



REPORT

Phase Two Environmental Site Assessment

2596 Carp Road, Ottawa, Ontario

Submitted to:

Cavanagh Developments

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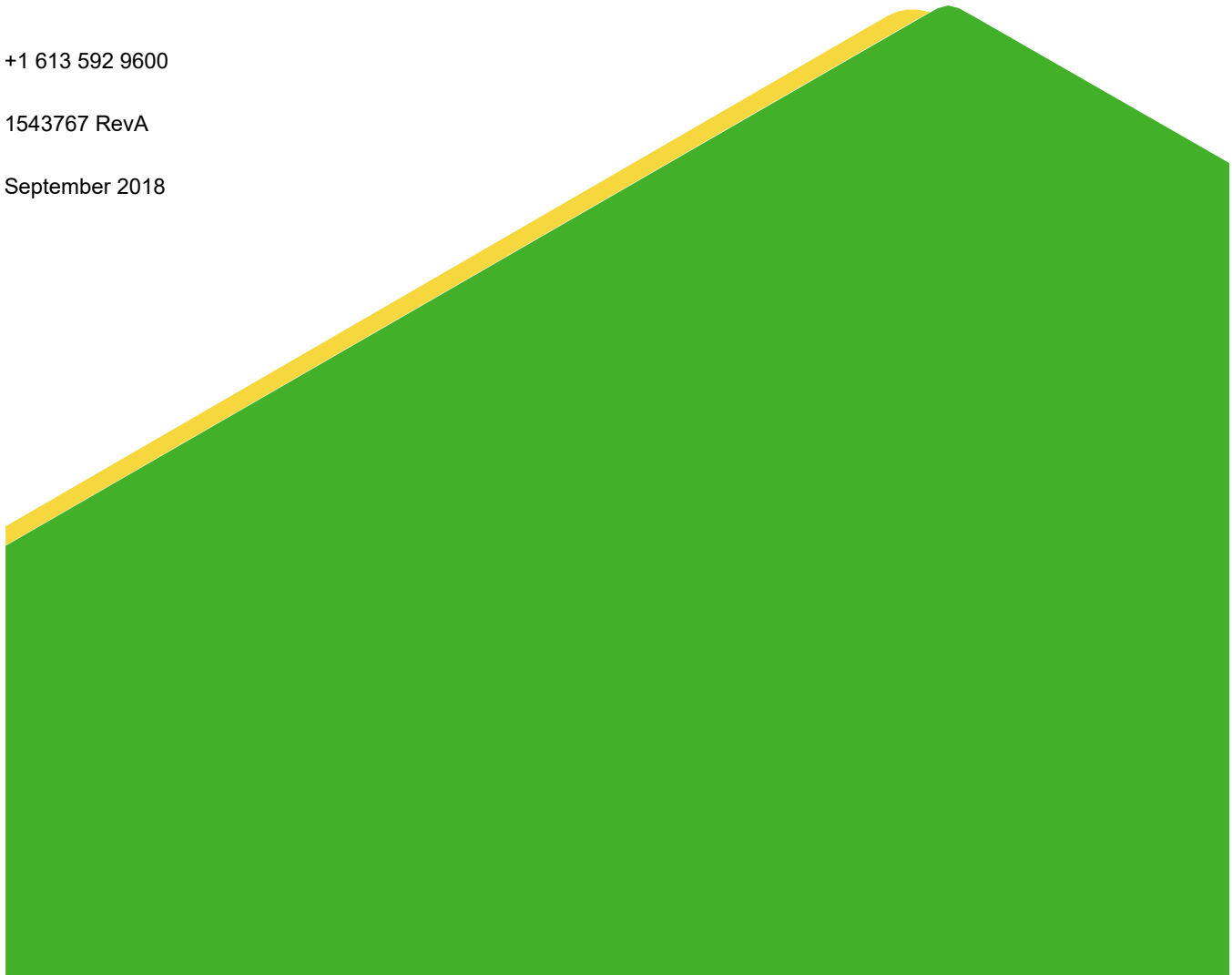
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Table of Contents

1.0 EXECUTIVE SUMMARY	1
2.0 INTRODUCTION	4
2.1 Site Description	4
2.2 Property Ownership	4
2.3 Current and Proposed Future Uses	4
2.4 Applicable Site Condition Standard	4
3.0 BACKGROUND INFORMATION.....	5
3.1 Physical Setting.....	5
3.2 Past Investigations.....	5
3.2.1 Phase One ESA.....	5
4.0 SCOPE OF THE INVESTIGATION.....	7
4.1 Overview of Site Investigation.....	7
4.2 Media Investigated.....	8
4.3 Phase One Conceptual Site Model.....	8
4.4 Deviations from Sampling and Analysis Plan	11
4.5 Impediments.....	11
5.0 INVESTIGATION METHOD.....	11
5.1 General.....	11
5.2 Drilling	12
5.3 Soil: Sampling	12
5.4 Field Screening Measurements	12
5.5 Groundwater: Monitoring Well Installation	13
5.6 Groundwater: Field Measurements for Water Quality Parameters.....	13
5.7 Groundwater: Sampling	13
5.8 Sediment: Sampling.....	13
5.9 Analytical Testing	13

5.10	Residue Management Procedures	14
5.11	Elevation Surveying	14
5.12	Quality Assurance and Quality Control Measures	14
6.0	REVIEW AND EVALUATION	15
6.1	Geology	15
6.2	Groundwater: Elevations and Flow Direction.....	16
6.3	Groundwater: Hydraulic Gradients.....	16
6.4	Coarse Soil Texture	16
6.5	Soil: Field Screening	16
6.6	Soil: Quality	17
6.7	Groundwater: Quality	18
6.8	Sediment: Quality.....	19
6.9	Quality Assurance and Quality Control Results	19
6.10	Phase Two Conceptual Site Model.....	20
7.0	CONCLUSIONS.....	27
8.0	REFERENCES.....	29
9.0	LIMITATIONS.....	30
10.0	SIGNATURES	31

TABLES

Table 1 – Monitoring Well Construction Details

Table 2 – Groundwater Elevations

Table 3 – Summary of Soil Samples Submitted for Laboratory Analysis

Table 4 – Summary of Groundwater Samples Submitted for Laboratory Analysis

Table 5A – Soil Analytical Results: Metals

Table 5B – Soil Analytical Results: Petroleum Hydrocarbon Fractions / Volatile Organic Compounds

Table 5C – Soil Analytical Results: Polycyclic Aromatic Hydrocarbons

Table 6A – Groundwater Analytical Results: Metals

Table 6B – Groundwater Analytical Results: Petroleum Hydrocarbon Fractions / Volatile Organic Compounds

Table 6C – Groundwater Analytical Results: Polycyclic Aromatic Hydrocarbons

FIGURES

Figure 1 – Key Plan

Figure 2 – Site Plan and Areas of Potential Environmental Concern

Figure 3 – Soil Exceedances

Figure 4 – Groundwater Exceedances

Figure 5 – Shallow Groundwater Elevations and Flow Direction

Figure 6 – Interpreted Cross Section A – A'

Figure 7 – Interpreted Cross Section B – B'

Figure 8 – Conceptual Site Model for Human and Ecological Receptors

APPENDICES**APPENDIX A (I)**

Sampling and Analysis Plan

APPENDIX A (II)

Field Logs

APPENDIX A (III)

Certificates of Analysis

APPENDIX A (IV)

Plan of Survey

1.0 EXECUTIVE SUMMARY

Golder Associates Ltd. (“Golder”) was retained by Cavanagh Developments (“Cavanagh”) to conduct a Phase Two Environmental Site Assessment (“ESA”) of the property located at 2596 Carp Road, Ottawa, Ontario (the “Site” or the “Phase Two Property”), as shown on Figure 1. The legal description of the Site is: PIN 045370750, Huntley Concession 2 Part of Lot 6 RP; 4R11656 Part of Part 1.

Golder previously completed a Phase One ESA for the Site, the results of which were documented in Golder Report No. 1543767 entitled, “Phase I Environmental Site Assessment, Part of Lot 6, Concession 2, Township of Huntley, Ottawa, Ontario”, dated May 2016. Golder also completed a Phase One ESA Update letter for the Site, the results of which are presented in Report No. 1543767 entitled, “Phase I Environmental Site Assessment Update, 2596 Carp Road, Ottawa, Ontario”, dated September 2018. The Phase One ESA identified the following Areas of Potential Environmental Concern (“APEC”) APECs for the Site:

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
APEC #1A to APEC #1F Importation of Fill of Unknown Quality	APEC 1A – Northeast of the Cover-All Structure	#30 Importation of Fill of Unknown Quality	Onsite	PHC/BTEX, PAHs, Metals	Soil and Groundwater
	APEC 1B – Northeast of the Cover-All Structure				
	APEC 1C – Near the Residence				
	APEC 1D – Near the Cover-All Structure	Potential importation of fill of unknown quality is present at certain locations on the Site			
	APEC 1E – Northeast of the Equipment Storage Area				
	APEC 1F – At the Equipment Storage and AST / Generator Storage Area				

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
APEC #2A to #2E	APEC 2A - Currently used AST in the Equipment Storage Area	#28 Gasoline and Associated Products Storage in Fixed Tanks	Onsite	PHC/BTEX, PAHs, VOCs	Soil and Groundwater
	APEC 2B - Currently used AST in the Equipment Storage Area				
	APEC 2C - Currently used AST in the Equipment Storage Area	Diesel and gasoline tanks are/were used in specific locations on the Site. Newly constructed, unused generator ASTs are also stored onsite.			
	APEC 2D - Former AST adjacent to the Cover-All Structure				
	APEC 2E - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area				
APEC #3	APEC 3 – South east portion of Site	#10 Commercial Autobody Shops (Riviera Automobiles)	Off-Site	PHC/BTEX, PAHs, VOCs	Groundwater

The Phase Two ESA was conducted to assess soil and groundwater conditions at the Site. Analytical data was compared to the Table 8 generic site condition standards in a potable groundwater condition within 30 metres of a water body (SCS; residential/parkland/industrial/commercial property use, coarse soil texture) presented in the Ontario Ministry of the Environment, Conservation and Parks (“MOECP”) “*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*”, dated April 15, 2011 (“MOECP Table 8 Standards”).

The results of the Phase Two ESA are summarized as follows:

- APEC 1A (unknown fill quality northeast of the Cover-All Structure) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified.
- APEC 1B (unknown fill quality northeast of the Cover-All Structure) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified.
- APEC 1C (unknown fill quality related to the on-site residence) - Cadmium concentrations in crushed stone exceeded the MOECP Table 8 Standard (residential/industrial/commercial land use) at one (1) location. The cadmium exceedance was identified in sample BH18-8 SA1 (0 - 0.61 mbgs). Based on the sampling conducted and the September 2018 Phase I ESA Site Visit, the exceedance of cadmium at BH18-8 appears to be limited to the imported fill used for creation of the residence’s driveway and not a site wide issue.

- APEC 1D (unknown quality fill related to Cover-All Structure) – Cobalt concentrations in groundwater exceeded the MOECP Table 8 Standard (residential/industrial/commercial land use) at one (1) location. The cobalt exceedance was identified in sample MW18-10. No soil impacts compared to MOECP Table 8 Standards were identified.
- APEC 1E (unknown fill quality northeast of Equipment Storage Area) – Molybdenum concentrations in soil exceeded the MOECP Table 8 Standard (residential/industrial/commercial land use) at one (1) location. The molybdenum exceedance was identified in sample BH18-6 SA5 (3.04 – 3.65 mbgs).
- APEC 1F (unknown fill quality in the Equipment Storage and AST/Generator Storage Area) – Cobalt concentrations in groundwater exceeded the MOECP Table 8 Standard (all land uses) at one (1) location. The cobalt exceedance was identified in sample MW18-2. No soil impacts compared to MOECP Table 8 Standards were identified.
- APEC 2A (gasoline and associated products in fixed tanks in the Equipment Storage Area) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified.
- APECs 2B and 2C (gasoline and associated products in fixed tanks in the Equipment Storage Area) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified.
- APEC 2D (gasoline and associated products at the Former AST) – Petroleum Hydrocarbon Fractions F1 and F2 (“PHC F1-F2”) concentrations in soil exceeded the MOECP Table 8 Standard (residential/industrial/commercial) at one (1) location. The PHC F1 and F2 exceedances were identified in soil sample BH18-10 SA4 (2.29 – 2.90 mbgs). Ethylbenzene, Total Xylene, PHC F2, 1-Methylnaphtalene, 2-Methylnaphtalene, and Methylnaphtalene, 2-(1-) in groundwater exceeded the MOECP Table 8 Standard in groundwater samples MW18-10 (along with it’s duplicate DUP-1).
- APEC 2E (gasoline and associated products at the AST/Generator Storage Area) - no soil or groundwater impacts compared to MOECP Table 8 Standards were identified.
- APEC 3 (commercial autobody shops) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified.

In summary, APEC 1C (unknown fill quality, soil impacts in one sample identified), APEC 1D (unknown fill quality, cobalt impacts in groundwater), APEC 1E (unknown fill quality, soil impacts in one sample identified), APEC 1F (unknown fill quality, cobalt impacts in groundwater) and APEC 2D (gasoline and associated products at the Former AST) were confirmed to be Issues of Environmental Concern (IEC) for the Site. Given that cobalt was not identified above the MOECP Table 8 Standards in soil at the Site, the presence of cobalt in groundwater at MW18-2 and MW18-10 may be naturally occurring.

The current land use of the site is mixed use residential and commercial/industrial. Golder understands that the single residence currently present at the Site will be vacated and converted to commercial office space to support the planned concrete plant which is proposed south of the residence. The proposed concrete plant is not planned where evidence of impacts has been identified in this Phase Two ESA. As such, the APECs identified at the Site are not anticipated to impact the planned concrete plant. Under Ontario Regulation 153/04, there is no requirement for a Record of Site Condition (“RSC”) given that the redevelopment is not to a more sensitive land use. Excess fill (if any) created during construction should be managed in accordance with current MOECP guidance.

2.0 INTRODUCTION

2.1 Site Description

Golder was retained by Cavanagh Developments to conduct a Phase Two ESA of the following property:

Municipal Address	2596 Carp Road, Ottawa, Ontario
Property Identification Number	045370750
Legal Description	Huntley Concession 2 Part of Lot 6 RP; 4R11656 Part of Part 1
Size of the Phase Two Property	38 hectares

The Site location is provided on Figure 1. A plan of survey for the Site is provided in Appendix A(iv). The boundaries of the Phase Two Property are provided in Figure 2.

2.2 Property Ownership

Authorization to proceed with this investigation was received from Chris Collins of Cavanagh Developments on August 10, 2018. The contact information for the Phase Two Property owner is as follows:

Site Owner / Client	Address	Contact Information
Client: Cavanagh Developments	9094 Cavanagh Road, R.R.#2 Ashton, Ontario K0A 1B0	Chris Collins Telephone: 613-257-2918 ccollins@thomascavanagh.ca

2.3 Current and Proposed Future Uses

The Phase Two Property is largely undeveloped land at the present time. The Site features a 1-storey residence with basement, as well as a white coloured "Cover-All" garage/storage building (herein referred to as the Cover-All Structure).

The proposed future use of the Phase Two Property is commercial/industrial. A proposed concrete plant is planned to be constructed by the property owner along the southeastern site boundary.

2.4 Applicable Site Condition Standard

The analytical results of the samples collected for this Phase Two ESA were compared to the Table 8 generic site condition standards in a potable groundwater condition within 30 meters of a water body (SCS; residential/parkland/industrial/commercial property use, coarse soil texture) presented in the MOECP "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", dated April 15, 2011. The applicable site condition standards were selected based on the following rationale:

- The Site and other properties located around the Site obtain their source of water from private drinking water wells;
- A watercourse is present on the Site and is located in the northeastern portion of the Phase Two Property;

- The Site currently has a mixed property use consisting of residential and industrial/commercial. For the purpose of this environmental assessment, soil analytical data was compared to a residential/industrial/commercial land use;
- Based on field observations, the native soil materials are coarse textured;
- The Ottawa River is located about 10 kilometres (“km”) northeast of the Phase Two Property;
- There are no features on the Phase Two Property that would meet the conditions of an environmentally sensitive site, as described in Section 41;
- The intended land use for the Phase Two Property is commercial/industrial;
- The overburden thickness is greater than 2 metres over more than one-third of the Phase Two Property; and,
- The shallowest depth to the water table is at least 1.46 metres below ground surface.

3.0 BACKGROUND INFORMATION

This section presents the background conditions of the Phase Two Property including a description of the physical setting and a summary of past investigations conducted.

The objectives of the Phase Two ESA were to obtain information about environmental conditions in the soil and groundwater on, in or under the Site. The objectives of this Phase Two ESA were achieved by:

- Developing an understanding of the geological and hydrogeological conditions at the Site; and,
- Conducting field sampling for all contaminants of concern (“COCs”) associated with each area of potential environmental concern (“APEC”) identified in the Phase One ESA.

3.1 Physical Setting

The nearest surface water body is a watercourse located in the northeastern portion of the Phase Two Property. The Ottawa River is located approximately 10 km northeast of the Phase Two Property. There are no areas of natural significance within the Phase One Study area. Land uses surrounding the Phase Two Property are residential and commercial/industrial, as shown in Figure 2. The topography of the Phase Two Property and surrounding areas is generally flat.

3.2 Past Investigations

3.2.1 Phase One ESA

Golder conducted a Phase One ESA entitled, “*Phase I Environmental Site Assessment, Part of Lot 6, Concession 2, Township of Huntley, Ottawa, Ontario*”, dated May 2016, to assess the likelihood of soil and/or groundwater contamination resulting from historic or present activities at the Site and surrounding area. This included a review of available historical information on the Site and surrounding area, interviews with persons familiar with the Site and a Site reconnaissance. A Phase One ESA Update letter was completed by Golder in September 2018. The APECs identified in the 2018 Phase One ESA Update are summarized in the following table:

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
APEC #1A to APEC #1F Importation of Fill of Unknown Quality	APEC 1A – Northeast of the Cover-All Structure	#30 Importation of Fill of Unknown Quality Potential importation of fill of unknown quality is present at certain locations on the Site	Onsite	PHC/BTEX, PAHs, Metals	Soil and Groundwater
	APEC 1B – Northeast of the Cover-All Structure				
	APEC 1C – Near the Residence				
	APEC 1D – Near the Cover-All Structure				
	APEC 1E – Northeast of the Equipment Storage Area				
	APEC 1F – At the Equipment Storage and AST / Generator Storage Area				
APEC #2A to #2E	APEC 2A - Currently used AST in the Equipment Storage Area	#28 Gasoline and Associated Products Storage in Fixed Tanks Diesel and gasoline tanks are/were used in specific locations on the Site. Newly constructed, unused generator ASTs are also stored onsite.	Onsite	PHC/BTEX, PAHs, VOCs	Soil and Groundwater
	APEC 2B - Currently used AST in the Equipment Storage Area				
	APEC 2C - Currently used AST in the Equipment Storage Area				
	APEC 2D - Former AST adjacent to the Cover-All Structure				
	APEC 2E - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area				

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
APEC #3	APEC 3 – South east portion of Site	#10 Commercial Autobody Shops (Riviera Automobiles)	Off-Site	PHC/BTEX, PAHs, VOCs	Groundwater

Notes

PCA Potentially contaminating activity as listed O.Reg. 153/04, Schedule D, Table 2

PHC petroleum hydrocarbon compound fractions

BTEX benzene, toluene, ethylbenzene, xylenes

This report was prepared by the Qualified Person and was relied upon for the Phase Two investigation.

4.0 SCOPE OF THE INVESTIGATION

4.1 Overview of Site Investigation

The Phase Two ESA investigation activities were completed between August 22, 2018 and September 12, 2018 and included the following tasks:

- **Health and Safety Plan:** Preparation of a Health and Safety Plan for internal and subcontractor use prior to initiating any field work at the Site.
- **Utility Clearances:** Coordination of utility clearances with local utility companies along with retaining the services of a private locator to assess for possible services in the areas of the proposed test locations.
- **Borehole Advancement and Monitoring Well Installation:** The borehole drilling and monitoring well installation program included drilling of eleven (11) boreholes, five (5) of which were completed as groundwater monitoring wells and were used for groundwater sampling at the Site. The rationale for the selected location of the boreholes is provided in the Sampling and Analysis Plan provided in Appendix A(i). The location of the boreholes and monitoring wells are shown on Figure 3. The monitoring well construction details are presented in Table 1.
- **Soil Sampling:** Selected soil samples were collected on August 23 and 24, 2018 from the boreholes. Soil samples were submitted for chemical analysis of one or more of the following: petroleum hydrocarbons ("PHCs"), volatile organic compounds ("VOCs"), polycyclic aromatic hydrocarbons ("PAHs"), and metals.
- **Groundwater Monitoring and Sampling:** Groundwater samples were collected on August 28, 2018. Groundwater samples were submitted for analysis of one or more of the following: PHCs, VOCs, metals, and PAHs.
- **Surveying:** An elevation survey for the boreholes and monitoring wells advanced as part of the Phase Two ESA investigation was completed by Cavanagh.
- **Reporting:** Golder compiled and assessed the field and laboratory results from the above noted activities into this report.

The Phase Two investigation was carried out in general accordance with Golder's standard operating procedures, which conform to the requirements of O. Reg. 153/04. The data from the Phase Two ESA investigation completed by Golder at the Site were incorporated into a single Phase Two ESA report following the Phase Two ESA report format required by O. Reg. 153/04.

There were no impediments or access limitations that would affect the conclusions of this Phase Two ESA report.

4.2 Media Investigated

To address the potential environmental issues identified in the Phase One ESA, the Phase Two ESA field program included sampling of subsurface soil and of groundwater from wells screened within the overburden at the Site. No sediment sampling was completed. A summary of media investigated and the applicable contaminants of potential concern are provided in Tables 3 and 4. The sampling and analysis plan outlines the rationale for the field investigation activities carried out at the Site and the associated methodologies used to meet the objectives of this Phase Two ESA.

4.3 Phase One Conceptual Site Model

The following key Site features are presented in Figures 1 and 2:

- Existing buildings and structures;
- Water bodies and areas of natural significance located in the Phase One Study Area;
- Drinking water wells on the Phase One Property;
- Roads (including names) within the Phase One Study Area;
- Uses of properties adjacent to the Phase One Property; and,
- Location of identified PCAs in the Phase One Study Area (including any storage tanks).

The following describes the Phase One ESA CSM for the Site based on the information obtained and reviewed as part of this Phase One ESA:

- At the time of the Site reconnaissance, conducted on April 25, 2016, the Site consisted of approximately 72 acres (29 hectares) of irregularly shaped land parcel. The Site includes land that is proposed for future development and currently has a residence and a Cover-All structure located on the Site. There are also temporary trailers (construction type site trailers) located on Site in the vicinity of the residence and Cover-All structure, possibly associated with former operations at the Site;
- A small watercourse (creek) runs through the northern part of the Site. The Ottawa River is located approximately 9.8 kilometres northeast of the Site. No areas of natural significance were identified on or within the Phase One Study Area;
- The drift thickness at the Site is expected to range between 3 to 5 mbgs at the southernmost part of the Site, 5 to 10 mbgs at the western and central part of the Site and 10 to 15 mbgs at the northeastern part of the Site. Borehole records on the Site, as identified in the ERIS report, indicate a depth to bedrock of approximately 11.3 mbgs. Records for the Study Area indicated a depth to bedrock ranging from 0.9 to 15.2 mbgs. The WWIS records indicate that soil stratigraphy at the Site consists of generally sandy clay or sand with gravel underlain by limestone at a depth of approximately 11.3 m (37 ft). The WWIS records indicate that the static water level on the Site ranges from 0.6 m to 4.3 metres below ground surface (mbgs) (2 ft to 14 ft);

- At the time of the Site visit the surrounding properties along Carp Road include primarily commercial/industrial properties, west of which (Cardevco Road) there are additional commercial/industrial properties including automotive repair and metal fabrication. East of the Site is primarily vacant land and residential properties. South of the Site (south of Richardson Site Road) is MCon Precast Concrete products, a manufacturing property;
- PCAs were identified in the Phase One Study Area and tabulated below and are shown on Figure 2;

Potentially Contaminating Activity	Location of PCA in Relation to the Site (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
PCA A1	Southwest of the Site, hydraulically upgradient, greater than 150 metres away	#10 Commercial Autobody Shops (uHaul, former Nortrax property, heavy equipment sales and service)	Off-site	PHC/BTEX, Metals, PAHs, VOCs, Metals	Groundwater
PCA A2	Southwest of the Site, hydraulically upgradient	#10 Commercial Autobody Shops (Riviera Automobiles).	Off-site	PHC/BTEX, Metals, PAHs, VOCs, Metals	Groundwater
PCA B1 to B5	PCA B1 – Diesel / Gasoline AST in Equipment Storage Area	#28 Gasoline and Associated Products Storage in Fixed Tanks Diesel / gasoline / waste oil tanks are/were used in specific locations on the Site. Newly constructed, unused generator ASTs are also stored onsite.	Onsite	PHC/BTEX, PAHs, VOCs	Soil and Groundwater
	PCA B2 - Diesel / Gasoline AST in Equipment Storage Area				
	PCA B3 - Diesel / Gasoline AST in Equipment Storage Area				
	PCA B4 – Former AST adjacent to the Cover-All Structure				
	PCA B5 – New / Used generators ASTs and new generators (not connected and functioning) in the AST / Generator Storage Area				

Potentially Contaminating Activity	Location of PCA in Relation to the Site (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
PCA C – Waste Management / Sorting Facility for dry construction materials	PCA C – Southeast of Site, hydraulically cross-gradient	#58 Waste Disposal and Waste Management The properties at 107 and 111 Westhunt Road are waste transfer / sorting management facilities owned by Tomlinson for recycling purposes.	Offsite	PHC/BTEX, Metals, PAHs,	Soil and Groundwater
PCA D1 to D6	PCA D1 – Northeast of the Cover-All Structure	#30 Importation of Fill of Unknown Quality Potential importation of fill of unknown quality is present at certain locations on the Site	Onsite	PHC/BTEX, PAHs, Metals	Soil and Groundwater
	PCA D2 – Northeast of the Cover-All Structure				
	PCA D3 – Near the Residence				
	PCA D4 – Near the Cover-All Structure				
	PCA D5 – Northeast of the Equipment Storage Area				
	PCA D6 – At the Equipment Storage and AST / Generator Storage Area				

- Underground utilities are not expected to be present at the Phase One Property;
- Local groundwater flow is anticipated to flow radially towards the small watercourse that runs through the northern part of the Site. Regional groundwater flow is anticipated to flow a north-easterly direction towards the Ottawa River located approximately 10 kilometres northeast of the Site. There are not many subsurface utilities in the vicinity of the Site that could potentially affect groundwater flow direction. There are some subsurface utilities in the vicinity of the Site along Carp Road (although not on-Site) and groundwater flow direction may be affected in the vicinity of the subsurface utilities.

4.4 Deviations from Sampling and Analysis Plan

A sampling and analysis plan is provided in Appendix A(i) which incorporates the 2018 investigation program. The sampling and analysis plan outlines the rationale for the field investigation activities carried out at the Site and the associated methodologies used to meet the objectives of this Phase Two ESA. This plan dated August 10, 2018 covers the activities undertaken during the Phase Two ESA. The procedures described in the Sampling and Analysis Plan were followed, apart from the following occurrence described below:

A monitoring well was planned to be installed at borehole location BH18-7 to verify groundwater conditions in the overburden, in an area suspected of containing fill of unknown quality. The borehole and monitoring well were planned to be used to assess potential impacts of soil and groundwater by potential fill of unknown quality.

During borehole drilling activities, auger refusal was encountered at approximately 4.57 mbgs. Refusal was interpreted to represent the presence of bedrock at the borehole location, and groundwater was not encountered prior to refusal. The water table was therefore inferred to be located within the bedrock at borehole location BH18-7 during this environmental investigation. Fill was encountered at borehole location BH18-7, however it was found that the water table was stratigraphically lower than the depth of the fill material. A monitoring well was not installed at this location and a groundwater sample was not taken, as was initially planned in the Sampling and Analysis Plan found in Appendix A (i).

4.5 Impediments

No physical impediments to the Phase Two ESA investigation were encountered. Access to the Phase Two Property was not denied or restricted.

5.0 INVESTIGATION METHOD

5.1 General

The following sections describe the field investigation methodology employed during the Phase Two ESA. The field work was conducted between August 23, 2018 and August 28, 2018.

Prior to initiating the field work, Golder developed and implemented Site-specific protocols to protect the health and safety of its employees and subcontractors through the preparation of a Site-specific Health and Safety Plan. An assessment of potential health and safety hazards at the Phase Two Property and those associated with the proposed work was completed each day of the field program. A health and safety tail gate meeting was held with Golder's subcontractors each day prior to completion of the field work. The document was reviewed and signed on-Site by field personnel prior to commencing work. Additionally, prior to any intrusive investigations, including drilling, USL-1 (subcontracted to Golder) completed public and private utility clearances.

5.2 Drilling

From August 23 to August 24, 2018, eleven boreholes (BH18-1, BH18-2, BH18-4, BH18-5, BH18-6, BH18-7, BH18-8, BH18-9, BH18-10, BH18-11, BH18-12) were advanced to depths of 2.1 to 4.6 metres below ground surface (“mbgs”). Borehole locations are provided in Figure 2. A description of the quality assurance/quality control measures taken to minimize the potential for cross-contamination between sampling locations is provided in Section 5.12.

Boreholes were advanced by George Downing Estate Drilling (“Downing Drilling”) using a track mounted CME 85 drill rig. During borehole drilling activities, overburden soil samples were collected using split spoon soil sampling equipment and augered using 200 mm outside diameter (“OD”) hollow stem augers.

Continuous soil samples were collected using the following method:

- Split-spoon: 0.61 m (2 foot) long, 5.08 cm (2 inch) diameter stainless steel split spoon sampling system at 0.76 m long intervals. Split-spoons were decontaminated between sample locations.

5.3 Soil: Sampling

Soil samples were collected from undisturbed locations and split in the field into two components. One component was placed into laboratory-prepared container with minimal headspace and stored in a cooler for potential laboratory analysis. The second component was placed inside a plastic bag for field screening, consisting of the soil description, and noting the presence of any staining, odour and/or debris. A photoionization detector (RKI Eagle II) calibrated to 100 parts per million (“ppm”) isobutylene was used to measure the total organic vapour concentration in the headspace in the sealed plastic bag.

As per the sampling and analysis plan, provided in Appendix A(i), at least one soil sample was submitted from each test location. One soil sample representing “worst-case” conditions at each sampling location was selected for laboratory analysis based on the field headspace screening measurements, visual observations (e.g., staining, discoloration and/or free product, if any), and olfactory observations (if any). Soil samples were submitted to the analytical laboratory under chain-of-custody procedures. A summary of the soil samples submitted for analysis is provided in Table 3.

Geologic descriptions, visual and olfactory observations, and results of field headspace measurements are presented on the Record of Borehole sheets in Appendix A(ii).

5.4 Field Screening Measurements

Field measurements of sample headspace concentration were made using the following equipment:

Equipment	Make and Model	Parameters Detected	Detection Limits	Precision	Accuracy	Calibration Standard	Calibration Procedure
RKI Eagle	Eagle 2	Combustible gas	0 - 50,000 ppm	N/A	±5%	Hexane (100 ppm)	By supplier prior to fieldwork
		VOCs	0 - 2,000 ppm	N/A	±5%	Isobutylene (100 ppm)	

One soil sample representing “worst-case” conditions at each sampling location was selected for laboratory analysis based on the soil headspace screening measurements, visual observations (e.g., staining, discoloration and/or free product, if any), and olfactory observations (if any). The results of soil headspace screening measurements are provided in the Record of Boreholes in Appendix A(ii).

5.5 Groundwater: Monitoring Well Installation

Groundwater monitoring wells were installed by Downing Drilling using threaded 50 mm diameter, schedule 40, polyvinyl chloride (“PVC”) well screens and riser pipe, which were brought to the Site in sealed plastic bags. The annular space was filled with silica filter sand to at least 0.3 m above the well screen. The monitoring well was sealed with bentonite from the top of the sand pack and completed with a flush mount protective well casing. The riser pipes were sealed with a J-plug. A description of the quality assurance/quality control measures taken to minimize the potential for cross-contamination between sampling locations is provided in Section 5.12.

Following drilling, the monitoring wells were developed on August 27, 2018 by removing up to ten well volumes, or by removing one well volume if the well was considered a “low yield” monitoring well, using dedicated Waterra® pumps (tubing with foot valves). During monitoring well development, qualitative observations were made of water colour, clarity, and the presence or absence of any hydrocarbon sheen or odours.

5.6 Groundwater: Field Measurements for Water Quality Parameters

Groundwater indicator parameters including temperature, pH, conductivity, oxidation-reduction potential (“ORP”) and dissolved oxygen were measured prior to sampling to ensure adequate well development and purging. A Horiba U-52 water quality meter was used to measure groundwater quality during monitoring well development and groundwater sampling. The instrument was calibrated by Pine Environmental of Ottawa, Ontario, using factory supplied solutions for electrical conductivity parameters.

5.7 Groundwater: Sampling

Each monitoring well was purged prior to sample collection. During purging, qualitative observations were made of water colour, clarity, and the presence of hydrocarbon sheen or odour. Groundwater sampling for all monitoring wells was accomplished using the “low-flow” groundwater sampling technique, which requires stabilization of water quality parameters before sample collection. Groundwater sampling was carried out on August 28, 2018.

Groundwater samples were placed in laboratory-prepared containers and stored in a cooler until delivery to the analytical laboratory under chain-of-custody procedures. A summary of the groundwater samples submitted for analysis is presented in Table 4.

5.8 Sediment: Sampling

No sediment samples were collected as part of this investigation.

5.9 Analytical Testing

The contact information for the analytical laboratory is included below.

Maxxam Analytics
32 Colonnade Road (#100)
Ottawa, Ontario, K2E 7J6
Laboratory Contact: Alisha Williamson
613-274-0573

The analytical laboratory is accredited by the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA), both of which are accepted by the MOECP.

5.10 Residue Management Procedures

All residues produced during the investigation that showed evidence of contamination (e.g., soil cuttings from drilling, groundwater from well development purging, wash water from equipment decontamination) were placed in sealed drums and stored on-Site for disposal by the Site owner.

5.11 Elevation Surveying

An elevation survey was completed by Cavanagh for all boreholes and monitoring wells advanced in the scope of this environment assessment.

5.12 Quality Assurance and Quality Control Measures

Golder's quality assurance program for environmental investigations was implemented to ensure that analytical data obtained by the investigation were valid and representative. The quality assurance program included the following measures:

- The use of standard operating procedures for all field investigation activities;
- All monitoring wells were developed following installation to remove fine particles from the filter pack and any fluids introduced during drilling;
- Monitoring wells were appropriately purged prior to groundwater sample collection to remove stagnant water from the well bore and improve sample representativeness, minimizing sample agitation and aeration to the extent practicable;
- The collection of field duplicate samples at a minimum frequency of one duplicate for every ten samples;
- The collection of at least one trip blank for sampling events that include the analysis of volatile organic compounds in groundwater;
- Initial calibration of field equipment was performed at the start of each field day, with a daily check of calibration, as needed, using a standard of known concentration;
- Soil and groundwater samples were handled and stored in accordance with the sample collection and preservation requirement of the Ministry of the Environment, Conservation, and Parks (MOECP) *Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act*, July 1, 2011. Samples were collected directly into pre-cleaned, laboratory-supplied sample containers with the appropriate preservative for the analyte group. Upon collection, samples were placed in insulated coolers with ice for storage and transport to the analytical laboratory under chain-of-custody;
- Dedicated sampling equipment (tubing and footvalves) and clean disposable Nitrile™ gloves were used at each sampling location to prevent cross-contamination. All non-dedicated sampling equipment (e.g., water level meters, split spoons) was decontaminated between sampling locations. Sampling equipment in contact with soil, groundwater, or sediment was: cleaned by mechanical means; washed with a phosphate-free, laboratory-grade detergent (e.g., LiquiNox) and, if necessary, an appropriate desorbing wash solution; and thoroughly rinsed with analyte-free water;

- Detailed field records documenting the methods and circumstances of collection for each field sample were prepared at the time of sample collection. Each sample was assigned a unique sample identification number recorded in the field notes, along with the date and time of sample collection, the sample matrix, and the requested analyses; and,
- The submission of samples to the analytical laboratory in accordance with standard chain of custody procedures.

Below is a summary of the primary and duplicate samples collected August 23, 24, and 28, 2018.

Date	Soil Samples ID	Duplicate ID	Trip Blanks
August 23, 2018	BH18-1 SA1, BH18-1 SA3, BH18-2 SA4, BH18-5 SA1, BH18-5 SA3, BH18-6 SA5, BH18-8 SA1, BH18-9 SA1, BH18-11 SA1, BH18-12 SA1 (10)	DUP-1 (Duplicate of BH18-8 SA1)	NA
August 24, 2018	BH18-4 SA1, BH18-4 SA4, BH18-7 SA1, BH18-7 SA2, BH18-10 SA4 (5)		NA
Date	Groundwater Samples Collected	Duplicates	Trip Blanks
August 28, 2018	MW18-01, MW18-02, MW18-04, MW18-05, MW18-10 (5)	DUP-1 (Duplicate of MW18-10)	Trip blank

6.0 REVIEW AND EVALUATION

This section of the report presents a review and evaluation of the results of the drilling, monitoring and sampling activities conducted as part of the Phase Two ESA.

6.1 Geology

The soil conditions encountered during the borehole drilling are presented in the Record of Borehole sheets and provided in Appendix A(ii). The following presents a summary of the subsurface soil conditions encountered during the investigation.

Boreholes were advanced to a maximum depth of 4.6 mbgs. A surficial layer of sand and gravel fill up to 2.5 meters in thickness was present at all borehole locations aside from BH18-6, which was located in a topographically elevated area consisting of fill to a depth of 3.65 mbgs. In general, the subsurface soil conditions below the sand and gravel fill material consisted native gravelly sand in the southwestern portion of the Site, and silty sand/clay glacial till in the central and northeastern portion of the Site.

Fill materials generally consisted of gravelly sand, extending to a maximum depth of 2 mbgs in the southwestern part of the property. The silty sand and silty clay glacial till unit was encountered below the fill materials, extending to the maximum depth of drilling. Bedrock was inferred to be encountered at approximately 4.57 mbgs at borehole location BH18-7 following auger refusal.

Based on the soil conditions encountered in the boreholes, the water table is generally contained within the silty sand / silty clay glacial till unit at the Phase Two property. At borehole locations BH18-7, the water table is anticipated to be located within the bedrock at the time of this environmental investigation.

6.2 Groundwater: Elevations and Flow Direction

All monitoring wells were used in the interpretation of shallow groundwater contours and shallow groundwater flow direction. Any temporary fluctuation in water levels on the Phase Two Property is not anticipated to affect the conclusions of the Phase Two ESA.

The base of shallow groundwater monitoring well screen intervals were installed at elevations ranging from approximately 112.383 to 109.691 masl (3.05 to 3.65 mbgs). The location and depth of the screens were selected based on the issues being investigated and were installed to straddle the water table. A summary of the monitoring well construction details are presented in Table 1. Monitoring for free phase product using an interface probe was conducted on August 27, 2018. No evidence of petroleum hydrocarbon free product or sheen in groundwater was observed.

The elevations of the potentiometric surface at each monitoring well are summarized in Table 2. Groundwater elevations at the Site ranged from 113.412 to 111.120 masl (1.49 to 2.26 mbgs) on August 27, 2018. Static groundwater levels were measured in the monitoring wells located across the Site on August 27, 2018. Figure 5 shows August 27, 2018 groundwater elevations; however, it is noted that monitoring wells are placed in a linear fashion in this area and a true representation of groundwater flow based on these points cannot be determined. Groundwater flow is inferred to be towards the southeast near the Cover-All Structure where groundwater is inferred to be flowing towards the watercourse based on local topography.

Seasonal fluctuation in water levels on the Site should be expected. Given the limited number of monitoring events seasonal trends could not be identified, however shallow groundwater water levels are typically highest following the spring recharge and decline throughout the summer and fall months into the winter.

The presence of subsurface utilities and structures at the Site are not expected to act as preferential pathways promoting the migration of COCs as there were no buried utilities identified at the Site.

6.3 Groundwater: Hydraulic Gradients

The horizontal hydraulic gradient was estimated for shallow groundwater conditions in the Equipment Storage and AST/Generator Storage Areas based on water levels collected on August 27, 2018, and the inferred groundwater contours are presented on Figure 5. The estimated horizontal hydraulic gradient for shallow groundwater conditions was calculated to be 0.001 m/m between monitoring wells MW18-5 and MW18-4.

Vertical hydraulic gradients were not calculated as nested monitoring wells were not installed at the Site.

6.4 Coarse Soil Texture

Soil samples for grain size analysis were not collected from the native overburden materials by Golder in the scope of this environmental investigation. The overburden soils were considered to be coarse textured based on fieldwork observations and borehole stratigraphy. Accordingly, the Site soil is considered to be coarse textured.

6.5 Soil: Field Screening

Headspace vapour measurements were conducted on the soil samples collected from all boreholes. Combustible gas vapour ranged from non-detect to 60 ppm and organic vapour measurements ranged from non-detect to 70 ppm (both of the highest readings were measured at BH18-10 between 2.29 and 2.90 mbgs).

The results of headspace vapour measurements are presented on the Record of Borehole sheets in Appendix A(ii).

6.6 Soil: Quality

Table 3 provides a summary of the soil samples submitted for analysis and the associated test parameters. The analytical results of soil samples are presented in Tables 5A to 5C. Laboratory Certificates of Analysis for the soil samples are included in Appendix A(iii).

Golder completed soil sampling at the Site during borehole advancement on August 23 and 24, 2018. The soil samples were submitted to Maxxam Analytics for analysis of one or more of the following parameters; metals, VOCs, PAHs and/or PHCs.

A summary of the number of soil samples analysed and the number of soil samples exceeding the MOECP Table 8 Standards is provided below:

Parameter	Number of soil samples analysed	Number of soil samples exceeding the Table 8 Standards
VOCs	10 (+1 Duplicate)	0
PAHs	9 (+1 Duplicate)	0
Metals	8 (+1 Duplicate)	2
PHC F1/BTEX	10 (+1 Duplicate)	1
PHC F2-F4	10 (+1 Duplicate)	1

Figure 3 shows the locations of the metals, PAH and PHC F1 and F2 soil exceedances compared to the MOECP Table 8 Standards (as compared to residential/parkland/industrial/commercial land uses).

Metals

- The reported concentration of cadmium in soil exceeded the MOECP Table 8 Standard of 1.2 ug/g (residential/parkland/industrial/commercial) at one (1) location, with a concentration of 4.5 ug/g. The cadmium exceedance was identified in soil sample BH18-8 SA1 (0 - 0.61 mbgs). The duplicate sample of BH18-8 SA1 (DUP-1) yielded a cadmium concentration of <0.1 ug/g, which meets MOE Table 8 Standards (residential/parkland). The discrepancy is likely linked to heterogenous soil conditions along this soil sampling interval.
- The reported concentration of molybdenum in soil exceeded the MOECP Table 8 Standard of 2 ug/g (residential/parkland/industrial/commercial) at one (1) location, with a concentration of 4.4 ug/g. The molybdenum exceedance was identified in soil sample BH18-6 SA5 (3.04 – 3.65 mbgs).

PHCs F1-F4/BTEX

- The reported concentration of PHC F1 in soil exceeded the MOECP Table 8 Standard of 25 ug/g (residential/parkland/industrial/commercial) at one (1) location, with a concentration of 78 ug/g. The PHC F1-BTEX exceedance was identified in soil sample BH18-10 SA4 (2.29 – 2.90 mbgs).
- The reported concentration of PHC F2 in soil exceeded the MOECP Table 8 Standard of 10 ug/g (residential/parkland/industrial/commercial) at one (1) location, with a concentration of 380 ug/g. The PHC F2 exceedance was identified in soil sample BH18-10 SA4 (2.29 – 2.90 mbgs).
- The reported concentration of Total Xylene in soil exceeded the MOECP Table 8 Standard of 0.05 ug/g (residential/parkland/industrial/commercial) at one (1) location, with a concentration of 0.59 ug/g. The Total Xylene exceedance was identified in soil sample BH18-10 SA4 (2.29 – 2.90 mbgs).

6.7 Groundwater: Quality

Monitoring well construction details are summarized in Table 1 and a list of groundwater samples submitted for laboratory analysis is provided in Table 4. The analytical results for groundwater samples are summarized in Tables 6A through 6C, along with the applicable MOECP Table 8 Standards. Laboratory Certificates of Analysis for groundwater are provided in Appendix A(iii).

Golder completed sampling of monitoring wells at the Site on August 28, 2018. Groundwater samples were submitted to Maxxam Analytics for analysis for one or more of the following parameters; metals, VOCs, PAHs, and/or PHCs.

A summary of the number of groundwater samples analysed and number of samples exceeding the MOECP Table 8 Standards is provided below:

Parameter	Number of groundwater samples analysed	Number of groundwater samples exceeding the 2011 Table 8 Standards
VOCs	5 (+1 duplicate)	0
PAHs	5 (+1 duplicate)	1 (+1 duplicate)
Metals	5 (+1 duplicate)	2 (+1 duplicate)
PHC F1/BTEX	5 (+1 duplicate)	1 (+1 duplicate)
PHC F2-F4	5 (+1 duplicate)	1 (+1 duplicate)

Figure 4 shows the locations of the groundwater exceedances as compared to the MOECP Table 8 Standards (all types of property use).

Metals

- The reported concentration of cobalt in groundwater exceeded the MOECP Table 8 Standard of 3.8 ug/L at two (2) locations, with concentrations ranging from 6 ug/L to 9.3 ug/L. The cobalt exceedance was identified in groundwater samples MW18-10 (along with it's duplicate DUP-1) as well as MW18-02.

PAHs

- The reported concentration of 1-Methylnaphtalene in groundwater exceeded the MOECP Table 8 Standard of 3.2 ug/L at one (1) location, with a concentration ranging from 3.9 ug/L to 4.2 ug/L. The 1-Methylnaphtalene exceedance was identified in groundwater samples MW18-10 (along with it's duplicate DUP-1).
- The reported concentration of 2-Methylnaphtalene in groundwater exceeded the MOECP Table 8 Standard of 3.2 ug/L at one (1) location, with a concentration ranging from 3.4 ug/L to 3.9 ug/L. The 2-Methylnaphtalene exceedance was identified in groundwater samples MW18-10 (along with it's duplicate DUP-1).
- The reported concentration of Methylnaphtalene, 2-(1-) in groundwater exceeded the MOECP Table 8 Standard of 3.2 ug/L at one (1) location, with a concentration ranging from 7.3 ug/L to 8.1 ug/L. The Methylnaphtalene, 2-(1-) exceedance was identified in groundwater samples MW18-10 (along with it's duplicate DUP-1).

PHC F1-F4/BTEX

- The reported concentration of Ethylbenzene in groundwater exceeded the MOECP Table 8 Standard of 2.4 ug/L at one (1) location, with a concentration ranging from 17 ug/L to 19 ug/L. The Ethylbenzene exceedance was identified in groundwater samples MW18-10 (along with it's duplicate DUP-1).
- The reported concentration of PHC F2 in groundwater exceeded the MOECP Table 8 Standard of 150 ug/L at one (1) location, with a concentration of 1300 ug/L. The Ethylbenzene exceedance was identified in groundwater samples MW18-10 (along with it's duplicate DUP-1).

In addition to numerical standards, the MOECP Table 8 Standard sets out non-numerical (aesthetic) standards relating to the presence of free phase product and hydrocarbon sheen. Specifically, a property does not meet the site condition standards if there is evidence of free product, including but not limited to, visible petroleum hydrocarbon film or sheen present on groundwater, surface water or in any groundwater or surface water samples. Monitoring for free phase product using an interface probe was conducted on August 27 and 28, 2018. No evidence of free product or sheen in groundwater was observed.

6.8 Sediment: Quality

No sediment samples were collected as part of this investigation.

6.9 Quality Assurance and Quality Control Results

The quality assurance assessment of the field duplicate sample results was conducted according to the document entitled Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004 (amended in July 2009 and effective as of July 1, 2011) ("Analytical Protocol").

To determine the precision of the analytical methods and field sampling procedures, blind duplicate samples were collected during soil and groundwater sampling. Precision is determined by the relative percent difference ("RPD") between the duplicate and original samples and was calculated as follows:

$$RPD = \frac{|x_1 - x_2|}{x_m}$$

Where

- x_1 initial sample results
- x_2 duplicate sample results
- x_m mean of x_1 , x_2

The analytical results of the primary and duplicate soil and groundwater samples indicated a satisfactory correlation between the primary and duplicate samples and were within the 30% recommended control limit in the Analytical Protocol for groundwater.

It is noted that the trip blank and field blank samples were found to have no detectable concentrations. The quality of the analytical results is further supported by Maxxam's internal quality assurance program that includes laboratory blanks, spikes, surrogates and duplicate samples.

All certificates of analysis or analytical reports received pursuant to clause 47 (2) (b) of the regulation comply with subsection 47(3). A certificate of analysis or analytical report has been received for each sample submitted for analysis and is provided in Appendix A(iii). The analytical laboratory did not qualify any of the analytical results.

Accordingly, the analytical data generated during the investigation are valid and representative and may be used in this Phase Two ESA without further qualification.

6.10 Phase Two Conceptual Site Model

The Phase Two conceptual site model is presented in the following sections.

POTENTIAL SOURCES OF CONTAMINATION

Potentially Contaminating Activities

Based on the information obtained as part of the Phase One ESA, the following potentially contaminating activities ("PCAs") were identified. The location of each PCA is provided on Figure 2:

Potentially Contaminating Activity	Location of PCA in Relation to the Site (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
PCA A1	Southwest of the Site, hydraulically upgradient, greater than 150 metres away	#10 Commercial Autobody Shops (uHaul, former Nortrax property, heavy equipment sales and service)	Off-site	PHC/BTEX, Metals, PAHs, VOCs, Metals	Groundwater
PCA A2	Southwest of the Site, hydraulically upgradient	#10 Commercial Autobody Shops (Riviera Automobiles).	Off-site	PHC/BTEX, Metals, PAHs, VOCs, Metals	Groundwater
PCA B1 to B5	PCA B1 – Diesel / Gasoline AST in Equipment Storage Area	#28 Gasoline and Associated Products Storage in Fixed Tanks Diesel / gasoline / waste oil tanks are/were used in specific locations on the Site. Newly constructed, unused generator ASTs are also stored onsite.	Onsite	PHC/BTEX, PAHs, VOCs	Soil and Groundwater
	PCA B2 - Diesel / Gasoline AST in Equipment Storage Area				
	PCA B3 - Diesel / Gasoline AST in Equipment Storage Area				
	PCA B4 – Former AST adjacent to the Cover-All Structure				
	PCA B5 – New / Used generators ASTs and new generators (not connected and functioning) in the AST / Generator Storage Area				

Potentially Contaminating Activity	Location of PCA in Relation to the Site (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
PCA C – Waste Management / Sorting Facility for dry construction materials	PCA C – Southeast of Site, hydraulically cross-gradient	#58 Waste Disposal and Waste Management The properties at 107 and 111 Westhunt Road are waste transfer / sorting management facilities owned by Tomlinson for recycling purposes.	Offsite	PHC/BTEX, Metals, PAHs,	Soil and Groundwater
PCA D1 to D6	PCA D1 – Northeast of the Cover-All Structure	#30 Importation of Fill of Unknown Quality Potential importation of fill of unknown quality is present at certain locations on the Site	Onsite	PHC/BTEX, PAHs, Metals	Soil and Groundwater
	PCA D2 – Northeast of the Cover-All Structure				
	PCA D3 – Near the Residence				
	PCA D4 – Near the Cover-All Structure				
	PCA D5 – Northeast of the Equipment Storage Area				
	PCA D6 – At the Equipment Storage and AST / Generator Storage Area				

Areas of Potential Environmental Concern

The following APECs were identified as summarized in the following table:

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property (See Figure 1)	Potentially Contaminating Activity (PCA) and Description of the Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (groundwater, soil and/or sediment)
APEC #1A to APEC #1F Importation of Fill of Unknown Quality	APEC 1A – Northeast of the Cover-All Structure	#30 Importation of Fill of Unknown Quality Potential importation of fill of unknown quality is present at certain locations on the Site	Onsite	PHC/BTEX, PAHs, Metals	Soil and Groundwater
	APEC 1B – Northeast of the Cover-All Structure				
	APEC 1C – Near the Residence				
	APEC 1D – Near the Cover-All Structure				
	APEC 1E – Northeast of the Equipment Storage Area				
	APEC 1F – At the Equipment Storage and AST / Generator Storage Area				
APEC #2A to #2E	APEC 2A - Currently used AST in the Equipment Storage Area	#28 Gasoline and Associated Products Storage in Fixed Tanks Diesel and gasoline tanks are/were used in specific locations on the Site. Newly constructed, unused generator ASTs are also stored onsite.	Onsite	PHC/BTEX, PAHs, VOCs	Soil and Groundwater
	APEC 2B - Currently used AST in the Equipment Storage Area				
	APEC 2C - Currently used AST in the Equipment Storage Area				
	APEC 2D - Former AST adjacent to the Cover-All Structure				
	APEC 2E - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area				
APEC #3	APEC 3 – South east portion of Site	#10 Commercial Autobody Shops (Riviera Automobiles)	Off-Site	PHC/BTEX, PAHs, VOCs	Groundwater

Subsurface Structures and Utilities

The Site is located on largely undeveloped land. The Site buildings are not serviced by municipal water, storm sewers, sanitary services, or natural gas. Hydro and telecommunication lines are present at the residence building however they are not expected to act as preferential pathways promoting the migration of COCs as the water table is not inferred to intercept buried utilities and subsurface structures at the Phase Two Property.

Building structures located on the Site are shown on Figure 2. The Site residential building is constructed with a basement. The depth and location of building foundations and footings are unknown.

PHYSICAL SETTING

Stratigraphy

Representative geologic cross-sections of the Site are presented in Figures 6 and 7.

A surficial layer of sand and gravel fill up to 2.5 meters in thickness was present at all borehole locations aside from BH18-6, which was located in a topographically elevated area consisting of fill to a depth of 3.65 mbgs. In general, the subsurface soil conditions below the sand and gravel fill material consisted native gravelly sand in the southwestern portion of the Site, and silty sand/clay glacial till in the central and northeastern portions of the Site.

Fill materials generally consisted of dark-brown/black gravelly sand, extending to a maximum depth of 2 mbgs in the southwestern part of the property. The silty sand and silty clay glacial till unit was encountered below the fill materials, extending to the maximum depth of drilling. Bedrock was inferred to be encountered at approximately 4.57 mbgs at borehole location BH18-7 following auger refusal.

Based on the soil conditions encountered in the boreholes, the water table is generally contained within the silty sand / silty clay glacial till unit at the Phase Two property. At borehole location BH18-7, the water table is anticipated to be located within the bedrock at the time of this environmental investigation.

Given that the average thickness of overburden at the Site is greater than 2 m, the Site is not considered to be a shallow soil property as defined by O. Reg 153/04 (as amended).

Hydrogeological Characteristics

The regional groundwater flow direction is expected to be towards the Ottawa River, located approximately 10 km to the north. The direction of local groundwater flow in the vicinity of the Site is to the northwest in the Equipment Storage and AST/Generator Storage Areas in the southwestern portion of the Site, and likely to the southeast in the area near the Cover-All Structure towards the watercourse based on local topography.

Static groundwater levels were measured in the monitoring wells located across the Site on August 27, 2018. Figure 5 shows August 27, 2018 groundwater elevations, however it is noted that monitoring wells are placed in a linear fashion in this area and a true representation of groundwater flow based on these points cannot be determined. Groundwater elevations at the Site ranged from 111.120 mald (MW18-10) to 113.412 mald (MW18-1) and were encountered at depths of 2.26 to 1.49 mbgs, respectively.

The horizontal hydraulic gradient was estimated for shallow groundwater conditions in the Equipment Storage and AST/Generator Storage Areas based on water levels collected on August 27, 2018, and the inferred groundwater contours are presented on Figure 5. The estimated horizontal hydraulic gradient for shallow groundwater conditions was calculated to be 0.001 m/m between monitoring wells MW18-5 and MW18-4.

Vertical hydraulic gradients were not calculated as nested monitoring well pairs were not installed at the Site.

The following additional observations are provided:

- Bedrock was inferred to be encountered at approximately 4.57 mbgs at borehole location BH18-7 during the Phase Two investigation;
- The depth to the water table varies from 1.47 to 2.26 mbgs which is within the native silty sand/clay glacial till and native gravelly sand;
- There is potential for soil to have been brought from another property and placed on, in or under the Site as part of this Phase Two ESA; and
- Groundwater flow at borehole/monitoring well location MW18-10 is inferred to be in the southeast direction based on local topography.

DELINEATION OF CONTAMINANT IMPACTS

APECs Where Contaminants are Present at a Concentration Above the Applicable Site Condition Standard

APEC locations are provided in Figure 2. The APECs where a contaminant is present on, in or under the Phase Two Property at a concentration greater than the applicable site condition standard, along with the contaminants present in each environmental medium, are identified in the following table.

APEC Description	Contaminants of Concern
APEC 1. Potential for soil and groundwater impacts due to the reported presence of fill on the Site at six (6) locations: APEC 1A – Northeast of Cover-All Structure APEC 1B – Northeast of Cover-All Structure APEC 1C – Adjacent to Residence APEC 1D – Adjacent to Cover-All Structure APEC 1E – Fill Mound Northeast of AST/Generator Area APEC 1F – AST/Generator Area and Equipment Storage Area	APEC 1A – Northeast of Cover-All Structure Soil – None Groundwater – NA Sediment – NA
	APEC 1B - Northeast of Cover-All Structure Soil – None Groundwater – NA Sediment – NA
	APEC 1C - Adjacent to Residence Soil – Cadmium Groundwater – NA Sediment – NA
	APEC 1D - Adjacent to Cover-All Structure Soil – None Groundwater – Cobalt Sediment – NA
	APEC 1E - Fill Mound Northeast of AST/Generator Area Soil – Molybdenum Groundwater – NA Sediment – NA
	APEC 1F - AST/Generator Area and Equipment Storage Area Soil – None Groundwater – Cobalt Sediment – NA

APEC Description	Contaminants of Concern
<p>APEC 2. Potential for soil and groundwater impacts due to Gasoline and Associated Products Storage in Fixed Tanks at five (5) locations:</p> <p>APEC 2A – Currently used AST in the Equipment Storage Area</p> <p>APEC 2B – Currently used AST in the Equipment Storage Area</p> <p>APEC 2C – Currently used AST in the Equipment Storage Area</p> <p>APEC 2D – Former AST adjacent to the Cover-All Structure</p> <p>APEC 2E - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area</p>	<p>APEC 2A Soil – None Groundwater – Cobalt Sediment – N/A</p> <p>APEC 2B Soil – None Groundwater – None Sediment – N/A</p> <p>APEC 2C Soil – None Groundwater – None Sediment – N/A</p> <p>APEC 2D Soil – PHC F1 – BTEX, PHC F2, Total Xylene Groundwater – Ethylbenzene, PHC F2, 1-Methylnaphtalene, 2-Methylnaphtalene, Methylnaphtalene 2-(1-) Sediment – N/A</p> <p>APEC 2E Soil – None Groundwater – None Sediment – N/A</p>
<p>APEC 3. Potential for groundwater impacts due to the presence of offsite autobody shops</p>	<p>APEC 3 Soil – None Groundwater – None Sediment – N/A</p>

Contaminant Distribution

The location of each contaminant present in soil at a concentration greater than the applicable site condition standard is presented in Figure 3. A summary of the reported concentrations in soil is presented in Tables 5A to 5C. Based on the work that was conducted, complete vertical and horizontal delineation was not achieved at each location that yielded soil exceedances greater than the SCS.

The location of each contaminant present in groundwater at a concentration greater than the applicable site condition standard is presented in Figure 4. A summary of the reported concentrations in groundwater is presented in Tables 6A to 6C. No sediment is present at the Phase Two Property. Based on the work that was conducted, complete vertical and horizontal delineation was not achieved at each location that yielded groundwater exceedances greater than the SCS.

Soil

- The soil PHC F1 – BTEX, PHC F2, and Total Xylene exceedance at borehole location BH18-10 is located immediately adjacent to the Former AST at the Cover-All Structure (related to APEC 2D). The soil sample that yielded elevated concentrations of PHC F1 and PHC F2 above that of the site condition standards and was recovered near the water table (from 2.29 to 2.90 mbgs).

- The soil cadmium exceedance at borehole location BH18-8 was recovered from 0 – 0.61 mbgs and is considered to represent a shallow area of impact located adjacent to the residence (related to APEC 1C). This soil impacted area is not anticipated to contribute to groundwater impacts on the Site, as the observed exceedances is likely located over 2 m above the water table.
- The soil molybdenum exceedance at borehole location BH18-6 was recovered from 3.04 – 3.65 mbgs and is considered to represent a deep area of impact related to APEC 1C. This soil impacted area is not anticipated to contribute to groundwater impacts on the Site, as the observed exceedances is located above the water table.

Groundwater

- The ethylbenzene, PHC F2, 1-Methylnaphtalene, 2-Methylnaphtalene, and Methylnaphtalene 2-(1-) groundwater exceedances at monitoring well location MW18-10 is located immediately adjacent to the Former AST at the Cover-All Structure.
- The cobalt groundwater exceedances are located at two separate locations: at monitoring wells locations MW18-02 and MW18-10.

Potential Reason for Discharge into the Environment at the Site

The reason for the discharge of contaminants present on, in or under the Phase Two property at a concentration greater than the applicable SCS at borehole/monitoring well location BH/MW18-10 with regards to soil (namely PHC F1 – BTEX, PHC F2 concentrations, and Total Xylene) and groundwater (namely ethylbenzene, PHC F2, 1-Methylnaphtalene, 2-Methylnaphtalene, and Methylnaphtalene 2-(1-) concentrations) may be attributable to a past petroleum hydrocarbon spill at the Former AST adjacent to the Cover-All Structure (APEC 2D).

The cobalt exceedances in groundwater at monitoring well locations MW18-10 and MW18-02 may be attributable to the presence of fill of poor quality but may also represent a naturally elevated background condition considering elevated cobalt concentrations above that of the site condition standards were not measured in all soil samples recovered over the course of this environmental investigation. Groundwater cobalt concentrations are less than two times the SCS at monitoring well location MW18-02, and less than three times the SCS at monitoring well location MW18-10.

The cadmium soil sample exceedance at borehole location BH18-8, which was recovered from 0 – 0.61 mbgs adjacent to the residence, may be attributable to the presence of fill of poor quality. Soil cadmium concentrations are less than four times the SCS at borehole location BH18-8. Based on the sampling conducted and the September 2018 Phase I ESA Site Visit, the exceedance of cadmium at BH18-8 appears to be limited to the imported fill used for creation of the residence's driveway and not a site wide issue.

The molybdenum soil sample exceedance at borehole location BH18-6, which was recovered from 3.04 – 3.65 mbgs at APEC 1E, is likely associated to a naturally elevated background condition, as is commonly observed in limestone-bearing crushed stone from the Ottawa area.

Contaminant Migration

The soil cadmium exceedance at borehole location BH18-8 was recovered from 0 – 0.61 mbgs and is considered to represent a shallow area of impact located adjacent to the residence. This soil impacted area is not anticipated to contribute to groundwater impacts on the Site, as the observed exceedances is likely located over 2 m above the water table.

The soil (PHC F1 – BTEX, PHC F2, and Total Xylene) and groundwater (ethylbenzene, PHC F2, 1-Methylnaphtalene, 2-Methylnaphtalene, and Methylnaphtalene 2-(1-)) exceedances at borehole/monitoring well location BH/MW18-10 have the potential to migrate laterally and vertically in the subsurface via groundwater flow. The likely direction of migration of the above mentioned CoCs would be in the southeastern direction, towards the low-lying watercourse located approximately 30 to 40 meters to the southeast.

Meteorological and Climatic Considerations

Seasonal fluctuation in water levels on the Site should be expected. Given the limited number of monitoring events seasonal trends could not be identified, however shallow groundwater water levels are typically highest following the spring recharge and decline throughout the summer and fall months into the winter.

Soil Vapour Intrusion Pathways

Ethylbenzene, PHC F1, and PHC F2 are considered volatile and represent a potential vapour intrusion risk for both indoor air at the Cover-All Structure and outdoor air for on-Site receptors.

CROSS-SECTIONS

Lateral and Vertical Distribution of Contaminants

Representative cross-sections of the Site are presented in Figures 6 and 7.

POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS

A description of the potential release and transport mechanisms, exposure pathways and human and ecological receptors located on-Site in relation to the contaminant of concern is provided on Figure 8.

7.0 CONCLUSIONS

A Phase Two ESA was conducted to assess soil and groundwater conditions at the Site. Analytical data was compared to the Table 8 generic site condition standards in a potable groundwater condition within 30 meters of a water body (SCS; residential/parkland/industrial/commercial property use, coarse soil texture) presented in the Ontario Ministry of the Environment, Conservation and Parks (“MOECP”) “*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*”, dated April 15, 2011 (“MOECP Table 8 Standards”).

The results of the Phase Two ESA are summarized as follows:

- APEC 1A (unknown fill quality northeast of the Cover-All Structure) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified;
- APEC 1B (unknown fill quality northeast of the Cover-All Structure) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified;
- APEC 1C (unknown fill quality related to the on-site residence) - Cadmium concentrations in crushed stone exceeded the MOECP Table 8 Standard (residential/industrial/commercial land use) at one (1) location. The cadmium exceedance was identified in sample BH18-8 SA1 (0 - 0.61 mbgs). Based on the sampling conducted and the September 2018 Phase I ESA Site Visit, the exceedance of cadmium at BH18-8 appears to be limited to the imported fill used for creation of the residence’s driveway and not a site wide issue.

- APEC 1D (unknown quality fill related to Cover-All Structure) – Cobalt concentrations in groundwater exceeded the MOECP Table 8 Standard (residential/industrial/commercial land use) at one (1) location. The cobalt exceedance was identified in sample MW18-10. No soil impacts compared to MOECP Table 8 Standards were identified;
- APEC 1E (unknown fill quality northeast of Equipment Storage Area) – Molybdenum concentrations in soil exceeded the MOECP Table 8 Standard (residential/industrial/commercial land use) at one (1) location. The molybdenum exceedance was identified in sample BH18-6 SA5 (3.04 – 3.65 mbgs);
- APEC 1F (unknown fill quality in the Equipment Storage and AST/Generator Storage Area) – Cobalt concentrations in groundwater exceeded the MOECP Table 8 Standard (all land uses) at one (1) location. The cobalt exceedance was identified in sample MW18-2. No soil impacts compared to MOECP Table 8 Standards were identified;
- APEC 2A (gasoline and associated products in fixed tanks in the Equipment Storage Area) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified;
- APECs 2B and 2C (gasoline and associated products in fixed tanks in the Equipment Storage Area) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified;
- APEC 2D (gasoline and associated products at the Former AST) – Petroleum Hydrocarbon Fractions F1 and F2 (“PHC F1-F2”) concentrations in soil exceeded the MOECP Table 8 Standard (residential/industrial/commercial) at one (1) location. The PHC F1 and F2 exceedances were identified in soil sample BH18-10 SA4 (2.29 – 2.90 mbgs). Ethylbenzene, Total Xylene, PHC F2, 1-Methylnaphtalene, 2-Methylnaphtalene, and Methylnaphtalene, 2-(1-) in groundwater exceeded the MOECP Table 8 Standard in groundwater samples MW18-10 (along with it’s duplicate DUP-1);
- APEC 2E (gasoline and associated products at the AST/Generator Storage Area) - no soil or groundwater impacts compared to MOECP Table 8 Standards were identified; and
- APEC 3 (commercial autobody shops) – no soil or groundwater impacts compared to MOECP Table 8 Standards were identified;

The current land use of the site is mixed use residential and commercial/industrial. Golder understands that the single residence currently present at the Site will be vacated and converted to commercial office space to support the planned concrete plant which is proposed south of the residence. The proposed concrete plant is not planned where evidence of impacts has been identified in this Phase Two ESA. As such, the APECs identified at the Site are not anticipated to impact the planned concrete plant. Under Ontario Regulation 153/04, there is no requirement for a Record of Site Condition (“RSC”) given that the redevelopment is not to a more sensitive land use. Excess fill (if any) created during construction should be managed in accordance with current MOECP guidance.

8.0 REFERENCES

Golder Associates Ltd. 2016. Phase One Environmental Site Assessment, Part of Lot 6, Concession 2, Township of Huntley, Ottawa, Ontario. Project No. 1543767, May 2016.

Golder Associates Ltd. 2018. Ontario Regulation 153/04 Phase One Environmental Site Assessment Update, 2596 Carp Road, Ottawa, Ontario. Project No. 1543767, September 2018.

Bedrock Geology of Ontario, Ontario Geological Survey (2011). Miscellaneous Release – Data 126-Revision 1. 1:250,000.

The Surficial Geology of Southern Ontario, Ontario Geological Survey (2010). Miscellaneous Release – Data 128-REV. 1:50,000.

9.0 LIMITATIONS

This report was prepared for the exclusive use of Cavanagh Developments. The report, which specifically includes all tables, figures and appendices, is based on data and information, collected during conducting the Phase Two ESA, and is based solely on the conditions of the property at the time of conducting investigations, supplemented by historical information and data obtained by Golder Associates Ltd. as described in this report.

The assessment of environmental conditions at this Site has been made using the results of field screening techniques and chemical analysis of soil and groundwater samples at a limited number of locations. The Site conditions between sampling locations have been inferred based on conditions observed at the sampling locations. Conditions may vary from these sample locations. Additional study, including further investigation, can reduce the inherent uncertainties associated with this type of study. However, it is never possible, even with exhaustive sampling and testing, to dismiss the possibility that part of a Site may be contaminated and remain undetected.

The services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party (other than as noted above) as a result of decisions made or actions based on this report.

The content of this report is based on information collected during the drilling, soil and groundwater sampling activities, our present understanding of the Site conditions, and our professional judgement in light of such information at the time of this report. This report provides a professional opinion and therefore no warranty is expressed, implied, or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, including excavations, borings or other studies, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

The monitoring wells installed as part of this project have been constructed using licensed drilling/well contractors employing licensed well technicians. It is owner's responsibility to have a licensed well technician properly abandon all monitoring wells, if required.

10.0 SIGNATURES

The undersigned Qualified Person confirms that he/she was responsible for conducting and/or supervising this Phase Two ESA and the associated findings and conclusions.

We trust that you will find the contents of this report satisfactory for your current needs. Should you require clarification of the information provided, please do not hesitate to contact the undersigned.

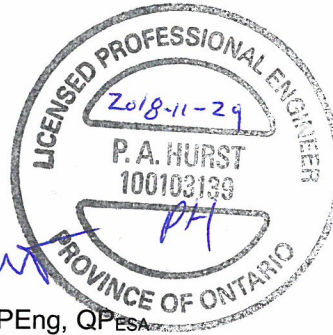
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EL/PH/hw/ca

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Tables

Table 1: Groundwater Monitoring Well Construction Details
2596 Carp Road, Ottawa, Ontario

Monitoring Well ID	Ground Surface Elevation (mASL)	Top of Pipe (mASL)	Borehole Depth (mbgs)	Screen Interval (mbgs)	Screen Interval Elevation (mASL)		Sand pack depth interval (mbgs)	Bentonite depth intervals (mbgs)	Lithology at Screen	Date of Completion
MW18-01	114.848	115.632	3.66	1.52 - 3.05	113.328	111.798	1.22 - 3.05	0 - 1.22	Fine sand, brown (native)	23-Aug-18
MW18-02	115.327	115.217	3.05	1.52 - 3.05	113.807	112.277	1.22 - 3.05	0 - 1.22	Gravelly sand (Fill) with wood debris, gravelly sand (native)	23-Aug-18
MW18-04	115.433	115.35	3.05	1.52 - 3.05	113.913	112.383	1.22 - 3.05	0 - 1.22	Gravel glacial Till (native) with some sand and cobbles	24-Aug-18
MW18-05	114.83	115.605	3.05	1.52 - 3.05	113.31	111.78	1.22 - 3.05	0 - 1.22	Gravelly sand (native) with some cobbles	23-Aug-18
MW18-10	113.341	114.221	4.42	2.13 - 3.65	111.211	109.691	1.83 - 3.65	0 - 1.83	Silty clay glacial till (native), with some sand and gravel	24-Aug-18

Notes:

1. mbgs = metres below ground surface
 2. mASL = metres above sea level
- NA = Not available

Prepared by: EL

Checked by: RM

Table 2: Groundwater Levels and Elevations
2596 Carp Road, Ottawa, Ontario

Monitoring Well/ Standpipe	Depth to Groundwater below TOP (mbTOP), August 27, 2018	Depth to Groundwater below ground surface (mbgs), August 27, 2018	Ground surface elevation (mASL)	Top of Pipe (mASL)	Calculated Groundwater Elevation (mASL), August 27, 2018
MW18-01	2.220	1.49	114.848	115.632	113.412
MW18-02	1.892	1.892	115.327	115.217	113.325
MW18-04	2.015	2.015	115.433	115.35	113.335
MW18-05	2.197	1.47	114.83	115.605	113.408
MW18-10	3.101	2.26	113.341	114.221	111.120

Notes:

mbTOP: metres below Top Of Pipe

mASL: metres above sea level

* Metres below ground surface

Prepared by: EL

Checked by: RM

Table 3: Soil Data Details for Samples Submitted for Analysis
2596 Carp Road, Ottawa, Ontario

Area of Potential Environmental Concern (APEC)	APEC Location (Figure 2)		Sample ID	Soil Sample ID, Depth Interval (mbgs) and soil type	Date of Sample Collection	PID reading (ppm)	Odour, staining or waste observed	Rationale for selecting the soil sample for laboratory analysis	Parameters Analysed	Maxxam Analytical Report Reference Number	MOE Table 8 ⁽¹⁾ Exceedances
APEC 1 Presence of fill of unknown quality at six (6) separate locations	APEC 1F	AST/Generator Storage Area	BH18-1	SA1 - 0 - 0.61 (Gravelly Sand FILL)	23-Aug-18	25	None	The soil samples were submitted for analysis to characterize the fill quality in the AST/Generator Storage Area	PAHs	R5381065	None
			BH18-5	SA1 - 0 - 0.61 (Sand and gravel FILL)	23-Aug-18	60	None		Metals, PAHs	R5381065	None
		Equipment Storage Area	BH18-4	SA1 - 0 - 0.61 (Gravelly sand FILL)	24-Aug-18	0	None	The soil samples were submitted for analysis to characterize the fill quality in the Equipment Storage Area	Metals, PAHs	R5381065	None
	APEC 1E	Fill Mound northeast of AST/Generator Area	BH18-6	SA5 - 3.04 - 3.65 (Silty clay FILL)	23-Aug-18	55	None	The soil samples were collected from a topographically elevated area of fill material and were submitted for analysis to characterize the fill quality at surficial and deeper depths.	Metals, PAHs, PHC/VOCs	R5381065	Molybdenum
			BH18-7	SA1 - 0 - 0.61 (Sandy gravel FILL)	24-Aug-18	NM	None		Metals, PAHs	R5381065	None
	APEC 1C	Adjacent to Residence	BH18-8	SA1 - 0 - 0.61 (Gravelly sand FILL)	23-Aug-18	5	None	The soil sample was submitted for analysis to characterize the fill quality near the residence.	Metals, PAHs, PHC/VOCs	R5381065	Cadmium
	APEC 1D	Adjacent to Cover-All Structure	BH18-9	SA1 - 0 - 0.61 (Gravelly sand FILL)	23-Aug-18	NM	None	The soil sample was submitted for analysis to characterize the fill quality near the Cover-All Structure.	Metals, PAHs	R5381065	None
	APEC 1A	Northeast of Cover-All Structure	BH18-11	SA1 - 0 - 0.61 (Top Soil)	23-Aug-18	0	None	The soil samples were submitted for analysis to characterize the fill quality in the area northeast of the Cover-All Structure	Metals, PAHs, PHC/VOCs	R5381065	None
	APEC 1B	Northeast of Cover-All Structure	BH18-12	SA1 - 0 - 0.61 (Silty clay)	23-Aug-18	0	None		Metals, PAHs, PHC/VOCs	R5381065	None
APEC 2 Gasoline and Associated Products Storage in Fixed Tanks at five (5) separate locations	APEC 2A	One (1) AST at APEC 2A (active use of an AST for fueling heavy equipment)	BH18-2	SA4 - 2.29 - 2.90 (Gravelly sand FILL)	23-Aug-18	NM	None	The soil sample was submitted for analysis to characterize soil quality near the water table for PHCs/VOCs	PHC/VOCs	R5381065	None
	APEC 2B and APEC 2C	Two (2) ASTs at APEC 2B and APEC 2C (active use of an AST for fueling heavy equipment)	BH18-4	SA4 - 2.29 - 2.90 (Gravel Till)	24-Aug-18	40	None	The soil sample was submitted for analysis to characterize soil quality near the water table for PHCs/VOCs	PHC/VOCs	R5381065	None
	APEC 2E	AST/Generator Storage Area (storage of heavy equipment, new/used ASTs, and new generators)	BH18-5	SA3 - 1.52 - 2.13 (Gravelly sand)	23-Aug-18	0	None	The soil sample was submitted for analysis to characterize soil quality near the water table for PHCs/VOCs	PHC/VOCs	R5381065	None
			BH18-1	SA3 - 1.52 - 2.13 (Gravelly sand)	23-Aug-18	10	None	The soil sample was submitted for analysis to characterize soil quality near the water table for PHCs/VOCs	PHC/VOCs	R5381065	None
	APEC 2D	Former AST near Cover-All Structure (Former active use of an AST with visible staining in 2016)	BH18-10	SA4 - 2.29 - 2.90 (Gravel Till)	24-Aug-18	70	PHC Odour	The soil sample was submitted for analysis to characterize soil quality near the water table for PHCs/VOCs	PHC/VOCs	R5381065	PHC F1, PHC F1 - BTEX, PHC F2, Total Xylene
APEC 3 Offsite Autobody Shops	APEC 3	AST/Generator Storage Area	BH18-5	SA3 - 1.52 - 2.13 (Gravelly sand)	23-Aug-18	0	None	The soil sample was submitted for analysis to characterize soil quality near the water table for PHCs/VOCs	PHC/VOCs	R5381065	None
			BH18-1	SA3 - 1.52 - 2.13 (Gravelly sand)	23-Aug-18	10	None	The soil sample was submitted for analysis to characterize soil quality near the water table for PHCs/VOCs	PHC/VOCs	R5381065	None

Notes:

PHCs = Petroleum hydrocarbon fractions F1 to F4

BTEX = Benzene, toluene, ethylbenzene and xylenes

PAHs=Polycyclic Aromatic Hydrocarbons

Metals= Reg. 153/04 list of metals

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition, Residential/Parkland/Institutional Property Use, coarse-textured soil, April 15, 2011 (MOE Table 2 Standards).

Bold and shaded parameters exceed MOE Table 8 Standards for residential / parkland / industrial / commercial, coarse textured soils

2. None = Not detected above method detection limit and/ or does not exceed MOE Table 2 Standards

3. mbgs = metres below ground surface

4. ppm=parts per million

6. PID- photionization detector

7. Table to be read in conjunction with accompanying report

NM-not measured

Created by: EL

Checked by: RM

Table 4: Summary of Groundwater Samples Submitted for Analysis
2596 Carp Road, Ottawa, Ontario

Area of Potential Environmental Concern (APEC)	APEC Location (Figure 2)		Sample Location/Sample ID	Date of Sample Collection	Screen Interval (mbgs)	Groundwater Observations	Parameters Analysed	Maxxam Analytical Report Reference Number	MOE Table 8 ⁽¹⁾ Exceedances
APEC 1 Presence of fill of unknown quality at six (6) separate locations	APEC 1D	Adjacent to Cover-All Structure	MW18-10 (DUP-1)	28-Aug-18	2.13 - 3.65	slightly cloudy, no sediment, sheen or odour	metals, PAHs	R5382302	Metals Cobalt PAHs 1-Methylnaphtalene, 2-Methylnaphtalene, Methylnaphtalene 2-(1-)
	APEC 1F	Equipment Storage Area	MW18-02 MW18-04	28-Aug-18	1.52 - 3.05	slightly cloudy, no sediment, sheen or odour	metals, PAHs	R5382302	Cobalt (at MW18-02)
		AST/Generator Storage Area	MW18-01 MW18-05	28-Aug-18	1.52 - 3.05	slightly cloudy, no sediment, sheen or odour	metals, PAHs	R5382302	None
APEC 2 Gasoline and Associated Products Storage in Fixed Tanks	APEC 2A	One (1) AST at APEC 2A (active use of an AST for fueling heavy equipment)	MW18-02	28-Aug-18	1.52 - 3.05	slightly cloudy, no sediment, sheen or odour	PHCs F1 to F4, BTEX, PAHs, VOCs	R5382302	Cobalt
	APEC 2B and APEC 2C	Two (2) ASTs at APEC 2B and APEC 2C (active use of an AST for fueling heavy equipment)	MW18-04	28-Aug-18	1.52 - 3.05	slightly cloudy, no sediment, sheen or odour	PHCs F1 to F4, BTEX, PAHs, VOCs	R5382302	None
	APEC 2E	AST/Generator Storage Area (storage of heavy equipment, new/used ASTs, and new generators)	MW18-01	28-Aug-18	1.52 - 3.05	slightly cloudy, no sediment, sheen or odour	PHCs F1 to F4, BTEX, PAHs, VOCs	R5382302	None
			MW18-05	28-Aug-18	1.52 - 3.05	slightly cloudy, no sediment, sheen or odour	PHCs F1 to F4, BTEX, PAHs, VOCs	R5382302	None
	APEC 2D	Former AST near Cover-All Structure (Former active use of an AST with visible staining in 2016)	MW18-10 (DUP-1)	28-Aug-18	2.13 - 3.65	slightly cloudy, no sediment or sheen. PHC odour encountered	PHCs F1 to F4, BTEX, PAHs, VOCs	R5382302	PHCs/VOCs Ethylbenzene, PHC F2 PAHs 1-Methylnaphtalene, 2-Methylnaphtalene, Methylnaphtalene 2-(1-)
APEC 3 Offsite Autobody Shop	APEC 3	AST/Generator Storage Area	MW18-01 MW18-05	28-Aug-18	1.52 - 3.05	slightly cloudy, no sediment, sheen or odour	metals, PAHs, PHCs F1 to F4, BTEX, VOCs	R5382302	None

Notes:

PHCs - Petroleum hydrocarbon fractions F1 to F4

BTEX- Benzene, toluene, ethylbenzene and xylenes

PAHs - Polycyclic Aromatic Hydrocarbons

Metals- Reg.153/04 list of metals

mbgs - metres below ground surface

None- Not detected above method detection limit and/or does not exceed MOE Table 2 Standards

parameters exceed MOE Table 8 Standards for All Types of Land Use

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 8 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition, All Types Property Use, coarse-textured soil, April 15, 2011 (MOE Table 2 Standards).

Prepared by: EI

Checked by: RM

Table 5a: Soil analytical data (O.Reg 153/04 Metals)
2596 Carp Road, Ottawa, Ontario

Parameter	Units	Sample ID	BH18-4 SA1	BH18-5 SA1	BH18-6 SA5	BH18-7 SA1	BH18-8 SA1	DUP-1	RPD (%)	BH18-9 SA1	BH18-11 SA1	BH18-12 SA1
		Sample date	24/8/2018	23/8/2018	23/8/2018	24/8/2018	23/8/2018	23/8/2018		23/8/2018	23/8/2018	23/8/2018
		Depth (mbgs)										
		REG153 (11) T8 - RES/PARK/IND/COMM COARSE ⁽¹⁾	0 - 0.61	0 - 0.61	3.04 - 3.65	0 - 0.61	0 - 0.61	0 - 0.61		0 - 0.61	0 - 0.61	0 - 0.61
Metals and inorganics												
Antimony	µg/g	1.3	<0.20	0.21	0.25	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20
Arsenic	µg/g	18	1.2	1.8	2.2	2.1	1.2	1.1	5.7	1.1	<1.0	<1.0
Barium	µg/g	220	140	93	100	180	47	75	33.1	60	55	120
Beryllium	µg/g	2.5	0.51	0.29	0.42	0.47	<0.20	<0.20	nc	0.44	0.29	0.46
Boron	µg/g	36	<5.0	5.2	9.7	<5.0	<5.0	<5.0	nc	<5.0	<5.0	<5.0
Boron (Hot Water Soluble)	µg/g	1.5	-	-	-	-	-	-	nc	-	-	-
Cadmium	µg/g	1.2	0.15	0.13	<0.10	0.13	4.5	<0.10	nc	<0.10	0.12	<0.10
Chromium	µg/g	70	28	18	22	31	7.8	7.1	6.2	22	18	29
Chromium VI	µg/g	0.66	-	-	-	-	-	-	nc	-	-	-
Cobalt	µg/g	22	9.3	6.4	6.9	9.9	3.0	2.6	9.3	7.3	5.3	8.0
Copper	µg/g	92	18	21	40	24	9.8	6.4	26.2	11	6.0	15
Lead	µg/g	120	9.2	9.6	12	10	9.7	6.7	23.0	4.4	3.9	4.0
Mercury	µg/g	0.27	-	-	-	-	-	-	nc	-	-	-
Molybdenum	µg/g	2	0.53	1.3	4.4	0.98	0.54	<0.50	nc	<0.50	<0.50	<0.50
Nickel	µg/g	82	17	14	15	19	8.3	6.7	13.7	12	9.1	15
Selenium	µg/g	1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50
Silver	µg/g	0.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	<0.20
Thallium	µg/g	1	0.20	0.12	0.12	0.16	0.065	<0.050	nc	0.10	0.077	0.16
Uranium	µg/g	2.5	0.73	0.42	0.58	0.6	0.34	0.37	5.7	0.65	0.35	0.55
Vanadium	µg/g	86	45	24	34	41	28	16	33.3	39	32	42
Zinc	µg/g	290	53	59	91	66	30	18	30.8	25	33	36

Notes:

µg/g - micrograms per gram

< - concentrations is below laboratory method detection limit

- Chemical not analyzed

mbgs-metres below ground surface

(1) - Ontario Ministry of Environment and Climate Change (MOECC) Table 8 Site Condition Standards for residential/parkland/industrial/commercial property use for coarse textured soil in a potable groundwater condition

Screening:**Bold, shaded, underlined** Exceeds REG 153/04 Table 8 residential/parkland/commercial/industrial land use, coarse textured soil

Prepared by: EL

Checked by: RM

Parameter	Units	Sample ID	BH18-1 SA3	BH18-2 SA4	BH18-4 SA4	BH18-5 SA3	BH18-6 SA5	BH18-7 SA2	BH18-8 SA1	DUP-1	RPD (%)	BH18-10 SA4	BH18-11 SA1	BH18-12 SA1
		Sample date	23/8/2018	23/8/2018	24/8/2018	23/8/2018	23/8/2018	24/8/2018	23/8/2018	23/8/2018		24/8/2018	23/8/2018	23/8/2018
		Depth (mbgs)												
		REG153 (11) T8 - RES/PARK/IND/COMM COARSE ⁽¹⁾	1.52 - 2.13	2.29 - 2.90	2.29 - 2.90	1.52 - 2.13	3.04 - 3.65	0.76 - 1.37	0 - 0.61	0 - 0.61		2.29 - 2.90	0 - 0.61	0 - 0.61
VOCs														
Acetone	µg/g	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50
Benzene	µg/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020
Bromodichloromethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Bromoform	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Bromomethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Carbon Tetrachloride	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Chloroform	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Dibromochloromethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,1-Dichloroethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,2-Dichloroethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,1-Dichloroethylene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Cis-1,2-Dichloroethylene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Trans-1,2-Dichloroethylene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,2-Dichloropropane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Cis-1,3-Dichloropropylene	µg/g	NC	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	nc	<0.030	<0.030	<0.030
Trans-1,3-Dichloropropylene	µg/g	NC	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	nc	<0.040	<0.040	<0.040
Ethylbenzene	µg/g	0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc	0.042	<0.020	<0.020
Ethylene Dibromide	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	µg/g	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50
Methylene Chloride	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Methyl Isobutyl Ketone	µg/g	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50
Methyl-t-Butyl Ether	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Styrene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Toluene	µg/g	0.2	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020
Tetrachloroethylene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,1,1-Trichloroethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Trichloroethylene	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Vinyl Chloride	µg/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020
m-Xylene & p-Xylene	µg/g	NC	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc	0.59	<0.020	<0.020
o-Xylene	µg/g	NC	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc	<0.020	<0.020	<0.020
Total Xylenes	µg/g	0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	nc	0.59	<0.020	<0.020
Dichlorodifluoromethane	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Dioxane, 1,4-	µg/g	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Hexane(n)	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.076	nc	<0.050	<0.050	<0.050
Trichlorofluoromethane	µg/g	0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
1,3-Dichloropropene (cis + trans)	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050
Petroleum Hydrocarbons (PHCs)														
F1 (C ₆ -C ₁₀)	µg/g	25	<10	<10	<10	<10	<10	<10	<10	<10	nc	79	<10	<10
F1 (C ₆ -C ₁₀) - BTEX	µg/g	25	<10	<10	<10	<10	<10	<10	<10	<10	nc	78	<10	<10
F2 (C ₁₀ -C ₁₆)	µg/g	10	<10	<10	<10	<10	<10	<10	<10	<10	nc	380	<10	<10
F3 (C ₁₆ -C ₃₄)	µg/g	240	<50	<50	<50	<50	<50	<50	<50	<50	nc	130	<50	<50
F4 (C ₃₄ -C ₅₀)	µg/g	120	<50	<50	<50	<50	<50	<50	<50	<50	nc	<50	<50	<50
Reached Baseline at C50	NA	NA	YES	YES	YES	YES	YES	YES	YES	YES	NA	YES	YES	YES

Notes:

µg/g - micrograms per gram

BTEX - Benzene, toluene, ethylbenzene, xylenes; PHC - Petroleum hydrocarbon

< - concentrations is below laboratory method detection limit

NC - No Criteria

NA - Not Applicable

nc - Not Calculated

-- Chemical not analyzed

(1) - Ontario Ministry of Environment and Climate Change (MOECC) Table 8 Site Condition Standards for residential/parkland/industrial/commercial property use for coarse textured soil in a potable groundwater condition

Screening:**Bold, shaded, underlined** Exceeds REG 153/04 Table 8 residential/parkland/commercial/industrial land use, coarse textured soil

Prepared by: EL

Checked by: RM

Table 5C: Soil Analytical Results (PAHs)
2596 Carp Road, Ottawa, Ontario

Parameter	Units	Sample ID	BH18-1 SA1	BH18-4 SA1	BH18-5 SA1	BH18-6 SA5	BH18-7 SA1	BH18-8 SA1	DUP-1	RPD (%)	BH18-9 SA1	BH18-11 SA1	BH18-12 SA1
		Sample date	23/8/2018	24/8/2018	23/8/2018	23/8/2018	24/8/2018	23/8/2018	23/8/2018		23/8/2018	23/8/2018	23/8/2018
		Depth (mbgs)											
		REG153 (11) T8 - RES/PARK/IND/COMM COARSE ⁽¹⁾	0 - 0.61	0 - 0.61	0 - 0.61	1.52 - 2.13	0 - 0.61	0 - 0.61	0 - 0.61		0 - 0.61	0 - 0.61	0 - 0.61
PAHs													
Acenaphthene	µg/g	0.072	<0.0050	<0.0050	0.022	0.0071	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Acenaphthylene	µg/g	0.093	<0.0050	<0.0050	<0.0050	0.0065	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Anthracene	µg/g	0.22	<0.0050	<0.0050	0.058	0.023	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Benzo(a)anthracene	µg/g	0.36	0.016	<0.0050	0.25	0.06	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Benzo(a)pyrene	µg/g	0.3	0.019	<0.0050	0.24	0.057	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Benzo(b/j)fluoranthene	µg/g	0.47	0.035	<0.0050	0.33	0.088	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Benzo(ghi)perylene	µg/g	0.68	0.019	<0.0050	0.12	0.038	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Benzo(k)fluoranthene	µg/g	0.48	0.0097	<0.0050	0.11	0.025	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Chrysene	µg/g	2.8	0.019	<0.0050	0.22	0.064	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Dibenzo(a,h)anthracene	µg/g	0.1	<0.0050	<0.0050	0.038	0.0083	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Fluoranthene	µg/g	0.69	0.039	<0.0050	0.42	0.16	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Fluorene	µg/g	0.19	<0.0050	<0.0050	0.023	0.0062	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.019	<0.0050	0.14	0.041	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
1-Methylnaphthalene	µg/g	0.59	<0.0050	<0.0050	0.0053	<0.0050	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
2-Methylnaphthalene	µg/g	0.59	<0.0050	<0.0050	0.0063	<0.0050	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Naphthalene	µg/g	0.09	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Phenanthrene	µg/g	0.69	0.016	<0.0050	0.26	0.092	<0.050	<0.0050	<0.0050	nc	<0.050	<0.0050	<0.0050
Pyrene	µg/g	1	0.032	<0.0050	0.34	0.12	<0.050	0.0064	<0.0050	nc	<0.050	<0.0050	<0.0050
Methylnaphthalene, 2-(1-)	µg/g	0.59	<0.0071	<0.0071	0.012	<0.0071	<0.0071	<0.0071	<0.0071	nc	<0.0071	<0.0071	<0.0071

Notes:

µg/g - micrograms per gram

PAH - Polycyclic aromatic hydrocarbon

NC - no criteria

NA - not applicable - benzo(a)pyrene TPE is only relevant to evaluating

< - concentrations is below laboratory method detection limit

-- Chemical not analyzed or criteria not defined

(1) - Ontario Ministry of Environment and Climate Change (MOECC) Table 8 Site Condition Standards for residential/parkland/industrial/commercial property use for coarse textured soil in a potable groundwater condition

Screening:

Bold, shaded, underlined Exceeds REG 153/04 Table 8 residential/parkland/commercial/industrial land use, coarse textured soil

Prepared by: EL

Checked by: RM

Table 6A: Groundwater Analytical Results (Metals)
2596 Carp Road, Ottawa, Ontario

Parameter	Units	Sample ID	MW18-01	MW18-02	MW18-04	MW18-05	MW18-10	DUP-1	RPD (%)
		Sample date	28/8/2018	28/8/2018	28/8/2018	28/8/2018	28/8/2018	28/8/2018	
		Screened Interval (mbgs)	1.52 - 3.05	1.52 - 3.05	1.52 - 3.05	1.52 - 3.05	2.13 - 3.65	2.13 - 3.65	
		REG153 (11) T8 - ALL LAND USES COARSE ⁽¹⁾							
Metals									
Antimony	µg/L	6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc
Arsenic	µg/L	25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nc
Barium	µg/L	1000	82	250	160	71	250	250	0.0
Beryllium	µg/L	4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc
Boron	µg/L	5000	52	36	46	44	28	29	2.4
Cadmium	µg/L	2.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc
Chromium	µg/L	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	nc
Chromium VI	µg/L	25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc
Cobalt	µg/L	3.8	<0.50	6	<0.50	0.94	9.3	9.3	0.0
Copper	µg/L	69	5.4	<1.0	1.70	6.70	4.3	3.7	9.8
Lead	µg/L	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc
Mercury	µg/L	0.29	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	nc
Molybdenum	µg/L	70	0.7	<0.50	1.2	4.4	3.5	3.4	1.9
Nickel	µg/L	100	1.3	1.8	1.3	1.9	7.4	7.5	0.9
Sodium	ug/L	490000	32000	440000	230000	140000	32000	33000	2.1
Selenium	µg/L	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	nc
Silver	µg/L	1.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc
Thallium	µg/L	2	<0.050	<0.050	<0.050	<0.050	0.07	0.06	4.0
Uranium	µg/L	20	0.62	0.29	0.65	1.5	1.5	1.4	4.5
Vanadium	µg/L	6.2	<0.50	2	<0.50	<0.50	<0.50	<0.50	nc
Zinc	µg/L	890	5.2	<5.0	<5.0	<5.0	<5.0	<5.0	nc

Notes:

µg/g - micrograms per gram

< - concentrations is below laboratory method detection limit

- Chemical not analyzed

mbgs-metres below ground surface

(1) - Ontario Ministry of Environment and Climate Change (MOECC) Table 8

Site Condition Standards for all land uses in a potable groundwater condition in coarse textured soils

Screening:

Bold, shaded, underlined Exceeds REG 153/04 Table 8, All Land
 Uses, Coarse Textured Soils

Prepared by: EL

Checked by: RM

Prepared by: EL
 Checked by: PH

Table 6B: Groundwater Analytical Results (PHC/VOC)
2596 Carp Road, Ottawa, Ontario

Parameter	Units	Sample ID	MW18-01	MW18-02	MW18-04	MW18-05	MW18-10	DUP-1	RPD (%)	Trip Blank	Field Blank	
		Sample date	28/8/2018	28/8/2018	28/8/2018	28/8/2018	28/8/2018	28/8/2018		28/8/2018	28/8/2018	28/8/2018
		Screened Interval (mbgs)	1.52 - 3.05	1.52 - 3.05	1.52 - 3.05	1.52 - 3.05	2.13 - 3.65	2.13 - 3.65		NA	NA	
		REG153 (11) T8 - ALL LAND USES COARSE ⁽¹⁾										
VOCs												
Acetone	µg/L	2700	<10	<10	<10	<10	11	13	11.4	<10	<10	
Benzene	µg/L	5	<0.20	<0.20	<0.20	<0.20	0.67	0.68	1.0	<0.20	<0.20	
Bromodichloromethane	µg/L	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
Bromoform	µg/L	25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nc	<1.0	<1.0	
Bromomethane	µg/L	0.89	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
Carbon Tetrachloride	µg/L	0.79	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Chlorobenzene	µg/L	30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Chloroform	µg/L	2.4	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Dibromochloromethane	µg/L	25	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,2-Dichlorobenzene	µg/L	3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,3-Dichlorobenzene	µg/L	59	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,4-Dichlorobenzene	µg/L	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,1-Dichloroethane	µg/L	5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
1,2-Dichloroethane	µg/L	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,1-Dichloroethylene	µg/L	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Cis-1,2-Dichloroethylene	µg/L	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
Trans-1,2-Dichloroethylene	µg/L	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,2-Dichloropropane	µg/L	5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Cis-1,3-Dichloropropylene	µg/L	NV	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	nc	<0.30	<0.30	
Trans-1,3-Dichloropropylene	µg/L	NV	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	nc	<0.40	<0.40	
Ethylbenzene	µg/L	2.4	<0.20	<0.20	<0.20	<0.20	17	19	7.5	<0.20	<0.20	
Ethylene Dibromide	µg/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Methyl Ethyl Ketone	µg/L	1800	<10	<10	<10	<10	<10	<10	nc	<10	<10	
Methylene Chloride	µg/L	50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	nc	<2.0	<2.0	
Methyl Isobutyl Ketone	µg/L	640	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	nc	<5.0	<5.0	
Methyl-t-Butyl Ether	µg/L	15	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
Styrene	µg/L	5.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,1,1,2-Tetrachloroethane	µg/L	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,1,2,2-Tetrachloroethane	µg/L	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
Toluene	µg/L	22	<0.20	0.32	0.21	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Tetrachloroethylene	µg/L	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
1,1,1-Trichloroethane	µg/L	200	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
1,1,2-Trichloroethane	µg/L	4.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
Trichloroethylene	µg/L	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Vinyl Chloride	µg/L	0.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
m-Xylene & p-Xylene	µg/L	NV	<0.20	<0.20	<0.20	<0.20	8	8.9	7.2	<0.20	<0.20	
o-Xylene	µg/L	NV	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	nc	<0.20	<0.20	
Total Xylenes	µg/L	300	<0.20	<0.20	<0.20	<0.20	8	8.9	10.1	<0.20	<0.20	
Dichlorodifluoromethane	µg/L	590	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nc	<1.0	<1.0	
Dioxane, 1,4-	µg/L	50	-	-	-	-	-	-	nc	-	-	
Hexane(n)	µg/L	51	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nc	<1.0	<1.0	
Trichlorofluoromethane	µg/L	150	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
1,3-Dichloropropene (cis + trans)	µg/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	nc	<0.50	<0.50	
Petroleum Hydrocarbons (PHCs)												
F1 (C6-C10)	µg/L	420	<25	<25	<25	<25	130	140	5.0	--	--	
F1 (C6-C10) - BTEX	µg/L	420	<25	<25	<25	<25	100	110	6.5	--	--	
F2 (C10-C16)	µg/L	150	<100	<100	<100	<100	1300	1300	0.0	--	--	
F3 (C16-C34)	µg/L	500	<200	<200	<200	<200	<200	<200	nc	--	--	
F4 (C34-C50)	µg/L	500	<200	<200	<200	<200	<200	<200	nc	--	--	
Reached Baseline at C50	NA	NA	YES	YES	YES	YES	YES	YES	NA	NA	NA	

Notes:

µg/g - micrograms per gram

BTEX - Benzene, toluene, ethylbenzene, xylenes; PHC - Petroleum hydrocarbon

< - concentrations is below laboratory method detection limit

NC - No Criteria

NA - Not Applicable

nc - Not Calculated

-- Chemical not analyzed

(1) - Ontario Ministry of Environment and Climate Change (MOECC) Table 8 Site Condition Standards for all land uses in a potable groundwater condition in coarse textured soils

Screening:**Bold, shaded, underlined** Exceeds REG 153/04 Table 8, All Land Uses, Coarse Textured Soils

Table 6C: Groundwater Analytical Results (PAHs)
2596 Carp Road, Ottawa, Ontario

Parameter	Units	Sample ID	MW18-01	MW18-02	MW18-04	MW18-05	MW18-10	DUP-1	RPD (%)
		Sample date	28/8/2018	28/8/2018	28/8/2018	28/8/2018	28/8/2018	28/8/2018	
		Screened Interval (mbgs)							
		REG153 (11) T8 - ALL LAND USES COARSE ⁽¹⁾	1.52 - 3.05	1.52 - 3.05	1.52 - 3.05	1.52 - 3.05	2.13 - 3.65	2.13 - 3.65	
PAHs									
Acenaphthene	µg/L	4.1	<0.050	<0.050	<0.050	<0.050	0.81	0.85	3.2
Acenaphthylene	µg/L	1	<0.050	<0.050	<0.050	<0.050	<0.050	0.058	nc
Anthracene	µg/L	1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
Benzo(a)anthracene	µg/L	1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
Benzo(a)pyrene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	nc
Benzo(b/j)fluoranthene	µg/L	0.1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
Benzo(ghi)perylene	µg/L	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
Benzo(k)fluoranthene	µg/L	0.1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
Chrysene	µg/L	0.1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
Dibenzo(a,h)anthracene	µg/L	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
Fluoranthene	µg/L	0.41	<0.050	<0.050	<0.050	<0.050	0.13	0.13	0.0
Fluorene	µg/L	120	<0.050	<0.050	<0.050	<0.050	0.77	0.79	1.7
Indeno(1,2,3-cd)pyrene	µg/L	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc
1-Methylnaphthalene	µg/L	3.2	<0.050	<0.050	<0.050	<0.050	3.9	4.2	5.0
2-Methylnaphthalene	µg/L	3.2	<0.050	<0.050	<0.050	<0.050	3.4	3.9	9.3
Naphthalene	µg/L	11	<0.050	<0.050	<0.050	<0.050	5	5.4	5.2
Phenanthrene	µg/L	1	<0.030	<0.030	<0.030	<0.030	0.22	0.23	3.0
Pyrene	µg/L	4.1	<0.050	<0.050	<0.050	<0.050	0.11	0.11	0.0
Methylnaphthalene, 2-(1-)	µg/L	3.2	<0.071	<0.071	<0.071	<0.071	7.3	8.1	7.0

Notes:

µg/g - micrograms per gram

PAH - Polycyclic aromatic hydrocarbon

NC - no criteria

NA - not applicable - benzo(a)pyrene TPE is only relevant to evaluating

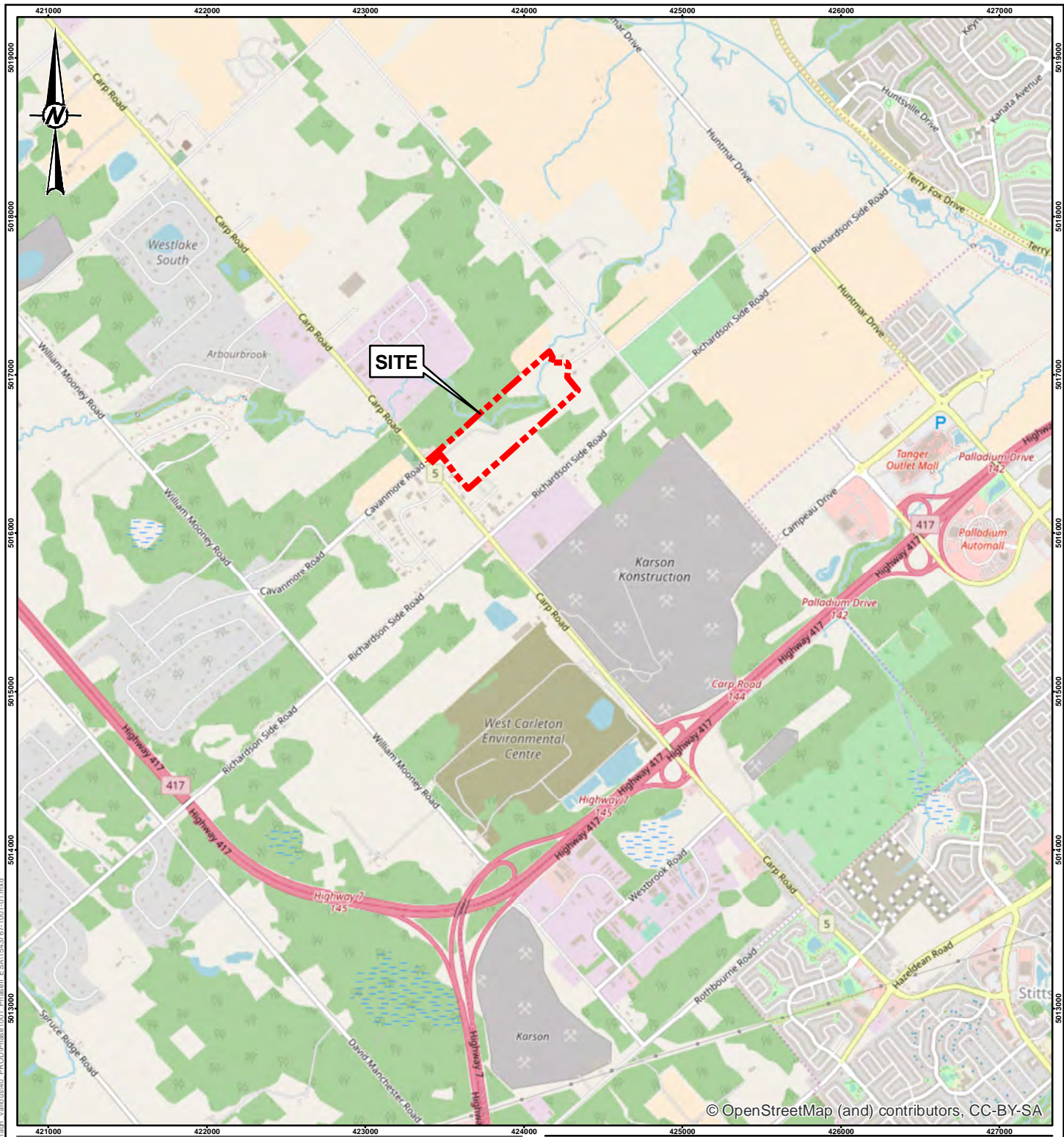
< - concentrations is below laboratory method detection limit

-- Chemical not analyzed or criteria not defined

(1) - Ontario Ministry of Environment and Climate Change (MOECC) Table 8 Site Condition Standards for all land uses in a potable groundwater condition in coarse textured soils

Screening:**Bold, shaded, underlined** Exceeds REG 153/04 Table 8, All Land Uses, Coarse Textured Soils

Figures



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LEGEND



APPROXIMATE SITE BOUNDARY



REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 18 VERTICAL DATUM: CGVD28

CLIENT

CAVANAGH DEVELOPMENTS

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT
2596 CARP ROAD, OTTAWA, ONTARIO

TITLE

KEY PLAN

CONSULTANT



GOLDER

YYYY-MM-DD 2018-09-05

DESIGNED ----

PREPARED JEM

REVIEWED EL

APPROVED PH

PROJECT NO.
1543767

PHASE
1001

REV.
0

FIGURE
1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM 25mm



LEGEND

APPROXIMATE BOREHOLE/MONITORING WELL LOCATION

APPROXIMATE MONITORING WELL LOCATION, PREVIOUS INVESTIGATION

ROADWAY

CROSS-SECTION LOCATION

WATERCOURSE

WETLAND

APPROXIMATE SITE BOUNDARY

APEC 1A TO 1F - IMPORTATION OF FILL OF UNKNOWN QUALITY

APEC 2A TO 2E - GASOLINE AND ASSOCIATED PRODUCTS STORAGE IN FIXED TANKS

APEC 3 - OFF-SITE COMMERCIAL AUTOBODY SHOP

Potential Contaminating Activities ("PCA")			
PCA Location	APEC	Description	PCA# (O.Reg 153/04)
A1	None	Commercial Autobody Shops (Offsite) - Two commercial autobody shops are located southwest of the Site. PCA A1 was not interpreted to represent APECs due to the distance from the Site (>150 m).	10
A2	3		
B1	2A	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	28
B2	2B	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	
B3	2C	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used waste oil AST in the Equipment Storage Area	
B4	2D	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Former AST adjacent to the Cover-All Structure	
B5	2E	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area	
C	None	Waste Disposal and Waste Management - The properties at 107 and 111 Westhunt Road are waste transfer/sorting management facilities for dry construction materials for recycling purposes. PCA C was not interpreted to represent an APEC since the waste management/sorting facility is inferred to be located cross-gradient from the Phase One Property based on local topography and contained largely stockpiled lumber and other dry construction materials with absence of liquid waste during the 2016 and 2018 Site Reconnaissance.	58
D1	1A	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality northeast of the Cover-All Structure	30
D2	1B	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality northeast of the Cover-All Structure	
D3	1C	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present near the Residence	
D4	1D	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present near the Cover-All Structure	
D5	1E	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present northeast of the Equipment Storage Area	
D6	1F	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present at the Equipment Storage and AST/Generator Areas	

REFERENCE(S)

1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014

2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 18 VERTICAL DATUM: CGVD28

0 40 80 160

1:4,000 METRES

CLIENT

CAVANAGH DEVELOPMENTS

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT
2596 CARP ROAD, OTTAWA, ONTARIO

TITLE

SITE PLAN AND AREAS OF POTENTIAL ENVIRONMENT CONCERN

CONSULTANT

YYYY-MM-DD

2018-09-07

DESIGNED

PREPARED

JEM/BR

REVIEWED

EL

APPROVED

PH

PROJECT NO.

1543767

PHASE

1001

REV.

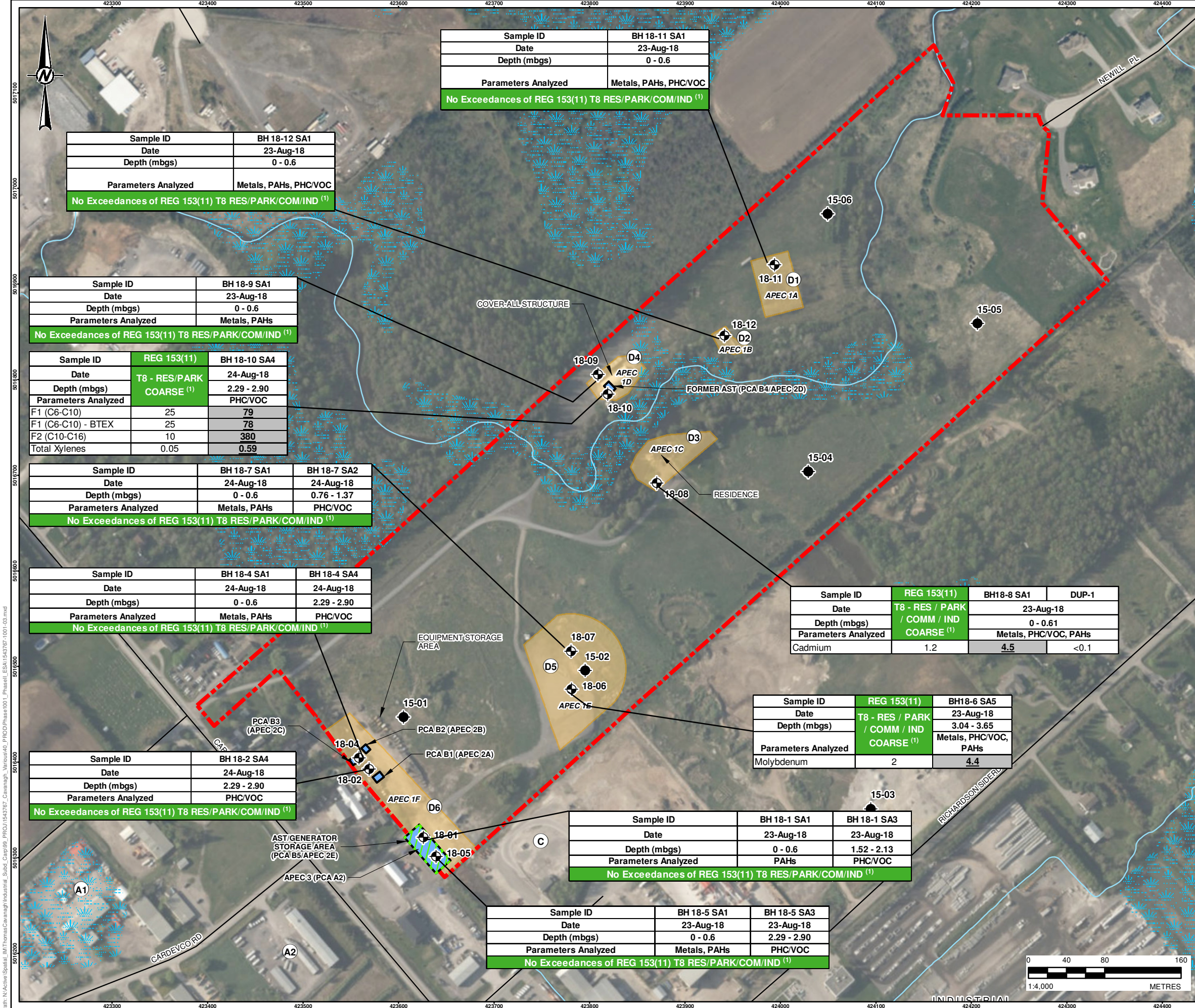
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FIGURE

2

Ruth Wukitch-Spatial, M:\ThomasCavanagh\Industrial_Subs_Comp\99_PRCU\1543767_Cavanagh_Visuals\40_PRCU\Phase001_PhaseII_ESA\1543767_1001_02.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm



LEGEND

- APPROXIMATE BOREHOLE/MONITORING WELL LOCATION
- APPROXIMATE MONITORING WELL LOCATION, PREVIOUS INVESTIGATION
- ROADWAY
- WATERCOURSE
- WETLAND
- APPROXIMATE SITE BOUNDARY
- APEC 1A TO 1F - IMPORTATION OF FILL OF UNKNOWN QUALITY
- APEC 2A TO 2E - GASOLINE AND ASSOCIATED PRODUCTS STORAGE IN FIXED TANKS
- APEC 3 - OFF-SITE COMMERCIAL AUTOBODY SHOP

Potential Contaminating Activities ("PCA")			
PCA Location	APEC	Description	PCA# (O.Reg 153/04)
A1	None	Commercial Autobody Shops (Offsite) - Two commercial autobody shops are located southwest of the Site. PCA A1 was not interpreted to represent APECs due to the distance from the Site (>150 m).	10
A2	3		
B1	2A	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	
B2	2B	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	
B3	2C	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used waste oil AST in the Equipment Storage Area	28
B4	2D	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Former AST adjacent to the Cover-All Structure	
B5	2E	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area	
C	None	Waste Disposal and Waste Management - The properties at 107 and 111 Westhunt Road are waste transfer/sorting management facilities for dry construction materials for recycling purposes. PCA C was not interpreted to represent an APEC since the waste management/sorting facility is inferred to be located cross-gradient from the Phase One Property based on local topography and contained largely stockpiled lumber and other dry construction materials with absence of liquid waste during the 2016 and 2018 Site Reconnaissance.	58
D1	1A	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality northeast of the Cover-All Structure	
D2	1B	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality northeast of the Cover-All Structure	
D3	1C	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present near the Residence	
D4	1D	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present near the Cover-All Structure	30
D5	1E	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present northeast of the Equipment Storage Area	
D6	1F	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present at the Equipment Storage and AST/Generator Areas	

NOTE(S)

- ONTARIO MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE (MOECC) TABLE 2 SITE CONDITION STANDARDS FOR RESIDENTIAL/PARKLAND/INSTITUTIONAL PROPERTY USE FOR COARSE TEXTURED SOIL IN A POTABLE GROUNDWATER CONDITION
- ONTARIO MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE (MOECC) TABLE 2 SITE CONDITION STANDARDS FOR RESIDENTIAL/PARKLAND/INSTITUTIONAL PROPERTY USE FOR COARSE TEXTURED SOIL IN A POTABLE GROUNDWATER CONDITION
- UG/G - MICROGRAMS PER GRAM
- MBGS - METRES BELOW GROUND SURFACE
- CHEMICAL NOT ANALYZED

0.1	Meets REG 153/04 Table 8 residential/parkland/industrial/commercial land use, coarse textured soil
780	Exceeds REG 153/04 Table 8 residential/parkland/industrial/commercial land use, coarse textured soil

REFERENCE(S)

- LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
- PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18 VERTICAL DATUM: CGVD28

CLIENT

CAVANAGH DEVELOPMENTS

PROJECT

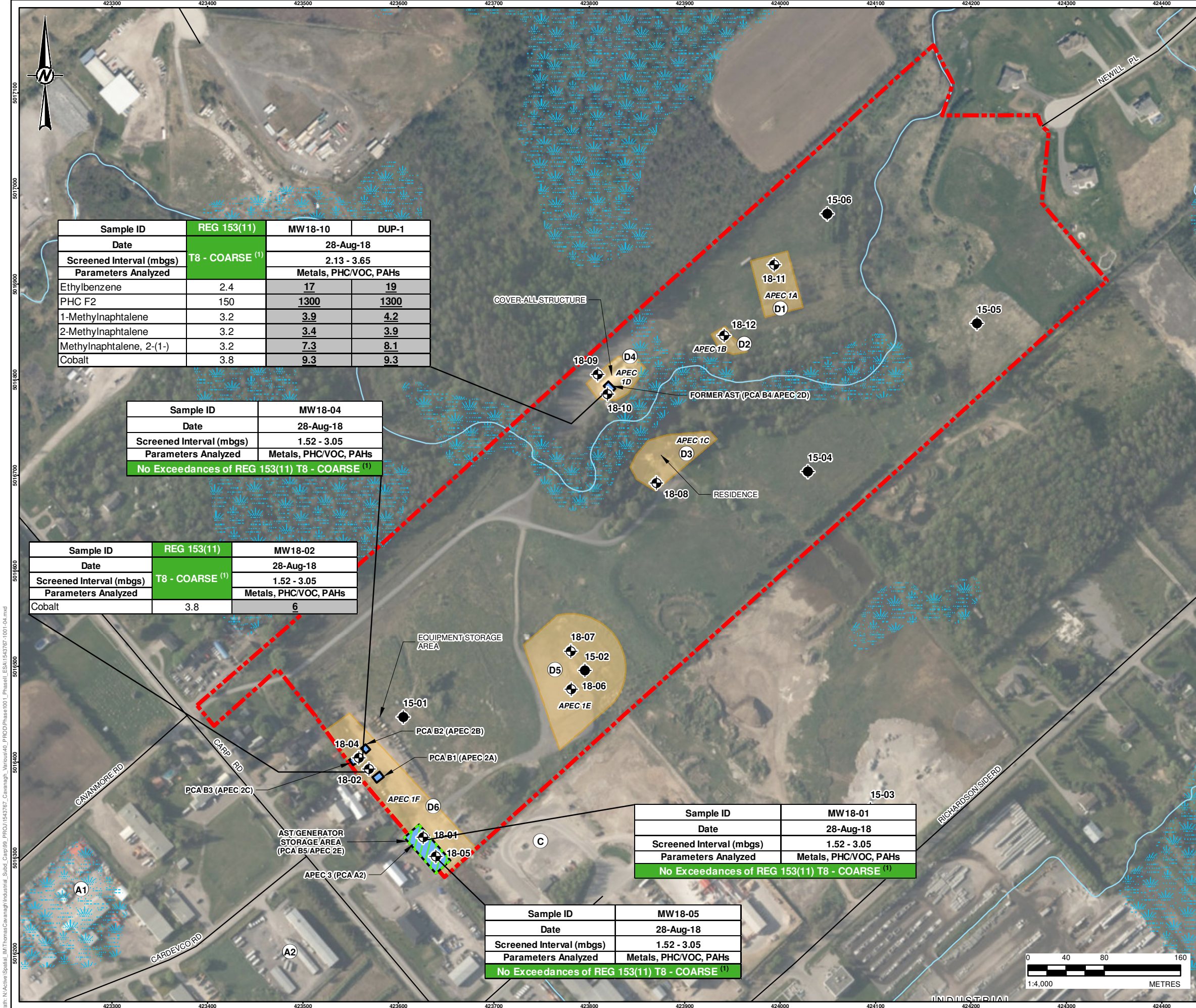
PHASE II ENVIRONMENTAL SITE ASSESSMENT
2596 CARP ROAD, OTTAWA, ONTARIO

TITLE

SOIL EXCEEDANCES

CONSULTANT	YYYY-MM-DD	2018-09-07
DESIGNED	----	
PREPARED	JEM/BR	
REVIEWED	EL	
APPROVED	PH	

PROJECT NO.	PHASE	REV.	FIGURE
1543767	1001	0	3



Sample ID	REG 153(11)	MW18-10	DUP-1
Date		28-Aug-18	
Screened Interval (mbgs)	T8 - COARSE ⁽¹⁾	2.13 - 3.65	
Parameters Analyzed		Metals, PHC/VOC, PAHs	
Ethylbenzene	2.4	17	19
PHC F2	150	1300	1300
1-Methylnaphtalene	3.2	3.9	4.2
2-Methylnaphtalene	3.2	3.4	3.9
Methylnaphtalene, 2-(1-)	3.2	7.3	8.1
Cobalt	3.8	9.3	9.3

Sample ID	MW18-04
Date	28-Aug-18
Screened Interval (mbgs)	1.52 - 3.05
Parameters Analyzed	Metals, PHC/VOC, PAHs
No Exceedances of REG 153(11) T8 - COARSE ⁽¹⁾	

Sample ID	REG 153(11)	MW18-02
Date		28-Aug-18
Screened Interval (mbgs)	T8 - COARSE ⁽¹⁾	1.52 - 3.05
Parameters Analyzed		Metals, PHC/VOC, PAHs
Cobalt	3.8	6

Sample ID	MW18-01
Date	28-Aug-18
Screened Interval (mbgs)	1.52 - 3.05
Parameters Analyzed	Metals, PHC/VOC, PAHs
No Exceedances of REG 153(11) T8 - COARSE ⁽¹⁾	

Sample ID	MW18-05
Date	28-Aug-18
Screened Interval (mbgs)	1.52 - 3.05
Parameters Analyzed	Metals, PHC/VOC, PAHs
No Exceedances of REG 153(11) T8 - COARSE ⁽¹⁾	

- LEGEND
- APPROXIMATE BOREHOLE/MONITORING WELL LOCATION
- APPROXIMATE MONITORING WELL LOCATION, PREVIOUS INVESTIGATION
- ROADWAY
- WATERCOURSE
- WETLAND
- APPROXIMATE SITE BOUNDARY
- APEC 1A TO 1F - IMPORTATION OF FILL OF UNKNOWN QUALITY
- APEC 2A TO 2E - GASOLINE AND ASSOCIATED PRODUCTS STORAGE IN FIXED TANKS
- APEC 3 - OFF-SITE COMMERCIAL AUTOBODY SHOP

Potential Contaminating Activities ("PCA")			
PCA Location	APEC	Description	PCA# (O.Reg 153/04)
A1	None	Commercial Autobody Shops (Offsite) - Two commercial autobody shops are located southwest of the Site. PCA A1 was not interpreted to represent APECs due to the distance from the Site (>150 m).	10
A2	3		
B1	2A	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	28
B2	2B	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	
B3	2C	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used waste oil AST in the Equipment Storage Area	
B4	2D	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Former AST adjacent to the Cover-All Structure	
B5	2E	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area	
C	None	Waste Disposal and Waste Management - The properties at 107 and 111 Westhunt Road are waste transfer/sorting management facilities for dry construction materials for recycling purposes. PCA C was not interpreted to represent an APEC since the waste management/sorting facility is inferred to be located cross-gradient from the Phase One Property based on local topography and contained largely stockpiled lumber and other dry construction materials with absence of liquid waste during the 2016 and 2018 Site Reconnaissance.	58
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D6	1F	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present at the Equipment Storage and AST/Generator Areas	

- NOTE(S)
1. ONTARIO MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE (MOECC) TABLE 8 SITE CONDITION STANDARDS FOR ALL TYPES OF LAND USE FOR COARSE TEXTURED SOIL IN A POTABLE GROUNDWATER CONDITION

2. UG/G - MICROGRAMS PER GRAM

3. MBGS - METRES BELOW GROUND SURFACE

4. -- CHEMICAL NOT ANALYZED
- | | |
|-----|---|
| 0.1 | Meets REG 153/04 Table 8 all types of land use, coarse textured soils |
| 790 | Exceeds REG 153/04 Table 8 all types of land use, coarse textured soils |

- REFERENCE(S)
1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014

2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83

COORDINATE SYSTEM: UTM ZONE 18 VERTICAL DATUM: CGVD28

CLIENT

CAVANAGH DEVELOPMENTS

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT
2596 CARP ROAD, OTTAWA, ONTARIO

TITLE

GROUNDWATER EXCEEDANCES

CONSULTANT

XXXX-MM-DD 2018-09-07

DESIGNED

PREPARED

JEM/BR

REVIEWED

EL

APPROVED

PH

PROJECT NO.

1543767

PHASE

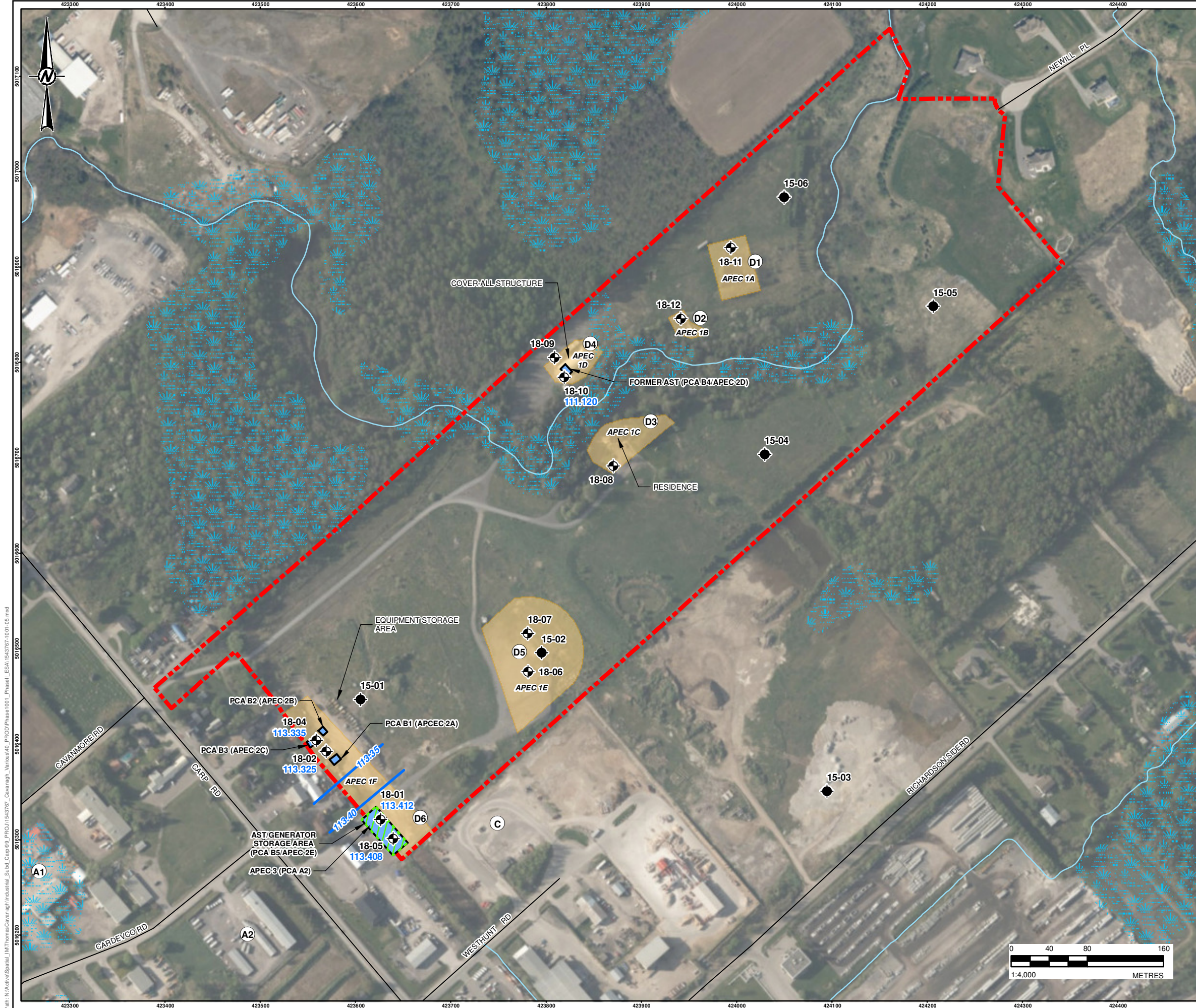
1001

REV.

0

FIGURE

4



LEGEND

APPROXIMATE BOREHOLE/MONITORING WELL LOCATION

APPROXIMATE MONITORING WELL LOCATION, PREVIOUS INVESTIGATION

ROADWAY

WATERCOURSE

WETLAND

APPROXIMATE SITE BOUNDARY

9999 GROUNDWATER ELEVATION, mASL

GROUNDWATER ELEVATION CONTOUR, mASL

APEC 1A TO 1F - IMPORTATION OF FILL OF UNKNOWN QUALITY

APEC 2A TO 2E - GASOLINE AND ASSOCIATED PRODUCTS STORAGE IN FIXED TANKS

APEC 3 - OFF-SITE COMMERCIAL AUTOBODY SHOP

Potential Contaminating Activities ("PCA")			
PCA Location	APEC	Description	PCA# (O.Reg 153/04)
A1	None	Commercial Autobody Shops (Offsite) - Two commercial autobody shops are located southwest of the Site. PCA A1 was not interpreted to represent APECs due to the distance from the Site (>150 m).	10
A2	3		
B1	2A	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	28
B2	2B	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used diesel/gasoline AST in the Equipment Storage Area	
B3	2C	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Currently used waste oil AST in the Equipment Storage Area	
B4	2D	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - Former AST adjacent to the Cover-All Structure	
B5	2E	Gasoline and Associated Products Storage in Fixed Tanks (Onsite) - New/used generator ASTs and new generators (not connected and functioning) in the AST/Generator Storage Area	
C	None	Waste Disposal and Waste Management - The properties at 107 and 111 Westhunt Road are waste transfer/sorting management facilities for dry construction materials for recycling purposes. PCA C was not interpreted to represent an APEC since the waste management/sorting facility is inferred to be located cross-gradient from the Phase One Property based on local topography and contained largely stockpiled lumber and other dry construction materials with absence of liquid waste during the 2016 and 2018 Site Reconnaissance.	58
D1	1A	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality northeast of the Cover-All Structure	30
D2	1B	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality northeast of the Cover-All Structure	
D3	1C	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present near the Residence	
D4	1D	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present near the Cover-All Structure	
D5	1E	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present northeast of the Equipment Storage Area	
D6	1F	Importation of Fill of Unknown Quality - Potential importation of fill of unknown quality is present at the Equipment Storage and AST/Generator Areas	

REFERENCE(S)
1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 18 VERTICAL DATUM: CGVD28

CLIENT
CAVANAGH DEVELOPMENTS

PROJECT
PHASE II ENVIRONMENTAL SITE ASSESSMENT
2596 CARP ROAD, OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS AND INTERPRETED
GROUNDWATER FLOW DIRECTION

CONSULTANT

YYYY-MM-DD
DESIGNED
PREPARED
REVIEWED
APPROVED

2018-09-07

JEM/BR
EL
PH

PROJECT NO.
1543767

PHASE
1001

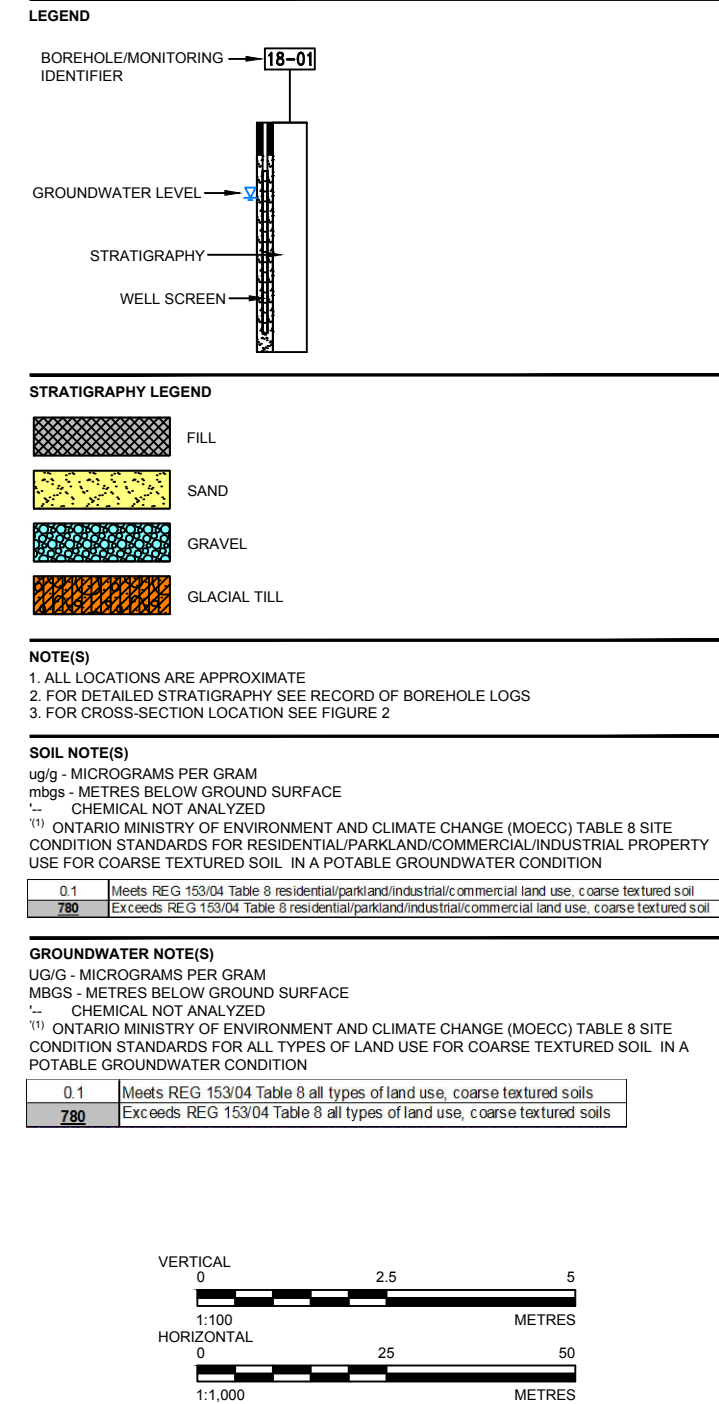
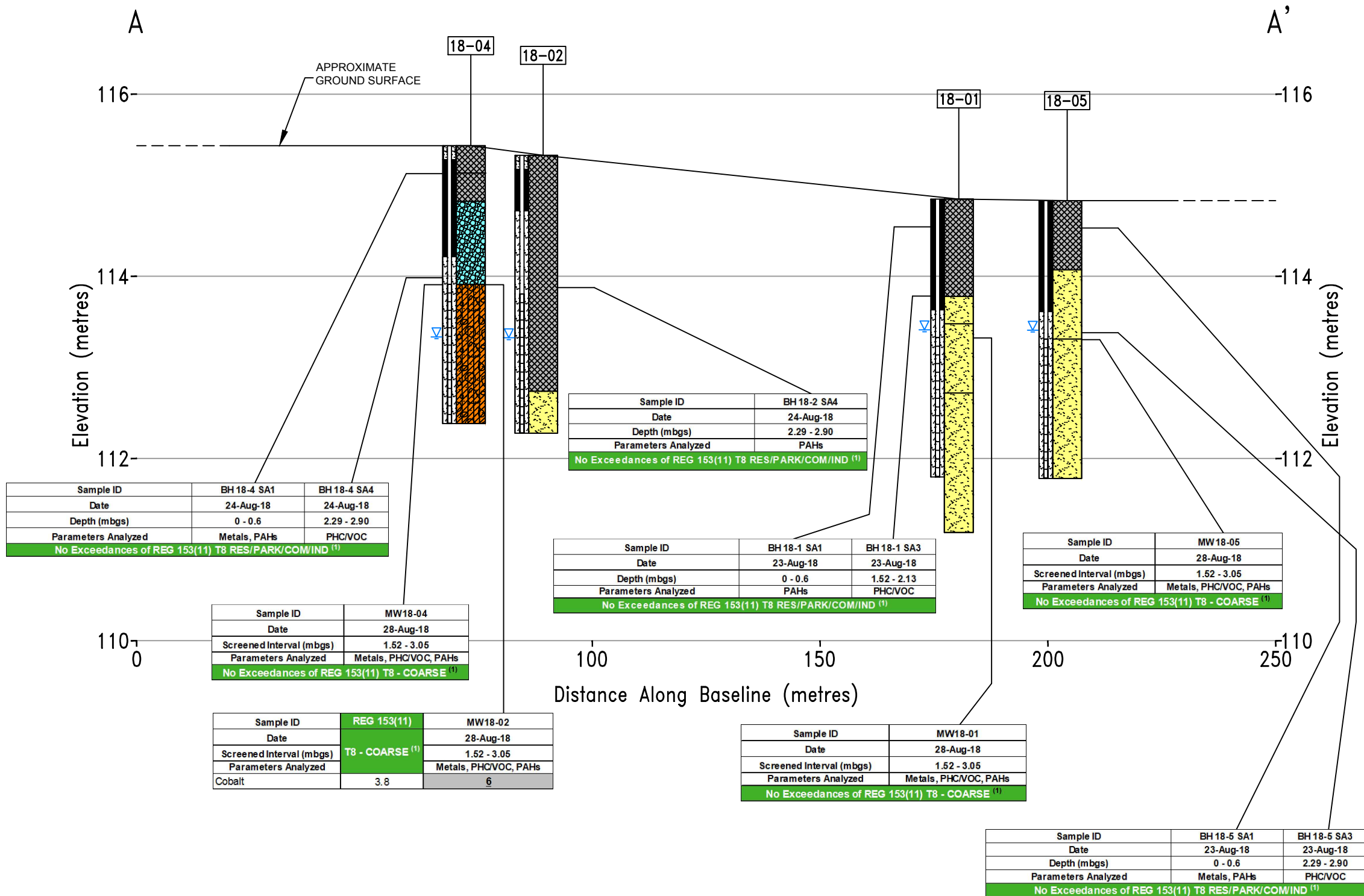
REV.
0

FIGURE
5

Path: \\Active-Spatial\MT\ThamesCavanagh\Industrial_Sub\Comp\95_PROJ\1543767_Cavanagh_Variou\A0_PRCDD\Phase1001_PhaseII_ESA\1543767_1001_05.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: \\golder\golder\ottawa\active\spatial\m\ThomasCavanagh\Industrial_Sud_Corp\09_PRC\1543767_Coverage_Various\01_PRC\Phase1_ESA | File Name: 1543767-1001-AS.dwg

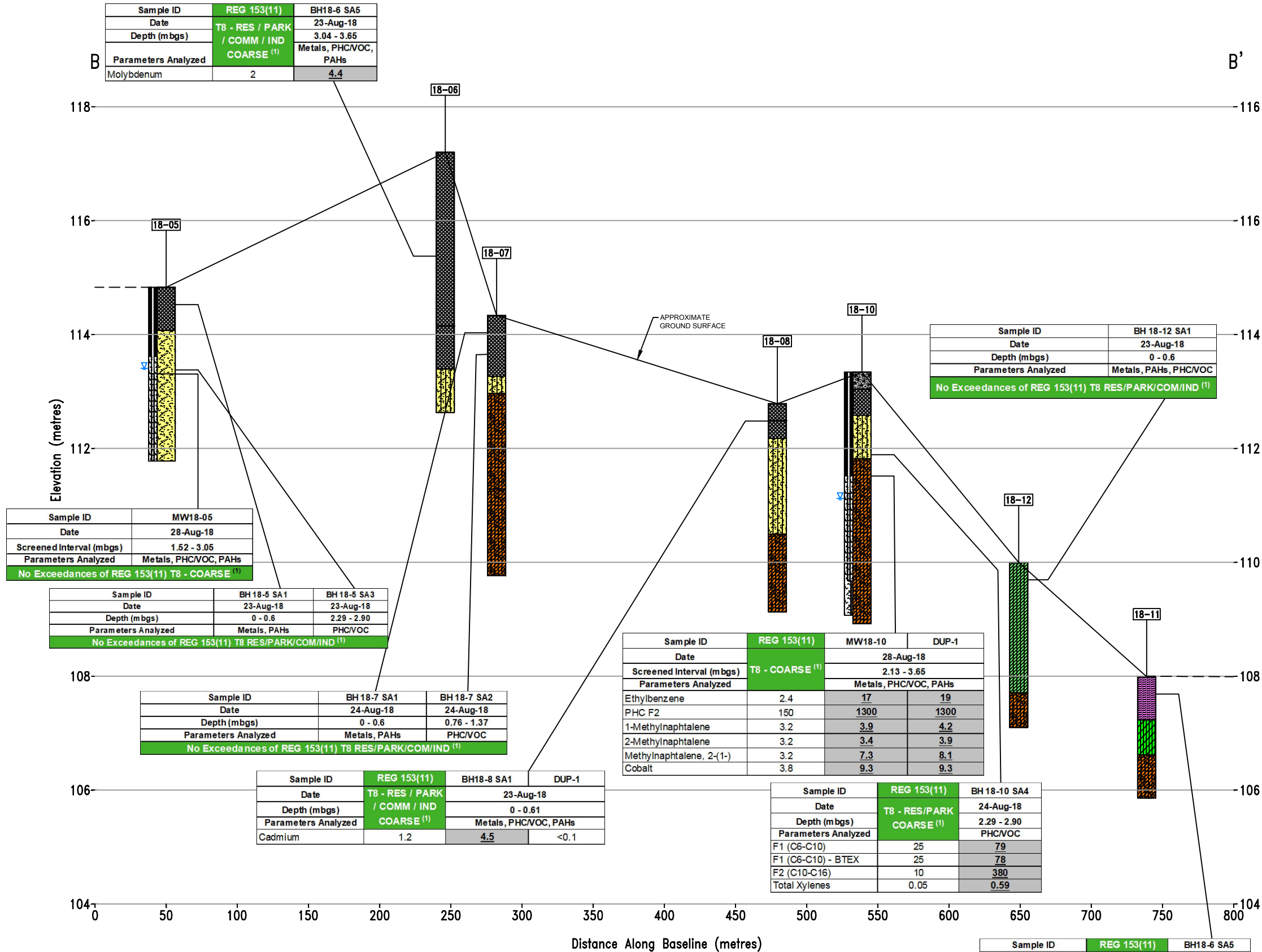


CLIENT		
CAVANAGH DEVELOPMENTS		
PROJECT		
PHASE II ENVIRONMENTAL SITE ASSESSMENT		
2596 CARP ROAD, OTTAWA, ONTARIO		
TITLE		
GEOLOGICAL CROSS-SECTION A-A'		
CONSULTANT		
YYYY-MM-DD	2018-09-07	
DESIGNED	---	
PREPARED	BR	
REVIEWED	EL	
APPROVED	PH	
PROJECT NO.	PHASE	REV.
1543767	1001	0
FIGURE		6

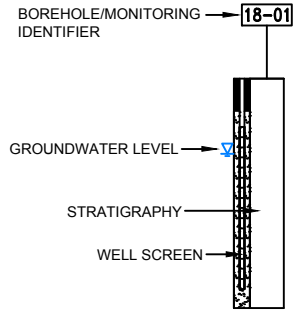
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4 (ANSI B)

28 mm

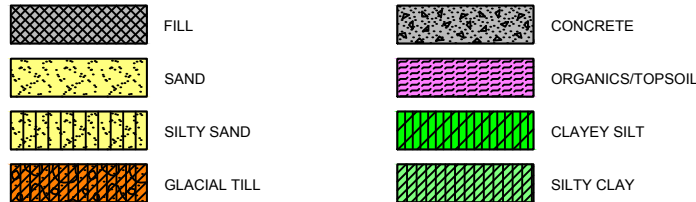
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LEGEND



STRATIGRAPHY LEGEND



NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. FOR DETAILED STRATIGRAPHY SEE RECORD OF BOREHOLE LOGS
3. FOR CROSS-SECTION LOCATION SEE FIGURE 2

SOIL NOTE(S)

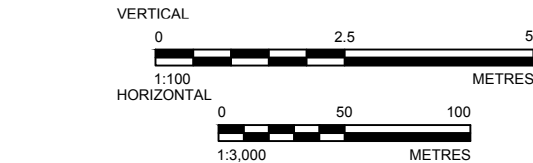
ug/g - MICROGRAMS PER GRAM
mbgs - METRES BELOW GROUND SURFACE
- CHEMICAL NOT ANALYZED
⁽¹⁾ ONTARIO MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE (MOECC) TABLE 8 SITE CONDITION STANDARDS FOR RESIDENTIAL/PARKLAND/COMMERCIAL/INDUSTRIAL PROPERTY USE FOR COARSE TEXTURED SOIL IN A POTABLE GROUNDWATER CONDITION

0.1	Meets REG 153/04 Table 8 residential/parkland/industrial/commercial land use, coarse textured soil
780	Exceeds REG 153/04 Table 8 residential/parkland/industrial/commercial land use, coarse textured soil

GROUNDWATER NOTE(S)

UG/G - MICROGRAMS PER GRAM
MBGS - METRES BELOW GROUND SURFACE
- CHEMICAL NOT ANALYZED
⁽¹⁾ ONTARIO MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE (MOECC) TABLE 8 SITE CONDITION STANDARDS FOR ALL TYPES OF LAND USE FOR COARSE TEXTURED SOIL IN A POTABLE GROUNDWATER CONDITION

0.1	Meets REG 153/04 Table 8 all types of land use, coarse textured soils
780	Exceeds REG 153/04 Table 8 all types of land use, coarse textured soils



CLIENT

CAVANAGH DEVELOPMENTS

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT
2596 CARP ROAD, OTTAWA, ONTARIO

TITLE

GEOLOGICAL CROSS-SECTION B-B'

CONSULTANT



YYYY-MM-DD	2018-09-07
DESIGNED	---
PREPARED	BR
REVIEWED	EL
APPROVED	PH

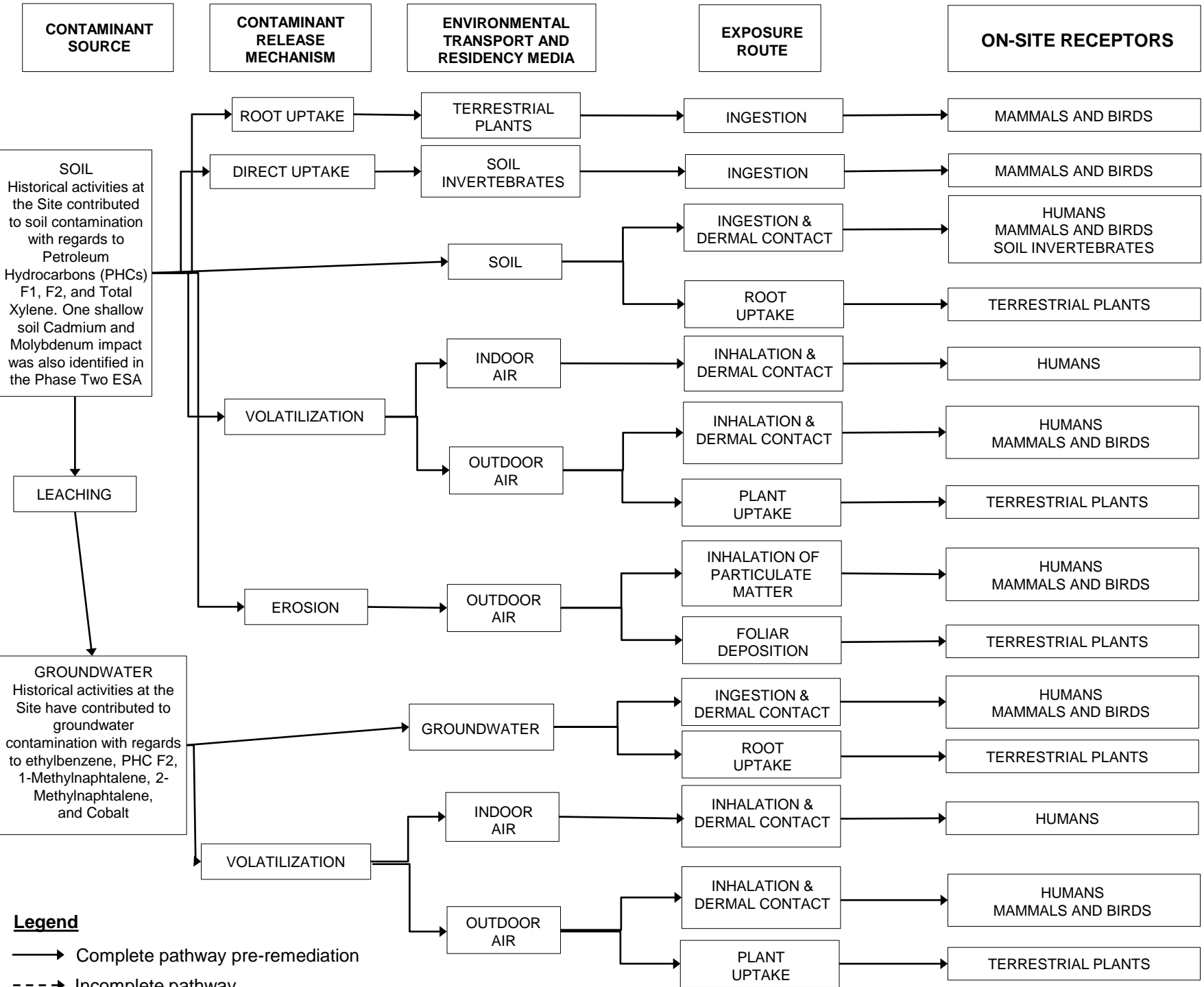
PROJECT NO.
1543767

PHASE
1001

REV.
0

FIGURE
7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3S B28 mm



Notes:
1. This diagram indicates all potential pathways which are considered to have the potential to result in exposure of contaminants by receptors at the Site pre-remediation.

APPENDIX A (I)

Sampling and Analysis Plan

Area of Potential Environmental Concern (APEC)	APEC Location (Figure 2)		Investigation Outline					Soil Analysis				Groundwater Analysis					
			Scope of Work	Total Boreholes	Total Monitoring Wells	Borehole ID	Anticipated Screened Interval (mbga)	Approximate Soil Sample Frequency	Rationale	O.Reg 153(11) Metals	PHC/VOC	PAHs	Rationale	O.Reg 153(11) Metals	PHC F1-F4/BTEX	PAHs	VOCs
APEC 1 Presence of fill of unknown quality at six (6) separate locations	APEC 1F	AST/Generator Storage Area	Drilling and installation of five (3) boreholes / monitoring wells. Groundwater sampling of all newly installed monitoring wells.	3	3	BH18-1	3.5 - 5	Every 0.76 m	The soil samples will be submitted for analysis to characterize the fill quality at APEC 1F			1	The groundwater samples will be submitted for analysis to characterize the groundwater beneath the fill at APEC 1F	1		1	
						1				1	1						
		Equipment Storage Area					1				1	1					
	APEC 1E	Fill Mound northeast of AST/Generator Area	Drilling and installation of one (1) borehole and one (1) borehole / monitoring well. Groundwater sampling of all newly installed monitoring wells.	2	1	BH18-6	N/A	Every 0.76 m	The soil samples will be submitted for analysis to characterize the fill quality at APEC 1E	1	1	1	The groundwater samples will be submitted for analysis to characterize the groundwater beneath the fill at APEC 1E				
						BH18-7	3.5 - 5			1	1	1		1			
	APEC 1C	Adjacent to Residence	Drilling and installation of one (1) borehole.	1	0	BH18-8	N/A	Every 0.76 m	The soil samples will be submitted for analysis to characterize the fill quality at APEC 1C	1	1	1	N/A				
	APEC 1D	Adjacent to Cover-All Structure	Drilling and installation of one (1) borehole and one (1) borehole / monitoring well.	2	1	BH18-10	3.5 - 5	Every 0.76 m	The soil samples will be submitted for analysis to characterize the fill quality at APEC 1D				The groundwater samples will be submitted for analysis to characterize the groundwater beneath the fill at APEC 1D	1	1	1	1
						BH18-9	N/A			1		1					
	APEC 1A	Northeast of Cover-All Structure	Drilling and installation of one (1) borehole.	1	0	BH18-11	N/A	Every 0.76 m	The soil samples will be submitted for analysis to characterize the fill quality at APEC 1A	1	1	1	N/A				
	APEC 1B	Northeast of Cover-All Structure	Drilling and installation of one (1) borehole.	1	0	BH18-12	N/A	Every 0.76 m	The soil samples will be submitted for analysis to characterize the fill quality at APEC 1B	1	1	1	N/A				
APEC 2 Gasoline and Associated Products Storage in Fixed Tanks at five (5) separate locations	APEC 2A	One (1) AST at APEC 2A (active use of an AST for fueling heavy equipment)	Drilling and installation of one (1) borehole / monitoring well. Groundwater sampling of newly installed monitoring well.	1	1	BH18-2	3.5 - 5	Every 0.76 m	The soil samples will be submitted for analysis to address potential gasoline and associated products soil impacts		1		The groundwater sample will be submitted for analysis to address APEC 2A	1	1	1	1
	APEC 2B and APEC 2C	Two (2) ASTs at APEC 2B and APEC 2C (active use of an AST for fueling heavy equipment)	Drilling and installation of one (1) borehole / monitoring well. Groundwater sampling of newly installed monitoring well.	1	1	BH18-4	3.5 - 5	Every 0.76 m	The soil samples will be submitted for analysis to address potential gasoline and associated products soil impacts		1		The groundwater sample will be submitted for analysis to address APEC 2B and APEC 2C		1		1
	APEC 2E	AST/Generator Storage Area (storage of heavy equipment, new/used ASTs, and new generators)	Drilling and installation of two (2) borehole / monitoring wells. Groundwater sampling of newly installed monitoring well.	2	2	BH18-1	3.5 - 5	Every 0.76 m	The soil samples will be submitted for analysis to address potential gasoline and associated products soil impacts		1		The groundwater sample will be submitted for analysis to address APEC 2E		1		1
						BH18-5	3.5 - 5				1				1		1
	APEC 2D	Former AST near Cover-All Structure (Former active use of an AST with visible staining in 2016)	Drilling and installation of one (1) borehole / monitoring well. Groundwater sampling of newly installed monitoring well.	1	1	BH18-10	3.5 - 5	Every 0.76 m	The soil samples will be submitted for analysis to address potential gasoline and associated products soil impacts		1		The groundwater sample will be submitted for analysis to address APEC 2D		1		1
APEC 3 Offsite Autobody Shops	APEC 3	AST/Generator Storage Area	Drilling and installation of (2) borehole / monitoring wells.	2	2	BH18-1	3.5 - 5	Every 0.76 m	The soil samples will be submitted for analysis to address potential offsite Autobody Shop Impacts	Soil samples collected for APEC 1 and APEC 2 at both borehole/monitoring well locations will be used to assess APEC 3 (Metals, PHC/VOC, PAHs)			The groundwater sample will be submitted for analysis to address APEC 3	Groundwater samples collected for APEC 1 and APEC 2 at both borehole/monitoring well locations will be used to assess APEC 3 (Metals, PHCs F1-F4/BTEX, VOCs, PAHs)			
BH18-5	3.5 - 5																
Sub-Totals									8	10	9		6	6	6	6	
Field Duplicates (QA/QC)									1	1	1		1	1	1	1	
Trip Blanks/Spikes (QA/QC)									0	0	0		0	0	0	2	
Total Samples									9	11	10		7	7	7	9	

APPENDIX A (II)

Field Logs

PROJECT: 1543767

RECORD OF BOREHOLE: 18-01

SHEET 1 OF 1




LOCATION: See Site Plan

BORING DATE: August 23, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] ⊕				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] □				WATER CONTENT PERCENT					
								ND = Not Detected				Wp — W — Wi					
								ND = Not Detected				20 40 60 80					
0		GROUND SURFACE		114.85													
	Power Auger 200 mm Diam. (Hollow Stem)	FILL - gravelly SAND; dark brown, contains cobbles; non-cohesive, dry to moist, dense		0.00	1	SS	48 ⊕	ND	□					PAH			
														Bentonite Seal			
1					113.78	2	SS	7 ⊕	□	ND						Silica Sand	
		SAND, medium, some gravel; brown; non-cohesive, moist, loose		1.07													
		Gravelly SAND, medium; brown; non-cohesive, wet, compact		1.37													
2				112.72	3	SS	13 ⊕	□	ND					PHC, VOC	51 mm Diam. PVC #10 Slot Screen		
	SAND, fine; brown; non-cohesive, wet, compact			2.13													
3																	
				111.19	4	SS	23 ⊕	□	ND						W.L. in Screen at Elev. 113.412 m depth on August 27, 2018		
4		End of Borehole		3.66													
5																	
6																	
7																	
8																	
9																	
10																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

PROJECT: 1543767

RECORD OF BOREHOLE: 18-02

SHEET 1 OF 1

LOCATION: See Site Plan

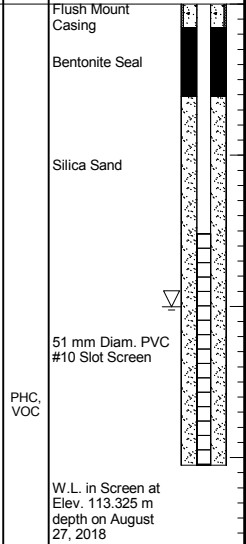
BORING DATE: August 23, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square				WATER CONTENT PERCENT					
								ND = Not Detected				Wp — W — Wi					
								ND = Not Detected				20 40 60 80					
0	Power Auger 200 mm Diam. (Hollow Stem)	GROUND SURFACE		115.33 0.00													
		FILL - gravelly SAND; dark brown, contains wood debris from 0.76 to 2.13 m depth; non-cohesive, dry to wet, very loose to compact			1	SS	14	ND									
1					2	SS	1										
2					3	SS	21										
		Gravelly SAND, medium; grey; non-cohesive, wet		112.74 2.59	4	SS	6										
3		End of Borehole		112.28 3.05													
4																	
5																	
6																	
7																	
8																	
9																	
10																	



MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

PROJECT: 1543767

RECORD OF BOREHOLE: 18-04

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: August 24, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	ND = Not Detected				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³						
								HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square				WATER CONTENT PERCENT						
								ND = Not Detected				Wp — W — Wl						
								20	40	60	80	20	40	60	80			
0	Power Auger 200 mm Diam. (Hollow Stem)	GROUND SURFACE		115.43													PAH	<div>Flush Mount Casing</div> <div>Bentonite Seal</div> <div>Silica Sand</div> <div>51 mm Diam. PVC #10 Slot Screen</div> <div>W.L. in Screen at Elev. 113.335 m depth on August 27, 2018</div>
FILL - gravelly SAND; dark bry; non-cohesive, dry, compact			0.00															
FILL - sandy GRAVEL; brown; non-cohesive, dry, compact			115.13 0.30	1	SS	14	\oplus											
Sandy GRAVEL; brown; non-cohesive, moist to wet, compact			114.82 0.61															
1																		
					</													

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

SHEET 1 OF 1

DATUM: CGVD28

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

CHECKED: PH

PROJECT: 1543767

RECORD OF BOREHOLE: 18-06

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: August 23, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] ⊕				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION			
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	ND = Not Detected				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³							
								HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] □				WATER CONTENT PERCENT							
								ND = Not Detected				Wp — W — WI							
								20	40	60	80								
0		GROUND SURFACE		117.20															
	Power Auger 200 mm Diam. (Hollow Stem)	FILL - gravelly SAND; black to dark brown; non-cohesive, dry to moist, compact to loose		0.00															
			1	SS	24	⊕	ND												
1				2	SS	10	⊕	ND											
2																			
3		FILL - SILTY CLAY, some sand and gravel; brown; cohesive, moist, dense		114.15															
				3.05															
4		SILTY SAND, some clay; brown to grey; cohesive, moist, loose		113.39															
				3.81															
		</																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

PROJECT: 1543767

RECORD OF BOREHOLE: 18-07

SHEET 1 OF 1



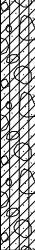

LOCATION: See Site Plan

BORING DATE: August 24, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³				
								SHEAR STRENGTH Cu, kPa				nat V. + Q - rem V. ⊕ U - ●		WATER CONTENT PERCENT					
														Wp — W — Wl					
							20	40	60	80	20	40	60	80					
0		GROUND SURFACE		114.34															
	Power Auger 200 mm Diam. (Hollow Stem)	FILL - sandy GRAVEL; grey; non-cohesive, dry, dense		0.00	1	SS	48									Metals, PAH			
1				113.27	2	SS	22									PHC, VOC			
		SILTY SAND; brown; non-cohesive, dry, compact		1.07															
		CLAYEY SILT, some gravel and sand; brown (GLACIAL TILL); cohesive, moist, compact to very dense		1.37	3	SS	15												
2																			
						4	SS	58											
3					111.29														
		SILTY SAND, some gravel and clay; brown (GLACIAL TILL); cohesive, moist, very dense		3.05	5	SS	74												
4																			
				109.77															
5		End of Borehole Auger Refusal		4.57															
6																			
7																			
8																			
9																			
10																			

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

PROJECT: 1543767

RECORD OF BOREHOLE: 18-08

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: August 23, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] ⊕				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] □				WATER CONTENT PERCENT					
								ND = Not Detected				Wp — W — Wi					
								ND = Not Detected				20 40 60 80					
0		GROUND SURFACE		112.79													
	Power Auger 200 mm Diam. (Hollow Stem)	FILL - gravelly SAND; black; non-cohesive, dry, compact		0.00													
		FILL - SAND; brown; non-cohesive, dry, compact		112.49	1	SS	12	⊕	□								
				0.30													
		SILTY SAND, fine, some clay and gravel; grey; cohesive, moist, compact		112.18													
				0.61													
1					2	SS	10	⊕	□								
2					3	SS	33	⊕	□								
		CLAYEY SILT, some sand and gravel, trace cobbles; brown (GLACIAL TILL); moist to wet		110.50													
				2.29	4	SS	57	⊕	□								
3																	
					5	SS	43	⊕	□								
4		End of Borehole		109.13													
				3.66													
5																	
6																	
7																	
8																	
9																	
10																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

PROJECT: 1543767

RECORD OF BOREHOLE: 18-09

SHEET 1 OF 1





LOCATION: See Site Plan

BORING DATE: August 23, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s					
								ND = Not Detected				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³					
								HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square				WATER CONTENT PERCENT					
								ND = Not Detected				Wp \bigcirc W Wi					
								20	40	60	80	20	40	60	80		
0		GROUND SURFACE		113.40													
	Power Auger 200 mm Diam. (Hollow Stem)	FILL - gravelly SAND; grey brown; non-cohesive, dry, loose		0.00	1	SS	9									Metals, PAH	
1		SILTY SAND, fine; brown; non-cohesive, moist, compact		112.64 0.76	2	SS	13	ND									
		SILTY SAND, some gravel; brown, contains cobbles; cohesive, very dense		111.88 1.52	3	SS	65	ND									
2																	
		SILTY CLAY, some gravel; brown (GLACIAL TILL); cohesive, dense		111.11 2.29	4	SS	38	ND									
3		End of Borehole		110.50 2.90													
4																	
5																	
6																	
7																	
8																	
9																	
10																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

PROJECT: 1543767

RECORD OF BOREHOLE: 18-10

SHEET 1 OF 1








LOCATION: See Site Plan

BORING DATE: August 24, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	ND = Not Detected				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³					
								HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square				WATER CONTENT PERCENT					
								ND = Not Detected				Wp — \bigcirc W — Wl					
								20	40	60	80	20	40	60	80		
0	Power Auger 200 mm Diam. (Hollow Stem)	GROUND SURFACE		113.34													
		CONCRETE		0.00													
		FILL - gravelly SAND; brown; non-cohesive, dry, loose		113.04 0.30	1	SS	6										
1		SILTY SAND; brown; non-cohesive, moist, loose		112.58 0.76	2	SS	5	\oplus	ND								Bentonite Seal
		SILTY CLAY, some sand and gravel; brown (GLACIAL TILL); cohesive, moist to wet, very dense		111.82 1.52	3	SS	44	\oplus	ND								Silica Sand
2																	
		- PHC odour from 2.29 to 2.90 m depth			4	SS	>50		\square	\oplus							PHC, VOC
3																	51 mm Diam. PVC #10 Slot Screen
		- Slight PHC odour from 3.05 to 4.42 m depth			5	SS	58	\oplus	\square								
4																Silica Sand	
		End of Borehole		108.92 4.42												W.L. in Screen at Elev. 111.12 m depth on August 27, 2018	
5																	
6																	
7																	
8																	
9																	
10																	

Bentonite Seal

Silica Sand

PHC,
VOC51 mm Diam. PVC
#10 Slot Screen

Silica Sand

W.L. in Screen at
Elev. 111.12 m
depth on August
27, 2018

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

PROJECT: 1543767

RECORD OF BOREHOLE: 18-11

SHEET 1 OF 1




LOCATION: See Site Plan

BORING DATE: August 23, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	ND = <i>Not Detected</i> 20 40 60 80				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³					
								HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square ND = <i>Not Detected</i>				WATER CONTENT PERCENT					
								20 40 60 80				Wp — \bigcirc W WI 20 40 60 80					
0	Power Auger 200 mm Diam. (Hollow Stem)	GROUND SURFACE		107.99													
		TOPSOIL - SILTY SAND; brown; cohesive, dry, loose		0.00	1	SS	4	\bigcirc	ND						Metals, PAH, PHC, VOC		
1		CLAYEY SILT; brown; cohesive, moist, compact		107.23 0.76	2	SS	10	\bigcirc	ND								
		SILTY SAND, some gravel; brown (GLACIAL TILL); cohesive, moist, compact		106.62 1.37	3	SS	12										
2		End of Borehole		105.86 2.13													
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001 1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

PROJECT: 1543767

RECORD OF BOREHOLE: 18-12

SHEET 1 OF 1

LOCATION: See Site Plan

BORING DATE: August 23, 2018

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] ⊕				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] □				WATER CONTENT PERCENT					
							ND = Not Detected 20 40 60 80				Wp ——— W ——— WI					
0	Power Auger 200 mm Diam. (Hollow Stem)	GROUND SURFACE		110.00												
		SILTY CLAY, some sand; brown; cohesive, dry to wet, loose		0.00	1	SS	5									
1					2	SS	6									
2					3	SS	7	ND								
		SILTY SAND, some gravel; grey (GLACIAL TILL); non-cohesive, wet, compact		107.71 2.29	4	SS	10	ND								
3		End of Borehole		107.10 2.90												
4																
5																
6																
7																
8																
9																
10																

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: EL

CHECKED: PH

MIS-BHS 001_1543767.GPJ GAL-MIS.GDT 09/17/18 JEM

APPENDIX A (III)

Certificates of Analysis

Your P.O. #: 1543767
Your C.O.C. #: 680051-13-01

Attention: Erik Lalonde

Golder Associates Ltd
1931 Robertson Rd
Ottawa, ON
CANADA K2H 5B7

Report Date: 2018/08/30

Report #: R5381065

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8M1712

Received: 2018/08/27, 10:00

Sample Matrix: Soil
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	10	N/A	2018/08/30	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	11	N/A	2018/08/30		EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	5	2018/08/29	2018/08/29	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	6	2018/08/29	2018/08/30	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS (1)	9	2018/08/29	2018/08/29	CAM SOP-00447	EPA 6020B m
Moisture (1)	16	N/A	2018/08/29	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM) (1)	4	2018/08/29	2018/08/29	CAM SOP-00318	EPA 8270D m
PAH Compounds in Soil by GC/MS (SIM) (1)	6	2018/08/29	2018/08/30	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	1	N/A	2018/08/28	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds and F1 PHCs (1)	9	N/A	2018/08/29	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds and F1 PHCs (1)	1	N/A	2018/08/30	CAM SOP-00230	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

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

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

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

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

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

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

Your P.O. #: 1543767
Your C.O.C. #: 680051-13-01

Attention: Erik Lalonde

Golder Associates Ltd
1931 Robertson Rd
Ottawa, ON
CANADA K2H 5B7

Report Date: 2018/08/30

Report #: R5381065

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8M1712

Received: 2018/08/27, 10:00

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

(1) This test was performed by Maxxam Analytics Mississauga

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Alisha Williamson, Project Manager

Email: AWilliamson@maxxam.ca

Phone# (613) 274-0573

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

O.REG 153 ICPMS METALS (SOIL)

Maxxam ID		HOZ033	HOZ034	HOZ036	HOZ037	HOZ038		
Sampling Date		2018/08/24 12:43	2018/08/24 10:41	2018/08/23 16:22	2018/08/23 17:50	2018/08/23 17:15		
COC Number		680051-13-01	680051-13-01	680051-13-01	680051-13-01	680051-13-01		
	UNITS	BH18-4 SA1	BH18-7 SA1	BH18-9 SA1	BH18-12 SA1	BH18-11 SA1	RDL	QC Batch

Metals								
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	5704657
Acid Extractable Arsenic (As)	ug/g	1.2	2.1	1.1	<1.0	<1.0	1.0	5704657
Acid Extractable Barium (Ba)	ug/g	140	180	60	120	55	0.50	5704657
Acid Extractable Beryllium (Be)	ug/g	0.51	0.47	0.44	0.46	0.29	0.20	5704657
Acid Extractable Boron (B)	ug/g	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	5704657
Acid Extractable Cadmium (Cd)	ug/g	0.15	0.13	<0.10	<0.10	0.12	0.10	5704657
Acid Extractable Chromium (Cr)	ug/g	28	31	22	29	18	1.0	5704657
Acid Extractable Cobalt (Co)	ug/g	9.3	9.9	7.3	8.0	5.3	0.10	5704657
Acid Extractable Copper (Cu)	ug/g	18	24	11	15	6.0	0.50	5704657
Acid Extractable Lead (Pb)	ug/g	9.2	10	4.4	4.0	3.9	1.0	5704657
Acid Extractable Molybdenum (Mo)	ug/g	0.53	0.98	<0.50	<0.50	<0.50	0.50	5704657
Acid Extractable Nickel (Ni)	ug/g	17	19	12	15	9.1	0.50	5704657
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5704657
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	5704657
Acid Extractable Thallium (Tl)	ug/g	0.20	0.16	0.10	0.16	0.077	0.050	5704657
Acid Extractable Uranium (U)	ug/g	0.73	0.60	0.65	0.55	0.35	0.050	5704657
Acid Extractable Vanadium (V)	ug/g	45	41	39	42	32	5.0	5704657
Acid Extractable Zinc (Zn)	ug/g	53	66	25	36	33	5.0	5704657

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

O.REG 153 ICPMS METALS (SOIL)

Maxxam ID		HOZ039	HOZ040	HOZ041	HOZ042		
Sampling Date		2018/08/23 14:26	2018/08/23 14:26	2018/08/23 13:34	2018/08/23 08:25		
COC Number		680051-13-01	680051-13-01	680051-13-01	680051-13-01		
	UNITS	BH18-8 SA1	DUP-1	BH18-6 SA5	BH18-5 SA1	RDL	QC Batch
Metals							
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	0.25	0.21	0.20	5704657
Acid Extractable Arsenic (As)	ug/g	1.2	1.1	2.2	1.8	1.0	5704657
Acid Extractable Barium (Ba)	ug/g	47	75	100	93	0.50	5704657
Acid Extractable Beryllium (Be)	ug/g	<0.20	<0.20	0.42	0.29	0.20	5704657
Acid Extractable Boron (B)	ug/g	<5.0	<5.0	9.7	5.2	5.0	5704657
Acid Extractable Cadmium (Cd)	ug/g	4.5	<0.10	<0.10	0.13	0.10	5704657
Acid Extractable Chromium (Cr)	ug/g	7.8	7.1	22	18	1.0	5704657
Acid Extractable Cobalt (Co)	ug/g	3.0	2.6	6.9	6.4	0.10	5704657
Acid Extractable Copper (Cu)	ug/g	9.8	6.4	40	21	0.50	5704657
Acid Extractable Lead (Pb)	ug/g	9.7	6.7	12	9.6	1.0	5704657
Acid Extractable Molybdenum (Mo)	ug/g	0.54	<0.50	4.4	1.3	0.50	5704657
Acid Extractable Nickel (Ni)	ug/g	8.3	6.7	15	14	0.50	5704657
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	0.50	5704657
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	0.20	5704657
Acid Extractable Thallium (Tl)	ug/g	0.065	<0.050	0.12	0.12	0.050	5704657
Acid Extractable Uranium (U)	ug/g	0.34	0.37	0.58	0.42	0.050	5704657
Acid Extractable Vanadium (V)	ug/g	28	16	34	24	5.0	5704657
Acid Extractable Zinc (Zn)	ug/g	30	18	91	59	5.0	5704657
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

O.REG 153 PAHS (SOIL)

Maxxam ID		HOZ033		HOZ034	HOZ036			HOZ037		
Sampling Date		2018/08/24 12:43		2018/08/24 10:41	2018/08/23 16:22			2018/08/23 17:50		
COC Number		680051-13-01		680051-13-01	680051-13-01			680051-13-01		
	UNITS	BH18-4 SA1	RDL	BH18-7 SA1	BH18-9 SA1	RDL	QC Batch	BH18-12 SA1	RDL	QC Batch
Inorganics										
Moisture	%	10	1.0	4.4	10	1.0	5704783			
Calculated Parameters										
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	<0.071	<0.071	0.071	5702650	<0.0071	0.0071	5702650
Polyaromatic Hydrocarbons										
Acenaphthene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Acenaphthylene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Anthracene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Benzo(a)anthracene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Benzo(a)pyrene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Chrysene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Fluoranthene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Fluorene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
1-Methylnaphthalene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
2-Methylnaphthalene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Naphthalene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Phenanthrene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Pyrene	ug/g	<0.0050	0.0050	<0.050	<0.050	0.050	5704930	<0.0050	0.0050	5704754
Surrogate Recovery (%)										
D10-Anthracene	%	89		111	108		5704930	102		5704754
D14-Terphenyl (FS)	%	67		67	61		5704930	90		5704754
D8-Acenaphthylene	%	84		83	83		5704930	90		5704754
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

O.REG 153 PAHS (SOIL)

Maxxam ID		HOZ037			HOZ038	HOZ039	HOZ040	HOZ041		
Sampling Date		2018/08/23 17:50			2018/08/23 17:15	2018/08/23 14:26	2018/08/23 14:26	2018/08/23 13:34		
COC Number		680051-13-01			680051-13-01	680051-13-01	680051-13-01	680051-13-01		
	UNITS	BH18-12 SA1 Lab-Dup	RDL	QC Batch	BH18-11 SA1	BH18-8 SA1	DUP-1	BH18-6 SA5	RDL	QC Batch

Calculated Parameters

Methylnaphthalene, 2-(1-)	ug/g				<0.0071	<0.0071	<0.0071	<0.0071	0.0071	5702650
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Polyaromatic Hydrocarbons

Acenaphthene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.0071	0.0050	5704754
Acenaphthylene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.0065	0.0050	5704754
Anthracene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.023	0.0050	5704754
Benzo(a)anthracene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.060	0.0050	5704754
Benzo(a)pyrene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.057	0.0050	5704754
Benzo(b,j)fluoranthene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.088	0.0050	5704754
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.038	0.0050	5704754
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.025	0.0050	5704754
Chrysene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.064	0.0050	5704754
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.0083	0.0050	5704754
Fluoranthene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.16	0.0050	5704754
Fluorene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.0062	0.0050	5704754
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.041	0.0050	5704754
1-Methylnaphthalene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5704754
2-Methylnaphthalene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5704754
Naphthalene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	5704754
Phenanthrene	ug/g	<0.0050	0.0050	5704754	<0.0050	<0.0050	<0.0050	0.092	0.0050	5704754
Pyrene	ug/g	<0.0050	0.0050	5704754	<0.0050	0.0064	<0.0050	0.12	0.0050	5704754

Surrogate Recovery (%)

D10-Anthracene	%	94		5704754	92	93	99	100		5704754
D14-Terphenyl (FS)	%	82		5704754	79	80	84	103		5704754
D8-Acenaphthylene	%	83		5704754	87	89	90	92		5704754

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 PAHS (SOIL)

Maxxam ID		HOZ042		HOZ044		
Sampling Date		2018/08/23 08:25		2018/08/23 09:56		
COC Number		680051-13-01		680051-13-01		
	UNITS	BH18-5 SA1	QC Batch	BH18-1 SA1	RDL	QC Batch
Inorganics						
Moisture	%	3.3	5704783	6.6	1.0	5704783
Calculated Parameters						
Methylnaphthalene, 2-(1-)	ug/g	0.012	5702650	<0.0071	0.0071	5702650
Polyaromatic Hydrocarbons						
Acenaphthene	ug/g	0.022	5704930	<0.0050	0.0050	5704754
Acenaphthylene	ug/g	<0.0050	5704930	<0.0050	0.0050	5704754
Anthracene	ug/g	0.058	5704930	<0.0050	0.0050	5704754
Benzo(a)anthracene	ug/g	0.25	5704930	0.016	0.0050	5704754
Benzo(a)pyrene	ug/g	0.24	5704930	0.019	0.0050	5704754
Benzo(b/j)fluoranthene	ug/g	0.33	5704930	0.035	0.0050	5704754
Benzo(g,h,i)perylene	ug/g	0.12	5704930	0.019	0.0050	5704754
Benzo(k)fluoranthene	ug/g	0.11	5704930	0.0097	0.0050	5704754
Chrysene	ug/g	0.22	5704930	0.019	0.0050	5704754
Dibenz(a,h)anthracene	ug/g	0.038	5704930	<0.0050	0.0050	5704754
Fluoranthene	ug/g	0.42	5704930	0.039	0.0050	5704754
Fluorene	ug/g	0.023	5704930	<0.0050	0.0050	5704754
Indeno(1,2,3-cd)pyrene	ug/g	0.14	5704930	0.019	0.0050	5704754
1-Methylnaphthalene	ug/g	0.0053	5704930	<0.0050	0.0050	5704754
2-Methylnaphthalene	ug/g	0.0063	5704930	<0.0050	0.0050	5704754
Naphthalene	ug/g	<0.0050	5704930	<0.0050	0.0050	5704754
Phenanthrene	ug/g	0.26	5704930	0.016	0.0050	5704754
Pyrene	ug/g	0.34	5704930	0.032	0.0050	5704754
Surrogate Recovery (%)						
D10-Anthracene	%	94	5704930	102		5704754
D14-Terphenyl (FS)	%	72	5704930	102		5704754
D8-Acenaphthylene	%	92	5704930	96		5704754
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		HOZ031	HOZ032	HOZ035		HOZ037		
Sampling Date		2018/08/24 09:12	2018/08/24 13:16	2018/08/24 10:49		2018/08/23 17:50		
COC Number		680051-13-01	680051-13-01	680051-13-01		680051-13-01		
	UNITS	BH18-10 SA4	BH18-4 SA4	BH18-7 SA2	QC Batch	BH18-12 SA1	RDL	QC Batch
Inorganics								
Moisture	%	6.7	12	12	5704783	25	1.0	5704783
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	<0.050	5702406	<0.050	0.050	5702406
Volatile Organics								
Acetone (2-Propanone)	ug/g	<0.50	<0.50	<0.50	5702586	<0.50	0.50	5702586
Benzene	ug/g	<0.020	<0.020	<0.020	5702586	<0.020	0.020	5702586
Bromodichloromethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Bromoform	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Bromomethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Carbon Tetrachloride	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Chlorobenzene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Chloroform	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Dibromochloromethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,1-Dichloroethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,2-Dichloroethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,1-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,2-Dichloropropane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	<0.030	5702586	<0.030	0.030	5702586
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	<0.040	5702586	<0.040	0.040	5702586
Ethylbenzene	ug/g	0.042	<0.020	<0.020	5702586	<0.020	0.020	5702586
Ethylene Dibromide	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Hexane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	<0.50	5702586	<0.50	0.50	5702586
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	<0.50	5702586	<0.50	0.50	5702586
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Styrene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Maxxam ID		HOZ031	HOZ032	HOZ035		HOZ037		
Sampling Date		2018/08/24 09:12	2018/08/24 13:16	2018/08/24 10:49		2018/08/23 17:50		
COC Number		680051-13-01	680051-13-01	680051-13-01		680051-13-01		
	UNITS	BH18-10 SA4	BH18-4 SA4	BH18-7 SA2	QC Batch	BH18-12 SA1	RDL	QC Batch
1,1,2,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Tetrachloroethylene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Toluene	ug/g	<0.020	<0.020	<0.020	5702586	<0.020	0.020	5702586
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Trichloroethylene	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	<0.050	5702586	<0.050	0.050	5702586
Vinyl Chloride	ug/g	<0.020	<0.020	<0.020	5702586	<0.020	0.020	5702586
p+m-Xylene	ug/g	0.59	<0.020	<0.020	5702586	<0.020	0.020	5702586
o-Xylene	ug/g	<0.020	<0.020	<0.020	5702586	<0.020	0.020	5702586
Total Xylenes	ug/g	0.59	<0.020	<0.020	5702586	<0.020	0.020	5702586
F1 (C6-C10)	ug/g	79	<10	<10	5702586	<10	10	5702586
F1 (C6-C10) - BTEX	ug/g	78	<10	<10	5702586	<10	10	5702586
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	380	<10	<10	5704623	<10	10	5704737
F3 (C16-C34 Hydrocarbons)	ug/g	130	<50	<50	5704623	<50	50	5704737
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	5704623	<50	50	5704737
Reached Baseline at C50	ug/g	Yes	Yes	Yes	5704623	Yes		5704737
Surrogate Recovery (%)								
o-Terphenyl	%	93	87	92	5704623	92		5704737
4-Bromofluorobenzene	%	100	87	86	5702586	85		5702586
D10-o-Xylene	%	112	118	112	5702586	114		5702586
D4-1,2-Dichloroethane	%	98	103	110	5702586	109		5702586
D8-Toluene	%	99	89	92	5702586	92		5702586
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		HOZ037			HOZ038	HOZ039	HOZ040		
Sampling Date		2018/08/23 17:50			2018/08/23 17:15	2018/08/23 14:26	2018/08/23 14:26		
COC Number		680051-13-01			680051-13-01	680051-13-01	680051-13-01		
	UNITS	BH18-12 SA1 Lab-Dup	RDL	QC Batch	BH18-11 SA1	BH18-8 SA1	DUP-1	RDL	QC Batch
Inorganics									
Moisture	%	25	1.0	5704783	16	10	11	1.0	5704783
Calculated Parameters									
1,3-Dichloropropene (cis+trans)	ug/g				<0.050	<0.050	<0.050	0.050	5702406
Volatile Organics									
Acetone (2-Propanone)	ug/g				<0.50	<0.50	<0.50	0.50	5702586
Benzene	ug/g				<0.020	<0.020	<0.020	0.020	5702586
Bromodichloromethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Bromoform	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Bromomethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Carbon Tetrachloride	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Chlorobenzene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Chloroform	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Dibromochloromethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,2-Dichlorobenzene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,3-Dichlorobenzene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,4-Dichlorobenzene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Dichlorodifluoromethane (FREON 12)	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,1-Dichloroethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,2-Dichloroethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,1-Dichloroethylene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
cis-1,2-Dichloroethylene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
trans-1,2-Dichloroethylene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,2-Dichloropropane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
cis-1,3-Dichloropropene	ug/g				<0.030	<0.030	<0.030	0.030	5702586
trans-1,3-Dichloropropene	ug/g				<0.040	<0.040	<0.040	0.040	5702586
Ethylbenzene	ug/g				<0.020	<0.020	<0.020	0.020	5702586
Ethylene Dibromide	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Hexane	ug/g				<0.050	<0.050	0.076	0.050	5702586
Methylene Chloride(Dichloromethane)	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Methyl Ethyl Ketone (2-Butanone)	ug/g				<0.50	<0.50	<0.50	0.50	5702586
Methyl Isobutyl Ketone	ug/g				<0.50	<0.50	<0.50	0.50	5702586
Methyl t-butyl ether (MTBE)	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Styrene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Lab-Dup = Laboratory Initiated Duplicate									

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		HOZ037			HOZ038	HOZ039	HOZ040		
Sampling Date		2018/08/23 17:50			2018/08/23 17:15	2018/08/23 14:26	2018/08/23 14:26		
COC Number		680051-13-01			680051-13-01	680051-13-01	680051-13-01		
	UNITS	BH18-12 SA1 Lab-Dup	RDL	QC Batch	BH18-11 SA1	BH18-8 SA1	DUP-1	RDL	QC Batch
1,1,1,2-Tetrachloroethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,1,2,2-Tetrachloroethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Tetrachloroethylene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Toluene	ug/g				<0.020	<0.020	<0.020	0.020	5702586
1,1,1-Trichloroethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
1,1,2-Trichloroethane	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Trichloroethylene	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Trichlorofluoromethane (FREON 11)	ug/g				<0.050	<0.050	<0.050	0.050	5702586
Vinyl Chloride	ug/g				<0.020	<0.020	<0.020	0.020	5702586
p+m-Xylene	ug/g				<0.020	<0.020	<0.020	0.020	5702586
o-Xylene	ug/g				<0.020	<0.020	<0.020	0.020	5702586
Total Xylenes	ug/g				<0.020	<0.020	<0.020	0.020	5702586
F1 (C6-C10)	ug/g				<10	<10	<10	10	5702586
F1 (C6-C10) - BTEX	ug/g				<10	<10	<10	10	5702586
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	5704737	<10	<10	<10	10	5704737
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	5704737	<50	<50	<50	50	5704737
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	5704737	<50	<50	<50	50	5704737
Reached Baseline at C50	ug/g	Yes		5704737	Yes	Yes	Yes		5704737
Surrogate Recovery (%)									
o-Terphenyl	%	93		5704737	92	93	89		5704737
4-Bromofluorobenzene	%				85	87	86		5702586
D10-o-Xylene	%				118	122	115		5702586
D4-1,2-Dichloroethane	%				111	116	109		5702586
D8-Toluene	%				95	92	92		5702586
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate									

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		HOZ041		HOZ043	HOZ045	HOZ046		
Sampling Date		2018/08/23 13:34		2018/08/23 08:47	2018/08/23 10:21	2018/08/23 12:07		
COC Number		680051-13-01		680051-13-01	680051-13-01	680051-13-01		
	UNITS	BH18-6 SA5	QC Batch	BH18-5 SA3	BH18-1 SA3	BH18-2 SA4	RDL	QC Batch
Inorganics								
Moisture	%	13	5704783	10	17	13	1.0	5704783
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	5702406	<0.050	<0.050	<0.050	0.050	5702406
Volatile Organics								
Acetone (2-Propanone)	ug/g	<0.50	5702586	<0.50	<0.50	<0.50	0.50	5702586
Benzene	ug/g	<0.020	5702586	<0.020	<0.020	<0.020	0.020	5702586
Bromodichloromethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Bromoform	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Bromomethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Carbon Tetrachloride	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Chlorobenzene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Chloroform	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Dibromochloromethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,2-Dichlorobenzene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,3-Dichlorobenzene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,4-Dichlorobenzene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,1-Dichloroethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,2-Dichloroethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,1-Dichloroethylene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
cis-1,2-Dichloroethylene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
trans-1,2-Dichloroethylene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,2-Dichloropropane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
cis-1,3-Dichloropropene	ug/g	<0.030	5702586	<0.030	<0.030	<0.030	0.030	5702586
trans-1,3-Dichloropropene	ug/g	<0.040	5702586	<0.040	<0.040	<0.040	0.040	5702586
Ethylbenzene	ug/g	<0.020	5702586	<0.020	<0.020	<0.020	0.020	5702586
Ethylene Dibromide	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Hexane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Methylene Chloride(Dichloromethane)	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	5702586	<0.50	<0.50	<0.50	0.50	5702586
Methyl Isobutyl Ketone	ug/g	<0.50	5702586	<0.50	<0.50	<0.50	0.50	5702586
Methyl t-butyl ether (MTBE)	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Styrene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,1,1,2-Tetrachloroethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

O.REG 153 VOCs BY HS & F1-F4 (SOIL)

Maxxam ID		HOZ041		HOZ043	HOZ045	HOZ046		
Sampling Date		2018/08/23 13:34		2018/08/23 08:47	2018/08/23 10:21	2018/08/23 12:07		
COC Number		680051-13-01		680051-13-01	680051-13-01	680051-13-01		
	UNITS	BH18-6 SA5	QC Batch	BH18-5 SA3	BH18-1 SA3	BH18-2 SA4	RDL	QC Batch
1,1,2,2-Tetrachloroethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Tetrachloroethylene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Toluene	ug/g	<0.020	5702586	<0.020	<0.020	<0.020	0.020	5702586
1,1,1-Trichloroethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
1,1,2-Trichloroethane	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Trichloroethylene	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	5702586	<0.050	<0.050	<0.050	0.050	5702586
Vinyl Chloride	ug/g	<0.020	5702586	<0.020	<0.020	<0.020	0.020	5702586
p+m-Xylene	ug/g	<0.020	5702586	<0.020	<0.020	<0.020	0.020	5702586
o-Xylene	ug/g	<0.020	5702586	<0.020	<0.020	<0.020	0.020	5702586
Total Xylenes	ug/g	<0.020	5702586	<0.020	<0.020	<0.020	0.020	5702586
F1 (C6-C10)	ug/g	<10	5702586	<10	<10	<10	10	5702586
F1 (C6-C10) - BTEX	ug/g	<10	5702586	<10	<10	<10	10	5702586
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	<10	5704737	<10	<10	<10	10	5704623
F3 (C16-C34 Hydrocarbons)	ug/g	<50	5704737	<50	<50	<50	50	5704623
F4 (C34-C50 Hydrocarbons)	ug/g	<50	5704737	<50	<50	<50	50	5704623
Reached Baseline at C50	ug/g	Yes	5704737	Yes	Yes	Yes		5704623
Surrogate Recovery (%)								
o-Terphenyl	%	88	5704737	93	91	91		5704623
4-Bromofluorobenzene	%	87	5702586	83	83	83		5702586
D10-o-Xylene	%	125	5702586	107	117	115		5702586
D4-1,2-Dichloroethane	%	112	5702586	110	112	112		5702586
D8-Toluene	%	93	5702586	91	92	92		5702586
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

TEST SUMMARY

Maxxam ID: HOZ031
Sample ID: BH18-10 SA4
Matrix: Soil

Collected: 2018/08/24
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704623	2018/08/29	2018/08/30	Anna Stuglik Rolland
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/30	Yang (Philip) Yu

Maxxam ID: HOZ032
Sample ID: BH18-4 SA4
Matrix: Soil

Collected: 2018/08/24
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704623	2018/08/29	2018/08/30	Anna Stuglik Rolland
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/28	Yang (Philip) Yu

Maxxam ID: HOZ033
Sample ID: BH18-4 SA1
Matrix: Soil

Collected: 2018/08/24
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704930	2018/08/29	2018/08/29	Mitesh Raj

Maxxam ID: HOZ034
Sample ID: BH18-7 SA1
Matrix: Soil

Collected: 2018/08/24
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704930	2018/08/29	2018/08/29	Mitesh Raj

Maxxam ID: HOZ035
Sample ID: BH18-7 SA2
Matrix: Soil

Collected: 2018/08/24
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704623	2018/08/29	2018/08/30	Anna Stuglik Rolland
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

TEST SUMMARY

Maxxam ID: HOZ036
Sample ID: BH18-9 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704930	2018/08/29	2018/08/30	Mitesh Raj

Maxxam ID: HOZ037
Sample ID: BH18-12 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704737	2018/08/29	2018/08/29	Barbara Wowk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704754	2018/08/29	2018/08/29	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

Maxxam ID: HOZ037 Dup
Sample ID: BH18-12 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704737	2018/08/29	2018/08/29	Barbara Wowk
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704754	2018/08/29	2018/08/29	Mitesh Raj

Maxxam ID: HOZ038
Sample ID: BH18-11 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704737	2018/08/29	2018/08/29	Barbara Wowk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704754	2018/08/29	2018/08/29	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

Maxxam ID: HOZ039
Sample ID: BH18-8 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk

TEST SUMMARY

Maxxam ID: HOZ039
Sample ID: BH18-8 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704737	2018/08/29	2018/08/29	Barbara Wowk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704754	2018/08/29	2018/08/30	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

Maxxam ID: HOZ040
Sample ID: DUP-1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704737	2018/08/29	2018/08/29	Barbara Wowk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704754	2018/08/29	2018/08/30	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

Maxxam ID: HOZ041
Sample ID: BH18-6 SA5
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704737	2018/08/29	2018/08/29	Barbara Wowk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704754	2018/08/29	2018/08/30	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

Maxxam ID: HOZ042
Sample ID: BH18-5 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
Strong Acid Leachable Metals by ICPMS	ICP/MS	5704657	2018/08/29	2018/08/29	Daniel Teclu
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704930	2018/08/29	2018/08/30	Mitesh Raj

TEST SUMMARY

Maxxam ID: HOZ043
Sample ID: BH18-5 SA3
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704623	2018/08/29	2018/08/30	Anna Stuglik Rolland
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

Maxxam ID: HOZ044
Sample ID: BH18-1 SA1
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5702650	N/A	2018/08/30	Automated Statchk
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5704754	2018/08/29	2018/08/30	Mitesh Raj

Maxxam ID: HOZ045
Sample ID: BH18-1 SA3
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704623	2018/08/29	2018/08/30	Anna Stuglik Rolland
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

Maxxam ID: HOZ046
Sample ID: BH18-2 SA4
Matrix: Soil

Collected: 2018/08/23
Shipped:
Received: 2018/08/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5702406	N/A	2018/08/30	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5704623	2018/08/29	2018/08/30	Anna Stuglik Rolland
Moisture	BAL	5704783	N/A	2018/08/29	Chun Yan
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5702586	N/A	2018/08/29	Yang (Philip) Yu

GENERAL COMMENTS

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

Package 1	7.7°C
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Sample HOZ034 [BH18-7 SA1] : PAH Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample HOZ036 [BH18-9 SA1] : PAH Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

Golder Associates Ltd
Your P.O. #: 1543767
Sampler Initials: WD

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5702586	4-Bromofluorobenzene	2018/08/28	92	60 - 140	95	60 - 140	84	%		
5702586	D10-o-Xylene	2018/08/28	124	60 - 130	111	60 - 130	108	%		
5702586	D4-1,2-Dichloroethane	2018/08/28	100	60 - 140	103	60 - 140	112	%		
5702586	D8-Toluene	2018/08/28	104	60 - 140	105	60 - 140	91	%		
5704623	o-Terphenyl	2018/08/29	91	60 - 130	89	60 - 130	91	%		
5704737	o-Terphenyl	2018/08/29	78	60 - 130	75	60 - 130	78	%		
5704754	D10-Anthracene	2018/08/29	97	50 - 130	98	50 - 130	96	%		
5704754	D14-Terphenyl (FS)	2018/08/29	83	50 - 130	86	50 - 130	84	%		
5704754	D8-Acenaphthylene	2018/08/29	89	50 - 130	85	50 - 130	81	%		
5704930	D10-Anthracene	2018/08/29	83	50 - 130	82	50 - 130	79	%		
5704930	D14-Terphenyl (FS)	2018/08/29	63	50 - 130	61	50 - 130	62	%		
5704930	D8-Acenaphthylene	2018/08/29	80	50 - 130	74	50 - 130	75	%		
5702586	1,1,1,2-Tetrachloroethane	2018/08/28	102	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
5702586	1,1,1-Trichloroethane	2018/08/28	101	60 - 140	102	60 - 130	<0.050	ug/g	NC	50
5702586	1,1,2,2-Tetrachloroethane	2018/08/28	93	60 - 140	97	60 - 130	<0.050	ug/g	NC	50
5702586	1,1,2-Trichloroethane	2018/08/28	107	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
5702586	1,1-Dichloroethane	2018/08/28	106	60 - 140	109	60 - 130	<0.050	ug/g	NC	50
5702586	1,1-Dichloroethylene	2018/08/28	108	60 - 140	109	60 - 130	<0.050	ug/g	NC	50
5702586	1,2-Dichlorobenzene	2018/08/28	100	60 - 140	103	60 - 130	<0.050	ug/g	NC	50
5702586	1,2-Dichloroethane	2018/08/28	97	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
5702586	1,2-Dichloropropane	2018/08/28	104	60 - 140	102	60 - 130	<0.050	ug/g	NC	50
5702586	1,3-Dichlorobenzene	2018/08/28	102	60 - 140	103	60 - 130	<0.050	ug/g	NC	50
5702586	1,4-Dichlorobenzene	2018/08/28	104	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
5702586	Acetone (2-Propanone)	2018/08/28	88	60 - 140	91	60 - 140	<0.50	ug/g	NC	50
5702586	Benzene	2018/08/28	99	60 - 140	101	60 - 130	<0.020	ug/g	NC	50
5702586	Bromodichloromethane	2018/08/28	102	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
5702586	Bromoform	2018/08/28	89	60 - 140	93	60 - 130	<0.050	ug/g	NC	50
5702586	Bromomethane	2018/08/28	102	60 - 140	104	60 - 140	<0.050	ug/g	NC	50
5702586	Carbon Tetrachloride	2018/08/28	102	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
5702586	Chlorobenzene	2018/08/28	98	60 - 140	100	60 - 130	<0.050	ug/g	NC	50
5702586	Chloroform	2018/08/28	99	60 - 140	100	60 - 130	<0.050	ug/g	NC	50

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Your P.O. #: 1543767
Sampler Initials: WD

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5702586	cis-1,2-Dichloroethylene	2018/08/28	97	60 - 140	99	60 - 130	<0.050	ug/g	NC	50
5702586	cis-1,3-Dichloropropene	2018/08/28	89	60 - 140	87	60 - 130	<0.030	ug/g	NC	50
5702586	Dibromochloromethane	2018/08/28	96	60 - 140	99	60 - 130	<0.050	ug/g	NC	50
5702586	Dichlorodifluoromethane (FREON 12)	2018/08/28	129	60 - 140	131	60 - 140	<0.050	ug/g	NC	50
5702586	Ethylbenzene	2018/08/28	105	60 - 140	105	60 - 130	<0.020	ug/g	NC	50
5702586	Ethylene Dibromide	2018/08/28	95	60 - 140	98	60 - 130	<0.050	ug/g	NC	50
5702586	F1 (C6-C10) - BTEX	2018/08/28					<10	ug/g	NC	30
5702586	F1 (C6-C10)	2018/08/28	105	60 - 140	96	80 - 120	<10	ug/g	NC	30
5702586	Hexane	2018/08/28	114	60 - 140	117	60 - 130	<0.050	ug/g	NC	50
5702586	Methyl Ethyl Ketone (2-Butanone)	2018/08/28	90	60 - 140	93	60 - 140	<0.50	ug/g	NC	50
5702586	Methyl Isobutyl Ketone	2018/08/28	98	60 - 140	97	60 - 130	<0.50	ug/g	NC	50
5702586	Methyl t-butyl ether (MTBE)	2018/08/28	95	60 - 140	97	60 - 130	<0.050	ug/g	NC	50
5702586	Methylene Chloride(Dichloromethane)	2018/08/28	94	60 - 140	98	60 - 130	<0.050	ug/g	NC	50
5702586	o-Xylene	2018/08/28	103	60 - 140	103	60 - 130	<0.020	ug/g	NC	50
5702586	p+m-Xylene	2018/08/28	102	60 - 140	105	60 - 130	<0.020	ug/g	NC	50
5702586	Styrene	2018/08/28	103	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
5702586	Tetrachloroethylene	2018/08/28	97	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
5702586	Toluene	2018/08/28	102	60 - 140	103	60 - 130	<0.020	ug/g	NC	50
5702586	Total Xylenes	2018/08/28					<0.020	ug/g	NC	50
5702586	trans-1,2-Dichloroethylene	2018/08/28	100	60 - 140	102	60 - 130	<0.050	ug/g	NC	50
5702586	trans-1,3-Dichloropropene	2018/08/28	94	60 - 140	92	60 - 130	<0.040	ug/g	NC	50
5702586	Trichloroethylene	2018/08/28	99	60 - 140	99	60 - 130	<0.050	ug/g	NC	50
5702586	Trichlorofluoromethane (FREON 11)	2018/08/28	111	60 - 140	113	60 - 130	<0.050	ug/g	NC	50
5702586	Vinyl Chloride	2018/08/28	113	60 - 140	115	60 - 130	<0.020	ug/g	NC	50
5704623	F2 (C10-C16 Hydrocarbons)	2018/08/29	92	50 - 130	88	80 - 120	<10	ug/g	NC	30
5704623	F3 (C16-C34 Hydrocarbons)	2018/08/29	90	50 - 130	86	80 - 120	<50	ug/g	4.6	30
5704623	F4 (C34-C50 Hydrocarbons)	2018/08/29	87	50 - 130	84	80 - 120	<50	ug/g	2.0	30
5704657	Acid Extractable Antimony (Sb)	2018/08/29	95	75 - 125	105	80 - 120	<0.20	ug/g	NC	30
5704657	Acid Extractable Arsenic (As)	2018/08/29	105	75 - 125	108	80 - 120	<1.0	ug/g	0.55	30
5704657	Acid Extractable Barium (Ba)	2018/08/29	NC	75 - 125	101	80 - 120	<0.50	ug/g	2.9	30
5704657	Acid Extractable Beryllium (Be)	2018/08/29	100	75 - 125	101	80 - 120	<0.20	ug/g	1.6	30

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Your P.O. #: 1543767
Sampler Initials: WD

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5704657	Acid Extractable Boron (B)	2018/08/29	96	75 - 125	98	80 - 120	<5.0	ug/g	NC	30
5704657	Acid Extractable Cadmium (Cd)	2018/08/29	102	75 - 125	101	80 - 120	<0.10	ug/g	8.5	30
5704657	Acid Extractable Chromium (Cr)	2018/08/29	104	75 - 125	102	80 - 120	<1.0	ug/g	0.84	30
5704657	Acid Extractable Cobalt (Co)	2018/08/29	101	75 - 125	104	80 - 120	<0.10	ug/g	4.6	30
5704657	Acid Extractable Copper (Cu)	2018/08/29	100	75 - 125	105	80 - 120	<0.50	ug/g	2.3	30
5704657	Acid Extractable Lead (Pb)	2018/08/29	95	75 - 125	101	80 - 120	<1.0	ug/g	6.7	30
5704657	Acid Extractable Molybdenum (Mo)	2018/08/29	103	75 - 125	104	80 - 120	<0.50	ug/g	NC	30
5704657	Acid Extractable Nickel (Ni)	2018/08/29	103	75 - 125	102	80 - 120	<0.50	ug/g	0.22	30
5704657	Acid Extractable Selenium (Se)	2018/08/29	102	75 - 125	101	80 - 120	<0.50	ug/g	NC	30
5704657	Acid Extractable Silver (Ag)	2018/08/29	100	75 - 125	104	80 - 120	<0.20	ug/g	NC	30
5704657	Acid Extractable Thallium (Tl)	2018/08/29	98	75 - 125	99	80 - 120	<0.050	ug/g	3.0	30
5704657	Acid Extractable Uranium (U)	2018/08/29	100	75 - 125	100	80 - 120	<0.050	ug/g	12	30
5704657	Acid Extractable Vanadium (V)	2018/08/29	105	75 - 125	103	80 - 120	<5.0	ug/g	1.6	30
5704657	Acid Extractable Zinc (Zn)	2018/08/29	NC	75 - 125	110	80 - 120	<5.0	ug/g	10	30
5704737	F2 (C10-C16 Hydrocarbons)	2018/08/29	85	50 - 130	83	80 - 120	<10	ug/g	NC	30
5704737	F3 (C16-C34 Hydrocarbons)	2018/08/29	84	50 - 130	83	80 - 120	<50	ug/g	NC	30
5704737	F4 (C34-C50 Hydrocarbons)	2018/08/29	84	50 - 130	81	80 - 120	<50	ug/g	NC	30
5704754	1-Methylnaphthalene	2018/08/29	103	50 - 130	102	50 - 130	<0.0050	ug/g	NC	40
5704754	2-Methylnaphthalene	2018/08/29	87	50 - 130	86	50 - 130	<0.0050	ug/g	NC	40
5704754	Acenaphthene	2018/08/29	90	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
5704754	Acenaphthylene	2018/08/29	84	50 - 130	84	50 - 130	<0.0050	ug/g	NC	40
5704754	Anthracene	2018/08/29	84	50 - 130	84	50 - 130	<0.0050	ug/g	NC	40
5704754	Benzo(a)anthracene	2018/08/29	94	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40
5704754	Benzo(a)pyrene	2018/08/29	93	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
5704754	Benzo(b/j)fluoranthene	2018/08/29	90	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
5704754	Benzo(g,h,i)perylene	2018/08/29	94	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
5704754	Benzo(k)fluoranthene	2018/08/29	92	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
5704754	Chrysene	2018/08/29	90	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
5704754	Dibenz(a,h)anthracene	2018/08/29	104	50 - 130	102	50 - 130	<0.0050	ug/g	NC	40
5704754	Fluoranthene	2018/08/29	84	50 - 130	87	50 - 130	<0.0050	ug/g	NC	40
5704754	Fluorene	2018/08/29	88	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Your P.O. #: 1543767
Sampler Initials: WD

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5704754	Indeno(1,2,3-cd)pyrene	2018/08/29	98	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
5704754	Naphthalene	2018/08/29	82	50 - 130	83	50 - 130	<0.0050	ug/g	NC	40
5704754	Phenanthrene	2018/08/29	90	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40
5704754	Pyrene	2018/08/29	83	50 - 130	87	50 - 130	<0.0050	ug/g	NC	40
5704783	Moisture	2018/08/29							0	20
5704930	1-Methylnaphthalene	2018/08/29	93	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40
5704930	2-Methylnaphthalene	2018/08/29	77	50 - 130	74	50 - 130	<0.0050	ug/g	NC	40
5704930	Acenaphthene	2018/08/29	83	50 - 130	82	50 - 130	<0.0050	ug/g	NC	40
5704930	Acenaphthylene	2018/08/29	76	50 - 130	71	50 - 130	<0.0050	ug/g	NC	40
5704930	Anthracene	2018/08/29	78	50 - 130	77	50 - 130	<0.0050	ug/g	NC	40
5704930	Benzo(a)anthracene	2018/08/29	85	50 - 130	79	50 - 130	<0.0050	ug/g	NC	40
5704930	Benzo(a)pyrene	2018/08/29	86	50 - 130	83	50 - 130	<0.0050	ug/g	NC	40
5704930	Benzo(b/j)fluoranthene	2018/08/29	89	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
5704930	Benzo(g,h,i)perylene	2018/08/29	69	50 - 130	70	50 - 130	<0.0050	ug/g	NC	40
5704930	Benzo(k)fluoranthene	2018/08/29	90	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40
5704930	Chrysene	2018/08/29	89	50 - 130	85	50 - 130	<0.0050	ug/g	NC	40
5704930	Dibenz(a,h)anthracene	2018/08/29	79	50 - 130	75	50 - 130	<0.0050	ug/g	NC	40
5704930	Fluoranthene	2018/08/29	72	50 - 130	68	50 - 130	<0.0050	ug/g	NC	40
5704930	Fluorene	2018/08/29	86	50 - 130	82	50 - 130	<0.0050	ug/g	NC	40
5704930	Indeno(1,2,3-cd)pyrene	2018/08/29	74	50 - 130	72	50 - 130	<0.0050	ug/g	NC	40
5704930	Naphthalene	2018/08/29	66	50 - 130	67	50 - 130	<0.0050	ug/g	NC	40
5704930	Phenanthrene	2018/08/29	87	50 - 130	84	50 - 130	<0.0050	ug/g	NC	40

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Your P.O. #: 1543767
Sampler Initials: WD

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5704930	Pyrene	2018/08/29	75	50 - 130	71	50 - 130	<0.0050	ug/g	NC	40

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

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

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

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

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

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

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

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

Ewa Pranjić



Ewa Pranjić, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

4, 6, 6

CHAIN OF CUSTODY RECORD

Page 2 of 2

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #14090 Golder Associates Ltd		Company Name: <u>Golder</u>		Quotation #: B80683		Maxxam Job #:	
Attention: Accounts Payable		Attention: Erik Lalonde		P.O. #: 1543767		Bottle Order #:	
Address: 1931 Robertson Rd		Address:		Project:		COC #:	
Ottawa ON K2H 5B7		Tel:		Project Name:		Project Manager:	
Tel: (613) 592-9600 Fax: (613) 592-9601		Tel:		Site #:		Jonathan Urban	
Email: AP_CustomerService@golder.com		Email: elalonde@golder.com		Sampled By:		C#680051-14-01	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required:			
Regulation 153 (2011) <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input checked="" type="checkbox"/> Table 2 <input checked="" type="checkbox"/> Ind/Comm <input checked="" type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table						Other Regulations <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Municipality <input type="checkbox"/> PWQO <input type="checkbox"/> Other						Special Instructions						Please provide advance notice for rush projects	
Include Criteria on Certificate of Analysis (Y/N)?						Field Filtered (please circle): Metals / Hg / Cr / VI						Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Doxins/Furans are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) Date Required: <u>Aug 30, 2018</u> Time Required: <u>13:00</u> <input checked="" type="checkbox"/> Rush Confirmation Number: (call lab for #)							
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix												# of Bottles	Comments		
1	BH18-6 SA5	8/23/2018	13:34	soil		X	X	X								6			
2	BH18-5 SA1	8/23/2018	8:25	soil		X	X									2	on rce		
3	BH18-5 SA3	8/23/2018	8:47	soil				X								4			
4	BH18-1 SA1	8/23/2018	9:56	soil			X									1	RECEIVED IN OTTAWA		
5	BH18-1 SA3	8/23/2018	10:21	soil				X								4			
6	BH18-2 SA4	8/23/2018	12:07	soil				X								4			
7																			
8																			
9																			
10																			

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only		
<u>Erik Lalonde</u>	18/08/27	9:30	<u>Erik Lalonde</u>	2018/08/27	10:00		Time Sensitive	Temperature (°C) on Reel	Custody Seal
			<u>See Page 1</u>					8.8.7	Intact

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

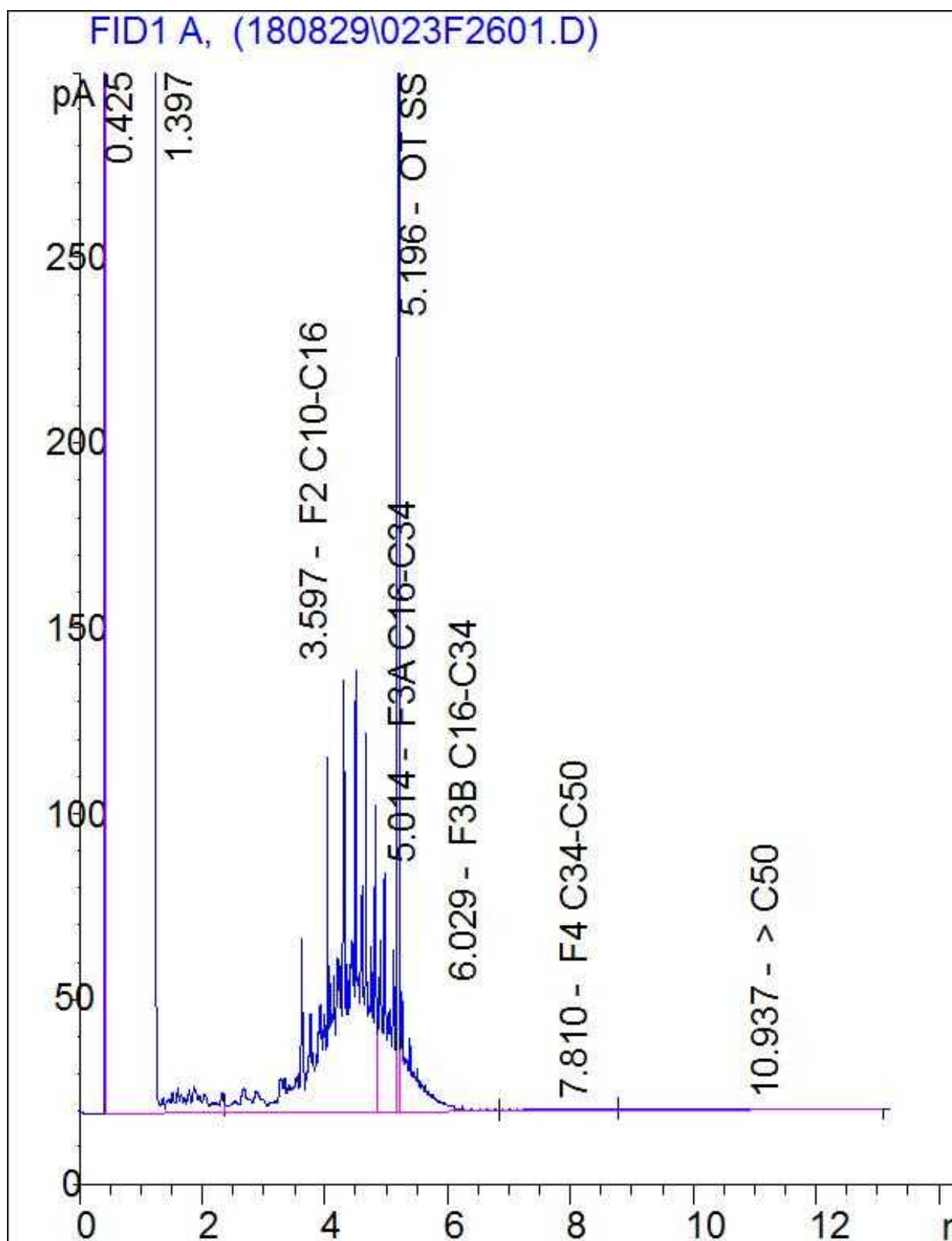
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/MP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

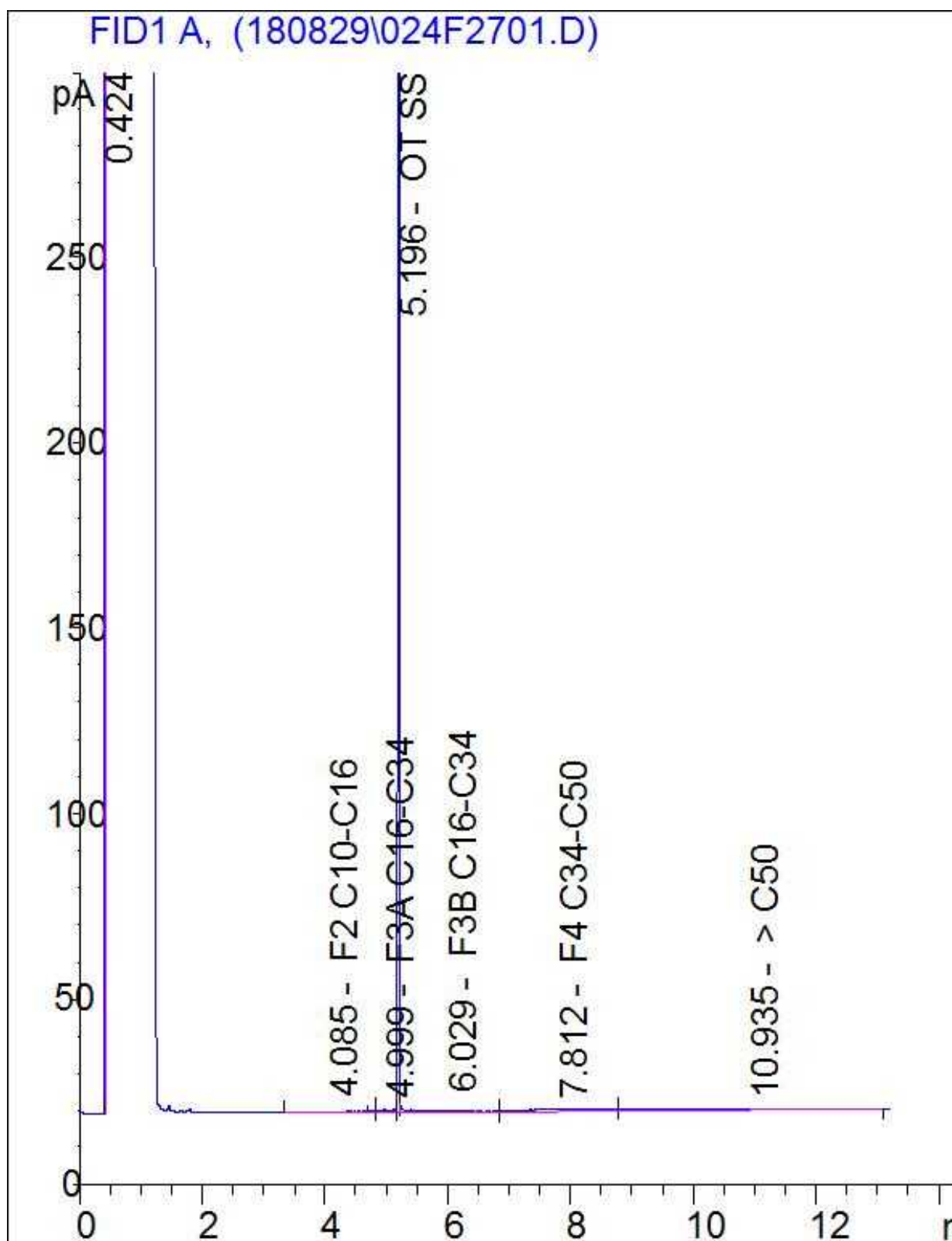
White: Maxxa Yellow: Client

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



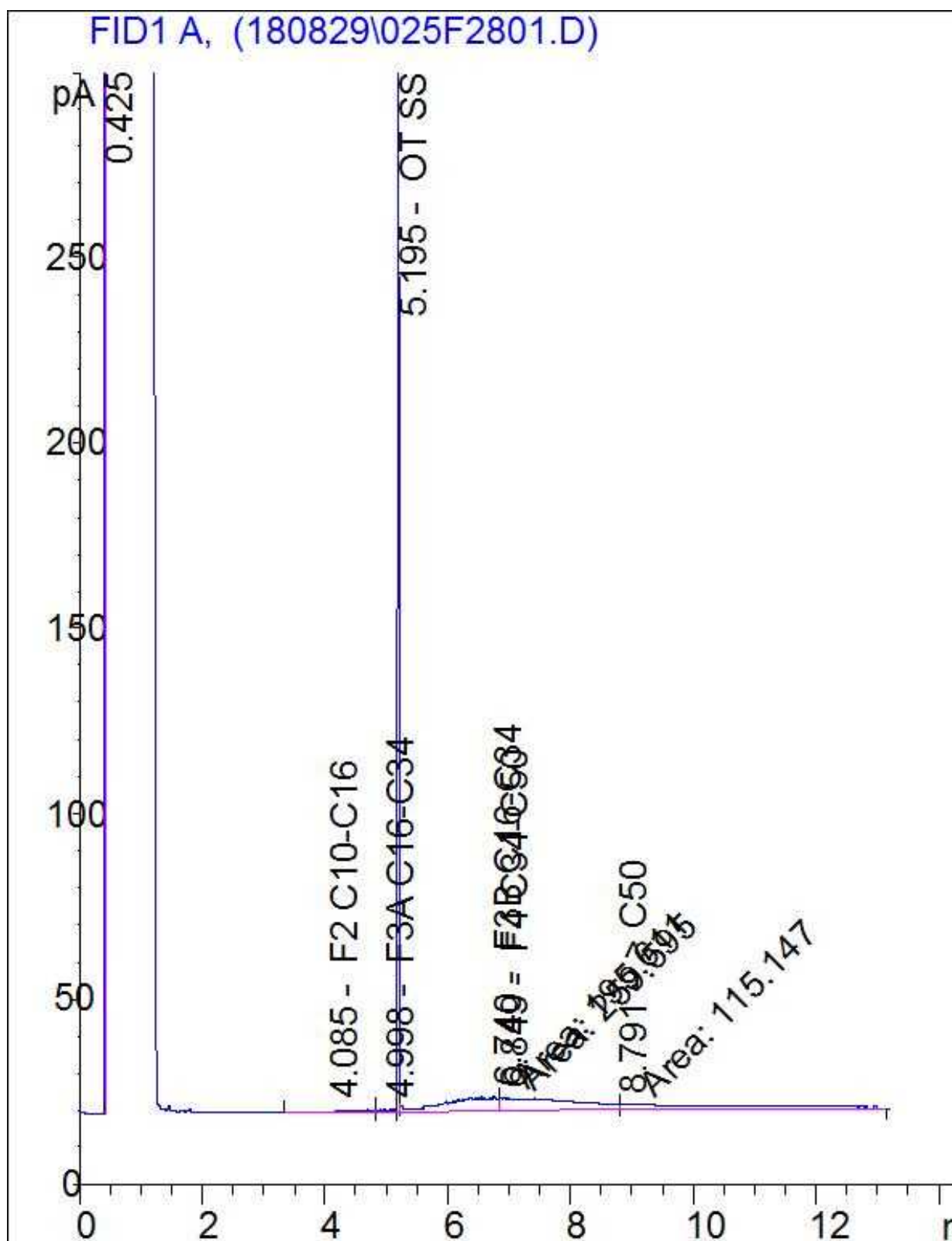
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



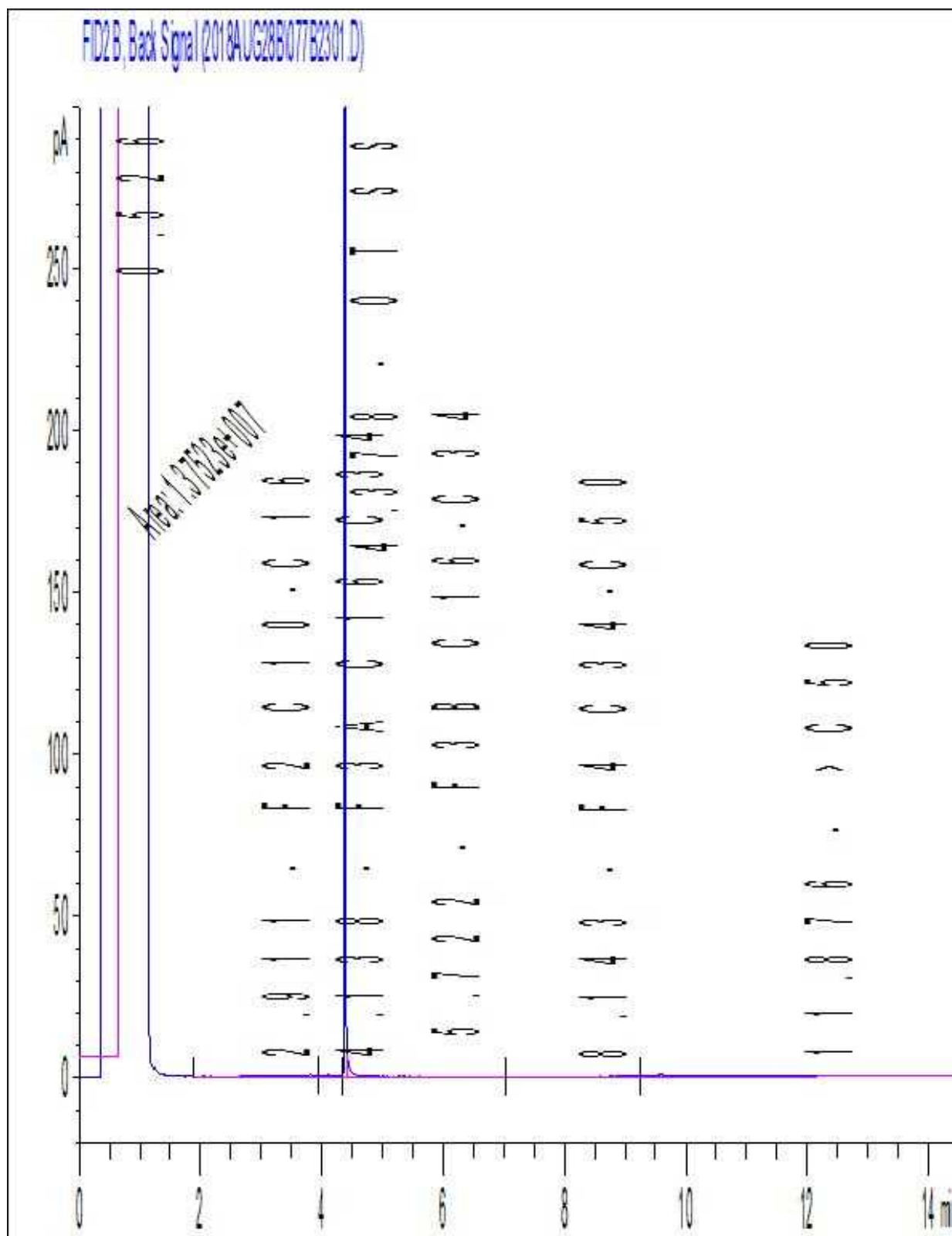
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



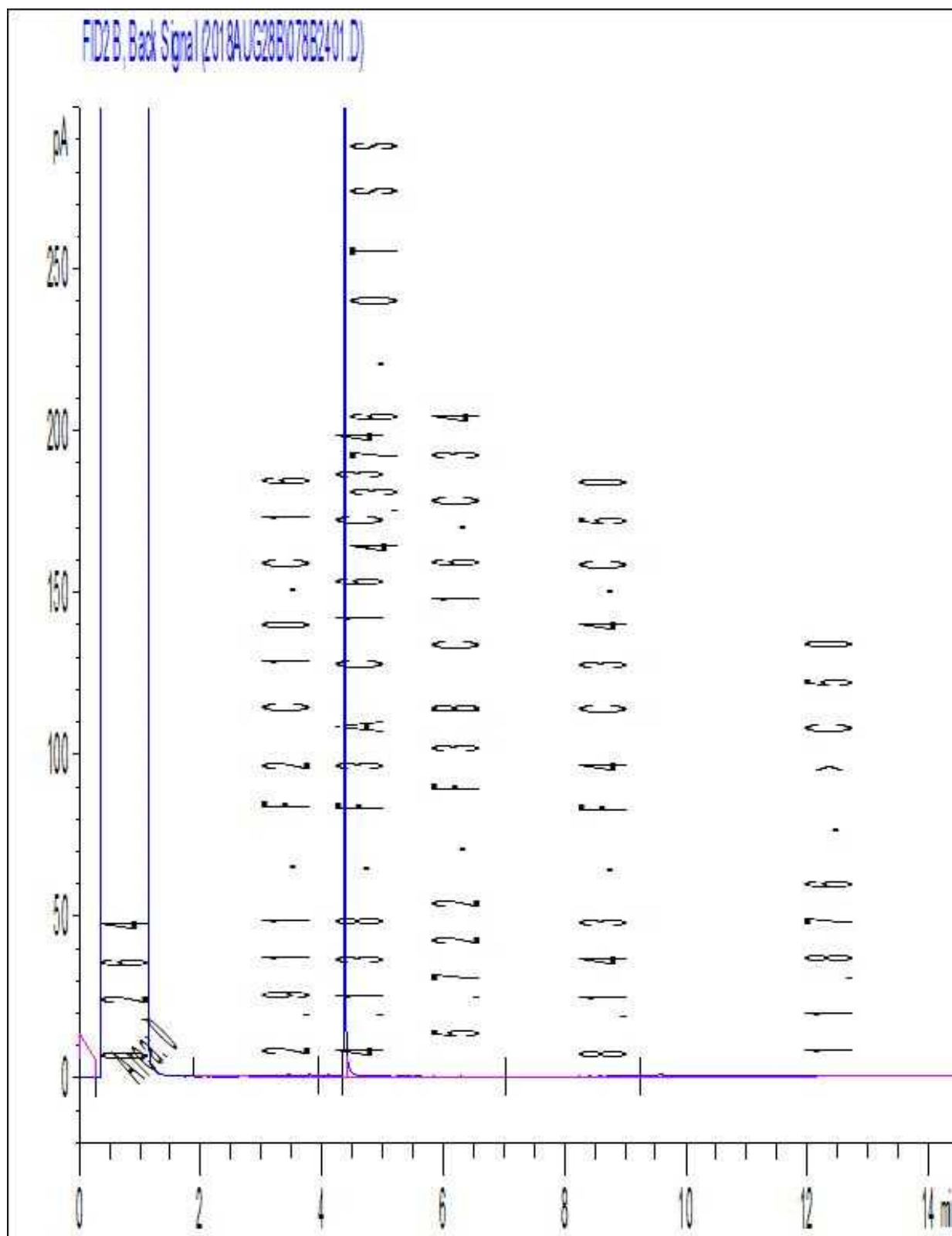
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



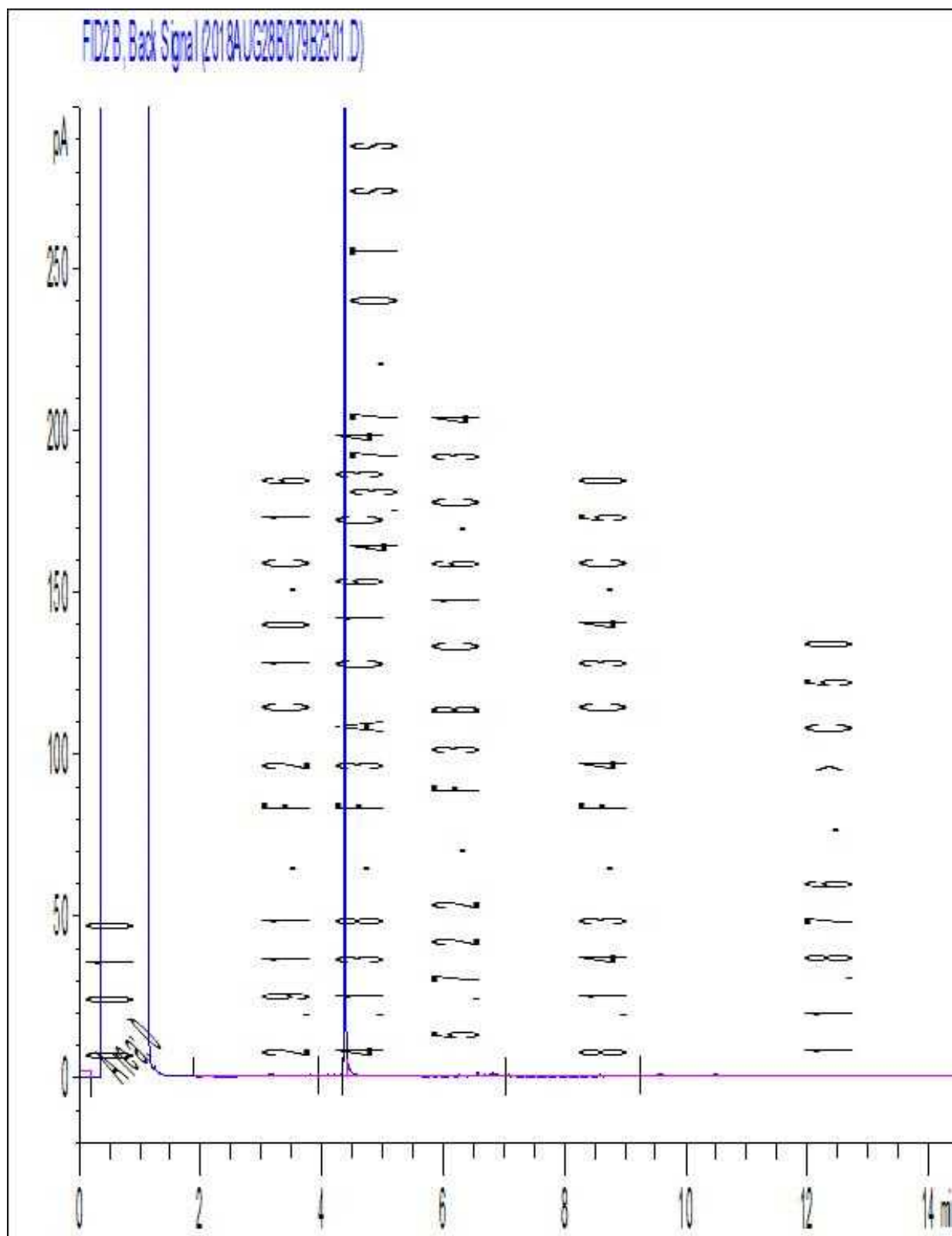
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



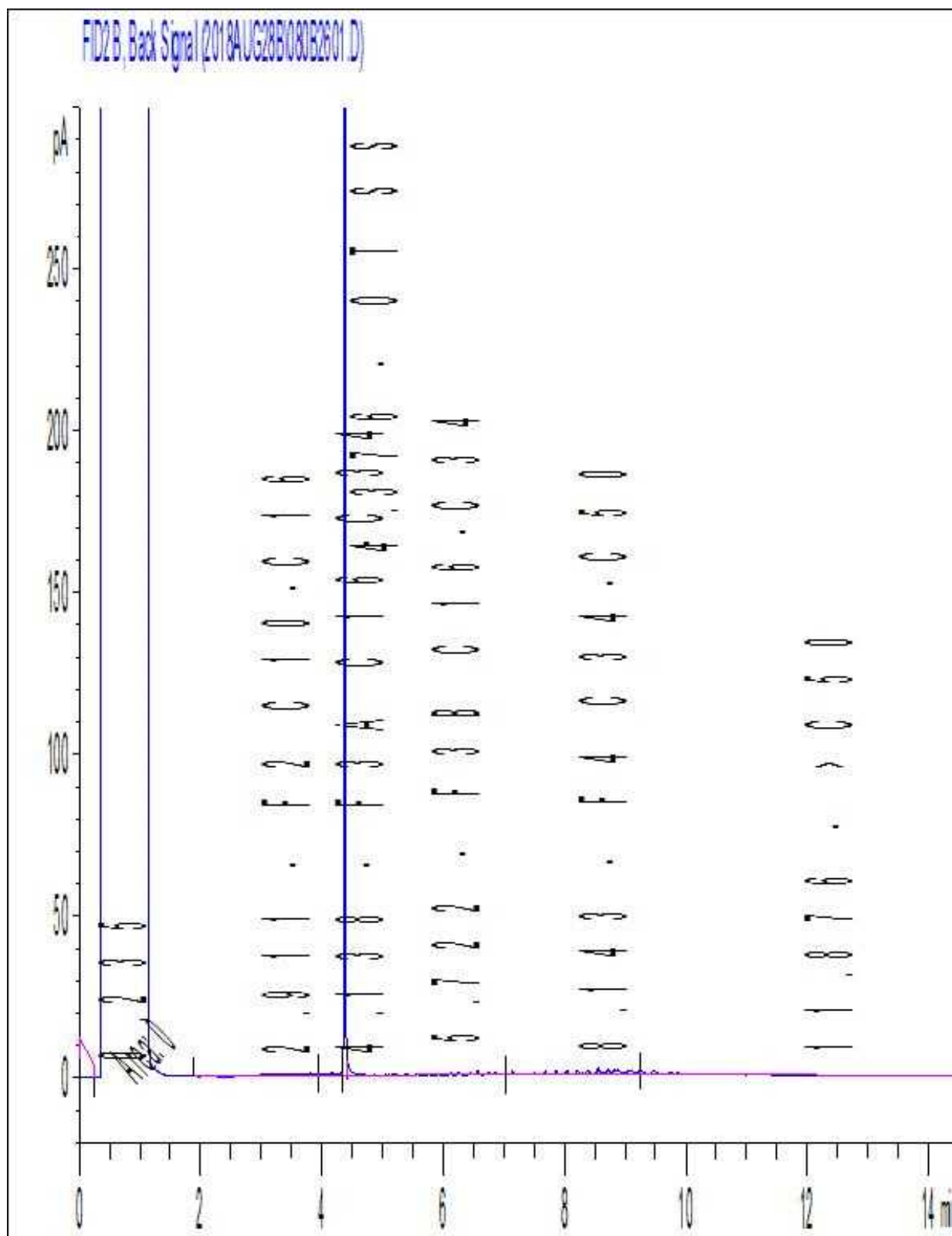
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



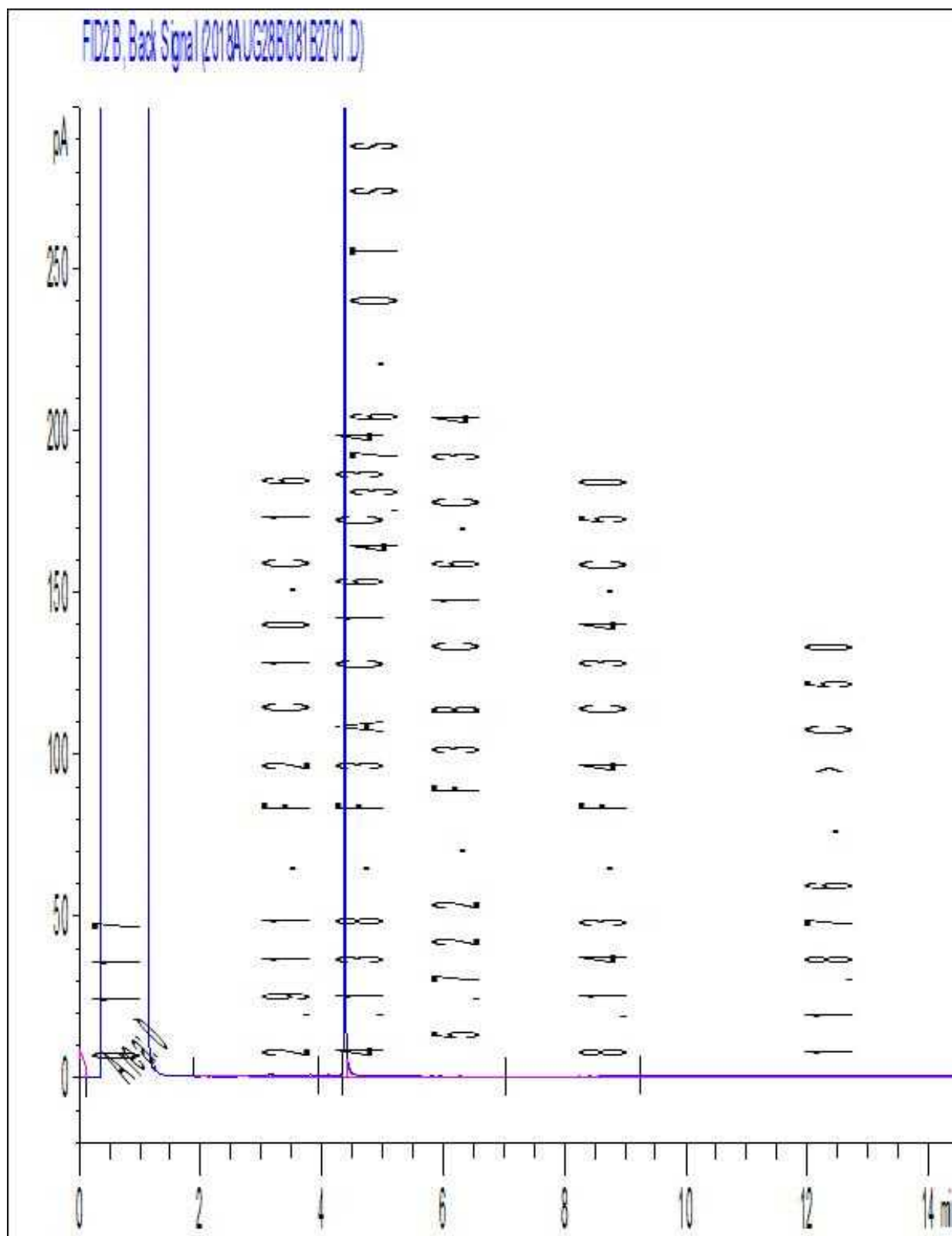
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



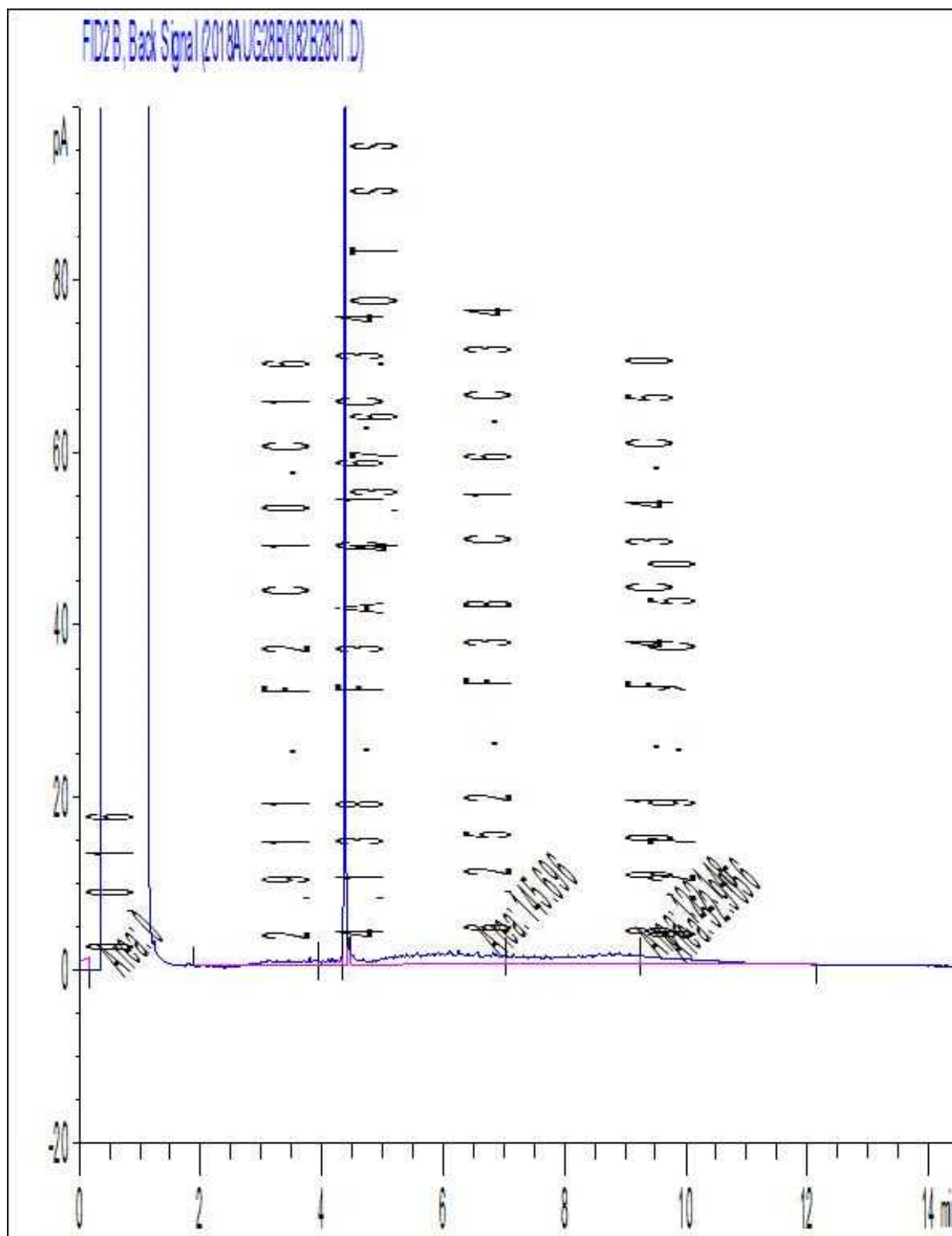
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



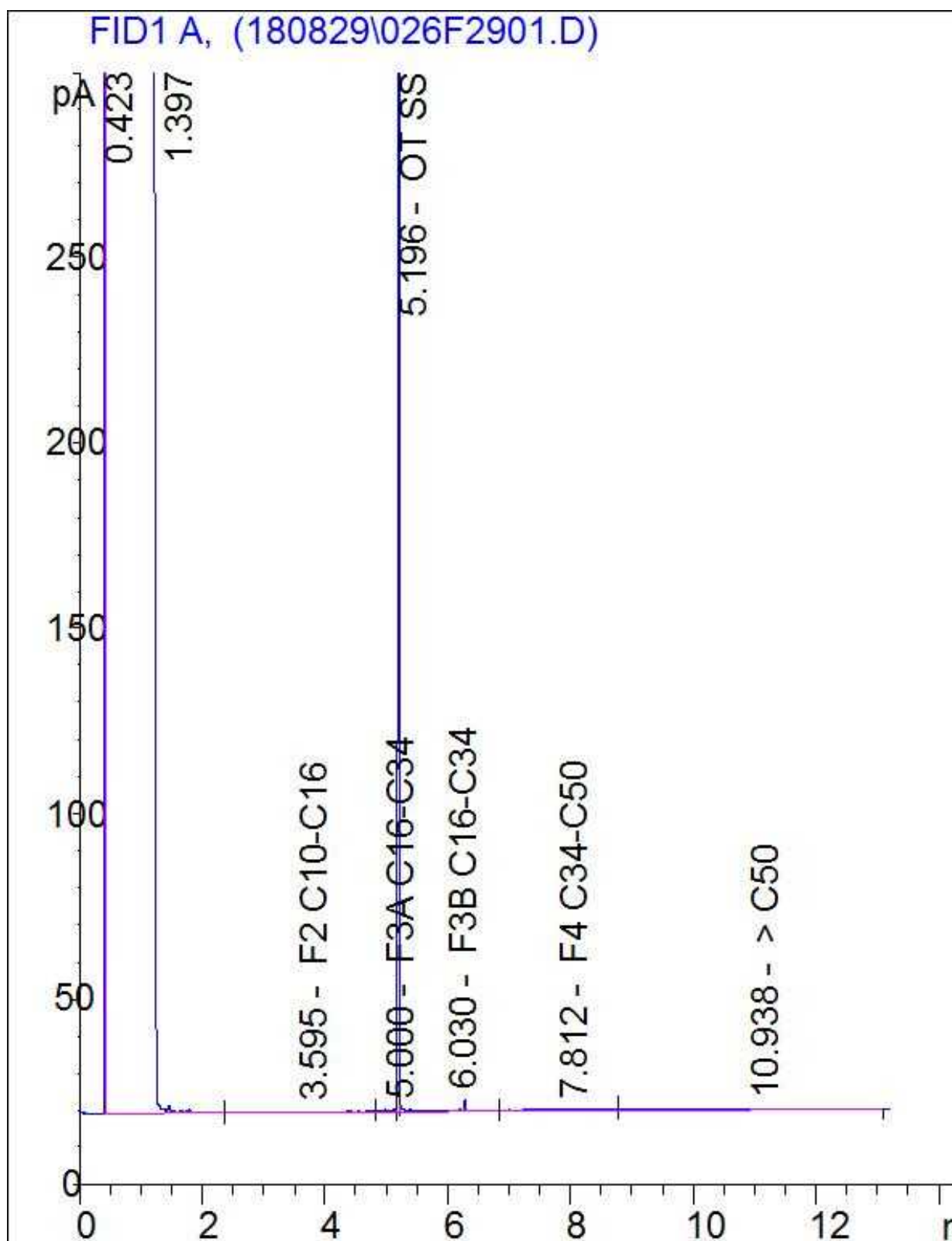
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



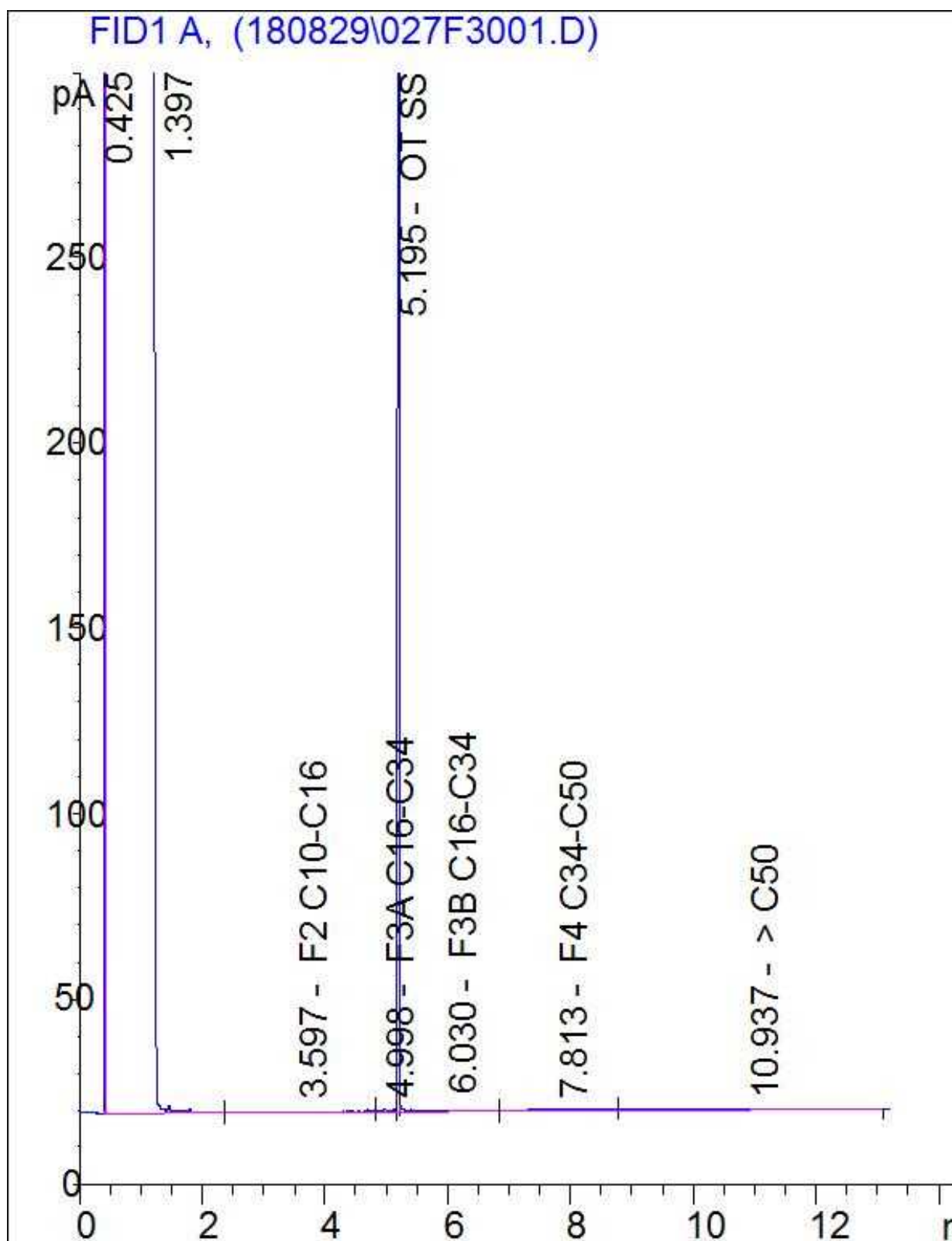
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



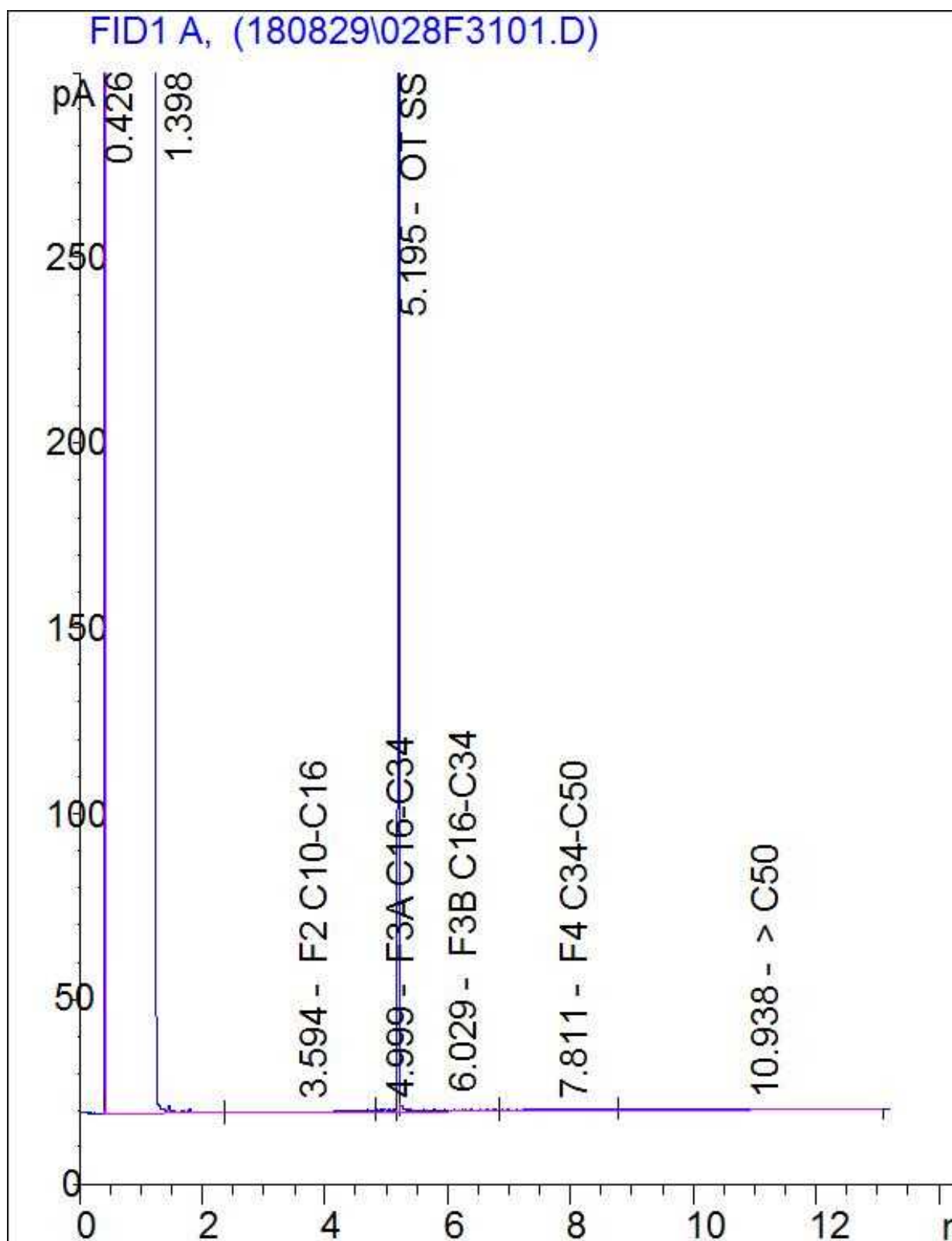
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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

Your Project #: 1543767
Your C.O.C. #: 680135-05-01

Attention: Erik Lalonde

Golder Associates Ltd
1931 Robertson Rd
Ottawa, ON
CANADA K2H 5B7

Report Date: 2018/08/31

Report #: R5382302

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8M3256

Received: 2018/08/28, 17:15

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	6	N/A	2018/08/31	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum (1)	8	N/A	2018/08/31		EPA 8260C m
Chromium (VI) in Water (1)	6	N/A	2018/08/29	CAM SOP-00436	EPA 7199 m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	6	2018/08/30	2018/08/31	CAM SOP-00316	CCME PHC-CWS m
Mercury (1)	6	2018/08/29	2018/08/30	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS (1)	6	N/A	2018/08/29	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM) (1)	6	2018/08/30	2018/08/31	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs (1)	6	N/A	2018/08/30	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds in Water (1)	2	N/A	2018/08/31	CAM SOP-00228	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

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

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

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

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

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

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

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

Your Project #: 1543767
Your C.O.C. #: 680135-05-01

Attention: Erik Lalonde

Golder Associates Ltd
1931 Robertson Rd
Ottawa, ON
CANADA K2H 5B7

Report Date: 2018/08/31

Report #: R5382302

Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8M3256

Received: 2018/08/28, 17:15

(1) This test was performed by Maxxam Analytics Mississauga

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Alisha Williamson, Project Manager

Email: AWilliamson@maxxam.ca

Phone# (613) 274-0573

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

O.REG 153 METALS PACKAGE (WATER)

Maxxam ID		HPH886	HPH887	HPH888	HPH889	HPH890	HPH891		
Sampling Date		2018/08/28 14:45	2018/08/28 14:45	2018/08/28 13:30	2018/08/28 12:15	2018/08/28 11:00	2018/08/28 10:20		
COC Number		680135-05-01	680135-05-01	680135-05-01	680135-05-01	680135-05-01	680135-05-01		
	UNITS	MW18-10	DUP-1	MW18-05	MW18-01	MW18-02	MW18-04	RDL	QC Batch

Metals									
Chromium (VI)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5700897
Mercury (Hg)	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	5705079
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5705331
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5705331
Dissolved Barium (Ba)	ug/L	250	250	71	82	250	160	2.0	5705331
Dissolved Beryllium (Be)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5705331
Dissolved Boron (B)	ug/L	28	29	44	52	36	46	10	5705331
Dissolved Cadmium (Cd)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5705331
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	5705331
Dissolved Cobalt (Co)	ug/L	9.3	9.3	0.94	<0.50	6.0	<0.50	0.50	5705331
Dissolved Copper (Cu)	ug/L	4.3	3.7	6.7	5.4	<1.0	1.7	1.0	5705331
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5705331
Dissolved Molybdenum (Mo)	ug/L	3.5	3.4	4.4	0.70	<0.50	1.2	0.50	5705331
Dissolved Nickel (Ni)	ug/L	7.4	7.5	1.9	1.3	1.8	1.3	1.0	5705331
Dissolved Selenium (Se)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5705331
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5705331
Dissolved Sodium (Na)	ug/L	32000	33000	140000	32000	440000	230000	100	5705331
Dissolved Thallium (Tl)	ug/L	0.068	0.064	<0.050	<0.050	<0.050	<0.050	0.050	5705331
Dissolved Uranium (U)	ug/L	1.5	1.4	1.5	0.62	0.29	0.65	0.10	5705331
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	<0.50	<0.50	2.0	<0.50	0.50	5705331
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	5.2	<5.0	<5.0	5.0	5705331

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Maxxam ID		HPH891		
Sampling Date		2018/08/28 10:20		
COC Number		680135-05-01		
	UNITS	MW18-04 Lab-Dup	RDL	QC Batch
Metals				
Chromium (VI)	ug/L	<0.50	0.50	5700897
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
Lab-Dup = Laboratory Initiated Duplicate				

O.REG 153 PAHS (WATER)

Maxxam ID		HPH886	HPH887	HPH888	HPH889	HPH890	HPH891		
Sampling Date		2018/08/28 14:45	2018/08/28 14:45	2018/08/28 13:30	2018/08/28 12:15	2018/08/28 11:00	2018/08/28 10:20		
COC Number		680135-05-01	680135-05-01	680135-05-01	680135-05-01	680135-05-01	680135-05-01		
	UNITS	MW18-10	DUP-1	MW18-05	MW18-01	MW18-02	MW18-04	RDL	QC Batch

Calculated Parameters

Methylnaphthalene, 2-(1-)	ug/L	7.3	8.1	<0.071	<0.071	<0.071	<0.071	0.071	5704889
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Polyaromatic Hydrocarbons

Acenaphthene	ug/L	0.81	0.85	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Acenaphthylene	ug/L	<0.050	0.058	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Benzo(a)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	5708207
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Chrysene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Fluoranthene	ug/L	0.13	0.13	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Fluorene	ug/L	0.77	0.79	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5708207
1-Methylnaphthalene	ug/L	3.9	4.2	<0.050	<0.050	<0.050	<0.050	0.050	5708207
2-Methylnaphthalene	ug/L	3.4	3.9	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Naphthalene	ug/L	5.0	5.4	<0.050	<0.050	<0.050	<0.050	0.050	5708207
Phenanthrene	ug/L	0.22	0.23	<0.030	<0.030	<0.030	<0.030	0.030	5708207
Pyrene	ug/L	0.11	0.11	<0.050	<0.050	<0.050	<0.050	0.050	5708207

Surrogate Recovery (%)

D10-Anthracene	%	102	103	106	107	98	114		5708207
D14-Terphenyl (FS)	%	94	94	100	101	92	100		5708207
D8-Acenaphthylene	%	121	123	93	96	91	96		5708207

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		HPH886	HPH887			HPH887		
Sampling Date		2018/08/28 14:45	2018/08/28 14:45			2018/08/28 14:45		
COC Number		680135-05-01	680135-05-01			680135-05-01		
	UNITS	MW18-10	DUP-1	RDL	QC Batch	DUP-1 Lab-Dup	RDL	QC Batch
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	0.50	5704692			
Volatile Organics								
Acetone (2-Propanone)	ug/L	11	13	10	5704612	15	10	5704612
Benzene	ug/L	0.67	0.68	0.20	5704612	0.65	0.20	5704612
Bromodichloromethane	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
Bromoform	ug/L	<1.0	<1.0	1.0	5704612	<1.0	1.0	5704612
Bromomethane	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
Carbon Tetrachloride	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
Chlorobenzene	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
Chloroform	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
Dibromochloromethane	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	1.0	5704612	<1.0	1.0	5704612
1,1-Dichloroethane	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
1,2-Dichloroethane	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
1,1-Dichloroethylene	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
1,2-Dichloropropane	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	0.30	5704612	<0.30	0.30	5704612
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	0.40	5704612	<0.40	0.40	5704612
Ethylbenzene	ug/L	17	19	0.20	5704612	18	0.20	5704612
Ethylene Dibromide	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
Hexane	ug/L	<1.0	<1.0	1.0	5704612	<1.0	1.0	5704612
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	2.0	5704612	<2.0	2.0	5704612
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	10	5704612	<10	10	5704612
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	5.0	5704612	<5.0	5.0	5704612
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
Styrene	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
Tetrachloroethylene	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								
Lab-Dup = Laboratory Initiated Duplicate								

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		HPH886	HPH887			HPH887		
Sampling Date		2018/08/28 14:45	2018/08/28 14:45			2018/08/28 14:45		
COC Number		680135-05-01	680135-05-01			680135-05-01		
	UNITS	MW18-10	DUP-1	RDL	QC Batch	DUP-1 Lab-Dup	RDL	QC Batch
Toluene	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
Trichloroethylene	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	0.50	5704612	<0.50	0.50	5704612
Vinyl Chloride	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
p+m-Xylene	ug/L	8.0	8.9	0.20	5704612	8.2	0.20	5704612
o-Xylene	ug/L	<0.20	<0.20	0.20	5704612	<0.20	0.20	5704612
Total Xylenes	ug/L	8.0	8.9	0.20	5704612	8.2	0.20	5704612
F1 (C6-C10)	ug/L	130	140	25	5704612	140	25	5704612
F1 (C6-C10) - BTEX	ug/L	100	110	25	5704612	120	25	5704612
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/L	1300	1300	100	5708184			
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	200	5708184			
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	200	5708184			
Reached Baseline at C50	ug/L	Yes	Yes		5708184			
Surrogate Recovery (%)								
o-Terphenyl	%	113	109		5708184			
4-Bromofluorobenzene	%	95	95		5704612	95		5704612
D4-1,2-Dichloroethane	%	104	99		5704612	102		5704612
D8-Toluene	%	92	96		5704612	92		5704612
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate								

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		HPH888	HPH889	HPH890	HPH891		
Sampling Date		2018/08/28 13:30	2018/08/28 12:15	2018/08/28 11:00	2018/08/28 10:20		
COC Number		680135-05-01	680135-05-01	680135-05-01	680135-05-01		
	UNITS	MW18-05	MW18-01	MW18-02	MW18-04	RDL	QC Batch
Calculated Parameters							
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704692
Volatile Organics							
Acetone (2-Propanone)	ug/L	<10	<10	<10	<10	10	5704612
Benzene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Bromodichloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5704612
Bromomethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
Carbon Tetrachloride	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Chlorobenzene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Chloroform	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Dibromochloromethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5704612
1,1-Dichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
1,2-Dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
1,1-Dichloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
1,2-Dichloropropane	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	<0.30	<0.30	0.30	5704612
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	5704612
Ethylbenzene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Hexane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5704612
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	5704612
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	<10	<10	10	5704612
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	5704612
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
Tetrachloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Toluene	ug/L	<0.20	<0.20	0.32	0.21	0.20	5704612
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Maxxam ID		HPH888	HPH889	HPH890	HPH891		
Sampling Date		2018/08/28 13:30	2018/08/28 12:15	2018/08/28 11:00	2018/08/28 10:20		
COC Number		680135-05-01	680135-05-01	680135-05-01	680135-05-01		
	UNITS	MW18-05	MW18-01	MW18-02	MW18-04	RDL	QC Batch
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
Trichloroethylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5704612
Vinyl Chloride	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
p+m-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
o-Xylene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
Total Xylenes	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	5704612
F1 (C6-C10)	ug/L	<25	<25	<25	<25	25	5704612
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	<25	25	5704612
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	100	5708184
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	200	5708184
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	200	5708184
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes		5708184
Surrogate Recovery (%)							
o-Terphenyl	%	109	112	103	104		5708184
4-Bromofluorobenzene	%	89	86	88	86		5704612
D4-1,2-Dichloroethane	%	102	103	106	105		5704612
D8-Toluene	%	93	93	92	92		5704612
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

O.REG 153 VOCs BY HS (WATER)

Maxxam ID		HPH884	HPH885		
Sampling Date		2018/08/28 14:00	2018/08/28		
COC Number		680135-05-01	680135-05-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Calculated Parameters					
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	<0.50	0.50	5706891
Volatile Organics					
Acetone (2-Propanone)	ug/L	<10	<10	10	5703193
Benzene	ug/L	<0.20	<0.20	0.20	5703193
Bromodichloromethane	ug/L	<0.50	<0.50	0.50	5703193
Bromoform	ug/L	<1.0	<1.0	1.0	5703193
Bromomethane	ug/L	<0.50	<0.50	0.50	5703193
Carbon Tetrachloride	ug/L	<0.20	<0.20	0.20	5703193
Chlorobenzene	ug/L	<0.20	<0.20	0.20	5703193
Chloroform	ug/L	<0.20	<0.20	0.20	5703193
Dibromochloromethane	ug/L	<0.50	<0.50	0.50	5703193
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5703193
1,3-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5703193
1,4-Dichlorobenzene	ug/L	<0.50	<0.50	0.50	5703193
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	<1.0	1.0	5703193
1,1-Dichloroethane	ug/L	<0.20	<0.20	0.20	5703193
1,2-Dichloroethane	ug/L	<0.50	<0.50	0.50	5703193
1,1-Dichloroethylene	ug/L	<0.20	<0.20	0.20	5703193
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	5703193
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	0.50	5703193
1,2-Dichloropropane	ug/L	<0.20	<0.20	0.20	5703193
cis-1,3-Dichloropropene	ug/L	<0.30	<0.30	0.30	5703193
trans-1,3-Dichloropropene	ug/L	<0.40	<0.40	0.40	5703193
Ethylbenzene	ug/L	<0.20	<0.20	0.20	5703193
Ethylene Dibromide	ug/L	<0.20	<0.20	0.20	5703193
Hexane	ug/L	<1.0	<1.0	1.0	5703193
Methylene Chloride(Dichloromethane)	ug/L	<2.0	<2.0	2.0	5703193
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	<10	10	5703193
Methyl Isobutyl Ketone	ug/L	<5.0	<5.0	5.0	5703193
Methyl t-butyl ether (MTBE)	ug/L	<0.50	<0.50	0.50	5703193
Styrene	ug/L	<0.50	<0.50	0.50	5703193
1,1,1,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	5703193
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	0.50	5703193
Tetrachloroethylene	ug/L	<0.20	<0.20	0.20	5703193
Toluene	ug/L	<0.20	<0.20	0.20	5703193
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

O.REG 153 VOCs BY HS (WATER)

Maxxam ID		HPH884	HPH885		
Sampling Date		2018/08/28 14:00	2018/08/28		
COC Number		680135-05-01	680135-05-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
1,1,1-Trichloroethane	ug/L	<0.20	<0.20	0.20	5703193
1,1,2-Trichloroethane	ug/L	<0.50	<0.50	0.50	5703193
Trichloroethylene	ug/L	<0.20	<0.20	0.20	5703193
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	<0.50	0.50	5703193
Vinyl Chloride	ug/L	<0.20	<0.20	0.20	5703193
p+m-Xylene	ug/L	<0.20	<0.20	0.20	5703193
o-Xylene	ug/L	<0.20	<0.20	0.20	5703193
Total Xylenes	ug/L	<0.20	<0.20	0.20	5703193
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	99	106		5703193
D4-1,2-Dichloroethane	%	120	123		5703193
D8-Toluene	%	97	99		5703193
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

TEST SUMMARY

Maxxam ID: HPH884
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5706891	N/A	2018/08/31	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	5703193	N/A	2018/08/31	Anna Gabrielyan

Maxxam ID: HPH885
Sample ID: TRIP BLANK
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	5706891	N/A	2018/08/31	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	5703193	N/A	2018/08/31	Anna Gabrielyan

Maxxam ID: HPH886
Sample ID: MW18-10
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5704889	N/A	2018/08/31	Automated Statchk
1,3-Dichloropropene Sum	CALC	5704692	N/A	2018/08/31	Automated Statchk
Chromium (VI) in Water	IC	5700897	N/A	2018/08/29	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5708184	2018/08/30	2018/08/31	Zhiyue (Frank) Zhu
Mercury	CV/AA	5705079	2018/08/29	2018/08/30	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5705331	N/A	2018/08/29	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5708207	2018/08/30	2018/08/31	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5704612	N/A	2018/08/30	Denis Reid

Maxxam ID: HPH887
Sample ID: DUP-1
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5704889	N/A	2018/08/31	Automated Statchk
1,3-Dichloropropene Sum	CALC	5704692	N/A	2018/08/31	Automated Statchk
Chromium (VI) in Water	IC	5700897	N/A	2018/08/29	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5708184	2018/08/30	2018/08/31	Zhiyue (Frank) Zhu
Mercury	CV/AA	5705079	2018/08/29	2018/08/30	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5705331	N/A	2018/08/29	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5708207	2018/08/30	2018/08/31	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5704612	N/A	2018/08/30	Denis Reid

Maxxam ID: HPH887 Dup
Sample ID: DUP-1
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5704612	N/A	2018/08/30	Denis Reid

TEST SUMMARY

Maxxam ID: HPH888
Sample ID: MW18-05
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5704889	N/A	2018/08/31	Automated Statchk
1,3-Dichloropropene Sum	CALC	5704692	N/A	2018/08/31	Automated Statchk
Chromium (VI) in Water	IC	5700897	N/A	2018/08/29	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5708184	2018/08/30	2018/08/31	Zhiyue (Frank) Zhu
Mercury	CV/AA	5705079	2018/08/29	2018/08/30	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5705331	N/A	2018/08/29	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5708207	2018/08/30	2018/08/31	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5704612	N/A	2018/08/30	Denis Reid

Maxxam ID: HPH889
Sample ID: MW18-01
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5704889	N/A	2018/08/31	Automated Statchk
1,3-Dichloropropene Sum	CALC	5704692	N/A	2018/08/31	Automated Statchk
Chromium (VI) in Water	IC	5700897	N/A	2018/08/29	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5708184	2018/08/30	2018/08/31	Zhiyue (Frank) Zhu
Mercury	CV/AA	5705079	2018/08/29	2018/08/30	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5705331	N/A	2018/08/29	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5708207	2018/08/30	2018/08/31	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5704612	N/A	2018/08/30	Denis Reid

Maxxam ID: HPH890
Sample ID: MW18-02
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5704889	N/A	2018/08/31	Automated Statchk
1,3-Dichloropropene Sum	CALC	5704692	N/A	2018/08/31	Automated Statchk
Chromium (VI) in Water	IC	5700897	N/A	2018/08/29	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5708184	2018/08/30	2018/08/31	Zhiyue (Frank) Zhu
Mercury	CV/AA	5705079	2018/08/29	2018/08/30	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5705331	N/A	2018/08/29	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5708207	2018/08/30	2018/08/31	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5704612	N/A	2018/08/30	Denis Reid

Maxxam ID: HPH891
Sample ID: MW18-04
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5704889	N/A	2018/08/31	Automated Statchk
1,3-Dichloropropene Sum	CALC	5704692	N/A	2018/08/31	Automated Statchk
Chromium (VI) in Water	IC	5700897	N/A	2018/08/29	Lang Le
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5708184	2018/08/30	2018/08/31	Zhiyue (Frank) Zhu

Maxxam Job #: B8M3256
Report Date: 2018/08/31

Golder Associates Ltd
Client Project #: 1543767
Sampler Initials: EL

TEST SUMMARY

Maxxam ID: HPH891
Sample ID: MW18-04
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5705079	2018/08/29	2018/08/30	Ron Morrison
Dissolved Metals by ICPMS	ICP/MS	5705331	N/A	2018/08/29	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5708207	2018/08/30	2018/08/31	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5704612	N/A	2018/08/30	Denis Reid

Maxxam ID: HPH891 Dup
Sample ID: MW18-04
Matrix: Water

Collected: 2018/08/28
Shipped:
Received: 2018/08/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chromium (VI) in Water	IC	5700897	N/A	2018/08/29	Lang Le

GENERAL COMMENTS

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

Package 1	15.7°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

Golder Associates Ltd
Client Project #: 1543767
Sampler Initials: EL

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5703193	4-Bromofluorobenzene	2018/08/29	99	70 - 130	102	70 - 130	99	%		
5703193	D4-1,2-Dichloroethane	2018/08/29	121	70 - 130	110	70 - 130	113	%		
5703193	D8-Toluene	2018/08/29	102	70 - 130	98	70 - 130	100	%		
5704612	4-Bromofluorobenzene	2018/08/30	101	70 - 130	98	70 - 130	86	%		
5704612	D4-1,2-Dichloroethane	2018/08/30	101	70 - 130	102	70 - 130	105	%		
5704612	D8-Toluene	2018/08/30	100	70 - 130	103	70 - 130	92	%		
5708184	o-Terphenyl	2018/08/31	112	60 - 130	114	60 - 130	111	%		
5708207	D10-Anthracene	2018/08/30	106	50 - 130	105	50 - 130	104	%		
5708207	D14-Terphenyl (FS)	2018/08/30	100	50 - 130	94	50 - 130	91	%		
5708207	D8-Acenaphthylene	2018/08/30	101	50 - 130	98	50 - 130	90	%		
5700897	Chromium (VI)	2018/08/29	100	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
5703193	1,1,1,2-Tetrachloroethane	2018/08/29	99	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
5703193	1,1,1-Trichloroethane	2018/08/29	101	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
5703193	1,1,2,2-Tetrachloroethane	2018/08/29	112	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
5703193	1,1,2-Trichloroethane	2018/08/29	119	70 - 130	87	70 - 130	<0.50	ug/L	NC	30
5703193	1,1-Dichloroethane	2018/08/29	104	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5703193	1,1-Dichloroethylene	2018/08/29	103	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5703193	1,2-Dichlorobenzene	2018/08/29	98	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
5703193	1,2-Dichloroethane	2018/08/29	119	70 - 130	110	70 - 130	<0.50	ug/L	NC	30
5703193	1,2-Dichloropropane	2018/08/29	104	70 - 130	108	70 - 130	<0.20	ug/L	NC	30
5703193	1,3-Dichlorobenzene	2018/08/29	95	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
5703193	1,4-Dichlorobenzene	2018/08/29	96	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
5703193	Acetone (2-Propanone)	2018/08/29	141 (1)	60 - 140	113	60 - 140	<10	ug/L	NC	30
5703193	Benzene	2018/08/29	96	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5703193	Bromodichloromethane	2018/08/29	106	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
5703193	Bromoform	2018/08/29	103	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
5703193	Bromomethane	2018/08/29	97	60 - 140	91	60 - 140	<0.50	ug/L	NC	30
5703193	Carbon Tetrachloride	2018/08/29	97	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
5703193	Chlorobenzene	2018/08/29	97	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
5703193	Chloroform	2018/08/29	103	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
5703193	cis-1,2-Dichloroethylene	2018/08/29	107	70 - 130	102	70 - 130	<0.50	ug/L	0.65	30

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Client Project #: 1543767
Sampler Initials: EL

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5703193	cis-1,3-Dichloropropene	2018/08/29	106	70 - 130	94	70 - 130	<0.30	ug/L	NC	30
5703193	Dibromochloromethane	2018/08/29	102	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
5703193	Dichlorodifluoromethane (FREON 12)	2018/08/29	108	60 - 140	117	60 - 140	<1.0	ug/L	NC	30
5703193	Ethylbenzene	2018/08/29	97	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5703193	Ethylene Dibromide	2018/08/29	102	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5703193	Hexane	2018/08/29	99	70 - 130	101	70 - 130	<1.0	ug/L	NC	30
5703193	Methyl Ethyl Ketone (2-Butanone)	2018/08/29	137	60 - 140	114	60 - 140	<10	ug/L	NC	30
5703193	Methyl Isobutyl Ketone	2018/08/29	130	70 - 130	89	70 - 130	<5.0	ug/L	NC	30
5703193	Methyl t-butyl ether (MTBE)	2018/08/29	103	70 - 130	96	70 - 130	<0.50	ug/L	NC	30
5703193	Methylene Chloride(Dichloromethane)	2018/08/29	93	70 - 130	86	70 - 130	<2.0	ug/L	NC	30
5703193	o-Xylene	2018/08/29	96	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5703193	p+m-Xylene	2018/08/29	95	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5703193	Styrene	2018/08/29	99	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
5703193	Tetrachloroethylene	2018/08/29	91	70 - 130	104	70 - 130	<0.20	ug/L	NC	30
5703193	Toluene	2018/08/29	95	70 - 130	93	70 - 130	<0.20	ug/L	NC	30
5703193	Total Xylenes	2018/08/29					<0.20	ug/L	NC	30
5703193	trans-1,2-Dichloroethylene	2018/08/29	105	70 - 130	101	70 - 130	<0.50	ug/L	2.5	30
5703193	trans-1,3-Dichloropropene	2018/08/29	111	70 - 130	87	70 - 130	<0.40	ug/L	NC	30
5703193	Trichloroethylene	2018/08/29	93	70 - 130	107	70 - 130	<0.20	ug/L	NC	30
5703193	Trichlorofluoromethane (FREON 11)	2018/08/29	101	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
5703193	Vinyl Chloride	2018/08/29	100	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
5704612	1,1,1,2-Tetrachloroethane	2018/08/30	105	70 - 130	101	70 - 130	<0.50	ug/L	NC	30
5704612	1,1,1-Trichloroethane	2018/08/30	106	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
5704612	1,1,2,2-Tetrachloroethane	2018/08/30	98	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
5704612	1,1,2-Trichloroethane	2018/08/30	96	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
5704612	1,1-Dichloroethane	2018/08/30	99	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
5704612	1,1-Dichloroethylene	2018/08/30	98	70 - 130	89	70 - 130	<0.20	ug/L	NC	30
5704612	1,2-Dichlorobenzene	2018/08/30	101	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
5704612	1,2-Dichloroethane	2018/08/30	96	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
5704612	1,2-Dichloropropane	2018/08/30	92	70 - 130	87	70 - 130	<0.20	ug/L	NC	30
5704612	1,3-Dichlorobenzene	2018/08/30	107	70 - 130	101	70 - 130	<0.50	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Client Project #: 1543767
Sampler Initials: EL

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5704612	1,4-Dichlorobenzene	2018/08/30	99	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
5704612	Acetone (2-Propanone)	2018/08/30	82	60 - 140	77	60 - 140	<10	ug/L	15	30
5704612	Benzene	2018/08/30	96	70 - 130	90	70 - 130	<0.20	ug/L	5.9	30
5704612	Bromodichloromethane	2018/08/30	101	70 - 130	97	70 - 130	<0.50	ug/L	NC	30
5704612	Bromoform	2018/08/30	99	70 - 130	98	70 - 130	<1.0	ug/L	NC	30
5704612	Bromomethane	2018/08/30	110	60 - 140	96	60 - 140	<0.50	ug/L	NC	30
5704612	Carbon Tetrachloride	2018/08/30	111	70 - 130	101	70 - 130	<0.20	ug/L	NC	30
5704612	Chlorobenzene	2018/08/30	95	70 - 130	90	70 - 130	<0.20	ug/L	NC	30
5704612	Chloroform	2018/08/30	102	70 - 130	96	70 - 130	<0.20	ug/L	NC	30
5704612	cis-1,2-Dichloroethylene	2018/08/30	101	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
5704612	cis-1,3-Dichloropropene	2018/08/30	93	70 - 130	83	70 - 130	<0.30	ug/L	NC	30
5704612	Dibromochloromethane	2018/08/30	101	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
5704612	Dichlorodifluoromethane (FREON 12)	2018/08/30	113	60 - 140	103	60 - 140	<1.0	ug/L	NC	30
5704612	Ethylbenzene	2018/08/30	100	70 - 130	84	70 - 130	<0.20	ug/L	7.6	30
5704612	Ethylene Dibromide	2018/08/30	95	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
5704612	F1 (C6-C10) - BTEX	2018/08/30					<25	ug/L	1.9	30
5704612	F1 (C6-C10)	2018/08/30	88	60 - 140	99	60 - 140	<25	ug/L	0.0092	30
5704612	Hexane	2018/08/30	94	70 - 130	85	70 - 130	<1.0	ug/L	NC	30
5704612	Methyl Ethyl Ketone (2-Butanone)	2018/08/30	79	60 - 140	76	60 - 140	<10	ug/L	NC	30
5704612	Methyl Isobutyl Ketone	2018/08/30	76	70 - 130	75	70 - 130	<5.0	ug/L	NC	30
5704612	Methyl t-butyl ether (MTBE)	2018/08/30	85	70 - 130	83	70 - 130	<0.50	ug/L	NC	30
5704612	Methylene Chloride(Dichloromethane)	2018/08/30	95	70 - 130	91	70 - 130	<2.0	ug/L	NC	30
5704612	o-Xylene	2018/08/30	92	70 - 130	85	70 - 130	<0.20	ug/L	NC	30
5704612	p+m-Xylene	2018/08/30	95	70 - 130	82	70 - 130	<0.20	ug/L	8.8	30
5704612	Styrene	2018/08/30	92	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
5704612	Tetrachloroethylene	2018/08/30	106	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
5704612	Toluene	2018/08/30	93	70 - 130	88	70 - 130	<0.20	ug/L	NC	30
5704612	Total Xylenes	2018/08/30					<0.20	ug/L	8.8	30
5704612	trans-1,2-Dichloroethylene	2018/08/30	102	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
5704612	trans-1,3-Dichloropropene	2018/08/30	97	70 - 130	85	70 - 130	<0.40	ug/L	NC	30
5704612	Trichloroethylene	2018/08/30	104	70 - 130	96	70 - 130	<0.20	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Client Project #: 1543767
Sampler Initials: EL

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5704612	Trichlorofluoromethane (FREON 11)	2018/08/30	114	70 - 130	104	70 - 130	<0.50	ug/L	NC	30
5704612	Vinyl Chloride	2018/08/30	97	70 - 130	88	70 - 130	<0.20	ug/L	NC	30
5705079	Mercury (Hg)	2018/08/30	97	75 - 125	93	80 - 120	<0.1	ug/L	NC	20
5705331	Dissolved Antimony (Sb)	2018/08/29	104	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
5705331	Dissolved Arsenic (As)	2018/08/29	99	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
5705331	Dissolved Barium (Ba)	2018/08/29	98	80 - 120	96	80 - 120	<2.0	ug/L	1.4	20
5705331	Dissolved Beryllium (Be)	2018/08/29	104	80 - 120	106	80 - 120	<0.50	ug/L	NC	20
5705331	Dissolved Boron (B)	2018/08/29	100	80 - 120	99	80 - 120	<10	ug/L	6.4	20
5705331	Dissolved Cadmium (Cd)	2018/08/29	102	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
5705331	Dissolved Chromium (Cr)	2018/08/29	93	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
5705331	Dissolved Cobalt (Co)	2018/08/29	101	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
5705331	Dissolved Copper (Cu)	2018/08/29	101	80 - 120	102	80 - 120	<1.0	ug/L	0.40	20
5705331	Dissolved Lead (Pb)	2018/08/29	101	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
5705331	Dissolved Molybdenum (Mo)	2018/08/29	106	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
5705331	Dissolved Nickel (Ni)	2018/08/29	97	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
5705331	Dissolved Selenium (Se)	2018/08/29	104	80 - 120	103	80 - 120	<2.0	ug/L	NC	20
5705331	Dissolved Silver (Ag)	2018/08/29	88	80 - 120	96	80 - 120	<0.10	ug/L	NC	20
5705331	Dissolved Sodium (Na)	2018/08/29	99	80 - 120	99	80 - 120	<100	ug/L	0.028	20
5705331	Dissolved Thallium (Tl)	2018/08/29	98	80 - 120	98	80 - 120	<0.050	ug/L	NC	20
5705331	Dissolved Uranium (U)	2018/08/29	99	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
5705331	Dissolved Vanadium (V)	2018/08/29	97	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
5705331	Dissolved Zinc (Zn)	2018/08/29	99	80 - 120	99	80 - 120	<5.0	ug/L	1.1	20
5708184	F2 (C10-C16 Hydrocarbons)	2018/08/31	109	50 - 130	109	60 - 130	<100	ug/L	NC	30
5708184	F3 (C16-C34 Hydrocarbons)	2018/08/31	108	50 - 130	110	60 - 130	<200	ug/L	NC	30
5708184	F4 (C34-C50 Hydrocarbons)	2018/08/31	106	50 - 130	107	60 - 130	<200	ug/L	NC	30
5708207	1-Methylnaphthalene	2018/08/31	115	50 - 130	107	50 - 130	<0.050	ug/L	NC	30
5708207	2-Methylnaphthalene	2018/08/31	91	50 - 130	88	50 - 130	<0.050	ug/L	NC	30
5708207	Acenaphthene	2018/08/31	96	50 - 130	92	50 - 130	<0.050	ug/L	NC	30
5708207	Acenaphthylene	2018/08/31	92	50 - 130	87	50 - 130	<0.050	ug/L	NC	30
5708207	Anthracene	2018/08/31	90	50 - 130	89	50 - 130	<0.050	ug/L	NC	30
5708207	Benzo(a)anthracene	2018/08/31	97	50 - 130	95	50 - 130	<0.050	ug/L	NC	30

QUALITY ASSURANCE REPORT(CONT'D)

Golder Associates Ltd
Client Project #: 1543767
Sampler Initials: EL

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5708207	Benzo(a)pyrene	2018/08/31	95	50 - 130	93	50 - 130	<0.010	ug/L	NC	30
5708207	Benzo(b,j)fluoranthene	2018/08/31	99	50 - 130	95	50 - 130	<0.050	ug/L	NC	30
5708207	Benzo(g,h,i)perylene	2018/08/31	89	50 - 130	87	50 - 130	<0.050	ug/L	NC	30
5708207	Benzo(k)fluoranthene	2018/08/31	93	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5708207	Chrysene	2018/08/31	95	50 - 130	94	50 - 130	<0.050	ug/L	NC	30
5708207	Dibenz(a,h)anthracene	2018/08/31	79	50 - 130	80	50 - 130	<0.050	ug/L	NC	30
5708207	Fluoranthene	2018/08/31	110	50 - 130	105	50 - 130	<0.050	ug/L	NC	30
5708207	Fluorene	2018/08/31	96	50 - 130	90	50 - 130	<0.050	ug/L	NC	30
5708207	Indeno(1,2,3-cd)pyrene	2018/08/31	94	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5708207	Naphthalene	2018/08/31	92	50 - 130	89	50 - 130	<0.050	ug/L	NC	30
5708207	Phenanthrene	2018/08/31	101	50 - 130	96	50 - 130	<0.030	ug/L	NC	30
5708207	Pyrene	2018/08/31	108	50 - 130	104	50 - 130	<0.050	ug/L	NC	30

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

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

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

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

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

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

(1) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

VALIDATION SIGNATURE PAGE

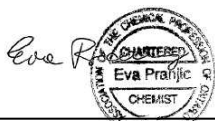
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist



Cristina Carriere, Scientific Service Specialist

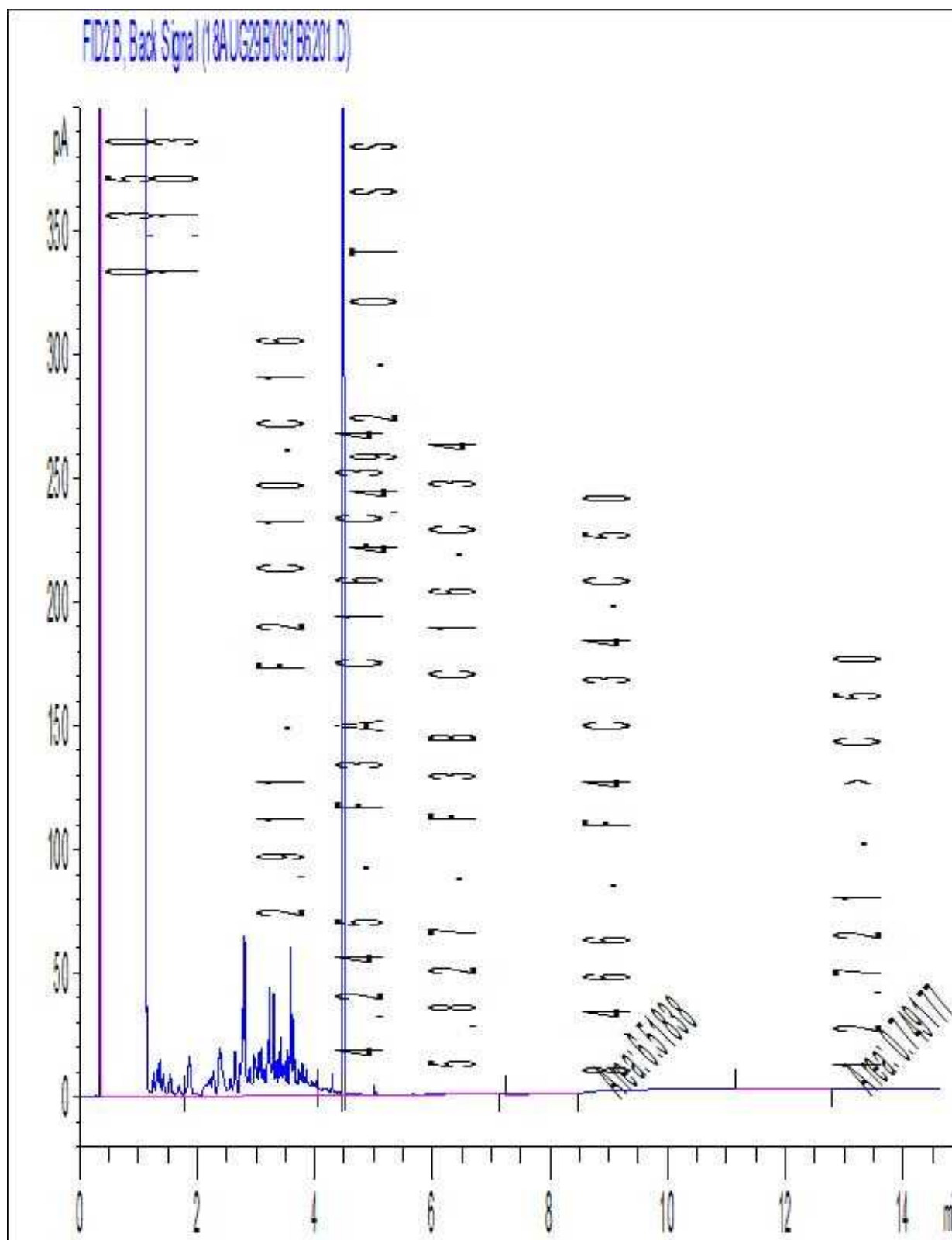


Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

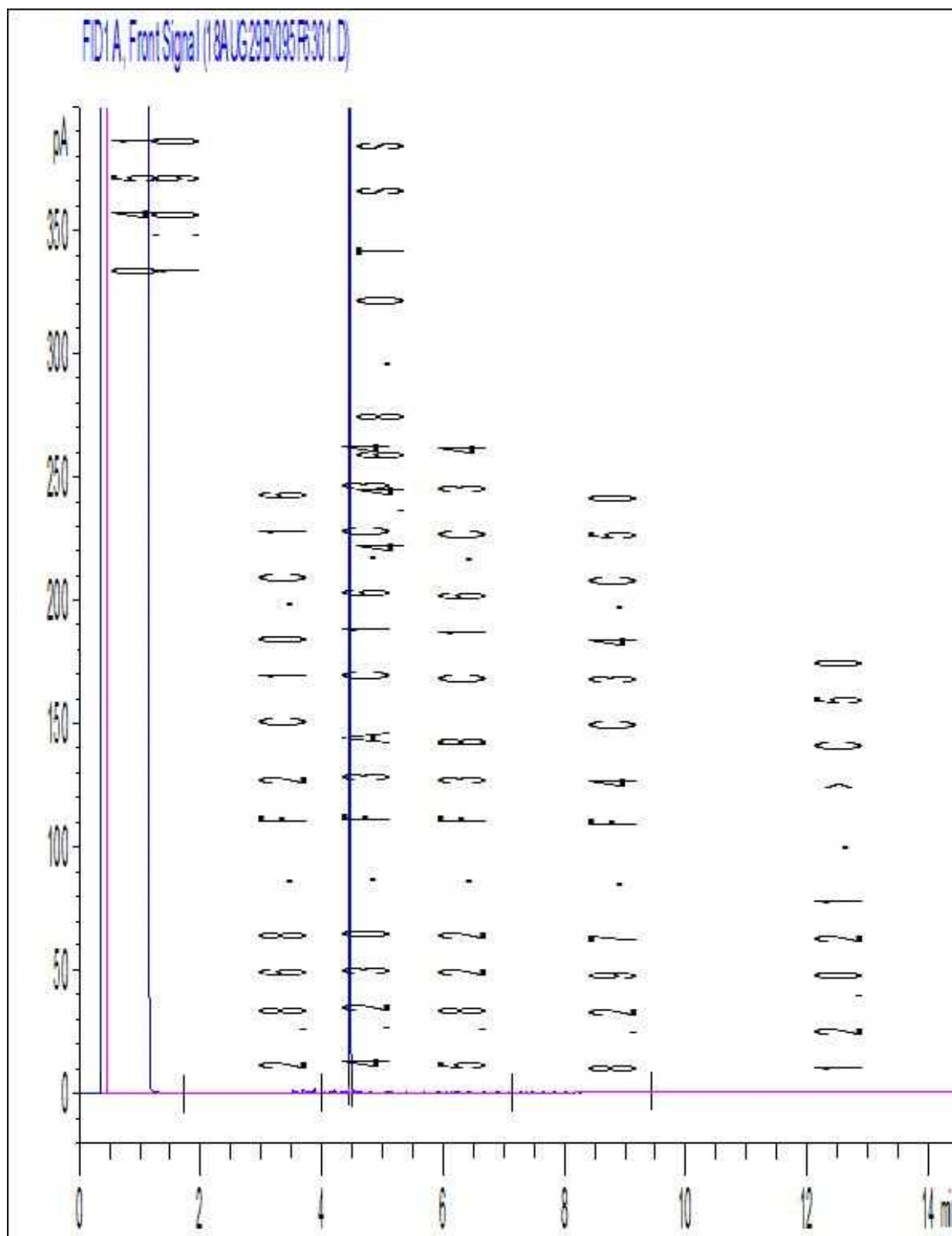
<div style="display: flex; justify-content: space-between;"> <div> MAXXAM <small>Maxxam Analytics International Corporation c/o Maxxam Analytics 6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca</small> </div> <div> CHAIN OF CUSTODY RECORD Page 1 of 1 </div> </div>																			
INVOICE TO:			REPORT TO:			PROJECT INFORMATION:			Laboratory Use Only:										
Company Name: #14090 Golder Associates Ltd Attention: Accounts Payable Address: 1931 Robertson Rd Ottawa ON K2H 5B7 Tel: (613) 592-9600 Fax: (613) 592-9601 Email: AP_CustomerService@golder.com			Company Name: Attention: Erik Lalonde Address: Tel: Email: Erik.Lalonde@golder.com			Quotation #: B80683 P.O. #: Project: 1543767 Project Name: Site #: Sampled By:			Maxxam Job #: Bottle Order #: COC #: Project Manager: Jonathan Urban										
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)													
<div style="display: flex; justify-content: space-between;"> <div> Regulation 153 (2011) <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input checked="" type="checkbox"/> Table 2 <input checked="" type="checkbox"/> Ind/Comm <input checked="" type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table </div> <div> Other Regulations <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA <input type="checkbox"/> Municipality <input type="checkbox"/> PWQO <input type="checkbox"/> Other </div> <div> Special Instructions </div> </div>						<div style="display: flex; justify-content: space-between;"> <div> Field Filtered (please circle): Metals / Hg / Cr / VI </div> <div> <input type="checkbox"/> O Reg 153 Metals Package (Water) <input type="checkbox"/> O Reg 153 Petroleum Hydrocarbons (Water) <input type="checkbox"/> O Reg 153 PAHs (Water) <input type="checkbox"/> O Reg 153 VOCs by HS (Water) </div> </div>						Turnaround Time (TAT) Required: Please provide advance notice for rush projects Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) Date Required: 3/8/2018 Time Required: 12:00 <input checked="" type="checkbox"/> Rush Confirmation Number: (call lab for #)							
Include Criteria on Certificate of Analysis (Y/N)?						# of Bottles Comments													
Sample Bag/Code Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix															
1	Field blank	28/8/2018	14:00	water															2 on ice
2	Trip blank	17/1/2018		water															2
3	MW18-10	28/8/2018	14:45	water	X	X	X	X	X										12
4	DUP-1	28/8/2018	14:45	water	X	X	X	X	X										12
5	MW18-05	29/8/2018	13:30	water	X	X	X	X	X										12
6	MW18-01	28/8/2018	12:15	water	X	X	X	X	X										12
7	MW18-02	28/8/2018	11:00	water	X	X	X	X	X										12
8	MW18-04	28/8/2018	10:20	water	X	X	X	X	X										12
9																			
10																			
* RELINQUISHED BY: (Signature/Print) Date: (YY/MM/DD) Time						RECEIVED BY: (Signature/Print) Date: (YY/MM/DD) Time						# Jars used and not submitted		Laboratory Use Only					
Erik Lalonde 18/8/18 17:00						Erik Lalonde 20/8/18 17:15						Time Sensitive		Temperature (°C) on Reel 16.15, 16		Custody Seal Present Intact		Yes No	
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.						* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.						SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM		White: Maxxa Yellow: Client					

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



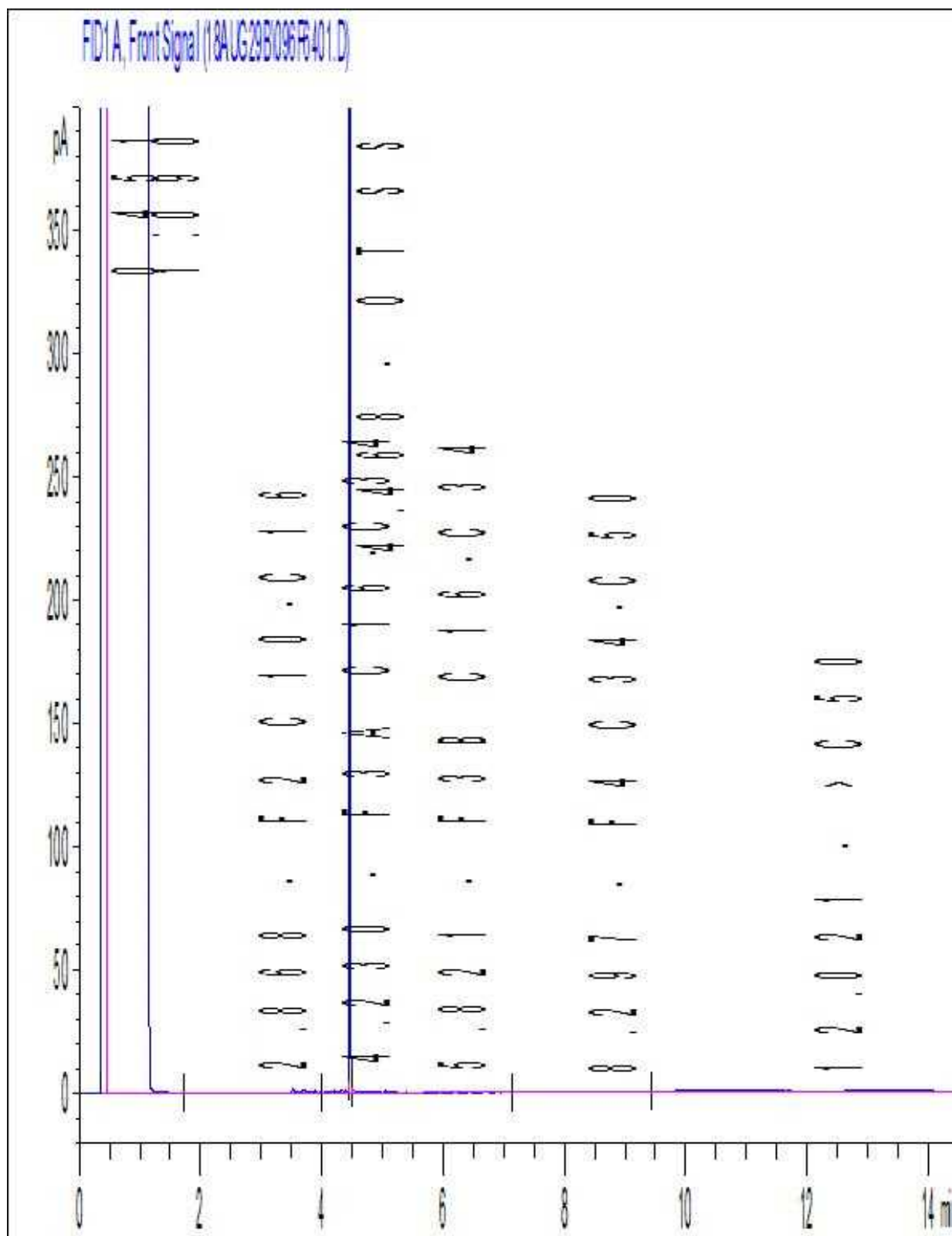
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



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

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

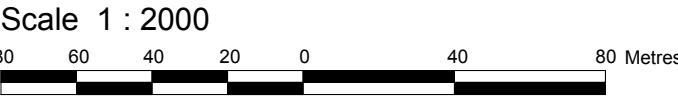


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

APPENDIX A (IV)

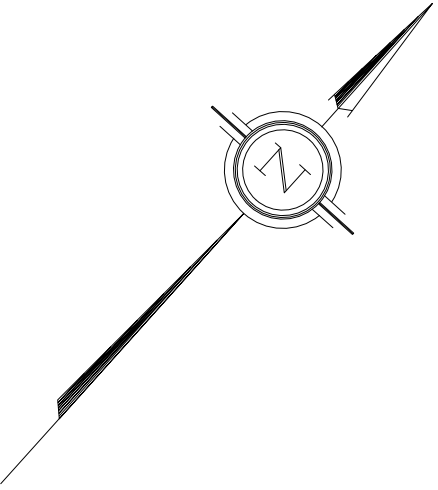
Plan of Survey

SKETCH TO ILLUSTRATE
PART OF LOT 6
CONCESSION 2
Geographic Township of Huntley
CITY OF OTTAWA
Prepared by Annis, O'Sullivan, Vollebeek Ltd.
April 24, 2014



Metric
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND
CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Notes
SITE AREA 28.78 Ha
BOUNDARY INFORMATION COMPILED FROM PLANS 4R-11656
AND 4R-17391, NOT FROM AN ACTUAL FIELD SURVEY.
Bearings are grid bearings.





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