

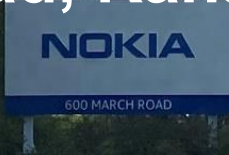


# Phase Two Environmental Site Assessment

600 March Road, Kanata (Ottawa), Ontario

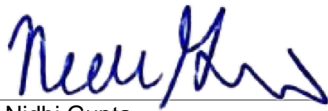
Nokia Canada Inc.

July 19, 2022

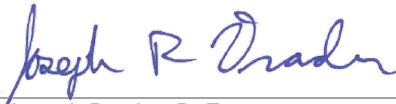






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<b>Project name</b>		Nokia Property/Colliers/300 March Road					
<b>Document title</b>		Phase Two Environmental Site Assessment   600 March Road, Kanata (Ottawa), Ontario					
<b>Project number</b>		12566614					
<b>File name</b>		12566614-RPT-3-Draft-Phase Two ESA					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	00	Nidhi Gupta	Kevin Emenau, P.Geo.	*On File	Joseph Drader, P.Eng.	*On File	July 05-2022
S4	01	Nidhi Gupta	Kevin Emenau, P.Geo.		Joseph Drader, P.Eng.		July 19-2022

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# 1. Executive summary

GHD was retained by Nokia Canada Inc. (Nokia) to conduct a Phase Two Environmental Site Assessment (ESA) of the commercial/industrial property located at 600 March Road in Kanata (Ottawa), Ontario; the property will be hereinafter referred to as the Site or Phase Two Property. GHD previously prepared a Phase One ESA dated April 20, 2022 at the Site. The Phase One ESA and Phase Two ESA were undertaken for due diligence purposes, as well as in support of future local municipal planning department requirements associated with the proposed redevelopment of the Site. The Phase One ESA and Phase Two ESA may also be used to support the preparation of a Record of Site Condition (RSC) in accordance with Ontario Regulation (O. Reg) 153/04, as applicable.

Based on the results of the Phase One ESA (GHD, 2022), the following areas of potential environmental concerns (APECs) were identified:

- APEC #1 – Adjacent Manufacturing Operations
- APEC #2 – Surrounding Dry Cleaning Operations
- APEC #3 – Surrounding Historic Landfill
- APEC #4 – Surrounding Manufacturing Operations
- APEC #5 – Site Diesel Generator/Tank Operations

The Phase Two ESA was recommended based on the APECs identified in the Phase One ESA, in order to assess the soil and groundwater quality at the Site. The Phase Two ESA field activities were completed in May 2022, and included the advancement of advancement of boreholes into the overburden and bedrock stratigraphy, installation of overburden and bedrock monitoring wells, soil field screening and groundwater monitoring, and the collection and laboratory analysis of soil and groundwater samples for testing of contaminants of potential concern (CPCs) based upon visual and olfactory observations. CPCs included metals and inorganic compounds, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs), and/or general chemistry parameters.

A summary of the analytical results of the soil and groundwater quality are presented below:

- **Soil Quality** | Based on a review of the soil analytical results, all analyzed parameters had concentrations below the Ministry of the Environment, Conservation and Parks (MECP) Table 7 Standards. No associated impacts were noted for APEC #5 (Site Diesel Generator/Tank Operations).
- **Groundwater Quality** | Based on a review of the groundwater analytical results, all analyzed parameters had concentrations below the MECP Table 7 Standards with the exception of a chloride exceedance at BH17-22 (northwest corner of the Site), assumed to be associated with snow plowing and road salt operations near the intersection of March Road and Terry Fox Drive. No associated impacts were noted for APEC #1 (Adjacent Manufacturing Operations), APEC #2 (Surrounding Dry Cleaning Operations), APEC #3 (Surrounding Historic Landfill), APEC #4 (Surrounding Manufacturing Operations), and APEC #5 (Site Diesel Generator/Tank Operations).
- There was no evidence of measurable NAPL during the drilling or groundwater sampling activities.

The Phase Two ESA results indicate that there are no potential impacts to soil and groundwater associated with the APECs.

Based on the May 2022 results, it is recommended that monitoring wells (including the wells deemed dry during the May 2022 investigation) in the northern half of the Property be resampled during future residential planning and when applying for a Record of Site Condition with the MECP. This recommendation is to ensure groundwater monitoring and quality data are up to date.

## 2. Introduction

GHD was retained by Nokia Canada Inc. (Nokia) to conduct a Phase Two Environmental Site Assessment (ESA) of the commercial/industrial property located at 600 March Road in Kanata (Ottawa), Ontario; the property will be hereinafter referred to as the Site or Phase Two Property. A Site Location Map and a Site Plan are provided on **Figure 1 and Figure 2**, respectively.

The Phase Two ESA was undertaken for due diligence purposes, as well as in support of future local municipal planning department requirements associated with the proposed redevelopment of the Site. The Phase Two ESA may also be used to support the preparation of a Record of Site Condition (RSC) in accordance with O. Reg. 153/04 – RSC, as applicable.

The objective of the Phase Two ESA was to undertake a preliminary investigation of the general soil and groundwater quality on Site and in the Areas of Potential Environmental Concern (APECs) that were identified to be associated with the Site based on the findings of the 2022 Phase One ESA completed by GHD.

### 2.1 Site Description

The Phase Two Property is located east of March Road, south Terry Fox Drive, and west of Legget Drive. The Phase Two Property is approximately 10.39 hectares (ha) (25.67 acres) in size and includes multiple interlinked building/tower structures (approximately 50,000 square metres [m<sup>2</sup>] of office and computer lab space), car parking (approximately 1,900 surface parking stalls), access roads and landscaped areas. The Phase Two Property is currently used for office and research/development activities. Prior to the current development, the Phase Two Property was vacant and/or used for agricultural purposes.

The Site is legally described as Part of Block 1 and Block 6 under Registered Plan 4M-642 and Part of Lots 8 and 9 under Concession 4, Geographic Township of March, City of Ottawa. The Site contains five parcels with the following property identification numbers (PINs) and descriptions:

- 04517-0813 (LT) | Block 1, Plan 4M-642, Save and Except 1, 2, and 16 on Plan 4R-12735, Kanata.
- 04517-0699 (LT) | Southeast Half of Lot 9, Concession 4, Designated as Part 4 on 4R-5753, Save and Except Parts 1, 2, and 3 on Plan 4R-11611, Kanata.
- 04517-0474 (LT) | PCL 6-1, Sec 4M-642, Block 6, PL 4M-642, Kanata.
- 04517-0467 (LT) (parking lot) | PCL 8-3, Sec March-4, PT LT 8, Con 4, Part 1, 4R10610, Kanata.
- 04517-0809 (LT) (parking lot) | Part of Lot 8 Concession 4, being Part 1 on Plan 4R-7809 except Parts 1 and 8 on Plan 4R10610 and Part 1 on Plan 4R12588, Kanata.

### 2.2 Property Ownership

The Site is currently owned by Nokia Canada Inc. Contact information for the client representative is listed below:

Mr. Aaron Clodd, Director, Development Management Strategy & Consulting Group  
Colliers  
181 Bay Street, Suite 1400  
Toronto, Ontario M5J 2V1

Phone | (905) 960-4506  
Email | aaron.clodd@colliers.com

## 2.3 Current and Proposed Future Uses

The Site is currently used for office and research/development activities. Prior to the current development, the Phase Two Property was vacant and/or used for agricultural purposes.

GHD's understanding that Nokia intends to amend the zoning of the Phase Two Property to add additional density and uses into an integrated live/work/play community. This includes the addition of two high rise buildings for labs and offices with at least one level of parking for each building in the southern portion of the Site, with the potential to add more underground basement levels subject to the bedrock depth, along with residential towers in the central and northern portions of the Site (up to ten buildings based on current concept plans).

## 2.4 Applicable Site Condition Standards

Generic site condition standards are provided in the Ontario MECP document entitled, "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*," dated April 15, 2011. The 2011 standards are referenced in O. Reg. 153/04 – Records of Site Condition, as amended by O. Reg. 511/09 (hereafter referred to as the 2011 MECP Standards).

The Standard provides site condition standards for certain chemicals, based on combinations of six different site-specific conditions, as follows:

- Property use type – agricultural, residential/parkland/institutional, or industrial/commercial/community. The Property had been used for commercial/industrial land uses. The Property is planned to be redeveloped for further residential /parkland and commercial/industrial land use. As such, the standards for both residential/parkland/institutional property use and industrial/commercial/community property use were applied to the Site.
- Restoration of groundwater quality - potable/non-potable. The Property, and all other properties located, in whole or in part, within 250 metres (m) of the boundaries of the property, are supplied by a municipal drinking water system. The Site is not in an area designated on the City of Ottawa official plan as an intake protection zone. The Site is not in an area designated on the City of Ottawa official plan as a well-head protection area (WHPA). As such, the standards for a non-potable groundwater condition are considered applicable to the Site.
- Restoration depth - full depth and stratified depth. For comparative purposes, the full depth standards were applied to the Site.
- Soil texture - coarse or medium to fine. Based on the results of the Phase Two ESA (presented herein), the predominant soil type on Site is considered to be coarse textured. As such, the standards for coarse textured soils were applied to the Site.
- Shallow soil property. The Site is considered to be a shallow soil property, due to less than 2 m of overburden above bedrock existing for a majority of the Site.
- Within 30 m of a water body. There are no water bodies or water courses located on the Site.

The generic 2011 MECP Standards are not applicable if the Site is considered to be an environmentally sensitive area based on the conditions presented in Section 41 of O. Reg. 153/04, as amended. Based on GHD's review, there are no Areas of Natural Scientific Interest (ANSI) or Provincially Significant Wetlands (PSW) identified by the Ministry of Natural Resources and Forestry (MNRF) within the 250 m Study Area. There are no areas designated by the municipality in its current official plan (Bylaw 2008-250-Zoning) as Environmentally Protected zoning ('EP') within the Study Area. As the Site does not contain an area of natural significance as defined by O. Reg. 153/04, and properties within 250 m of the Site limits do not contain areas of natural significance, the Site is not classified as an environmentally sensitive property (O. Reg. 153/04, s41).

Based upon the above-described assessments, the O. Reg. 153/04 Table 7: General Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (residential/parkland/institutional and industrial/commercial/community property use; coarse-grained soil texture) is considered the applicable Site comparison.



## 2.5 Limitations

This report has been prepared by GHD for Nokia Canada Inc. and may only be used and relied on by Nokia Canada Inc. for the purpose agreed between GHD and Client.

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

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

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

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

## 3. Background Information

### 3.1 Physical Setting

The Site is currently used for office and research/development activities. Prior to the current development, the Phase Two Property was vacant and/or used for agricultural purposes. The Site is approximately 10.39 ha (25.67 acres) in size and includes multiple interlinked building/tower structures (approximately 50,000 m<sup>2</sup> of office and computer lab space), car parking (approximately 1,900 surface parking stalls), access roads and landscaped areas.

Information regarding adjacent/surrounding properties within the Phase Two Study Area are noted below:

#### North

The Site is bound to the north by Terry Fox Drive, beyond which are the following properties:

- Wooded area (north) and strip mall property (northeast) at 700 March Road with offices (Scotia Bank, dental, optometry, and physio), stores (convenience market, barber, video games, and cleaners [no dry cleaning observed]) and restaurants (Burger King, Subway, Chinese Food, Barley Mow) to the north.
- Residential development to the north (off McKinley Drive) and to the northwest beyond intersection of March Road and Terry Fox Drive.
- Beyond the commercial property to the north is a vacant, wooded property, followed by a Shell gas station with car wash building at 720 March Road.
- Beyond wooded area to the northeast are office buildings at 360 and 362 Terry Fox Drive (Artaflex [integrated electronics services] and B.J. Kane Electric Ltd. [commercial and industrial electrical services], respectively).

#### West

The Site is bound to the west by March Road, beyond which are the following properties (north to south):

- Office buildings at 603 March Road and 375 Terry Fox Drive (Renasas [microcontrollers, analogue, and power devices] and TalentLab [IT Recruiters]).
- Vacant, wooded property.
- Commercial strip mall property at 591 March Road; includes following businesses: insurance, veterinary hospital, restaurants, pet grooming and supplies, spa.
- Power Muscle & Fitness (Gym) property at 555 March Road.

- Commercial property (insurance company and medicine wellness centre) at 525 March Road.
- Office building at 88 Hines Road (Telemus [electric warfare systems] and CCI Antennas [wireless equipment]).
- Office buildings at 80 and 84 Hines Road (multiple businesses at both buildings).
- Royal Canadian Legion at 70 Hines Road.
- Office buildings at 505 March Road and 50 Hines Road (multiple businesses at both buildings).

### **South**

The Site is bound to the south by the following properties:

- Office and possible manufacturing (Sanmina Corporation – Optical, RF/Microwave products) at 500 March Road (adjacent).
- Vacant, wooded property with evidence of a creek running through it at 490 March Road.
- Office building at 3001 Solandt Road (flex [electronics services]).
- Office building at 40 Hines Road (Trend Micro [cybersecurity]; across March Road to the southwest).
- Office building at 495 March Road (multiple businesses; across March Road to the southwest).

### **East**

The Site is bound to the east by Legget Drive, beyond which are the following properties (south to north):

- Office building at 425 Legget Drive (Innovapost, Avaya, Renaissance).
- Office building at 515 Legget Drive (multiple businesses).
- Brookstreet Hotel and Conference Center at 525 Legget Drive, beyond which is a golf course and stormwater ponds.
- Office building at 535 Legget Drive (multiple businesses).
- Office buildings at 555 Legget Drive (multiple businesses).
- Office building at 359 Terry Fox Drive (multiple businesses).

Based on the 2022 GHD Phase One ESA (refer to Section 3.2):

- There are no water bodies or water courses located on the Site. Surface water ponds are located to the east of the Site (associated with a golf course), and portions of Shirley's Brook are observed in the southern portion and east-northeast boundaries of the Phase Two Study Area. The closest significant surface water body is the Ottawa River located approximately 3.2 kilometres (km) northeast of the Site.
- Based on the definition of area of natural significance provided in O. Reg. 153/04, the Site is not considered to be an area of natural significance.
- The Site is currently serviced with municipal water, sanitary sewer, and storm sewer services. A stormwater retention pond is located to the east of the Site (off-Site at golf course) that does capture Site storm water via catch basins in parking lot and driveways, as well as from other surrounding properties.
- The Property, and all other properties located, in whole or in part, within 250 m of the boundaries of the property, are supplied by a municipal drinking water system. The Site is not in an area designated on the City of Ottawa official plan as an intake protection zone. The Site is not in an area designated on the City of Ottawa official plan as a WHPA.
- GHD is not aware of any historical utility and/or water services. GHD did not observe any evidence of active or abandoned water supply wells or septic systems on the Site.

## **3.2 Past Investigations**

The following investigations have been completed at the Site:

- "Phase One Environmental Site Assessment – 600 March Road, Ottawa, Ontario", prepared by GHD, dated April 20, 2022
- "Preliminary Geotechnical Investigation and Hydrogeological Assessment", prepared by GHD, dated April 7, 2022

Information from the 2022 Phase One ESA report is referenced in Section 4.2 (Phase One Conceptual Site Model), as well as included in other sections of this report, as applicable. The Phase One Conceptual Site Model with the location of applicable APECs and potentially contaminating activities (PCAs) is presented on **Figure 3**.

Applicable information from the 2022 GHD Preliminary Geotechnical Investigation and Hydrogeological Assessment report is referenced in Section 6.

## 4. Scope of the Investigation

The Phase Two ESA included assessments of the soil and groundwater quality on Site. The Phase Two ESA field activities included the advancement of boreholes and installation of monitoring wells, field screening, and the collection and laboratory analysis of soil and groundwater samples as described in detail below. The data generated within GHD's investigative activities has been presented herein.

### 4.1 Media Investigated

Based on the APECs identified at the Site, the investigation of the soil and groundwater quality on Site included the following:

Media Type	Date	Borehole/Well, Test Hole, & Test Pit	Sample Location	Analytical Parameters	APEC Info
Soil	April 2022	S-001, S-002, S-003, S-004	Shallow Overburden	BTEX, PHC F1-F4	Exterior diesel above ground storage tank (AST) and Generator (PCA #28; APEC #5) within fenced in area surrounding generator at the Site
Groundwater	May 2022	BH01-22	Overburden	Metals/Inorganics, PAHs, PHC F1-F4, VOCs	Southern Property Boundary adjacent to electronic manufacturing operations (PCA #19; APEC #1) at 500 March Road
		BH02-22, BH11-22, BH12-22	Bedrock		
		BH13-22, BH14-22, BH15-22, BH16-22, BH17-22	Bedrock	VOCs	Northwest Property Boundary – Operation of former dry cleaners (PCA #37; APEC #2) at 591 March Road; Historic March Landfill with associated adjacent groundwater contamination plume (PCA #58; APEC #3); and electronic manufacturing operations (PCA #19; APEC #4) at 603 March Road
		BH16-22, BH17-22		Metals/Inorganics, PAHs, PHC F1-F4, VOCs	
BH10-22	Bedrock	BTEX, PHC F1-F4	Exterior diesel above ground storage tank (AST) and Generator (PCA #28; APEC #5) within fenced in area surrounding generator at the Site		

Notes:

BTEX – Benzene, toluene, ethylbenzene, and xylene  
 PAHs – Polycyclic Aromatic Hydrocarbons  
 PHC F1-F4 – Petroleum Hydrocarbon Fractions F1 to F4  
 VOCs – Volatile Organic Compounds



The borehole, monitoring well, and sampling locations are shown on **Figure 4**.

There are no water bodies located on the Site; therefore, surface water and sediment were not sampled during the Phase Two ESA. Soil vapour sampling was not completed as part of the Phase Two ESA.

## 4.2 Phase One Conceptual Site Model

The Site is located at 600 March Road in Kanata (Ottawa), Ontario, east of March Road, south of Terry Fox Drive, and west of Legget Drive. The Site is legally described as Part of Block 1 and Block 6 under Registered Plan 4M-642 and Part of Lots 8 and 9 under Concession 4, Geographic Township of March, City of Ottawa.

The Site is approximately 10.39 ha (25.67 acres) in size and includes multiple interlinked building/tower structures (approximately 50,000 m<sup>2</sup> of office and computer lab space), car parking (approximately 1,900 surface parking stalls), access roads, and landscaped areas.

The Site is currently owned by Nokia Canada Inc., and is currently used for office and research/development activities. Prior to Nokia owning/operating the Site, the following companies conducted similar operations/activities: Newbridge Networks; Alcatel; and Alcatel-Lucent. Prior to the current development, the Site was vacant and/or used for agricultural purposes.

The general topography at the Site and surrounding area is noted to be relatively flat and/or sloping east/south towards creeks associated with Shirley's Brook. There are no water bodies or water courses located on the Site. Surface water ponds are located to the east of the Site (associated with a golf course), and portions of Shirley's Brook are observed in the southern portion and east-northeast boundaries of the Site. The Ottawa River is located approximately 3.2 km northeast from the Site limits.

Based on GHD's "Preliminary Geotechnical and Hydrogeological Investigation" report (dated April 7, 2022) a Site investigation was carried out between January 28 and February 6, 2022, to provide understanding of the soil/bedrock stratigraphy and groundwater conditions at the Site. A summary of the applicable subsurface conditions is noted below:

- Topsoil (organic material with rootlets), and asphalt surfaces with granular base/subbase were observed from the surface to approximately 0.9 metres below ground surface (mBGS). Silty clay to clay deposit was encountered below topsoil or subbase material.
- Auger refusal (presumed bedrock) was encountered at depths ranging from 0.4 to 3.6 mBGS in all boreholes.
- Groundwater was not encountered in the overburden stratigraphy.
- Groundwater static water elevations in the bedrock stratigraphy ranged from 75.84 to 77.24 metres above mean sea level (mAMSL) on February 9, 2022. The estimated groundwater flow direction is likely to the south and/or east towards Shirley's Brook (actual direction could not be confirmed based on well locations and dry well conditions). It should be noted that the position of the groundwater table is subject to seasonal fluctuations and is responsive to precipitation and snowmelt events.

Based on the information reviewed and the definition of area of natural significance provided in O. Reg. 153/04, the Site is not considered an area of natural significance.

The Site is serviced with electricity provided by Hydro Ottawa, including three Hydro Ottawa rooms/vaults for main transformers (owned by Nokia). The Site is serviced with natural gas provided by Enbridge for various building operations/appliances. The Site is currently serviced with municipal water, sanitary sewer, and storm sewer services. GHD did not observe any evidence of active or abandoned water supply wells or septic systems on the Site.

Based on the results of the Phase One ESA, including the Site inspection, information provided by Site representatives and regulatory agencies, documents reviewed, and the review of Site history, the following APECs were identified to be associated with the Site.

1. **Adjacent Manufacturing Operations** | Based on review of historical documentation and Site inspection, the electronic manufacturing operations of the Sanmina Corporation on the adjacent property to the south at

500 March Road is identified as a PCA (#19 – Electronic and Computer Equipment Manufacturing) in accordance with O. Reg. 153.04, and the southern property boundary is identified as **APEC #1**.

2. **Surrounding Dry Cleaning Operations** | The operation of various dry cleaners at 591 March Road to the west of the Site (across March Road) is identified as a PCA (#37 – Operation of Dry Cleaning Equipment) in accordance with O. Reg. 153/04, and the northwest portion of the property boundary is identified as **APEC #2**.
3. **Surrounding Historic Landfill** | The historic March Landfill (operated from 1963 to 1974) and associated groundwater contamination (chlorinated solvents that extend approximately 1.5 km from the former landfill) located northwest and west of the Site are identified as a PCA (#58 – Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosolids as soil conditioners) in accordance with O. Reg. 153.04, and the northwest portion of the property boundary is identified as **APEC #3**.
4. **Surrounding Manufacturing Operations** | Newbridge Networks Corp at 603 March Road located west of the Site (across March Road) was identified in the CA database with approved/cancelled Industrial Air certificates around 1990-1991 for Exhaust Systems No. 1-5. In addition, Tundra Semiconductor Corp was identified with operations noted as "semiconductor and other electronic component manufacturing". The operations at 603 March Road are identified as a PCA (#19 – Electronic and Computer Equipment Manufacturing) in accordance with O. Reg. 153.04, and the northwest property boundary is identified as **APEC #4**.
5. **Site Diesel Generator/Tank Operations** | Although no reported spills were identified by the Site Representative, due to snow covered exterior containment area and evidence of drips/staining from generator within the outbuilding (on top of flat tank), the operation of the exterior 4,540 litre AST is identified as a PCA (#28 – Gasoline and Associated Products Storage in Fixed Tanks) in accordance with O. Reg. 153/04, and the fenced in area containing the generator and AST is identified as **APEC #5**.

The Phase One ESA Conceptual Site Model, including the location of PCAs and APECs, is depicted on **Figure 3**. Based on the results, the contaminants of concern were identified as metals/inorganics, PAHs, PHCs, VOCs, and/or BTEX.

## 4.3 Deviations from the Sampling and Analysis Plan

Deviations from the sampling and analysis plan occurred during the field program due to several dry wells and lack of groundwater exhibited in a few of the monitoring wells installed in May 2022. A summary of the deviations are described below:

- Monitoring wells BH13-22, BH15-22, and BH16-22 could not be sampled due to wells being dry and/or extremely limited recharge of groundwater observed at these wells.
- Metals/Inorganics and PAH parameters were removed from analysis from sample collected at BH11-22 due to limited recharge of groundwater observed at this well.

## 4.4 Impediments

There were no impediments encountered during the investigation.

# 5. Investigation Methods

## 5.1 General

The following investigative activities were undertaken between April 28 and May 26, 2022, and are described in detail in the following subsections:

- Advancement of boreholes.

- Installation of groundwater monitoring wells.
- Collection of field screening measurements and observations.
- Collection and laboratory analysis of soil and groundwater samples.
- Groundwater field measurements of water quality parameters.
- Collection of groundwater level measurements.
- Residue management.
- Quality assurance and quality control measures.
- Elevation surveying.

The field investigation activities were completed in accordance with MECP protocols, GHD's standard operating procedures (SOPs), and standard industry practice.

Prior to completing the investigation activities undertaken by GHD, a Site-specific Health and Safety Plan (HASP) was prepared to provide specific guidelines and established procedures for the protection of personnel performing the Site investigation activities. In addition, the appropriate public utility notifications were completed and a private utility locator was retained to assist with on-Site utility clearances. Private utility locate services were completed prior to undertaking subsurface investigative activities.

## 5.2 Drilling and Boring Activities

As part of the Preliminary Geotechnical Investigation and Hydrogeological Assessment (GHD, April 2022) conducted at the Site between January 28 and February 2, 2022, ten boreholes BH01-22 to BH10-22 were drilled to refusal or within bedrock. Borehole BH01-22 (overburden) and boreholes BH-02-22, BH03-22, BH06-22, and BH10-22 (bedrock) were originally installed with monitor wells for groundwater level measurements and hydrogeological assessment purposes, but were later used to investigate groundwater quality conditions associated with APEC #1 and APEC #5.

On April 28, 2022, hand shoveling was used to collect soil samples (S-001 to S-004) at the existing exterior diesel AST and Generator (APEC #5) located on the Site. Soil was sampled at a depth of approximately 0.3 mBGS.

On May 11 and 12, 2022, seven boreholes (BH11-22 to BH17-22) were advanced on Site using a track-mounted drill rig, and each of the boreholes was instrumented as a monitoring well to investigate groundwater quality conditions associated with APEC #1 to #4. GHD retained Aardvark Drilling Inc. (Aardvark), a MECP licensed driller of Carleton Place, Ontario, to complete the drilling activities.

The location of the boreholes and monitoring wells are shown on **Figure 4**. Borehole and monitoring well installation details, including geological descriptions of the soil encountered, are provided in borehole logs presented in **Appendix A**. Borehole logs were not created for the four shallow soil samples (S-001 to S-004).

Prior to use and between each borehole, the drilling and sampling equipment was thoroughly cleaned using Alconox® soap and potable water rinse.

## 5.3 Soil Sampling

Soil samples S-001 to S-004 were collected near and around the existing exterior diesel AST and Generator (APEC #5) on Site. Soil sample collection was facilitated through the use of a stainless steel shovel. Soil samples were collected at a depth of approximately 0.3 mBGS, directly from the shallow boring. Soil samples were not collected from the drilled borehole locations.

Soil samples obtained from each borehole were qualitatively and quantitatively screened for the presence of impact. Qualitative screening was based on visual and olfactory observations, while quantitative screening was based on the presence of undifferentiated VOCs in the headspace of soil samples collected as measured in the field (refer to Section 5.4 for further screening details).



Select soil samples were submitted for laboratory analysis of VOCs and PHCs. Soil samples were collected in laboratory supplied glass containers which were placed in a cooler containing ice for sample preservation. Undisturbed samples for VOC analysis were placed directly in sample containers provided by the laboratory. All soil samples were collected using the required sampling techniques in accordance with O. Reg. 153/04, including the methanol field preservation method for those soil samples being submitted for analysis of PHC F1 and VOCs. Samples were submitted to the laboratory for analysis under chain-of-custody protocol. A sample key for the submitted soil samples is presented in **Table 1**.

## 5.4 Field Screening Measurements

As discussed in Section 5.3, soil samples of the overburden were taken and placed into a sealable plastic bag for headspace screening. The headspace soil samples were screened for undifferentiated VOC vapour readings using a photo-ionization detector (PID). Prior to screening, the field screening equipment was inspected and calibrated according to the manufacturer's recommendations by GHD personnel.

The results of the field screening for all collected soil samples are presented in **Table 3**. PID screening results ranged from 0.0 to 0.2 parts per million (ppm) for VOC headspace readings.

## 5.5 Groundwater: Monitoring Well Installation

Between January and May 2022, groundwater monitoring wells were installed in twelve of the seventeen on-Site boreholes advanced as part of the geotechnical, hydrogeological, and environmental investigations. The locations of the monitoring wells are presented on **Figure 4**.

The monitoring well at BH01-22 was installed in the overburden stratigraphy, originally for geotechnical and hydrogeological assessment purposes in February 2022 (Note: BH01-22 was observed to be dry in February 2022), but later used for collection of groundwater samples for laboratory analysis in May 2022. The remaining 11 monitoring wells (BH02-22, BH03-22, BH6-22, and BH10-22 to BH17-22) were all installed/sealed in the deeper bedrock to facilitate the hydrogeological assessment in February 2022 (only BH02-22, BH03-22, BH06-22 and BH10-22; Note: BH03-22 was observed to be dry in February 2022) and collection of groundwater samples for laboratory analysis in May 2022.

The monitoring wells were constructed with a 2-inch (") (50 millimetre [mm]) diameter, Schedule 40 polyvinyl chloride (PVC) riser and No. 10 slot size well screens (either 1.5 or 3 m screen length). A silica sand pack was placed in the annular space between the PVC screen/riser pipe and the borehole to a height of at least 0.3 m above the top of the screen. A bentonite seal was placed directly above the sand pack and extended to within 0.3 m of the ground surface. To complete the installation, an expandable J-plug or a 2" PVC cap was placed on the riser pipe to protect against debris falling and/or surface runoff infiltrating into the well and a protective aboveground steel casing (flush-mount construction) with a concrete collar was placed around each well to cover the top of the riser pipe. The groundwater monitoring well construction and installation details are shown on the stratigraphic and instrumentation logs provided in **Appendix A**. Monitoring wells BH01-22 to BH03-22, BH06-22, and BH10-22 were developed on February 3, 2022, and monitoring wells BH11-22 to BH17-22 were developed on May 16<sup>th</sup> to May 18<sup>th</sup>, 2022, in order to remove all residual drilling fluids and/or remove as much silt from the wells as possible. A minimum of three to five well volumes were attempted for each well, although development of BH11-22 to BH17-22 took over 3-days to complete due to the slow recharge and lack of groundwater in several of the monitoring wells. The monitoring wells were allowed to stabilize for at least 1-week prior to the completion of groundwater sampling activities.

## 5.6 Groundwater Field Measurements of Water Quality Parameters

In order to ensure that samples representative of on-Site groundwater conditions was obtained, each monitoring well was purged prior to groundwater sample collection using dedicated Waterra™ valves and tubing. The following protocol was generally followed at each monitoring well location during well purging activities:

- Groundwater level measurements were collected prior and subsequent to well development activities using a calibrated oil/water interface probe. The depth to water was measured relative to a specific reference point in the monitoring well. Reference and groundwater levels and elevations are presented in **Table 2**.
- Where Waterra™ sampling techniques were used, a minimum of three well volumes of water were purged from the monitoring well. In the event that slow groundwater recharge conditions were encountered, the well was purged until dry and then allowed to recover prior to sample collection. Field measurements of temperature, pH, turbidity, and electrical conductivity were taken using a water quality meter after each purged well volume was removed until consistent field measurements were recorded indicating that water in the well was representative of the actual groundwater conditions.
- Groundwater in the monitoring well was allowed to recover and settle prior to sample collection to reduce sediment agitation and mobilization in volatile and semi-volatile samples.

## 5.7 Groundwater Sampling

Groundwater samples were collected from a total of seven monitoring wells (BH01-22, BH02-22, BH10-22, BH11-22, BH12-22, BH14-22, and BH17-22) on May 17, May 25, and May 26. Refer to Section 5.6 for details on the sampling method.

Groundwater samples were collected and placed directly into laboratory-supplied sample containers specific to the analytical parameters. Groundwater samples were submitted for laboratory analysis of one or more of the following parameters: O. Reg. 153/04 metals/inorganics, PHC F<sub>1</sub> to F<sub>4</sub>, VOCs, BTEX, and/or PAHs. Groundwater samples collected for metals analysis were field filtered using a 0.45 micron filter prior to sample collection. Samples were stored in coolers chilled with ice for sample preservation and submitted to the laboratory for analysis under chain-of-custody protocol. The chain-of-custody forms document the condition and handling of the samples throughout the collection, transportation, and final analysis of the samples. A sample key for the submitted groundwater samples is presented in **Table 1**.

## 5.8 Sediment Sampling

Sediment sampling was not completed during the Phase Two ESA as sediment was not identified as a potentially contaminated media.

## 5.9 Analytical Testing

Soil and groundwater samples collected during GHD's investigation were submitted to ALS Global (ALS) in Ottawa, Ontario. ALS is a member of the Standards Council of Canada (SCC) and Canadian Association of Environmental Analytical Laboratories (CAEAL). Copies of the analytical laboratory reports are provided in **Appendix B**.

## 5.10 Residue Management Procedures

Soil cuttings, equipment decontamination wash water and purge/well development water for GHD's investigative activities were containerized in 205-litre drums for off-Site disposal. Soil cuttings and wash water/purge/development waters are being temporarily stored on Site.

## 5.11 Elevation Surveying

The elevations of the boreholes were surveyed using a survey grade GPS equipment referenced to the NAD 83 UTM Zone 18 and geodetic datum, for boreholes BH01-22 to BH10-22 in February 2022. Boreholes BH11-22 to BH17-22 were surveyed in May 2022 using GPS and laser level equipment, and tying in elevations initially collected in February 2022.

## 5.12 Quality Assurance and Quality Control Measures

A Quality Assurance/Quality Control (QA/QC) program was implemented during the program to ensure quality data was generated. This program involved both field and laboratory QA/QC measures.

Samples were collected in laboratory supplied sampling containers with the appropriate preservative in accordance with O. Reg. 153/04, including the methanol field preservation method for those soil samples being submitted for analysis of PHC F<sub>1</sub> and VOCs.

Samples were submitted under chain-of-custody protocol to an analytical laboratory for chemical analysis. For quality assurance, the following was undertaken:

- Between collection of each soil and groundwater sample, GHD field personnel donned a new pair of disposable nitrile gloves.
- Prior to use and between each borehole location, the drilling and non-dedicated sampling equipment was thoroughly cleaned using Alconox® soap and potable water rinse.
- Stainless steel sampling equipment was used and cleaned using Alconox® soap and potable water rinse between each sample collection event.
- Wherever possible, dedicated sampling equipment (e.g., LDPE tubing, fittings, Ziploc® bags, etc.) was used to reduce the potential for cross contamination.
- The groundwater monitoring wells were equipped with a dedicated Waterra™ foot valve and polyethylene tubing for well development activities.

To validate the field analysis, QA/QC trip blanks were also submitted (generally one per laboratory submission) for soil and groundwater where analysis of volatile parameters were required QC samples were also analysed by the laboratory as required by their analytical methods. A Data Quality Assessment and Verification memorandum is presented in **Appendix C**.

# 6. Review and Evaluation

The results of the Site investigation activities are described in the following sections.

## 6.1 Geology

In general, soils encountered at the borehole locations consisted of a surface layer of topsoil or asphalt pavement, overlying a fill material and discontinuous layer of native silty clay to clay, overlying sandstone bedrock with dolomite interbeds. Shallow bedrock ranging in depths of 0.4 to 1.37 mBGS was encountered in the northern and central portions of the Site and gradually increased to depths of up to 1.4 to 4.7 mBGS in the southern portion of the site boundary.

General descriptions of the subsurface conditions are summarized in the following sections, with a graphical representation of each borehole presented on borehole logs attached in **Appendix A**.

### 6.1.1 Surface Material

Topsoil was encountered in at boreholes BH07-22, BH09-22, and BH11-22 to BH17-22 to depths ranging from 0.6 to 0.9 mBGS and generally constituted of organic material with rootlets.

An asphalt layer with thickness of 100 mm was encountered at the ground surface at the location of boreholes BH02-22, BH03-22, BH04-22, BH05-22, BH06-22, BH08-22, and BH10-22. Granular base/subbase (fill material) encountered below the asphalt consisted of sandy silt, sandy gravel to gravelly sand, and extends to depths ranging from 0.4 to 0.9 mBGS. Fill material was also encountered at the surface in borehole BH01-22 and extends to depth of 0.6 mBGS.

### 6.1.2 Silty Clay to Clay

Silty clay to clay deposits were encountered below the fill or topsoil in boreholes BH01-22 to BH05-22, BH07-22, BH11-22, and BH12-22 at depth of 0.6 to 4.7 mBGS.

### 6.1.3 Sandy Silt to Clayey Silt

Sandy silt to clayey silt deposits were encountered below topsoil in boreholes BH13-22, BH14-22, and BH15-22 directly above bedrock. The silt deposit extended to depths ranging from 0.6 to 1.4 mBGS.

### 6.1.4 Bedrock

Bedrock (including presumed due to auger refusal) was encountered at depths ranging from 0.4 to 4.7 mBGS. Upon refusal on the presumed possible bedrock, boreholes BH02-22, BH03-22, BH06-22, BH07-22, and BH10-22 were extended an additional 1.6 m to 6.4 m below the refusal using HQ diamond coring methods to confirm the presence, type, and quality of bedrock. Bedrock at boreholes BH11-22 to BH17-22 were drilled an additional 3.2 to 5.2 m below refusal using air hammer methods.

Based on retrieved rock core and rock exposures, bedrock at the site consists of slightly weathered to fresh, thinly to medium bedded, light grey with yellow bands dolomitic sandstone of the Beekmantown Group per the published Paleozoic geology map.

Rock Quality Designation (RQD) values measured on the bedrock core samples generally range from 63 to 100 percent, indicating fair to excellent quality rock, except for bedrock at borehole BH10-22 where RQD value of 36 percent indicating poor quality rock is noted at depths of 3.5 to 4.0 mBGS. This low RQD value measured was due to mechanical break that occurred during the last core run of borehole BH10-22 drilling operations, resulting in loss of some of the drilled core sample.

## 6.2 Groundwater Elevations and Flow Direction

Groundwater level measurements were collected from the on-Site monitoring wells using a calibrated electronic oil/water interface probe (i.e., Solinst) or a Solinst water level tape. The depth to water was measured relative to a specific reference point in the monitoring well (i.e., the top of the monitoring well riser pipe). Based on the survey information of the top of riser pipe elevation, the groundwater elevation was calculated by subtracting the water level measurement from the reference point elevation. Groundwater level measurements and elevations collected on May 26, 2022 are provided in **Table 2**, with groundwater elevations, contours, and flow direction depicted on **Figure 5**.

Based on the water level measurements recorded on May 26, 2022, the direction of groundwater flow across the Site in the bedrock aquifer appears to be highly variable and heading in multiple directions. Due to lack of groundwater in portions of the overburden stratigraphy and multiple dry bedrock wells, groundwater flow may be affected by differential pathways in the bedrock aquifer. It should be noted that the groundwater table is subject to seasonal fluctuations and in response to precipitation and snowmelt events. Also, it would be expected that water may be

perched within fill materials or the poor bedrock. Future monitoring would determine if the flow patterns were accurate throughout the year.

There was no evidence of measurable NAPL during the drilling or groundwater sampling activities.

### 6.3 Groundwater Hydraulic Gradients

The hydraulic gradient would be calculated by dividing the difference in hydraulic head by the lateral distance between monitoring locations. As noted in Section 6.2, the May 26, 2022 direction of bedrock groundwater flow across the Site appeared to be highly variable and heading in multiple directions, as well as observations of limited groundwater in portions of the overburden stratigraphy and multiple dry bedrock wells. Hydraulic gradients would also be highly variable at this time, and affected by differential pathways in the bedrock aquifer and seasonal fluctuations. Future monitoring would determine if an accurate hydraulic gradient could be calculated.

Based on the hydrogeological assessment conducted in February 2022 (GHD, April 2022) and the results from single well response tests, the horizontal hydraulic conductivity ( $K_h$ ) of the Beekmantown Group Formation at the Site ranges from  $2.073 \times 10^{-6}$  (BH10-22) to  $3.849 \times 10^{-5}$  centimetre per second (cm/sec) ( $2.073 \times 10^{-4}$  to  $3.849 \times 10^{-3}$  [metres per day] m/day) (geometric mean  $8.93 \times 10^{-6}$  cm/sec [ $8.93 \times 10^{-4}$  m/day]).

### 6.4 Soil: Field Screening

During the investigation, field screening of collected soil samples was undertaken for organic vapours using a MiniRAE photo-ionization detector (PID). Any visual or olfactory evidence of potential impacts was also documented. The results of the soil field screening and corresponding sample depth intervals are provided on **Table 3**.

During the drilling and groundwater sampling activities, there was no field evidence of impact identified nor evidence of light or dense non-aqueous phase liquids on the Site.

### 6.5 Soil Quality

Soil samples were selected for laboratory analysis around the exterior AST and diesel generator building (APEC #5) located on the Site. Surface soil samples were taken in four locations, S-001, S-002, S-003, and S-004. Five samples total were taken, comprised of four samples and one duplicate sample. All samples were taken from a depth of approximately 0.3 mBGS.

No parameters were found above MECP Table 7 Standards. During the drilling activities, there was no field evidence of impact identified nor evidence of light or dense non-aqueous phase liquids on the Site.

Laboratory analytical reports are provided in **Appendix B**. All soil analytical results are presented on **Table 3**. A summary of the maximum detected soil concentrations is presented in **Table 4**.

### 6.6 Groundwater Quality

Groundwater samples were collected for laboratory analysis from BH01-22, BH02-22, BH10-22, BH11-22, BH12-22, BH14-22, and BH17-22. Laboratory analytical reports are provided in **Appendix B**. All groundwater analytical results are presented on **Table 5**. A summary of the maximum detected groundwater concentrations is presented in **Table 6**. No parameters were found above MECP Table 7 Standards, with the exception of chloride concentrations in bedrock monitoring well BH17-22. This exceedance is assumed to be associated with snow plowing and road salt operations near the March Road and Terry Fox intersection.

During the groundwater sampling activities, there was no field evidence of impact identified nor evidence of light or dense non-aqueous phase liquids on the Site.

## 6.7 Sediment Quality

Sediment associated with water bodies was not identified as Potentially Contaminated Media on Site; therefore, sediment was not sampled during the Phase Two ESA.

## 6.8 Phase Two Conceptual Site Model

### Introduction

The Site is located east of March Road, south of Terry Fox Drive, and west of Legget Drive. The Site is approximately 10.39 ha (25.67 acres) in size and includes multiple interlinked building/tower structures (approximately 50,000 m<sup>2</sup> of office and computer lab space), car parking (approximately 1,900 surface parking stalls), access roads, and landscaped areas.

The Site is legally described as Part of Block 1 and Block 6 under Registered Plan 4M-642 and Part of Lots 8 and 9 under Concession 4, Geographic Township of March, City of Ottawa.

The Site contains five parcels with the following property identification numbers (PINs) and descriptions:

- 04517-0813 (LT) | Block 1, Plan 4M-642, Save and Except 1, 2, and 16 on Plan 4R-12735, Kanata.
- 04517-0699 (LT) | Southeast Half of Lot 9, Concession 4, Designated as Part 4 on 4R-5753, Save and Except Parts 1, 2, and 3 on Plan 4R-11611, Kanata.
- 04517-0474 (LT) | PCL 6-1, Sec 4M-642, Block 6, PL 4M-642, Kanata.
- 04517-0467 (LT) (parking lot) | PCL 8-3, Sec March-4, PT LT 8, Con 4, Part 1, 4R10610, Kanata.
- 04517-0809 (LT) (parking lot) | Part of Lot 8 Concession 4, being Part 1 on Plan 4R-7809 except Parts 1 and 8 on Plan 4R10610 and Part 1 on Plan 4R12588, Kanata.

The Site is currently used for office and research/development activities. Prior to the current development, the Site was vacant and/or used for agricultural purposes.

It is GHD's understanding that Nokia intends to amend the zoning of the Site to add additional density and uses into an integrated live/work/play community. This includes the addition of two high rise buildings for labs and offices with at least one level of parking for each building in the southern portion of the Site, with the potential to add more underground basement levels subject to the bedrock depth, along with residential towers in the central and northern portions of the Site (up to ten buildings based on current concept plans).

The Phase Two ESA was undertaken for due diligence purposes, as well as in support of future local municipal planning department requirements associated with the proposed redevelopment of the Site. The Phase One ESA may also be used to support the preparation of a Record of Site Condition (RSC) in accordance with O. Reg. 153/04 - RSC, as applicable.

The objective of the Phase Two ESA was to undertake a preliminary investigation of the general soil and groundwater quality on Site and in the APECs that were identified to be associated with the Site based on the findings of the 2022 Phase One ESA completed by GHD.

Based on the results of the Phase One ESA (GHD, 2022), the following APECs were identified:

- APEC #1 – Adjacent Manufacturing Operations
- APEC #2 – Surrounding Dry Cleaning Operations
- APEC #3 – Surrounding Historic Landfill
- APEC #4 – Surrounding Manufacturing Operations
- APEC #5 – Site Diesel Generator/Tank Operations

The Phase Two ESA activities included the advancement of boreholes, installation of monitoring wells, field screening, and the collection and laboratory analysis of soil and groundwater samples.

## Potential Contaminant Distribution and Transport Pathways

GHD did not observe any evidence of active or abandoned water supply wells or septic systems on the Site. A stormwater retention pond is located to the east of the Site (off-Site at golf course) that does capture Site storm water via catchbasins in parking lot and driveways, as well as from other surrounding properties. The Site is serviced with electricity provided by Hydro Ottawa, including three Hydro Ottawa rooms/vaults for main transformers (owned by Nokia). The buildings are heated by electric forced air, radiant, and baseboard heaters. The Site is serviced with natural gas provided by Enbridge for humidification units, kitchen appliances, and water heaters.

Based on the historical information reviewed, subsurface structures and utilities that may affect contaminant distribution and transport on Site included the following (which date back to the early development of the Site): utility backfill trenches, and abandoned utility conduits.

## Physical Setting

The general topography in the Phase Two Study area is noted to be relatively flat and/or sloping east/south towards creeks associated with Shirley's Brook. The Ottawa River is located approximately 3.2 km northeast from the Site limits.

**Geology** | In general, soils encountered at the borehole locations consisted of a surface layer of topsoil or asphalt pavement, overlying a fill material and discontinuous layer of native silty clay to clay, overlying sandstone bedrock with dolomite interbeds.

**Hydrogeology** | Based on the water level measurements recorded on May 26, 2022, the direction of groundwater flow across the Site in the bedrock aquifer appears to be highly variable and heading in multiple directions. Due to lack of groundwater in portions of the overburden stratigraphy and multiple dry bedrock wells, groundwater flow may be affected by differential pathways in the bedrock aquifer. It should be noted that the groundwater table is subject to seasonal fluctuations and in response to precipitation and snowmelt events. Also, it would be expected that water may be perched within fill materials or the poor bedrock. Future monitoring would determine if the flow patterns were accurate throughout the year.

## Applicable Site Condition Standards

The soil and groundwater analytical results were assessed to the MECP Table 7 Standards for Residential/Parkland/Institutional and Industrial/Commercial/Community property uses for a non-potable groundwater for coarse textured soils.

## Nature and Extent of Impact

The soil and groundwater quality investigations included the advancement of boreholes and the instrumentation of the boreholes as groundwater monitoring wells. The investigative locations are shown on **Figure 4**. A summary of the analytical results is presented below.

**Soil Quality** | Based on a review of the soil analytical results, all analyzed parameters had concentrations below the MECP Table 7 Standards. No associated impacts were noted for APEC #5 (Site Diesel Generator/Tank Operations).

**Groundwater Quality** | Based on a review of the groundwater analytical results, all analyzed parameters had concentrations below the MECP Table 7 Standards with the exception of a chloride exceedance at BH17-22 (northwest corner of the Site), assumed to be associated with snow plowing and road salt operations near the intersection of March Road and Terry Fox Drive. No associated impacts were noted for APEC #1 (Adjacent Manufacturing Operations), APEC #2 (Surrounding Dry Cleaning Operations), APEC #3 (Surrounding Historic Landfill), APEC #4 (Surrounding Manufacturing Operations), and APEC #5 (Site Diesel Generator/Tank Operations).

There was no evidence of measurable NAPL during the drilling or groundwater sampling activities.

As described in the Phase One ESA, five APECs were identified for the Site. The Phase Two ESA results indicate that there are no potential impacts to soil and groundwater associated with the APECs.



## Potential Migration Pathways

No preferential migration pathways were identified associated with the results observed.

## Climatic and Meteorological Conditions

The effect of climatic or meteorological conditions (such as the fluctuation of the groundwater table) on the distribution and migration of the contaminants on Site is not considered to be significant.

## Vapour Intrusion

There are no vapour intrusion concerns associated with the Site.

# 7. Conclusions

The objective of the Phase Two ESA activities were to undertake investigations of the general soil and groundwater quality on Site and in the APECs that were identified to be associated with the Site. The Phase Two ESAs included the advancement of boreholes, installation of monitoring wells, field screening, and the collection and laboratory analysis of soil and groundwater samples. Based on the findings of the Phase Two ESA, the following conclusions are provided:

- All analyzed soil parameters had concentrations below the MECP Table 7 Standards. No associated impacts were noted for APEC #5 (Site Diesel Generator/Tank Operations).
- All analyzed groundwater parameters had concentrations below the MECP Table 7 Standards with the exception of a chloride exceedance at BH17-22 (northwest corner of the Site), assumed to be associated with snow plowing and road salt operations near the intersection of March Road and Terry Fox Drive. No associated impacts were noted for APEC #1 (Adjacent Manufacturing Operations), APEC #2 (Surrounding Dry Cleaning Operations), APEC #3 (Surrounding Historic Landfill), APEC #4 (Surrounding Manufacturing Operations), and APEC #5 (Site Diesel Generator/Tank Operations).
- There was no evidence of measurable NAPL during the drilling or groundwater sampling activities.

The Phase Two ESA results indicate that there are no potential impacts to soil and groundwater associated with the APECs.

Based on the May 2022 results, it is recommended that monitoring wells (including the wells deemed dry during the May 2022 investigation) in the northern half of the Property be resampled during future residential planning and when applying for a Record of Site Condition with the MECP. This recommendation is to ensure groundwater monitoring and quality data are up to date.

# Tables

**Sample Key**  
**Phase Two Environmental Site Assessment**  
**600 March Road, Ottawa, Ontario**

Sample Identification	Monitoring Location	Sampling Date	Sample Parameters
<b><u>Soil Samples</u></b>			
S-12566614-042822-DA-001	SS-001	April 28, 2022	BTEX, PHCs
S-12566614-042822-DA-002	SS-002	April 28, 2022	BTEX, PHCs
S-12566614-042822-DA-003	SS-003	April 28, 2022	BTEX, PHCs
S-12566614-042822-DA-004	SS-003 (duplicate)	April 28, 2022	BTEX, PHCs
S-12566614-042822-DA-005	SS-004	April 28, 2022	BTEX, PHCs
<b><u>Groundwater Samples</u></b>			
GW-12566614-051722-NG-001	BH01-22	May 17, 2022	Metals/Inorganics, PAHs, PHCs, VOCs
GW-12566614-051722-NG-002	BH02-22	May 17, 2022	Metals/Inorganics, PAHs, PHCs, VOCs
GW-12566614-051722-NG-003	BH10-22	May 17, 2022	PHCs/BTEX
GW-12566614-051722-NG-004	BH02-22 (duplicate)	May 17, 2022	Metals/Inorganics, PAHs, PHCs, VOCs
GW-12566614-052522-NG-005	BH12-22	May 25, 2022	Metals/Inorganics, PAHs, PHCs, VOCs
GW-12566614-052622-NG-006	BH17-22	May 26, 2022	Metals/Inorganics, PAHs, PHCs, VOCs
GW-12566614-052622-NG-007	BH14-22	May 26, 2022	VOCs
GW-12566614-052622-NG-008	BH11-22	May 26, 2022	Metals/Inorganics, PHCs, VOCs

**Notes:**

BTEX – Benzene, toluene, ethylbenzene, and xylene

PAHs – Polycyclic Aromatic Hydrocarbons

PHC – Petroleum Hydrocarbon Fractions F1 to F4

VOCs – Volatile Organic Compounds

**Groundwater Elevations  
Phase Two Environmental Site Assessment  
600 March Road, Ottawa, Ontario**

<b>Well Identification</b>	<b>Grade Elevation (mAMSL)</b>	<b>Well Riser Elevation (mAMSL)</b>	<b>Well Bottom Depth (mBGS)</b>	<b>Well Bottom Elevation (mAMSL)</b>	<b>Static Water Level May 26, 2022 (mBTOR)</b>	<b>Static Water Elevation May 26, 2022 (mAMSL)</b>
BH01-22 (Overburden)	80.18	80.06	3.42	76.75	2.45	77.61
BH02-22	79.72	79.65	8.38	71.33	3.14	76.51
BH03-22	80.71	80.61	2.82	77.88	0.92	79.68
BH06-22	79.61	79.51	3.39	76.22	2.74	76.78
BH10-22	80.43	80.39	3.85	76.58	2.53	77.86
BH11-22	80.21	80.12	8.17	72.04	5.93	74.19
BH12-22	79.60	79.49	7.70	71.90	2.05	77.44
BH13-22	81.95	81.83	6.01	75.94	NA (dry)	NA (dry)
BH14-22	82.19	82.12	6.00	76.20	3.57	78.55
BH15-22	81.94	81.88	6.05	75.89	NA (dry)	NA (dry)
BH16-22	81.49	81.44	6.35	75.14	NA (dry)	NA (dry)
BH17-22	81.48	81.41	5.71	75.77	5.36	76.05

## Notes:

mAMSL - metres above mean sea level

mBGS - metres below ground surface

mBTOR - metres below top of riser

NA - not applicable

**Table 3**  
**Summary of Soil Analysis**  
**Phase Two Environmental Site Assessment**  
**600 March Road, Ottawa, Ontario**

Sample Location:				SS-001	SS-002	SS-003	SS-003	SS-004
Sample ID:				S-12566614-0428-DA-001	S-12566614-0428-DA-002	S-12566614-0428-DA-003	S-12566614-0428-DA-004	S-12566614-0428-DA-005
Sample Date:				4/28/2022	4/28/2022	4/28/2022	4/28/2022	4/28/2022
Sample Depth:				0.30 mbgs	0.30 mbgs	0.30 mbgs	0.30 mbgs	0.30 mbgs
Sample Type:				Original	Original	Original	Duplicate of SS-003	Original
PID Readings (ppm):				0.0	0.1	0.2	0.2	0.1
Parameters	Units	MECP	MECP					
		Table 7	Table 7					
		Residential	Industrial/ Commercial					
<b>Volatile Organic Compounds</b>								
Benzene	ug/g	0.21	0.32	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068
Ethylbenzene	ug/g	2	9.5	<0.018	<0.018	<0.018	<0.018	<0.018
Toluene	ug/g	2.3	68	<0.080	<0.080	<0.080	<0.080	<0.080
Xylenes (Total)	ug/g	3.1	26	<0.050	<0.19	<0.050	<0.050	<0.050
<b>Petroleum Hydrocarbons Fractions</b>								
PHC F1 (C6-C10)	ug/g	55	55	<5.0	<5.0	<5.0	<5.0	<5.0
PHC F2 (C10-C16)	ug/g	98	230	<10.0	<10.0	<10.0	<10.0	<10.0
PHC F3 (C16-C34)	ug/g	300	1700	<50.0	<50.0	<50.0	<50.0	<50.0
PHC F4 (C34-C50)	ug/g	2800	3300	<50.0	<50.0	<50.0	<50.0	<50.0

Notes:  
m bgs - metres below ground surface  
PID - Photoionization Detector (parts per million (PPM))  
µg/g - microgram per gram  
<0.0068 - Not detected at the associated detection limit  
**Bold/Border** - Detected concentration exceeds the associated MECP Table 7 Standard  
<sup>(1)</sup> MECP Table 7: Full Depth Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (coarse textured soil).

Table 4

**Maximum Soil Parameter Concentrations  
Phase Two Environmental Site Assessment  
600 March Road, Ottawa, Ontario**

Parameters	Units	MECP Table 7 Residential	MECP Table 7 Industrial/ Commercial	Maximum Soil Concentration	Sample Identification	Sample Depth (mBGS)
<b>Volatile Organic Compounds</b>						
Benzene	ug/g	0.21	0.32	ND(0.0068)	ALL	0.3
Ethylbenzene	ug/g	2	9.5	ND(0.018)	ALL	0.3
Toluene	ug/g	2.3	68	ND(0.080)	ALL	0.3
Xylenes (Total)	ug/g	3.1	26	ND(0.05)	ALL	0.3
<b>Petroleum Hydrocarbons Fractions</b>						
PHC F1 (C6-C10)	ug/g	55	55	ND(5.0)	ALL	0.3
PHC F2 (C10-C16)	ug/g	98	230	ND(10.0)	ALL	0.3
PHC F3 (C16-C34)	ug/g	300	1700	ND(50.0)	ALL	0.3
PHC F4 (C34-C50)	ug/g	2800	3300	ND(50.0)	ALL	0.3

## Notes:

mBGS - metres below ground surface

µg/g - microgram per gram

ND (0.020) - Not detected at the associated method detection limit

**Bold/Border** - Detected concentration exceeds the associated MECP Table 7 Standard<sup>(1)</sup> MECP Table 7: Full Depth Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (coarse textured soil).

**Table 5**  
**Summary of Groundwater Analysis**  
**Phase Two Environmental Site Assessment**  
**600 March Road, Ottawa, Ontario**

Sample Location:		BH01-22	BH02-22	BH10-22	BH02-22	BH12-22	BH17-22	BH14-22	BH11-22
Sample ID:		GW-12566614-051722-NG-001	GW-12566614-051722-NG-002	GW-12566614-051722-NG-003	GW-12566614-051722-NG-004	GW-12566614-052522-NG-005	GW-12566614-052622-NG-006	GW-12566614-052622-NG-007	GW-12566614-052622-NG-008
Sample Date:		5/17/2022	5/17/2022	5/17/2022	5/17/2022	5/25/2022	5/26/2022	5/25/2022	5/26/2022
Sample Type:		Original	Original	Original	Duplicate	Original	Original	Original	Original
Stratigraphy		Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Parameters	Units	MECP Table 7 All Property Types							
<b>Physical Tests</b>									
Conductivity	mS/cm	--	2.3	3.42	--	3.39	2.9	7.76	--
pH	-	--	8.11	7.76	--	7.75	7.54	7.84	--
<b>Anions and Nutrients</b>									
Chloride	ug/L	1800000	620000	896000	--	858000	749000	2820000	--
<b>Cyanides</b>									
Cyanide	ug/L	52	<2.0	<2.0	--	<2.0	<2.0	<2.0	--
<b>Dissolved Metals</b>									
Antimony	ug/L	16000	<1.00	<1.00	--	<1.00	<1.00	<1.00	--
Arsenic	ug/L	1500	<1.00	<1.00	--	<1.00	<1.00	<1.00	--
Barium	ug/L	230000	244	216	--	209	129	573	--
Beryllium	ug/L	53	<0.200	<0.200	--	<0.200	<0.200	<0.200	--
Boron	ug/L	360000	<100	<100	--	<100	<100	<100	--
Cadmium	ug/L	2.1	<0.0500	<0.0500	--	<0.0500	<0.0500	0.0799	--
Chromium	ug/L	640	<5.00	<5.00	--	<5.00	<5.00	<5.00	--
Cobalt	ug/L	52	<1.00	<1.00	--	<1.00	1.46	1.23	--
Copper	ug/L	69	<2.00	<2.00	--	<2.00	<2.00	3.75	--
Lead	ug/L	20	<0.500	<0.500	--	<0.500	<0.500	<0.500	--
Mercury	ug/L	0.1	<0.0050	<0.0050	--	<0.0050	<0.0050	<0.0050	--
Molybdenum	ug/L	7300	2.39	1.47	--	1.49	7.98	6.93	--
Nickel	ug/L	390	<5.00	<5.00	--	<5.00	5.87	<5.00	--
Selenium	ug/L	50	<0.500	<0.500	--	<0.500	0.914	0.745	--
Silver	ug/L	1.2	<0.100	<0.100	--	<0.100	<0.100	<0.100	--
Sodium	ug/L	1800000	236000	405000	--	415000	336000	1570000	--
Thallium	ug/L	400	<0.100	<0.100	--	<0.100	<0.100	<0.100	--
Uranium	ug/L	330	4.53	2.18	--	2.2	10.4	10.3	--
Vanadium	ug/L	200	<5.00	<5.00	--	<5.00	<5.00	<5.00	--
Zinc	ug/L	890	<10.0	<10.0	--	<10.0	<10.0	<10.0	--
Hexavalent Chromium	ug/L	110	<0.50	<0.50	--	<0.50	<0.50	<0.50	--
<b>Volatile Organic Compounds</b>									
Acetone	ug/L	100000	<20	<20	--	<20	<20	<20	<20
Benzene	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	ug/L	67000	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Bromoform	ug/L	5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Bromomethane	ug/L	0.89	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Carbon Tetrachloride	ug/L	0.2	<0.20	<0.20	--	<0.20	<0.20	<0.20	<0.20
Chlorobenzene	ug/L	140	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Chloroform	ug/L	2	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Dibromochloromethane	ug/L	65000	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,2-Dibromoethane	ug/L	0.2	<0.20	<0.20	--	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	ug/L	150	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	ug/L	7600	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	ug/L	3500	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	ug/L	11	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50



**Table 5**  
**Summary of Groundwater Analysis**  
**Phase Two Environmental Site Assessment**  
**600 March Road, Ottawa, Ontario**

Sample Location:		BH01-22	BH02-22	BH10-22	BH02-22	BH12-22	BH17-22	BH14-22	BH11-22
Sample ID:		GW-12566614-051722-NG-001	GW-12566614-051722-NG-002	GW-12566614-051722-NG-003	GW-12566614-051722-NG-004	GW-12566614-052522-NG-005	GW-12566614-052622-NG-006	GW-12566614-052622-NG-007	GW-12566614-052622-NG-008
Sample Date:		5/17/2022	5/17/2022	5/17/2022	5/17/2022	5/25/2022	5/26/2022	5/25/2022	5/26/2022
Sample Type:		Original	Original	Original	Duplicate	Original	Original	Original	Original
Stratigraphy		Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Parameters	Units	MECP Table 7 All Property Types							
cis-1,2-Dichloroethylene	ug/L	1.6	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	ug/L	1.6	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Dichloromethane	ug/L	--	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	ug/L	0.58	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
cis+trans-1,3-Dichloropropylene	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropylene	ug/L	--	<0.30	<0.30	--	<0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropylene	ug/L	--	<0.30	<0.30	--	<0.30	<0.30	<0.30	<0.30
Ethylbenzene	ug/L	54	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hexane (n)	ug/L	5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Methyl Ethyl Ketone [MEK]	ug/L	21000	<20	<20	--	<20	<20	<20	<20
Methyl Isobutyl Ketone [MIBK]	ug/L	5200	<20	<20	--	<20	<20	<20	<20
Methyl-Tert-Butyl Ether [MTBE]	ug/L	15	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Styrene	ug/L	43	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	ug/L	1.1	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Toluene	ug/L	320	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	ug/L	23	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	ug/L	2000	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	ug/L	0.5	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50
m+p-Xylene	ug/L	--	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
o-Xylene	ug/L	--	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Total Xylenes	ug/L	72	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
<b>Hydrocarbons</b>									
F1 (C6-C10)	ug/L	420	<25	<25	<25	<25	<25	--	<25
F1-BTEX	ug/L	420	<25	<25	<25	<25	<25	--	--
F2 (C10-C16)	ug/L	150	<100	<100	<100	<100	<100	--	--
F2-naphthalene	ug/L	--	<100	<100	--	<100	--	--	--
F3 (C16-C34)	ug/L	500	<250	<250	280	<250	<250	--	--
F3-PAH	ug/L	--	<250	<250	--	<250	--	--	--
F4 (C34-C50)	ug/L	500	<250	<250	<250	<250	<250	--	--
Total Hydrocarbons (C6-C50)	ug/L	--	<370	<370	<370	<370	<370	--	--
<b>Polycyclic Aromatic Hydrocarbons</b>									
Acenaphthene	ug/L	17	<0.010	<0.010	--	<0.010	0.013	0.045	--
Acenaphthylene	ug/L	1	<0.010	<0.010	--	<0.010	<0.010	<0.010	--
Anthracene	ug/L	1	<0.010	<0.010	--	<0.010	0.04	0.018	--
Benz(a)anthracene	ug/L	1.8	<0.010	<0.010	--	<0.010	<0.010	<0.010	--
Benzo(a)pyrene	ug/L	0.81	<0.0050	<0.0050	--	<0.0050	<0.0050	<0.0050	--
Benzo(b+j)fluoranthene	ug/L	0.75	<0.010	<0.010	--	<0.010	<0.010	<0.010	--
Benzo(g,h,i)perylene	ug/L	0.2	<0.010	<0.010	--	<0.010	<0.010	<0.010	--
Benzo(k)fluoranthene	ug/L	0.4	<0.010	<0.010	--	<0.010	<0.010	<0.010	--
Chrysene	ug/L	0.7	0.016	<0.010	--	<0.010	0.012	<0.010	--
Dibenz(a,h)anthracene	ug/L	0.4	<0.0050	<0.0050	--	<0.0050	<0.0050	<0.0050	--
Fluoranthene	ug/L	44	0.034	<0.010	--	<0.010	0.117	0.048	--
Fluorene	ug/L	290	<0.010	<0.010	--	<0.010	0.043	0.074	--
Indeno(1,2,3-c,d)pyrene	ug/L	0.2	<0.010	<0.010	--	<0.010	<0.010	<0.010	--
1+2-Methylnaphthalene	ug/L	1500	0.015	<0.015	--	<0.015	0.064	0.224	--
1-Methylnaphthalene	ug/L	1500	<0.010	<0.010	--	<0.010	0.024	0.144	--
2-Methylnaphthalene	ug/L	1500	0.015	<0.010	--	<0.010	0.04	0.08	--

**Table 5**  
**Summary of Groundwater Analysis**  
**Phase Two Environmental Site Assessment**  
**600 March Road, Ottawa, Ontario**

Sample Location:		BH01-22	BH02-22	BH10-22	BH02-22	BH12-22	BH17-22	BH14-22	BH11-22
Sample ID:		GW-12566614-051722-NG-001	GW-12566614-051722-NG-002	GW-12566614-051722-NG-003	GW-12566614-051722-NG-004	GW-12566614-052522-NG-005	GW-12566614-052622-NG-006	GW-12566614-052622-NG-007	GW-12566614-052622-NG-008
Sample Date:		5/17/2022	5/17/2022	5/17/2022	5/17/2022	5/25/2022	5/26/2022	5/25/2022	5/26/2022
Sample Type:		Original	Original	Original	Duplicate	Original	Original	Original	Original
Stratigraphy		Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Parameters	Units	MECP Table 7 All Property Types							
Naphthalene	ug/L	7	<0.050	<0.050	--	<0.050	<0.050	--	--
Phenanthrene	ug/L	380	<0.020	<0.020	--	0.486	0.638	--	--
Pyrene	ug/L	5.7	0.019	<0.010	--	0.108	0.1	--	--

Notes:

µg/L - microgram per litre  
 <0.0068 - Not detected at the associated detection limit

**Bold/Border** - Detected concentration exceeds the associated MECP Table 7 Standard

<sup>(1)</sup> MECP Table 7: Full Depth Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition.

**Maximum Groundwater Parameter Concentrations  
Phase Two Environmental Site Assessment  
600 March Road, Ottawa, Ontario**

<b>Parameters</b>	<b>Units</b>	<b>MECP Table 7 All Property Types</b>	<b>Maximum GW Concentration</b>	<b>Sample Identification</b>
<b>Physical Tests</b>				
Conductivity	mS/cm	--	7.76	BH17-22
pH	-	--	8.11	BH01-22
<b>Anions and Nutrients</b>				
Chloride	ug/L	1800000	<b>2820000</b>	BH17-22
<b>Cyanides</b>				
Cyanide	ug/L	52	<2.0	ALL
<b>Dissolved Metals</b>				
Antimony	ug/L	16000	ND(1.0)	ALL
Arsenic	ug/L	1500	ND(1.0)	ALL
Barium	ug/L	23000	573	BH17-22
Beryllium	ug/L	53	ND(0.200)	ALL
Boron	ug/L	36000	ND(100)	ALL
Cadmium	ug/L	2.1	0.799	BH17-22
Chromium	ug/L	640	ND(5.0)	ALL
Cobalt	ug/L	52	2.78	BH11-22
Copper	ug/L	69	3.75	BH17-22
Lead	ug/L	20	ND(0.500)	ALL
Mercury	ug/L	0.1	ND(0.0050)	ALL
Molybdenum	ug/L	7300	17.4	BH11-22
Nickel	ug/L	390	9.96	BH11-22
Selenium	ug/L	50	0.914	BH12-22
Silver	ug/L	1.2	ND(0.100)	ALL
Sodium	ug/L	1800000	1570000	BH17-22
Thallium	ug/L	400	ND(0.100)	ALL
Uranium	ug/L	330	10.4	BH12-22
Vanadium	ug/L	200	ND(5.0)	ALL
Zinc	ug/L	890	ND(10.0)	ALL
Hexavalent Chromium	ug/L	110	ND(0.50)	ALL
<b>Volatile Organic Compounds</b>				
Acetone	ug/L	100000	ND(0.20)	ALL
Benzene	ug/L	0.5	ND(0.50)	ALL
Bromodichloromethane	ug/L	67000	ND(0.50)	ALL
Bromoform	ug/L	5	ND(0.50)	ALL
Bromomethane	ug/L	0.89	ND(0.50)	ALL
Carbon Tetrachloride	ug/L	0.2	ND(0.20)	ALL
Chlorobenzene	ug/L	140	ND(0.50)	ALL
Chloroform	ug/L	2	ND(0.50)	ALL
Dibromochloromethane	ug/L	65000	ND(0.50)	ALL
1,2-Dibromoethane	ug/L	0.2	ND(0.20)	ALL
1,2-Dichlorobenzene	ug/L	150	ND(0.50)	ALL
1,3-Dichlorobenzene	ug/L	7600	ND(0.50)	ALL
1,4-Dichlorobenzene	ug/L	0.5	ND(0.50)	ALL
Dichlorodifluoromethane	ug/L	3500	ND(0.50)	ALL
1,1-Dichloroethane	ug/L	11	ND(0.50)	ALL
1,2-Dichloroethane	ug/L	0.5	ND(0.50)	ALL
1,1-Dichloroethylene	ug/L	0.5	ND(0.50)	ALL
cis-1,2-Dichloroethylene	ug/L	1.6	ND(0.50)	ALL
trans-1,2-Dichloroethylene	ug/L	1.6	ND(0.50)	ALL
Dichloromethane	ug/L	--	ND(1.0)	ALL
1,2-Dichloropropane	ug/L	0.58	ND(0.50)	ALL
cis+trans-1,3-Dichloropropylene	ug/L	0.5	ND(0.50)	ALL
cis-1,3-Dichloropropylene	ug/L	--	ND(0.30)	ALL
trans-1,3-Dichloropropylene	ug/L	--	ND(0.30)	ALL
Ethylbenzene	ug/L	54	ND(0.50)	ALL

**Maximum Groundwater Parameter Concentrations  
Phase Two Environmental Site Assessment  
600 March Road, Ottawa, Ontario**

Parameters	Units	MECP Table 7 All Property Types	Maximum GW Concentration	Sample Identification
Hexane (n)	ug/L	5	ND(0.50)	ALL
Methyl Ethyl Ketone [MEK]	ug/L	21000	ND(20)	ALL
Methyl Isobutyl Ketone [MIBK]	ug/L	5200	ND(20)	ALL
Methyl-Tert-Butyl Ether [MTBE]	ug/L	15	ND(0.50)	ALL
Styrene	ug/L	43	ND(0.50)	ALL
1,1,1,2-Tetrachloroethane	ug/L	1.1	ND(0.50)	ALL
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND(0.50)	ALL
Tetrachloroethylene	ug/L	0.5	ND(0.50)	ALL
Toluene	ug/L	320	ND(0.50)	ALL
1,1,1-Trichloroethane	ug/L	23	ND(0.50)	ALL
1,1,2-Trichloroethane	ug/L	0.5	ND(0.50)	ALL
Trichloroethylene	ug/L	0.5	ND(0.50)	ALL
Trichlorofluoromethane	ug/L	2000	ND(0.50)	ALL
Vinyl Chloride	ug/L	0.5	ND(0.50)	ALL
m+p-Xylene	ug/L	--	ND(0.40)	ALL
o-Xylene	ug/L	--	ND(0.30)	ALL
Total Xylenes	ug/L	72	ND(0.50)	ALL
Total BTEX	ug/L		ND(1.0)	ALL
<b>Hydrocarbons</b>				
F1 (C6-C10)	ug/L	420	ND(25)	ALL
F1-BTEX	ug/L	420	ND(25)	ALL
F2 (C10-C16)	ug/L	150	ND(100)	ALL
F2-naphthalene	ug/L	--	ND(100)	ALL
F3 (C16-C34)	ug/L	500	280	BH10-22
F3-PAH	ug/L	--	ND(250)	ALL
F4 (C34-C50)	ug/L	500	ND(250)	ALL
Total Hydrocarbons (C6-C50)	ug/L	--	ND(370)	ALL
<b>Polycyclic Aromatic Hydrocarbons</b>				
Acenaphthene	ug/L	17	0.045	BH17-22
Acenaphthylene	ug/L	1	ND(0.010)	ALL
Anthracene	ug/L	1	0.04	BH12-22
Benz(a)anthracene	ug/L	1.8	ND(0.010)	ALL
Benzo(a)pyrene	ug/L	0.81	ND(0.0050)	ALL
Benzo(b+j)fluoranthene	ug/L	0.75	ND(0.010)	ALL
Benzo(g,h,i)perylene	ug/L	0.2	ND(0.010)	ALL
Benzo(k)fluoranthene	ug/L	0.4	ND(0.010)	ALL
Chrysene	ug/L	0.7	0.016	BH01-22
Dibenz(a,h)anthracene	ug/L	0.4	ND(0.0050)	ALL
Fluoranthene	ug/L	44	0.117	BH12-22
Fluorene	ug/L	290	0.074	BH17-22
Indeno(1,2,3-c,d)pyrene	ug/L	0.2	ND(0.010)	ALL
1+2-Methylnaphthalene	ug/L	1500	0.224	BH17-22
1-Methylnaphthalene	ug/L	1500	0.144	BH17-22
2-Methylnaphthalene	ug/L	1500	0.08	BH17-22
Naphthalene	ug/L	7	ND(0.050)	ALL
Phenanthrene	ug/L	380	0.638	BH17-22
Pyrene	ug/L	5.7	0.108	BH12-22

## Notes:

µg/L - microgram per litre

ND (0.020) - Not detected at the associated method detection limit

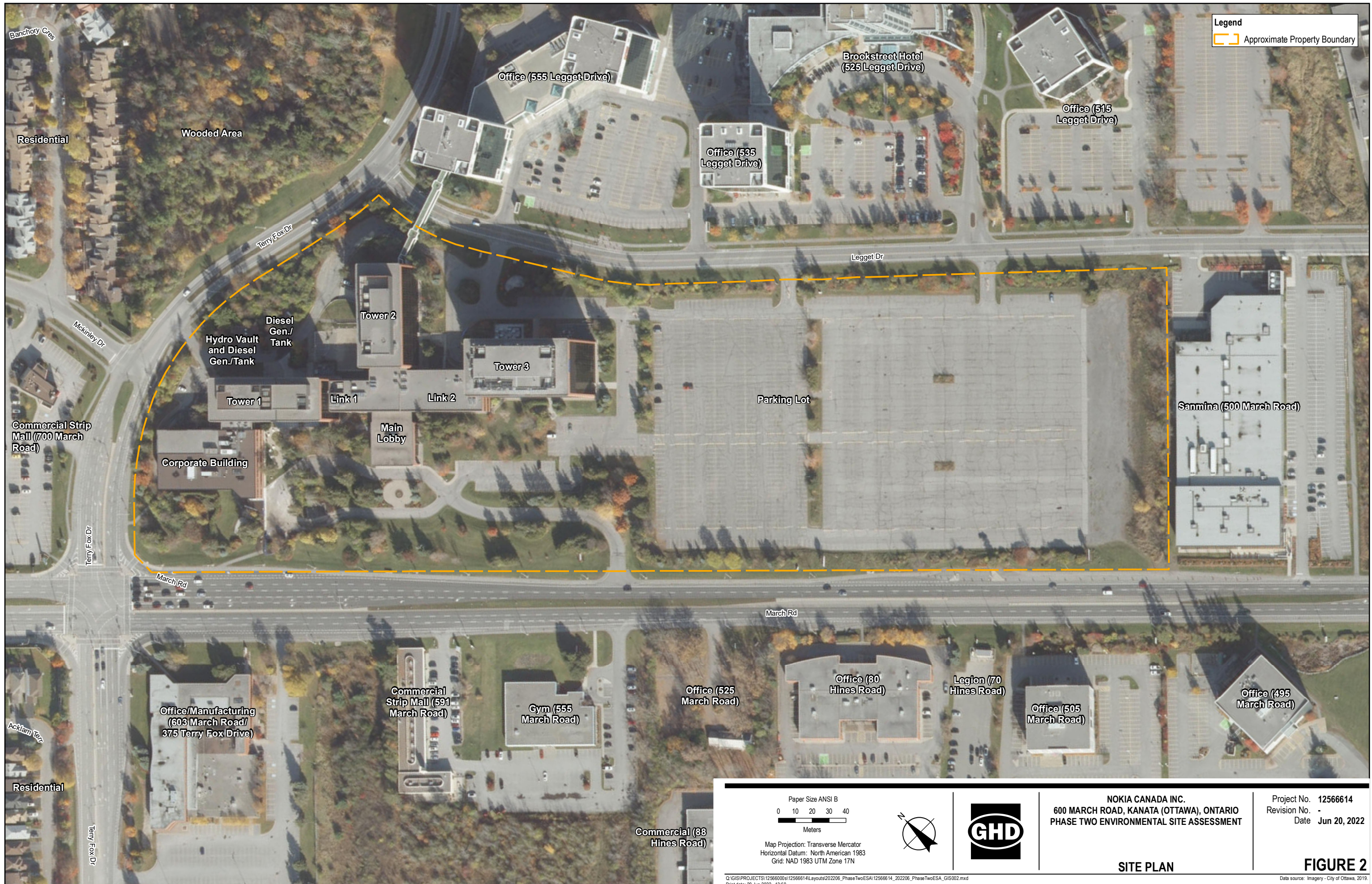
**Bold/Border** - Detected concentration exceeds the associated MECP Table 7 Standard


<sup>(1)</sup> MECP Table 7: Full Depth Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition.

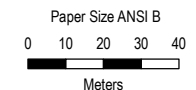
# Figures







**Legend**  
 Approximate Property Boundary



Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 17N



**NOKIA CANADA INC.**  
 600 MARCH ROAD, KANATA (OTTAWA), ONTARIO  
 PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

Project No. 12566614  
 Revision No. -  
 Date Jun 20, 2022

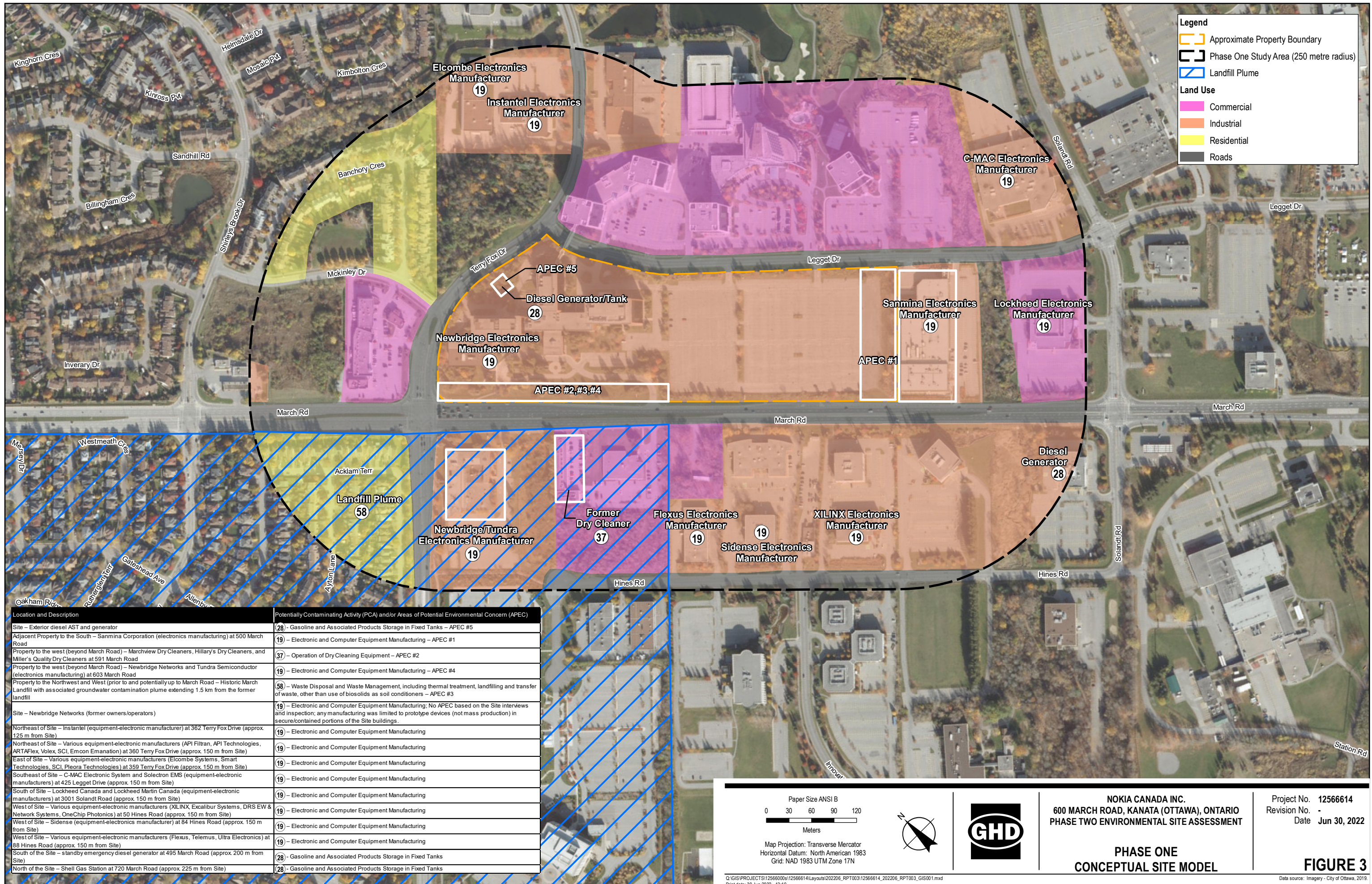
**SITE PLAN**

**FIGURE 2**

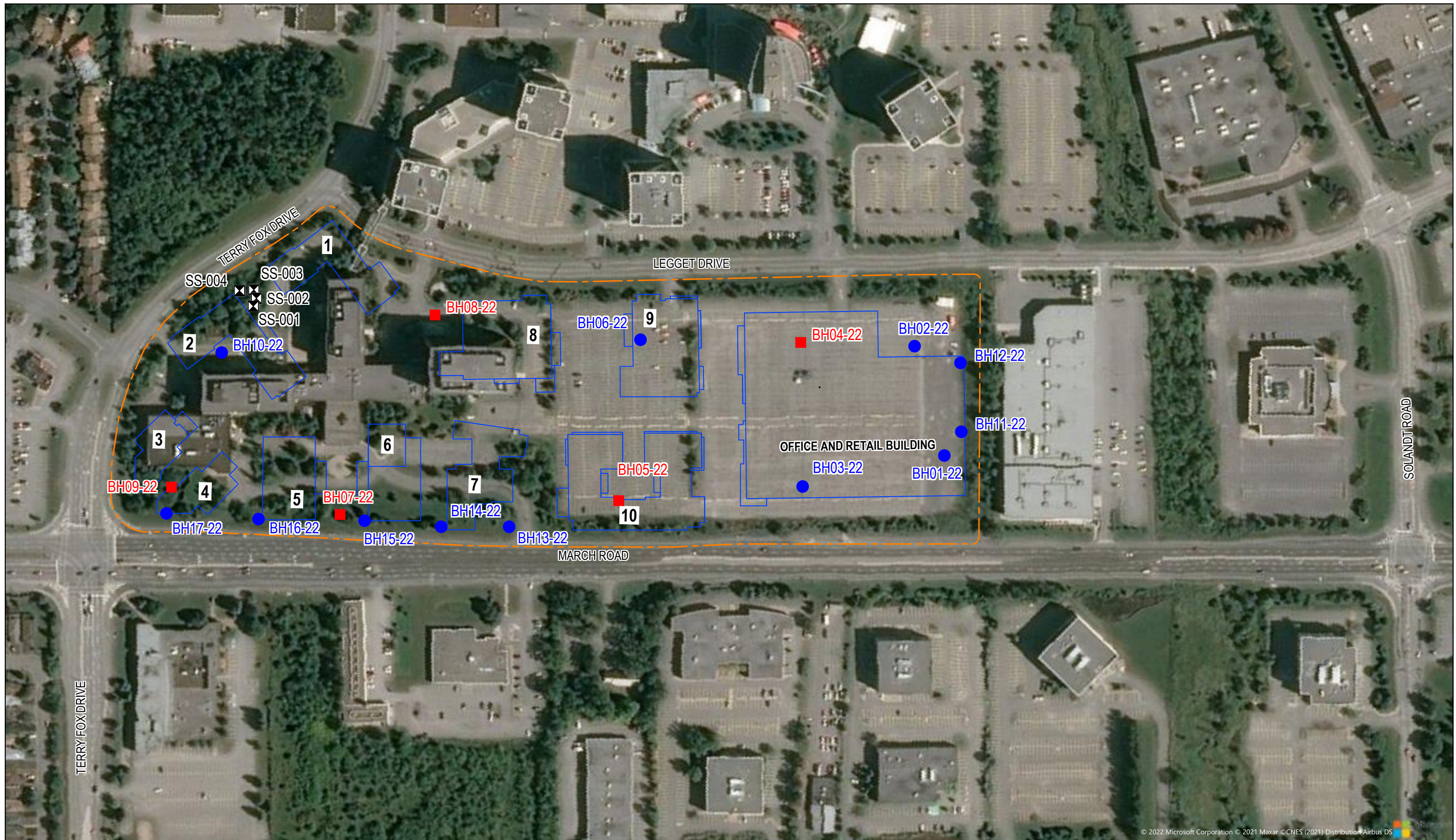
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 Print date: 20 Jun 2022 - 13:50

Data source: Imagery - City of Ottawa, 2019





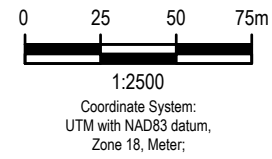




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**LEGEND**

- PROPERTY BOUNDARY
  - PROPOSED BUILDING OUTLINE
  - BOREHOLE LOCATION
  - MONITORING WELL
  - X SOIL SAMPLING LOCATION
- 1 BUILDING NUMBER



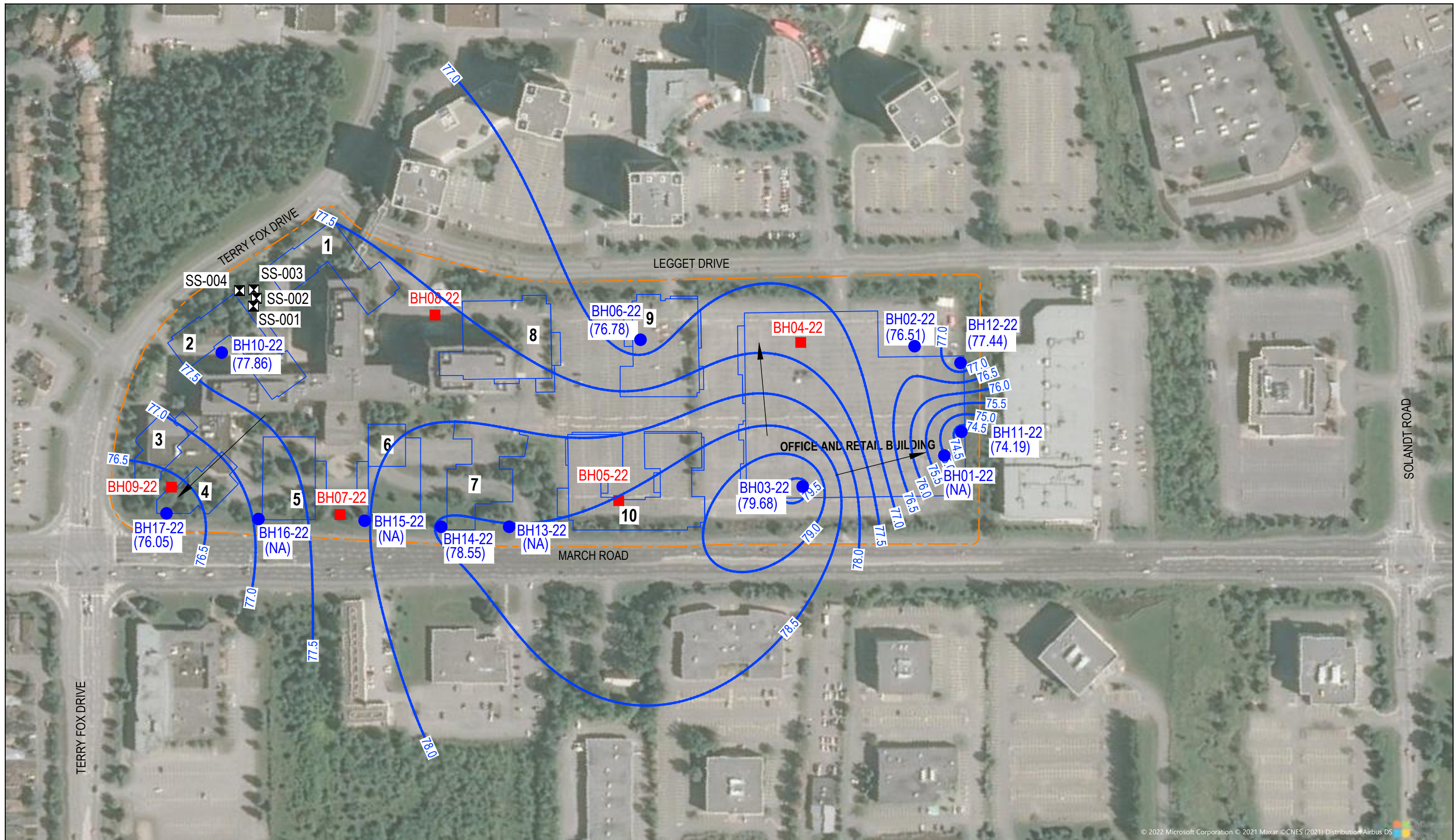
NOKIA CANADA INC.  
600 MARCH ROAD, KANATA (OTTAWA), ONTARIO  
PHASE TWO ENVIRONMENTAL  
SITE ASSESSMENT

BOREHOLE LOCATION PLAN

Project No. 12566614  
Date June 2022

FIGURE 4

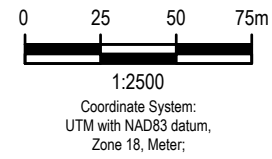




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**LEGEND**

- - - PROPERTY BOUNDARY
- PROPOSED BUILDING OUTLINE
- BOREHOLE LOCATION
- MONITORING WELL
- X SOIL SAMPLING LOCATION
- 1 BUILDING NUMBER
- GROUNDWATER POTENTIOMETRIC ELEVATION CONTOURS
- ← APPROXIMATE GROUNDWATER FLOW DIRECTION
- (76.05) GROUNDWATER ELEVATION (mASL)
- (NA) NOT APPLICABLE



NOKIA CANADA INC.  
 600 MARCH ROAD, KANATA (OTTAWA), ONTARIO  
 PHASE TWO ENVIRONMENTAL  
 SITE ASSESSMENT  
**BEDROCK GROUNDWATER ELEVATIONS  
 AND FLOW DIRECTION**

Project No. 12566614  
 Date June 2022

**FIGURE 5**



# Appendices

# **Appendix A**

## **Borehole Logs**



## Notes on Borehole and Test Pit Reports

### Soil description :

Each subsurface stratum is described using the following terminology. The relative density of granular soils is determined by the Standard Penetration Index ("N" value), while the consistency of clayey soils is measured by the value of undrained shear strength (Cu).

Classification (Unified system)			
Clay	< 0.002 mm		
Silt	0.002 to 0.075 mm		
Sand	0.075 to 4.75 mm	fine	0.075 to 4.25 mm
		medium	0.425 to 2.0 mm
		coarse	2.0 to 4.75 mm
Gravel	4.75 to 75 mm	fine	4.75 to 19 mm
		coarse	19 to 75 mm
Cobbles	75 to 300 mm		
Boulders	>300 mm		

Terminology	
"trace"	1-10%
"some"	10-20%
adjective (silty, sandy)	20-35%
"and"	35-50%

Relative density of granular soils	Standard penetration index "N" value (BLOWS/ft – 300 mm)
Very loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

Consistency of cohesive soils	Undrained shear strength (Cu)	
	(P.S.F)	(kPa)
Very soft	<250	<12
Soft	250-500	12-25
Firm	500-1000	25-50
Stiff	1000-2000	50-100
Very stiff	2000-4000	100-200
Hard	>4000	>200

Rock quality designation	
"RQD" (%) Value	Quality
<25	Very poor
25-50	Poor
50-75	Fair
75-90	Good
>90	Excellent

STRATIGRAPHIC LEGEND			
Sand	Gravel	Cobbles & boulders	Bedrock
Silt	Clay	Organic soil	Fill

### Samples:

#### Type and Number

The type of sample recovered is shown on the log by the abbreviation listed hereafter. The numbering of samples is sequential for each type of sample.

SS: Split spoon

ST: Shelby tube

AG: Auger

SSE, GSE, AGE: Environmental sampling

PS: Piston sample (Osterberg)

RC: Rock core

GS: Grab sample

#### Recovery

The recovery, shown as a percentage, is the ratio of length of the sample obtained to the distance the sampler was driven/pushed into the soil

#### RQD

The "Rock Quality Designation" or "RQD" value, expressed as percentage, is the ratio of the total length of all core fragments of 4 inches (10 cm) or more to the total length of the run.

#### IN-SITU TESTS:

N: Standard penetration index

N<sub>c</sub>: Dynamic cone penetration index

k: Permeability

R: Refusal to penetration

Cu: Undrained shear strength

ABS: Absorption (Packer test)

Pr: Pressure meter

#### LABORATORY TESTS:

I<sub>p</sub>: Plasticity index

H: Hydrometer analysis

A: Atterberg limits

C: Consolidation

O.V.: Organic vapor

W<sub>l</sub>: Liquid limit

GSA: Grain size analysis

w: Water content

CS: Swedish fall cone

W<sub>p</sub>: Plastic limit

y: Unit weight

CHEM: Chemical analysis







**BOREHOLE No.:** BH02-22  
**ELEVATION:** 79.7 m (GEODETIC)

**BOREHOLE REPORT**  
 Page 1 of 2

**CLIENT:** Nokia  
**PROJECT:** Geotechnical Investigation-Nokia Campus Rezoning  
**LOCATION:** 570 and 600 March Road, Ottawa, Ontario  
**DESCRIBED BY:** Dathon Ash **CHECKED BY:** Sahar Soleimani  
**DATE (START):** 31 January 2022 **DATE (FINISH):** 1 February 2022

**LEGEND**

- ☒ SS - SPLIT SPOON
- ☒ ST - SHELBY TUBE
- ☒ VA - VANE SHEAR
- ☒ AU - AUGER PROBE
- ☒ GS - GRAB SAMPLE
- ▼ - WATER LEVEL

**NORTHING:** 5021805.708 **EASTING:** 428046.309 **ELEVATION:** 79.7

File: \\GHDNET\GHD\CA\OTAWA\PROJECTS\6611\12566614\TECH\GINT LOGS\12566614.GLB Report: 12566614 SOIL LOG Date: 24/3/22

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL	State and Number	Gravel Sand Silt Clay	Unconfined Compressive Strength	Recovery/TCR (%)	Moisture Content	Blows per 15cm/ RQD (%)	N <sub>v</sub> Value SCR (%)	PIEZOMETER/ STANDPIPE INSTALLATION									
											W <sub>p</sub>	W <sub>L</sub>	"N" Value (blows / 12 in.-30 cm)							
Feet	Metres		GROUND SURFACE		%	MPa	%	%	%	%	10	20	30	40	50	60	70	80	90	
0	0.1	79.6	ASPHALT																	
			FILL - GRAVEL, some sand and silt, grey, moist, dense	GS1																
1	0.5	79.1	CLAY, some silt, trace sand and gravel, greyish brown, moist, stiff																	
2	0.6																			
3	1.0			SS1	2-5-48-45		83.3	29	9-6-7-7	13	●	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖
4																				
5	1.5																			
6																				
7	2.0																			
8	2.4	77.3	DOLOMITIC SANDSTONE, grey, slightly weathered, excellent to fair quality	SS2			0.0	--	50/102mm	50/102mm										
9	2.5			Run1																
10	3.0																			
11			joint, perpendicular to core axis	Run2																
12	3.5																			
13	4.0																			
14			joint, perpendicular to core axis	Run3																
15	4.5																			
16																				

2/3/2022

4.9 m











**BOREHOLE No.:** BH06-22  
**ELEVATION:** 79.6 m (GEODETIC)

**BOREHOLE REPORT**  
 Page 1 of 1

**CLIENT:** Nokia  
**PROJECT:** Geotechnical Investigation-Nokia Campus Rezoning  
**LOCATION:** 570 and 600 March Road, Ottawa, Ontario  
**DESCRIBED BY:** Dathon Ash **CHECKED BY:** Sahar Soleimani  
**DATE (START):** 2 February 2022 **DATE (FINISH):** 2 February 2022

**LEGEND**

- ☒ SS - SPLIT SPOON
- ☒ ST - SHELBY TUBE
- ☒ VA - VANE SHEAR
- ☒ AU - AUGER PROBE
- ☒ GS - GRAB SAMPLE
- ▼ - WATER LEVEL

**NORTHING:** 5021952.611 **EASTING:** 427924.443 **ELEVATION:** 79.6

File: \\GHDNET\GHD\CA\OTTAWA\PROJECTS\6611\12566614\TECH\GINT LOGS\12566614.GLB Report: 12566614 SOIL LOG Date: 24/3/22

Depth	Elevation (m) BGS	Stratigraphy	DESCRIPTION OF SOIL	State and Number	Gravel Sand Silt Clay	Unconfined Compressive Strength	Recovery/TCR (%)	Moisture Content	Blows per 15cm/ RQD (%)	N <sub>v</sub> Value SCR (%)	PIEZOMETER/ STANDPIPE INSTALLATION									
											W <sub>p</sub>	W <sub>L</sub>	"N" Value (blows / 12 in.-30 cm)							
Feet	Metres		GROUND SURFACE		%	MPa	%	%	%	%	10	20	30	40	50	60	70	80	90	
0	0.1	79.5	ASPHALT																	
			FILL - Sandy SILT, some gravel, brown, moist, dense	GS1			--	--	--	--										
1	0.4	79.2	DOLOMITIC SANDSTONE, light grey with yellow bands, fresh, good quality																	
2	0.5																			
3	1.0																			
4	1.5			Run1			97	--	87	97										
5	2.0																			
6	2.5																			
7	3.0																			
8	3.5																			
9	3.6	76.0	END OF BOREHOLE	Run2		94.2	90	--	75	90										
10	4.0																			
11	4.5																			
12																				
13																				
14																				
15																				
16																				

**NOTE:**  
 1. Water level at a depth of 2.86 m (Elev. 79.15 m) below ground surface on February 3, 2022.













# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH11-22  
DATE COMPLETED: 11 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CA\OTTA\AWA\PROJECTS\66112566614\TECH\GINT\LOGS\12566614-ENVIRO.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
	GROUND SURFACE TOP OF RISER	80.21 80.12					
0.5	TOPSOIL, silt with gravel, well graded, brown, trace organics		Sand				
1.0	SILTY CLAY, well graded, dark brown, moist	79.60					
2.0	CLAY, well graded, dense, grey-brown, moist	78.07	Bentonite				
3.0	- trace gravel from 3.05 to 3.66m BGS						
4.0	- sand from 3.81 to 4.57m BGS						
4.5	TILL, gravel, trace clay, grey, very moist	75.64					
5.0	BEDROCK	75.48					
6.0			Sand Pack Well Screen				
6.5							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
STATIC WATER LEVEL ▼ May 26, 2022

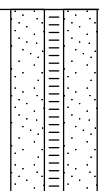


# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH11-22  
DATE COMPLETED: 11 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CAOTTAWA\PROJECTS\12566614\TECH\GINT\LOGS\12566614-ENV\RO.GPJ Library File: GHD\_ENV\RO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
7.5							
8.0	END OF BOREHOLE @ 7.92m BGS	72.28					
8.5							
9.0							
9.5							
10.0							
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
STATIC WATER LEVEL ▼ May 26, 2022



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH12-22  
DATE COMPLETED: 12 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CA\OTTA\AWA\PROJECTS\12566614\TECH\GINT\LOGS\12566614-ENVIRO.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
	GROUND SURFACE TOP OF RISER	79.60 79.49					
0.5	TOPSOIL, silt, trace sand, trace gravel, loose, dark brown, organics						
1.0	SILTY CLAY, trace sand, well graded, dense, grey-brown, organics	78.99					
2.0							
3.0	CLAYEY SAND, trace till and gravel, brown, moist	76.55					
4.0	TILL, trace silty clay, dense, grey, moist	75.79					
4.5	BEDROCK	75.18					
5.0							
5.5							
6.0							
6.5							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
STATIC WATER LEVEL ▼ May 26, 2022

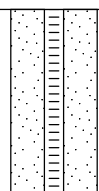


# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
 PROJECT NUMBER: 12566614  
 CLIENT: Nokia Canada Inc.  
 LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH12-22  
 DATE COMPLETED: 12 May 2022  
 DRILLING METHOD: Auger/Air hammer  
 FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CAOTTAWA\PROJECTS\12566614\TECH\GINT\LOGS\12566614-ENV\RO.GPJ Library File: GHD\_ENV\RO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
7.5							
8.0	END OF BOREHOLE @ 7.92m BGS	71.67					
8.5							
9.0							
9.5							
10.0							
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ May 26, 2022



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH13-22  
DATE COMPLETED: 11 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CA\OTAWA\PROJECTS\66112566614\TECH\GINT LOGS\12566614-ENV\RO.GPJ Library File: GHD\_ENV\RO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
	GROUND SURFACE TOP OF RISER	81.95 81.83					
0.5	TOPSOIL, silty sand, poorly graded, trace gravel, brown, organics						
1.0	SANDY SILT, poorly graded, trace till and topsoil, dark brown, trace organics	81.34					
1.5	BEDROCK	80.58					
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5	END OF BOREHOLE @ 6.40m BGS  Note: Borehole dry upon completion of drilling	75.55					

**WELL DETAILS**  
Screened interval:  
78.60 to 75.55mAMSL  
3.35 to 6.40m BGS

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH13-22  
DATE COMPLETED: 11 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px; margin-bottom: 5px;">File: \\GHDNET\GHD\CAOTTAWA\PROJECTS\66112566614\TECH\GINT LOGS\12566614-ENVIRO.GPJ Library File: GHD_ENVIRO_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22</div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">7.5</div> <div style="margin-bottom: 5px;">8.0</div> <div style="margin-bottom: 5px;">8.5</div> <div style="margin-bottom: 5px;">9.0</div> <div style="margin-bottom: 5px;">9.5</div> <div style="margin-bottom: 5px;">10.0</div> <div style="margin-bottom: 5px;">10.5</div> <div style="margin-bottom: 5px;">11.0</div> <div style="margin-bottom: 5px;">11.5</div> <div style="margin-bottom: 5px;">12.0</div> <div style="margin-bottom: 5px;">12.5</div> <div style="margin-bottom: 5px;">13.0</div> <div style="margin-bottom: 5px;">13.5</div> </div> </div>			Length: 3.05m Diameter: 51mm Slot Size: #10 Material: PVC Sand Pack: 79.21 to 75.55mAMSL 2.74 to 6.40m BGS Material: Silica				

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





# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH14-22  
DATE COMPLETED: 12 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CA\OTTA\AWA\PROJECTS\6614\TECH\GINT LOGS\12566614-ENVIRO.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
	GROUND SURFACE TOP OF RISER	82.19 82.12					
0.5	TOPSOIL, organics, very little recovery	81.58					
1.0	CLAYEY SILT, well graded, trace gravel, brown, organics	80.97					
1.5	BEDROCK, fractured rock						
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0	END OF BOREHOLE @ 6.10m BGS	76.09					
6.5							
7.0							
7.5							

**WELL DETAILS**  
 Screened interval:  
 79.14 to 76.09mAMSL  
 3.05 to 6.10m BGS  
 Length: 3.05m  
 Diameter: 51mm  
 Slot Size: #10  
 Material: PVC  
 Sand Pack:  
 79.45 to 76.09mAMSL  
 2.74 to 6.10m BGS  
 Material: Silica

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ May 26, 2022



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH15-22  
DATE COMPLETED: 12 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CA\OTTA\AWA\PROJECTS\6614\TECH\GINT LOGS\12566614-ENVIRO.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
	GROUND SURFACE TOP OF RISER	81.94 81.88					
0.5	TOPSOIL, well graded, brown, organics, very little recovery						
1.0	SANDY SILT, topsoil, well graded, trace clay, dark brown	81.33					
1.5	BEDROCK	80.72					
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5	END OF BOREHOLE @ 6.10m BGS	75.84					
7.0	Note: Borehole dry upon completion of drilling						
7.5							

**WELL DETAILS**  
 Screened interval:  
 78.89 to 75.84mAMSL  
 3.05 to 6.10m BGS  
 Length: 3.05m  
 Diameter: 51mm  
 Slot Size: #10  
 Material: PVC  
 Sand Pack:  
 79.20 to 75.84mAMSL  
 2.74 to 6.10m BGS  
 Material: Silica

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH16-22  
DATE COMPLETED: 12 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CA\TAWA\PROJECTS\66112566614\TECH\GINT\LOGS\12566614-ENVIRO.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
	GROUND SURFACE TOP OF RISER	81.49 81.44					
0.5	TOPSOIL, trace sand, loose, brown, organics						
1.0	BEDROCK	80.57					
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0	END OF BOREHOLE @ 6.10m BGS	75.39					
6.5	Note: Borehole dry upon completion of drilling						

**WELL DETAILS**  
 Screened interval:  
 78.44 to 75.39mAMSL  
 3.05 to 6.10m BGS  
 Length: 3.05m  
 Diameter: 51mm  
 Slot Size: #10

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH16-22  
DATE COMPLETED: 12 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CAOTTAWA\PROJECTS\66112566614\TECH\IGNIT\LOGS\12566614-ENV\IRO.GPJ Library File: GHD\_ENV\IRO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">7.5</div> <div style="margin-bottom: 5px;">8.0</div> <div style="margin-bottom: 5px;">8.5</div> <div style="margin-bottom: 5px;">9.0</div> <div style="margin-bottom: 5px;">9.5</div> <div style="margin-bottom: 5px;">10.0</div> <div style="margin-bottom: 5px;">10.5</div> <div style="margin-bottom: 5px;">11.0</div> <div style="margin-bottom: 5px;">11.5</div> <div style="margin-bottom: 5px;">12.0</div> <div style="margin-bottom: 5px;">12.5</div> <div style="margin-bottom: 5px;">13.0</div> <div style="margin-bottom: 5px;">13.5</div> </div>			Material: PVC Sand Pack: 78.75 to 75.39mAMSL 2.74 to 6.10m BGS Material: Silica				

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH17-22  
DATE COMPLETED: 12 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

File: \\GHDNET\GHD\CA\T\AWA\PROJECTS\66112566614\TECH\GINT\LOGS\12566614-ENV\RO.GPJ Library File: GHD\_ENV\RO\_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
	GROUND SURFACE TOP OF RISER	81.48 81.41					
0.5	TOPSOIL, silty, trace sand, trace gravel, loose, dark brown, organics						
1.0	TILL, trace sand, slight orange tint BEDROCK	80.63 80.56					
1.5							
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0	END OF BOREHOLE @ 6.10m BGS	75.38					
6.5							

**WELL DETAILS**  
Screened interval:  
78.43 to 75.38mAMSL  
3.05 to 6.10m BGS  
Length: 3.05m  
Diameter: 51mm  
Slot Size: #10

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
STATIC WATER LEVEL ▼ May 26, 2022



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME:  
PROJECT NUMBER: 12566614  
CLIENT: Nokia Canada Inc.  
LOCATION: 600 March Road, Ottawa, Ontario

HOLE DESIGNATION: BH17-22  
DATE COMPLETED: 12 May 2022  
DRILLING METHOD: Auger/Air hammer  
FIELD PERSONNEL: N. Gupta

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. mAMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px; margin-bottom: 5px;">File: \\GHDNET\GHD\CAOTTAWA\PROJECTS\66112566614\TECH\GINT\LOGS\12566614-ENV\RO.GPJ Library File: GHD_ENV\RO_V04.GLB Report: OVERBURDEN LOG Date: 30/6/22</div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">7.5</div> <div style="margin-bottom: 5px;">8.0</div> <div style="margin-bottom: 5px;">8.5</div> <div style="margin-bottom: 5px;">9.0</div> <div style="margin-bottom: 5px;">9.5</div> <div style="margin-bottom: 5px;">10.0</div> <div style="margin-bottom: 5px;">10.5</div> <div style="margin-bottom: 5px;">11.0</div> <div style="margin-bottom: 5px;">11.5</div> <div style="margin-bottom: 5px;">12.0</div> <div style="margin-bottom: 5px;">12.5</div> <div style="margin-bottom: 5px;">13.0</div> <div style="margin-bottom: 5px;">13.5</div> </div> </div>			Material: PVC Sand Pack: 78.74 to 75.38mAMSL 2.74 to 6.10m BGS Material: Silica				

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ May 26, 2022

# **Appendix B**

**Laboratory Certificates of Analysis**



GHD Limited (Waterloo)  
ATTN: Pascal Renella  
455 PHILLIP STREET  
WATERLOO ON N2L 3X2

Date Received: 28-APR-22  
Report Date: 03-MAY-22 13:17 (MT)  
Version: FINAL

Client Phone: 519-884-0510

## Certificate of Analysis

**Lab Work Order #:** L2702132  
**Project P.O. #:** NOT SUBMITTED  
**Job Reference:** 12566614  
**C of C Numbers:** 20-1009502  
**Legal Site Desc:**

Rick Hawthorne  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 60 Northland Road, Unit 1, Waterloo, ON N2V 2B8 Canada | Phone: +1 519 886 6910 | Fax: +1 519 886 9047  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2702132-1 S-12566614-042822-DA-001 Sampled By: CLIENT on 28-APR-22 @ 10:00 Matrix: SOIL							
<b>Physical Tests</b>							
% Moisture	34.4		0.25	%	30-APR-22	01-MAY-22	R5770108
<b>Volatile Organic Compounds</b>							
Benzene	<0.0068		0.0068	ug/g	02-MAY-22	03-MAY-22	R5770503
Ethylbenzene	<0.018		0.018	ug/g	02-MAY-22	03-MAY-22	R5770503
Toluene	<0.080		0.080	ug/g	02-MAY-22	03-MAY-22	R5770503
o-Xylene	<0.020		0.020	ug/g	02-MAY-22	03-MAY-22	R5770503
m+p-Xylenes	<0.030		0.030	ug/g	02-MAY-22	03-MAY-22	R5770503
Xylenes (Total)	<0.050		0.050	ug/g		02-MAY-22	
Surrogate: 4-Bromofluorobenzene	97.1		50-140	%	02-MAY-22	03-MAY-22	R5770503
Surrogate: 1,4-Difluorobenzene	102.1		50-140	%	02-MAY-22	03-MAY-22	R5770503
<b>Hydrocarbons</b>							
F1 (C6-C10)	<5.0		5.0	ug/g	02-MAY-22	03-MAY-22	R5770503
F1-BTEX	<5.0		5.0	ug/g		02-MAY-22	
F2 (C10-C16)	<10		10	ug/g	29-APR-22	02-MAY-22	R5770400
F3 (C16-C34)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
F4 (C34-C50)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
Total Hydrocarbons (C6-C50)	<72		72	ug/g		02-MAY-22	
Chrom. to baseline at nC50	YES				29-APR-22	02-MAY-22	R5770400
Surrogate: 2-Bromobenzotrifluoride	89.4		60-140	%	29-APR-22	02-MAY-22	R5770400
Surrogate: 3,4-Dichlorotoluene	82.5		60-140	%	02-MAY-22	03-MAY-22	R5770503
L2702132-2 S-12566614-042822-DA-002 Sampled By: CLIENT on 28-APR-22 @ 10:15 Matrix: SOIL							
<b>Physical Tests</b>							
% Moisture	26.5		0.25	%	30-APR-22	01-MAY-22	R5770108
<b>Volatile Organic Compounds</b>							
Benzene	<0.0068		0.0068	ug/g	02-MAY-22	03-MAY-22	R5770503
Ethylbenzene	<0.018		0.018	ug/g	02-MAY-22	03-MAY-22	R5770503
Toluene	<0.080		0.080	ug/g	02-MAY-22	03-MAY-22	R5770503
o-Xylene	<0.19	DLQ	0.19	ug/g	02-MAY-22	03-MAY-22	R5770503
m+p-Xylenes	<0.030		0.030	ug/g	02-MAY-22	03-MAY-22	R5770503
Xylenes (Total)	<0.19		0.19	ug/g		03-MAY-22	
Surrogate: 4-Bromofluorobenzene	106.2		50-140	%	02-MAY-22	03-MAY-22	R5770503
Surrogate: 1,4-Difluorobenzene	103.8		50-140	%	02-MAY-22	03-MAY-22	R5770503
<b>Hydrocarbons</b>							
F1 (C6-C10)	<5.0		5.0	ug/g	02-MAY-22	03-MAY-22	R5770503
F1-BTEX	<5.0		5.0	ug/g		03-MAY-22	
F2 (C10-C16)	<10		10	ug/g	29-APR-22	02-MAY-22	R5770400
F3 (C16-C34)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
F4 (C34-C50)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
Total Hydrocarbons (C6-C50)	<72		72	ug/g		03-MAY-22	
Chrom. to baseline at nC50	YES				29-APR-22	02-MAY-22	R5770400

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2702132-2 S-12566614-042822-DA-002 Sampled By: CLIENT on 28-APR-22 @ 10:15 Matrix: SOIL							
<b>Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	88.5		60-140	%	29-APR-22	02-MAY-22	R5770400
Surrogate: 3,4-Dichlorotoluene	91.4		60-140	%	02-MAY-22	03-MAY-22	R5770503
L2702132-3 S-12566614-042822-DA-003 Sampled By: CLIENT on 28-APR-22 @ 10:30 Matrix: SOIL							
<b>Physical Tests</b>							
% Moisture	21.4		0.25	%	30-APR-22	01-MAY-22	R5770108
<b>Volatile Organic Compounds</b>							
Benzene	<0.0068		0.0068	ug/g	02-MAY-22	03-MAY-22	R5770503
Ethylbenzene	<0.018		0.018	ug/g	02-MAY-22	03-MAY-22	R5770503
Toluene	<0.080		0.080	ug/g	02-MAY-22	03-MAY-22	R5770503
o-Xylene	<0.020		0.020	ug/g	02-MAY-22	03-MAY-22	R5770503
m+p-Xylenes	<0.030		0.030	ug/g	02-MAY-22	03-MAY-22	R5770503
Xylenes (Total)	<0.050		0.050	ug/g		02-MAY-22	
Surrogate: 4-Bromofluorobenzene	105.0		50-140	%	02-MAY-22	03-MAY-22	R5770503
Surrogate: 1,4-Difluorobenzene	111.4		50-140	%	02-MAY-22	03-MAY-22	R5770503
<b>Hydrocarbons</b>							
F1 (C6-C10)	<5.0		5.0	ug/g	02-MAY-22	03-MAY-22	R5770503
F1-BTEX	<5.0		5.0	ug/g		02-MAY-22	
F2 (C10-C16)	<10		10	ug/g	29-APR-22	02-MAY-22	R5770400
F3 (C16-C34)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
F4 (C34-C50)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
Total Hydrocarbons (C6-C50)	<72		72	ug/g		02-MAY-22	
Chrom. to baseline at nC50	YES				29-APR-22	02-MAY-22	R5770400
Surrogate: 2-Bromobenzotrifluoride	86.2		60-140	%	29-APR-22	02-MAY-22	R5770400
Surrogate: 3,4-Dichlorotoluene	94.3		60-140	%	02-MAY-22	03-MAY-22	R5770503
L2702132-4 S-12566614-042822-DA-004 Sampled By: CLIENT on 28-APR-22 @ 10:40 Matrix: SOIL							
<b>Physical Tests</b>							
% Moisture	19.3		0.25	%	30-APR-22	01-MAY-22	R5770108
<b>Volatile Organic Compounds</b>							
Benzene	<0.0068		0.0068	ug/g	02-MAY-22	03-MAY-22	R5770503
Ethylbenzene	<0.018		0.018	ug/g	02-MAY-22	03-MAY-22	R5770503
Toluene	<0.080		0.080	ug/g	02-MAY-22	03-MAY-22	R5770503
o-Xylene	<0.020		0.020	ug/g	02-MAY-22	03-MAY-22	R5770503
m+p-Xylenes	<0.030		0.030	ug/g	02-MAY-22	03-MAY-22	R5770503
Xylenes (Total)	<0.050		0.050	ug/g		02-MAY-22	
Surrogate: 4-Bromofluorobenzene	104.6		50-140	%	02-MAY-22	03-MAY-22	R5770503
Surrogate: 1,4-Difluorobenzene	107.3		50-140	%	02-MAY-22	03-MAY-22	R5770503
<b>Hydrocarbons</b>							
F1 (C6-C10)	<5.0		5.0	ug/g	02-MAY-22	03-MAY-22	R5770503
F1-BTEX	<5.0		5.0	ug/g		02-MAY-22	

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2702132-4 S-12566614-042822-DA-004 Sampled By: CLIENT on 28-APR-22 @ 10:40 Matrix: SOIL							
<b>Hydrocarbons</b>							
F2 (C10-C16)	<10		10	ug/g	29-APR-22	02-MAY-22	R5770400
F3 (C16-C34)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
F4 (C34-C50)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
Total Hydrocarbons (C6-C50)	<72		72	ug/g		02-MAY-22	
Chrom. to baseline at nC50	YES				29-APR-22	02-MAY-22	R5770400
Surrogate: 2-Bromobenzotrifluoride	89.5		60-140	%	29-APR-22	02-MAY-22	R5770400
Surrogate: 3,4-Dichlorotoluene	79.0		60-140	%	02-MAY-22	03-MAY-22	R5770503
L2702132-5 S-12566614-042822-DA-005 Sampled By: CLIENT on 28-APR-22 @ 10:50 Matrix: SOIL							
<b>Physical Tests</b>							
% Moisture	28.4		0.25	%	30-APR-22	01-MAY-22	R5770108
<b>Volatile Organic Compounds</b>							
Benzene	<0.0068		0.0068	ug/g	02-MAY-22	03-MAY-22	R5770503
Ethylbenzene	<0.018		0.018	ug/g	02-MAY-22	03-MAY-22	R5770503
Toluene	<0.080		0.080	ug/g	02-MAY-22	03-MAY-22	R5770503
o-Xylene	<0.020		0.020	ug/g	02-MAY-22	03-MAY-22	R5770503
m+p-Xylenes	<0.030		0.030	ug/g	02-MAY-22	03-MAY-22	R5770503
Xylenes (Total)	<0.050		0.050	ug/g		02-MAY-22	
Surrogate: 4-Bromofluorobenzene	101.4		50-140	%	02-MAY-22	03-MAY-22	R5770503
Surrogate: 1,4-Difluorobenzene	104.5		50-140	%	02-MAY-22	03-MAY-22	R5770503
<b>Hydrocarbons</b>							
F1 (C6-C10)	<5.0		5.0	ug/g	02-MAY-22	03-MAY-22	R5770503
F1-BTEX	<5.0		5.0	ug/g		02-MAY-22	
F2 (C10-C16)	<10		10	ug/g	29-APR-22	02-MAY-22	R5770400
F3 (C16-C34)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
F4 (C34-C50)	<50		50	ug/g	29-APR-22	02-MAY-22	R5770400
Total Hydrocarbons (C6-C50)	<72		72	ug/g		02-MAY-22	
Chrom. to baseline at nC50	YES				29-APR-22	02-MAY-22	R5770400
Surrogate: 2-Bromobenzotrifluoride	86.6		60-140	%	29-APR-22	02-MAY-22	R5770400
Surrogate: 3,4-Dichlorotoluene	81.8		60-140	%	02-MAY-22	03-MAY-22	R5770503

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

## Reference Information

### Sample Parameter Qualifier key listed:

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S
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Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

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

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS
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Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1
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Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

#### Notes:

1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011 and as of November 30, 2020), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
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## Reference Information

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

Total xylenes represents the sum of o-xylene and m&p-xylene.

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

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

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

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### Chain of Custody Numbers:

20-1009502

### GLOSSARY OF REPORT TERMS

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample*

*mg/kg lwt - milligrams per kilogram based on lipid weight of sample*

*mg/L - unit of concentration based on volume, parts per million.*

*< - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

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

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



**Environmental**

## Quality Control Report

Workorder: L2702132

Report Date: 03-MAY-22

Page 1 of 3

Client: GHD Limited (Waterloo)  
455 PHILLIP STREET  
WATERLOO ON N2L 3X2

Contact: Pascal Renella

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>BTX-511-HS-WT</b>		<b>Soil</b>						
<b>Batch</b>	<b>R5770503</b>							
<b>WG3722340-4</b>	<b>DUP</b>	<b>WG3722340-3</b>						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	03-MAY-22
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	03-MAY-22
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-MAY-22
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	03-MAY-22
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	03-MAY-22
<b>WG3722340-2</b>	<b>LCS</b>							
Benzene			100.0		%		70-130	02-MAY-22
Ethylbenzene			92.0		%		70-130	02-MAY-22
m+p-Xylenes			96.5		%		70-130	02-MAY-22
o-Xylene			93.1		%		70-130	02-MAY-22
Toluene			96.8		%		70-130	02-MAY-22
<b>WG3722340-1</b>	<b>MB</b>							
Benzene			<0.0068		ug/g		0.0068	02-MAY-22
Ethylbenzene			<0.018		ug/g		0.018	02-MAY-22
m+p-Xylenes			<0.030		ug/g		0.03	02-MAY-22
o-Xylene			<0.020		ug/g		0.02	02-MAY-22
Toluene			<0.080		ug/g		0.08	02-MAY-22
Surrogate: 1,4-Difluorobenzene			115.1		%		50-140	02-MAY-22
Surrogate: 4-Bromofluorobenzene			111.8		%		50-140	02-MAY-22
<b>WG3722340-5</b>	<b>MS</b>	<b>WG3722340-3</b>						
Benzene			109.4		%		60-140	03-MAY-22
Ethylbenzene			98.3		%		60-140	03-MAY-22
m+p-Xylenes			103.3		%		60-140	03-MAY-22
o-Xylene			100.3		%		60-140	03-MAY-22
Toluene			105.2		%		60-140	03-MAY-22
<b>F1-HS-511-WT</b>		<b>Soil</b>						
<b>Batch</b>	<b>R5770503</b>							
<b>WG3722340-4</b>	<b>DUP</b>	<b>WG3722340-3</b>						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	03-MAY-22
<b>WG3722340-2</b>	<b>LCS</b>							
F1 (C6-C10)			95.5		%		80-120	02-MAY-22
<b>WG3722340-1</b>	<b>MB</b>							
F1 (C6-C10)			<5.0		ug/g		5	02-MAY-22
Surrogate: 3,4-Dichlorotoluene			101.7		%		60-140	02-MAY-22
<b>WG3722340-5</b>	<b>MS</b>	<b>WG3722340-3</b>						



**Environmental**

## Quality Control Report

Workorder: L2702132

Report Date: 03-MAY-22

Page 2 of 3

Client: GHD Limited (Waterloo)  
 455 PHILLIP STREET  
 WATERLOO ON N2L 3X2

Contact: Pascal Renella

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>F1-HS-511-WT</b>								
	<b>Soil</b>							
<b>Batch</b>	<b>R5770503</b>							
<b>WG3722340-5</b>	<b>MS</b>	<b>WG3722340-3</b>						
F1 (C6-C10)			99.8		%		60-140	03-MAY-22
<b>F2-F4-511-WT</b>								
	<b>Soil</b>							
<b>Batch</b>	<b>R5770400</b>							
<b>WG3722066-3</b>	<b>DUP</b>	<b>WG3722066-5</b>						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	02-MAY-22
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	02-MAY-22
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	02-MAY-22
<b>WG3722066-2</b>	<b>LCS</b>							
F2 (C10-C16)			98.0		%		70-130	02-MAY-22
F3 (C16-C34)			96.4		%		70-130	02-MAY-22
F4 (C34-C50)			104.5		%		70-130	02-MAY-22
<b>WG3722066-1</b>	<b>MB</b>							
F2 (C10-C16)			<10		ug/g		10	02-MAY-22
F3 (C16-C34)			<50		ug/g		50	02-MAY-22
F4 (C34-C50)			<50		ug/g		50	02-MAY-22
Surrogate: 2-Bromobenzotrifluoride			93.3		%		60-140	02-MAY-22
<b>WG3722066-4</b>	<b>MS</b>	<b>WG3722066-5</b>						
F2 (C10-C16)			96.2		%		60-140	02-MAY-22
F3 (C16-C34)			96.5		%		60-140	02-MAY-22
F4 (C34-C50)			105.6		%		60-140	02-MAY-22
<b>MOISTURE-WT</b>								
	<b>Soil</b>							
<b>Batch</b>	<b>R5770108</b>							
<b>WG3722197-4</b>	<b>DUP</b>	<b>L2702449-22</b>						
% Moisture		19.8	20.6		%	4.1	20	01-MAY-22
<b>WG3722197-2</b>	<b>LCS</b>							
% Moisture			100.4		%		90-110	01-MAY-22
<b>WG3722197-1</b>	<b>MB</b>							
% Moisture			<0.25		%		0.25	01-MAY-22

# Quality Control Report

Workorder: L2702132

Report Date: 03-MAY-22

Client: GHD Limited (Waterloo)  
455 PHILLIP STREET  
WATERLOO ON N2L 3X2

Page 3 of 3

Contact: Pascal Renella

## Legend:

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

## Sample Parameter Qualifier Definitions:

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

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## Hold Time Exceedances:

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

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

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

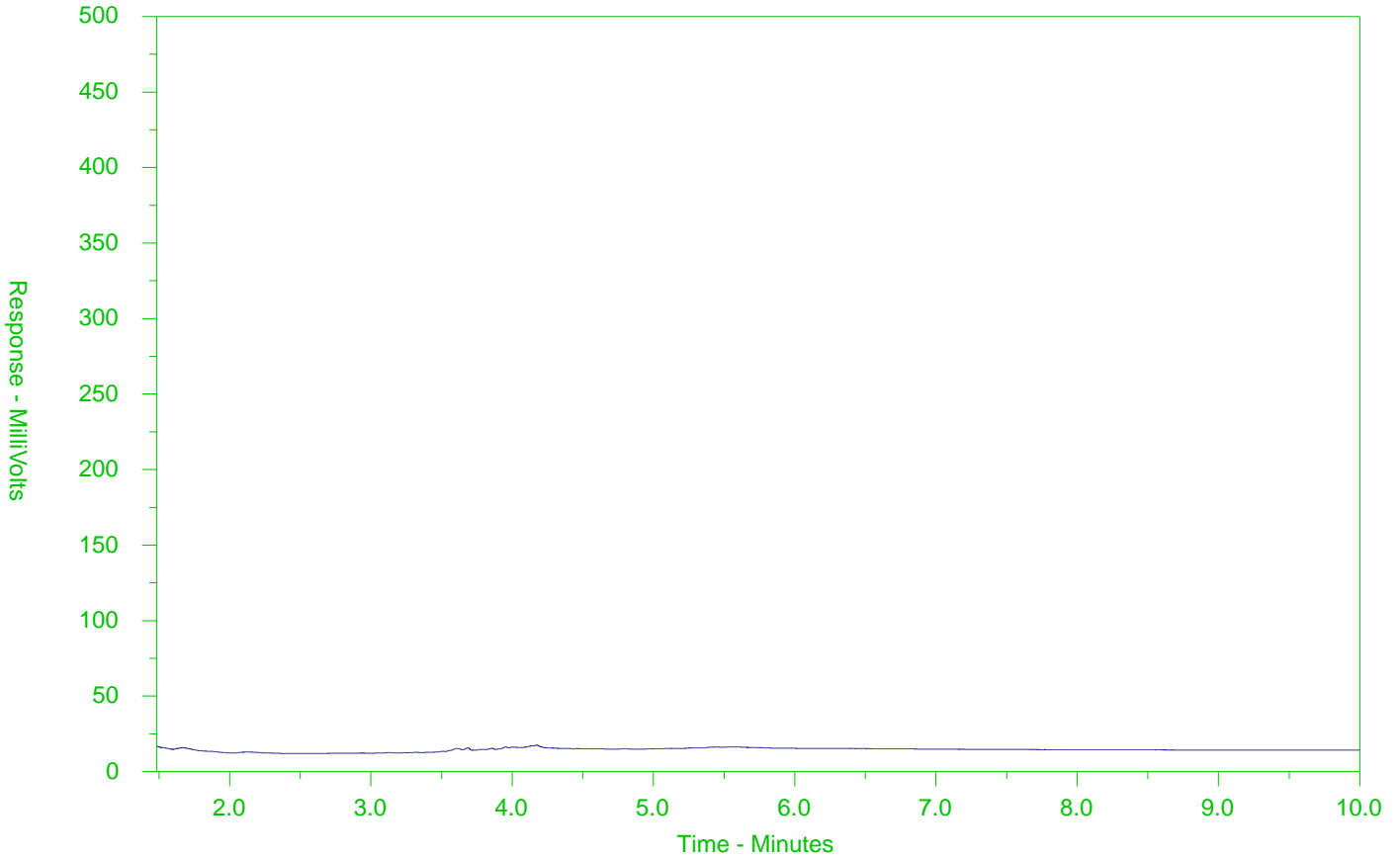
Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2702132-1  
 Client Sample ID: S-12566614-042822-DA-001



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

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

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

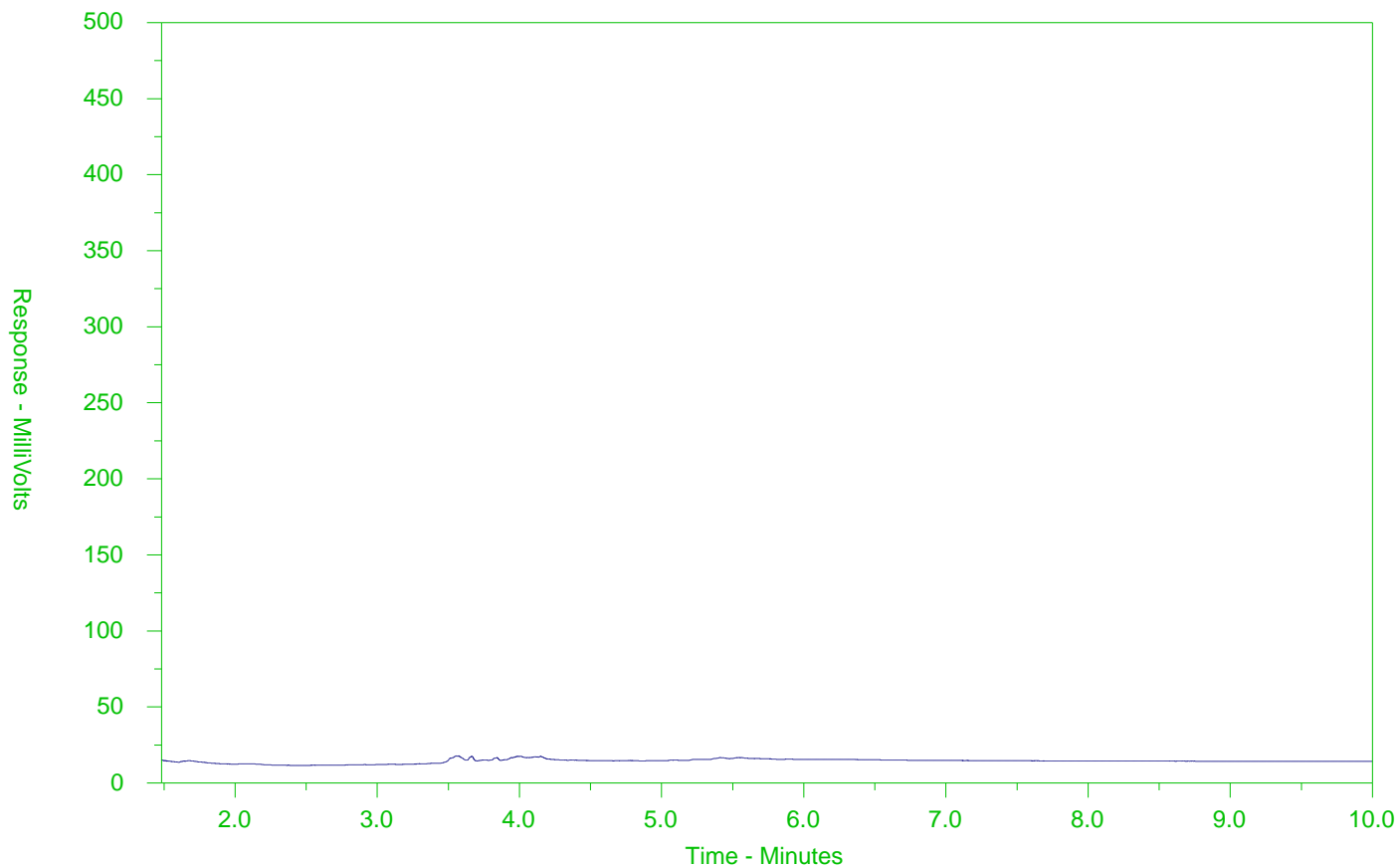
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

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

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2702132-2  
 Client Sample ID: S-12566614-042822-DA-002



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

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

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

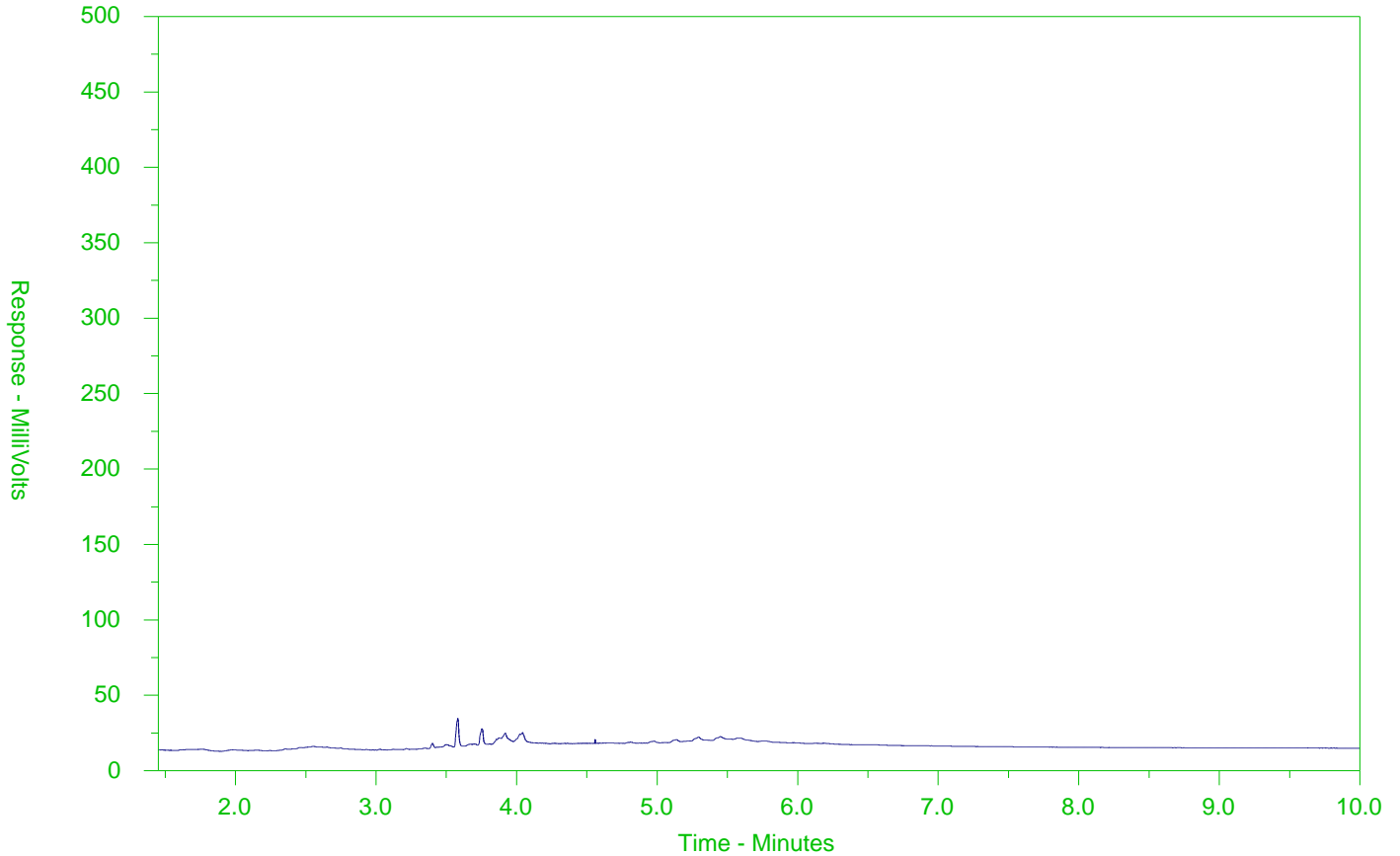
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

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

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2702132-3  
 Client Sample ID: S-12566614-042822-DA-003



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

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

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

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

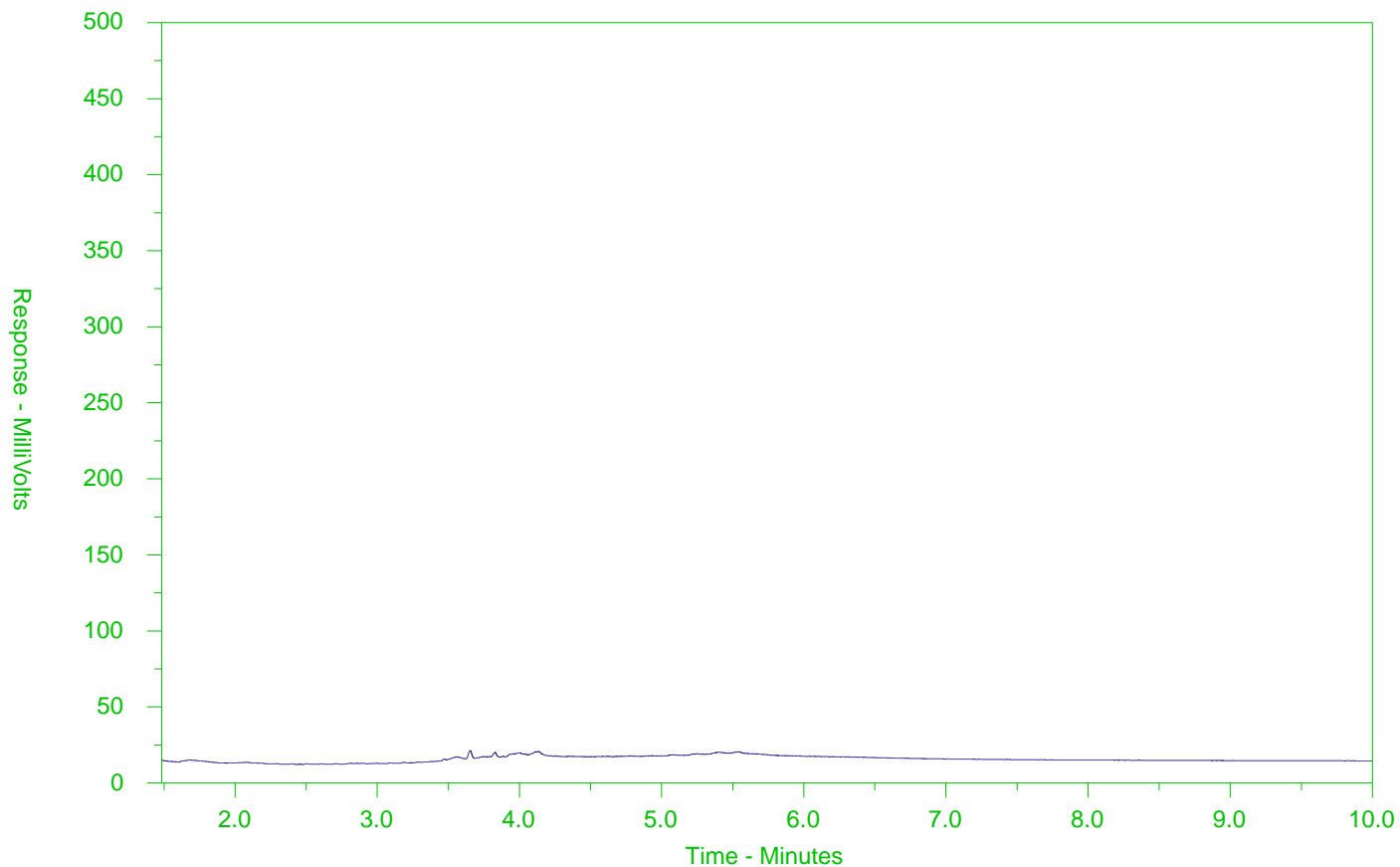
**Note:** This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at [www.alsglobal.com](http://www.alsglobal.com).



# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2702132-4  
 Client Sample ID: S-12566614-042822-DA-004



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

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

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

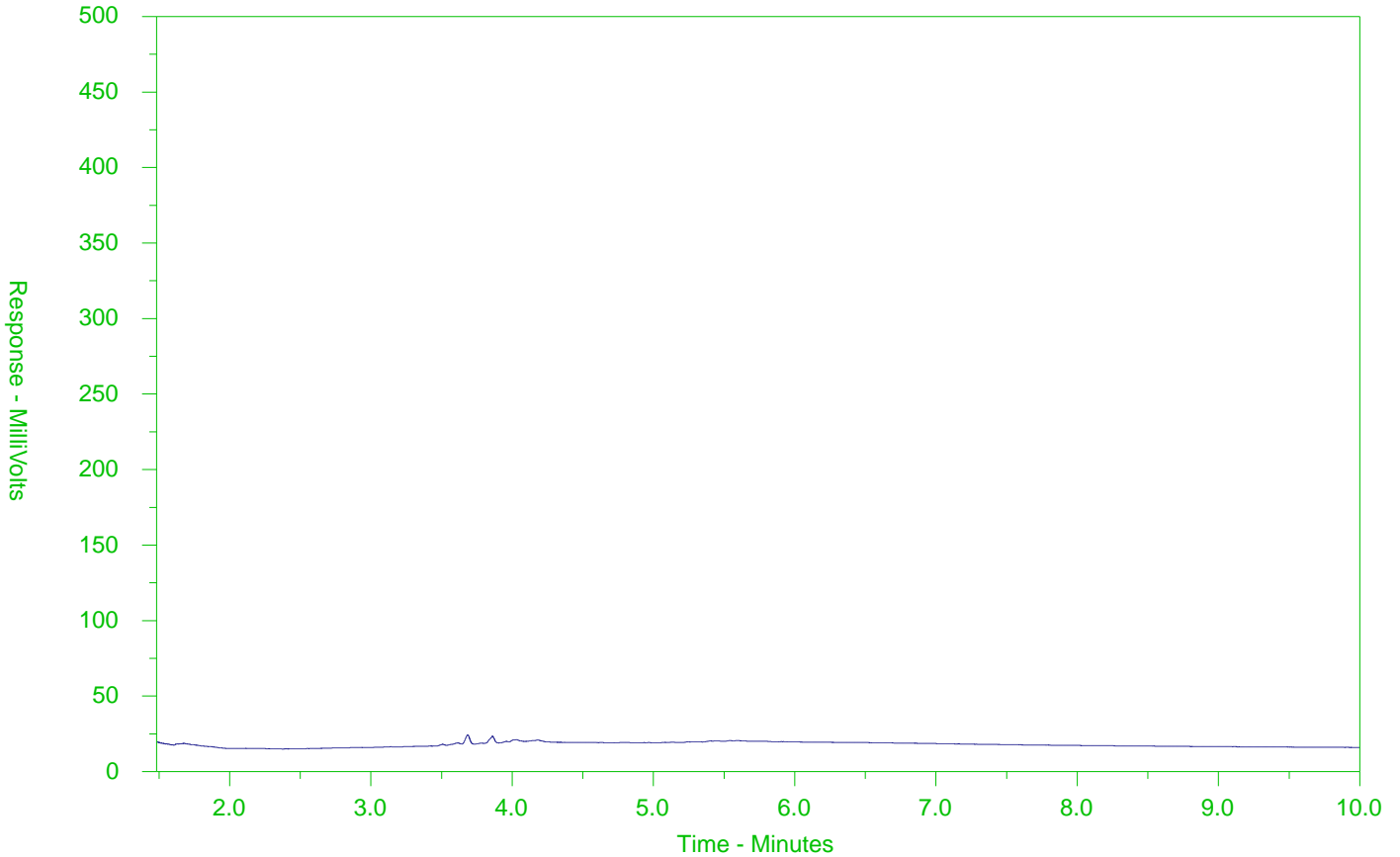
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

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

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2702132-5  
 Client Sample ID: S-12566614-042822-DA-005



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

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

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

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

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



www.als



L2702132-COFC

in of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20-1009507

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Reports / Recipients</b>			<b>Turnaround Time (TAT) Requested</b>				<b>AFFIX ALS BARCODE LABEL HERE (ALS use only)</b>																																																																																																																																																																																																																																																																																																																																																																																																																
Company:	GHD Ltd.	Select Report Format:	<input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)	<input type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply <i>* See</i> <input checked="" type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum <i>10/25</i> <input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum <input type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum <input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum <input type="checkbox"/> Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests																																																																																																																																																																																																																																																																																																																																																																																																																					
Contact:	Joseph Drader	Merge QC/QCI Reports with COA	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	Date and Time Required for all E&P TATs:				dd-mm-yy hh:mm am/pm																																																																																																																																																																																																																																																																																																																																																																																																																	
Phone:	+1-613-218-3463	Compare Results to Criteria on Report - provide details below if box checked	<input type="checkbox"/>	For all tests with rush TATs requested, please contact your AM to confirm availability.				<b>Analysis Request</b>																																																																																																																																																																																																																																																																																																																																																																																																																	
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	<table border="1"> <thead> <tr> <th rowspan="2">NUMBER OF CONTAINERS</th> <th colspan="10">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</th> <th rowspan="2">SAMPLES ON HOLD</th> <th rowspan="2">EXTENDED STORAGE REQUIRED</th> <th rowspan="2">SUSPECTED HAZARD (see notes)</th> </tr> <tr> <th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th> </tr> </thead> <tbody> <tr> <td>BTEX</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>PHC FI-F4</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>								NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below										SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)													BTEX																	PHC FI-F4																																																																																																																																																																																																																																																																																																																																																																		
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Street:	400-179 Colonnade Road	Email 1 or Fax:	Joseph.Drader@ghd.com	<b>Invoice Recipients</b>		<table border="1"> <thead> <tr> <th>ALS Sample # (ALS use only)</th> <th>Sample Identification and/or Coordinates (This description will appear on the report)</th> <th>Date (dd-mm-yy)</th> <th>Time (hh:mm)</th> <th>Sample Type</th> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th> </tr> </thead> <tbody> <tr> <td>S-12566614-042822-DA-001</td> <td></td> <td>28-04-22</td> <td>10:00</td> <td>Soil</td> <td>3</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>S-12566614-042822-DA-002</td> <td></td> <td>28-04-22</td> <td>10:15</td> <td>Soil</td> <td>3</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>S-12566614-042822-DA-003</td> <td></td> <td>28-04-22</td> <td>10:30</td> <td>Soil</td> <td>3</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>S-12566614-042822-DA-004</td> <td></td> <td>28-04-22</td> <td>10:40</td> <td>Soil</td> <td>3</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td><del>S-12566614-004-DA</del></td> <td></td> <td></td> <td></td> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>S-12566614-042822-DA-005</td> <td></td> <td>28-04-22</td> <td>10:50</td> <td>Soil</td> <td>3</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Trip blank-001</td> <td></td> <td>28-04-22</td> <td>11:00</td> <td>Soil</td> <td>1</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>										ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	1	2	3	4	5	6	7	8	9	10	11	12	S-12566614-042822-DA-001		28-04-22	10:00	Soil	3	X	X										S-12566614-042822-DA-002		28-04-22	10:15	Soil	3	X	X										S-12566614-042822-DA-003		28-04-22	10:30	Soil	3	X	X										S-12566614-042822-DA-004		28-04-22	10:40	Soil	3	X	X										<del>S-12566614-004-DA</del>																	S-12566614-042822-DA-005		28-04-22	10:50	Soil	3	X	X										Trip blank-001		28-04-22	11:00	Soil	1	X	X																																																																																																																																																																																																																																																																											
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Released by:	Dathan Ash	Date:	Apr. 28, 2022	Time:		Received by:	[Signature]	Date:	29.4.22	Time:	1:10	Received by:	[Signature]	Date:	29.4.22	Time:	9:00																																																																																																																																																																																																																																																																																																																																																																																																								

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION  
 Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.  
 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>WT2204113</b>	<b>Page</b>	: 1 of 11
<b>Client</b>	: <b>GHD Limited</b>	<b>Laboratory</b>	: <b>Waterloo - Environmental</b>
<b>Contact</b>	: <b>Pascal Renella</b>	<b>Account Manager</b>	: <b>Rick Hawthorne</b>
<b>Address</b>	: <b>455 Phillip Street</b> <b>Waterloo ON Canada N2L 3X2</b>	<b>Address</b>	: <b>60 Northland Road, Unit 1</b> <b>Waterloo ON Canada N2V 2B8</b>
<b>Telephone</b>	: <b>519 725 3313</b>	<b>Telephone</b>	: <b>+1 519 886 6910</b>
<b>Project</b>	: <b>12566614</b>	<b>Date Samples Received</b>	: <b>17-May-2022 15:45</b>
<b>PO</b>	: <b>735-002942</b>	<b>Date Analysis</b>	: <b>19-May-2022</b>
		<b>Commenced</b>	
<b>C-O-C number</b>	: <b>----</b>	<b>Issue Date</b>	: <b>31-May-2022 13:10</b>
<b>Sampler</b>	: <b>CLIENT</b>		
<b>Site</b>	: <b>----</b>		
<b>Quote number</b>	: <b>12566614-SSOW-735-002942</b>		
<b>No. of samples received</b>	: <b>4</b>		
<b>No. of samples analysed</b>	: <b>4</b>		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Andrea Armstrong	Department Manager - Air Quality and Volatiles	Organics, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Metals, Waterloo, Ontario
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Organics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Inorganics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Metals, Waterloo, Ontario





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre
mS/cm	millisiemens per centimetre
pH units	pH units

>: greater than.

<: less than.

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

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

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

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	<i>Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.</i>
DLHC	<i>Detection Limit Raised: Dilution required due to high concentration of test analyte(s).</i>



## Analytical Results

WT2204113-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-001

Client sampling date / time: 17-May-2022 10:20

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
conductivity	----	2.30	0.0010	mS/cm	E100	20-May-2022	21-May-2022	494874
pH	----	8.11	0.10	pH units	E108	20-May-2022	21-May-2022	494873
<b>Anions and Nutrients</b>								
chloride	16887-00-6	620 <sup>DLDS</sup>	2.50	mg/L	E235.Cl	20-May-2022	24-May-2022	494894
<b>Cyanides</b>								
cyanide, weak acid dissociable	----	<2.0	2.0	µg/L	E336	19-May-2022	19-May-2022	493552
<b>Dissolved Metals</b>								
antimony, dissolved	7440-36-0	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
arsenic, dissolved	7440-38-2	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
barium, dissolved	7440-39-3	244 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
beryllium, dissolved	7440-41-7	<0.200 <sup>DLHC</sup>	0.200	µg/L	E421	20-May-2022	24-May-2022	495359
boron, dissolved	7440-42-8	<100 <sup>DLHC</sup>	100	µg/L	E421	20-May-2022	24-May-2022	495359
cadmium, dissolved	7440-43-9	<0.0500 <sup>DLHC</sup>	0.0500	µg/L	E421	20-May-2022	24-May-2022	495359
chromium, dissolved	7440-47-3	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
cobalt, dissolved	7440-48-4	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
copper, dissolved	7440-50-8	<2.00 <sup>DLHC</sup>	2.00	µg/L	E421	20-May-2022	24-May-2022	495359
lead, dissolved	7439-92-1	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
mercury, dissolved	7439-97-6	<0.0050	0.0050	µg/L	E509	20-May-2022	20-May-2022	494459
molybdenum, dissolved	7439-98-7	2.39 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
nickel, dissolved	7440-02-0	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
selenium, dissolved	7782-49-2	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
silver, dissolved	7440-22-4	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
sodium, dissolved	7440-23-5	236000 <sup>DLHC</sup>	500	µg/L	E421	20-May-2022	24-May-2022	495359
thallium, dissolved	7440-28-0	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
uranium, dissolved	7440-61-1	4.53 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
vanadium, dissolved	7440-62-2	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
zinc, dissolved	7440-66-6	<10.0 <sup>DLHC</sup>	10.0	µg/L	E421	20-May-2022	24-May-2022	495359
dissolved mercury filtration location	----	Field	-	-	EP509	-	20-May-2022	494459
dissolved metals filtration location	----	Field	-	-	EP421	-	20-May-2022	495359
<b>Speciated Metals</b>								
chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.50	0.50	µg/L	E532A	-	19-May-2022	493593
<b>Volatile Organic Compounds</b>								
acetone	67-64-1	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
benzene	71-43-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromodichloromethane	75-27-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromoform	75-25-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromomethane	74-83-9	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
carbon tetrachloride	56-23-5	<0.20	0.20	µg/L	E611D	20-May-2022	20-May-2022	494387
chlorobenzene	108-90-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
chloroform	67-66-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dibromochloromethane	124-48-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dibromoethane, 1,2-	106-93-4	<0.20	0.20	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,2-	95-50-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,3-	541-73-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,4-	106-46-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorodifluoromethane	75-71-8	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethane, 1,1-	75-34-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethane, 1,2-	107-06-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387



## Analytical Results

WT2204113-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-001

Client sampling date / time: 17-May-2022 10:20

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QC/Lot
<b>Volatile Organic Compounds</b>								
dichloroethylene, 1,1-	75-35-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, cis-1,2-	156-59-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, trans-1,2-	156-60-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloromethane	75-09-2	<1.0	1.0	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropane, 1,2-	78-87-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, cis+trans-1,3-	542-75-6	<0.50	0.5	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, cis-1,3-	10061-01-5	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, trans-1,3-	10061-02-6	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
hexane, n-	110-54-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl ethyl ketone [MEK]	78-93-3	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl isobutyl ketone [MIBK]	108-10-1	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl-tert-butyl ether [MTBE]	1634-04-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
styrene	100-42-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethane, 1,1,1,2-	630-20-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethane, 1,1,2,2-	79-34-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethylene	127-18-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
toluene	108-88-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethane, 1,1,1-	71-55-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethane, 1,1,2-	79-00-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethylene	79-01-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichlorofluoromethane	75-69-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
vinyl chloride	75-01-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611D	20-May-2022	20-May-2022	494387
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
BTEX, total	----	<1.0	1.0	µg/L	E611D	20-May-2022	20-May-2022	494387
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	120	1.0	%	E611D	20-May-2022	20-May-2022	494387
difluorobenzene, 1,4-	540-36-3	95.7	1.0	%	E611D	20-May-2022	20-May-2022	494387
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<25	25	µg/L	E581.F1-L	20-May-2022	20-May-2022	494388
F2 (C10-C16)	----	<100	100	µg/L	E601.SG	20-May-2022	26-May-2022	494854
F2-naphthalene	----	<100	100	µg/L	EC600SG	-	25-May-2022	-
F3 (C16-C34)	----	<250	250	µg/L	E601.SG	20-May-2022	26-May-2022	494854
F3-PAH	n/a	<250	250	µg/L	EC600SG	-	25-May-2022	-
F4 (C34-C50)	----	<250	250	µg/L	E601.SG	20-May-2022	26-May-2022	494854
F1-BTEX	----	<25	25	µg/L	EC580	-	24-May-2022	-
hydrocarbons, total (C6-C50)	----	<370	370	µg/L	EC581SG	-	24-May-2022	-
chromatogram to baseline at nC50	n/a	YES	-	-	E601.SG	20-May-2022	26-May-2022	494854
<b>Hydrocarbons Surrogates</b>								
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	85.5	1.0	%	E601.SG	20-May-2022	26-May-2022	494854
dichlorotoluene, 3,4-	97-75-0	92.3	1.0	%	E581.F1-L	20-May-2022	20-May-2022	494388
<b>Polycyclic Aromatic Hydrocarbons</b>								
acenaphthene	83-32-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
acenaphthylene	208-96-8	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
anthracene	120-12-7	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benz(a)anthracene	56-55-3	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856



## Analytical Results

WT2204113-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-001

Client sampling date / time: 17-May-2022 10:20

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Polycyclic Aromatic Hydrocarbons</b>								
benzo(a)pyrene	50-32-8	<0.0050	0.0050	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(b+j)fluoranthene	n/a	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(g,h,i)perylene	191-24-2	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(k)fluoranthene	207-08-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
chrysene	218-01-9	0.016	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
dibenz(a,h)anthracene	53-70-3	<0.0050	0.0050	µg/L	E641A	20-May-2022	24-May-2022	494856
fluoranthene	206-44-0	0.034	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
fluorene	86-73-7	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
indeno(1,2,3-c,d)pyrene	193-39-5	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 1-	90-12-0	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 1+2-	----	0.015	0.015	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 2-	91-57-6	0.015	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
naphthalene	91-20-3	<0.050	0.050	µg/L	E641A	20-May-2022	24-May-2022	494856
phenanthrene	85-01-8	<0.020	0.020	µg/L	E641A	20-May-2022	24-May-2022	494856
pyrene	129-00-0	0.019	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>								
chrysene-d12	1719-03-5	105	0.1	%	E641A	20-May-2022	24-May-2022	494856
naphthalene-d8	1146-65-2	102	0.1	%	E641A	20-May-2022	24-May-2022	494856
phenanthrene-d10	1517-22-2	106	0.1	%	E641A	20-May-2022	24-May-2022	494856

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

WT2204113-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-002

Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
conductivity	----	3.42	0.0010	mS/cm	E100	20-May-2022	21-May-2022	494874
pH	----	7.76	0.10	pH units	E108	20-May-2022	21-May-2022	494873
<b>Anions and Nutrients</b>								
chloride	16887-00-6	896 <sup>DLDS</sup>	2.50	mg/L	E235.Cl	20-May-2022	24-May-2022	494894
<b>Cyanides</b>								
cyanide, weak acid dissociable	----	<2.0	2.0	µg/L	E336	19-May-2022	19-May-2022	493552
<b>Dissolved Metals</b>								
antimony, dissolved	7440-36-0	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
arsenic, dissolved	7440-38-2	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
barium, dissolved	7440-39-3	216	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
beryllium, dissolved	7440-41-7	<0.200 <sup>DLHC</sup>	0.200	µg/L	E421	20-May-2022	24-May-2022	495359
boron, dissolved	7440-42-8	<100 <sup>DLHC</sup>	100	µg/L	E421	20-May-2022	24-May-2022	495359
cadmium, dissolved	7440-43-9	<0.0500 <sup>DLHC</sup>	0.0500	µg/L	E421	20-May-2022	24-May-2022	495359
chromium, dissolved	7440-47-3	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
cobalt, dissolved	7440-48-4	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
copper, dissolved	7440-50-8	<2.00 <sup>DLHC</sup>	2.00	µg/L	E421	20-May-2022	24-May-2022	495359
lead, dissolved	7439-92-1	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
mercury, dissolved	7439-97-6	<0.0050	0.0050	µg/L	E509	20-May-2022	20-May-2022	494459



## Analytical Results

WT2204113-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-002

Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QC Lot
<b>Dissolved Metals</b>								
molybdenum, dissolved	7439-98-7	1.47 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
nickel, dissolved	7440-02-0	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
selenium, dissolved	7782-49-2	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
silver, dissolved	7440-22-4	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
sodium, dissolved	7440-23-5	405000 <sup>DLHC</sup>	500	µg/L	E421	20-May-2022	24-May-2022	495359
thallium, dissolved	7440-28-0	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
uranium, dissolved	7440-61-1	2.18 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
vanadium, dissolved	7440-62-2	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
zinc, dissolved	7440-66-6	<10.0 <sup>DLHC</sup>	10.0	µg/L	E421	20-May-2022	24-May-2022	495359
dissolved mercury filtration location	----	Field	-	-	EP509	-	20-May-2022	494459
dissolved metals filtration location	----	Field	-	-	EP421	-	20-May-2022	495359
<b>Speciated Metals</b>								
chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.50	0.50	µg/L	E532A	-	19-May-2022	493593
<b>Volatile Organic Compounds</b>								
acetone	67-64-1	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
benzene	71-43-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromodichloromethane	75-27-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromoform	75-25-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromomethane	74-83-9	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
carbon tetrachloride	56-23-5	<0.20	0.20	µg/L	E611D	20-May-2022	20-May-2022	494387
chlorobenzene	108-90-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
chloroform	67-66-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dibromochloromethane	124-48-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dibromoethane, 1,2-	106-93-4	<0.20	0.20	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,2-	95-50-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,3-	541-73-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,4-	106-46-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorodifluoromethane	75-71-8	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethane, 1,1-	75-34-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethane, 1,2-	107-06-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, 1,1-	75-35-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, cis-1,2-	156-59-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, trans-1,2-	156-60-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloromethane	75-09-2	<1.0	1.0	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropane, 1,2-	78-87-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, cis+trans-1,3-	542-75-6	<0.50	0.5	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, cis-1,3-	10061-01-5	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, trans-1,3-	10061-02-6	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
hexane, n-	110-54-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl ethyl ketone [MEK]	78-93-3	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl isobutyl ketone [MIBK]	108-10-1	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl-tert-butyl ether [MTBE]	1634-04-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
styrene	100-42-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethane, 1,1,1,2-	630-20-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethane, 1,1,2,2-	79-34-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethylene	127-18-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
toluene	108-88-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387





## Analytical Results

WT2204113-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-002

Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Volatile Organic Compounds</b>								
trichloroethane, 1,1,1-	71-55-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethane, 1,1,2-	79-00-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethylene	79-01-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichlorofluoromethane	75-69-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
vinyl chloride	75-01-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611D	20-May-2022	20-May-2022	494387
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
BTEX, total	----	<1.0	1.0	µg/L	E611D	20-May-2022	20-May-2022	494387
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	117	1.0	%	E611D	20-May-2022	20-May-2022	494387
difluorobenzene, 1,4-	540-36-3	96.3	1.0	%	E611D	20-May-2022	20-May-2022	494387
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<25	25	µg/L	E581.F1-L	20-May-2022	20-May-2022	494388
F2 (C10-C16)	----	<100	100	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F2-naphthalene	----	<100	100	µg/L	EC600SG	-	25-May-2022	-
F3 (C16-C34)	----	<250	250	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F3-PAH	n/a	<250	250	µg/L	EC600SG	-	25-May-2022	-
F4 (C34-C50)	----	<250	250	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F1-BTEX	----	<25	25	µg/L	EC580	-	24-May-2022	-
hydrocarbons, total (C6-C50)	----	<370	370	µg/L	EC581SG	-	24-May-2022	-
chromatogram to baseline at nC50	n/a	YES	-	-	E601.SG	20-May-2022	27-May-2022	494854
<b>Hydrocarbons Surrogates</b>								
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	83.3	1.0	%	E601.SG	20-May-2022	27-May-2022	494854
dichlorotoluene, 3,4-	97-75-0	89.3	1.0	%	E581.F1-L	20-May-2022	20-May-2022	494388
<b>Polycyclic Aromatic Hydrocarbons</b>								
acenaphthene	83-32-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
acenaphthylene	208-96-8	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
anthracene	120-12-7	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benz(a)anthracene	56-55-3	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(a)pyrene	50-32-8	<0.0050	0.0050	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(b+j)fluoranthene	n/a	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(g,h,i)perylene	191-24-2	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(k)fluoranthene	207-08-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
chrysene	218-01-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
dibenz(a,h)anthracene	53-70-3	<0.0050	0.0050	µg/L	E641A	20-May-2022	24-May-2022	494856
fluoranthene	206-44-0	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
fluorene	86-73-7	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
indeno(1,2,3-c,d)pyrene	193-39-5	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 1-	90-12-0	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 1+2-	----	<0.015	0.015	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 2-	91-57-6	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
naphthalene	91-20-3	<0.050	0.050	µg/L	E641A	20-May-2022	24-May-2022	494856
phenanthrene	85-01-8	<0.020	0.020	µg/L	E641A	20-May-2022	24-May-2022	494856
pyrene	129-00-0	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>								
chrysene-d12	1719-03-5	105	0.1	%	E641A	20-May-2022	24-May-2022	494856
naphthalene-d8	1146-65-2	105	0.1	%	E641A	20-May-2022	24-May-2022	494856





### Analytical Results

WT2204113-002

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

Client sample ID: GW-12566614-051722-NG-002  
 Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>								
phenanthrene-d10	1517-22-2	106	0.1	%	E641A	20-May-2022	24-May-2022	494856

Please refer to the General Comments section for an explanation of any qualifiers detected.

### Analytical Results

WT2204113-003

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

Client sample ID: GW-12566614-051722-NG-003  
 Client sampling date / time: 17-May-2022 14:10

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Volatile Organic Compounds</b>								
benzene	71-43-2	<0.50	0.50	µg/L	E611A	20-May-2022	20-May-2022	494592
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A	20-May-2022	20-May-2022	494592
toluene	108-88-3	<0.50	0.50	µg/L	E611A	20-May-2022	20-May-2022	494592
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611A	20-May-2022	20-May-2022	494592
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611A	20-May-2022	20-May-2022	494592
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611A	20-May-2022	20-May-2022	494592
BTEX, total	----	<1.0	1.0	µg/L	E611A	20-May-2022	20-May-2022	494592
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	108	1.0	%	E611A	20-May-2022	20-May-2022	494592
difluorobenzene, 1,4-	540-36-3	101	1.0	%	E611A	20-May-2022	20-May-2022	494592
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<25	25	µg/L	E581.F1-L	20-May-2022	20-May-2022	494591
F2 (C10-C16)	----	<100	100	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F3 (C16-C34)	----	280	250	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F4 (C34-C50)	----	<250	250	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F1-BTEX	----	<25	25	µg/L	EC580	-	21-May-2022	-
hydrocarbons, total (C6-C50)	----	<370	370	µg/L	EC581.SG	-	21-May-2022	-
chromatogram to baseline at nC50	n/a	YES	-	-	E601.SG	20-May-2022	27-May-2022	494854
<b>Hydrocarbons Surrogates</b>								
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	83.4	1.0	%	E601.SG	20-May-2022	27-May-2022	494854
dichlorotoluene, 3,4-	97-75-0	102	1.0	%	E581.F1-L	20-May-2022	20-May-2022	494591

Please refer to the General Comments section for an explanation of any qualifiers detected.

### Analytical Results

WT2204113-004

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

Client sample ID: GW-12566614-051722-NG-004  
 Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
conductivity	----	3.39	0.0010	mS/cm	E100	20-May-2022	21-May-2022	494874
pH	----	7.75	0.10	pH units	E108	20-May-2022	21-May-2022	494873
<b>Anions and Nutrients</b>								
chloride	16887-00-6	858 <sup>DLDS</sup>	2.50	mg/L	E235.Cl	20-May-2022	24-May-2022	494894



## Analytical Results

WT2204113-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-004

Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Cyanides</b>								
cyanide, weak acid dissociable	----	<2.0	2.0	µg/L	E336	19-May-2022	19-May-2022	493552
<b>Dissolved Metals</b>								
antimony, dissolved	7440-36-0	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
arsenic, dissolved	7440-38-2	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
barium, dissolved	7440-39-3	209 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
beryllium, dissolved	7440-41-7	<0.200 <sup>DLHC</sup>	0.200	µg/L	E421	20-May-2022	24-May-2022	495359
boron, dissolved	7440-42-8	<100 <sup>DLHC</sup>	100	µg/L	E421	20-May-2022	24-May-2022	495359
cadmium, dissolved	7440-43-9	<0.0500 <sup>DLHC</sup>	0.0500	µg/L	E421	20-May-2022	24-May-2022	495359
chromium, dissolved	7440-47-3	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
cobalt, dissolved	7440-48-4	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	20-May-2022	24-May-2022	495359
copper, dissolved	7440-50-8	<2.00 <sup>DLHC</sup>	2.00	µg/L	E421	20-May-2022	24-May-2022	495359
lead, dissolved	7439-92-1	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
mercury, dissolved	7439-97-6	<0.0050 <sup>DLHC</sup>	0.0050	µg/L	E509	20-May-2022	20-May-2022	494459
molybdenum, dissolved	7439-98-7	1.49 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
nickel, dissolved	7440-02-0	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
selenium, dissolved	7782-49-2	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	20-May-2022	24-May-2022	495359
silver, dissolved	7440-22-4	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
sodium, dissolved	7440-23-5	415000 <sup>DLHC</sup>	500	µg/L	E421	20-May-2022	24-May-2022	495359
thallium, dissolved	7440-28-0	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
uranium, dissolved	7440-61-1	2.20 <sup>DLHC</sup>	0.100	µg/L	E421	20-May-2022	24-May-2022	495359
vanadium, dissolved	7440-62-2	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	20-May-2022	24-May-2022	495359
zinc, dissolved	7440-66-6	<10.0 <sup>DLHC</sup>	10.0	µg/L	E421	20-May-2022	24-May-2022	495359
dissolved mercury filtration location	----	Field	-	-	EP509	-	20-May-2022	494459
dissolved metals filtration location	----	Field	-	-	EP421	-	20-May-2022	495359
<b>Speciated Metals</b>								
chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.50	0.50	µg/L	E532A	-	19-May-2022	493593
<b>Volatile Organic Compounds</b>								
acetone	67-64-1	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
benzene	71-43-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromodichloromethane	75-27-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromoform	75-25-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
bromomethane	74-83-9	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
carbon tetrachloride	56-23-5	<0.20	0.20	µg/L	E611D	20-May-2022	20-May-2022	494387
chlorobenzene	108-90-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
chloroform	67-66-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dibromochloromethane	124-48-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dibromoethane, 1,2-	106-93-4	<0.20	0.20	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,2-	95-50-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,3-	541-73-1	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorobenzene, 1,4-	106-46-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichlorodifluoromethane	75-71-8	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethane, 1,1-	75-34-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethane, 1,2-	107-06-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, 1,1-	75-35-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, cis-1,2-	156-59-2	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloroethylene, trans-1,2-	156-60-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloromethane	75-09-2	<1.0	1.0	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropane, 1,2-	78-87-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387



## Analytical Results

WT2204113-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-051722-NG-004

Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QC/Lot
<b>Volatile Organic Compounds</b>								
dichloropropylene, cis+trans-1,3-	542-75-6	<0.50	0.5	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, cis-1,3-	10061-01-5	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
dichloropropylene, trans-1,3-	10061-02-6	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
hexane, n-	110-54-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl ethyl ketone [MEK]	78-93-3	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl isobutyl ketone [MIBK]	108-10-1	<20	20	µg/L	E611D	20-May-2022	20-May-2022	494387
methyl-tert-butyl ether [MTBE]	1634-04-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
styrene	100-42-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethane, 1,1,1,2-	630-20-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethane, 1,1,2,2-	79-34-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
tetrachloroethylene	127-18-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
toluene	108-88-3	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethane, 1,1,1-	71-55-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethane, 1,1,2-	79-00-5	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichloroethylene	79-01-6	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
trichlorofluoromethane	75-69-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
vinyl chloride	75-01-4	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611D	20-May-2022	20-May-2022	494387
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611D	20-May-2022	20-May-2022	494387
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611D	20-May-2022	20-May-2022	494387
BTEX, total	----	<1.0	1.0	µg/L	E611D	20-May-2022	20-May-2022	494387
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	119	1.0	%	E611D	20-May-2022	20-May-2022	494387
difluorobenzene, 1,4-	540-36-3	95.2	1.0	%	E611D	20-May-2022	20-May-2022	494387
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<25	25	µg/L	E581.F1-L	20-May-2022	20-May-2022	494388
F2 (C10-C16)	----	<100	100	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F2-naphthalene	----	<100	100	µg/L	EC600SG	-	25-May-2022	-
F3 (C16-C34)	----	<250	250	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F3-PAH	n/a	<250	250	µg/L	EC600SG	-	25-May-2022	-
F4 (C34-C50)	----	<250	250	µg/L	E601.SG	20-May-2022	27-May-2022	494854
F1-BTEX	----	<25	25	µg/L	EC580	-	24-May-2022	-
hydrocarbons, total (C6-C50)	----	<370	370	µg/L	EC581SG	-	24-May-2022	-
chromatogram to baseline at nC50	n/a	YES	-	-	E601.SG	20-May-2022	27-May-2022	494854
<b>Hydrocarbons Surrogates</b>								
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	82.4	1.0	%	E601.SG	20-May-2022	27-May-2022	494854
dichlorotoluene, 3,4-	97-75-0	90.6	1.0	%	E581.F1-L	20-May-2022	20-May-2022	494388
<b>Polycyclic Aromatic Hydrocarbons</b>								
acenaphthene	83-32-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
acenaphthylene	208-96-8	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
anthracene	120-12-7	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benz(a)anthracene	56-55-3	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(a)pyrene	50-32-8	<0.0050	0.0050	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(b+j)fluoranthene	n/a	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(g,h,i)perylene	191-24-2	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
benzo(k)fluoranthene	207-08-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
chrysene	218-01-9	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856



## Analytical Results

WT2204113-004

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: GW-12566614-051722-NG-004

Client sampling date / time: 17-May-2022 11:30

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Polycyclic Aromatic Hydrocarbons</b>								
dibenz(a,h)anthracene	53-70-3	<0.0050	0.0050	µg/L	E641A	20-May-2022	24-May-2022	494856
fluoranthene	206-44-0	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
fluorene	86-73-7	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
indeno(1,2,3-c,d)pyrene	193-39-5	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 1-	90-12-0	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 1+2-	----	<0.015	0.015	µg/L	E641A	20-May-2022	24-May-2022	494856
methylnaphthalene, 2-	91-57-6	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
naphthalene	91-20-3	<0.050	0.050	µg/L	E641A	20-May-2022	24-May-2022	494856
phenanthrene	85-01-8	<0.020	0.020	µg/L	E641A	20-May-2022	24-May-2022	494856
pyrene	129-00-0	<0.010	0.010	µg/L	E641A	20-May-2022	24-May-2022	494856
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>								
chrysene-d12	1719-03-5	105	0.1	%	E641A	20-May-2022	24-May-2022	494856
naphthalene-d8	1146-65-2	104	0.1	%	E641A	20-May-2022	24-May-2022	494856
phenanthrene-d10	1517-22-2	105	0.1	%	E641A	20-May-2022	24-May-2022	494856

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>WT2204113</b>	Page	: 1 of 11
Client	: <b>GHD Limited</b>	Laboratory	: Waterloo - Environmental
Contact	: Pascal Renella	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street Waterloo ON Canada N2L 3X2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 725 3313	Telephone	: +1 519 886 6910
Project	: 12566614	Date Samples Received	: 17-May-2022 15:45
PO	: 735-002942	Issue Date	: 31-May-2022 13:11
C-O-C number	: ----		
Sampler	: CLIENT		
Site	: ----		
Quote number	: 12566614-SSOW-735-002942		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

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

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

#### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-001	E235.Cl	17-May-2022	----	----	----		24-May-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-002	E235.Cl	17-May-2022	----	----	----		24-May-2022	28 days	7 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-004	E235.Cl	17-May-2022	----	----	----		24-May-2022	28 days	7 days	✓	
<b>Cyanides : WAD Cyanide</b>											
<b>HDPE - total (sodium hydroxide)</b> GW-12566614-051722-NG-001	E336	17-May-2022	----	----	----		19-May-2022	14 days	2 days	✓	
<b>Cyanides : WAD Cyanide</b>											
<b>HDPE - total (sodium hydroxide)</b> GW-12566614-051722-NG-002	E336	17-May-2022	----	----	----		19-May-2022	14 days	2 days	✓	
<b>Cyanides : WAD Cyanide</b>											
<b>HDPE - total (sodium hydroxide)</b> GW-12566614-051722-NG-004	E336	17-May-2022	----	----	----		19-May-2022	14 days	2 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> GW-12566614-051722-NG-001	E509	17-May-2022	20-May-2022	----	----		20-May-2022	28 days	3 days	✓	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> GW-12566614-051722-NG-002	E509	17-May-2022	20-May-2022	----	----		20-May-2022	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> GW-12566614-051722-NG-004	E509	17-May-2022	20-May-2022	----	----		20-May-2022	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW-12566614-051722-NG-001	E421	17-May-2022	20-May-2022	----	----		24-May-2022	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW-12566614-051722-NG-002	E421	17-May-2022	20-May-2022	----	----		24-May-2022	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW-12566614-051722-NG-004	E421	17-May-2022	20-May-2022	----	----		24-May-2022	180 days	7 days	✔	
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-001	E581.F1-L	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✔	
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-002	E581.F1-L	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✔	
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-003	E581.F1-L	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✔	
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-004	E581.F1-L	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-051722-NG-001	E601.SG	17-May-2022	20-May-2022	14 days	3 days	✔	26-May-2022	40 days	6 days	✔	
<b>Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-051722-NG-002	E601.SG	17-May-2022	20-May-2022	14 days	3 days	✔	27-May-2022	40 days	7 days	✔	
<b>Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-051722-NG-003	E601.SG	17-May-2022	20-May-2022	14 days	3 days	✔	27-May-2022	40 days	7 days	✔	
<b>Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-051722-NG-004	E601.SG	17-May-2022	20-May-2022	14 days	3 days	✔	27-May-2022	40 days	7 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-001	E100	17-May-2022	----	----	----		21-May-2022	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-002	E100	17-May-2022	----	----	----		21-May-2022	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-004	E100	17-May-2022	----	----	----		21-May-2022	28 days	4 days	✔	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-001	E108	17-May-2022	----	----	----		21-May-2022	4 days	4 days	✔	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-002	E108	17-May-2022	----	----	----		21-May-2022	4 days	4 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
Rec	Actual	Rec		Actual							
<b>Physical Tests : pH by Meter</b>											
<b>HDPE [ON MECP]</b> GW-12566614-051722-NG-004	E108	17-May-2022	----	----	----		21-May-2022	4 days	4 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-051722-NG-001	E641A	17-May-2022	20-May-2022	14 days	3 days	✓	24-May-2022	40 days	4 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-051722-NG-002	E641A	17-May-2022	20-May-2022	14 days	3 days	✓	24-May-2022	40 days	4 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-051722-NG-004	E641A	17-May-2022	20-May-2022	14 days	3 days	✓	24-May-2022	40 days	4 days	✓	
<b>Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC</b>											
<b>HDPE (sodium hydroxide+ammonium hydroxide+ammonium sulfate)</b> GW-12566614-051722-NG-001	E532A	17-May-2022	----	----	----		19-May-2022	28 days	2 days	✓	
<b>Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC</b>											
<b>HDPE (sodium hydroxide+ammonium hydroxide+ammonium sulfate)</b> GW-12566614-051722-NG-002	E532A	17-May-2022	----	----	----		19-May-2022	28 days	2 days	✓	
<b>Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC</b>											
<b>HDPE (sodium hydroxide+ammonium hydroxide+ammonium sulfate)</b> GW-12566614-051722-NG-004	E532A	17-May-2022	----	----	----		19-May-2022	28 days	2 days	✓	
<b>Volatile Organic Compounds : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-003	E611A	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✓	
<b>Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-001	E611D	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-002	E611D	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✓
<b>Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW-12566614-051722-NG-004	E611D	17-May-2022	20-May-2022	----	----		20-May-2022	14 days	3 days	✓

Legend & Qualifier Definitions

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



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
BTEX by Headspace GC-MS	E611A	494592	1	2	50.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	494388	2	6	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	494894	1	13	7.6	5.0	✓
Conductivity in Water	E100	494874	1	10	10.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	493593	1	11	9.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	494459	1	4	25.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	495359	1	19	5.2	5.0	✓
pH by Meter	E108	494873	1	15	6.6	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	494387	1	20	5.0	5.0	✓
WAD Cyanide	E336	493552	1	3	33.3	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
BTEX by Headspace GC-MS	E611A	494592	1	2	50.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	494388	2	6	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	494894	1	13	7.6	5.0	✓
Conductivity in Water	E100	494874	1	10	10.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	493593	1	11	9.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	494459	1	4	25.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	495359	1	19	5.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	494856	1	3	33.3	5.0	✓
pH by Meter	E108	494873	1	15	6.6	5.0	✓
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	494854	1	5	20.0	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	494387	1	20	5.0	5.0	✓
WAD Cyanide	E336	493552	1	3	33.3	5.0	✓
<b>Method Blanks (MB)</b>							
BTEX by Headspace GC-MS	E611A	494592	1	2	50.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	494388	2	6	33.3	5.0	✓
Chloride in Water by IC	E235.Cl	494894	1	13	7.6	5.0	✓
Conductivity in Water	E100	494874	1	10	10.0	5.0	✓
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	493593	1	11	9.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	494459	1	4	25.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	495359	1	19	5.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	494856	1	3	33.3	5.0	✓
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	494854	1	5	20.0	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	494387	1	20	5.0	5.0	✓
WAD Cyanide	E336	493552	1	3	33.3	5.0	✓
<b>Matrix Spikes (MS)</b>							
BTEX by Headspace GC-MS	E611A	494592	1	2	50.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	494388	2	6	33.3	5.0	✔
Chloride in Water by IC	E235.Cl	494894	1	13	7.6	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	493593	1	11	9.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	494459	1	4	25.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	495359	1	19	5.2	5.0	✔
VOCs (ON List) by Headspace GC-MS	E611D	494387	1	20	5.0	5.0	✔
WAD Cyanide	E336	493552	1	3	33.3	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Waterloo - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Waterloo - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
WAD Cyanide	E336 Waterloo - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by Continuous Flow Analyzer (CFA) with in-line distillation followed by colourmetric analysis.
Dissolved Metals in Water by CRC ICPMS	E421 Waterloo - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Waterloo - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Waterloo - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection.  sample pretreatment involved field or lab filtration following by sample preservation.
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs (ON List) by Headspace GC-MS	E611D Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Waterloo - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
F1-BTEX	EC580 Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
SUM F1 to F4 where F2-F4 is SG treated	EC581SG Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	Hydrocarbons, total (C6-C50) is the sum of CCME Fraction F1(C6-C10), F2(C10-C16), F3(C16-C34), and F4(C34-C50), where F2-F4 have been treated with silica gel. F4G-sg is not used within this calculation due to overlap with other fractions.
F2-F4 (sg) minus PAH	EC600SG Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	F2-F4 (sg) minus PAH is calculated as follows: F2-F4 minus PAH = Sum of CCME Fraction 2 (C10-C16), CCME Fraction 3 (C16-C34), and CCME Fraction 4 (C34-C50), minus select Polycyclic Aromatic Hydrocarbons (PAH).
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 Waterloo - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Waterloo - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Waterloo - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Waterloo - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



## QUALITY CONTROL REPORT

**Work Order** : **WT2204113**

Client : GHD Limited  
Contact : Pascal Renella  
Address : 455 Phillip Street  
Waterloo ON Canada N2L 3X2

Telephone : 519 725 3313

Project : 12566614  
PO : 735-002942  
C-O-C number : ----  
Sampler : CLIENT  
Site : ----  
Quote number : 12566614-SSOW-735-002942  
No. of samples received : 4  
No. of samples analysed : 4

Page : 1 of 16

Laboratory : Waterloo - Environmental  
Account Manager : Rick Hawthorne  
Address : 60 Northland Road, Unit 1  
Waterloo, Ontario Canada N2V 2B8

Telephone : +1 519 886 6910  
Date Samples Received : 17-May-2022 15:45  
Date Analysis Commenced : 19-May-2022  
Issue Date : 31-May-2022 13:10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Andrea Armstrong	Department Manager - Air Quality and Volatiles	Waterloo Organics, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Waterloo Organics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Waterloo Inorganics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Waterloo Metals, Waterloo, Ontario

Page : 2 of 16  
Work Order : WT2204113  
Client : GHD Limited  
Project : 12566614

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## **Workorder Comments**

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

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 494873)</b>											
WT2204109-005	Anonymous	pH	----	E108	0.10	pH units	8.19	8.14	0.05	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 494874)</b>											
WT2204109-005	Anonymous	conductivity	----	E100	2.0	µS/cm	194	196	0.871%	10%	----
<b>Anions and Nutrients (QC Lot: 494894)</b>											
WT2204109-005	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	7.92	7.96	0.436%	20%	----
<b>Cyanides (QC Lot: 493552)</b>											
WT2204113-001	GW-12566614-051722-NG-001	cyanide, weak acid dissociable	----	E336	0.0020	mg/L	<2.0 µg/L	<0.0020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 494459)</b>											
WT2204113-001	GW-12566614-051722-NG-001	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 495359)</b>											
WT2204009-001	Anonymous	antimony, dissolved	7440-36-0	E421	0.00100	mg/L	<1.00 µg/L	<0.00100	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00100	mg/L	<1.00 µg/L	<0.00100	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00100	mg/L	32.9 µg/L	0.0336	1.90%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000200	mg/L	<0.200 µg/L	<0.000200	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.100	mg/L	355 µg/L	0.336	0.018	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	0.0649 µg/L	0.0000678	0.0000029	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00500	mg/L	<5.00 µg/L	<0.00500	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00100	mg/L	<1.00 µg/L	<0.00100	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00200	mg/L	<2.00 µg/L	<0.00200	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000500	mg/L	<0.500 µg/L	<0.000500	0	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000500	mg/L	12.5 µg/L	0.0133	6.29%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00500	mg/L	16.6 µg/L	0.0171	0.00057	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000500	mg/L	1.03 µg/L	0.000992	0.000040	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.500	mg/L	201000 µg/L	207	3.17%	20%	----
		thallium, dissolved	7440-28-0	E421	0.000100	mg/L	0.356 µg/L	0.000342	0.000013	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000100	mg/L	10.2 µg/L	0.0103	0.733%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00500	mg/L	<5.00 µg/L	<0.00500	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0100	mg/L	34.0 µg/L	0.0331	0.0010	Diff <2x LOR	----
<b>Speciated Metals (QC Lot: 493593)</b>											



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Speciated Metals (QC Lot: 493593) - continued</b>											
CG2205921-008	Anonymous	chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 494387)</b>											
WT2204113-001	GW-12566614-051722-NG-001	acetone	67-64-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		benzene	71-43-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromomethane	74-83-9	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromoethane, 1,2-	106-93-4	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorodifluoromethane	75-71-8	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611D	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		hexane, n-	110-54-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 494387) - continued</b>											
WT2204113-001	GW-12566614-051722-NG-001	trichloroethane, 1,1,1-	71-55-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611D	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 494592)</b>											
WT2203988-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 494388)</b>											
WT2204113-001	GW-12566614-051722-NG-001	F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	<25	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 494591)</b>											
WT2203988-001	Anonymous	F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	<25	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 494874)</b>						
conductivity	----	E100	1	µS/cm	1.1	----
<b>Anions and Nutrients (QCLot: 494894)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Cyanides (QCLot: 493552)</b>						
cyanide, weak acid dissociable	----	E336	0.002	mg/L	<0.0020	----
<b>Dissolved Metals (QCLot: 494459)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 495359)</b>						
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
<b>Speciated Metals (QCLot: 493593)</b>						
chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
<b>Volatile Organic Compounds (QCLot: 494387)</b>						
acetone	67-64-1	E611D	20	µg/L	<20	----
benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	<0.50	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 494387) - continued</b>						
bromoform	75-25-2	E611D	0.5	µg/L	<0.50	---
bromomethane	74-83-9	E611D	0.5	µg/L	<0.50	---
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	<0.20	---
chlorobenzene	108-90-7	E611D	0.5	µg/L	<0.50	---
chloroform	67-66-3	E611D	0.5	µg/L	<0.50	---
dibromochloromethane	124-48-1	E611D	0.5	µg/L	<0.50	---
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	<0.20	---
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	<0.50	---
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	<0.50	---
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	<0.50	---
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	<0.50	---
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	<0.50	---
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	<0.50	---
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	<0.50	---
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	<0.50	---
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	<0.50	---
dichloromethane	75-09-2	E611D	1	µg/L	<1.0	---
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	<0.50	---
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	<0.30	---
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	<0.30	---
ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	---
hexane, n-	110-54-3	E611D	0.5	µg/L	<0.50	---
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	---
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	<0.50	---
styrene	100-42-5	E611D	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	<0.50	---
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	---
toluene	108-88-3	E611D	0.5	µg/L	<0.50	---
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	<0.50	---
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	<0.50	---
trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	<0.50	---
vinyl chloride	75-01-4	E611D	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 494387) - continued</b>						
xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	---
<b>Volatile Organic Compounds (QCLot: 494592)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	---
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	---
<b>Hydrocarbons (QCLot: 494388)</b>						
F1 (C6-C10)	---	E581.F1-L	25	µg/L	<25	---
<b>Hydrocarbons (QCLot: 494591)</b>						
F1 (C6-C10)	---	E581.F1-L	25	µg/L	<25	---
<b>Hydrocarbons (QCLot: 494854)</b>						
F2 (C10-C16)	---	E601.SG	100	µg/L	<100	---
F3 (C16-C34)	---	E601.SG	250	µg/L	<250	---
F4 (C34-C50)	---	E601.SG	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 494856)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 494873)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 494874)</b>									
conductivity	----	E100	1	µS/cm	1409 µS/cm	98.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 494894)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
<b>Cyanides (QCLot: 493552)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	107	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	94.8	80.0	120	----
<b>Dissolved Metals (QCLot: 495359)</b>									
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	0.05 mg/L	103	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	0.05 mg/L	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.0125 mg/L	106	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.005 mg/L	108	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	0.05 mg/L	105	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.005 mg/L	105	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.0125 mg/L	105	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.0125 mg/L	102	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.0125 mg/L	102	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.025 mg/L	101	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.0125 mg/L	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.025 mg/L	102	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	0.05 mg/L	102	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.005 mg/L	96.2	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	2.5 mg/L	108	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.00025 mg/L	101	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.025 mg/L	106	80.0	120	----
<b>Speciated Metals (QCLot: 493593)</b>									
chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.025 mg/L	98.8	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				Qualifier
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	
<b>Volatile Organic Compounds (QCLot: 494387)</b>									
acetone	67-64-1	E611D	20	µg/L	100 µg/L	114	70.0	130	----
benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	94.4	70.0	130	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
bromoform	75-25-2	E611D	0.5	µg/L	100 µg/L	117	70.0	130	----
bromomethane	74-83-9	E611D	0.5	µg/L	100 µg/L	97.9	70.0	130	----
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	100 µg/L	99.4	70.0	130	----
chlorobenzene	108-90-7	E611D	0.5	µg/L	100 µg/L	100.0	70.0	130	----
chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
dibromochloromethane	124-48-1	E611D	0.5	µg/L	100 µg/L	96.2	70.0	130	----
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	100 µg/L	95.6	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	100 µg/L	113	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	100 µg/L	111	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	100 µg/L	108	70.0	130	----
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	100 µg/L	107	70.0	130	----
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	100 µg/L	96.2	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	101	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	100 µg/L	99.7	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	100 µg/L	102	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	100 µg/L	88.1	70.0	130	----
ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	98.4	70.0	130	----
hexane, n-	110-54-3	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	100 µg/L	110	70.0	130	----
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	100 µg/L	110	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
styrene	100-42-5	E611D	0.5	µg/L	100 µg/L	84.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	100 µg/L	94.6	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	99.7	70.0	130	----
toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	91.9	70.0	130	----
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 494387) - continued</b>									
vinyl chloride	75-01-4	E611D	0.5	µg/L	100 µg/L	92.9	70.0	130	----
xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	102	70.0	130	----
xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	96.6	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 494592)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	96.7	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	105	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	99.8	70.0	130	----
<b>Hydrocarbons (QCLot: 494388)</b>									
F1 (C6-C10)	----	E581.F1-L	25	µg/L	2000 µg/L	104	80.0	120	----
<b>Hydrocarbons (QCLot: 494591)</b>									
F1 (C6-C10)	----	E581.F1-L	25	µg/L	2000 µg/L	91.3	80.0	120	----
<b>Hydrocarbons (QCLot: 494854)</b>									
F2 (C10-C16)	----	E601.SG	100	µg/L	5018 µg/L	104	70.0	130	----
F3 (C16-C34)	----	E601.SG	250	µg/L	6312 µg/L	122	70.0	130	----
F4 (C34-C50)	----	E601.SG	250	µg/L	6087 µg/L	79.1	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 494856)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5263 µg/L	108	50.0	140	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5263 µg/L	101	50.0	140	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5263 µg/L	102	50.0	140	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5263 µg/L	106	50.0	140	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5263 µg/L	97.4	50.0	140	----
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5263 µg/L	103	50.0	140	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5263 µg/L	104	50.0	140	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5263 µg/L	113	50.0	140	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5263 µg/L	110	50.0	140	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5263 µg/L	107	50.0	140	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5263 µg/L	113	50.0	140	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5263 µg/L	108	50.0	140	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5263 µg/L	107	50.0	140	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5263 µg/L	104	50.0	140	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5263 µg/L	97.7	50.0	140	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5263 µg/L	98.4	50.0	140	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5263 µg/L	112	50.0	140	----

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 Work Order : WT2204113  
 Client : GHD Limited  
 Project : 12566614



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 494856) - continued</b>									
pyrene	129-00-0	E641A	0.01	µg/L	0.5263 µg/L	114	50.0	140	----





## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 494894)</b>										
WT2204109-005	Anonymous	chloride	16887-00-6	E235.Cl	103 mg/L	100 mg/L	103	75.0	125	----
<b>Cyanides (QCLot: 493552)</b>										
WT2204113-001	GW-12566614-051722-NG-001	cyanide, weak acid dissociable	----	E336	0.156 mg/L	0.125 mg/L	125	70.0	130	----
<b>Dissolved Metals (QCLot: 494459)</b>										
WT2204113-002	GW-12566614-051722-NG-002	mercury, dissolved	7439-97-6	E509	0.0000896 mg/L	0.0001 mg/L	89.6	70.0	130	----
<b>Dissolved Metals (QCLot: 495359)</b>										
WT2204009-002	Anonymous	antimony, dissolved	7440-36-0	E421	0.494 mg/L	0.5 mg/L	98.8	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.502 mg/L	0.5 mg/L	100	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.121 mg/L	0.125 mg/L	96.5	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0466 mg/L	0.05 mg/L	93.3	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.459 mg/L	0.5 mg/L	91.7	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.0486 mg/L	0.05 mg/L	97.3	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.123 mg/L	0.125 mg/L	98.6	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.120 mg/L	0.125 mg/L	95.8	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.114 mg/L	0.125 mg/L	91.1	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.228 mg/L	0.25 mg/L	91.4	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.125 mg/L	0.125 mg/L	100	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.233 mg/L	0.25 mg/L	93.2	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.512 mg/L	0.5 mg/L	102	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0443 mg/L	0.05 mg/L	88.5	70.0	130	----
		sodium, dissolved	7440-23-5	E421	ND mg/L	25 mg/L	ND	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.443 mg/L	0.5 mg/L	88.5	70.0	130	----
		uranium, dissolved	7440-61-1	E421	ND mg/L	0.0025 mg/L	ND	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.258 mg/L	0.25 mg/L	103	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.222 mg/L	0.25 mg/L	88.7	70.0	130	----
<b>Speciated Metals (QCLot: 493593)</b>										
CG2205921-008	Anonymous	chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0393 mg/L	0.04 mg/L	98.4	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 494387)</b>										
WT2204113-001	GW-12566614-051722-NG-001	acetone	67-64-1	E611D	94 µg/L	100 µg/L	93.5	60.0	140	----
		benzene	71-43-2	E611D	89.5 µg/L	100 µg/L	89.5	60.0	140	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 494387) - continued</b>										
WT2204113-001	GW-12566614-051722-NG-001	bromodichloromethane	75-27-4	E611D	99.2 µg/L	100 µg/L	99.2	60.0	140	----
		bromoform	75-25-2	E611D	102 µg/L	100 µg/L	102	60.0	140	----
		bromomethane	74-83-9	E611D	91.1 µg/L	100 µg/L	91.1	60.0	140	----
		carbon tetrachloride	56-23-5	E611D	97.3 µg/L	100 µg/L	97.3	60.0	140	----
		chlorobenzene	108-90-7	E611D	93.3 µg/L	100 µg/L	93.3	60.0	140	----
		chloroform	67-66-3	E611D	96.7 µg/L	100 µg/L	96.7	60.0	140	----
		dibromochloromethane	124-48-1	E611D	85.4 µg/L	100 µg/L	85.4	60.0	140	----
		dibromoethane, 1,2-	106-93-4	E611D	84.8 µg/L	100 µg/L	84.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611D	107 µg/L	100 µg/L	107	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611D	110 µg/L	100 µg/L	110	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611D	107 µg/L	100 µg/L	107	60.0	140	----
		dichlorodifluoromethane	75-71-8	E611D	93.5 µg/L	100 µg/L	93.5	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611D	65.0 µg/L	100 µg/L	65.0	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611D	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611D	104 µg/L	100 µg/L	104	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	91.8 µg/L	100 µg/L	91.8	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	104 µg/L	100 µg/L	104	60.0	140	----
		dichloromethane	75-09-2	E611D	94.6 µg/L	100 µg/L	94.6	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611D	94.9 µg/L	100 µg/L	94.9	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	98.3 µg/L	100 µg/L	98.3	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611D	79.9 µg/L	100 µg/L	79.9	60.0	140	----
		ethylbenzene	100-41-4	E611D	93.7 µg/L	100 µg/L	93.7	60.0	140	----
		hexane, n-	110-54-3	E611D	99.5 µg/L	100 µg/L	99.5	60.0	140	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	87 µg/L	100 µg/L	87.4	60.0	140	----
		methyl isobutyl ketone [MIBK]	108-10-1	E611D	89 µg/L	100 µg/L	88.9	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	103 µg/L	100 µg/L	103	60.0	140	----
		styrene	100-42-5	E611D	76.1 µg/L	100 µg/L	76.1	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	85.5 µg/L	100 µg/L	85.5	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	84.6 µg/L	100 µg/L	84.6	60.0	140	----
		tetrachloroethylene	127-18-4	E611D	96.4 µg/L	100 µg/L	96.4	60.0	140	----
		toluene	108-88-3	E611D	95.0 µg/L	100 µg/L	95.0	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611D	98.2 µg/L	100 µg/L	98.2	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611D	92.3 µg/L	100 µg/L	92.3	60.0	140	----
		trichloroethylene	79-01-6	E611D	87.8 µg/L	100 µg/L	87.8	60.0	140	----
		trichlorofluoromethane	75-69-4	E611D	99.2 µg/L	100 µg/L	99.2	60.0	140	----
		vinyl chloride	75-01-4	E611D	83.7 µg/L	100 µg/L	83.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611D	197 µg/L	200 µg/L	98.5	60.0	140	----



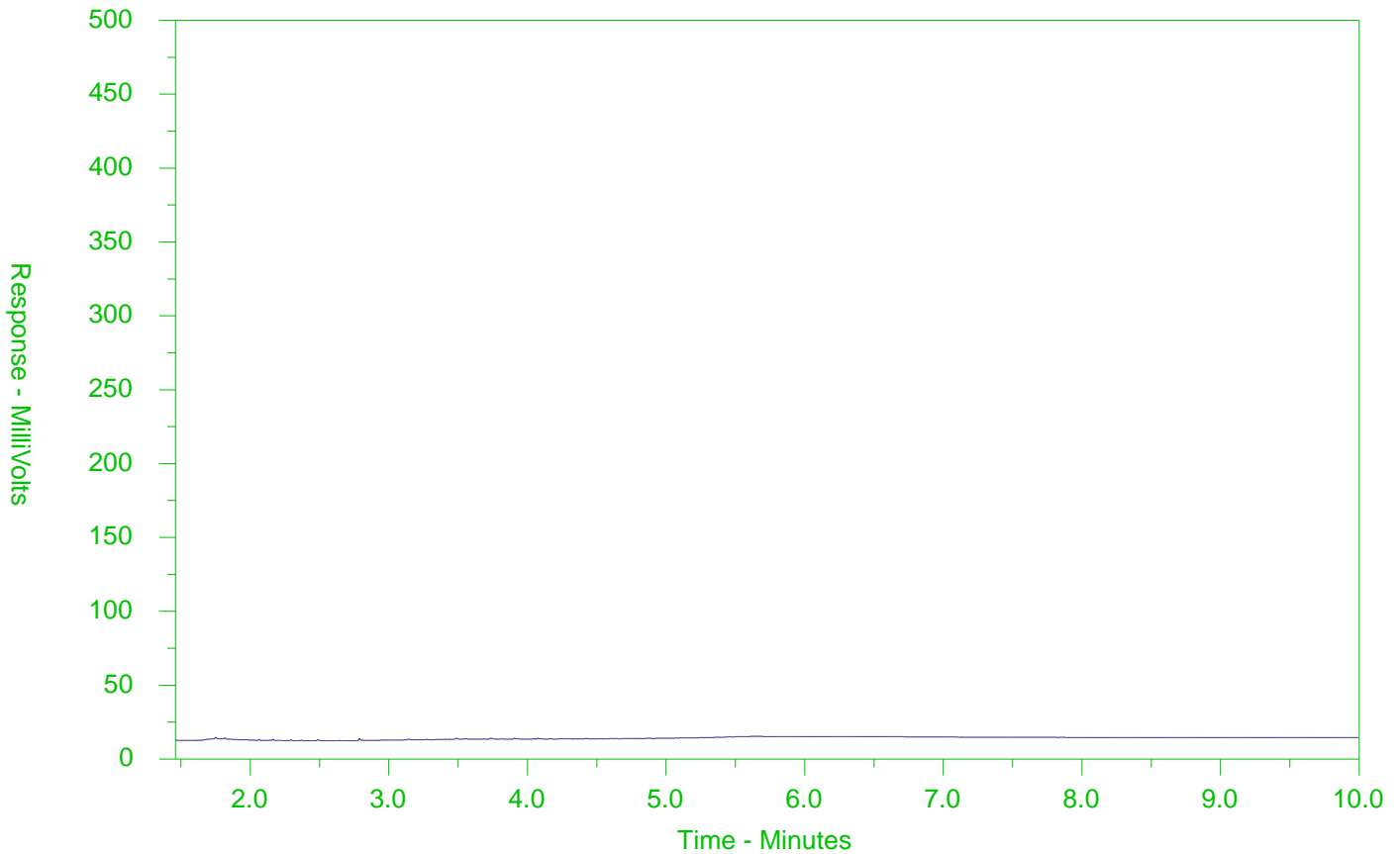
Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QCLot: 494387) - continued</b>										
WT2204113-001	GW-12566614-051722-NG-001	xylene, o-	95-47-6	E611D	91.6 µg/L	100 µg/L	91.6	60.0	140	----
<b>Volatile Organic Compounds (QCLot: 494592)</b>										
WT2203988-001	Anonymous	benzene	71-43-2	E611A	98.5 µg/L	100 µg/L	98.5	60.0	140	----
		ethylbenzene	100-41-4	E611A	91.2 µg/L	100 µg/L	91.2	60.0	140	----
		toluene	108-88-3	E611A	98.0 µg/L	100 µg/L	98.0	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	188 µg/L	200 µg/L	94.3	60.0	140	----
		xylene, o-	95-47-6	E611A	91.6 µg/L	100 µg/L	91.6	60.0	140	----
<b>Hydrocarbons (QCLot: 494388)</b>										
WT2204113-001	GW-12566614-051722-NG-001	F1 (C6-C10)	----	E581.F1-L	1830 µg/L	2000 µg/L	91.3	60.0	140	----
<b>Hydrocarbons (QCLot: 494591)</b>										
WT2203988-001	Anonymous	F1 (C6-C10)	----	E581.F1-L	1730 µg/L	2000 µg/L	86.5	60.0	140	----

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: WT2204113-001-E601.SG  
 Client Sample ID: GW-12566614-051722-NG-001



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

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

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

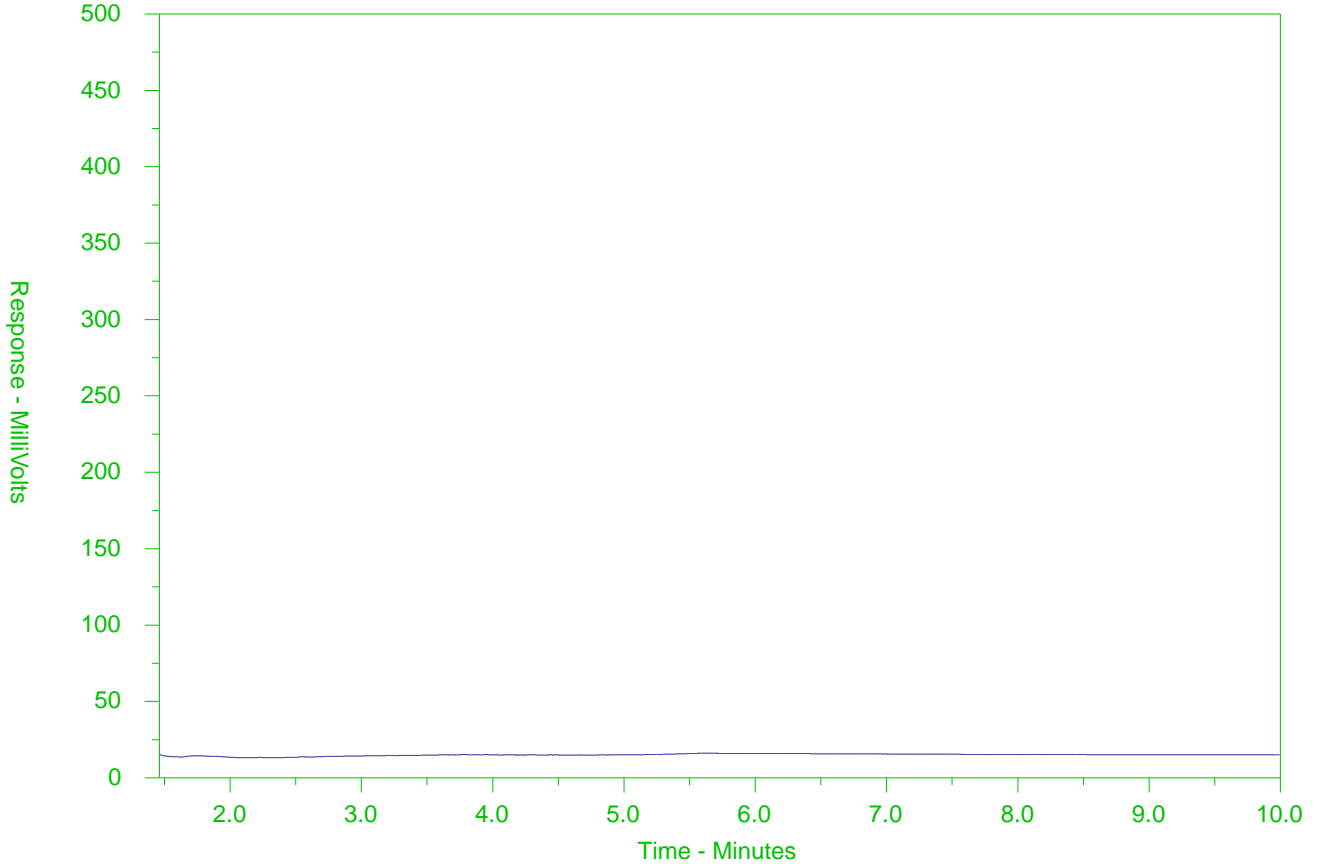
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

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

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: WT2204113-002-E601.SG  
 Client Sample ID: GW-12566614-051722-NG-002



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

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

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

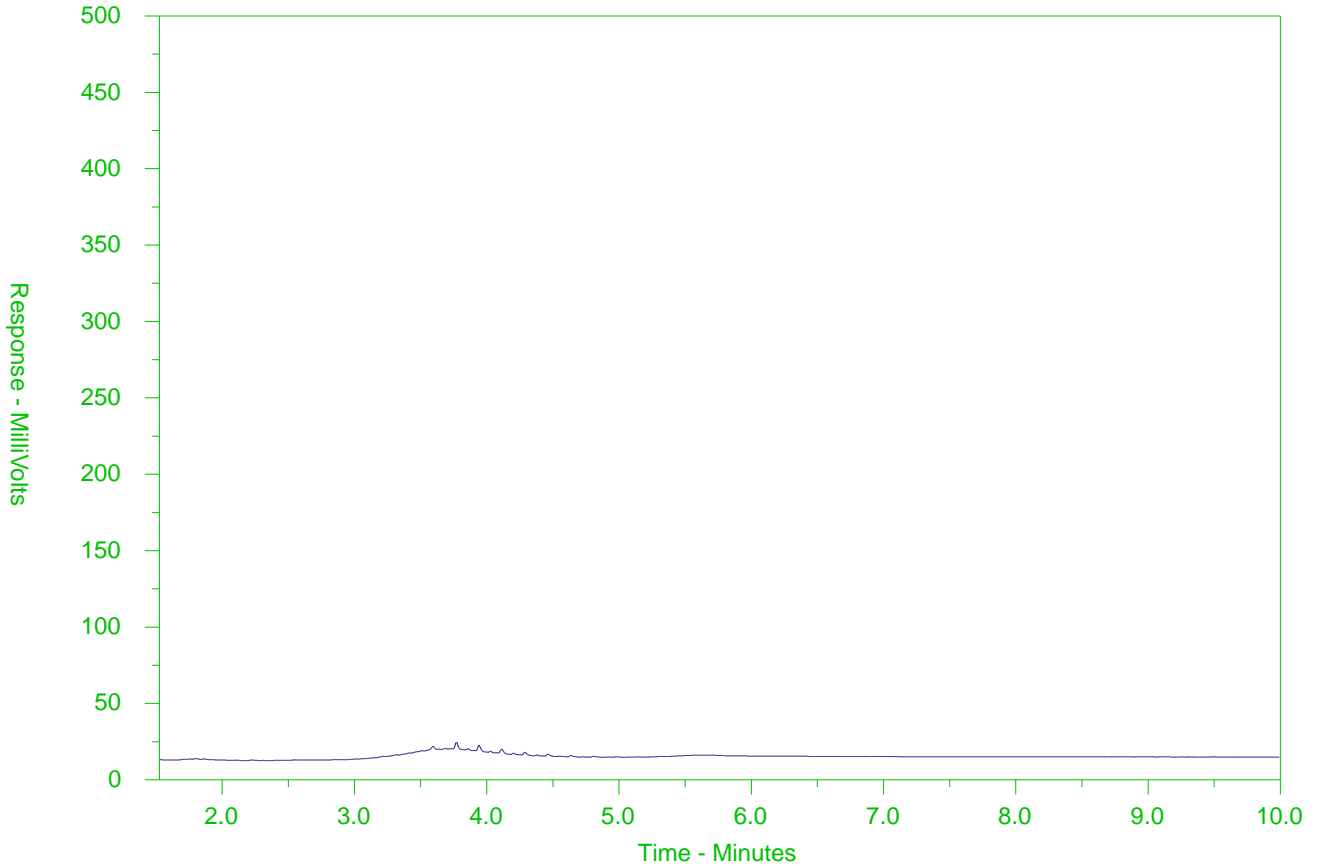
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

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

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: WT2204113-003-E601.SG  
 Client Sample ID: GW-12566614-051722-NG-003



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

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

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

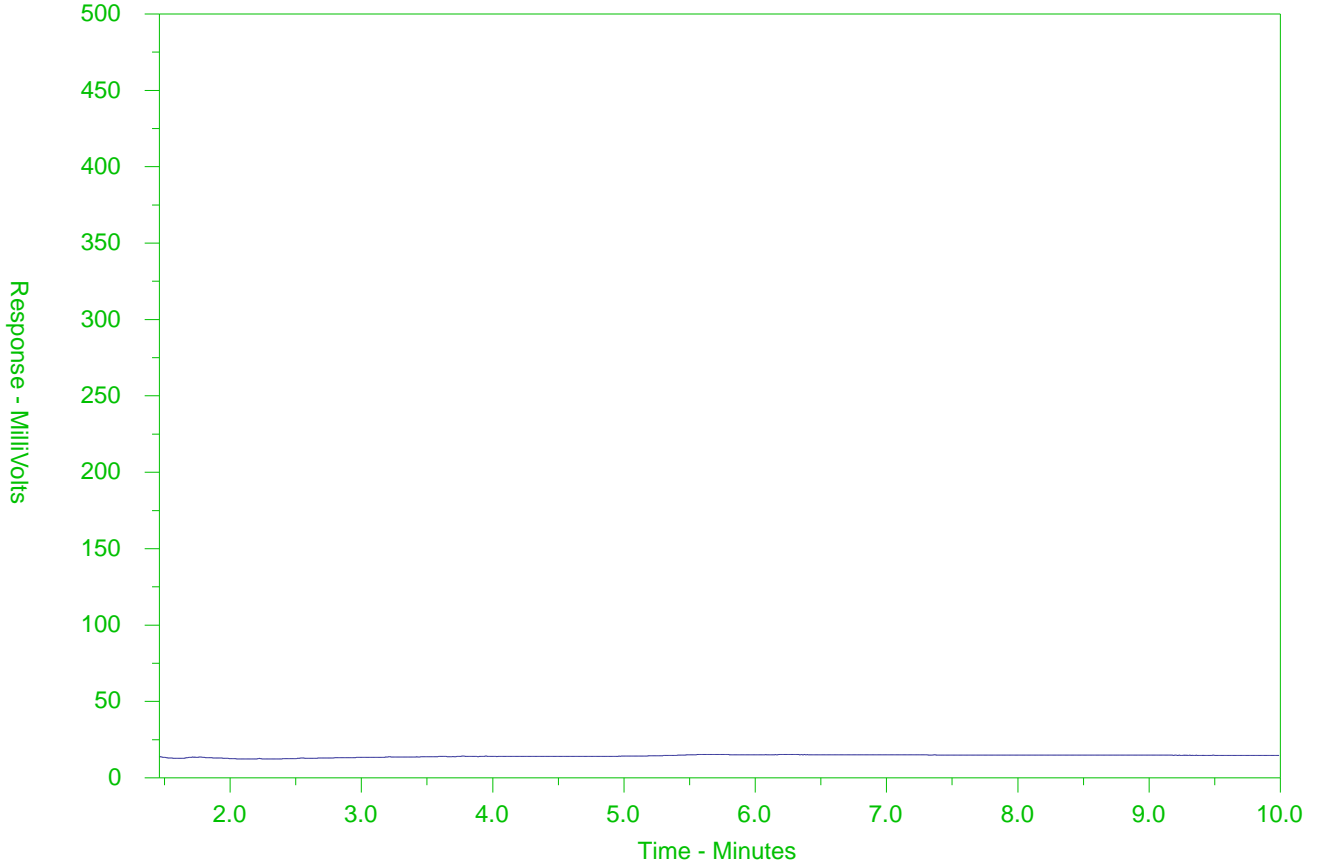
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

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

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: WT2204113-004-E601.SG  
 Client Sample ID: GW-12566614-051722-NG-004



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

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

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

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

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









Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 -

Page

Environmental Division
Waterloo
Work Order Reference
WT2204113



Telephone : + 1 519 886 6910

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

Company: GHD Ltd. (Acct 13791)
Contact: Pascal Renella
Phone: 519-884-0510
Street: 455 Phillip St.
City/Province: Waterloo, ON
Postal Code: N2L 3X2

Select Report Format: PDF, EXCEL, EDD (DIGITAL)
Merge QC/QCI Reports with COA
Compare Results to Criteria on Report
Select Distribution: EMAIL, MAIL, FAX
Email 1 or Fax: pascal.renella@ghd.com
Email 2: See SSO/W/PO
Email 3:

Routine [R] if received by 3pm M-F - no surcharges apply
4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
Same day [E2] if received by 10am M-S - 200% rush surcharge. Ad fees may apply to rush requests on weekends, statutory holidays and routine tests

Invoice To: Same as Report To
Copy of Invoice with Report: YES, NO

Select Invoice Distribution: EMAIL, MAIL, FAX
Email 1 or Fax: Invoicing-Canada@ghd.com
Email 2

Date and Time Required for all E&P TATs:
For tests that can not be performed according to the TATs

Company: GHD Ltd (Acct 13791)
Contact:
ALS Account # / Quote #: GHD100/W/T2022GHDL1000057
Job #: 12566614
PO / A/E:
LSD:

Project Information
Oil and Gas Required Fields (client use)
AFE/Cost Center:
Major/Minor Code:
Requisitioner:
Location:

Analysis Request
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

ALS Lab Work Order # (lab use only): W2204113

ALS Contact: Rick H
Sampler:

Table with columns: NUMBER OF CONTAINERS, Metal/Inorganics, PAHS, PHC, VOCs, BTEX, Trip Blank -F1

ALS Sample # (lab use only)
Sample Identification and/or Coordinates (This description will appear on the report)

Table with columns: Date (dd-mm-yy), Time (hh:mm), Sample Type

Table with columns: SAMPLES ON HOLD, EXTENDED STORAGE REQUIRED, SUSPECTED HAZARD (see notes)

Drinking Water (DW) Samples (client use)
Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Table with columns: Sample Identification and/or Coordinates, Date, Time, Sample Type

Cooling Method: NONE, ICE, ICE PACKS, FROZEN, COOLING INITIATED
Submission Comments identified on Sample Receipt Notification:
Cooler Custody Seals Intact: YES, NO
Sample Custody Seals Intact: YES, NO
INITIAL COOLER TEMPERATURES °C
FINAL COOLER TEMPERATURES °C

Are samples taken from a Regulated DW System?
Are samples for human consumption/ use?

SHIPMENT RELEASE (client use)
Date: 17/5/22
Time: 15:45
Received by: [Signature]

INITIAL SHIPMENT RECEPTION (lab use only)
Date: 17/7/22
Time: 14:5
Received by: [Signature]

FINAL SHIPMENT RECEPTION (lab use only)
Date: 19/7/22
Time: 9:30
Received by: [Signature]

Released by: Nicki Gwata
Date: 17/5/22
Time: 15:45

WHITE - LABORATORY COPY
YELLOW - CLIENT COPY

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



## CERTIFICATE OF ANALYSIS

Work Order	: WT2204544	Page	: 1 of 10
Client	: GHD Limited	Laboratory	: Waterloo - Environmental
Contact	: Pascal Renella	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street Waterloo ON Canada N2L 3X2	Address	: 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	: 519 725 3313	Telephone	: +1 519 886 6910
Project	: 12566614	Date Samples Received	: 27-May-2022 10:30
PO	: 735-002942	Date Analysis	: 28-May-2022
		Commenced	
C-O-C number	: ----	Issue Date	: 07-Jun-2022 12:52
Sampler	: ----		
Site	: ----		
Quote number	: 12566614-SSOW-735-002942		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Organics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Inorganics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Metals, Waterloo, Ontario
Sarah Birch	Team Leader - Volatiles	Organics, Waterloo, Ontario



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre
mS/cm	millisiemens per centimetre
pH units	pH units

>: greater than.

<: less than.

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

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

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

## Sample Comments

<i>Sample</i>	<i>Client Id</i>	<i>Comment</i>
WT2204544-004	GW-12566614-052622-NG-00 8	<b>ALS Sample #4 NG-008: Insufficient Sample. Test could not be conducted for EC,PH,CL.</b>

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).





## Analytical Results

WT2204544-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052522-NG-005

Client sampling date / time: 25-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
conductivity	----	2.90	0.0010	mS/cm	E100	28-May-2022	28-May-2022	502956
pH	----	7.54	0.10	pH units	E108	28-May-2022	28-May-2022	502955
<b>Anions and Nutrients</b>								
chloride	16887-00-6	749 <sup>DLDS</sup>	2.50	mg/L	E235.Cl	28-May-2022	30-May-2022	502949
<b>Cyanides</b>								
cyanide, weak acid dissociable	----	<2.0	2.0	µg/L	E336	30-May-2022	30-May-2022	504606
<b>Dissolved Metals</b>								
antimony, dissolved	7440-36-0	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
arsenic, dissolved	7440-38-2	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
barium, dissolved	7440-39-3	129 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
beryllium, dissolved	7440-41-7	<0.200 <sup>DLHC</sup>	0.200	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
boron, dissolved	7440-42-8	<100 <sup>DLHC</sup>	100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
cadmium, dissolved	7440-43-9	<0.0500 <sup>DLHC</sup>	0.0500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
chromium, dissolved	7440-47-3	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
cobalt, dissolved	7440-48-4	1.46 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
copper, dissolved	7440-50-8	<2.00 <sup>DLHC</sup>	2.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
lead, dissolved	7439-92-1	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
mercury, dissolved	7439-97-6	<0.0050	0.0050	µg/L	E509	31-May-2022	31-May-2022	505316
molybdenum, dissolved	7439-98-7	7.98 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
nickel, dissolved	7440-02-0	5.87 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
selenium, dissolved	7782-49-2	0.914 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
silver, dissolved	7440-22-4	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
sodium, dissolved	7440-23-5	336000 <sup>DLHC</sup>	500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
thallium, dissolved	7440-28-0	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
uranium, dissolved	7440-61-1	10.4 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
vanadium, dissolved	7440-62-2	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
zinc, dissolved	7440-66-6	<10.0 <sup>DLHC</sup>	10.0	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
dissolved mercury filtration location	----	Field	-	-	EP509	-	31-May-2022	505316
dissolved metals filtration location	----	Field	-	-	EP421	-	02-Jun-2022	507519
<b>Speciated Metals</b>								
chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.50	0.50	µg/L	E532A	-	30-May-2022	504601
<b>Volatile Organic Compounds</b>								
acetone	67-64-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
benzene	71-43-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromodichloromethane	75-27-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromoform	75-25-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromomethane	74-83-9	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
carbon tetrachloride	56-23-5	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
chlorobenzene	108-90-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
chloroform	67-66-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromochloromethane	124-48-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromoethane, 1,2-	106-93-4	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,2-	95-50-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,3-	541-73-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,4-	106-46-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorodifluoromethane	75-71-8	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,1-	75-34-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,2-	107-06-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059



## Analytical Results

WT2204544-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052522-NG-005

Client sampling date / time: 25-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Volatile Organic Compounds</b>								
dichloroethylene, 1,1-	75-35-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, cis-1,2-	156-59-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, trans-1,2-	156-60-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloromethane	75-09-2	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropane, 1,2-	78-87-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, cis+trans-1,3-	542-75-6	<0.50	0.5	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, cis-1,3-	10061-01-5	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, trans-1,3-	10061-02-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
hexane, n-	110-54-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl ethyl ketone [MEK]	78-93-3	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl isobutyl ketone [MIBK]	108-10-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl-tert-butyl ether [MTBE]	1634-04-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
styrene	100-42-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,1,2-	630-20-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,2,2-	79-34-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethylene	127-18-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
toluene	108-88-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,1-	71-55-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,2-	79-00-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethylene	79-01-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichlorofluoromethane	75-69-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
vinyl chloride	75-01-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
BTEX, total	----	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	91.7	1.0	%	E611D	31-May-2022	31-May-2022	505059
difluorobenzene, 1,4-	540-36-3	97.2	1.0	%	E611D	31-May-2022	31-May-2022	505059
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<25	25	µg/L	E581.F1-L	31-May-2022	31-May-2022	505060
F2 (C10-C16)	----	<100	100	µg/L	E601.SG	01-Jun-2022	07-Jun-2022	506541
F3 (C16-C34)	----	<250	250	µg/L	E601.SG	01-Jun-2022	07-Jun-2022	506541
F4 (C34-C50)	----	<250	250	µg/L	E601.SG	01-Jun-2022	07-Jun-2022	506541
F1-BTEX	----	<25	25	µg/L	EC580	-	01-Jun-2022	-
hydrocarbons, total (C6-C50)	----	<370	370	µg/L	EC581SG	-	01-Jun-2022	-
chromatogram to baseline at nC50	n/a	YES	-	-	E601.SG	01-Jun-2022	07-Jun-2022	506541
<b>Hydrocarbons Surrogates</b>								
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	86.9	1.0	%	E601.SG	01-Jun-2022	07-Jun-2022	506541
dichlorotoluene, 3,4-	97-75-0	84.6	1.0	%	E581.F1-L	31-May-2022	31-May-2022	505060
<b>Polycyclic Aromatic Hydrocarbons</b>								
acenaphthene	83-32-9	0.013	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
acenaphthylene	208-96-8	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
anthracene	120-12-7	0.040	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benz(a)anthracene	56-55-3	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benzo(a)pyrene	50-32-8	<0.0050	0.0050	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benzo(b+j)fluoranthene	n/a	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540



## Analytical Results

WT2204544-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052522-NG-005

Client sampling date / time: 25-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Polycyclic Aromatic Hydrocarbons</b>								
benzo(g,h,i)perylene	191-24-2	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benzo(k)fluoranthene	207-08-9	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
chrysene	218-01-9	0.012	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
dibenz(a,h)anthracene	53-70-3	<0.0050	0.0050	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
fluoranthene	206-44-0	0.117	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
fluorene	86-73-7	0.043	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
indeno(1,2,3-c,d)pyrene	193-39-5	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
methylnaphthalene, 1-	90-12-0	0.024	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
methylnaphthalene, 1+2-	----	0.064	0.015	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
methylnaphthalene, 2-	91-57-6	0.040	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
naphthalene	91-20-3	<0.050	0.050	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
phenanthrene	85-01-8	0.486	0.020	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
pyrene	129-00-0	0.108	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>								
chrysene-d12	1719-03-5	117	0.1	%	E641A	01-Jun-2022	02-Jun-2022	506540
naphthalene-d8	1146-65-2	92.7	0.1	%	E641A	01-Jun-2022	02-Jun-2022	506540
phenanthrene-d10	1517-22-2	113	0.1	%	E641A	01-Jun-2022	02-Jun-2022	506540

Please refer to the General Comments section for an explanation of any qualifiers detected.

## Analytical Results

WT2204544-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052622-NG-006

Client sampling date / time: 26-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Physical Tests</b>								
conductivity	----	7.76	0.0010	mS/cm	E100	28-May-2022	28-May-2022	502956
pH	----	7.84	0.10	pH units	E108	28-May-2022	28-May-2022	502955
<b>Anions and Nutrients</b>								
chloride	16887-00-6	2820 <sup>DLDS</sup>	10.0	mg/L	E235.Cl	28-May-2022	30-May-2022	502949
<b>Cyanides</b>								
cyanide, weak acid dissociable	----	<2.0	2.0	µg/L	E336	30-May-2022	30-May-2022	504606
<b>Dissolved Metals</b>								
antimony, dissolved	7440-36-0	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
arsenic, dissolved	7440-38-2	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
barium, dissolved	7440-39-3	573 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
beryllium, dissolved	7440-41-7	<0.200 <sup>DLHC</sup>	0.200	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
boron, dissolved	7440-42-8	<100 <sup>DLHC</sup>	100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
cadmium, dissolved	7440-43-9	0.0799 <sup>DLHC</sup>	0.0500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
chromium, dissolved	7440-47-3	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
cobalt, dissolved	7440-48-4	1.23 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
copper, dissolved	7440-50-8	3.75 <sup>DLHC</sup>	2.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
lead, dissolved	7439-92-1	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
mercury, dissolved	7439-97-6	<0.0050 <sup>DLHC</sup>	0.0050	µg/L	E509	31-May-2022	31-May-2022	505316
molybdenum, dissolved	7439-98-7	6.93 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
nickel, dissolved	7440-02-0	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519





## Analytical Results

WT2204544-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052622-NG-006

Client sampling date / time: 26-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QC Lot
<b>Dissolved Metals</b>								
selenium, dissolved	7782-49-2	0.745 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
silver, dissolved	7440-22-4	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
sodium, dissolved	7440-23-5	1570000 <sup>DLHC</sup>	5000	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
thallium, dissolved	7440-28-0	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
uranium, dissolved	7440-61-1	10.3 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
vanadium, dissolved	7440-62-2	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
zinc, dissolved	7440-66-6	<10.0 <sup>DLHC</sup>	10.0	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
dissolved mercury filtration location	----	Field	-	-	EP509	-	31-May-2022	505316
dissolved metals filtration location	----	Field	-	-	EP421	-	02-Jun-2022	507519
<b>Speciated Metals</b>								
chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.50	0.50	µg/L	E532A	-	30-May-2022	504601
<b>Volatile Organic Compounds</b>								
acetone	67-64-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
benzene	71-43-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromodichloromethane	75-27-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromoform	75-25-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromomethane	74-83-9	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
carbon tetrachloride	56-23-5	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
chlorobenzene	108-90-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
chloroform	67-66-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromochloromethane	124-48-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromoethane, 1,2-	106-93-4	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,2-	95-50-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,3-	541-73-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,4-	106-46-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorodifluoromethane	75-71-8	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,1-	75-34-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,2-	107-06-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, 1,1-	75-35-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, cis-1,2-	156-59-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, trans-1,2-	156-60-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloromethane	75-09-2	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropane, 1,2-	78-87-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, cis+trans-1,3-	542-75-6	<0.50	0.5	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, cis-1,3-	10061-01-5	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, trans-1,3-	10061-02-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
hexane, n-	110-54-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl ethyl ketone [MEK]	78-93-3	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl isobutyl ketone [MIBK]	108-10-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl-tert-butyl ether [MTBE]	1634-04-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
styrene	100-42-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,1,2-	630-20-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,2,2-	79-34-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethylene	127-18-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
toluene	108-88-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,1-	71-55-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,2-	79-00-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059



## Analytical Results

WT2204544-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052622-NG-006

Client sampling date / time: 26-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Volatile Organic Compounds</b>								
trichloroethylene	79-01-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichlorofluoromethane	75-69-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
vinyl chloride	75-01-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
BTEX, total	----	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	91.0	1.0	%	E611D	31-May-2022	31-May-2022	505059
difluorobenzene, 1,4-	540-36-3	97.5	1.0	%	E611D	31-May-2022	31-May-2022	505059
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<25	25	µg/L	E581.F1-L	31-May-2022	31-May-2022	505060
F2 (C10-C16)	----	<100	100	µg/L	E601.SG	01-Jun-2022	07-Jun-2022	506541
F3 (C16-C34)	----	<250	250	µg/L	E601.SG	01-Jun-2022	07-Jun-2022	506541
F4 (C34-C50)	----	<250	250	µg/L	E601.SG	01-Jun-2022	07-Jun-2022	506541
F1-BTEX	----	<25	25	µg/L	EC580	-	01-Jun-2022	-
hydrocarbons, total (C6-C50)	----	<370	370	µg/L	EC581SG	-	01-Jun-2022	-
chromatogram to baseline at nC50	n/a	YES	-	-	E601.SG	01-Jun-2022	07-Jun-2022	506541
<b>Hydrocarbons Surrogates</b>								
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	92.6	1.0	%	E601.SG	01-Jun-2022	07-Jun-2022	506541
dichlorotoluene, 3,4-	97-75-0	88.0	1.0	%	E581.F1-L	31-May-2022	31-May-2022	505060
<b>Polycyclic Aromatic Hydrocarbons</b>								
acenaphthene	83-32-9	0.045	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
acenaphthylene	208-96-8	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
anthracene	120-12-7	0.018	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benz(a)anthracene	56-55-3	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benzo(a)pyrene	50-32-8	<0.0050	0.0050	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benzo(b+j)fluoranthene	n/a	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benzo(g,h,i)perylene	191-24-2	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
benzo(k)fluoranthene	207-08-9	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
chrysene	218-01-9	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
dibenz(a,h)anthracene	53-70-3	<0.0050	0.0050	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
fluoranthene	206-44-0	0.048	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
fluorene	86-73-7	0.074	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
indeno(1,2,3-c,d)pyrene	193-39-5	<0.010	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
methylnaphthalene, 1-	90-12-0	0.144	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
methylnaphthalene, 1+2-	----	0.224	0.015	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
methylnaphthalene, 2-	91-57-6	0.080	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
naphthalene	91-20-3	<0.050	0.050	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
phenanthrene	85-01-8	0.638	0.020	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
pyrene	129-00-0	0.100	0.010	µg/L	E641A	01-Jun-2022	02-Jun-2022	506540
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>								
chrysene-d12	1719-03-5	103	0.1	%	E641A	01-Jun-2022	02-Jun-2022	506540
naphthalene-d8	1146-65-2	115	0.1	%	E641A	01-Jun-2022	02-Jun-2022	506540
phenanthrene-d10	1517-22-2	131	0.1	%	E641A	01-Jun-2022	02-Jun-2022	506540

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

WT2204544-003

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052622-NG-007

Client sampling date / time: 26-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Volatile Organic Compounds</b>								
acetone	67-64-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
benzene	71-43-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromodichloromethane	75-27-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromoform	75-25-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromomethane	74-83-9	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
carbon tetrachloride	56-23-5	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
chlorobenzene	108-90-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
chloroform	67-66-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromochloromethane	124-48-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromoethane, 1,2-	106-93-4	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,2-	95-50-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,3-	541-73-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,4-	106-46-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorodifluoromethane	75-71-8	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,1-	75-34-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,2-	107-06-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, 1,1-	75-35-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, cis-1,2-	156-59-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, trans-1,2-	156-60-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloromethane	75-09-2	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropane, 1,2-	78-87-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, cis+trans-1,3-	542-75-6	<0.50	0.5	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, cis-1,3-	10061-01-5	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, trans-1,3-	10061-02-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
hexane, n-	110-54-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl ethyl ketone [MEK]	78-93-3	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl isobutyl ketone [MIBK]	108-10-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl-tert-butyl ether [MTBE]	1634-04-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
styrene	100-42-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,1,2-	630-20-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,1,2,2-	79-34-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethylene	127-18-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
toluene	108-88-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,1-	71-55-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,2-	79-00-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethylene	79-01-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichlorofluoromethane	75-69-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
vinyl chloride	75-01-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
BTEX, total	----	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	92.4	1.0	%	E611D	31-May-2022	31-May-2022	505059
difluorobenzene, 1,4-	540-36-3	97.2	1.0	%	E611D	31-May-2022	31-May-2022	505059

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

WT2204544-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052622-NG-008

Client sampling date / time: 26-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Cyanides</b>								
cyanide, weak acid dissociable	----	<2.0	2.0	µg/L	E336	30-May-2022	30-May-2022	504606
<b>Dissolved Metals</b>								
antimony, dissolved	7440-36-0	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
arsenic, dissolved	7440-38-2	<1.00 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
barium, dissolved	7440-39-3	473 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
beryllium, dissolved	7440-41-7	<0.200 <sup>DLHC</sup>	0.200	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
boron, dissolved	7440-42-8	<100 <sup>DLHC</sup>	100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
cadmium, dissolved	7440-43-9	<0.0500 <sup>DLHC</sup>	0.0500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
chromium, dissolved	7440-47-3	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
cobalt, dissolved	7440-48-4	2.78 <sup>DLHC</sup>	1.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
copper, dissolved	7440-50-8	<2.00 <sup>DLHC</sup>	2.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
lead, dissolved	7439-92-1	<0.500 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
mercury, dissolved	7439-97-6	<0.0050 <sup>DLHC</sup>	0.0050	µg/L	E509	31-May-2022	31-May-2022	505316
molybdenum, dissolved	7439-98-7	17.4 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
nickel, dissolved	7440-02-0	9.96 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
selenium, dissolved	7782-49-2	0.701 <sup>DLHC</sup>	0.500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
silver, dissolved	7440-22-4	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
sodium, dissolved	7440-23-5	381000 <sup>DLHC</sup>	500	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
thallium, dissolved	7440-28-0	<0.100 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
uranium, dissolved	7440-61-1	5.51 <sup>DLHC</sup>	0.100	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
vanadium, dissolved	7440-62-2	<5.00 <sup>DLHC</sup>	5.00	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
zinc, dissolved	7440-66-6	<10.0 <sup>DLHC</sup>	10.0	µg/L	E421	02-Jun-2022	02-Jun-2022	507519
dissolved mercury filtration location	----	Field	-	-	EP509	-	31-May-2022	505316
dissolved metals filtration location	----	Field	-	-	EP421	-	02-Jun-2022	507519
<b>Speciated Metals</b>								
chromium, hexavalent [Cr VI], dissolved	18540-29-9	<0.50	0.50	µg/L	E532A	-	30-May-2022	504601
<b>Volatile Organic Compounds</b>								
acetone	67-64-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
benzene	71-43-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromodichloromethane	75-27-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromoform	75-25-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
bromomethane	74-83-9	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
carbon tetrachloride	56-23-5	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
chlorobenzene	108-90-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
chloroform	67-66-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromochloromethane	124-48-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dibromoethane, 1,2-	106-93-4	<0.20	0.20	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,2-	95-50-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,3-	541-73-1	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorobenzene, 1,4-	106-46-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichlorodifluoromethane	75-71-8	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,1-	75-34-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethane, 1,2-	107-06-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, 1,1-	75-35-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, cis-1,2-	156-59-2	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloroethylene, trans-1,2-	156-60-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloromethane	75-09-2	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropane, 1,2-	78-87-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059



## Analytical Results

WT2204544-004

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: GW-12566614-052622-NG-008

Client sampling date / time: 26-May-2022

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
<b>Volatile Organic Compounds</b>								
dichloropropylene, cis+trans-1,3-	542-75-6	<0.50	0.5	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, cis-1,3-	10061-01-5	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
dichloropropylene, trans-1,3-	10061-02-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
hexane, n-	110-54-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl ethyl ketone [MEK]	78-93-3	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl isobutyl ketone [MIBK]	108-10-1	<20	20	µg/L	E611D	31-May-2022	31-May-2022	505059
methyl-tert-butyl ether [MTBE]	1634-04-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
styrene	100-42-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,1,2-	630-20-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethane, 1,1,2,2-	79-34-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
tetrachloroethylene	127-18-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
toluene	108-88-3	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,1-	71-55-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethane, 1,1,2-	79-00-5	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichloroethylene	79-01-6	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
trichlorofluoromethane	75-69-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
vinyl chloride	75-01-4	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, m+p-	179601-23-1	<0.40	0.40	µg/L	E611D	31-May-2022	31-May-2022	505059
xylene, o-	95-47-6	<0.30	0.30	µg/L	E611D	31-May-2022	31-May-2022	505059
xylenes, total	1330-20-7	<0.50	0.50	µg/L	E611D	31-May-2022	31-May-2022	505059
BTEX, total	----	<1.0	1.0	µg/L	E611D	31-May-2022	31-May-2022	505059
<b>Volatile Organic Compounds Surrogates</b>								
bromofluorobenzene, 4-	460-00-4	90.4	1.0	%	E611D	31-May-2022	31-May-2022	505059
difluorobenzene, 1,4-	540-36-3	97.6	1.0	%	E611D	31-May-2022	31-May-2022	505059
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<25	25	µg/L	E581.F1-L	31-May-2022	31-May-2022	505060
F1-BTEX	----	<25	25	µg/L	EC580	-	01-Jun-2022	-
<b>Hydrocarbons Surrogates</b>								
dichlorotoluene, 3,4-	97-75-0	85.0	1.0	%	E581.F1-L	31-May-2022	31-May-2022	505060

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>WT2204544</b>	Page	: 1 of 11
Client	: <b>GHD Limited</b>	Laboratory	: Waterloo - Environmental
Contact	: Pascal Renella	Account Manager	: Rick Hawthorne
Address	: 455 Phillip Street Waterloo ON Canada N2L 3X2	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 725 3313	Telephone	: +1 519 886 6910
Project	: 12566614	Date Samples Received	: 27-May-2022 10:30
PO	: 735-002942	Issue Date	: 07-Jun-2022 12:53
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: 12566614-SSOW-735-002942		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

### **Workorder Comments**

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

### **Summary of Outliers**

#### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

#### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

#### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.







**Outliers : Quality Control Samples**

*Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes*

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
<b>Matrix Spike (MS) Recoveries</b>								
Dissolved Metals	Anonymous	Anonymous	selenium, dissolved	7782-49-2	E421	132 % <sup>MES</sup>	70.0-130%	Recovery greater than upper data quality objective
Volatile Organic Compounds	Anonymous	Anonymous	tetrachloroethane, 1,1,2,2-	79-34-5	E611D	34.9 % <sup>RRQC</sup>	60.0-140%	Recovery less than lower data quality objective

**Result Qualifiers**

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RRQC	Refer to report comments for information regarding this QC result.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> GW-12566614-052622-NG-006	E235.Cl	26-May-2022	----	----	----		30-May-2022	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> GW-12566614-052522-NG-005	E235.Cl	25-May-2022	----	----	----		30-May-2022	28 days	6 days	✓
<b>Cyanides : WAD Cyanide</b>										
<b>HDPE - total (sodium hydroxide)</b> GW-12566614-052622-NG-006	E336	26-May-2022	----	----	----		30-May-2022	14 days	5 days	✓
<b>Cyanides : WAD Cyanide</b>										
<b>HDPE - total (sodium hydroxide)</b> GW-12566614-052622-NG-008	E336	26-May-2022	----	----	----		30-May-2022	14 days	5 days	✓
<b>Cyanides : WAD Cyanide</b>										
<b>HDPE - total (sodium hydroxide)</b> GW-12566614-052522-NG-005	E336	25-May-2022	----	----	----		30-May-2022	14 days	6 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> GW-12566614-052622-NG-006	E509	26-May-2022	31-May-2022	----	----		31-May-2022	28 days	5 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> GW-12566614-052622-NG-008	E509	26-May-2022	31-May-2022	----	----		31-May-2022	28 days	5 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> GW-12566614-052522-NG-005	E509	25-May-2022	31-May-2022	----	----		31-May-2022	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW-12566614-052622-NG-006	E421	26-May-2022	02-Jun-2022	----	----		02-Jun-2022	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW-12566614-052622-NG-008	E421	26-May-2022	02-Jun-2022	----	----		02-Jun-2022	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> GW-12566614-052522-NG-005	E421	25-May-2022	02-Jun-2022	----	----		02-Jun-2022	180 days	8 days	✔	
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-052622-NG-006	E581.F1-L	26-May-2022	31-May-2022	----	----		31-May-2022	14 days	5 days	✔	
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-052622-NG-008	E581.F1-L	26-May-2022	31-May-2022	----	----		31-May-2022	14 days	5 days	✔	
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)</b>											
<b>Glass vial (sodium bisulfate)</b> GW-12566614-052522-NG-005	E581.F1-L	25-May-2022	31-May-2022	----	----		31-May-2022	14 days	6 days	✔	
<b>Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-052622-NG-006	E601.SG	26-May-2022	01-Jun-2022	14 days	6 days	✔	07-Jun-2022	40 days	6 days	✔	
<b>Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-052522-NG-005	E601.SG	25-May-2022	01-Jun-2022	14 days	7 days	✔	07-Jun-2022	40 days	6 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> GW-12566614-052622-NG-006	E100	26-May-2022	----	----	----		28-May-2022	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> GW-12566614-052522-NG-005	E100	25-May-2022	----	----	----		28-May-2022	28 days	4 days	✓	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE</b> GW-12566614-052622-NG-006	E108	26-May-2022	----	----	----		28-May-2022	0.25 hrs	64 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE</b> GW-12566614-052522-NG-005	E108	25-May-2022	----	----	----		28-May-2022	0.25 hrs	88 hrs	* EHTR-FM	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-052622-NG-006	E641A	26-May-2022	01-Jun-2022	14 days	6 days	✓	02-Jun-2022	40 days	1 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> GW-12566614-052522-NG-005	E641A	25-May-2022	01-Jun-2022	14 days	7 days	✓	02-Jun-2022	40 days	1 days	✓	
<b>Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC</b>											
<b>HDPE (sodium hydroxide+ammonium hydroxide+ammonium sulfate)</b> GW-12566614-052622-NG-006	E532A	26-May-2022	----	----	----		30-May-2022	28 days	5 days	✓	
<b>Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC</b>											
<b>HDPE (sodium hydroxide+ammonium hydroxide+ammonium sulfate)</b> GW-12566614-052622-NG-008	E532A	26-May-2022	----	----	----		30-May-2022	28 days	5 days	✓	
<b>Speciated Metals : Dissolved Hexavalent Chromium (Cr VI) by IC</b>											
<b>HDPE (sodium hydroxide+ammonium hydroxide+ammonium sulfate)</b> GW-12566614-052522-NG-005	E532A	25-May-2022	----	----	----		30-May-2022	28 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW-12566614-052622-NG-006	E611D	26-May-2022	31-May-2022	----	----		31-May-2022	14 days	5 days	✓
<b>Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW-12566614-052622-NG-007	E611D	26-May-2022	31-May-2022	----	----		31-May-2022	14 days	5 days	✓
<b>Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW-12566614-052622-NG-008	E611D	26-May-2022	31-May-2022	----	----		31-May-2022	14 days	5 days	✓
<b>Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> GW-12566614-052522-NG-005	E611D	25-May-2022	31-May-2022	----	----		31-May-2022	14 days	6 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	505060	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	502949	1	19	5.2	5.0	✔
Conductivity in Water	E100	502956	1	17	5.8	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	504601	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	505316	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	507519	1	20	5.0	5.0	✔
pH by Meter	E108	502955	1	18	5.5	5.0	✔
VOCs (ON List) by Headspace GC-MS	E611D	505059	2	16	12.5	5.0	✔
WAD Cyanide	E336	504606	1	9	11.1	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	505060	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	502949	1	19	5.2	5.0	✔
Conductivity in Water	E100	502956	1	17	5.8	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	504601	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	505316	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	507519	1	20	5.0	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	506540	1	10	10.0	5.0	✔
pH by Meter	E108	502955	1	18	5.5	5.0	✔
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	506541	1	13	7.6	5.0	✔
VOCs (ON List) by Headspace GC-MS	E611D	505059	1	16	6.2	5.0	✔
WAD Cyanide	E336	504606	1	9	11.1	5.0	✔
<b>Method Blanks (MB)</b>							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	505060	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	502949	1	19	5.2	5.0	✔
Conductivity in Water	E100	502956	1	17	5.8	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	504601	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	505316	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	507519	1	20	5.0	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	506540	1	10	10.0	5.0	✔
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	506541	1	13	7.6	5.0	✔
VOCs (ON List) by Headspace GC-MS	E611D	505059	1	16	6.2	5.0	✔
WAD Cyanide	E336	504606	1	9	11.1	5.0	✔
<b>Matrix Spikes (MS)</b>							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	505060	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	502949	1	19	5.2	5.0	✔
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A	504601	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	505316	1	20	5.0	5.0	✔



Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Dissolved Metals in Water by CRC ICPMS	E421	507519	1	20	5.0	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	505059	1	16	6.2	5.0	✓
WAD Cyanide	E336	504606	1	9	11.1	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Waterloo - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Waterloo - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
WAD Cyanide	E336 Waterloo - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by Continuous Flow Analyzer (CFA) with in-line distillation followed by colourmetric analysis.
Dissolved Metals in Water by CRC ICPMS	E421 Waterloo - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Waterloo - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hexavalent Chromium (Cr VI) by IC	E532A Waterloo - Environmental	Water	APHA 3500-Cr C (Ion Chromatography)	Hexavalent Chromium is measured by Ion chromatography-Post column reaction and UV detection.  sample pretreatment involved field or lab filtration following by sample preservation.
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME hydrocarbon fractions (F2-F4).
VOCs (ON List) by Headspace GC-MS	E611D Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
PAHs by Hexane LVI GC-MS	E641A  Waterloo - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
F1-BTEX	EC580  Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
SUM F1 to F4 where F2-F4 is SG treated	EC581SG  Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	Hydrocarbons, total (C6-C50) is the sum of CCME Fraction F1(C6-C10), F2(C10-C16), F3(C16-C34), and F4(C34-C50), where F2-F4 have been treated with silica gel. F4G-sg is not used within this calculation due to overlap with other fractions.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421  Waterloo - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Waterloo - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Waterloo - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Waterloo - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



## QUALITY CONTROL REPORT

**Work Order** : **WT2204544**  
Client : GHD Limited  
Contact : Pascal Renella  
Address : 455 Phillip Street  
Waterloo ON Canada N2L 3X2  
Telephone : 519 725 3313  
Project : 12566614  
PO : 735-002942  
C-O-C number : ----  
Sampler : ----  
Site : ----  
Quote number : 12566614-SSOW-735-002942  
No. of samples received : 4  
No. of samples analysed : 4

Page : 1 of 14  
Laboratory : Waterloo - Environmental  
Account Manager : Rick Hawthorne  
Address : 60 Northland Road, Unit 1  
Waterloo, Ontario Canada N2V 2B8  
Telephone : +1 519 886 6910  
Date Samples Received : 27-May-2022 10:30  
Date Analysis Commenced : 28-May-2022  
Issue Date : 07-Jun-2022 12:53

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Waterloo Organics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Waterloo Inorganics, Waterloo, Ontario
Jon Fisher	Department Manager - Inorganics	Waterloo Metals, Waterloo, Ontario
Sarah Birch	Team Leader - Volatiles	Waterloo Organics, Waterloo, Ontario

Page : 2 of 14  
Work Order : WT2204544  
Client : GHD Limited  
Project : 12566614

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## **Workorder Comments**

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

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 502955)</b>											
WT2204540-030	Anonymous	pH	----	E108	0.10	pH units	6.81	6.81	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 502956)</b>											
WT2204540-030	Anonymous	conductivity	----	E100	2.0	µS/cm	28.9	28.8	0.1	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 502949)</b>											
WT2204540-030	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 504606)</b>											
WT2204494-002	Anonymous	cyanide, weak acid dissociable	----	E336	0.0020	mg/L	<2.0 µg/L	<0.0020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 505316)</b>											
WT2204494-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.000050	mg/L	<0.0050 µg/L	<0.000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 507519)</b>											
WT2204494-002	Anonymous	antimony, dissolved	7440-36-0	E421	0.00100	mg/L	<1.00 µg/L	<0.00100	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00100	mg/L	<1.00 µg/L	<0.00100	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00100	mg/L	90.8 µg/L	0.0915	0.718%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000200	mg/L	<0.200 µg/L	<0.000200	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.100	mg/L	<100 µg/L	<0.100	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	<0.0500 µg/L	<0.0000500	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00500	mg/L	<5.00 µg/L	<0.00500	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00100	mg/L	<1.00 µg/L	<0.00100	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00200	mg/L	<2.00 µg/L	<0.00200	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000500	mg/L	<0.500 µg/L	<0.000500	0	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000500	mg/L	<0.500 µg/L	<0.000500	0	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00500	mg/L	<5.00 µg/L	<0.00500	0	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000500	mg/L	<0.500 µg/L	<0.000500	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.500	mg/L	48200 µg/L	49.6	2.70%	20%	----
		thallium, dissolved	7440-28-0	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00500	mg/L	<5.00 µg/L	<0.00500	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0100	mg/L	<10.0 µg/L	<0.0100	0	Diff <2x LOR	----
<b>Speciated Metals (QC Lot: 504601)</b>											
WT2204494-002	Anonymous	chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----



Sub-Matrix: Water

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 505059)</b>											
WT2204497-003	Anonymous	ethylbenzene	100-41-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
WT2204497-003	Anonymous	acetone	67-64-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		benzene	71-43-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromomethane	74-83-9	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromoethane, 1,2-	106-93-4	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorodifluoromethane	75-71-8	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611D	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		hexane, n-	110-54-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

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 Work Order : WT2204544  
 Client : GHD Limited  
 Project : 12566614



Sub-Matrix: **Water**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QC Lot: 505059) - continued</b>											
WT2204497-003	Anonymous	trichloroethylene	79-01-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611D	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 505060)</b>											
WT2204497-003	Anonymous	F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	<25	0	Diff <2x LOR	----





## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 502956)</b>						
conductivity	----	E100	1	µS/cm	1.1	----
<b>Anions and Nutrients (QCLot: 502949)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Cyanides (QCLot: 504606)</b>						
cyanide, weak acid dissociable	----	E336	0.002	mg/L	<0.0020	----
<b>Dissolved Metals (QCLot: 505316)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 507519)</b>						
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
<b>Speciated Metals (QCLot: 504601)</b>						
chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	<0.00050	----
<b>Volatile Organic Compounds (QCLot: 505059)</b>						
acetone	67-64-1	E611D	20	µg/L	<20	----
benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	<0.50	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 505059) - continued</b>						
bromoform	75-25-2	E611D	0.5	µg/L	<0.50	----
bromomethane	74-83-9	E611D	0.5	µg/L	<0.50	----
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	<0.20	----
chlorobenzene	108-90-7	E611D	0.5	µg/L	<0.50	----
chloroform	67-66-3	E611D	0.5	µg/L	<0.50	----
dibromochloromethane	124-48-1	E611D	0.5	µg/L	<0.50	----
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	<0.20	----
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	<0.50	----
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	<0.50	----
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	<0.50	----
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	<0.50	----
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	<0.50	----
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	<0.50	----
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	<0.50	----
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	<0.50	----
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	<0.50	----
dichloromethane	75-09-2	E611D	1	µg/L	<1.0	----
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	<0.50	----
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	<0.30	----
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	<0.30	----
ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	----
hexane, n-	110-54-3	E611D	0.5	µg/L	<0.50	----
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	----
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	<0.50	----
styrene	100-42-5	E611D	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	<0.50	----
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	----
toluene	108-88-3	E611D	0.5	µg/L	<0.50	----
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	<0.50	----
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	<0.50	----
trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	----
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	<0.50	----
vinyl chloride	75-01-4	E611D	0.5	µg/L	<0.50	----
xylylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 505059) - continued</b>						
xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	---
<b>Hydrocarbons (QCLot: 505060)</b>						
F1 (C6-C10)	---	E581.F1-L	25	µg/L	<25	---
<b>Hydrocarbons (QCLot: 506541)</b>						
F2 (C10-C16)	---	E601.SG	100	µg/L	<100	---
F3 (C16-C34)	---	E601.SG	250	µg/L	<250	---
F4 (C34-C50)	---	E601.SG	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 506540)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 502955)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 502956)</b>									
conductivity	----	E100	1	µS/cm	1409 µS/cm	96.9	90.0	110	----
<b>Anions and Nutrients (QCLot: 502949)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.6	90.0	110	----
<b>Cyanides (QCLot: 504606)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	92.4	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.3	80.0	120	----
<b>Dissolved Metals (QCLot: 507519)</b>									
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	0.05 mg/L	106	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	0.05 mg/L	106	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.0125 mg/L	106	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.005 mg/L	104	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	0.05 mg/L	105	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.005 mg/L	106	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.0125 mg/L	105	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.0125 mg/L	105	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.0125 mg/L	104	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.025 mg/L	104	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.0125 mg/L	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.025 mg/L	106	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	0.05 mg/L	105	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.005 mg/L	96.9	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	2.5 mg/L	114	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.00025 mg/L	107	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.025 mg/L	108	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.025 mg/L	106	80.0	120	----
<b>Speciated Metals (QCLot: 504601)</b>									
chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0005	mg/L	0.025 mg/L	100	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Volatile Organic Compounds (QCLot: 505059)</b>									
acetone	67-64-1	E611D	20	µg/L	100 µg/L	97.6	70.0	130	----
benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	99.9	70.0	130	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	100 µg/L	96.2	70.0	130	----
bromoform	75-25-2	E611D	0.5	µg/L	100 µg/L	92.6	70.0	130	----
bromomethane	74-83-9	E611D	0.5	µg/L	100 µg/L	95.0	70.0	130	----
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	100 µg/L	103	70.0	130	----
chlorobenzene	108-90-7	E611D	0.5	µg/L	100 µg/L	95.1	70.0	130	----
chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	93.5	70.0	130	----
dibromochloromethane	124-48-1	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	100 µg/L	89.5	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	100 µg/L	97.5	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	100 µg/L	99.4	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	100 µg/L	114	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	100 µg/L	93.4	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	100 µg/L	91.2	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	100 µg/L	93.9	70.0	130	----
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	100 µg/L	90.5	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	100 µg/L	86.6	70.0	130	----
dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	92.2	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	100 µg/L	87.6	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	100 µg/L	85.2	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	100 µg/L	82.1	70.0	130	----
ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	103	70.0	130	----
hexane, n-	110-54-3	E611D	0.5	µg/L	100 µg/L	91.0	70.0	130	----
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	100 µg/L	91.5	70.0	130	----
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	100 µg/L	96.4	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	100 µg/L	103	70.0	130	----
styrene	100-42-5	E611D	0.5	µg/L	100 µg/L	98.2	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	100 µg/L	93.0	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	100 µg/L	86.4	70.0	130	----
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	109	70.0	130	----
toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	100 µg/L	95.2	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	100 µg/L	92.9	70.0	130	----
trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	96.0	70.0	130	----
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 505059) - continued</b>									
vinyl chloride	75-01-4	E611D	0.5	µg/L	100 µg/L	88.8	70.0	130	----
xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	103	70.0	130	----
xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	102	70.0	130	----
<b>Hydrocarbons (QCLot: 505060)</b>									
F1 (C6-C10)	----	E581.F1-L	25	µg/L	2000 µg/L	104	80.0	120	----
<b>Hydrocarbons (QCLot: 506541)</b>									
F2 (C10-C16)	----	E601.SG	100	µg/L	5018 µg/L	104	70.0	130	----
F3 (C16-C34)	----	E601.SG	250	µg/L	6312 µg/L	130	70.0	130	----
F4 (C34-C50)	----	E601.SG	250	µg/L	6087 µg/L	82.8	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 506540)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5263 µg/L	93.6	50.0	140	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5263 µg/L	90.6	50.0	140	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5263 µg/L	90.6	50.0	140	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5263 µg/L	95.3	50.0	140	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5263 µg/L	81.2	50.0	140	----
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5263 µg/L	92.0	50.0	140	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5263 µg/L	82.1	50.0	140	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5263 µg/L	88.6	50.0	140	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5263 µg/L	94.6	50.0	140	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5263 µg/L	99.4	50.0	140	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5263 µg/L	100	50.0	140	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5263 µg/L	95.4	50.0	140	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5263 µg/L	98.4	50.0	140	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5263 µg/L	90.9	50.0	140	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5263 µg/L	84.4	50.0	140	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5263 µg/L	87.6	50.0	140	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5263 µg/L	101	50.0	140	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5263 µg/L	89.7	50.0	140	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 502949)</b>										
WT2204540-030	Anonymous	chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
<b>Cyanides (QCLot: 504606)</b>										
WT2204494-002	Anonymous	cyanide, weak acid dissociable	----	E336	0.118 mg/L	0.125 mg/L	94.8	70.0	130	----
<b>Dissolved Metals (QCLot: 505316)</b>										
WT2204494-003	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000927 mg/L	0.0001 mg/L	92.7	70.0	130	----
<b>Dissolved Metals (QCLot: 507519)</b>										
WT2204494-003	Anonymous	antimony, dissolved	7440-36-0	E421	0.0610 mg/L	0.05 mg/L	122	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0624 mg/L	0.05 mg/L	125	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.00609 mg/L	0.005 mg/L	122	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.057 mg/L	0.05 mg/L	114	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00600 mg/L	0.005 mg/L	120	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0147 mg/L	0.0125 mg/L	118	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0143 mg/L	0.0125 mg/L	114	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0138 mg/L	0.0125 mg/L	110	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0272 mg/L	0.025 mg/L	109	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0151 mg/L	0.0125 mg/L	121	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0285 mg/L	0.025 mg/L	114	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0658 mg/L	0.05 mg/L	132	70.0	130	MES
		silver, dissolved	7440-22-4	E421	0.00555 mg/L	0.005 mg/L	111	70.0	130	----
		sodium, dissolved	7440-23-5	E421	ND mg/L	2.5 mg/L	ND	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0545 mg/L	0.05 mg/L	109	70.0	130	----
		uranium, dissolved	7440-61-1	E421	ND mg/L	0.00025 mg/L	ND	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0307 mg/L	0.025 mg/L	123	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.0299 mg/L	0.025 mg/L	119	70.0	130	----
<b>Speciated Metals (QCLot: 504601)</b>										
WT2204494-002	Anonymous	chromium, hexavalent [Cr VI], dissolved	18540-29-9	E532A	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 505059)</b>										
WT2204458-001	Anonymous	acetone	67-64-1	E611D	ND µg/L	100 µg/L	ND	60.0	140	----
		benzene	71-43-2	E611D	94.9 µg/L	100 µg/L	94.9	60.0	140	----
		bromodichloromethane	75-27-4	E611D	80.0 µg/L	100 µg/L	80.0	60.0	140	----





Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 505059) - continued</b>										
WT2204458-001	Anonymous	bromoform	75-25-2	E611D	80.6 µg/L	100 µg/L	80.6	60.0	140	----
		bromomethane	74-83-9	E611D	83.4 µg/L	100 µg/L	83.4	60.0	140	----
		carbon tetrachloride	56-23-5	E611D	97.5 µg/L	100 µg/L	97.5	60.0	140	----
		chlorobenzene	108-90-7	E611D	88.8 µg/L	100 µg/L	88.8	60.0	140	----
		chloroform	67-66-3	E611D	85.0 µg/L	100 µg/L	85.0	60.0	140	----
		dibromochloromethane	124-48-1	E611D	93.1 µg/L	100 µg/L	93.1	60.0	140	----
		dibromoethane, 1,2-	106-93-4	E611D	79.7 µg/L	100 µg/L	79.7	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611D	91.3 µg/L	100 µg/L	91.3	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611D	96.0 µg/L	100 µg/L	96.0	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611D	93.9 µg/L	100 µg/L	93.9	60.0	140	----
		dichlorodifluoromethane	75-71-8	E611D	101 µg/L	100 µg/L	101	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611D	87.0 µg/L	100 µg/L	87.0	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611D	81.7 µg/L	100 µg/L	81.7	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611D	87.8 µg/L	100 µg/L	87.8	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	85.3 µg/L	100 µg/L	85.3	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	79.8 µg/L	100 µg/L	79.8	60.0	140	----
		dichloromethane	75-09-2	E611D	79.6 µg/L	100 µg/L	79.6	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611D	80.4 µg/L	100 µg/L	80.4	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	ND µg/L	100 µg/L	ND	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611D	74.6 µg/L	100 µg/L	74.6	60.0	140	----
		ethylbenzene	100-41-4	E611D	99.9 µg/L	100 µg/L	99.9	60.0	140	----
		hexane, n-	110-54-3	E611D	ND µg/L	100 µg/L	ND	60.0	140	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	ND µg/L	100 µg/L	ND	60.0	140	----
		methyl isobutyl ketone [MIBK]	108-10-1	E611D	77 µg/L	100 µg/L	77.0	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	76.1 µg/L	100 µg/L	76.1	60.0	140	----
		styrene	100-42-5	E611D	ND µg/L	100 µg/L	ND	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	87.0 µg/L	100 µg/L	87.0	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	34.9 µg/L	100 µg/L	34.9	60.0	140	RRQC
		tetrachloroethylene	127-18-4	E611D	102 µg/L	100 µg/L	102	60.0	140	----
		toluene	108-88-3	E611D	ND µg/L	100 µg/L	ND	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611D	91.2 µg/L	100 µg/L	91.2	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611D	85.3 µg/L	100 µg/L	85.3	60.0	140	----
		trichloroethylene	79-01-6	E611D	90.9 µg/L	100 µg/L	90.9	60.0	140	----
		trichlorofluoromethane	75-69-4	E611D	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		vinyl chloride	75-01-4	E611D	79.8 µg/L	100 µg/L	79.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611D	134 µg/L	200 µg/L	66.8	60.0	140	----
		xylene, o-	95-47-6	E611D	69.2 µg/L	100 µg/L	69.2	60.0	140	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Hydrocarbons (QCLot: 505060)</b>										
WT2204497-003	Anonymous	F1 (C6-C10)	----	E581.F1-L	1730 µg/L	2000 µg/L	86.6	60.0	140	----

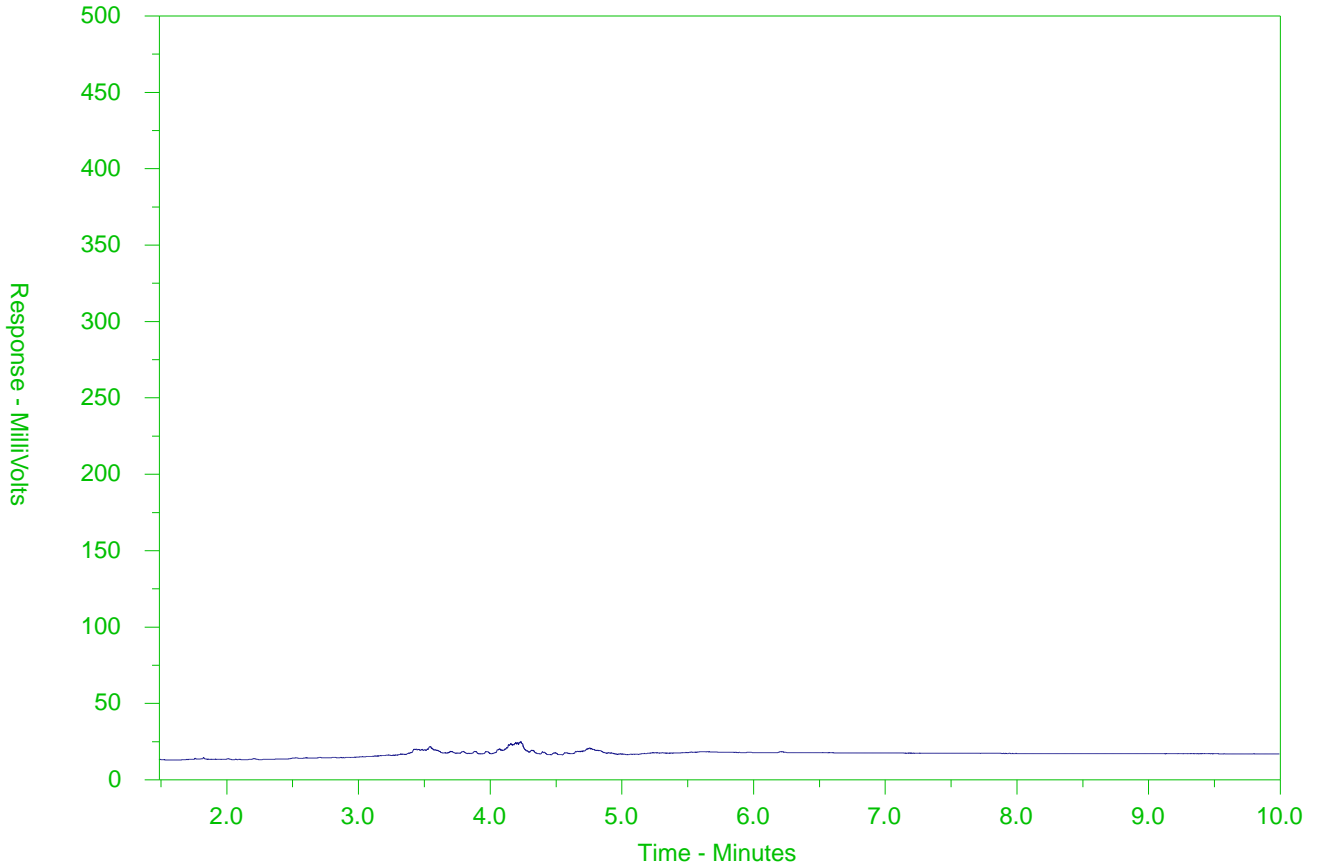
**Qualifiers**

<i>Qualifier</i>	<i>Description</i>
MES	<i>Data Quality Objective was marginally exceeded (by &lt; 10% absolute) for &lt; 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE &amp; CCME).</i>
RRQC	<i>Refer to report comments for information regarding this QC result.</i>

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: WT2204544-001-E601.SG  
 Client Sample ID: GW-12566614-052522-NG-005



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

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

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

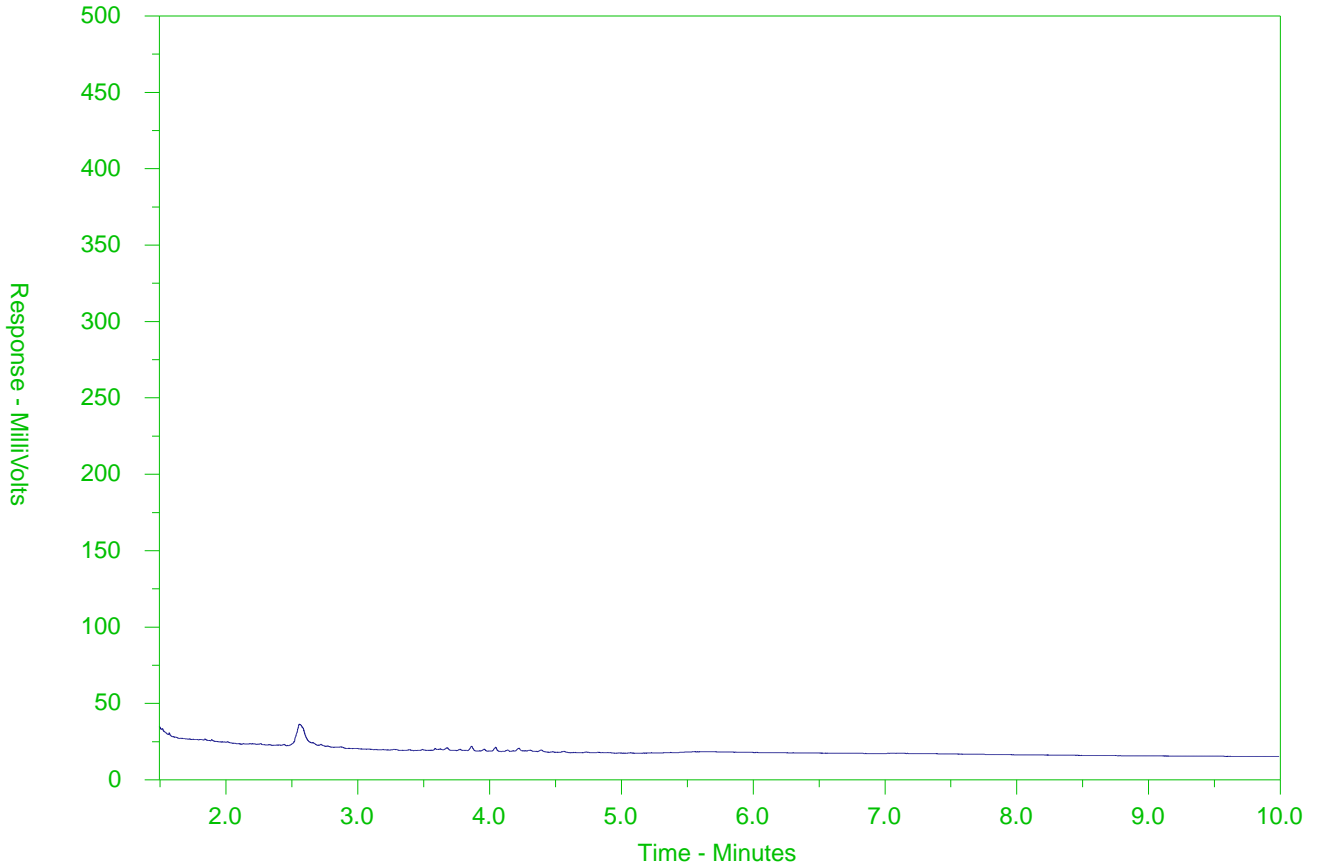
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

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

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: WT2204544-002-E601.SG  
 Client Sample ID: GW-12566614-052622-NG-006



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

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

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

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

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





www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20

Page

Environmental Division  
Waterloo  
Work Order Reference  
WT2204544

Contact and company name below will appear on the final report

Report To: GHD Ltd. (Acct 13791)

Company: Pascal Renella

Contact: 519-884-0510

Phone: Company address below will appear on the final report

Street: 455 Phillip St.

City/Province: Waterloo, ON

Postal Code: N2L 3X2

Invoice To: Same as Report To  YES  NO

Copy of Invoice with Report  YES  NO

Company: GHD Ltd. (Acct 13791)

Contact: Project Information

ALS Account # / Quote #: GHD100W/T2022GHD/1000057

Job #: 12566614

PO / AFE: Major/Minor Code: Requisitioner: Location:

LSD: ALS Lab Work Order # (lab use only): WT2204544

Reports / Recipients

Select Report Format:  PDF  EXCEL  EDP (DIGITAL)

Merge QC/QCI Reports with COA  YES  NO  N/A

Compare Results to Criteria on Report - provide details below if box checked

Select Distribution:  EMAIL  MAIL  FAX

Email 1 or Fax: pascal.renella@ghd.com

Email 2: See SSOW/PO

Email 3:

Invoice Recipients

Select Invoice Distribution:  EMAIL  MAIL  FAX

Email 1 or Fax: Invoicing-Canada@ghd.com

Email 2:

Email 3:

Oil and Gas Required Fields (client use)

AFC/Coast Center: PO#:

Major/Minor Code: Routing Code:

Requisitioner: Location:

ALS Contact: Rick H

Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type
	GW-12566614-052522-N6-005	25-05-22	14:30	WATER
	GW-12566614-052622-N6-006	26-05-22	10:20	WATER
	GW-12566614-052622-N6-007	26-05-22	10:45	WATER
	GW-12566614-052622-N6-008	26-05-22	13:06	WATER
	Trip Blank	26-05-22	N/A	WATER
				WATER
				WATER
				WATER
				WATER
				WATER
				WATER
				WATER

NUMBER OF CONTAINERS

Metal/Inorganics	PAHS	PHC	VOCs	BTEX	Trip Blank -F1
9	X	X	X	X	
9	X	X	X	X	
2					
6	X		X		
2				X	

SAMPLES ON HOLD  
EXTENDED STORAGE REQUIRED  
SUSPECTED HAZARD (see notes)

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System?  YES  NO

Are samples for human consumption/ use?  YES  NO

SHIPPING RELEASE (client use)

Released by: N Gupta Date: 26/5/22

Time: 14:40

Received by: [Signature]

Time: 14:40

Initial Shipment Reception (lab use only)

Turnaround Time (TAT) Requested

Routine (R) if received by 3pm M-F - no surcharges apply

4 day (P4) if received by 3pm M-F - 20% rush surcharge min/m

3 day (P3) if received by 3pm M-F - 25% rush surcharge min/m

2 day (P2) if received by 3pm M-F - 50% rush surcharge min/m

1 day (E) if received by 3pm M-F - 100% rush surcharge min/m

Same day (E2) if received by 10am M-F - 200% rush surcharge min/m

Same day (E2) if received by 10am M-F - 200% rush surcharge min/m

Same day (E2) if received by 10am M-F - 200% rush surcharge min/m

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Same day (E2) if received by 10am M-F - 200% rush surcharge min/m

Same day (E2) if received by 10am M-F - 200% rush surcharge min/m

Same day (E2) if received by 10am M-F - 200% rush surcharge min/m

For tests that can not be performed according to the TAT requested, you will be contacted.

Analysis Request

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

COOLING INITIATED

Submission Comments identified on Sample Receipt Notification:  YES  NO

Cooler Custody Seals Intact:  YES  N/A

Sample Custody Seals Intact:  YES  N/A

FINAL SHIPMENT RECEPTION (lab use only)

Released by: [Signature] Date: 05/12/22

Time: 10:30

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

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION  
WHITE - LABORATORY COPY YELLOW - CLIENT COPY  
ALS 2020 FORM

# **Appendix C**

**Data Quality Assessment and Verification**

# Technical Memorandum

June 17, 2022

<b>To</b>	Joseph Drader	<b>Tel</b>	450-902-4349
<b>Copy to</b>	Nidhi Gupta	<b>Email</b>	pascal.renella@ghd.com
<b>From</b>	Pascal Renella/an/01	<b>Ref. No.</b>	12566614
<b>Subject</b>	Data Quality Assessment and Verification		

<b>Laboratory:</b>	ALS Canada Ltd.
<b>Lab Job No.:</b>	L2702132, WT2204113, WT2204544
<b>Date(s) Sampled:</b>	April 28; May 17, 25, 26, 2022
<b>Media Sampled:</b>	Soil and Groundwater

QA/QC	Criteria	Pass	Qualifiers	Fail	N/A
<b>Holding Times</b>	Analyte specific	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Temperature</b>	<10°C at receipt	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Sample Preservation</b>	Required container/preservatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Field Duplicate (blind)</b>	Within 50% of original/<1xRL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Field Blank (blind)</b>	Non detect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Trip Blank</b>	Non detect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Lab QA/QC</b>	Within standard recoveries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following results are qualified due to high temperature (13.3°C) upon arrival at the laboratory:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
WT2204544	05/25/22	GW-12566614-052522-NG-005	conductivity	2.90	J	mS/cm
WT2204544	05/25/22	GW-12566614-052522-NG-005	pH	7.54	J	pH units
WT2204544	05/25/22	GW-12566614-052522-NG-005	chloride	749	J	mg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	cyanide, weak acid dissociable	2	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	antimony, dissolved	1	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	arsenic, dissolved	1	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	barium, dissolved	129	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	beryllium, dissolved	0.2	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	boron, dissolved	100	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	cadmium, dissolved	0.05	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	chromium, dissolved	5	UJ	µg/L



Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
WT2204544	05/25/22	GW-12566614-052522-NG-005	cobalt, dissolved	1.46	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	copper, dissolved	2	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	lead, dissolved	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	mercury, dissolved	0.005	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	molybdenum, dissolved	7.98	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	nickel, dissolved	5.87	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	selenium, dissolved	0.914	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	silver, dissolved	0.1	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	sodium, dissolved	336000	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	thallium, dissolved	0.1	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	uranium, dissolved	10.4	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	vanadium, dissolved	5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	zinc, dissolved	10	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	chromium, hexavalent [Cr VI], dissolved	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	acetone	20	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	benzene	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	bromodichloromethane	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	bromoform	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	bromomethane	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	carbon tetrachloride	0.2	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	chlorobenzene	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	chloroform	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dibromochloromethane	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dibromoethane, 1,2-	0.2	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichlorobenzene, 1,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichlorobenzene, 1,3-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichlorobenzene, 1,4-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichlorodifluoromethane	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloroethane, 1,1-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloroethane, 1,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloroethylene, 1,1-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloroethylene, cis-1,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloroethylene, trans-1,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloromethane	1	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloropropane, 1,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloropropylene, cis+trans-1,3-	0.5	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloropropylene, cis-1,3-	0.3	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dichloropropylene, trans-1,3-	0.3	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	ethylbenzene	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	hexane, n-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	methyl ethyl ketone [MEK]	20	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	methyl isobutyl ketone [MIBK]	20	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	methyl-tert-butyl ether [MTBE]	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	styrene	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	tetrachloroethane, 1,1,1,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	tetrachloroethane, 1,1,2,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	tetrachloroethylene	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	toluene	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	trichloroethane, 1,1,1-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	trichloroethane, 1,1,2-	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	trichloroethylene	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	trichlorofluoromethane	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	vinyl chloride	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	xylene, m+p-	0.4	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	xylene, o-	0.3	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	xylenes, total	0.5	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	BTEX, total	1	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	F1 (C6-C10)	25	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	F2 (C10-C16)	100	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	F3 (C16-C34)	250	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	F4 (C34-C50)	250	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	F1-BTEX	25	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	hydrocarbons, total (C6-C50)	370	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	acenaphthene	0.013	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	acenaphthylene	0.01	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	anthracene	0.040	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	benz(a)anthracene	0.01	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	benzo(a)pyrene	0.005	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	benzo(b+j)fluoranthene	0.01	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
WT2204544	05/25/22	GW-12566614-052522-NG-005	benzo(g,h,i)perylene	0.01	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	benzo(k)fluoranthene	0.01	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	chrysene	0.012	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	dibenz(a,h)anthracene	0.005	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	fluoranthene	0.117	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	fluorene	0.043	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	indeno(1,2,3-c,d)pyrene	0.01	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	methylnaphthalene, 1+2-	0.064	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	methylnaphthalene, 1-	0.024	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	methylnaphthalene, 2-	0.040	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	naphthalene	0.05	UJ	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	phenanthrene	0.486	J	µg/L
WT2204544	05/25/22	GW-12566614-052522-NG-005	pyrene	0.108	J	µg/L

**Conclusions:**

Based on the assessment detailed in the foregoing, the data summarized are acceptable with the specific qualifications noted above.

**Notes:**

- UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- BTEX - Benzene, Toluene, Ethylbenzene, Xylene
- QA/QC - Quality Assurance/Quality Control
- RL - Reporting Limit
- N/A - Not Applicable

**Data verification reference documents:**

1. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", United States Environmental Protection Agency (USEPA) 540/R-99-008, September 2016.
2. "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", Laboratory Services Branch, Ministry of the Environment, March 9, 2004, amended as of July 1, 2011

Regards



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Data Management - Data Validator

