Phase Two Environmental Site Assessment
5938 Hazeldean Road, Ottawa, Ontario

Client:
Hazeldean Crossing Inc.
521 Kilspindie Ridge
Ottawa, Ontario
K2J 5M8

Project Number:
OTT-00250806-C0

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Reviewed By: Carl Hentschel, P.Eng., PMP

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Type of Document:
Final

Date Submitted:
November 6, 2019

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Date Submitted:
November 6, 2019

Legal Notification

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Executive Summary

EXP Services Inc. (EXP) was retained by Hazeldean Crossing Inc. to complete a Phase Two Environmental Site Assessment (ESA) of the property referred to as 5938 Hazeldean Road, located in Ottawa, Ontario hereinafter referred to as the "Phase Two property". The objective of the Phase Two ESA is to assess the soil and groundwater quality since the site is a former gasoline retail outlet and automotive service garage. EXP understands that Hazeldean Crossing Inc. plans to re-develop the land as medium density residential and that this report is required as part of the permitting process with the City of Ottawa. Since the site was previously used for commercial purposes, a Record of Site Condition (RSC) is required. This work was supervised and completed by Mark McCalla, P. Geo., a qualified person in the province of Ontario.

Previously, a Phase One ESA was completed by EXP in order to identify potential environmental impacts. An underground storage tank removal report for the 2015 was also provided for review by EXP. Based on this assessment, the following Areas of Potential Environmental Concern (APEC) were identified:

Table EX.1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contaminants of Concern	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
1,Potential contamination from former on-site retail gasoline sales outlet and service garage	North / Central	#28: Gasoline and Associated Products Storage in Fixed Tanks #10: Commercial Autobody Shops	On-Site	Petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX), volatile organic compounds (VOCs), lead	Soil and groundwater

Based on these findings, it was recommended that a Phase Two ESA be completed to assess the soil and groundwater quality at the Phase Two property. The Phase Two ESA consisted of advancing eleven boreholes and completing them as groundwater monitoring wells. Soil and groundwater samples were collected and submitted for laboratory analysis of one or more of the following parameters: BTEX, PHC, VOCs, and lead.

For assessment purposes, EXP selected the Site Condition Standards (SCS), provided in Table 7 of *Soil, Groundwater and Sediment Standards for use Under Part XV.1 of the Environmental Protection Act*, Ministry of the Environment, Conservation and Parks (MECP), 2011 for residential/institutional land use at a site with coarse textured soil in accordance with Ontario Regulation 153/04 (as amended).

Based on the Phase Two ESA results, the following summary is provided:

- On February 15, 19 and 20, 2019, a total of 5 boreholes (MW19-1 to MW19-5) were advanced at the Phase Two property and were completed with a monitoring well. On March 13, 2019, six (6) boreholes (BH6 to MW19-11) were advanced at the Phase Two property and a monitoring well was installed in MW19-9 to MW19-11 to facilitate groundwater sampling. The monitoring well at BH11 was installed from 4.3 m to 5.8 m to vertically delineate petroleum impact to groundwater. MW19-9 and MW19-10 were installed to delineate groundwater impact to the west and south of MW19-1.

- Based on the Phase Two ESA, there was approximately 1.5 m of sand fill with some silt and gravel at MW19-3. At MW19-1 and MW19-2, there was sand fill from 1.5 m to 3.6 m which corresponds to the former UST excavations. Slight to moderate petroleum odours were identified in the lower fill material at MW19-1 and MW19-2. At MW19-4 and MW19-5 there was sand and gravel till with a trace silt and clay. The thickness of till ranged from 1.1 m to 1.5 m and was underlain by bedrock. No petroleum odours were identified in the native soil.
- Grey, limestone bedrock was encountered at a depth of 0.8 m to 1.5 m. Groundwater was encountered at a depth of 2.49 m bsg in MW19-9 to 3.42 m in MW19-4. No petroleum sheens were observed in the monitoring wells during the sampling event. Based on the groundwater elevations, the groundwater flow at the Phase Two property is to the north.t
- Based on the results of the investigation, the concentrations of one or more exceedances of PHC F3, cadmium, lead, benzo(a)pyrene and fluoranthene of the MECP Table 7 SCS in soil.
- Initially the concentrations of benzene, PHCs F2 and naphthalene exceeded the MECP Table 7 SCS in groundwater at the Phase Two property, however groundwater sample results from these monitoring wells in June and September 2019 had concentrations of benzene, PHCs F2 and naphthalene that were less than the MECP Table 7 SCS.
- Approximately 600 m^3 of impacted soil was identified east of the existing site building. This soil should be removed and disposed of at a licensed landfill so that the soil concentrations satisfy the MECP Table 7 SCS.
- If the wells are no longer needed, they should be decommissioned in accordance with Ontario Regulation 903.

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1 Introduction

EXP Services Inc. (EXP) was retained by Hazeldean Crossing Inc. to complete a Phase Two Environmental Site Assessment (ESA) of the property referred to as 5938 Hazeldean Road in Ottawa, Ontario, hereinafter referred to as the 'Phase Two property'. The objective of the Phase Two ESA is to assess the soil and groundwater quality since the site is a former gasoline retail outlet and automotive service garage. EXP understands that Hazeldean Crossing Inc. plans to re-develop the land as medium density residential and that this report is required as part of the permitting process with the City of Ottawa. Since the site was previously used for commercial purposes, a Record of Site Condition (RSC) is required.

This report has been prepared in accordance with the Phase Two ESA standard as defined by Ontario Regulation 153/04 (as amended), and in accordance with generally accepted professional practices. Subject to this standard of care, EXP makes no express or implied warranties regarding its services and no third-party beneficiaries are intended. Limitation of liability, scope of report and third-party reliance are outlined in Section 7 of this report.

1.1 Site Description

The Phase Two property is currently occupied by a service garage and retail store and has an area of 0.4 hectares. EXP completed a Phase One and Two ESA at the neighbouring site to the east in February 2019.

The Phase Two property is legally described as *Concession 11 Part of Lot 25 Registered Plan 4R-10078; Parts 1 & 2* and is shown on Figure 1 in Appendix B. The property identification number is 044620475 At the time of the investigation, the Phase Two property was an abandoned retail gasoline sales outlet, improved with one permanent structure, that was partially asphalt covered with gravel and grass covering the remainder. The Phase Two property was developed between 1955 and 1965 (Figure 2 in Appendix B). The Phase Two property and the adjacent properties are expected to be serviced by City of Ottawa water and sewage. At the time of the investigation, the Phase Two property was owned by Hazeldean Crossing Inc.

Owner Contact: Mr. Carmine Zayoun
Hazeldean Crossing Inc.
521 Kilspindie Road
Ottawa, Ontario K2J 6A2

Topographically, the Phase Two property is relatively flat. The surrounding area has a noticeable downwards slope towards the east. Regional groundwater flow direction is inferred to be in the easterly direction towards Poole Creek, found 580 m to the east.

The approximate Universal Transverse Mercator (UTM) coordinates for the Phase Two property centroid is NAD83, Zone 18T, 427654.4 m E, 5014040.6 m N. The UTM coordinates were based on an estimate derived using Google Earth™. The accuracy of the centroid is estimated to range from 5 to 50 m.

1.2 Current and Proposed Future Uses

At the time of the Phase Two ESA investigation, the Phase Two property was a former gasoline retail outlet and automotive service garage that is currently vacant. The future land use will be residential. A site plan is included in Appendix B.

1.3 Applicable Site Condition Standards

Analytical results obtained for Site soil and groundwater samples were assessed against Site Condition Standards (SCS) as established under subsection 169.4(1) of the Environmental Protection Act, and presented in the document Ontario Ministry of Environment, Conservation and Parks (MECP) "*Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*", ("SGWS" Standards), (MECP, 2011a). Tabulated background SCS (Table 1) applicable to environmentally sensitive Sites and effects based generic SCS (Tables 2 to 9) applicable to non-environmentally sensitive Sites are provided in MECP (2011a). The effects based SCS (Tables 2 to 9) are protective of human health and the environment for different groundwater conditions (potable and non-potable), land use scenarios (residential, parkland, institutional, commercial, industrial, community and agricultural/other), soil texture (coarse or medium/fine) and restoration depth (full or stratified).

Application of the generic or background SCS to a specific site is based on a consideration of site conditions related to soil pH (i.e. surface and subsurface soil), thickness and extent of overburden material, (i.e. shallow soil conditions), and proximity to an area of environmental sensitivity or of natural significance. For some chemical constituents, consideration is also given to soil textural classification with SCS having been derived for both coarse and medium-fine textured soil conditions.

For assessment purposes, EXP selected the MECP (2011) Table 7: Full Depth Generic Site Condition Standards (SCS) in a non-potable groundwater condition for a residential/parkland/institutional property use and coarse textured soil. The selection of this category was based on the following factors:

- The predominant soil type on the Phase Two property was considered to be coarse textured (refer to the results of the Grain Size Analysis as provided in the Certificates of Analysis presented in Appendix E);
- There was no intention to carry out a stratified restoration at the Phase Two property;
- Less than two-thirds of the Phase Two property has an overburden thickness greater than 2 m;
- The Phase Two property is not located within 30 m of a surface water body or an area of natural significance;
- The soil at the Phase Two property has a pH value between 5 and 9 for surficial soils; and, between 5 and 11 for subsurface soils;
- The property is not within an area of natural significance; does not include, nor is it adjacent to an area of natural significance, nor is it part of such an area; and, it does not include land that is within 30 m of an area of natural significance, nor is it part of such an area;
- The Phase Two property will be serviced by the City of Ottawa's water distribution system and the surrounding properties either are already municipally serviced or will be in the near future; and,
- The Phase Two property is planned for residential use.

2 Background Information

2.1 Physical Setting

At the time of the investigation, the Phase Two property was observed to be vacant former gasoline retail outlet and automotive service garage with an area of 0.4 hectares, approximately 50 m west of the southwest corner of the intersection of Hazeldean Road and Victor Street. The surrounding area to the west and south was developed with residential houses. To the north, across Hazeldean Road the land is commercial and to the east is undeveloped (Figure 2 in Appendix B). The Phase Two property is in a mixed commercial and residential zoned area. The Phase Two property and the neighbouring properties are serviced for water and sewer by the City of Ottawa.

Local Ontario Ministry of Environment, Conservation and Parks (MECP) water wells records show that bedrock was found at 1.5 - 5 m from surface. The overburden consists of sand and sandy clay. Bedrock in the area was found to be limestone.

Topographically, the Phase Two property is relatively flat. The surrounding area has a noticeable downwards slope towards the east. Regional groundwater flow direction is inferred to be in the easterly direction towards Poole Creek, found 500 m to the east.

2.2 Past Investigations

The following previous reports were provided to EXP for review.

- *Commercial Property Former Retail Petroleum Outlet 5938 Hazeldean Road, Stittsville, Ontario, Underground Storage Tank Removal Environmental Site Assessment*, dated October 8, 2015, prepared by Rubicon Environmental (2008) Inc.

  The report details the removal of all existing retail petroleum equipment on the site. Four (4) single wall steel underground storage tanks (UST) were removed in September 2015. Ten (10) confirmatory soil samples were collected from the walls and floor of the two excavations. No exceedances of the Ontario Ministry of Environment, Conservation and Parks (MECP) site condition standards were identified. Only limited groundwater was observed entering the excavation bottoms. No sheens or odours were observed on the groundwater surface. No groundwater samples were collected for laboratory analysis.

Based on this review, the following Areas of Potential Environmental Concern (APEC) are identified:

Table 2.1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contaminants of Concern	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
1.Potential contamination from former on-site retail gasoline sales outlet and service garage	North Central	#28: Gasoline and Associated Products Storage in Fixed Tanks #10: Commercial Autobody Shops	On-Site	Petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX),	Soil and groundwater

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contaminants of Concern	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
				volatile organic compounds (VOCs), lead	

Based on these results, it was recommended that a Phase Two ESA be completed to assess the soil and groundwater quality at the Phase Two property.

3 Scope of the Investigation

3.1 Overview of Site Investigation

The purpose of the Phase Two ESA was to investigate the soil and groundwater quality at the Phase Two property and to obtain soil and groundwater data to further characterize conditions in the surficial fill/shallow overburden soils.

It is understood that the Phase Two property is to be re-developed with medium density residential. As part of the permitting process, the City of Ottawa requires that a Phase Two ESA be completed in accordance with Ontario Regulation 153/04 (as amended).

3.2 Scope of Work

The scope of work for this Phase Two ESA was as follows:

- Request local utility locating companies (e.g., cable, telephone, gas, hydro) to mark any underground utilities present at the Phase Two property;
- Retain a private utility locating company to mark any underground utilities present in the vicinity of the borehole locations and to clear the individual borehole locations;
- Advance a total of eleven (1) boreholes and complete eight (8) of them as groundwater monitoring wells;
- Attempt to collect representative soil samples for chemical analysis of polycyclic aromatic hydrocarbons (PAH), metals, VOC, PHC and BTEX (PAHs were added to assess fill quality);
- Attempt to collect representative groundwater samples for chemical analysis of PAH, metals, VOC, PHC and BTEX;
- Measure groundwater levels in the monitoring wells and piezometer;
- Completion of a survey of the borehole locations relative to a geodetic or other permanent benchmark and in reference with the Universal Transverse Mercator (UTM) coordinate system for vertical and horizontal control; and
- Review the analytical data and prepare a report of the findings.

Maxime Leroux conducted assessment work for this project and was supervised by Mark McCalla, P.Geo., QP_{ESA}. Mark McCalla is a qualified person as defined by O. Reg. 153/04.

3.3 Media Investigated

The Phase Two ESA included the investigation of on-site soil and groundwater. As there are no water bodies on the Phase Two property, no surface water or sediment sampling was required.

The potential contaminants of concern (PCOCs) identified in EXP's (2019) Phase One ESA were identified as target parameters for this Phase Two ESA. The areas of potential environmental concern (APEC) and PCOCs identified in the Phase One ESA are outlined in Table 2.1.

The rationale for the selection of borehole and monitoring well locations during this investigation are to place them on the property to assess the soil and groundwater conditions in the APECs. A copy of the Sampling and Analysis Plan prepared for the Phase Two property is provided in Appendix A.

3.4 Phase One ESA Conceptual Site Model

In order to develop a conceptual model for the Phase Two property and surrounding study area, the following physical characteristics and pathways were considered.

3.4.1 Current and Past Uses

Based on a review chain of title information, air photos, and other records, the Phase Two property was developed into a gasoline retail outlet and automotive service garage since at least 1965.

3.4.2 Summary of Potentially Contaminating Activities

As per Ontario Regulation (O.Reg.) 153/04, a Potential Contaminating Activity (PCA) is defined as one of fifty-nine (59) industrial operations set out in Table 2 of Schedule D that occurs or has occurred in a Phase One study area. The following PCAs were identified:

- PCA 1 – 5938 Hazeldean Road – Former retail gasoline sales outlet and service garage, located adjacent to west of the Phase Two property. (PCA#10 – Commercial Autobody Shops, PCA#28 – Gasoline and Associated Products Stored in Fixed Tanks).
- PCA 2 – 5943 Hazeldean Road – Retail gasoline sales outlet built in 2015, located adjacent to 40 m west of the Phase Two property. (PCA#28 – Gasoline and Associated Products Stored in Fixed Tanks). Based on short time frame of existence, this is not considered an APEC.
- PCA 3 – 5899 Hazeldean Road – Retail gasoline sales outlet, located adjacent to 160 m to the east of the Phase Two property. (PCA#28 – Gasoline and Associated Products Stored in Fixed Tanks). Based on intervening distance and being downslope in terms of the assumed direction of groundwater flow, this is not considered an APEC.

3.4.3 Areas of Potential Environmental Concern

As a result of the PCAs, the report identified the following APECs at the Phase One Property:

- APEC 1 – (central / north part of the site) Contaminated soil and groundwater. This APEC is associated with PCA 1. The potential contaminants of concern include PHC, BTEX, VOCs, and lead.

It is noted that any significant uncertainty or absence of information has the ability to affect the Phase One Conceptual Site Model. However, based on the information and findings presented within the Phase One ESA, it is EXP's opinion that any uncertainty would be minimal, and it would not alter the validity of the model presented above.

3.4.4 Topography and Geology

Topographically, the Phase Two property is relatively flat. The surrounding area has a downwards slope towards the east. The closest body of water is Poole Creek, located approximately 550 m east of the Site. Regional groundwater flow direction is inferred to be in the eastern direction.

The bedrock in the general area is limestone at a depth of approximately less than 2 m. With respect to surficial geology, beneath any fill, the site is underlain by sand and sandy clay.

3.4.5 Estimated Groundwater Flow Direction

Topographically, the Phase Two property relatively flat with a slight downwards slope towards the east. Regional groundwater flow direction is inferred to be in the eastern direction towards Poole Creek.

3.4.6 Underground Utilities

Currently, there are buried water, sewer, natural gas utilities at the Phase Two property.

3.5 Deviations from Sampling and Analysis Plan

The field investigative and sampling program was carried out following the requirements of the Site Sampling and Analysis Plan (SAAP in Appendix A). No significant deviations from the Sampling and Analysis Plan were reported that affected the sampling and data quality objectives for the Phase Two property.

3.6 Impediments

No physical impediments were encountered during the field investigation. The entire property was accessible at the time of the investigation.

4 Investigation Method

4.1 General

The Phase Two property investigative activities consisted of drilling boreholes to facilitate the collection of soil samples for chemical analysis and the installation of monitoring wells for hydrogeological property characterization and the collection of groundwater samples for chemical analysis. This work was supervised and completed by Mark McCalla, P. Geo., a qualified person in the province of Ontario.

4.2 Borehole Drilling

Prior to the commencement of drilling, the locations of underground public utilities including telephone, natural gas and electrical lines were marked at the Phase Two property by locating companies. A private utility locating contractor was also retained to clear the individual borehole locations.

On February 15, 19, and 20, 2019, a total of 5 boreholes (MW19-1 to MW19-5) were advanced at the Phase Two property by OGS Drilling, a licensed well contractor, under the full-time supervision of EXP staff concurrently with a geotechnical investigation. A track mounted CME drill rig with split spoon samplers was used to collect the soil samples. A monitoring well was installed in each borehole to facilitate groundwater sampling. The locations of the boreholes and monitoring wells are presented on Figure 3 in Appendix B.

On March 13, 2019, six (6) boreholes (BH6 to MW19-11) were advanced at the Phase Two property by Marathon Drilling, a licensed well contractor, under the full-time supervision of EXP staff. Monitoring wells were installed in MW19-9 to MW19-11 to facilitate groundwater sampling. The monitoring well at BH11 was installed from 4.3 m to 5.8 m to vertically delineate petroleum impact to groundwater. MW19-9 and MW19-10 were installed to delineate groundwater impact to the west and south of MW19-1. The locations of the boreholes and monitoring wells are presented on Figure 3 in Appendix B.

No petroleum-based greases or solvents were used during drilling activities. EXP staff continuously monitored the drilling activities and recorded the depth of soil sample collection and total depth of boring. Field observations are summarized on the borehole logs provided in Appendix C.

The split spoon samplers were decontaminated between sampling intervals by the drilling contractor using a potable water/phosphate-free detergent solution followed by rinses with potable water.

4.3 Soil Sampling

The soil sampling during the completion of this Phase Two ESA was undertaken in general accordance with the SAAP presented in Appendix A.

Soil samples for geologic characterization were collected on a continuous basis in the overburden materials using 5 cm diameter, 61 cm long, split spoon samplers advanced into the subsurface using the drilling rig. The soil cores were removed from the samplers upon retrieval by drilling personnel. Geologic details of the recovered cores were logged by EXP field staff. EXP staff continuously monitored the drilling activities to log the stratigraphy observed from the recovered soil cores, to record the depth of soil sample collection, to record total depths of borings, and to record visual or olfactory observations of potential impacts. Field observations are summarized on the borehole logs provided in Appendix C.

Soil samples identified for possible laboratory analysis were collected from the split spoon sampler and placed directly into pre-cleaned, laboratory-supplied glass sample jars/vials. Samples to be analysed for VOC, PHC fraction F1 and BTEX were collected using a soil core sampler and placed in to vials containing methanol as a preservative. The jars and vials were sealed with Teflon-lined lids to minimize head-space and reduce the potential for induced volatilization during storage/transport prior to analysis. All soil samples

were placed in clean coolers containing ice prior to and during transportation to the subcontract laboratory, Maxxam Analytics Inc. (Maxxam) of Ottawa, Ontario. The samples were transported/submitted within 24 hours of collection to the laboratory following chain of custody protocols for chemical analysis.

No soil samples were collected from MW19-11 since the purpose of this monitoring well was to vertically delineate the groundwater impact found at MW19-1 and soil samples were previously collected from that location. MW19-11 was installed close to MW19-1.

4.4 Field Screening Measurements

The remaining portion of each soil sample was placed in a sealed Ziploc plastic bag and allowed to reach ambient temperature prior to field screening with a combustible vapour meter (RKI Eagle model) calibrated to hexane gas prior to use. The field screening measurements were made by inserting the instrument's probe into the plastic bag while manipulating the sample to ensure volatilization of the soil gases. These 'headspace' readings provide a real-time indication of the relative concentration of combustible vapours encountered in the subsurface during drilling and are used to aid in the assessment of the vertical and horizontal extent of potential impacts and the selection of soil samples for analysis. The field screening measurements, in parts per million (ppm) hexane equivalents, are presented with the borehole logs provided in Appendix C.

4.5 Soil Sample Submission

Soil samples were selected for laboratory analysis based on combustible vapour measurements and visual and olfactory evidence of impacts, where observed. One (1) worst case soil sample from each borehole was submitted for laboratory analysis of PAH, metals, VOC, PHC, and BTEX.

4.6 Groundwater: Monitoring Well Installation

Groundwater monitoring wells were installed in general accordance with the Ontario Water Resources Act - R.R.O. 1990, Regulation 903 (as-amended).

The monitoring wells consisted of a 1.5 m to 3.0 m length of 37 mm diameter Schedule 40 PVC screen and an appropriate length of PVC riser pipe. The annular space around the well was backfilled with sand to an average height of 0.3 m above the top of the screen. A bentonite seal was added from the top of the sand pack to approximately 0.3 m below ground surface. Details of the monitoring well installations are shown on the Borehole Logs provided in Appendix C.

The installation details of the installed monitoring wells are summarized in Table 4.1.

Table 4.1: Monitoring Well Installation Details

Monitoring Well/Piezometer	Ground Elevation (MASL)	Top of Sand Elevation (m)	Top of Screen Elevation (m)	Bottom of Screen Elevation (m)	Bottom of Borehole Elevation (m)	Depth of Borehole (m bsg)
MW19-1	114.92	113.1	112.8	111.3	111.3	3.6
MW19-2	114.88	113.2	112.9	111.4	111.4	3.5
MW19-3	114.82	112.7	112.4	110.0	110.0	4.8
MW19-4	114.97	113.0	112.7	110.3	110.3	4.7

Monitoring Well/Piezometer	Ground Elevation (MASL)	Top of Sand Elevation (m)	Top of Screen Elevation (m)	Bottom of Screen Elevation (m)	Bottom of Borehole Elevation (m)	Depth of Borehole (m bsg)
MW19-5	114.56	112.7	112.4	110.0	110.0	4.6
MW19-9	114.62	113.0	112.7	109.6	109.2	5.99
MW19-10	114.76	112.8	112.5	109.4	109.1	6.02
MW19-11	114.92	110.8	110.5	109.0	108.5	6.38

Note: Elevations were collected using a high precision GPS unit and a geodetic datum was established at the Phase Two Property.
m bsg – metres below surface grade
TOC - top of plastic well casing

When these monitoring wells are no longer required, they will be decommissioned in accordance with the procedure outlined in the Ontario Water Resources Act - R.R.O. 1990, Regulation 903 - Amended to O. Reg. 128/03.

Measures taken to minimize the potential for cross contamination or the introduction of contaminants during well construction included:

- The use of well pipe components (e.g. riser pipe and well screens) with factory machined threaded flush coupling joints;
- Construction of wells without the use of glues or adhesives;
- Removing the protective plastic wraps from well components at the time of borehole insertion to prevent contact with the ground and other surfaces;
- Cleaning of augers between sampling locations; and,
- The use of hollow stem augers to prevent loose and potentially contaminated material in overlying layers from sloughing into the boreholes and coming into contact with groundwater.

4.7 Groundwater: Field Measurement of Water Quality Parameters

The static water level was measured, the depth of each well was recorded and the well sampled. EXP used an interface probe to measure the possible presence of light non-aqueous phase liquid (LNAPL) in the monitoring well.

4.8 Groundwater: Sampling

Groundwater samples were collected from the monitoring wells on January 26 and March 18, 2019. The monitoring activities consisted of measuring the depth to groundwater in each monitoring well so that groundwater flow and direction below the Phase Two property could be assessed. The water level measurements were recorded on water level log sheets. The water level meter probe was decontaminated between monitoring well locations with a spray bottle of water and alconox solution, paper towel, then potable water.

Wells were then sampled using a “low flow” technique whereby the well was continuously purged using an electric pump (equipped with dedicated tubing) and parameters within the purged water were monitored

using a groundwater chemistry multi-meter probe (YSI 550) at 3 minute intervals. These parameters include: pH, conductivity, temperature, and salinity. Once these parameters were found to deviate less than 10% over three testing events, equilibrium was deemed to have occurred and a sample of the groundwater was collected.

Additional groundwater samples were collected from BH1 and BH3 on June 3 and September 5, 2019. The groundwater samples were submitted for laboratory analysis of BTEX and PHC. The sample from BH3 was also submitted for analysis of PAH.

The purge water was also continuously monitored for visual and olfactory evidence of petroleum and solvent impact (sheen and odour).

The groundwater samples were collected in laboratory provided sample bottles and submitted to Maxxam for analysis of PAH, metals, VOC, PHC, and BTEX. There was insufficient groundwater in MW19-2 during both sampling events so a groundwater sample was not collected from this location. The groundwater samples were placed in clean coolers containing ice prior to and during transportation to the subcontractor laboratory.

4.9 Sediment: Sampling

As no water body was present at the Phase Two property, sediment sampling was not part of the Phase Two ESA.

4.10 Analytical Testing

The contracted laboratory selected to perform chemical analysis on all soil and water samples was Maxxam Analytics Incorporated (Maxxam). Maxxam is an accredited laboratory under the Standards Council of Canada/Canadian Association for Laboratory Accreditation in accordance with ISO/IEC 17025:1999-*General Requirements for the Competence of Testing and Calibration Laboratories*.

4.11 Elevation Survey

An elevation survey was conducted to obtain vertical control of the newly installed monitoring well locations. The top of casing and surface grade elevation of each monitoring well location was surveyed using a high precision GPS unit.

4.12 Residue Management

The minor amount of drill cuttings were spread around the ground surface near the borehole locations.

Due to the low flow sampling method, purged water from groundwater sampling was stored in a pail. Since there were no visual or olfactory evidence of impact, the minimal amount of purge water was disposed of on the grass at the Phase Two property.

4.13 Quality Assurance and Quality Control Measures

A QA/QC program was also implemented to ensure that the analytical results received are accurate and dependable. A QA/QC program is a system of documented checks that validate the reliability of the data collected regarding any given Site. Quality Assurance is a system that ensures that quality control procedures are correctly performed and documented. Quality Control refers to the established procedures observed both in the field and in the laboratory, designed to ensure that the resulting end data meet intended quality objectives. The QA/QC program implemented by EXP incorporated the following components:

- Collection and analysis of blind duplicate soil and groundwater samples to ensure analytical precision;
- Using dedicated and/or disposal sampling equipment;
- Use of a trip blank, for VOC analysis, during each sampling event;
- Following proper decontamination protocols to minimize cross-contamination;
- Maintaining field notes and completing field forms to document on-Site activities; and,
- Using only laboratory supplied sample containers and following prescribed sample protocols, including proper preservation, meeting sample hold times, proper chain of custody documentation, to ensure integrity of the samples.

Maxxam's QA/QC program involved the systematic analysis of control standards for the purpose of optimizing the measuring system as well as establishing system precision and accuracy and included calibration standards, method blanks, reference standards, spiked samples, surrogates and duplicates.

5 Review and Evaluation

5.1 Geology

The detailed soil profiles encountered in the boreholes are provided on the attached borehole logs (Appendix C). Boundaries of soils indicated on the logs are intended to reflect transition zones for the purpose of environmental assessment and should not be interpreted as exact planes of geological change. A brief description of the soil stratigraphy at the Phase Two property, in order of depth, is summarized in the following sections. The interpreted Phase Two property geology is shown on the enclosed cross section (Figure 5, Appendix B).

5.1.1 Fill Material

There was approximately 1.5 m of sand fill with some silt and gravel at MW19-3. At MW19-1 and MW19-2, there was sand fill from 1.5 m to 3.6 m which corresponds to the former UST excavations. Slight to moderate petroleum odours were identified in the lower fill material at MW19-1 and MW19-2.

5.1.2 Native Material

At MW19-4 and MW19-5 there was sand and gravel till with a trace silt and clay. The thickness of till ranged from 1.1 m to 1.5 m and was underlain by bedrock. No petroleum odours were identified in the native soil in any of the boreholes.

The grain size analyses for BH7 and BH10 showed that less than 50% of the soil had a grain size of silt or finer. This indicates that the native soil is coarse grained. The results of the grain size analyses are found in Appendix A.

5.1.3 Bedrock

Limestone bedrock was encountered from 0.8 m to 1.5 m across the Phase Two property. Bedrock was also found at a depth of 3.6 m in MW19-1 and MW19-2, but these boreholes were located within the former UST nest.

5.2 Aquifers

In the Ottawa area, the regional aquifers consist of both bedrock and overburden sources, with the two key aquifers consisting of the highly weathered and fractured portion of the upper bedrock surface and overlying sand and gravel deposits (contact zone aquifer) and deeper bedrock aquifers.

In southeastern Ontario, there are four main bedrock aquifers (Singer et al., 2003):

- Nepean-March-Oxford Aquifer
- Rockcliffe Aquifer
- Ottawa Group Aquifer
- Billing-Carlsbad-Queenston Aquifer

In the vicinity of the Phase One Property, the primary bedrock aquifer is the Ottawa Group. This aquifer is considered to have good water yielding capacity with generally fair to good water quality (RRCA and SNCA, 2008).

The contact zone aquifer, which generally includes the sand and gravel deposits and underlying fractured bedrock, is present across the Ottawa region, with more than 90% of the water extracted in eastern Ontario

is extracted from the Contact Zone Aquifer (RRCA and SNCA, 2008). The contact zone aquifer varies in thickness across the region due to the large variation in the zone of upper bedrock fracturing.

Regional groundwater flow in both the contact zone and bedrock have been interpreted to be to the northeast towards the Ottawa River, generally following bedrock topography.

Recharge of aquifers regionally is limited due to the confining silty clay layer resulting from the former Champlain Sea. It has been estimated that only 10% of precipitation that falls in the Ottawa region infiltrates into the ground to recharge the aquifers, with the remainder of the precipitation being lost to evapotranspiration or runoff to rivers and lakes (City of Ottawa, 2011).

5.3 Groundwater: Elevations and Flow Direction

The monitoring well network advanced as part of this Phase Two ESA consists of two monitoring wells (MW19-1 and MW19-2) that were installed within the backfill material of a former UST nest within the limestone bedrock. Five additional monitoring wells (MW19-3, MW19-4, MW19-5, MW19-9, and MW19-10) and a deeper monitoring well (MW19-11) were screened within the limestone bedrock at the Phase Two property.

Groundwater elevations and water levels were measured at the Phase Two property on January 26, March 18, and April 25, 2019. Groundwater was encountered within the limestone at a depth of 2.49 m bsg in MW19-9 to 3.42 m in MW19-4. No petroleum sheens were observed in the monitoring wells during either sampling event.

A summary of the elevation survey and groundwater levels for each well are shown on Table 5.1.

Table 5.1: Groundwater Elevations

Monitoring Well ID	Ground Elevation (MASL)	February 26, 2019		March 18, 2019		April 25, 2019	
		Water Level (m bsg)	Water Level (MASL)	Water Level (m bsg)	Water Level (MASL)	Water Level (m bsg)	Water Level (MASL)
MW19-1*	114.92	3.03	111.89	2.96	111.96	2.54	112.38
MW19-2*	114.88	3.10	111.78	3.00	111.88	2.70	112.18
MW19-3	114.82	3.33	111.49	3.39	111.43	3.42	111.40
MW19-4	114.97	3.60	111.37	3.98	110.99	3.11	111.86
MW19-5	114.56	3.93	110.63	3.51	111.05	3.30	111.26
MW19-9	115.22	NA	NA	2.12	113.10	2.49	112.73
MW19-10	115.08	NA	NA	2.93	112.15	3.11	111.97
MW19-11	114.92	NA	NA	2.95	111.97	2.69	112.23

Note: Elevations were referenced using a high precision GPS unit and a geodetic datum was established at the Phase Two Property.

mbtoc – metres below top of plastic well casing

mASL – metres above sea level

NA – not applicable

* – well screened in backfill material in former UST nest within the limestone bedrock

Based on the groundwater levels measured on February 26 and March 18, 2019, the groundwater flow direction within the limestone bedrock at the site was to the north as shown on Figure 6 in Appendix B. EXP notes that groundwater flow direction and level can be influenced by utility trenches and other subsurface structures and may migrate in the bedding stone of nearby subsurface utility trenches.

5.4 Groundwater: Hydraulic Gradients

Horizontal hydraulic gradients estimated for the groundwater flow components identified in the shallow bedrock aquifer, based on the April 2019 groundwater elevations, was 0.029 m/m.

5.5 Single Well Response Tests (SWRTs) Analysis

The thin overburden at the site did not have sufficient groundwater to construct a monitoring well. Single well response tests were conducted on BH3 and BH5 which were completed within the shallow bedrock as a part of this Phase Two ESA. The calculated hydraulic conductivity in the limestone bedrock unit at these two monitoring wells was 9.1×10^{-8} m/s.

5.6 Soil Texture

Based on the grain size analysis of two (2) soil samples, the soil texture at the water table at the Phase One Property was assessed to be coarse textured (refer to the two grain-size analyses in Appendix E) consisting of silty sand and gravel. Therefore, the soil texture is coarse grained.

5.7 Soil: Field Screening

Inspection of the soil cores retrieved from the boreholes did not indicate the presence of sheen, the presence of a separate organic phase, or other evidence of a non-aqueous phase liquid (NAPL) either in the surficial fill or overburden soil materials. No petroleum staining or odours were observed in any of the soil samples.

5.8 Soil Quality

In accordance with the scope of work, chemical analyses were performed on selected soil samples recovered from the boreholes. The selection of representative “worst case” soil samples from each borehole was based on field visual or olfactory evidence of impacts and/or presence of potential water bearing zones. Summaries of the soil analytical results are found in Appendix D. Copies of the laboratory Certificates of Analysis for the tested soil samples are provided in Appendix E.

The MECP Table 7 SCS are applicable if soil pH is in the range of 5 to 11 for subsurface soil (less than 1.5 m below soil surface). The Certificates of Analysis include pH measurements taken from the subsurface soils. Two (2) soil samples were submitted for pH analysis with results of 7.70 and 7.90. The pH values were within the acceptable range for the application of MECP Table 7 SCS.

5.8.1 Petroleum Hydrocarbons

Ten (10) soil samples and two (2) blind duplicates were submitted for PHC and BTEX analyses. As shown in Table 1 in Appendix D, the concentrations of PHC and BTEX measured in the analysed soil samples were less than the MECP 2011 Table 7 SCS, with the exception of PHC F3 in the samples taken from BH4, BH6 and BH7. The area of PHC impact to soil is shown on Figure 7 and on cross-sections shown on Figures 10A and 11A.

5.8.2 Metals

Ten (10) soil samples and two (2) blind duplicates were submitted for metals analyses. As shown in Table 2 in Appendix D, the concentrations of metals measured in the analysed soil samples were less than the MECP 2011 Table 7 SCS, with the exception of cadmium in the samples from BH4 and BH6 and lead in BH4, BH6 and BH7. The area of metals impact to soil is shown on Figure 9 and on cross-sections shown on Figures 10C and 11C.

5.8.3 Volatile Organic Compounds

Five (5) soil samples and two blind duplicates were submitted for VOC analyses. The concentrations of VOC measured in the analysed soil samples were generally less than the laboratory detection limits and were less than the MECP 2011 Table 7 SCS, as shown in Table 3 in Appendix D.

5.8.4 Polycyclic Aromatic Hydrocarbons

Ten (10) soil samples and two (2) blind duplicates were submitted for PAH analyses. As shown in Table 4 in Appendix D, the concentrations of PAH measured in the analysed soil samples were less than the MECP 2011 Table 7 SCS, with the exception of benzo(a)pyrene and fluoranthene in the sample from BH4. The area of PAH impact to soil is shown on Figure 8 and on cross-sections shown on Figures 10B and 11B.

5.8.5 Chemical Transformation and Soil Contaminant Sources

There are three soil samples located east of the service garage building that had one or more exceedances of PHC F3, cadmium, lead, benzo(a)pyrene and fluoranthene of the MECP Table 7 SCS. Chemical transformations are a potential concern at the Site. However, based on the obtained results soils are not expected to be acting as a contaminant mass that could impact the Site's groundwater.

5.8.6 Evidence of Non-Aqueous Phase Liquid

Inspection of the soil cores retrieved from the boreholes did not indicate the presence of non-aqueous phase liquid (NAPL), via staining or sheen. Slight to moderate petroleum odours were identified in the lower fill material at MW19-1 and MW19-2. NAPLs are not expected to be present at the Phase Two property.

5.9 Groundwater Quality

Representative groundwater samples were collected from the newly installed monitoring wells to assess groundwater quality at the Phase Two property. Evidence of free phase product (i.e. visible film or sheen), and odour was not noted during well development or purging.

The groundwater analytical results are summarized on Tables 5 to 8 in Appendix D and the Certificates of Analysis are enclosed in Appendix E.

5.9.1 Petroleum Hydrocarbons

Nine (9) groundwater samples and a blind duplicate were submitted for the chemical analysis of PHC and BTEX. As shown in Table 5 in Appendix D, the concentrations of benzene and PHC F2 exceeded the MECP Table 7 SCS in the groundwater sample collected from BH3. The groundwater sample from BH1 also had a benzene concentration that exceeded the MECP Table 7 SCS. The groundwater samples from BH4, BH5, BH9, BH10, and BH11 had non-detectable concentrations of BTEX and PHC. The locations of the PHC groundwater exceedences are presented on the cross-section shown on Figures 12 and 13A. Additional groundwater samples were collected from BH1 and BH3 on June 3 and September 5, 2019. The

results showed no exceedences of MECP Table 7 SCS and indicates that the groundwater is not impacted. The previous elevated results may have been caused by fine sediment in the groundwater.

5.9.2 Metals

Four (4) groundwater samples were submitted for the chemical analysis of metals. As shown in Table 6 in Appendix D, the concentrations of metals parameters in the groundwater samples were less than the MECP Table 7 SCS.

5.9.3 Volatile Organic Compounds

Four (4) groundwater samples were submitted for the chemical analysis of volatile organic compounds (VOC). As shown in Table 7 in Appendix D, the concentrations of VOC parameters in the groundwater sample were non-detect and below the MECP Table 7 SCS, with the exception of benzene in BH1 and BH3 which exceeded the MECP Table 7 SCS. The locations of the benzene groundwater exceedences are shown on Figure 10 and on cross-sections shown on Figures 12A and 12B

5.9.4 Polycyclic Aromatic Hydrocarbons

Nine (9) groundwater samples and a blind duplicate were submitted for the chemical analysis of PAH. As shown in Table 8 in Appendix D, the concentrations of PAH parameters in the groundwater sample were less than the MECP Table 7 SCS, with the exception of naphthalene in the two groundwater samples collected from BH3. The locations of the PAH groundwater exceedences are shown on the cross-section shown on Figure 13B. Additional groundwater samples were collected from BH3 on June 3 and September 5, 2019. The results showed no exceedences of MECP Table 7 SCS and indicates that the groundwater is not impacted. The previous elevated results may have been caused by fine sediment in the groundwater.

5.9.5 Chemical Transformation and Contaminant Sources

There are no contaminants of concern in the groundwater at the Phase Two property.

5.9.6 Evidence of Non-Aqueous Phase Liquid

Inspection of the groundwater monitoring wells did not indicate the presence of non-aqueous phase liquid (NAPL), staining or sheen. Odours were not observed during groundwater sampling activities. NAPLs are not expected to be present at the Phase Two property.

5.10 Sediment Quality

As there were no water bodies on the Phase Two property, surface water and sediment sampling were not required.

5.11 Quality Assurance and Quality Control Results

Quality assurance and quality control measures were taken during the field activities to meet the objectives of the sampling and quality assurance plan to collect unbiased and representative samples to characterize existing conditions in the fill/upper overburden materials and groundwater at the Phase Two property. QA/QC measures, as described in Section 4.13, included:

- Using dedicated and/or disposal sampling equipment;
- Following proper decontamination protocols to minimize cross-contamination;
- Maintaining field notes and completing field forms to document on-site activities; and,

- Using only laboratory supplied sample containers and following prescribed sample protocols, including proper preservation, meeting sample hold times, proper chain of custody documentation, to ensure integrity of the samples.

Review of field activity documentation indicated that recommended sample volumes were collected from groundwater for each analytical test group into appropriate containers and preserved with proper chemical reagents in accordance with the protocols set out in the *Protocol for Analytical Methods used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act* (MOE, 2004). Samples were preserved at the required temperatures in insulated coolers and met applicable holding time requirements, when relinquished to the receiving laboratory.

Duplicate soil sample pairs BH1 SS4 and its duplicate DUPE, and BH10 AS1 and its duplicate Dup 1 were submitted for chemical analysis of PHC, PAH, and metals. Only duplicate pair BH1 SS4 and its duplicate DUPE were also submitted for VOC analyses. For QA/QC purposes, the analytical sample results are quantitatively evaluated by calculating the relative percent difference (RPD) between the samples and their duplicates. The concentrations of VOC, PAH, and PHC were less than the laboratory reported detection limits for both the primary and duplicate samples. The RPD for metals was 21.2% which is well within the 30% RPD threshold and therefore the soil data is acceptable from an RPD perspective.

Duplicate groundwater sample pair BH11 SS4 and its duplicate BH20 were submitted for chemical analysis of PHC and PAH. The concentrations of PHC were less than the laboratory reported detection limits for both the primary and duplicate samples. The RPD for PAH was 8.0% which is well within the 30% RPD threshold and therefore the soil data is acceptable from an RPD perspective.

Certificates of Analysis were received from Maxxam reporting the results of all the chemical analyses performed on the submitted soil and groundwater samples. Copies of the laboratory Certificates of Analysis are provided in Appendix E. A review of the Certificates of Analysis prepared by the laboratory indicates that they were in compliance with the requirements set out under subsection 47(3) of O.Reg. 511/09.

The analytical program conducted by laboratory included analytical test group specific QA/QC measures to evaluate the accuracy and precision of the analytical results and the efficiency of analyte recovery during solute extraction procedures. The laboratory QA/QC program consisted of the preparation and analysis of laboratory duplicate samples to assess precision and sample homogeneity, method blanks to assess analytical bias, spiked blanks and QC standards to evaluate analyte recovery, matrix spikes to evaluate matrix interferences and surrogate compound recoveries (VOCs only) to evaluate extraction efficiency. The laboratory QA/QC results are presented in the Quality Assurance Report provided in the Certificate of Analysis prepared by the laboratory. The QA/QC results are reported as percent recoveries for matrix spikes, spike blanks and QC standards, relative percent difference for laboratory duplicates and analyte concentrations for method blanks.

The laboratory QA/QC results were assessed against test group control limits in the case of spiked blanks, matrix spikes and surrogate recoveries and alert criteria in the case of method blanks and laboratory duplicates. Review of the laboratory QA/QC results reported by the laboratory indicated that they were within acceptable control limits or below applicable alert criteria for the sampled media and analytical test groups. Based on the assessment of the QA/QC, the analytical results reported by the laboratory are of acceptable quality and data qualifications are not required.

5.12 Phase Two Conceptual Site Model

This section presents a Conceptual Site Model (CSM) providing a narrative, graphical and tabulated description integrating information related to the Phase Two property's geologic and hydrogeological conditions, areas of potential environmental concern/potential contaminating activities, the presence and distribution of contaminants of concern, contaminant fate and transport, and potential exposure pathways.

For the purposes of this Phase Two CSM, the information relied upon was taken from all current and previous environmental reports conducted for the Phase One Property. However, the data relied upon was limited to the most recent information to convey the current Phase Two property conditions.

5.12.1 Site Identification Information

At the time of the investigation, the Phase Two property was observed to be vacant former gasoline retail outlet and automotive service garage with an area of 0.4 hectares, approximately 50 m west of the southwest corner of the intersection of Hazeldean Road and Victor Street (Figure 1 in Appendix A). The surrounding area to the west and south was developed with residential houses. To the north, across Hazeldean Road the land is commercial and to the east is undeveloped as shown on Figure 2 in Appendix B. At the time of the investigation, the Phase Two property was snow-covered, but is assumed to have been grass and asphalt covered. The Phase Two property was a gasoline retail outlet and automotive service garage since at least 1965. At the time of the investigation, the Phase Two property was owned by Hazeldean Crossing Incorporated.

The Phase Two property is in a mixed commercial and residentially zoned area. The Phase Two property is legally described as *Concession 11 Part of Lot 25 Registered Plan 4R-10078; Parts 1 & 2*. The property identification number is 044620475. The property and neighbouring properties are serviced for water and sewer by the City of Ottawa.

Local Ontario Ministry of Environment, Conservation and Parks (MECP) water wells records show that bedrock was found at 0.3 - 3 m from surface. The overburden consists of sand and gravel from the ground surface to 0.6 – 1.54 m. Bedrock in the area was found to be limestone.

Topographically, the Phase Two property is relatively flat. The surrounding area has a noticeable downwards slope towards the east. Regional groundwater flow direction is inferred to be in the easterly direction towards Poole Creek, found 580 m to the east.

Refer to the following table for the Phase Two property identification information.

Civic Address	5938 Hazeldean Road, Ottawa, ON
Current Land Use	Former Gasoline Outlet and Service Garage
Proposed Land Use	Residential
Legal Description	Concession 11 Part of Lot 25 Registered Plan 4R-10078; Parts 1 & 2. City of Ottawa
Property Identification Number	044620475
UTM Coordinates	427654.4 m E, 5014040.6 m N
Phase One Property Area	0.4 ha
Property Owner	Hazeldean Crossing Inc
Owner Contact	Mr. Carmine Zayoun
Owner Address	521 Kilspindie Road, Ottawa, ON

5.12.2 Physical Site Description

The Phase Two CSM provides a narrative and graphical interpretation of the Phase Two property surface features, near surface geologic and hydrogeologic conditions, PCOCs, contaminant fate and transport

mechanisms, and relevant receptors and exposure pathways. These components are discussed in the following sections and summarized in Table 1 in the Tables appendix.

The Phase Two property is located in a residential area of Ottawa where potable water is supplied by the City of Ottawa, however the depth to bedrock is less than 2 m over most of the Phase Two property and therefore the MECP Table 7 Site Condition Standards (SCS) are applied to the Phase Two property. The City of Ottawa obtains its water from the Ottawa River, located approximately 15 km northeast of the Phase Two property.

In accordance with Section 41 of the Ontario Regulation 153/04 (as amended), the Phase Two property is not an environmentally sensitive area. The Phase Two property is not located within an area of natural significance and it does not include land that is within 30 metres of an area of natural significance.

Based on the Phase Two ESA investigation, the Phase Two property is a shallow soil property as defined in Section 43.1 of the regulation. It does not include all or part of a water body, is not adjacent to a water body, and does not include land that is within 30 metres of a water body.

5.12.3 Geological and Hydrogeological Setting

Based on the findings of the Phase Two ESA, there was approximately 1.5 m of sand fill with some silt and gravel at MW19-3. At MW19-1 and MW19-2, there was sand fill from 1.5 m to 3.6 m which corresponds to the former UST excavations. Slight to moderate petroleum odours were identified in the lower fill material at MW19-1 and MW19-2.

At MW19-4 and MW19-5 there was sand and gravel till with a trace silt and clay. The thickness of till ranged from 1.1 m to 1.5 m and was underlain by bedrock. No petroleum odours were identified in the native soil.

Grey, limestone bedrock was encountered at a depth of 0.8 m to 1.5 m. Groundwater was encountered at a depth of 2.49 m bsg in MW19-9 to 3.42 m in MW19-4. No petroleum sheens were observed in the monitoring wells during the sampling event.

The geologic cross-sections prepared from the Phase Two property boreholes is presented on Figures 10 to 13 Appendix B.

Based on the Phase Two ESA, the groundwater flow within the bedrock is to the north.

5.12.4 Underground Utilities

The Phase Two property is municipally serviced by underground utilities such as bell, gas, water and sewer. The groundwater flow pattern in the limestone bedrock could be influenced by buried services.

5.12.5 Potentially Contaminating Activities

As per Ontario Regulation (O.Reg.) 153/04, a Potential Contaminating Activity (PCA) is defined as one of fifty-nine (59) industrial operations set out in Table 2 of Schedule D that occurs or has occurred in a Phase One study area. The following PCAs were previously identified:

- PCA 1 – 5938 Hazeldean Road – Former retail gasoline sales outlet and service garage, located adjacent to west of the Phase Two property. (PCA#10 – Commercial Autobody Shops, PCA#28 – Gasoline and Associated Products Stored in Fixed Tanks).
- PCA 2 – 5943 Hazeldean Road – Retail gasoline sales outlet built in 2015, located adjacent to 40 m west of the Phase Two property. (PCA#28 – Gasoline and Associated Products Stored in Fixed Tanks). Based on short time frame of existence, this is not considered an APEC.

- PCA 3 – 5899 Hazeldean Road – Retail gasoline sales outlet, located adjacent to 160 m to the east of the Phase Two property. (PCA#28 – Gasoline and Associated Products Stored in Fixed Tanks). Based on intervening distance and being downslope in terms of the assumed direction of groundwater flow, this is not considered an APEC.

No other PCAs that took place within the vicinity of the Phase Two property (approximately 250 m radius) were identified.

5.12.6 Areas of Potential Environmental Concern / Potential Contaminants of Concern

As per Ontario Regulation 153/04 (as amended), Potential Contaminating Activity (PCA) is defined as one of the 59 industrial operations set out in Table 2 of Schedule D that occurs or has occurred on the Phase Two property or within the Phase Two property study area. Based on Phase One ESA, the identified areas of potential environmental concern (APEC) and potential contaminants of concern (PCOC) are summarized in the table below and are shown on Figure 2 in Appendix B.

Table 5.2: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potentially Contaminating Activity (PCA)	Location of PCA (On-Site or Off-Site)	Contaminants of Concern	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
1.Potential contamination from a former retail gasoline sales outlet and service garage located at the Phase One property	Phase One property	#28: Gasoline and Associated Products Storage in Fixed Tanks #10: Commercial Autobody Shops	On-Site	Petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene and xylenes (BTEX), volatile organic compounds (VOCs), lead	Soil and groundwater

5.12.7 Investigation and Remediation

The Phase Two ESA was conducted to assess the soil and groundwater quality at the Phase Two property. As indicated in the APEC and PCOC Table (above), the analytical program of the Phase Two ESA included testing of soil for metals, VOC, PHC, and PAH, and groundwater for metals, VOC, PHC, and PAH from the boreholes and monitoring well installed on the Phase Two property. The addition of PAH analyses was made to assess the fill quality at the site. The borehole and monitoring well locations are shown on Figure 5 in Appendix B.

5.12.8 Contaminants of Concern (COC)

Based on the results of the investigation, the concentrations of one or more exceedances of PHC F3, cadmium, lead, benzo(a)pyrene and fluoranthene of the MECP Table 7 SCS in soil. Initially the concentrations of benzene, PHCs F2 and naphthalene exceeded the MECP Table 7 SCS in groundwater at the Phase Two property, however groundwater sample results from these monitoring wells in June and

September 2019 had concentrations of benzene, PHCs F2 and naphthalene that were less than the MECP Table 7 SCS. Therefore, there are no COC in groundwater.

5.12.9 Contaminant Fate and Transport

Soil COCs

A variety of physical, chemical and biochemical mechanisms affect the fate and transport of the potential COCs in soil, the contribution of which is dependent on the soil conditions and the chemical/physical properties of the COCs. Relevant fate and transport mechanisms are natural attenuation mechanisms, including advection mixing, mechanical dispersion/molecular diffusion, phase partitions (i.e. sorption and volatilization), and possibly abiotic or biotic chemical reactions, which effectively reduce COC concentrations.

Concentrations of the COCs in soil will be reduced by the effects of molecular diffusion and the creation of concentration gradients. As non-volatile chemical constituents PHC F3, cadmium, lead, benzo(a)pyrene and fluoranthene may undergo abiotic or biotic chemical reactions associated with the soil mineral particles and the micro-organisms present in the overburden material.

As a result of the various natural attenuation mechanisms in the soil environment, the concentrations of any COCs in soil will be reduced at the Site. The soil impacts are shown on the geologic cross sections (Figures 10A to 10C and 11A to 11C).

Approximately 600 m^3 of impacted soil was identified east of the existing site building.

Groundwater COCs

A variety of physical, chemical and biochemical mechanisms affect the fate and transport of the potential COCs in groundwater, the contribution of which is dependent on the groundwater conditions and the chemical/physical properties of the COCs. Relevant fate and transport mechanisms are advection, dispersion, molecule diffusion, phase partitioning including adsorption and ion exchange, chemical and biochemical reaction. The relevant physical properties are water solubility, saturated vapour pressure, Henry's Law Constants (as a measure of the potential for partitioning into the vapour phase) and, the sorption partition coefficient (as a measure of the potential for surface interactions or solid phase).

Concentrations of the groundwater COCs will be reduced and mass velocities retarded while being transported along the groundwater flow paths by the combined effects of mechanical dispersion and molecular diffusion. Molecular diffusion is mixing arising from concentration gradients and differences in molecule thermal energies and velocities. Mechanical dispersion is mixing arising from differences in fluid velocities both within pores and fractures as a result of frictional effects and along flow paths due to differences in pore and fracture geometry and orientation. The greater contribution is provided by mechanical dispersion by as much as four (4) orders of magnitude as compared to molecular diffusion. Concentrations of the COCs will be also be reduced by bulk mixing of groundwater up-gradient of the source zone with the source zone groundwater. The groundwater impacts are shown on the geologic cross sections (Figures 12, 13A and 13B).

While migrating along groundwater flow paths, COC groundwater concentrations can be reduced by the volatilization into the air-filled pore spaces and fractures of the unsaturated bedrock. This mechanism is most relevant to benzene and the aliphatic fractions of PHC F2, which are characterized by moderate vapour pressures/Henry's Law constants and therefore greater tendency for vapour phase partitioning. As a result, and under optimal conditions, these compounds may partition from soil or groundwater into soil/bedrock gas in the soil/bedrock unsaturated zone and potentially be transported through soil/bedrock gas under the influence of pressure and partial pressure gradients to outdoor air or the indoor air of an

overlying building. The heavier constituents (including naphthalene) have almost negligible vapour pressures and therefore limited tendency for vapour phase partitioning.

The movement of COCs can also be retarded by sorption on to organic carbon associated with soil mineral particles. The degree of retardation is dependent on the organic carbon content of the soil mineral particles and the magnitude of the organic carbon partition coefficient of the chemical. Given that PHCs have high organic carbon partition coefficients, the movement of these COCs may be retarded as groundwater passes through high organic content materials. Benzene has relatively moderate organic carbon partition coefficients; as such, this mechanism is not considered significant for these COCs.

As a result of the physical and chemical processes affecting the fate and transport of COCs at the Site, the mass velocities of these chemical constituents can be expected to be much less than the linear groundwater velocity.

Initially the concentrations of benzene, PHCs F2 and naphthalene exceeded the MECP Table 7 SCS in groundwater at the Phase Two property, however groundwater sample results from these monitoring wells in June and September 2019 had concentrations of benzene, PHCs F2 and naphthalene that were less than the MECP Table 7 SCS. Therefore, there are no COC in groundwater.

5.12.10 Receptors and Exposure Pathways

Human Health Receptors and Exposure Pathways

The Phase Two property is currently vacant but was used for commercial purposes and is occupied by a vacant service garage and all petroleum related equipment has been removed. The Phase Two property will be redeveloped to residential townhomes in the future. The potential on-Site human receptors currently comprise long-term workers, short-term workers, property visitors (adult, teen, child, toddler and infant), and construction workers. The future potential residential land use on-Site human receptors comprise residents (adult, teen, child, toddler and infant) and short term visitors (adult, teen, child, toddler and infant).

The potential on-site exposure pathways for the construction workers are inadvertent soil ingestion, soil particulate inhalation, soil dermal contact, and ambient vapour inhalation (sourced from soil due to potential work conducted in a trench scenario).

The potential on-site exposure pathways for the short-term (outdoor) workers are soil particulate inhalation, soil dermal contact, and inadvertent soil ingestion.

The potential on-site exposure pathways for the long-term (indoor) workers, residents and property visitors indoor air inhalation (sourced from soil).

Ecological Receptors and Exposure Pathways

The Phase Two property is comprised of developed commercial lands capable of supporting some terrestrial ecological receptors. Relevant terrestrial receptors are terrestrial vegetation, such as trees, grasses and weeds; soil invertebrates, such as earthworms, millipedes and beetles; terrestrial birds, such as pigeons, sparrows and robins; and small terrestrial mammals, such as moles, voles, and mice.

The potential on-site exposure pathways for terrestrial vegetation are root uptake (soil), and stem and foliar uptake of vapours (sourced from soil).

The potential on-site exposure pathways for soil invertebrates are soil particulate inhalation, soil dermal contact, soil ingestion, vapour inhalation (sourced from soil).

The potential on-site exposure pathways for mammals and birds are soil particulate inhalation, soil dermal contact, soil ingestion, vapour inhalation (sourced from soil), animal tissue ingestion (as a result of biotransformation of soil.

6 Conclusions and Recommendations

Based on the Phase Two ESA results, the following summary is provided:

- On February 15, 19 and 20, 2019, a total of 5 boreholes (MW19-1 to MW19-5) were advanced at the Phase Two property and were completed with a monitoring well. On March 13, 2019, six (6) boreholes (BH6 to MW19-11) were advanced at the Phase Two property and a monitoring well was installed in MW19-9 to MW19-11 to facilitate groundwater sampling. The monitoring well at BH11 was installed from 4.3 m to 5.8 m to vertically delineate petroleum impact to groundwater. MW19-9 and MW19-10 were installed to delineate groundwater impact to the west and south of MW19-1.

- Based on the Phase Two ESA, there was approximately 1.5 m of sand fill with some silt and gravel at MW19-3. At MW19-1 and MW19-2, there was sand fill from 1.5 m to 3.6 m which corresponds to the former UST excavations. Slight to moderate petroleum odours were identified in the lower fill material at MW19-1 and MW19-2. At MW19-4 and MW19-5 there was sand and gravel till with a trace silt and clay. The thickness of till ranged from 1.1 m to 1.5 m and was underlain by bedrock. No petroleum odours were identified in the native soil.
- Grey, limestone bedrock was encountered at a depth of 0.8 m to 1.5 m. Groundwater was encountered at a depth of 2.49 m bsg in MW19-9 to 3.42 m in MW19-4. No petroleum sheens were observed in the monitoring wells during the sampling event. Based on the groundwater elevations, the groundwater flow at the Phase Two property is to the north.t
- Based on the results of the investigation, the concentrations of one or more exceedances of PHC F3, cadmium, lead, benzo(a)pyrene and fluoranthene of the MECP Table 7 SCS in soil.
- Initially the concentrations of benzene, PHCs F2 and naphthalene exceeded the MECP Table 7 SCS in groundwater at the Phase Two property, however groundwater sample results from these monitoring wells in June and September 2019 had concentrations of benzene, PHCs F2 and naphthalene that were less than the MECP Table 7 SCS.
- Approximately 600 m^3 of impacted soil was identified east of the existing site building. This soil should be removed and disposed of at a licensed landfill so that the soil concentrations satisfy the MECP Table 7 SCS.
- If the wells are no longer needed, they should be decommissioned in accordance with Ontario Regulation 903.

7 General Limitations

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current environmental conditions within the Phase Two property. The conclusions and recommendations presented in this report reflect Phase Two property conditions existing at the time of the investigation.

More specific information with respect to the conditions between samples, or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during any such excavation operations. Consequently, during the future development of the Phase Two property, conditions not observed during this investigation may become apparent. Should this occur, EXP Services Inc. should be contacted to assess the situation, and the need for additional testing and reporting. EXP has qualified personnel to provide assistance in regards to any future geotechnical and environmental issues related to this property.

The environmental investigation was carried out to address the intent of applicable provincial Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Ministry of Environment. It should also be noted that current environmental Regulations, Guidelines, Policies, Standards, Protocols and Objectives are subject to change, and such changes, when put into effect, could alter the conclusions and recommendations noted throughout this report. Achieving the study objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of this investigation assist in reducing the client's risk associated with environmental impairment. Our work should not be considered 'risk mitigation'. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of Hazeldean Crossing Inc. and may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust this report satisfies your immediate requirements. If you have any questions regarding the information in this report, please do not hesitate to contact this office.

8 References

This study was conducted in general accordance with the applicable Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Ministry of the Environment. Specific reference is made to the following:

- John D. Patterson and Associates Limited; August 11, 1994; *Geotechnical Investigation, Site of Proposed Amber Centre, Victor Street At Hazeldean Road, Township of Goulbourn, Ontario.*
- City of Ottawa. 2011. Characterization of Ottawa's Watersheds: An Environmental Foundation Document with Supporting Information Base. March.
- Environmental Protection Act, R.S.O. 1990, Chapter E.19, as amended, September 2004.
- Ministry of the Environment [MOE] (1996) Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. Ontario Ministry of the Environment, December 1996.
- MOE (2011) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. Ontario Ministry of the Environment, April 15, 2011.
- MOE (2011) Guide for Completing Phase Two Environmental Site Assessments under Ontario Regulation 153/04. Ontario Ministry of the Environment, June 2011.
- MOE (2011) Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Ontario Ministry of the Environment, March 2004, amended as of July 1, 2011.
- Ontario Regulation 153/04, made under the Environmental Protection Act, May 2004, last amended to O.Reg.333/13.
- Ontario Water Resources Act – R.R.O. 1990, Regulation 903, amended to O.Reg. 128/03, August 2003.
- Groundwater, Freeze and Cherry 1979. Prentice Hall.
- Singer, S.N., C.K. Cheng, M.G. Scafe. 2003. Hydrogeology of Southern Ontario. Hydrogeology of Ontario Series – Report 1. Prepared for Ministry of Environment.
- WESA. 2006. Watershed Characterization: Geologic Model and Conceptual Hydrogeological Model, Raisin Region CA and South Nation Conservation, Source Protection Plan Partnership.

Tables

Table 1

Characteristic	Description
Minimum Depth to Bedrock	0.76 m
Minimum Depth to Groundwater	2.49 m (April 25, 2019)
Shallow Soil Property	Yes, bedrock less than 2.0 m
Proximity to water body or ANSI	580 m east
Soil pH	7.70 and 7.90
Soil Texture	Coarse
Current Property Use	Former Gasoline Retail Outlet and Service Garage
Future Property Use	Residential
Proposed Future Building	Residential Townhomes Over Entire Site
Areas where soil has been brought to the Phase One Property	None identified

Appendix A – Sampling and Analysis Plan

1 Introduction

This appendix presents the Sampling and Analysis Plan (SAAP) that was developed in support of the Phase Two Environmental Site Assessment (ESA) for the property located at 5938 Hazeldean Road in Ottawa, Ontario (hereinafter referred to as the 'site'). The SAAP presents the procedures and measures that will be undertaken during field investigative activities to characterize the site conditions and meet the data quality objectives of the Phase Two ESA.

The SAAP presents the sampling program proposed for the site, the recommended procedures and protocols for sampling and related field activities, the data quality objectives, and the quality assurance/ quality control measures that will be undertaken to provide for the collection of accurate, reproducible and representative data. These components are described in further detail below.

2 Field Sampling Program

The field sampling program was developed to provide for the collection of samples of the soil and groundwater for chemical analysis of petroleum hydrocarbons (PHC), benzene, toluene, ethylbenzene and xylenes (collectively known as 'BTEX'), polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), and/or metals. The soil sampling media is to consist of the overburden materials (depths up to 3.5 m of overburden beneath site). The soil sampling will be location-specific to assess for the potential presence of PHC, BTEX, PAH, VOC, and/or metals based on the identification of potential areas of potential environmental concern identified in a Phase One ESA completed by EXP in 2019. Vapour readings will also be taken in the field to determine samples to be submitted for laboratory analysis.

Each of the groundwater samples will be submitted for analysis of metals, VOC, PAH, PHC and BTEX. The monitoring well network is to comprise of five monitoring wells.

Vertical control of the boreholes and monitoring wells will be obtained through the completion of an elevation survey with reference to a geodetic benchmark. Groundwater flow and direction in the overburden aquifer will also be determined through groundwater level measurements and the elevations established in the site elevation survey.

3 Field Methods

To meet the requirements of the field sampling program, the following field investigative methods will be undertaken:

- Borehole Drilling;
- Soil Sampling;
- Monitoring Well Installation;
- Groundwater Level Measurements;
- Elevation Survey; and,
- Groundwater Sampling.

The field investigative methods will be performed following the procedures and protocols set out in EXP's standard operating procedures and are outlined below:

3.1 Borehole Drilling

Boreholes will be advanced at the site to facilitate the collection of soil samples for chemical analysis and geologic characterization; and, for the installation of groundwater monitoring wells. A total of five (5) boreholes are proposed to be advanced at the site, up to a maximum overburden depth of approximately 6 m below grade, to provide for the collection of samples of the surficial and overburden materials beneath the site. The borehole locations will be selected to delineate the extent and magnitude of PCOC related impacts to the soils and the groundwater.

Prior to borehole drilling, utility clearances will be obtained from public and private locators, as required. The borehole drilling program will be conducted by a licensed driller under the oversight of EXP field staff. All drilling equipment will be cleaned prior to the commencement of drilling at each borehole location.

3.2 Soil Sampling

Soil samples will be collected for chemical analysis and geologic property characterization. The soil samples will be collected using 5 cm diameter, 60 cm long, stainless steel split-spoon sampling devices advanced ahead of the direct push drilling equipment at continuous intervals. The split spoon sampling devices will be attached to drill rods and advanced into the soil by means of a standard penetrating hammer. Upon retrieval from the boreholes, the split-spoon samplers will be placed on a flat surface and disassembled by drilling personnel to provide access of the recovered cores. Geologic and sampling details of the recovered cores will be logged and the samples will be assessed for the potential presence of non-aqueous phase liquids. Samples for chemical analysis will be selected on the basis of visual and olfactory evidence of impacts and at specific intervals to define the lateral and vertical extent of known impacts.

Recommended volumes of soil samples selected for chemical analysis will be collected into pre-cleaned, laboratory supplied, analytical test group specific containers. The samples will be placed into clean insulated coolers chilled with ice for storage and transport. Samples intended for analysis of VOC, BTEX and PHC F1-F2 will be collected into 40 ml vials. The samples will be assigned unique identification numbers, and the date, time, location, and requested analyses for each sample will be documented in a bound field note book. The samples will be submitted to the contract laboratory within analytical test group holding times under Chain of Custody (COC) protocols. New disposable chemical resistant gloves will be used for each soil core to prevent sample cross-contamination.

3.3 Monitoring Well Installation

It is proposed that five boreholes will be instrumented as a groundwater monitoring well installed with slotted screens intercepting either the native overburden material or the shallow bedrock, where the water table aquifer is expected, extending to depths of approximately 6 m below grade. The monitoring wells will be constructed using 37 mm diameter, Schedule 40, PVC riser pipe and number 10 slot size (0.25 mm) well screens. The base of the well screens will be sealed with threaded flush PVC end caps. All well pipe connections will be factory machined threaded flush couplings. The annular space around the well screens will be backfilled with silica sand, to an average height of 0.3 m above the top of the screen. Granular bentonite will be placed in the borehole annulus from the top of the sand pack to approximately 0.3 m below grade. The monitoring wells will be completed with either a flush-mounted protective steel casing or above ground protective casings cemented into place.

3.4 Monitoring Well Development

The newly installed monitoring wells will be developed to remove fine sediment particles potentially lodged in the sand pack and well screen to enhance hydraulic communication with the surrounding formation waters.

Standing water volumes will be determined by means of an electronic water level meter. Prior to collecting groundwater samples, the monitoring wells will be developed using low flow sampling techniques to reduce the amount of sediment in the samples. Well development details will be documented on a well development log sheet or in a bound hard cover notebook. All development waters will be collected and stored in labeled, sealed containers.

3.5 Groundwater Level Measurements

Groundwater level measurements will be recorded for the monitoring wells to determine groundwater flow and direction in the water table aquifer beneath the site. Water levels will be measured with respect to the top of the casing by means of an electronic water level meter. The water levels will be recorded on water level log sheets. The water level meter probe will be decontaminated between monitoring well locations.

3.6 Elevation Survey

An elevation survey will be conducted to obtain vertical control of all monitoring well locations. The top of casing and ground surface elevation of each monitoring well location will be surveyed against a known geodetic benchmark, or if unavailable, against a suitable arbitrary benchmark. Elevations measured against using a high precision GPS unit and a benchmark with an assigned elevation will be recorded as meters above mean sea level (m AMSL). The elevation survey will be accurate to within ± 0.5 cm.

3.7 Groundwater Sampling

Groundwater samples will be collected from the monitoring wells for chemical analysis. The wells will be sampled using a “low flow” technique whereby the wells are continuously purged using an electric pump (equipped with dedicated tubing) and parameters within the purged water are monitored using a groundwater chemistry multi-meter at 3 minute intervals. These parameters include: pH, conductivity, temperature, and salinity. Once these parameters are found to deviate less than 10% over three testing events, equilibrium is deemed to have occurred and a sample of the groundwater will be collected. The purge water will also be continuously monitored for visual and olfactory evidence of petroleum and solvent impact (sheen and odour).

Recommended groundwater sample volumes will be collected into pre-clean laboratory-supplied vials or bottles provided with analytical test group specific preservatives, as required. The samples will be placed in an insulated cooler chilled with ice for storage and transport. Each VOC vial will be inverted and inspected for gas bubbles prior to being placed in the cooler to ensure that no head-space is present. All groundwater samples will be assigned unique identification numbers, and the date, time, project number, company name, location and requested analyses for each sample will be documented in a bound hard cover notebook. The samples will be submitted to the contractual laboratory within analytical test group holding times under COC protocols. New disposable chemical resistant gloves will be used for each sampling location to prevent sample cross-contamination.

4 Field Quality Assurance/Quality Control Program

The objective of the field quality assurance/quality control (QA/QC) program is to obtain soil and groundwater samples and other field measurements that provide data of acceptable quality that meets the objectives of the Phase Two ESA. The objectives of the QA/QC program will be achieved through the implementation of procedures for the collection of unbiased (i.e. non-contaminated) samples, sample documentation and the collection of appropriate QC samples to provide a measure of sample reproducibility and accuracy. The field QA/QC measures will comprise:

- Decontamination Protocols;
- Equipment Calibration;
- Sample Preservation;
- Sample Documentation; and,
- Field Quality Control Samples.

Details on the field QA/QC measures are provided below.

4.1 Decontamination Protocols

Decontamination protocols will be followed during field sampling where non-dedicated sampling equipment is used to prevent sample cross contamination. The split spoon soil sampling device will be cleaned/decontaminated between sampling intervals in according with SOP requirements. For the monitoring well installation, well components are not to come into contact with the ground surface prior to insertion into boreholes. Electronic water level meters will be decontaminated between monitoring well locations during well development, and purging activities. For hydraulic conductivity tests, the electronic water level meters will be decontaminated between sampling locations. All decontamination fluids will be collected and stored in sealed, labeled containers.

4.2 Equipment Calibration

All equipment requiring calibration will be calibrated in the field according to manufacturer's requirements using analytical grade reagents, or by the supplier prior to conducting field activities, and subsequently checked in the field. The calibration of all pre-calibrated instruments will be checked in the field using analytical grade reagents and re-calibrated as required. For multiple day sampling events, equipment calibration will be checked prior to the beginning of sampling activities. All calibration data will be documented in a bound hard cover notebook.

4.3 Sample Preservation

All samples will be preserved using appropriate analytical test group specific reagents, as required, and upon collection placed in pre-chilled insulated coolers packed with ice for storage and transport.

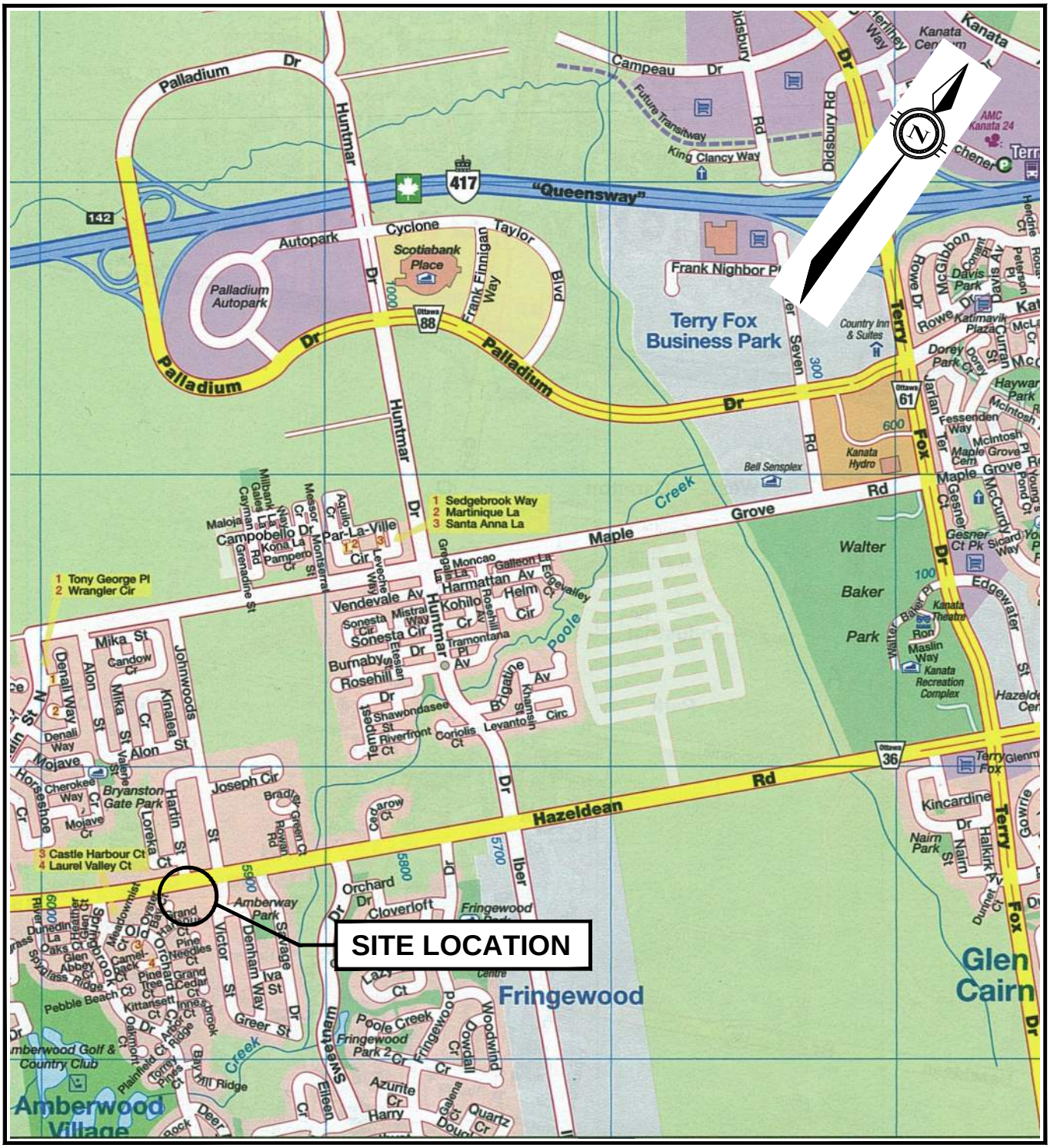
4.4 Sample Documentation

All samples will be assigned a unique identification number, which is to be recorded along with the date, time, project number, company name, location and requested analysis in a bound field notebook. All samples will be handled and transported following COC protocols.

4.5 Field Quality Control

Field quality controls samples will be collected to evaluate the accuracy and reproducibility of the field sampling procedures. For soil and groundwater sampling, one (1) field duplicate is to be collected for every ten (10) samples submitted for chemical analysis. The field duplicate samples will be assessed by calculating the relative percent difference and comparing to the analytical test group specific acceptance criteria.

Appendix B – Figures



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DATE: APRIL 2019	CLIENT: HAZELDEAN CROSSING INC.	project no. OTT-00250806-A0
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DRAWN BY: A.O.		FIG 1

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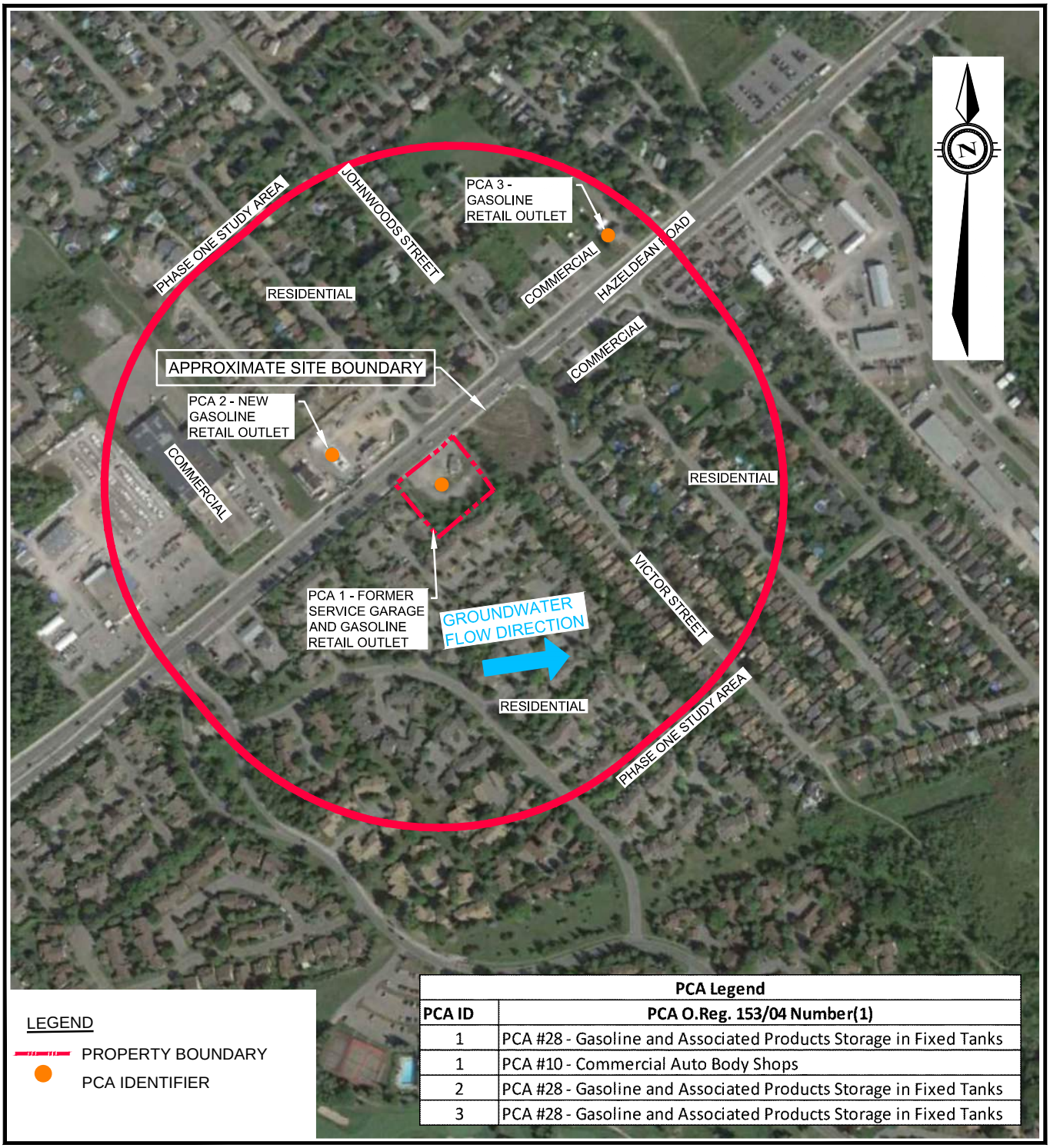

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1	PCA #10 - Commercial Auto Body Shops
2	PCA #28 - Gasoline and Associated Products Storage in Fixed Tanks
3	PCA #28 - Gasoline and Associated Products Storage in Fixed Tanks

LEGEND

PROPERTY BOUNDARY

PCA IDENTIFIER

0 50m 100m 200m

HORIZONTAL 1:5000

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HORIZONTAL 1:750

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DATE: MAR. 2019	CLIENT: HAZELDEAN CROSSING INC.	project no. OTT-00250806-C0
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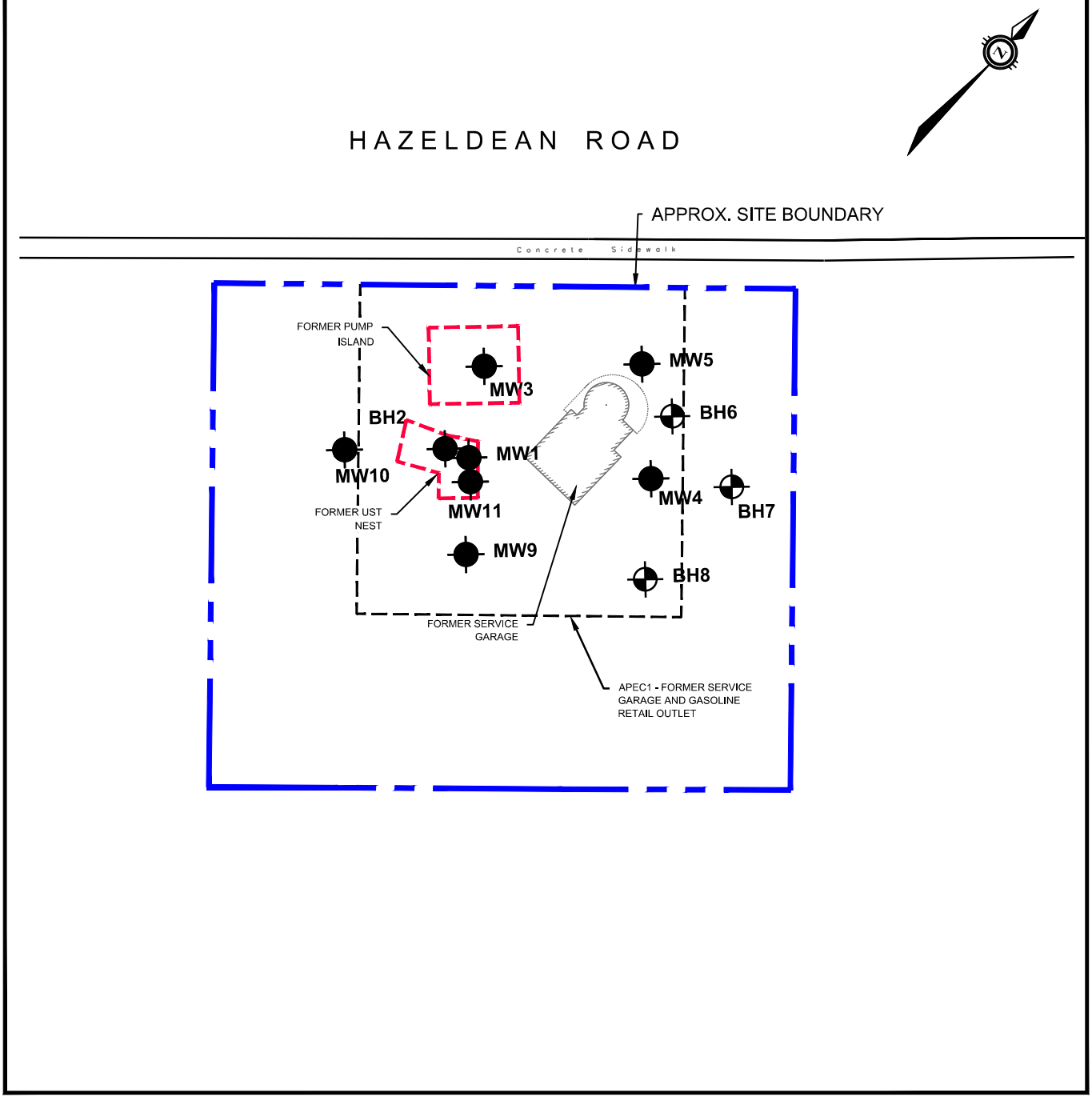

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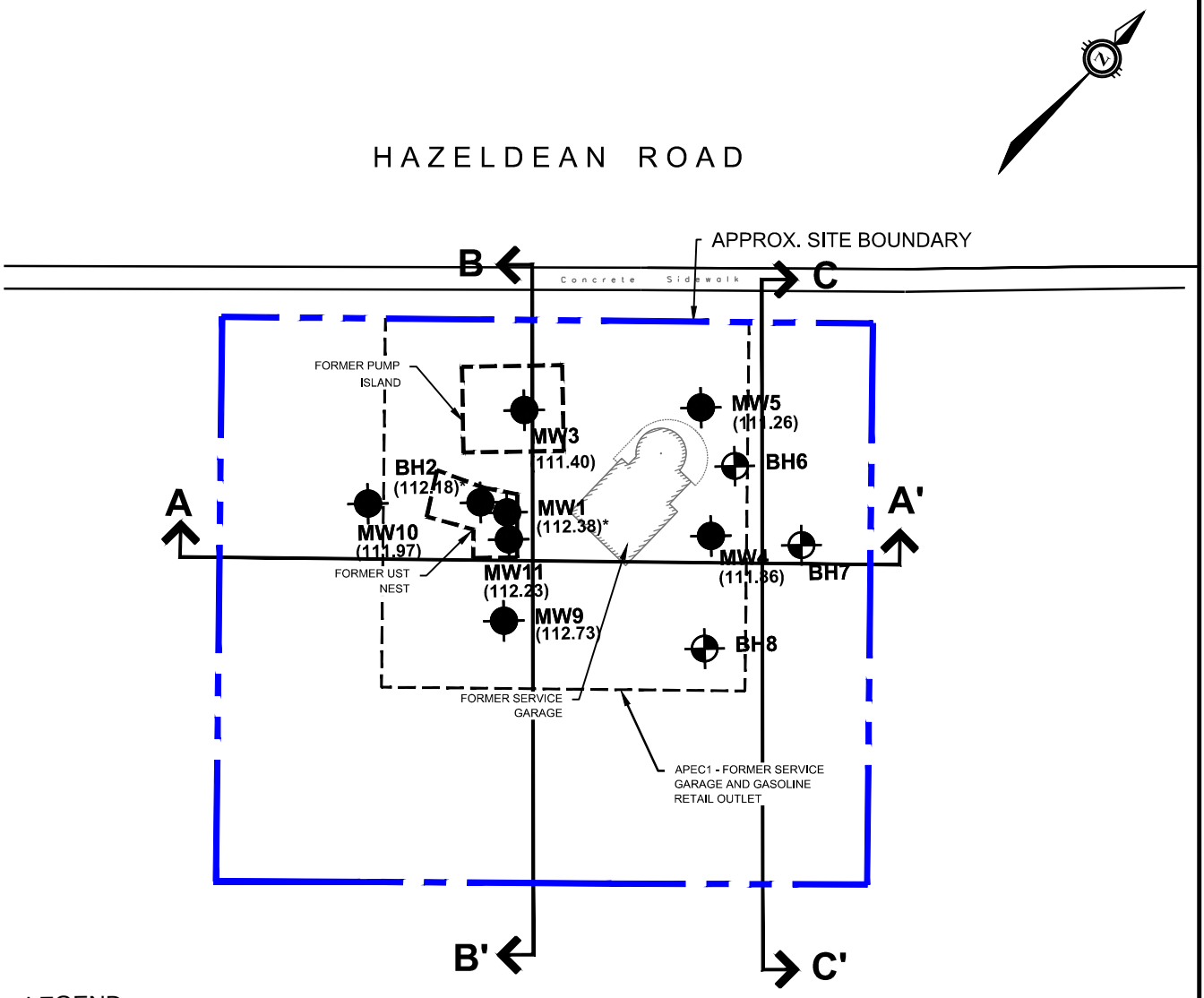

LEGEND

BH1 (111.97) BOREHOLE NUMBER, LOCATION AND GROUND WATER ELEVATION (APRIL 25, 2019)

MW11 (112.23) MONITORING NUMBER, LOCATION AND GROUND WATER ELEVATION (APRIL 25, 2019)

0 5m 10m 30m

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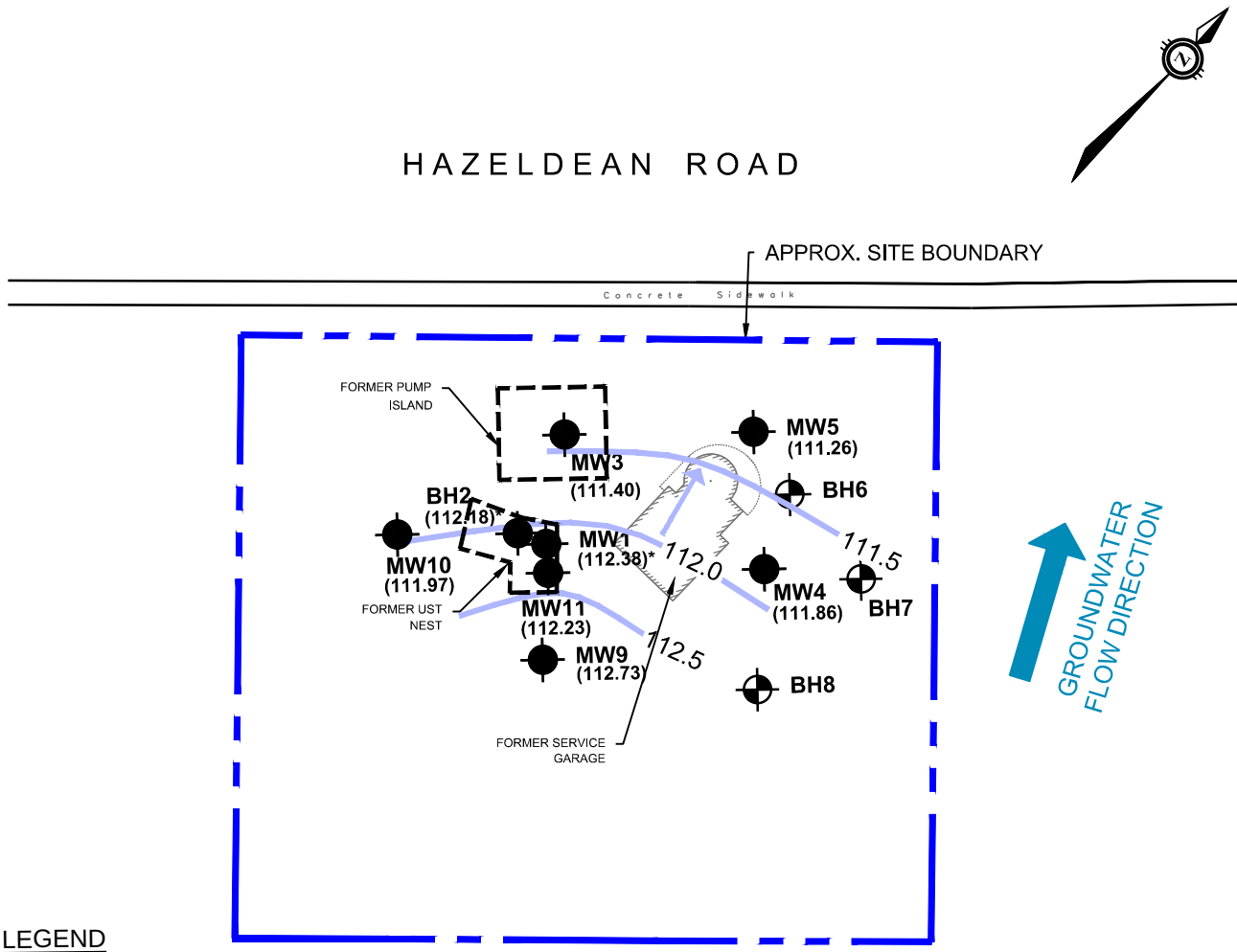

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BH1 (111.97) BOREHOLE NUMBER, LOCATION AND GROUND WATER ELEVATION (APRIL 25, 2019)

MW11 (112.23) MONITORING NUMBER, LOCATION AND GROUND WATER ELEVATION (APRIL 25, 2019)

(111.97)* OVERBURDEN GROUNDWATER ELEVATION

GROUND WATER CONTOUR

GROUND WATER FLOW DIRECTION

0 5m 10m 30m

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DRAWN BY: A.O.	TITLE: GROUNDWATER CONTOUR PLAN 5938 HAZELDEAN ROAD, OTTAWA, ON	FIG 6

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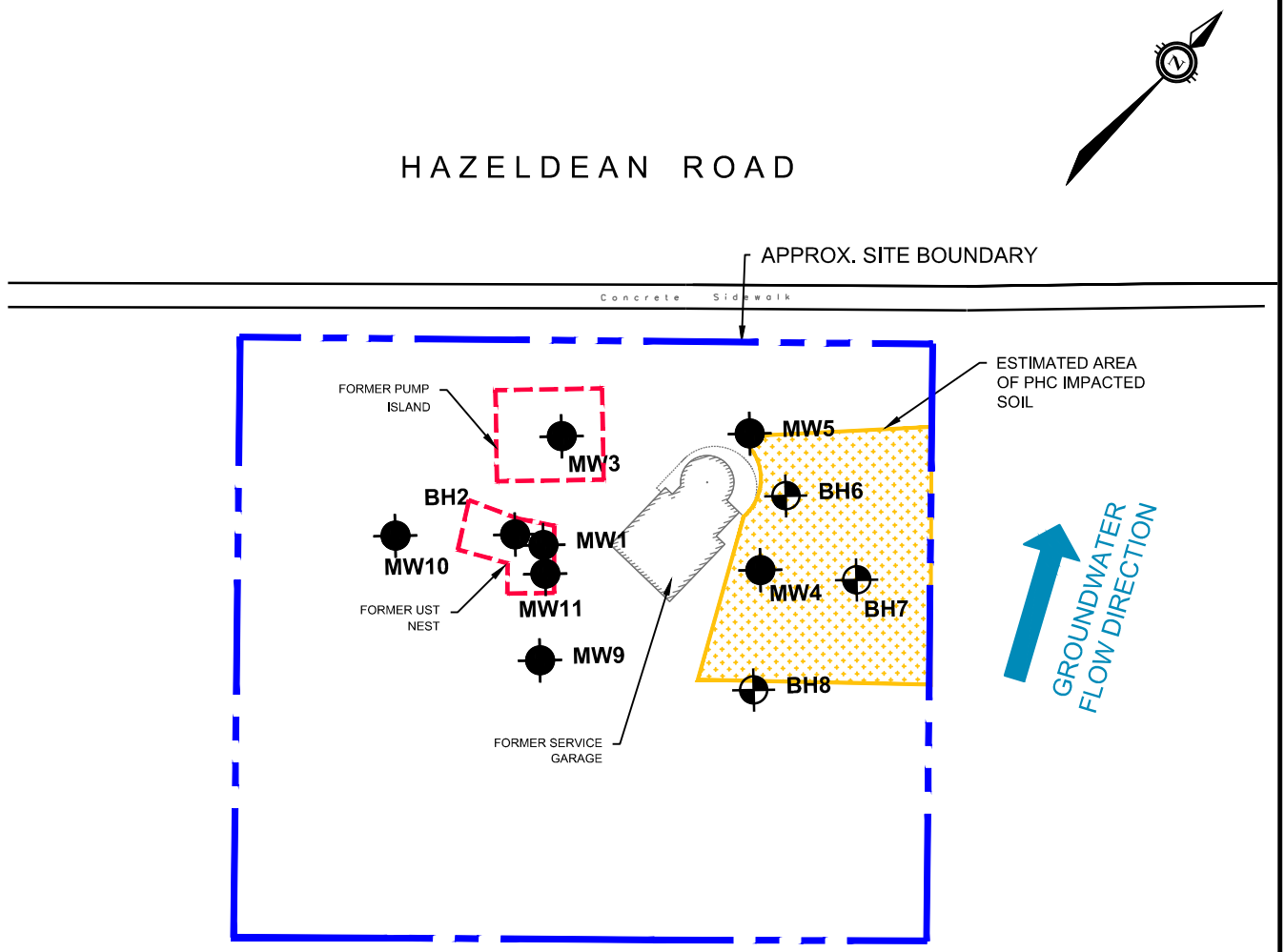

LEGEND

BH1 BOREHOLE NUMBER & LOCATION

MW11 MONITORING WELL NUMBER & LOCATION

ESTIMATED AREA OF PHC IMPACTED SOIL

BH4 AS1 (0.1S-0.7Sm)		
PARAMETER	CRITERIA (µs/s)	SAMPLE (µs/s)
PHC F3	300	900

BH6 AS2 (0.60-1.20m)		
PARAMETER	CRITERIA (µs/s)	SAMPLE (µs/s)
PHC F3	300	600

BH7 AS1 (0.10-0.30m)		
PARAMETER	CRITERIA (µs/s)	SAMPLE (µs/s)
PHC F3	300	650

0 5m 10m 30m

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DRAWN BY: A.O.	TITLE: PHC IMPACT IN SOIL 5938 HAZELDEAN ROAD, OTTAWA, ON	FIG 7

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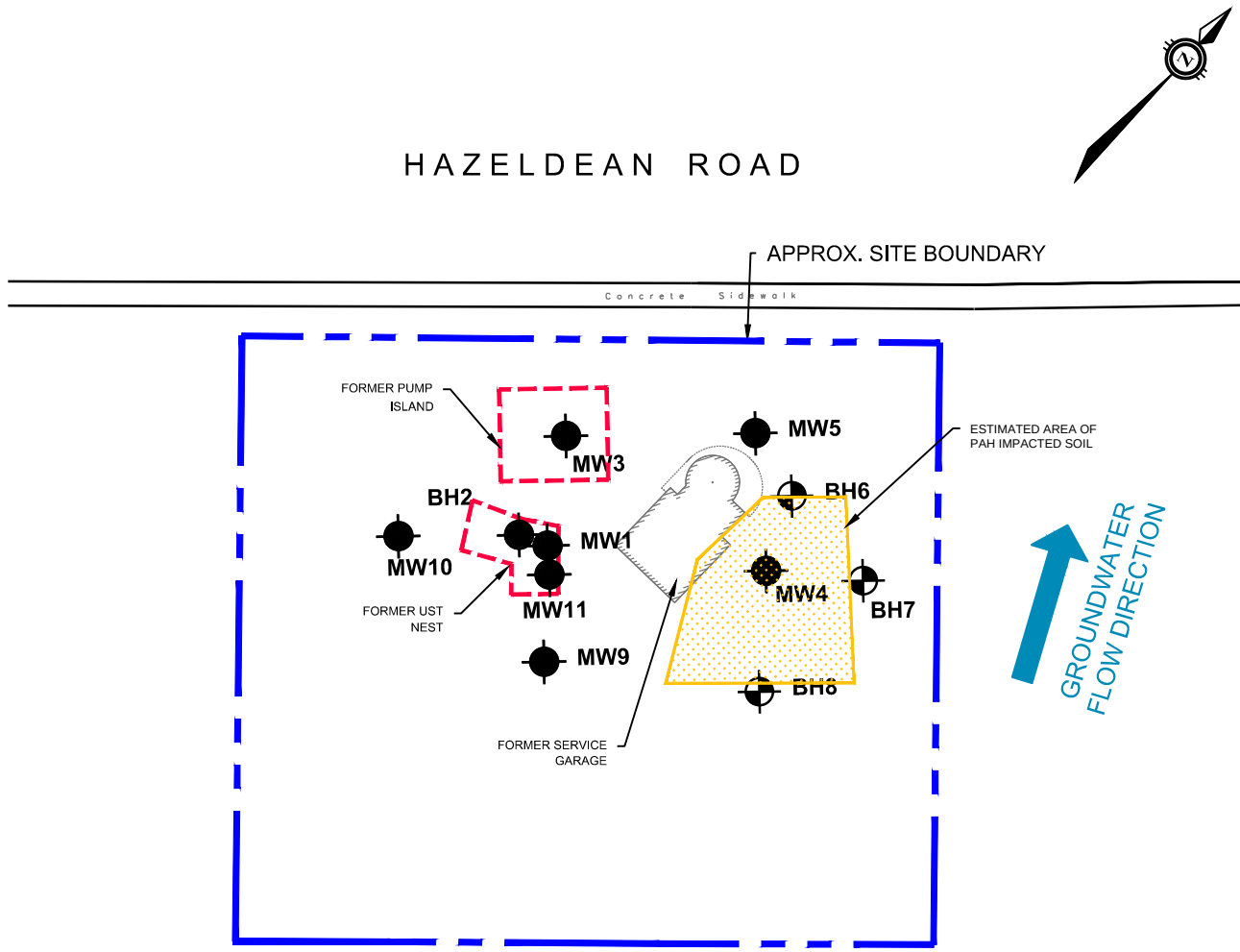

LEGEND

BH1 BOREHOLE NUMBER & LOCATION

MW11 MONITORING WELL NUMBER & LOCATION

ESTIMATED AREA OF PAH IMPACTED SOIL

BH4 A51 (0.15-0.75m)		
PARAMETER	CRITERIA (µs/s)	SAMPLE (µs/s)
BENZO(A) PYRENE	0.3	0.39
FLUORANTHENE	0.69	1.1

0 5m 10m 30m

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DATE: MAR. 2019	CLIENT: HAZELDEAN CROSSING INC.	project no. OTT-00250806-C0
DESIGN: M.G.M. / CHECKED: C.E.H.		scale: 1:750
DRAWN BY: A.O.	TITLE: PAH IMPACT IN SOIL 5938 HAZELDEAN ROAD, OTTAWA, ON	FIG 8

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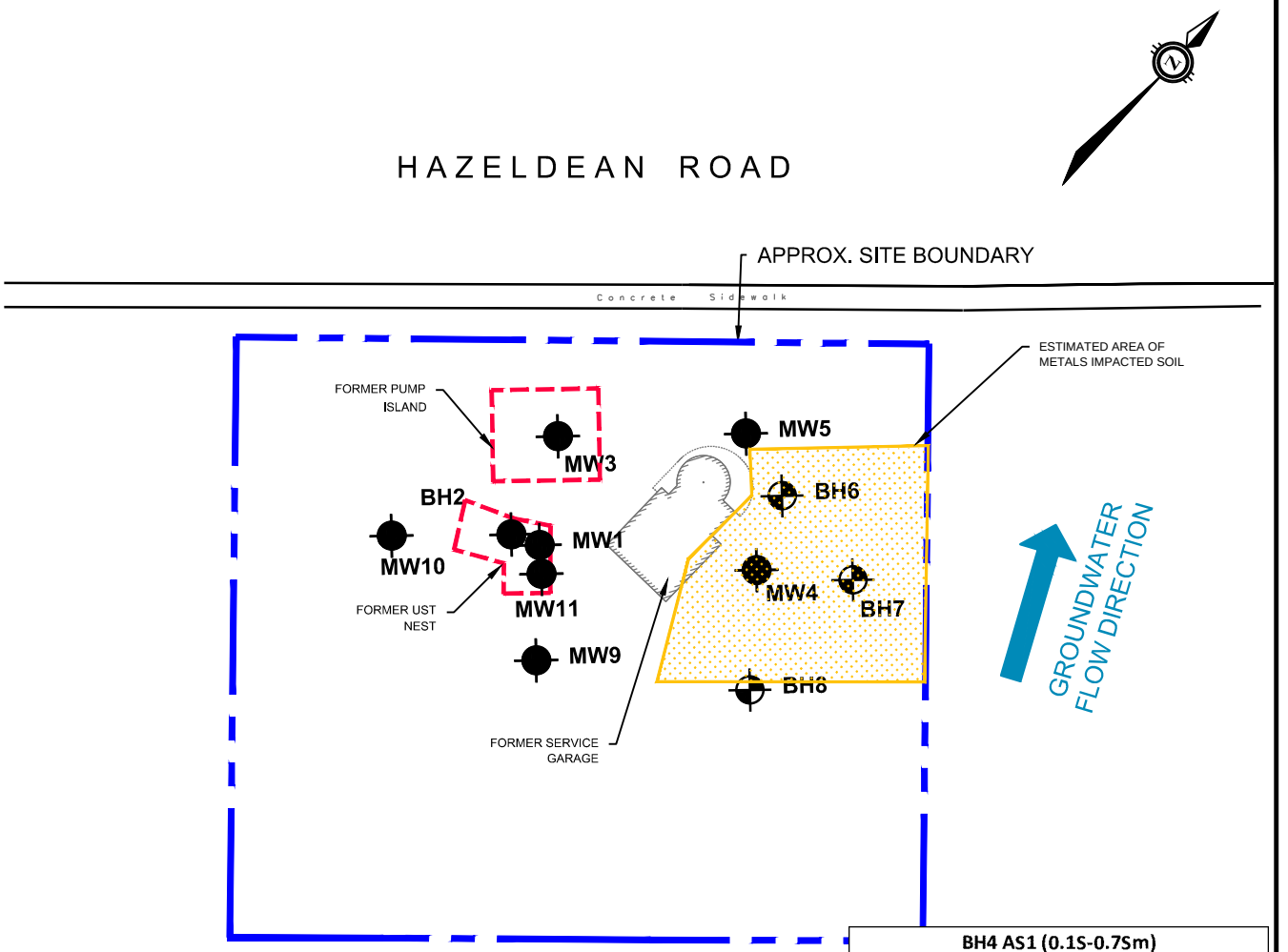

BH4 AS1 (0.1S-0.7Sm)		
PARAMETER	CRITERIA (µs/s)	SAMPLE (µs/s)
CADMIUM	1.2	1.4
LEAD	120	600

BH6 AS1 (0.60-1.20m)		
PARAMETER	CRITERIA (µs/s)	SAMPLE (µs/s)
CADMIUM	1.2	1.3
LEAD	120	270

BH7 AS1 (0.10-0.30m)		
PARAMETER	CRITERIA (µs/s)	SAMPLE (µs/s)
LEAD	120	340

LEGEND

BH1 BOREHOLE NUMBER & LOCATION

MW11 MONITORING WELL NUMBER & LOCATION

ESTIMATED AREA OF PAH IMPACTED SOIL

0 5m 10m 30m

HORIZONTAL 1:750

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DESIGN: M.G.M. / CHECKED: C.E.H.		scale: 1:750
DRAWN BY: A.O.	TITLE: METALS IMPACT IN SOIL 5938 HAZELDEAN ROAD, OTTAWA, ON	FIG 9

Filename: p:\projects\environmental\250000s\250000\250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 3 rev 2019-03-22.dwg
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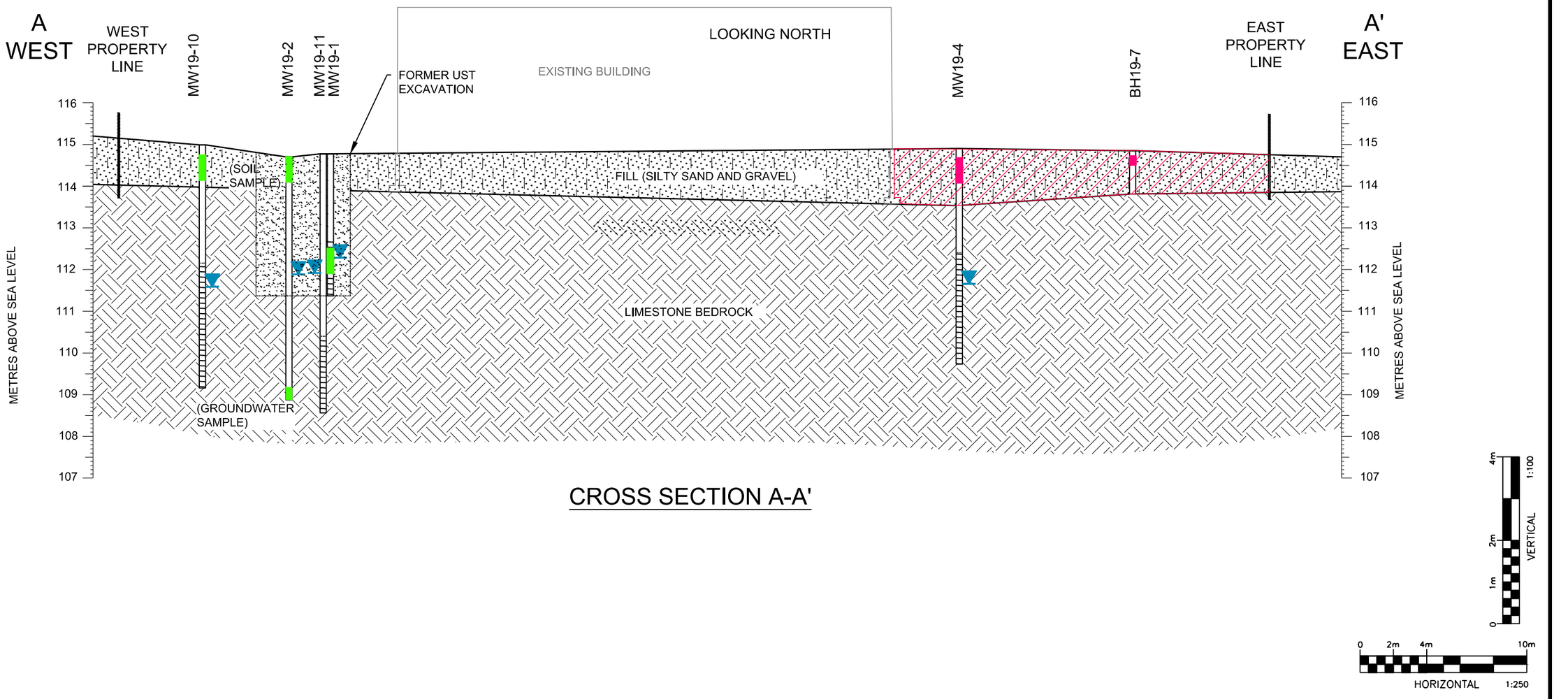

CROSS SECTION A-A'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- SOIL QUALITY MEETS MECP TABLE 7 SCS
- SOIL QUALITY EXCEEDS MECP TABLE 7 SCS
- ESTIMATED AREA OF PHC IMPACTED SOIL

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DATE: MAR. 2019	CLIENT: HAZELDEAN CROSSING INC.		project no. OTT-00250806-C0
DESIGN: M.G.M. / CHECKED: M.G.M.	TITLE: CROSS-SECTIONS A-A' PHC IMPACTS IN SOIL PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON		scale AS NOTED
DRAWN BY: A.O.			FIG 10A

Filename: p:\projects\environmental\250000s\250000250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
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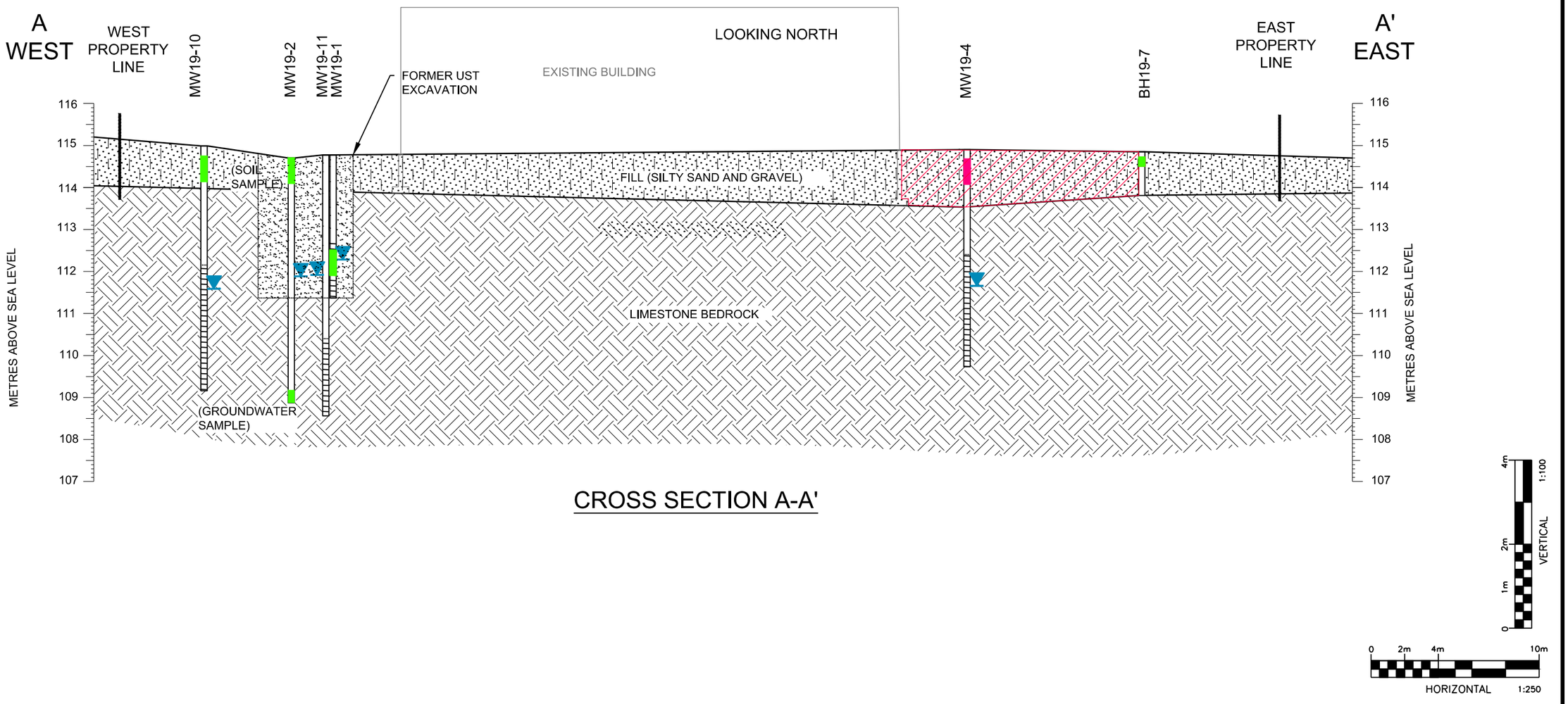

CROSS SECTION A-A'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- SOIL QUALITY MEETS MECP TABLE 7 SCS
- SOIL QUALITY EXCEEDS MECP TABLE 7 SCS
- ESTIMATED AREA OF PAH IMPACTED SOIL

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DATE: MAR. 2019	CLIENT: HAZELDEAN CROSSING INC.	project no. OTT-00250806-C0
DESIGN: M.G.M. / CHECKED: M.G.M.		scale: AS NOTED
DRAWN BY: A.O.	TITLE: CROSS-SECTIONS A-A' PAH IMPACTS IN SOIL PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON	FIG 10B

Filename: p:\projects\environmental\250000s\250000250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
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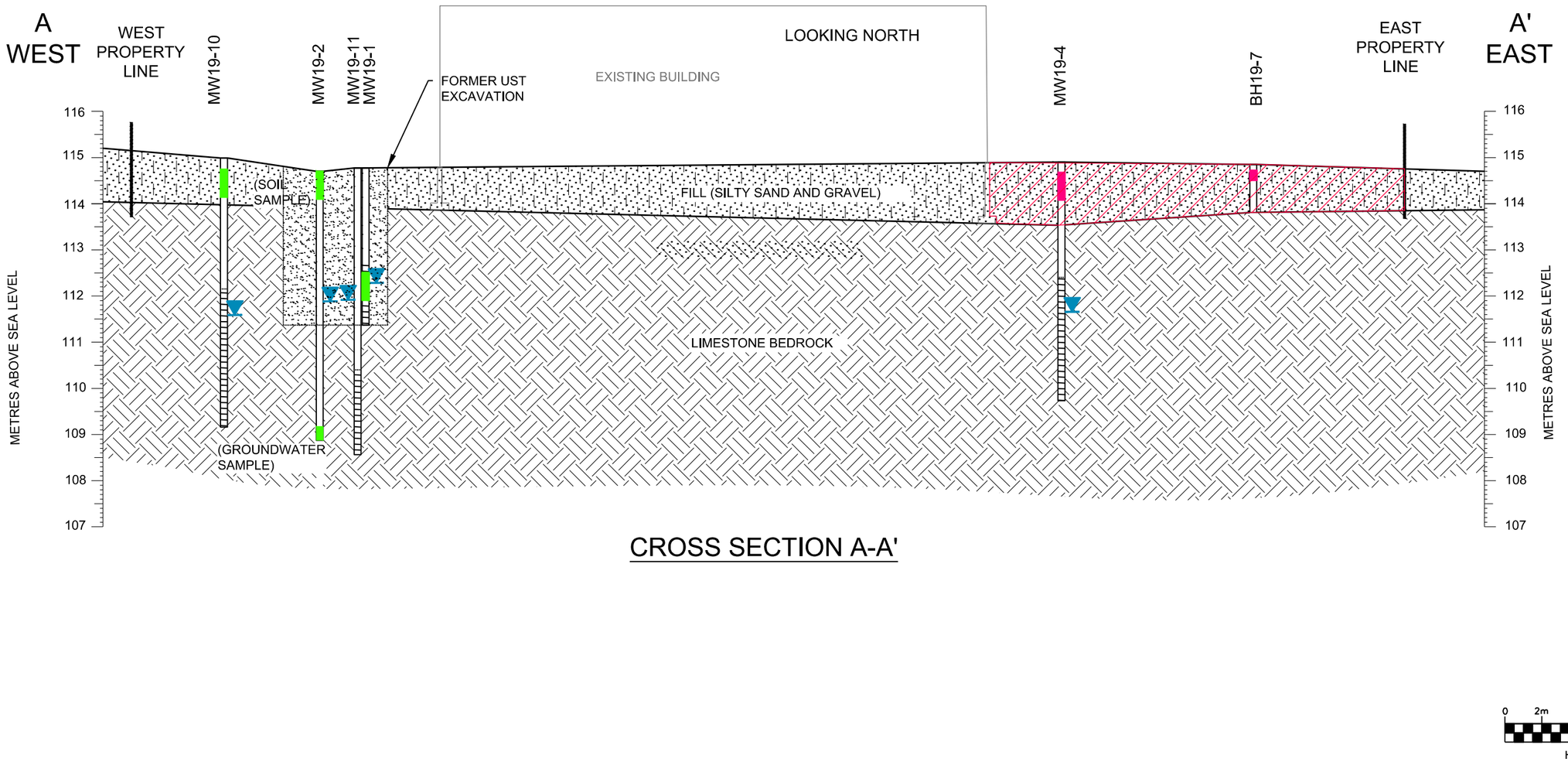

CROSS SECTION A-A'

4m 2m 1m 0 VERTICAL 1:100

0 2m 4m 10m HORIZONTAL 1:250

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- SOIL QUALITY MEETS MECP TABLE 7 SCS
- SOIL QUALITY EXCEEDS MECP TABLE 7 SCS
- ESTIMATED AREA OF METALS IMPACTED SOIL

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DATE: MAR. 2019	CLIENT: HAZELDEAN CROSSING INC.	project no. OTT-00250806-C0
DESIGN: M.G.M. / CHECKED: M.G.M.	TITLE: CROSS-SECTIONS A-A' METALS IMPACTS IN SOIL PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON	scale AS NOTED
DRAWN BY: A.O.		FIG 10C

Filename: p:\projects\environmental\250000s\250000250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
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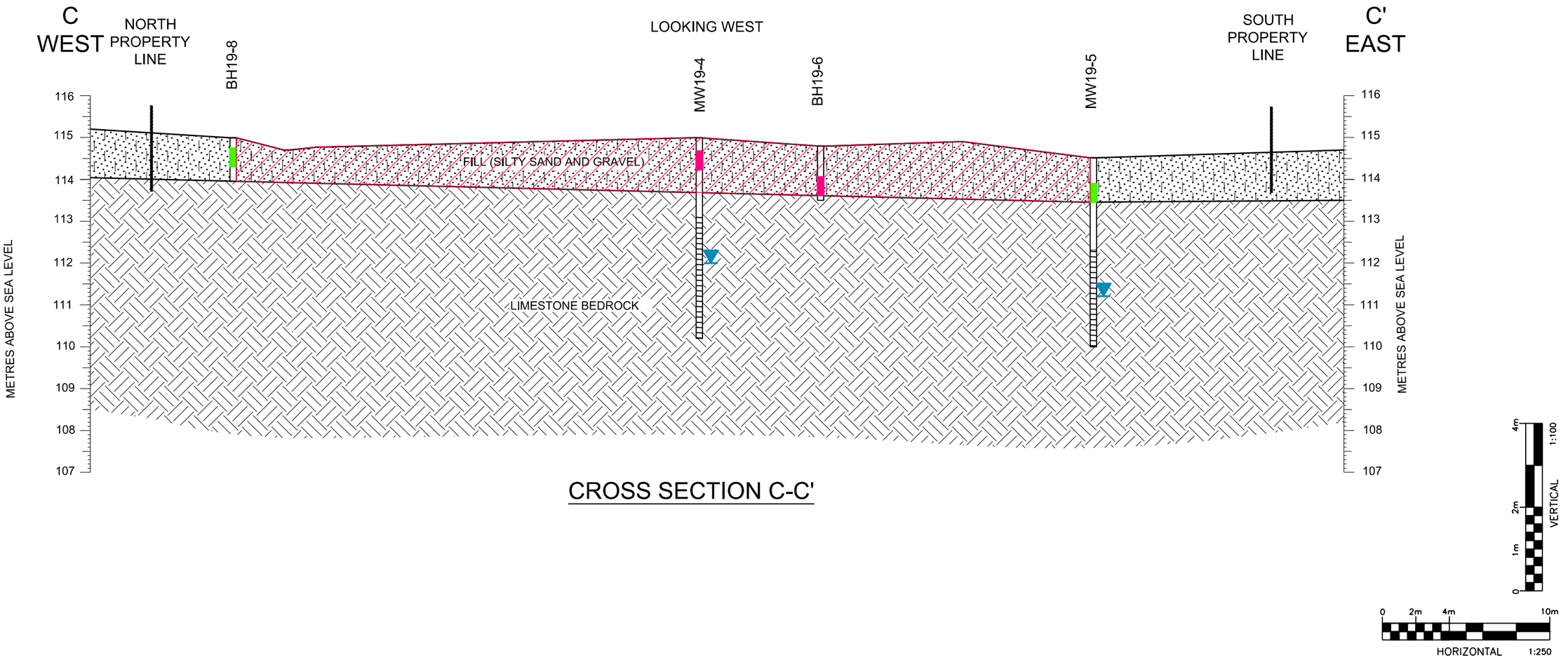

CROSS SECTION C-C'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- SOIL QUALITY MEETS MECP TABLE 7 SCS
- SOIL QUALITY EXCEEDS MECP TABLE 7 SCS
- ESTIMATED AREA OF PHC IMPACTED SOIL

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DESIGN: M.G.M.	CHECKED: M.G.M.	TITLE: CROSS-SECTIONS C-C' WITH PHC IMPACTS TO SOIL PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON	scale AS NOTED
DRAWN BY: A.O.			FIG 11A

Filename: p:\projects\environmental\250000s\250000250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
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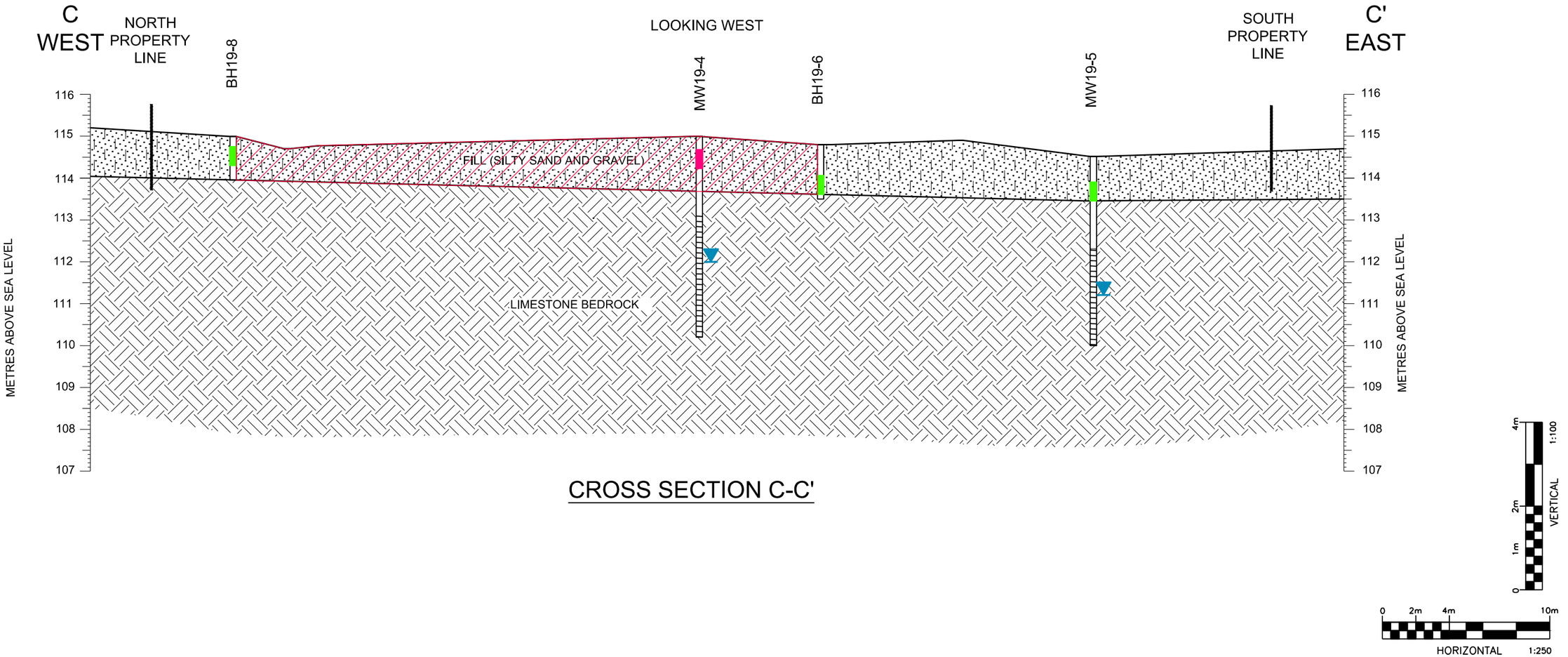

CROSS SECTION C-C'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- SOIL QUALITY MEETS MECP TABLE 7 SCS
- SOIL QUALITY EXCEEDS MECP TABLE 7 SCS
- ESTIMATED AREA OF PAH IMPACTED SOIL

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DESIGN: M.G.M.	CHECKED: M.G.M.	TITLE: CROSS-SECTIONS C-C' WITH PAH IMPACTS TO SOIL PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON	scale AS NOTED
DRAWN BY: A.O.			FIG 11B

Filename: p:\projects\environmental\250000s\250000250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
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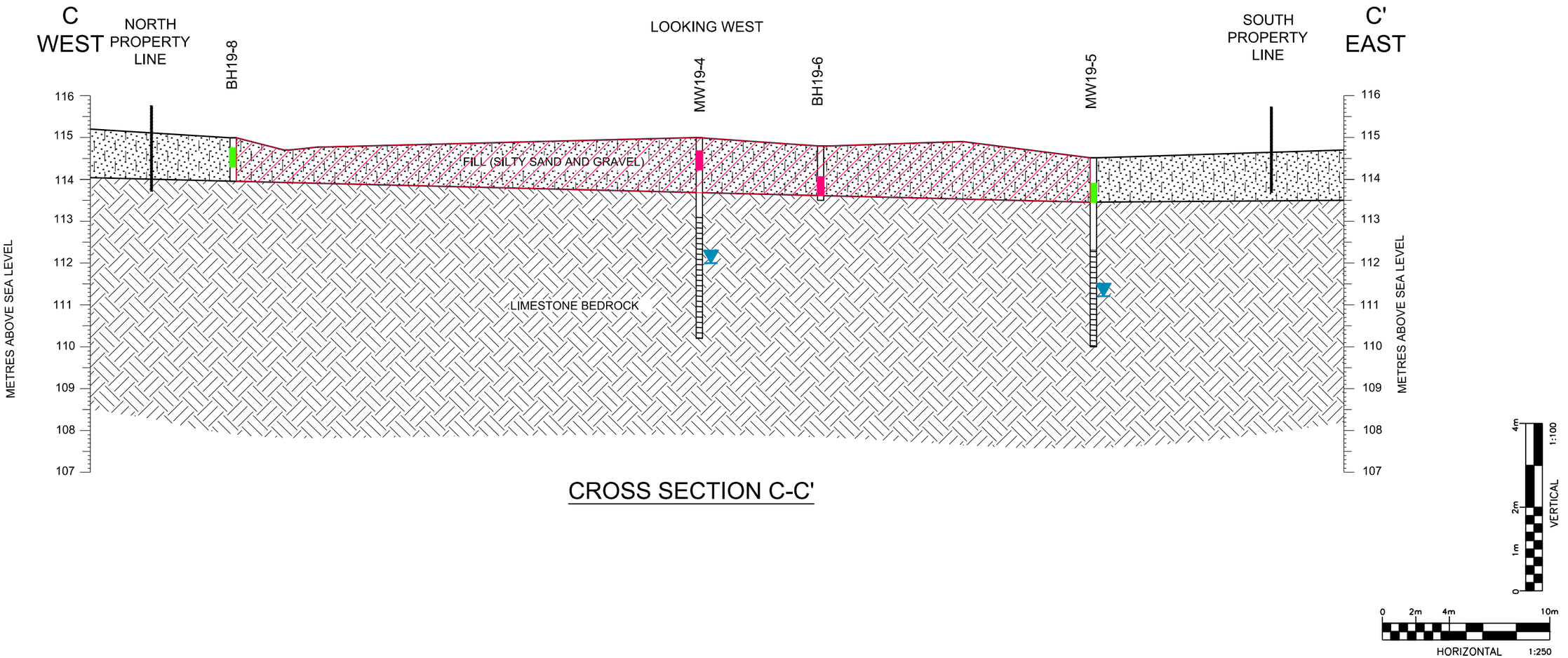

CROSS SECTION C-C'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- SOIL QUALITY MEETS MECP TABLE 7 SCS
- SOIL QUALITY EXCEEDS MECP TABLE 7 SCS
- ESTIMATED AREA OF METALS IMPACTED SOIL

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DESIGN: M.G.M.	CHECKED: M.G.M.	TITLE: CROSS-SECTIONS C-C' WITH METALS IMPACTS TO SOIL PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON	scale AS NOTED
DRAWN BY: A.O.			FIG 11C

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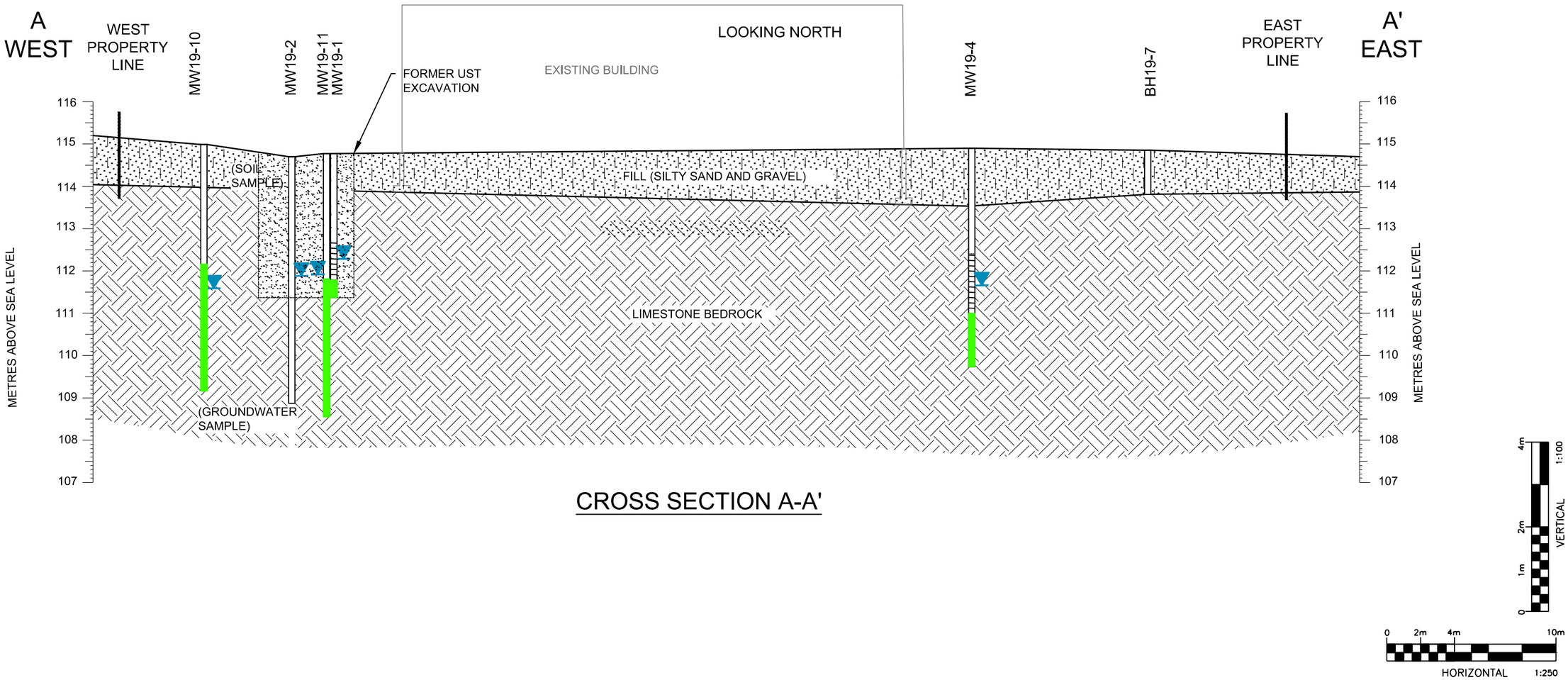

CROSS SECTION A-A'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- GROUNDWATER QUALITY MEETS MECP TABLE 7 SCS
- GROUNDWATER QUALITY EXCEEDS MECP TABLE 7 SCS

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DESIGN: M.G.M. / CHECKED: C.E.H.		scale: AS NOTED
DRAWN BY: A.O.	TITLE: CROSS-SECTIONS A-A' WITH PHC IMPACTS IN GROUNDWATER PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON	FIG 12

Filename: p:\projects\environmental\250000s\250000250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
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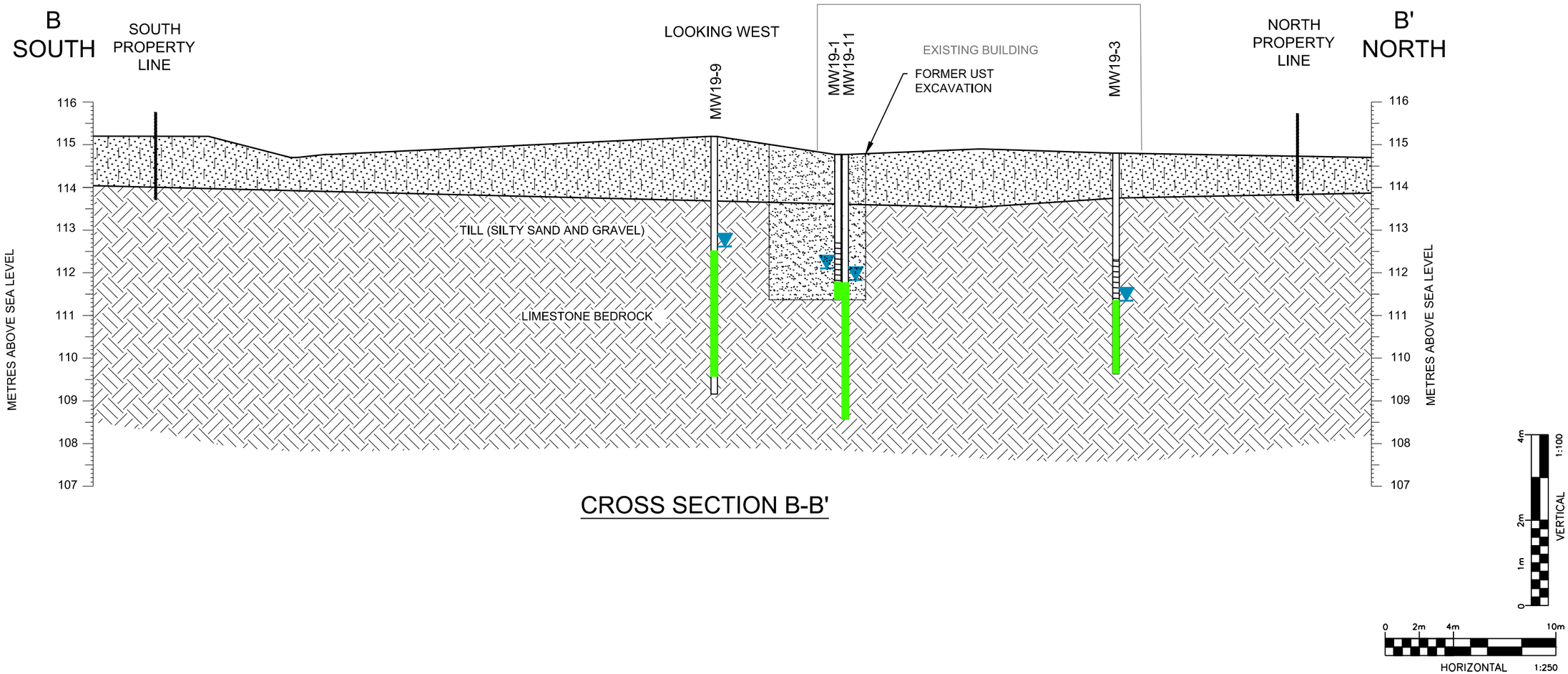

CROSS SECTION B-B'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- GROUNDWATER QUALITY MEETS MECP TABLE 7 SCS
- GROUNDWATER QUALITY EXCEEDS MECP TABLE 7 SCS

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DATE: MAR. 2019	CLIENT: HAZELDEAN CROSSING INC.		project no. OTT-00250806-C0
DESIGN: M.G.M.	CHECKED: C.E.H.	TITLE: CROSS-SECTIONS B-B' WITH PAH IMPACTS IN GROUNDWATER PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON	scale AS NOTED
DRAWN BY: A.O.			FIG 13A

Filename: p:\projects\environmental\250000s\250000\250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
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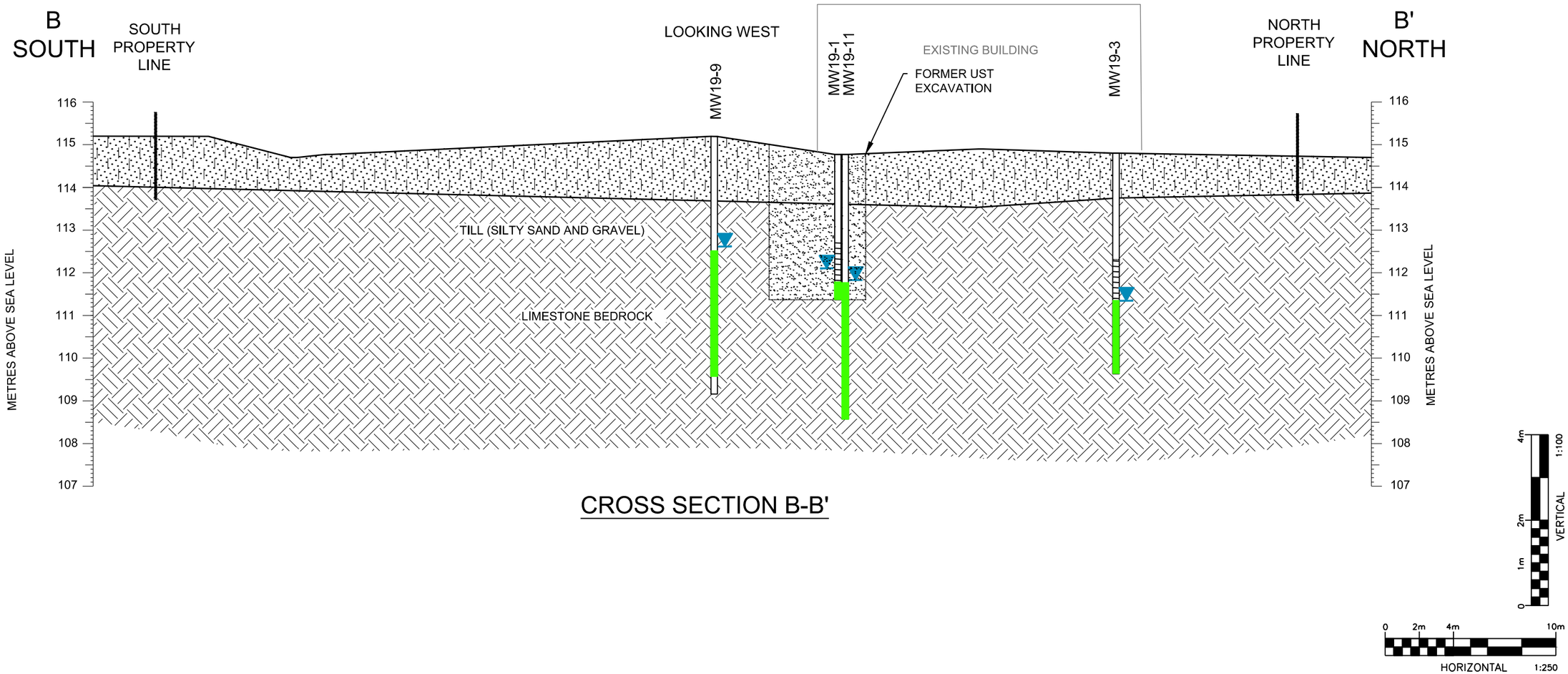

CROSS SECTION B-B'

LEGEND

- GROUNDWATER LEVEL (APRIL 25, 2019)
- FILL (SILTY SAND AND GRAVEL)
- LIMESTONE BEDROCK
- GROUNDWATER QUALITY MEETS MECP TABLE 7 SCS
- GROUNDWATER QUALITY EXCEEDS MECP TABLE 7 SCS

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DESIGN: M.G.M. / CHECKED: C.E.H.	TITLE: CROSS-SECTIONS B-B' WITH PHC IMPACTS IN GROUNDWATER PHASE TWO ESA 5938 HAZELDEAN ROAD, OTTAWA, ON		scale AS NOTED
DRAWN BY: A.O.			FIG 13B

Filename: p:\projects\environmental\250000s\250000\250806-c0 phase two esa 5938 hazeldean rd\working drawings\phase two dwgs\250806-a0 fig 5.dwg
Last Saved: 6/26/2019 11:41:08 AM
Last Plotted:6/26/2019 11:48:23 AM Plotted by: GhadbanM Pen Table:: trow standard, july 01, 2004.ctb

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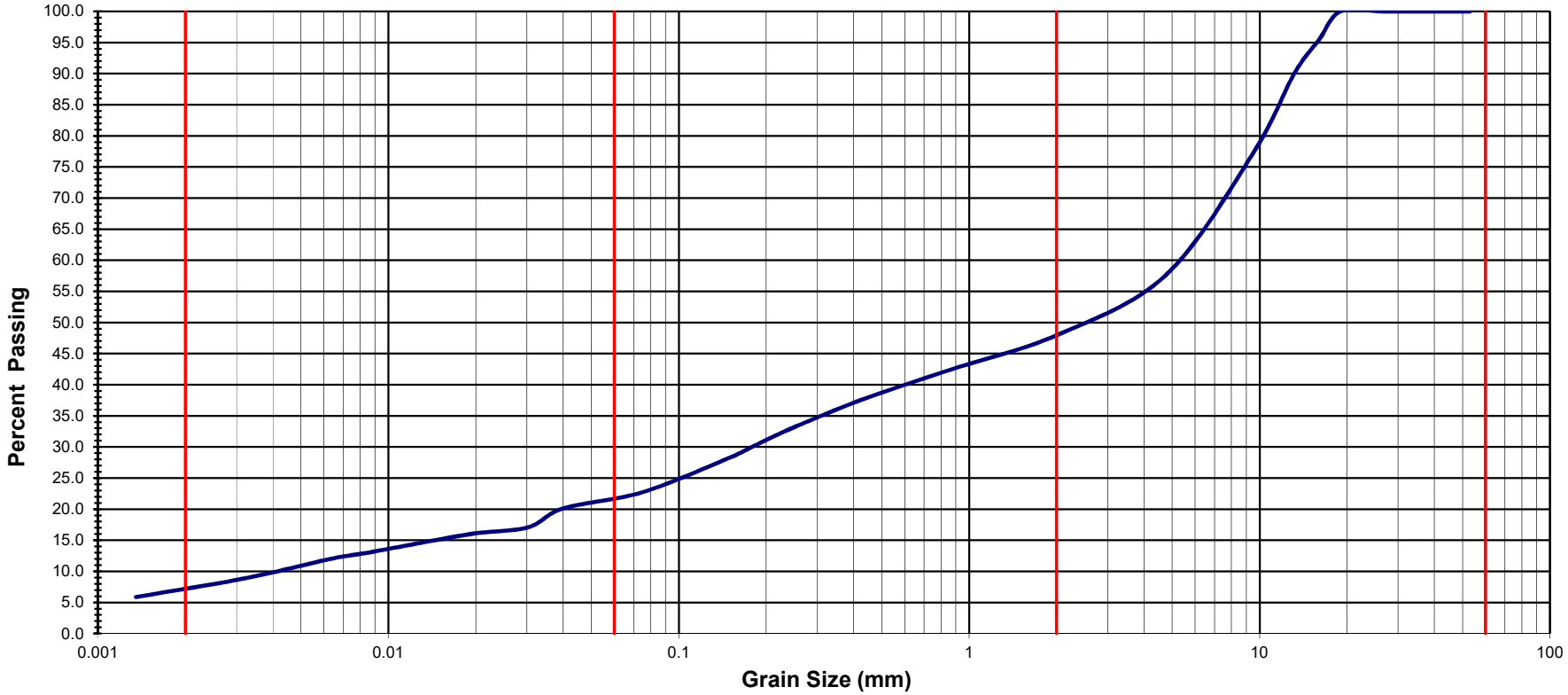
Grain-Size Distribution Curve
Method of Test for Particle Size Analysis of Soil
ASTM C-136/ASTM D-422

Modified M.I.T. Classification

CLAY	SILT			SAND			GRAVEL			
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	



EXP Project No.:	**OTT-00250806-A0**		**Project Name :**	**Geotechnical Investigation - Proposed Residential Development**					
Client :	**GNCR Developments**		**Project Location :**	**5924 Hazeldean Rd, Ottawa**					
Date Sampled :	**January 11, 2019**		**Borehole No:**	**BH3**		**Sample No.:**	**AS1**	**Depth (m) :**	**0-0.6**
Sample Composition:	**% Clay:**	**7**	**% Silt:**	**15**	**% Sand:**	**26**	**% Gravel:**	**52**	**Figure :** **C1**
Sample Description :	**Sandy Gravel, some Silt, trace Clay**								

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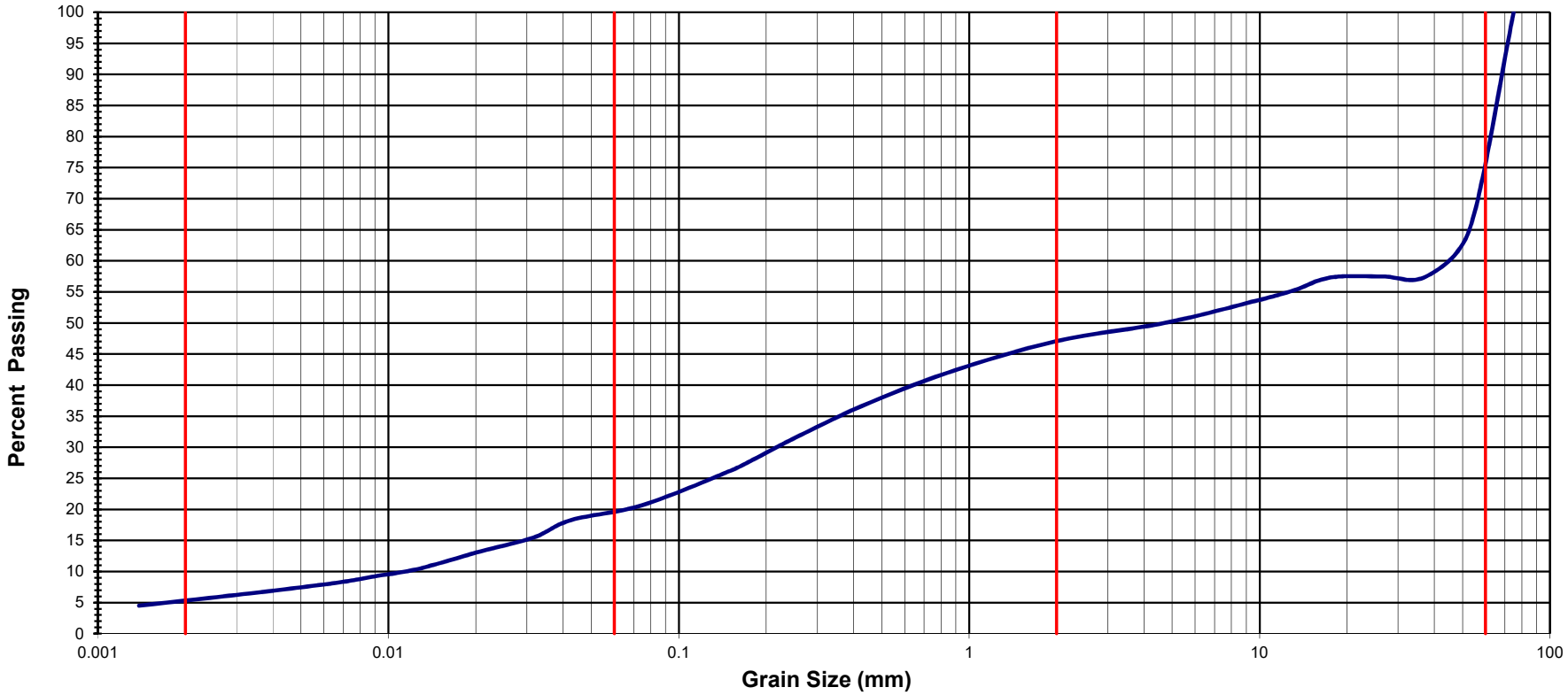
Grain-Size Distribution Curve
Method of Test for Particle Size Analysis of Soil
ASTM C-136/ASTM D-422

Modified M.I.T. Classification

CLAY	SILT			SAND			GRAVEL			
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	



EXP Project No.:	**OTT-00250806-A0**		**Project Name :**	**Geotechnical Investigation - Proposed Residential Development**					
Client :	**GNCR Developments**		**Project Location :**	**5924 Hazeldean Rd, Ottawa**					
Date Sampled :	**February 12, 2019**		**Borehole No:**	**TP5**		**Sample No.:**	**S2**	**Depth (m) :**	**0.3-0.9**
Sample Composition:	**% Clay:**	**5**	**% Silt:**	**14**	**% Sand:**	**28**	**% Gravel:**	**53**	**Figure :** **C2**
Sample Description :	**Sandy Gravel, some Silt, trace Clay**								

Appendix C: Borehole Logs

Explanation of Terms Used on Borehole Records

SOIL DESCRIPTION

Terminology describing common soil genesis:

Topsoil: mixture of soil and humus capable of supporting good vegetative growth.

Peat: fibrous fragments of visible and invisible decayed organic matter.

Fill: where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc.; none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

Till: the term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Terminology describing soil structure:

Desiccated: having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.

Stratified: alternating layers of varying material or color with the layers greater than 6 mm thick.

Laminated: alternating layers of varying material or color with the layers less than 6 mm thick.

Fissured: material breaks along plane of fracture.

Varved: composed of regular alternating layers of silt and clay.

Slickensided: fracture planes appear polished or glossy, sometimes striated.

Blocky: cohesive soil that can be broken down into small angular lumps which resist further breakdown.

Lensed: inclusion of small pockets of different soil, such as small lenses of sand scattered through a mass of clay; not thickness.

Seam: a thin, confined layer of soil having different particle size, texture, or color from materials above and below.

Homogeneous: same color and appearance throughout.

Well Graded: having wide range in grain sized and substantial amounts of all predominantly on grain size.

Uniformly Graded: predominantly on grain size.

All soil sample descriptions included in this report follow the ASTM D2487-11 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). The system divides soils into three major categories: (1) coarse grained, (2) fine-grained, and (3) highly organic. The soil is then subdivided based on either gradation or plasticity characteristics. The system provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification. The classification excludes particles larger than 76 mm. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually in accordance with ASTM D2488-09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems. Others may use different classification systems; one such system is the ISSMFE Soil Classification.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		

0.002	0.006	0.02	0.06	0.2	0.6	2.0	6.0	20	60	200

EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present and as described below in accordance with Note 16 in ASTM D2488-09a:

Table a: Percent or Proportion of Soil, Pp

	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5≤Pp≤10%
Little	15≤Pp≤25%
Some	30≤Pp≤45%
Mostly	50≤Pp≤100%

The standard terminology to describe cohesionless soils includes the compactness as determined by the Standard Penetration Test 'N' value:

Table b: Apparent Density of Cohesionless Soil

	'N' Value (blows/0.3 m)
Very Loose	N<5
Loose	5≤N<10
Compact	10≤N<30
Dense	30≤N<50
Very Dense	50≤N

The standard terminology to describe cohesive soils includes consistency, which is based on undrained shear strength as measured by insitu vane tests, penetrometer tests, unconfined compression tests or similar field and laboratory analysis, Standard Penetration Test 'N' values can also be used to provide an approximate indication of the consistency and shear strength of fine grained, cohesive soils:

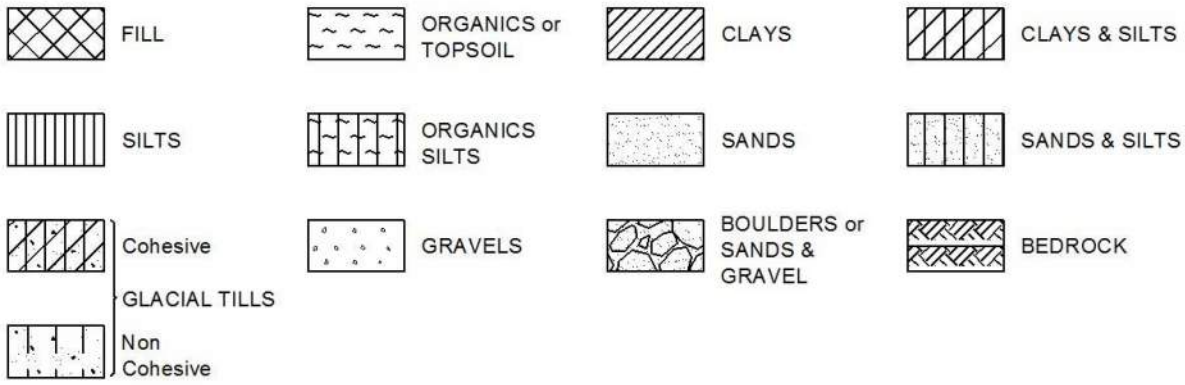
Table c: Consistency of Cohesive Soil

Consistency	Vane Shear Measurement (kPa)	'N' Value
Very Soft	<12.5	<2
Soft	12.5-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

Note: 'N' Value - The Standard Penetration Test records the number of blows of a 140 pound (64kg) hammer falling 30 inches (760mm), required to drive a 2 inch (50.8mm) O.D. split spoon sampler 1 foot (305mm). For split spoon samples where full penetration is not achieved, the number of blows is reported over the sampler penetration in meters (e.g. 50/0.15).

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



WATER LEVEL MEASUREMENT

Log of Borehole BH19-06

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 14

Page. 1 of 1

Date Drilled: March 13th, 2019

Drill Type: CME-55 Trackmount

Datum: Geodetic

Logged by: M.L. Checked by: M.M.

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		SAND AND GRAVEL FILL Trace silt and clay, brown, moist, upper 700 mm frozen, no odour or staining.	114.86	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
						20 □ ×		
				1		65 □ ×		
			113.6					
		Auger Refusal at 1.3 m Depth						

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. The borehole was backfilled upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole BH19-07

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 15

Page. 1 of 1

Date Drilled: March 13th, 2019

Drill Type: CME-55 Trackmount

Datum: Geodetic

Logged by: M.D. Checked by: M.M

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		SAND AND GRAVEL FILL Trace silt and clay, brown, moist, upper 700 mm frozen, no odour or staining.	114.95	0	20 40 60 80 / 50 100 150 200	250 500 750 / 20 40 60		
			113.8	1		20 □× 0 □×		
		Auger Refusal at 1.2 m Depth						

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. The borehole was backfilled upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

Log of Borehole BH19-08

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 16

Page. 1 of 1

Date Drilled: March 13th, 2019

Drill Type: CME-55 Trackmount

Datum: Geodetic

Logged by: M.D. Checked by: M.M

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—⊖
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		SAND AND GRAVEL FILL Trace silt and clay, brown, moist, upper 700 mm frozen, no odour or staining.	115.065	0	20 40 60 80 / 50 100 150 200 kPa	250 500 750 / 20 40 60		
			114.3			20 □×		
		Auger Refusal at 0.8 m Depth						

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. The borehole was backfilled upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole MW19-01

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 9

Page. 1 of 1

Date Drilled: February 15th, 2019

Drill Type: CME-75 Truckmount

Datum: Geodetic

Logged by: M.L. Checked by: M.M.

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		SAND TO SAND AND GRAVEL FILL Fine to medium grained, some gravel, brown, moist, no odour, upper 600 mm frozen, (loose)	114.92	0	12	0		
		SAND FILL Fine grained, trace silt, brown to grey, moist to wet, petroleum odour at 3.0 m depth, (loose to very loose)	113.4	1	6	0		
				2	4	0		
			112.42		2	0		
				3	50/Refusal	10		
		Auger Refusal at 3.6 m Depth	111.3					

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	2.4	-
11 days	3.1	-
26 days	3.0	-
31 days	3.0	-
99 days	2.5	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

Log of Borehole MW19-02

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 10

Page. 1 of 1

Date Drilled: February 15th, 2019

Drill Type: CME-75 Truckmount

Datum: Geodetic

Logged by: M.L. Checked by: M.M.

Split Spoon Sample ⊠ | Auger Sample ◧ | SPT (N) Value ○ | Dynamic Cone Test —— | Shelby Tube ■ | Shear Strength by Vane Test +S

Combustible Vapour Reading □ | Natural Moisture Content × | Atterberg Limits |—○—| | Undrained Triaxial at % Strain at Failure ⊕ | Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		SAND AND GRAVEL TO SAND FILL Fine to medium grained, some gravel, brown, moist, no odour, upper 700 mm frozen, (loose)	114.88	0
		SAND FILL Fine grained, trace silt and gravel, brown to grey, moist to wet, strong petroleum odour at 3.0 m depth, (loose)	113.4	1
			112.18	2
		Auger Refusal at 3.5 m Depth	111.4	3

Standard Penetration Test N Value: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % / Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES | Natural Unit Wt. kN/m³

Depth	SPT (N)	Combustible Vapour Reading (ppm)	Natural Moisture Content %
0	15	0	
1	6	0	
2	5	0	
3	4	0	
3	50/Refusal	40	

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	2.5	-
11 days	3.1	-
26 days	3.1	-
31 days	3.0	-
95 days	2.7	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

Log of Borehole MW19-03

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 11

Page. 1 of 1

Date Drilled: February 15th, 2019

Drill Type: CME-75 Truckmount

Datum: Geodetic

Logged by: M.L. Checked by: M.M.

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth	Standard Penetration Test N Value / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Wt. kN/m³
		SAND AND GRAVEL TO SAND FILL Fine to medium grained, trace to some gravel, brown, moist, no odour, upper 900 mm frozen, (loose)	114.82	0	20 (50)	0 (20)		
				1	7	10		
		SANDSTONE BEDROCK Some interbedded limestone layers, fine grained, moderate joint spacing, highly weathered in upper 300 mm, (very poor to excellent to good quality)	113.2		50/Refusal	5	Run 1	
				2			Run 2	
▼			111.42	3			Run 3	
				4			Run 4	
		Borehole Terminated at 4.8 m Depth	110.0					

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

NOTES:

1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	-	-
11 days	3.4	-
26 days	3.3	-
31 days	3.4	-
95 days	3.4	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.7 - 2	60	0
2	2 - 2.7	100	95
3	2.7 - 4.2	100	91
4	4.2 - 4.8	100	80

Log of Borehole MW19-04

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 12

Page. 1 of 1

Date Drilled: February 19th, 2019

Drill Type: CME-45 Trackmount

Datum: Geodetic

Logged by: M.L. Checked by: M.M.

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		SAND AND GRAVEL FILL Trace silt and clay, brown, moist, upper 700 mm frozen, (compact)	114.97	0
				1
			113.4	
		SANDSTONE BEDROCK Some interbedded limestone layers, fine grained, moderate joint spacing, highly weathered in upper 400 mm, (very poor to good quality)		2
				3
			111.87	
				4
			110.3	
		Borehole Terminated at 4.7 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength kPa: 50 100 150 200
14
50/Refusal

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES: Run 1, Run 2, Run 3

Natural Unit Wt. kN/m³

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	-	-
8 days	3.8	-
30 days	3.6	-
35 days	4.0	-
95 days	3.1	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.7 - 2	33	0
2	2 - 3.1	82	66
3	3.1 - 4.7	100	81

Log of Borehole MW19-05

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 13

Page. 1 of 1

Date Drilled: February 20th, 2019

Drill Type: CME-45 Trackmount

Datum: Geodetic

Logged by: M.L. Checked by: M.M.

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		SAND AND GRAVEL FILL Trace silt and clay, brown, moist, upper 700 mm frozen, (compact)	114.56	0
			113.5	1
		SANDSTONE BEDROCK Some interbedded limestone layers, fine grained, moderate joint spacing, highly weathered in upper 100 mm, (fair to good quality)		2
			111.26	3
			110.0	4
		Borehole Terminated at 4.6 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
50/Refusal ○

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60
×

SAMPLES: Run 1, Run 2, Run 3

Natural Unit Wt. kN/m³

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	-	-
7 days	3.5	-
31 days	3.9	-
36 days	3.5	-
94 days	3.3	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.1 - 1.6	88	55
2	1.6 - 3.1	90	68
3	3.1 - 4.6	100	85

Log of Borehole MW19-09

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 17

Page. 1 of 1

Date Drilled: March 13th, 2019

Drill Type: CME-55 Trackmount

Datum: Geodetic

Logged by: M.D. Checked by: M.M

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		SILTY SAND FILL WITH SOME GRAVEL Brown, moist, upper 700 mm frozen, no odour or staining.	115.22	0
			113.7	1
		WEATHERED BEDROCK OR BOULDERS Grey, gravel and rock pieces.	113.5	
		SANDSTONE BEDROCK Some interbedded limestone layers, some shaly partings, fine grained, moderate joint spacing, grey, (very poor to good quality).	112.72	2
				3
				4
				5
			109.2	6
		Borehole Terminated at 6.0 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

10
5

SAMPLES: Run 1, Run 2, Run 3

Natural Unit Wt. kN/m³

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 32 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
5 days	2.1	-
73 days	2.5	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.5 - 2.9	94	22
2	2.9 - 4.5	100	44
3	4.5 - 6	99	80

Log of Borehole MW19-10

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 18

Page. 1 of 1

Date Drilled: March 13th, 2019

Drill Type: CME-55 Trackmount

Datum: Geodetic

Logged by: M.D. Checked by: M.M

Split Spoon Sample ⊠
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits —○—
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		SAND AND GRAVEL FILL Trace silt and clay, brown, moist, upper 700 mm frozen, no odour or staining.	115.08	0
			114.0	1
		WEATHERED BEDROCK OR BOULDERS Grey, gravel and rock pieces.	113.8	
		SANDSTONE BEDROCK Some interbedded limestone layers, fine grained, moderate joint spacing, highly weathered in upper 300 mm, grey (very poor to good quality).		2
			111.98	3
				4
				5
			109.1	6
		Borehole Terminated at 6.0 m Depth		

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
50/75mm
66/200mm

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60
10
10

SAMPLES: Run 1, Run 2, Run 3, Run 4

Natural Unit Wt. kN/m³

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 51 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
5 days	2.9	-
73 days	3.1	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.1 - 1.5	100	0
2	1.5 - 3	98	38
3	3 - 4.5	100	43
4	4.5 - 6	100	82

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

Log of Borehole MW19-11

Project No: OTT-00250806-C0

Project: Phase Two Environmental Site Assessment

Location: 5938 Hazeldean Road, City of Ottawa, Ontario

Figure No. 19

Page. 1 of 1

Date Drilled: March 13th, 2019

Drill Type: CME-55 Trackmount

Datum: Geodetic

Logged by: M.D. Checked by: M.M

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth
		SAND AND GRAVEL TO SAND FILL Fine to medium grained, some gravel, brown, moist, no odour, upper 700 mm frozen, (loose)	114.92	0
			112.22	3
		WEATHERED BEDROCK OR BOULDERS Grey, gravel and rock pieces.	111.7	3
		SANDSTONE BEDROCK Some interbedded limestone layers, some shaly partings, fine grained, moderate joint spacing, several fractures throughout, grey (fair to good quality).	111.4	4
		Borehole Terminated at 6.4 m Depth	108.5	6

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 20 40 60

SAMPLES: Run 1, Run 2, Run 3

Natural Unit Wt. kN/m³

NOTES:
1. Borehole data requires interpretation by EXP before use by others
2. A 51 mm diameter monitoring well installed upon completion
3. Field work supervised by an EXP representative.
4. See Notes on Sample Descriptions
5. Log to be read with EXP Report OTT-00250806-C0

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)
5 days	3.0	-
73 days	2.7	

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	3.2 - 4.2	73	50
2	4.2 - 5.7	100	66
3	5.7 - 6.4	100	89

LOG OF BOREHOLE BH LOGS - 250806 (ENV)- 5938 HAZELDEAN.GPJ TROW OTTAWA.GDT 5/17/19

Appendix D - Analytical Summary Tables

TABLE 1 **SOIL ANALYTICAL RESULTS *(µg/g)***
Petroleum Hydrocarbons (PHCs) and BTEX
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1 SS4	DUPE	BH2 SS3	BH3 SS2	BH4 AS1	BH5 SS2	BH6 AS2	BH7 AS1	BH8 AS1	BH9 AS2	BH10 AS1	Dup 1
Sample Date (d/m/y)	Residential	15-Feb-19		15-Feb-19	15-Feb-19	15-Feb-19	15-Feb-19	13-Mar-19	13-Mar-19	13-Mar-19	13-Mar-19	13-Mar-19	
Sample Depth (mbsg)		2.3 - 2.9		1.5 - 2.1	0.76 - 1.35	0.15 - 0.75	0.75 - 1.1	0.6 - 1.2	0.1 - 0.3	0.2 - 0.7	0.8 - 1.2	0.1 - 0.7	
Benzene	0.21	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	2.1	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Toluene	2.3	<0.020	<0.020	<0.020	<0.020	0.025	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	3.1	<0.020	<0.020	<0.020	<0.020	0.024	<0.020	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
F1 (C6-C10)	55	<10	11	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	98	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16-C34 Hydrocarbons)	300	<50	<50	<50	<50	900	<50	600	650	<50	<50	<50	<50
F4 (C34-C50 Hydrocarbons)	2800	<50	<50	<50	<50	320	<50	320	300	<50	<50	<50	<50
F4G (C34-C50 Hydrocarbons)	2800	NA	NA	NA	NA	NA	NA	1000	1000	NA	NA	NA	NA

NOTES:

1	MECP *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7 Non-Potable Residential SCS, coarse grained soil.*
Shaded	Concentration exceeds MECP Table 7 Residential SCS.
NA	Not analyzed

TABLE 2 SOIL ANALYTICAL RESULTS *(µg/g)*
METALS
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1 SS4	DUPE	BH2 SS3	BH3 SS2	BH4 AS1	BH5 SS2	BH6 AS2	BH7 AS1	BH8 AS1	BH9 AS2	BH10 AS1	Dup 1
Sample Date (d/m/y)	Residential	15-Feb-19		15-Feb-19	15-Feb-19	15-Feb-19	15-Feb-19	13-Mar-19	13-Mar-19	13-Mar-19	13-Mar-19	13-Mar-19	
Sample Depth (mbsg)		2.3 - 2.9		1.5 - 2.1	0.76 - 1.35	0.15 - 0.75	0.75 - 1.1	0.6 - 1.2	0.1 - 0.3	0.2 - 0.7	0.8 - 1.2	0.1 - 0.7	
Antimony	7.5	<0.20	<0.20	<0.20	<0.20	1.2	<0.20	2.3	0.80	<0.20	<0.20	<0.20	<0.20
Arsenic	18	<1.0	<1.0	<1.0	<1.0	2.1	2.8	3.8	1.9	<1.0	2.1	1.6	1.0
Barium	390	33	28	35	16	130	110	100	96	180	85	66	49
Beryllium	4	<0.20	<0.20	<0.20	<0.20	<0.20	0.77	0.38	0.23	<0.20	0.59	0.33	0.23
Boron (total)	120	<5.0	<5.0	<5.0	<5.0	<5.0	7.0	5.3	5.2	<5.0	5.2	9.5	5.6
Cadmium	1.2	<0.10	<0.10	<0.10	<0.10	1.4	0.38	1.3	0.71	<0.10	0.18	<0.10	<0.10
Chromium (total)	160	9.4	8.2	8.9	8.9	81	32	22	46	45	27	61	52
Cobalt	22	4.0	3.5	3.9	2.9	4.1	8.8	4.6	4.2	3.5	7.9	6.2	4.5
Copper	140	9.9	9.0	10	8.0	86	10	85	29	6.7	14	11	7.2
Lead	120	5.5	5.4	10	2.3	600	9.2	270	340	5.0	18	9.9	6.1
Mercury	0.27	<0.050	<0.050	<0.050	<0.050	<0.050	0.081	NA	NA	NA	NA	NA	NA
Molybdenum	6.9	<0.50	<0.50	<0.50	0.51	4.2	<0.50	0.82	2.0	0.88	0.59	1.5	1.3
Nickel	100	6.7	6.7	6.3	5.3	17	18	11	11	7.7	18	13	9.4
Selenium	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Silver	20	<0.20	<0.20	<0.20	<0.20	0.45	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium	1	0.052	0.058	0.058	<0.050	0.059	0.21	0.11	0.090	0.066	0.25	0.094	0.063
Uranium	23	0.46	0.36	0.42	0.35	0.36	0.75	0.37	0.45	0.34	0.56	0.34	0.28
Vanadium	86	19	17	21	17	17	37	19	20	14	41	16	13
Zinc	340	19	19	22	12	130	99	200	110	16	42	17	13

NOTES:

1 MECP *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7 Non-Potable Residential SCS, coarse grained soil.*

Shaded Concentration exceeds MECP Table 7 Residential SCS.

TABLE 3 **SOIL ANALYTICAL RESULTS *(µg/g)***
VOLATILE ORGANIC COMPOUNDS
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1 SS4	DUPE	BH2 SS3	BH3 SS2	BH4 AS1	BH5 SS2
Sample Date (d/m/y)	Residential	15-Feb-19		15-Feb-19	15-Feb-19	15-Feb-19	15-Feb-19
Sample Depth (mbsg)		2.3 - 2.9		1.5 - 2.1	0.76 - 1.35	0.15 - 0.75	0.75 - 1.1
Acetone	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzene	0.21	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Bromodichloromethane	13	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	0.27	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	2.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	9.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	3.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	4.8	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.083	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	16	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	3.5	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cis-1,2-Dichloroethylene	3.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trans-1,2-Dichloroethylene	0.084	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cis-1,3-Dichloropropylene	0.05	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Trans-1,3-Dichloropropylene							
Ethylbenzene	2	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylene Dibromide	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Hexane	2.8	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylene Chloride	0.1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	16	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-t-Butyl Ether	0.75	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Styrene	0.7	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.058	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	2.3	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	0.28	<0.020	<0.020	<0.020	<0.020	0.025	<0.020
1,1,1-Trichloroethane	0.38	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	0.061	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichlorofluoromethane	4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Vinyl Chloride	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	3.1	<0.020	<0.020	<0.020	<0.020	0.024	<0.020

NOTES:

1 MECP *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7 Non-Potable Residential SCS, coarse grained soil.*

Shaded Concentration exceeds MECP Table 7 Residential SCS.

TABLE 4 SOIL ANALYTICAL RESULTS *(µg/g)*
POLYCYCLIC AROMATIC HYDROCARBONS
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1 SS4	DUPE	BH2 SS3	BH3 SS2	BH4 AS1	BH5 SS2	BH6 AS2	BH7 AS1	BH8 AS1	BH9 AS2	BH10 AS1	Dup 1
Sample Date (d/m/y)	Residential	15-Feb-19		15-Feb-19	15-Feb-19	15-Feb-19	15-Feb-19	13-Mar-19	13-Mar-19	13-Mar-19	13-Mar-19	13-Mar-19	
Sample Depth (mbsg)		2.3 - 2.9		1.5 - 2.1	0.76 - 1.35	0.15 - 0.75	0.75 - 1.1	0.6 - 1.2	0.1 - 0.3	0.2 - 0.7	0.8 - 1.2	0.1 - 0.7	
Acenaphthene	7.9	<0.0050	<0.0050	<0.0050	<0.0050	0.12	<0.0050	<0.0050	0.023	0.0054	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.15	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.67	<0.0050	<0.0050	<0.0050	<0.0050	0.20	0.0083	<0.0050	0.043	0.011	<0.0050	<0.0050	<0.0050
Benzo[a]anthracene	0.5	<0.0050	<0.0050	<0.0050	<0.0050	0.46	0.035	0.036	0.13	0.035	<0.0050	<0.0050	<0.0050
Benzo[a]pyrene	0.3	<0.0050	<0.0050	<0.0050	<0.0050	0.39	0.031	0.035	0.11	0.032	<0.0050	<0.0050	<0.0050
Benzo[b]fluoranthene	0.78	<0.0050	<0.0050	<0.0050	<0.0050	0.50	0.039	0.047	0.13	0.044	<0.0050	<0.0050	<0.0050
Benzo[g,h,i]perylene	6.6	<0.0050	0.010	<0.0050	<0.0050	0.32	0.018	0.031	0.073	0.019	<0.0050	<0.0050	<0.0050
Benzo[k]fluoranthene	0.78	<0.0050	<0.0050	<0.0050	<0.0050	0.17	0.015	0.014	0.039	0.012	<0.0050	<0.0050	<0.0050
Chrysene	7	<0.0050	<0.0050	<0.0050	<0.0050	0.38	0.028	0.029	0.10	0.031	<0.0050	<0.0050	<0.0050
Dibenz[a,h]anthracene	0.1	<0.0050	<0.0050	<0.0050	<0.0050	0.058	<0.0050	<0.0050	0.012	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	0.69	<0.0050	<0.0050	<0.0050	<0.0050	1.1	0.069	0.067	0.27	0.086	0.0053	<0.0050	<0.0050
Fluorene	62	<0.0050	<0.0050	<0.0050	<0.0050	0.11	<0.0050	<0.0050	0.024	0.0054	<0.0050	<0.0050	<0.0050
Indeno[1,2,3-cd]pyrene	0.38	<0.0050	<0.0050	<0.0050	<0.0050	0.25	0.019	0.021	0.060	0.019	<0.0050	<0.0050	<0.0050
Methylnaphthalene, 1-	0.99	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	0.0068	<0.0050	<0.0050	<0.0050	<0.0050
Methylnaphthalene, 1-		<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	0.0088	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.6	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0050	<0.0050	0.011	<0.0050	<0.0050	<0.0050	<0.0050
Phenanthrene	6.2	<0.0050	<0.0050	<0.0050	<0.0050	0.97	0.021	0.020	0.20	0.055	<0.0050	<0.0050	<0.0050
Pyrene	78	<0.0050	<0.0050	0.0051	<0.0050	0.87	0.062	0.066	0.24	0.074	<0.0050	<0.0050	<0.0050

NOTES:

1 MECP *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7 non-potable residential standards, coarse grained soil.*

Shaded/ Bold Concentration exceeds MECP Table 7 non-potable, coarse grained, soil quality standard.

TABLE 5 GROUNDWATER ANALYTICAL RESULTS *(µg/L)*
PETROLEUM HYDROCARBONS and BTEX
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1				BH3				BH18
Sample Date (d/m/y)		26-Feb-19	18-Mar-19	3-Jun-19	5-Sep-19	26-Feb-19	18-Mar-19	3-Jun-19	5-Sep-19	Dupe of
Screened Interval		2.1 - 3.6				2.4 - 4.8				BH3
Benzene	0.5	1.0	1.2	<0.20	<0.20	5.1	5.4	<0.20	<0.20	<0.20
Toluene	320	0.92	1.2	<0.20	<0.20	0.53	0.96	<0.20	<0.20	<0.20
Ethylbenzene	54	<0.20	<0.20	<0.20	<0.20	5.0	14	0.21	<0.20	<0.20
Total Xylenes	72	1.4	1.1	<0.40	<0.40	8.9	8.4	<0.40	<0.40	<0.40
PHC F1	420	<25	<25	<25	<25	49	61	<25	<25	<25
PHC F2	150	<100	120	<100	<100	1400	850	<100	<100	<100
PHC F3	500	<200	<200	<200	<200	<200	<200	<200	<200	<200
PHC F4	500	<200	<200	<200	<200	<200	<200	<200	<200	<200

Parameter	MECP Table 7[1]	BH4	BH5	BH9	BH10	BH11	BH20
Sample Date (d/m/y)		26-Feb-19	26-Feb-19	18-Mar-19	18-Mar-19	18-Mar-19	
Screened Interval		2.3 - 4.7	2.0 - 4.6	2.6 - 5.6	2.8 - 5.8	4.3 - 5.8	
Benzene	0.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	320	<0.20	<0.20	0.40	0.41	<0.20	<0.20
Ethylbenzene	54	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Xylenes	72	<0.20	<0.20	<0.40	<0.40	<0.40	<0.40
PHC F1	420	<25	<25	<25	<25	<25	<25
PHC F2	150	<100	<100	<100	<100	<100	<100
PHC F3	500	<200	<200	<200	<200	<200	<200
PHC F4	500	<200	<200	<200	<200	<200	<200

NOTES:

1 MECP *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7, for a non-potable groundwater, coarse grained soil.*

Shaded Concentration exceeds MECP Table 7 residential groundwater quality standard.

NA Not Analyzed

NV No Value

TABLE 6 GROUNDWATER ANALYTICAL RESULTS *(µg/L)*
PETROLEUM HYDROCARBONS and BTEX
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1	BH3	BH4	BH5
Sample Date (d/m/y)		26-Feb-19	26-Feb-19	26-Feb-19	26-Feb-19
Screened Interval		2.1 - 3.6	2.4 - 4.8	2.3 - 4.7	2.0 - 4.6
Antimony	16000	<0.50	<0.50	<0.50	<0.50
Arsenic	1500	<1.0	<1.0	<1.0	<1.0
Barium	23000	150	760	140	120
Beryllium	53	<0.50	<0.50	<0.50	<0.50
Boron	36000	150	54	57	72
Cadmium	2.1	<0.10	<0.10	<0.10	<0.10
Chromium	640	<5.0	<5.0	<5.0	<5.0
Cobalt	52	2.3	0.88	0.67	0.54
Copper	69	1.2	1.3	<1.0	6.7
Lead	20	<0.50	<0.50	<0.50	<0.50
Molybdenum	7300	44	2.2	0.97	5.4
Nickel	390	5.1	5.1	2.4	4.6
Selenium	50	<2.0	<2.0	<2.0	<2.0
Silver	1.2	<0.10	<0.10	<0.10	<0.10
Thallium	400	<0.050	<0.050	0.076	<0.050
Uranium	330	1.5	0.96	0.71	4.5
Vanadium	200	<0.50	<0.50	<0.50	<0.50
Zinc	890	<5.0	6.1	5.4	6.3

NOTES:

1	MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7, for a non-potable groundwater, coarse grained soil.
Shaded	Concentration exceeds MECP Table 7 residential groundwater quality standard.
NA	Not Analyzed
NV	No Value

TABLE 7 GROUNDWATER ANALYTICAL RESULTS *(µg/L)*
VOLATILE ORGANIC COMPOUNDS
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1			BH3			BH4	BH5
Sample Date (d/m/y)		26-Feb-19	18-Mar-19	3-Jun-19	26-Feb-19	18-Mar-19	3-Jun-19	26-Feb-19	26-Feb-19
Screened Interval		2.1 - 3.6			2.4 - 4.8			2.3 - 4.7	2.0 - 4.6
Acetone	100000	110	NA	NA	<10	NA	NA	<10	<10
Benzene	0.5	1.0	1.2	<0.20	5.1	5.4	<0.20	<0.20	<0.20
Bromodichloromethane	67000	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
Bromoform	5	<1.0	NA	NA	<1.0	NA	NA	<1.0	<1.0
Bromomethane	0.89	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
Carbon Tetrachloride	0.2	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Chlorobenzene	140	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Chloroform	2	<0.20	NA	NA	0.40	NA	NA	0.30	0.38
Dibromochloromethane	65000	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
1,2-Dichlorobenzene	150	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
1,3-Dichlorobenzene	7600	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
1,4-Dichlorobenzene	0.5	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
Dichlorodifluoromethane	3500	<1.0	NA	NA	<1.0	NA	NA	<1.0	<1.0
1,1-Dichloroethane	11	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
1,2-Dichloroethane	0.5	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
1,1-Dichloroethylene	0.5	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Cis-1,2-Dichloroethylene	1.6	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
Trans-1,2-Dichloroethylene	1.6	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
1,2-Dichloropropane	0.58	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Cis-1,3-Dichloropropylene	0.5	<0.30	NA	NA	<0.30	NA	NA	<0.30	<0.30
Trans-1,3-Dichloropropylene		<0.40	NA	NA	<0.40	NA	NA	<0.40	<0.40
Ethylbenzene	54	<0.20	<0.20	<0.20	5.0	14	0.51	<0.20	<0.20
Ethylene Dibromide	0.2	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Hexane	5	<1.0	NA	NA	<1.0	NA	NA	<1.0	<1.0
Methylene Chloride	26	<2.0	NA	NA	<2.0	NA	NA	<2.0	<2.0
Methyl Ethyl Ketone	21000	<10	NA	NA	<10	NA	NA	<10	<10
Methyl Isobutyl Ketone	5200	<5.0	NA	NA	<5.0	NA	NA	<5.0	<5.0
Methyl-t-Butyl Ether	15	<0.50	NA	NA	0.55	NA	NA	<0.50	<0.50
Styrene	43	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
1,1,1,2-Tetrachloroethane	1.1	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
1,1,2,2-Tetrachloroethane	0.5	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
Tetrachloroethylene	0.5	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Toluene	320	0.90	1.2	<0.20	0.53	0.96	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	23	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
1,1,2-Trichloroethane	0.5	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
Trichloroethylene	0.5	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Trichlorofluoromethane	2000	<0.50	NA	NA	<0.50	NA	NA	<0.50	<0.50
Vinyl Chloride	0.5	<0.20	NA	NA	<0.20	NA	NA	<0.20	<0.20
Total Xylenes	72	1.4	1.1	<0.40	8.9	8.4	<0.40	<0.20	<0.20

NOTES:

1 MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7, for a non-potable groundwater, coarse grained soil.

Shaded Concentration exceeds MOE Table 7 groundwater quality criterion.

TABLE 8 GROUNDWATER ANALYTICAL RESULTS *(µg/L)*
POLYCYCLIC AROMATIC HYDROCARBONS
5938 Hazeldean Road, Ottawa

Parameter	MECP Table 7[1]	BH1		BH3				BH18	BH4	BH5	BH9	BH10	BH11	BH20
Sample Date (d/m/y)		26-Feb-19	18-Mar-19	26-Feb-19	18-Mar-19	3-Jun-19	5-Sep-19	Dupe of	26-Feb-19	26-Feb-19	18-Mar-19	18-Mar-19	18-Mar-19	Duplicate of
Screened Interval		2.1 - 3.6		2.4 - 4.8				BH3	2.3 - 4.7	2.0 - 4.6	2.6 - 5.6	2.8 - 5.8	4.3 - 5.8	BH11
Acenaphthene	17	1.4	0.52	4.9	3.0	0.34	<0.050	<0.050	0.29	1.2	<0.050	<0.050	0.21	0.24
Acenaphthylene	1	<0.050	<0.050	<1.0	<0.50	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	1	0.098	<0.050	0.19	0.080	<0.050	<0.050	<0.050	0.076	0.098	<0.050	<0.050	0.054	0.053
Benzo[a]anthracene	1.8	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo[a]pyrene	0.81	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo[b]fluoranthene	0.75	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo[g,h,i]perylene	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo[k]fluoranthene	0.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	0.7	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenzo[a,h]anthracene	0.4	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	44	<0.050	<0.050	0.073	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	290	1.4	0.60	6.4	3.5	0.31	<0.050	<0.050	0.27	1.6	<0.050	<0.050	0.23	0.21
Indeno[1,2,3-cd]pyrene	0.2	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene -1	1500	0.74	0.15	120	52	2.6	0.2	0.22	<0.050	0.079	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene -2		0.57	0.12	66	11	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	7	0.61	0.22	49	18	2.6	0.051	<0.050	0.080	<0.20	<0.050	<0.050	0.086	0.082
Phenanthrene	380	0.14	0.064	4.3	1.5	0.1	<0.030	0.039	0.24	0.28	<0.030	<0.030	0.039	0.035
Pyrene	5.7	<0.050	<0.050	0.074	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

NOTES:

1 MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 7, for a non-potable groundwater, coarse grained soil.

NV no value in standards

Shaded Concentration exceeds MECP Table 7 groundwater quality standard.

Appendix E – Laboratory Certificates of Analysis

Your Project #: OTT-00250806-CO
Your C.O.C. #: 483691

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/03/01
Report #: R5612277
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B951492
Received: 2019/02/27, 10:30

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	6	N/A	2019/03/01	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	6	N/A	2019/03/01	OTT SOP-00002	EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Soil (2)	6	2019/02/27	2019/02/28	OTT SOP-00001	CCME CWS
Strong Acid Leachable Metals by ICPMS (1)	6	2019/03/01	2019/03/01	CAM SOP-00447	EPA 6020B m
Moisture	6	N/A	2019/03/01	CAM SOP-00445	McKeague 2nd ed 1978
PAH Compounds in Soil by GC/MS (SIM) (1)	1	2019/02/28	2019/02/28	CAM SOP-00318	EPA 8270D m
PAH Compounds in Soil by GC/MS (SIM) (1)	5	2019/02/28	2019/03/01	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs	5	N/A	2019/02/28	OTT SOP-00002	EPA 8260C m
Volatile Organic Compounds and F1 PHCs	1	N/A	2019/03/01	OTT SOP-00002	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.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by 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

Your Project #: OTT-00250806-CO
Your C.O.C. #: 483691

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/03/01
Report #: R5612277
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B951492

Received: 2019/02/27, 10:30

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.

Maxxam Job #: B951492
Report Date: 2019/03/01

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JBQ769	JBQ769	JBQ770	JBQ771	JBQ772	JBQ773	JBQ774		
Sampling Date		2019/02/15 09:00	2019/02/15 09:00	2019/02/15 09:00	2019/02/15 11:00	2019/02/15 12:00	2019/02/19 09:00	2019/02/20 14:00		
COC Number		483691	483691	483691	483691	483691	483691	483691		
	UNITS	**BH1 SS4**	**BH1 SS4 Lab-Dup**	**DUPU**	**BH2 SS3**	**BH3 SS2**	**BH4 AS1**	**BH5 SS2**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	12	12	12	6.9	5.1	13	15	0.2	5995672

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B951492
Report Date: 2019/03/01

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JBQ769	JBQ770	JBQ771	JBQ772	JBQ773	JBQ774		
Sampling Date		2019/02/15 09:00	2019/02/15 09:00	2019/02/15 11:00	2019/02/15 12:00	2019/02/19 09:00	2019/02/20 14:00		
COC Number		483691	483691	483691	483691	483691	483691		
	UNITS	**BH1 SS4**	**DUPU**	**BH2 SS3**	**BH3 SS2**	**BH4 AS1**	**BH5 SS2**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	ug/g	3300	2900	3300	3400	4400	19000	50	5997511
Acid Extractable Antimony (Sb)	ug/g	<0.20	<0.20	<0.20	<0.20	1.2	<0.20	0.20	5997511
Acid Extractable Arsenic (As)	ug/g	<1.0	<1.0	<1.0	<1.0	2.1	2.8	1.0	5997511
Acid Extractable Barium (Ba)	ug/g	33	28	35	16	130	110	0.50	5997511
Acid Extractable Beryllium (Be)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.77	0.20	5997511
Acid Extractable Bismuth (Bi)	ug/g	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5997511
Acid Extractable Boron (B)	ug/g	<5.0	<5.0	<5.0	<5.0	<5.0	7.0	5.0	5997511
Acid Extractable Cadmium (Cd)	ug/g	<0.10	<0.10	<0.10	<0.10	1.4	0.38	0.10	5997511
Acid Extractable Calcium (Ca)	ug/g	37000	32000	33000	62000	90000	14000	50	5997511
Acid Extractable Chromium (Cr)	ug/g	9.4	8.2	8.9	8.9	81	32	1.0	5997511
Acid Extractable Cobalt (Co)	ug/g	4.0	3.5	3.9	2.9	4.1	8.8	0.10	5997511
Acid Extractable Copper (Cu)	ug/g	9.9	9.0	10	8.0	86	10	0.50	5997511
Acid Extractable Iron (Fe)	ug/g	9800	8600	9900	7900	13000	25000	50	5997511
Acid Extractable Lead (Pb)	ug/g	5.5	5.4	10	2.3	600	9.2	1.0	5997511
Acid Extractable Magnesium (Mg)	ug/g	7600	6700	7700	17000	11000	4400	50	5997511
Acid Extractable Manganese (Mn)	ug/g	220	190	230	310	350	1100	1.0	5997511
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	<0.50	<0.50	0.51	4.2	<0.50	0.50	5997511
Acid Extractable Nickel (Ni)	ug/g	6.7	6.7	6.3	5.3	17	18	0.50	5997511
Acid Extractable Phosphorus (P)	ug/g	820	710	890	590	730	1100	50	5997511
Acid Extractable Potassium (K)	ug/g	560	470	570	640	710	1100	200	5997511
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5997511
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	0.45	<0.20	0.20	5997511
Acid Extractable Sodium (Na)	ug/g	160	130	160	160	210	180	50	5997511
Acid Extractable Strontium (Sr)	ug/g	54	51	51	66	130	32	1.0	5997511
Acid Extractable Thallium (Tl)	ug/g	0.052	0.058	0.058	<0.050	0.059	0.21	0.050	5997511
Acid Extractable Tin (Sn)	ug/g	<1.0	<1.0	<1.0	<1.0	7.6	<1.0	1.0	5997511
Acid Extractable Uranium (U)	ug/g	0.46	0.36	0.42	0.35	0.36	0.75	0.050	5997511
Acid Extractable Vanadium (V)	ug/g	19	17	21	17	17	37	5.0	5997511
Acid Extractable Zinc (Zn)	ug/g	19	19	22	12	130	99	5.0	5997511
Acid Extractable Mercury (Hg)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	0.081	0.050	5997511

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B951492
Report Date: 2019/03/01

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		JBQ769	JBQ770	JBQ771			JBQ771		
Sampling Date		2019/02/15 09:00	2019/02/15 09:00	2019/02/15 11:00			2019/02/15 11:00		
COC Number		483691	483691	483691			483691		
	UNITS	**BH1 SS4**	**DUPU**	**BH2 SS3**	**RDL**	**QC Batch**	**BH2 SS3 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters									
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	<0.0071	0.0071	5993183			
Polyaromatic Hydrocarbons									
Acenaphthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Anthracene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Benzo(a)anthracene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Benzo(a)pyrene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Benzo(b/j)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	0.0059	0.0050	5996362
Benzo(g,h,i)perylene	ug/g	<0.0050	0.010	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Benzo(k)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Chrysene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Dibenz(a,h)anthracene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	0.0067	0.0050	5996362
Fluorene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Phenanthrene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	5996362	<0.0050	0.0050	5996362
Pyrene	ug/g	<0.0050	<0.0050	0.0051	0.0050	5996362	0.0074	0.0050	5996362
Surrogate Recovery (%)									
D10-Anthracene	%	102	95	97		5996362	91		5996362
D14-Terphenyl (FS)	%	93	87	90		5996362	86		5996362
D8-Acenaphthylene	%	93	88	89		5996362	86		5996362

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B951492
Report Date: 2019/03/01

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		JBQ772		JBQ773		JBQ774		
Sampling Date		2019/02/15 12:00		2019/02/19 09:00		2019/02/20 14:00		
COC Number		483691		483691		483691		
	UNITS	**BH3 SS2**	**RDL**	**BH4 AS1**	**RDL**	**BH5 SS2**	**RDL**	**QC Batch**
Calculated Parameters								
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	<0.071	0.071	<0.0071	0.0071	5993183
Polyaromatic Hydrocarbons								
Acenaphthene	ug/g	<0.0050	0.0050	0.12	0.050	<0.0050	0.0050	5996362
Acenaphthylene	ug/g	<0.0050	0.0050	<0.050	0.050	<0.0050	0.0050	5996362
Anthracene	ug/g	<0.0050	0.0050	0.20	0.050	0.0083	0.0050	5996362
Benzo(a)anthracene	ug/g	<0.0050	0.0050	0.46	0.050	0.035	0.0050	5996362
Benzo(a)pyrene	ug/g	<0.0050	0.0050	0.39	0.050	0.031	0.0050	5996362
Benzo(b/j)fluoranthene	ug/g	<0.0050	0.0050	0.50	0.050	0.039	0.0050	5996362
Benzo(g,h,i)perylene	ug/g	<0.0050	0.0050	0.32	0.050	0.018	0.0050	5996362
Benzo(k)fluoranthene	ug/g	<0.0050	0.0050	0.17	0.050	0.015	0.0050	5996362
Chrysene	ug/g	<0.0050	0.0050	0.38	0.050	0.028	0.0050	5996362
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	0.058	0.050	<0.0050	0.0050	5996362
Fluoranthene	ug/g	<0.0050	0.0050	1.1	0.050	0.069	0.0050	5996362
Fluorene	ug/g	<0.0050	0.0050	0.11	0.050	<0.0050	0.0050	5996362
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	0.0050	0.25	0.050	0.019	0.0050	5996362
1-Methylnaphthalene	ug/g	<0.0050	0.0050	<0.050	0.050	<0.0050	0.0050	5996362
2-Methylnaphthalene	ug/g	<0.0050	0.0050	<0.050	0.050	<0.0050	0.0050	5996362
Naphthalene	ug/g	<0.0050	0.0050	<0.050	0.050	<0.0050	0.0050	5996362
Phenanthrene	ug/g	<0.0050	0.0050	0.97	0.050	0.021	0.0050	5996362
Pyrene	ug/g	<0.0050	0.0050	0.87	0.050	0.062	0.0050	5996362
Surrogate Recovery (%)								
D10-Anthracene	%	96		116		98		5996362
D14-Terphenyl (FS)	%	89		83		92		5996362
D8-Acenaphthylene	%	90		96		93		5996362

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B951492
Report Date: 2019/03/01

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		JBQ769	JBQ770	JBQ771	JBQ772	JBQ773	JBQ774		
Sampling Date		2019/02/15 09:00	2019/02/15 09:00	2019/02/15 11:00	2019/02/15 12:00	2019/02/19 09:00	2019/02/20 14:00		
COC Number		483691	483691	483691	483691	483691	483691		
	UNITS	**BH1 SS4**	**DUPU**	**BH2 SS3**	**BH3 SS2**	**BH4 AS1**	**BH5 SS2**	**RDL**	**QC Batch**
Calculated Parameters									
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993650
Volatile Organics									
Acetone (2-Propanone)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5993774
Benzene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	5993774
Bromodichloromethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Bromoform	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Bromomethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Carbon Tetrachloride	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Chlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Chloroform	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Dibromochloromethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,2-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,3-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,4-Dichlorobenzene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Dichlorodifluoromethane (FREON 12)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,1-Dichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,2-Dichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,1-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
cis-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
trans-1,2-Dichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,2-Dichloropropane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.030	5993774
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	5993774
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	5993774
Ethylene Dibromide	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Hexane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Methylene Chloride(Dichloromethane)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5993774
Methyl Isobutyl Ketone	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5993774
Methyl t-butyl ether (MTBE)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Styrene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,1,1,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,1,2,2-Tetrachloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Tetrachloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	0.025	<0.020	0.020	5993774

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QC Batch = Quality Control Batch

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Report Date: 2019/03/01

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		JBQ769	JBQ770	JBQ771	JBQ772	JBQ773	JBQ774		
Sampling Date		2019/02/15 09:00	2019/02/15 09:00	2019/02/15 11:00	2019/02/15 12:00	2019/02/19 09:00	2019/02/20 14:00		
COC Number		483691	483691	483691	483691	483691	483691		
	UNITS	**BH1 SS4**	**DUPU**	**BH2 SS3**	**BH3 SS2**	**BH4 AS1**	**BH5 SS2**	**RDL**	**QC Batch**
1,1,1-Trichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
1,1,2-Trichloroethane	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Trichloroethylene	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Trichlorofluoromethane (FREON 11)	ug/g	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	5993774
Vinyl Chloride	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	5993774
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.024	<0.020	0.020	5993774
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	5993774
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	0.024	<0.020	0.020	5993774
F1 (C6-C10)	ug/g	<10	11	<10	<10	<10	<10	10	5993774
F1 (C6-C10) - BTEX	ug/g	<10	11	<10	<10	<10	<10	10	5993774
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	97	122	92	102	96	93		5993774
D10-o-Xylene	%	95	161 (1)	177 (1)	99	89	187 (1)		5993774
D4-1,2-Dichloroethane	%	120	101	112	95	106	93		5993774
D8-Toluene	%	106	109	112	77	107	81		5993774

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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exp Services Inc
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Sampler Initials: ML

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		JBQ769	JBQ770	JBQ771	JBQ772	JBQ773	JBQ774		
Sampling Date		2019/02/15 09:00	2019/02/15 09:00	2019/02/15 11:00	2019/02/15 12:00	2019/02/19 09:00	2019/02/20 14:00		
COC Number		483691	483691	483691	483691	483691	483691		
	UNITS	**BH1 SS4**	**DUPU**	**BH2 SS3**	**BH3 SS2**	**BH4 AS1**	**BH5 SS2**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	<10	10	5994449
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	900	<50	50	5994449
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	320	<50	50	5994449
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	Yes		5994449
Surrogate Recovery (%)									
o-Terphenyl	%	83	84	84	83	89	88		5994449

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Sampler Initials: ML

TEST SUMMARY

Maxxam ID: JBQ769
Sample ID: BH1 SS4
Matrix: Soil

Collected: 2019/02/15
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5993183	N/A	2019/03/01	Automated Statchk
1,3-Dichloropropene Sum	CALC	5993650	N/A	2019/03/01	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5994449	2019/02/27	2019/02/28	Mariana Vascan
Strong Acid Leachable Metals by ICPMS	ICP/MS	5997511	2019/03/01	2019/03/01	Matthew Ritenburg
Moisture	BAL	5995672	N/A	2019/03/01	Mariana Vascan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5996362	2019/02/28	2019/03/01	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993774	N/A	2019/02/28	Liliana Gaburici

Maxxam ID: JBQ769 Dup
Sample ID: BH1 SS4
Matrix: Soil

Collected: 2019/02/15
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5995672	N/A	2019/03/01	Mariana Vascan

Maxxam ID: JBQ770
Sample ID: DUPU
Matrix: Soil

Collected: 2019/02/15
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5993183	N/A	2019/03/01	Automated Statchk
1,3-Dichloropropene Sum	CALC	5993650	N/A	2019/03/01	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5994449	2019/02/27	2019/02/28	Mariana Vascan
Strong Acid Leachable Metals by ICPMS	ICP/MS	5997511	2019/03/01	2019/03/01	Matthew Ritenburg
Moisture	BAL	5995672	N/A	2019/03/01	Mariana Vascan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5996362	2019/02/28	2019/03/01	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993774	N/A	2019/02/28	Liliana Gaburici

Maxxam ID: JBQ771
Sample ID: BH2 SS3
Matrix: Soil

Collected: 2019/02/15
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5993183	N/A	2019/03/01	Automated Statchk
1,3-Dichloropropene Sum	CALC	5993650	N/A	2019/03/01	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5994449	2019/02/27	2019/02/28	Mariana Vascan
Strong Acid Leachable Metals by ICPMS	ICP/MS	5997511	2019/03/01	2019/03/01	Matthew Ritenburg
Moisture	BAL	5995672	N/A	2019/03/01	Mariana Vascan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5996362	2019/02/28	2019/02/28	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993774	N/A	2019/02/28	Liliana Gaburici

Maxxam ID: JBQ771 Dup
Sample ID: BH2 SS3
Matrix: Soil

Collected: 2019/02/15
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5996362	2019/02/28	2019/03/01	Mitesh Raj

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Sampler Initials: ML

TEST SUMMARY

Maxxam ID: JBQ772
Sample ID: BH3 SS2
Matrix: Soil

Collected: 2019/02/15
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5993183	N/A	2019/03/01	Automated Statchk
1,3-Dichloropropene Sum	CALC	5993650	N/A	2019/03/01	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5994449	2019/02/27	2019/02/28	Mariana Vascan
Strong Acid Leachable Metals by ICPMS	ICP/MS	5997511	2019/03/01	2019/03/01	Matthew Ritenburg
Moisture	BAL	5995672	N/A	2019/03/01	Mariana Vascan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5996362	2019/02/28	2019/03/01	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993774	N/A	2019/02/28	Liliana Gaburici

Maxxam ID: JBQ773
Sample ID: BH4 AS1
Matrix: Soil

Collected: 2019/02/19
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5993183	N/A	2019/03/01	Automated Statchk
1,3-Dichloropropene Sum	CALC	5993650	N/A	2019/03/01	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5994449	2019/02/27	2019/02/28	Mariana Vascan
Strong Acid Leachable Metals by ICPMS	ICP/MS	5997511	2019/03/01	2019/03/01	Matthew Ritenburg
Moisture	BAL	5995672	N/A	2019/03/01	Mariana Vascan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5996362	2019/02/28	2019/03/01	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993774	N/A	2019/03/01	Liliana Gaburici

Maxxam ID: JBQ774
Sample ID: BH5 SS2
Matrix: Soil

Collected: 2019/02/20
Shipped:
Received: 2019/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5993183	N/A	2019/03/01	Automated Statchk
1,3-Dichloropropene Sum	CALC	5993650	N/A	2019/03/01	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5994449	2019/02/27	2019/02/28	Mariana Vascan
Strong Acid Leachable Metals by ICPMS	ICP/MS	5997511	2019/03/01	2019/03/01	Matthew Ritenburg
Moisture	BAL	5995672	N/A	2019/03/01	Mariana Vascan
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	5996362	2019/02/28	2019/03/01	Mitesh Raj
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993774	N/A	2019/02/28	Liliana Gaburici

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GENERAL COMMENTS

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

Package 1	10.0°C

VOCF1 Analysis: Extraction surrogates (D10- Xylene) is above the limit for some samples due to the low level of methanol in the sample.

Sample JBQ773 [BH4 AS1] : PAH analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

VOLATILE ORGANICS BY GC/MS (SOIL)

Volatile Organic Compounds and F1 PHCs: VOCF1 Analysis: Some parameters for matrix spike were not calclulated (NC) due to high concentration of target analyte in the parent sample.

Results relate only to the items tested.

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Report Date: 2019/03/01

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5993774	4-Bromofluorobenzene	2019/02/28	101	60 - 140	75	60 - 140	108	%		
5993774	D10-o-Xylene	2019/02/28	82	60 - 130	77	60 - 130	114	%		
5993774	D4-1,2-Dichloroethane	2019/02/28	114	60 - 140	107	60 - 140	100	%		
5993774	D8-Toluene	2019/02/28	103	60 - 140	102	60 - 140	99	%		
5994449	o-Terphenyl	2019/02/28	97	30 - 130	92	30 - 130	94	%		
5996362	D10-Anthracene	2019/02/28	98	50 - 130	97	50 - 130	99	%		
5996362	D14-Terphenyl (FS)	2019/02/28	91	50 - 130	92	50 - 130	93	%		
5996362	D8-Acenaphthylene	2019/02/28	95	50 - 130	93	50 - 130	92	%		
5993774	1,1,1,2-Tetrachloroethane	2019/02/28	110	60 - 140	104	60 - 130	<0.050	ug/g	NC	50
5993774	1,1,1-Trichloroethane	2019/02/28	108	60 - 140	117	60 - 130	<0.050	ug/g	NC	50
5993774	1,1,2,2-Tetrachloroethane	2019/02/28	103	60 - 140	78	60 - 130	<0.050	ug/g	NC	50
5993774	1,1,2-Trichloroethane	2019/02/28	109	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
5993774	1,1-Dichloroethane	2019/02/28	100	60 - 140	101	60 - 130	<0.050	ug/g	NC	50
5993774	1,1-Dichloroethylene	2019/02/28	98	60 - 140	119	60 - 130	<0.050	ug/g	NC	50
5993774	1,2-Dichlorobenzene	2019/02/28	106	60 - 140	103	60 - 130	<0.050	ug/g	NC	50
5993774	1,2-Dichloroethane	2019/02/28	105	60 - 140	106	60 - 130	<0.050	ug/g	NC	50
5993774	1,2-Dichloropropane	2019/02/28	101	60 - 140	91	60 - 130	<0.050	ug/g	NC	50
5993774	1,3-Dichlorobenzene	2019/02/28	109	60 - 140	105	60 - 130	<0.050	ug/g	NC	50
5993774	1,4-Dichlorobenzene	2019/02/28	112	60 - 140	110	60 - 130	<0.050	ug/g	NC	50
5993774	Acetone (2-Propanone)	2019/02/28	101	60 - 140	116	60 - 140	<0.50	ug/g	26	50
5993774	Benzene	2019/02/28	98	60 - 140	94	60 - 130	<0.020	ug/g	2.8	50
5993774	Bromodichloromethane	2019/02/28	109	60 - 140	106	60 - 130	<0.050	ug/g	NC	50
5993774	Bromoform	2019/02/28	99	60 - 140	79	60 - 130	<0.050	ug/g	NC	50
5993774	Bromomethane	2019/02/28	106	60 - 140	130	60 - 140	<0.050	ug/g	NC	50
5993774	Carbon Tetrachloride	2019/02/28	113	60 - 140	119	60 - 130	<0.050	ug/g	NC	50
5993774	Chlorobenzene	2019/02/28	103	60 - 140	96	60 - 130	<0.050	ug/g	NC	50
5993774	Chloroform	2019/02/28	112	60 - 140	106	60 - 130	<0.050	ug/g	NC	50
5993774	cis-1,2-Dichloroethylene	2019/02/28	100	60 - 140	119	60 - 130	<0.050	ug/g	NC	50
5993774	cis-1,3-Dichloropropene	2019/02/28	105	60 - 140	107	60 - 130	<0.030	ug/g	NC	50
5993774	Dibromochloromethane	2019/02/28	105	60 - 140	107	60 - 130	<0.050	ug/g	NC	50
5993774	Dichlorodifluoromethane (FREON 12)	2019/02/28	103	60 - 140	109	60 - 140	<0.050	ug/g	NC	50
5993774	Ethylbenzene	2019/02/28	75	60 - 140	108	60 - 130	<0.020	ug/g	5.0	50

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5993774	Ethylene Dibromide	2019/02/28	103	60 - 140	93	60 - 130	<0.050	ug/g	NC	50
5993774	F1 (C6-C10) - BTEX	2019/02/28					<10	ug/g	9.5	30
5993774	F1 (C6-C10)	2019/02/28	NC	60 - 140	100	80 - 120	<10	ug/g	4.8	30
5993774	Hexane	2019/02/28	90	60 - 140	103	60 - 130	<0.050	ug/g	8.1	50
5993774	Methyl Ethyl Ketone (2-Butanone)	2019/02/28	110	60 - 140	118	60 - 140	<0.50	ug/g	34	50
5993774	Methyl Isobutyl Ketone	2019/02/28	110	60 - 140	112	60 - 130	<0.50	ug/g	5.7	50
5993774	Methyl t-butyl ether (MTBE)	2019/02/28	109	60 - 140	98	60 - 130	<0.050	ug/g	NC	50
5993774	Methylene Chloride(Dichloromethane)	2019/02/28	99	60 - 140	117	60 - 130	<0.050	ug/g	NC	50
5993774	o-Xylene	2019/02/28	60	60 - 140	85	60 - 130	<0.020	ug/g	5.9	50
5993774	p+m-Xylene	2019/02/28	NC	60 - 140	93	60 - 130	<0.020	ug/g	6.2	50
5993774	Styrene	2019/02/28	112	60 - 140	72	60 - 130	<0.050	ug/g	NC	50
5993774	Tetrachloroethylene	2019/02/28	100	60 - 140	96	60 - 130	<0.050	ug/g	NC	50
5993774	Toluene	2019/02/28	NC	60 - 140	101	60 - 130	<0.020	ug/g	19	50
5993774	Total Xylenes	2019/02/28					<0.020	ug/g	2.4	50
5993774	trans-1,2-Dichloroethylene	2019/02/28	98	60 - 140	86	60 - 130	<0.050	ug/g	NC	50
5993774	trans-1,3-Dichloropropene	2019/02/28	107	60 - 140	120	60 - 130	<0.040	ug/g	NC	50
5993774	Trichloroethylene	2019/02/28	97	60 - 140	118	60 - 130	<0.050	ug/g	NC	50
5993774	Trichlorofluoromethane (FREON 11)	2019/02/28	116	60 - 140	115	60 - 130	<0.050	ug/g	NC	50
5993774	Vinyl Chloride	2019/02/28	101	60 - 140	121	60 - 130	<0.020	ug/g	NC	50
5994449	F2 (C10-C16 Hydrocarbons)	2019/03/01	94	50 - 130	92	80 - 120	<10	ug/g	NC	50
5994449	F3 (C16-C34 Hydrocarbons)	2019/03/01	94	50 - 130	92	80 - 120	<50	ug/g	4.5	50
5994449	F4 (C34-C50 Hydrocarbons)	2019/03/01	94	50 - 130	92	80 - 120	<50	ug/g	8.0	50
5995672	Moisture	2019/03/01							4.2	50
5996362	1-Methylnaphthalene	2019/03/01	104	50 - 130	109	50 - 130	<0.0050	ug/g	NC	40
5996362	2-Methylnaphthalene	2019/03/01	94	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
5996362	Acenaphthene	2019/03/01	88	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40
5996362	Acenaphthylene	2019/03/01	90	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40
5996362	Anthracene	2019/03/01	85	50 - 130	86	50 - 130	<0.0050	ug/g	NC	40
5996362	Benzo(a)anthracene	2019/03/01	95	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
5996362	Benzo(a)pyrene	2019/03/01	91	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
5996362	Benzo(b/j)fluoranthene	2019/03/01	88	50 - 130	91	50 - 130	<0.0050	ug/g	17	40
5996362	Benzo(g,h,i)perylene	2019/03/01	88	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5996362	Benzo(k)fluoranthene	2019/03/01	84	50 - 130	88	50 - 130	<0.0050	ug/g	NC	40
5996362	Chrysene	2019/03/01	93	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
5996362	Dibenz(a,h)anthracene	2019/03/01	83	50 - 130	84	50 - 130	<0.0050	ug/g	NC	40
5996362	Fluoranthene	2019/03/01	97	50 - 130	94	50 - 130	<0.0050	ug/g	29	40
5996362	Fluorene	2019/03/01	88	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
5996362	Indeno(1,2,3-cd)pyrene	2019/03/01	93	50 - 130	96	50 - 130	<0.0050	ug/g	NC	40
5996362	Naphthalene	2019/03/01	86	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
5996362	Phenanthrene	2019/03/01	90	50 - 130	91	50 - 130	<0.0050	ug/g	NC	40
5996362	Pyrene	2019/03/01	96	50 - 130	94	50 - 130	<0.0050	ug/g	37	40
5997511	Acid Extractable Aluminum (Al)	2019/03/01	NC	75 - 125	102	80 - 120	<50	ug/g		
5997511	Acid Extractable Antimony (Sb)	2019/03/01	104	75 - 125	104	80 - 120	<0.20	ug/g	NC	30
5997511	Acid Extractable Arsenic (As)	2019/03/01	103	75 - 125	96	80 - 120	<1.0	ug/g	NC	30
5997511	Acid Extractable Barium (Ba)	2019/03/01	NC	75 - 125	97	80 - 120	<0.50	ug/g	4.7	30
5997511	Acid Extractable Beryllium (Be)	2019/03/01	109	75 - 125	101	80 - 120	<0.20	ug/g	5.7	30
5997511	Acid Extractable Bismuth (Bi)	2019/03/01	103	75 - 125	97	80 - 120	<1.0	ug/g		
5997511	Acid Extractable Boron (B)	2019/03/01	106	75 - 125	100	80 - 120	<5.0	ug/g	NC	30
5997511	Acid Extractable Cadmium (Cd)	2019/03/01	104	75 - 125	102	80 - 120	<0.10	ug/g	NC	30
5997511	Acid Extractable Calcium (Ca)	2019/03/01	NC	75 - 125	103	80 - 120	<50	ug/g		
5997511	Acid Extractable Chromium (Cr)	2019/03/01	109	75 - 125	102	80 - 120	<1.0	ug/g	1.5	30
5997511	Acid Extractable Cobalt (Co)	2019/03/01	103	75 - 125	98	80 - 120	<0.10	ug/g	5.0	30
5997511	Acid Extractable Copper (Cu)	2019/03/01	101	75 - 125	99	80 - 120	<0.50	ug/g	3.4	30
5997511	Acid Extractable Iron (Fe)	2019/03/01	NC	75 - 125	96	80 - 120	<50	ug/g		
5997511	Acid Extractable Lead (Pb)	2019/03/01	103	75 - 125	98	80 - 120	<1.0	ug/g	5.9	30
5997511	Acid Extractable Magnesium (Mg)	2019/03/01	NC	75 - 125	103	80 - 120	<50	ug/g		
5997511	Acid Extractable Manganese (Mn)	2019/03/01	NC	75 - 125	101	80 - 120	<1.0	ug/g		
5997511	Acid Extractable Mercury (Hg)	2019/03/01	95	75 - 125	92	80 - 120	<0.050	ug/g	NC	30
5997511	Acid Extractable Molybdenum (Mo)	2019/03/01	105	75 - 125	100	80 - 120	<0.50	ug/g	NC	30
5997511	Acid Extractable Nickel (Ni)	2019/03/01	103	75 - 125	101	80 - 120	<0.50	ug/g	1.6	30
5997511	Acid Extractable Phosphorus (P)	2019/03/01	NC	75 - 125	101	80 - 120	<50	ug/g		
5997511	Acid Extractable Potassium (K)	2019/03/01	NC	75 - 125	94	80 - 120	<200	ug/g		
5997511	Acid Extractable Selenium (Se)	2019/03/01	111	75 - 125	105	80 - 120	<0.50	ug/g	NC	30
5997511	Acid Extractable Silver (Ag)	2019/03/01	103	75 - 125	99	80 - 120	<0.20	ug/g	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5997511	Acid Extractable Sodium (Na)	2019/03/01	NC	75 - 125	102	80 - 120	<50	ug/g		
5997511	Acid Extractable Strontium (Sr)	2019/03/01	NC	75 - 125	104	80 - 120	<1.0	ug/g		
5997511	Acid Extractable Thallium (Tl)	2019/03/01	104	75 - 125	98	80 - 120	<0.050	ug/g	7.9	30
5997511	Acid Extractable Tin (Sn)	2019/03/01	102	75 - 125	100	80 - 120	<1.0	ug/g		
5997511	Acid Extractable Uranium (U)	2019/03/01	103	75 - 125	97	80 - 120	<0.050	ug/g	3.0	30
5997511	Acid Extractable Vanadium (V)	2019/03/01	111	75 - 125	102	80 - 120	<5.0	ug/g	5.0	30
5997511	Acid Extractable Zinc (Zn)	2019/03/01	107	75 - 125	102	80 - 120	<5.0	ug/g	3.9	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 (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).

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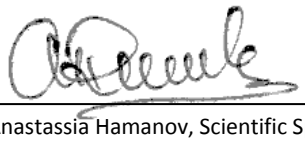
Maxxam Job #: B951492
Report Date: 2019/03/01

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: ML

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist

Liliana Gaburici, VOC Lab

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Analytics Inc
6740 Campobello Road, Mississauga, ON L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5778 Toll Free: (800) 563-6266

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE INFORMATION	REPORT INFORMATION (if differs from invoice)	PROJECT INFORMATION	MAXXAM JOB NUMBER
Company Name: EXP Services Inc.	Company Name:	Quotation #: EXP Stream 3.	
Contact Name: MARK MCALLA	Contact Name:	P.O. #:	CHAIN OF CUSTODY #
Address: 2650 QUEENSVIEW Dr. OTTawa	Address:	Project #: OTT-00250806-CO	OO 483691
Phone: 613 688-1899 Fax:	Phone: Fax:	Project Name:	
Email: mark.mccalla@exp.com	Email:	Location:	
		Sampled By: M.L.	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form.

- [ ] MISA — Reg. 153: Table 1 / Table 2 / Table 3 — Sewer Use: Sanitary / Storm — Region: ____
- [ ] PWQO
- [ ] Other (specify)
- [x] Reg. 558 Table 7

Report Criteria on C of A? [ ]

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

ANALYSIS REQUESTED (Please be specific)

TURNAROUND TIME (TAT) REQUIRED

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS.

Regular (Standard) TAT:
- [ ] 5 to 7 Working Days

Rush TAT: Rush Confirmation #: (call Lab for #)
- [ ] 1 day
- [x] 2 days
- [ ] 3 days

DATE Required: Friday March 1/19

TIME Required: NOON

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil, etc.)	Regulated Drinking Water? (Y / N)	Metals Field Filtered? (Y / N)	VOC	PHC	Metals	PAH	# of Cont.	COMMENTS / TAT COMMENTS
1	BH1 SS4	Feb 15		Soil			X	X	X	X	4	
2	DUPE.	Feb 15/19		"			X	X	X	X	4	
3	BH2 SS3.	Feb 15		"			X	X	X	X	4	
4	BH3 SS2	Feb 15		"			X	X	X	X	4	
5	BH4 ~~BS~~ AS1	Feb 19		"			X	X	X	X	4	
6	BH5 SS2.	Feb 20		"			X	X	X	X	4	
7												
8												
9												
10												
11												
12												

27-Feb-19 10:30
Alisha Williamson
B951492

RECEIVED IN OTTAWA

RELINQUISHED BY (Signature/Print)	RECEIVED BY (Signature/Print)	Date	Time
Mark McCalla	Serge Léger	Feb 27/19	10:30

Laboratory Use Only

Temperature (°C) on Receipt	Condition of Sample on Receipt
10, 10, 10	[ ] OK [ ] SIF

*MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

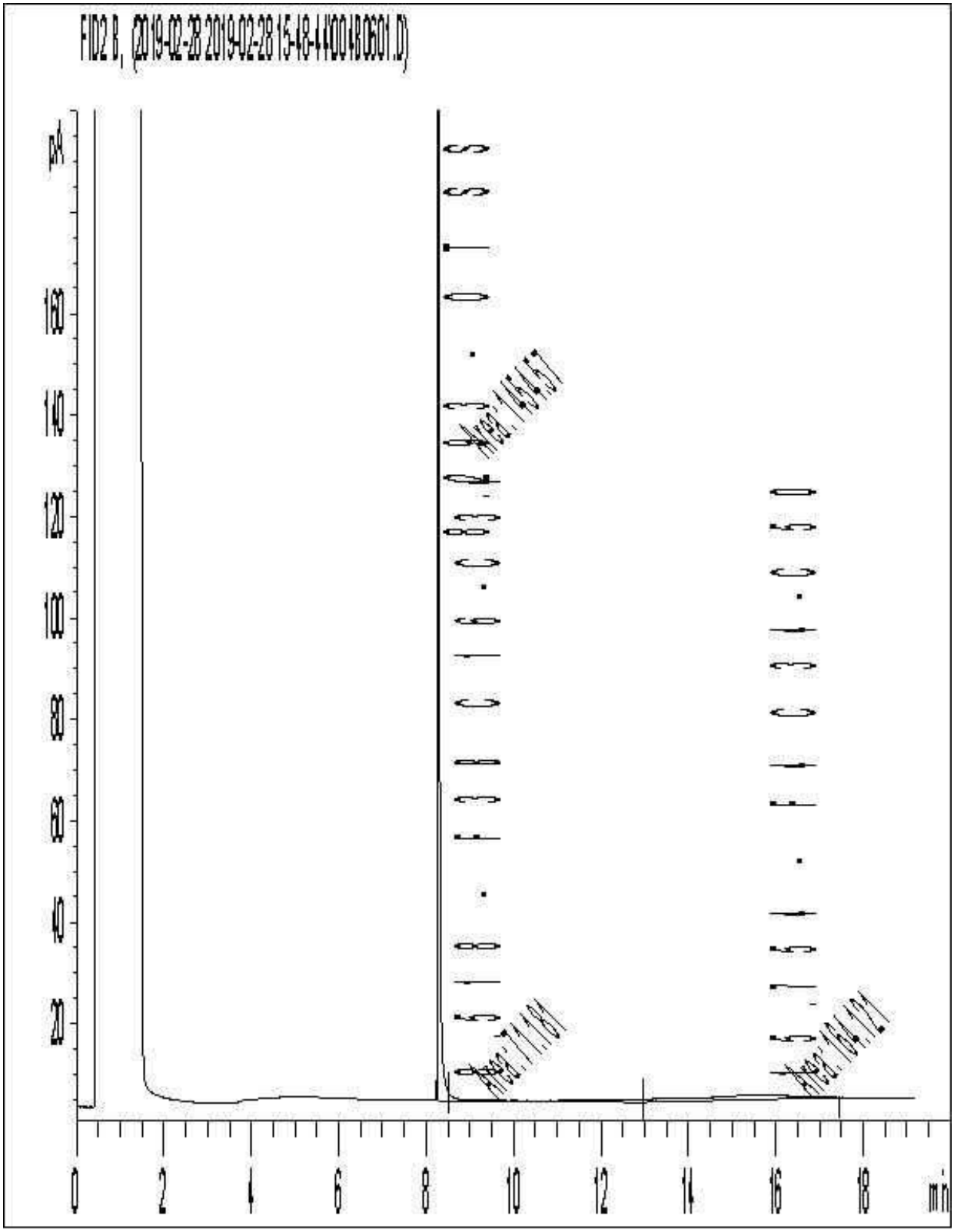
ENVCOC-ONT-05/06

White: Maxxam Yellow: Mail Pink: Client

Maxxam Job #: B951492
Report Date: 2019/03/01
Maxxam Sample: JBQ769

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH1 SS4

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

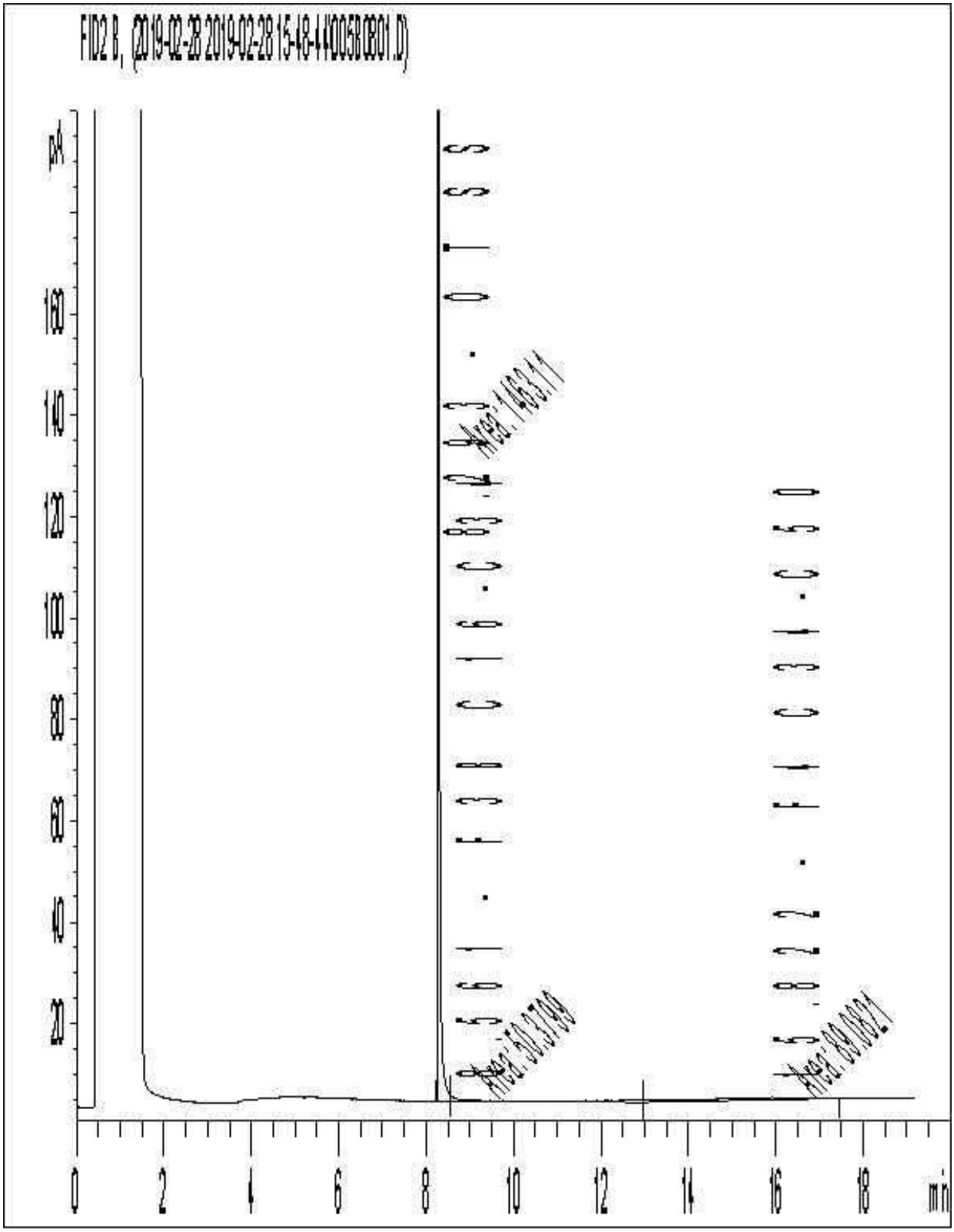


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B951492
Report Date: 2019/03/01
Maxxam Sample: JBQ770

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: DUPU

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

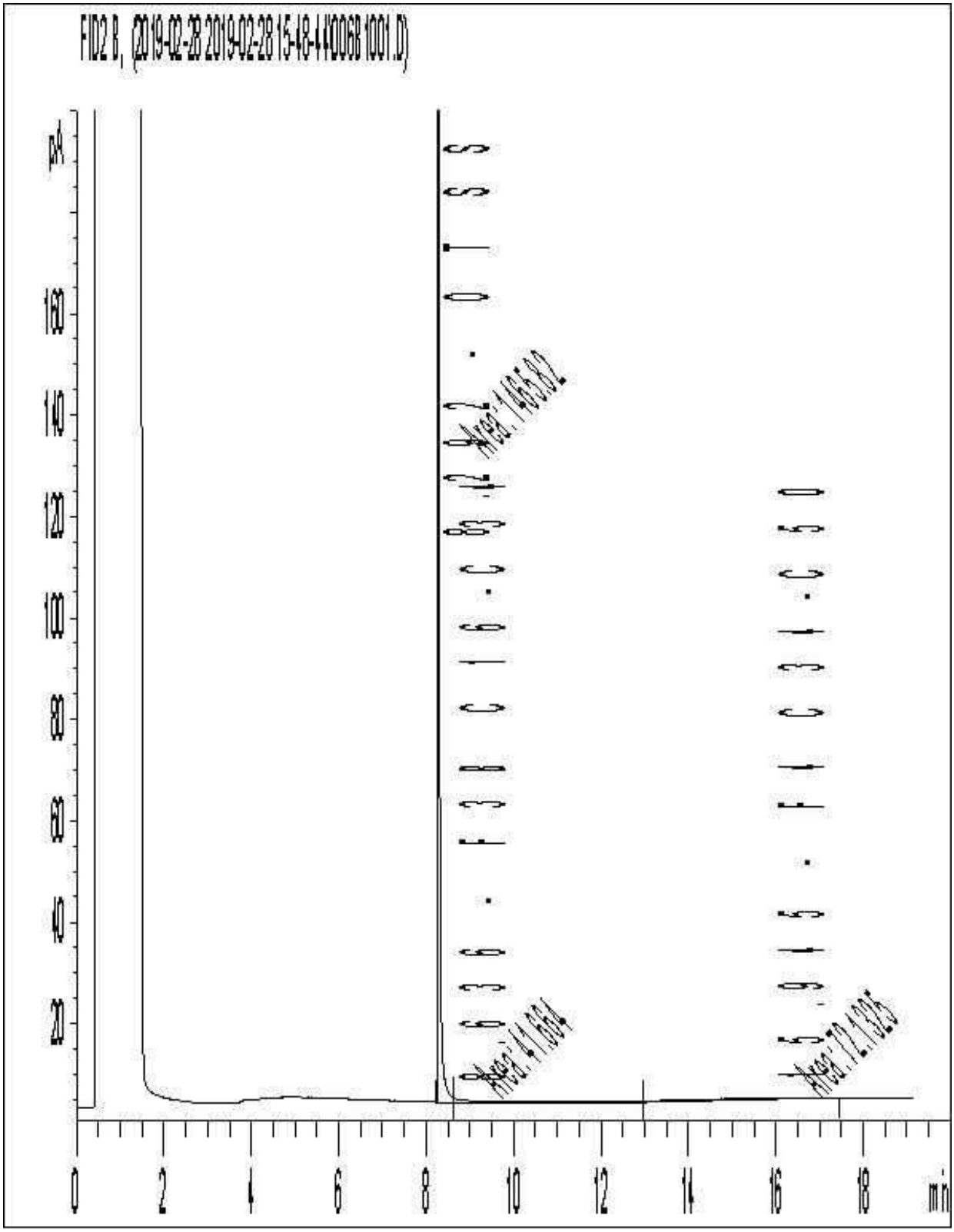


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B951492
Report Date: 2019/03/01
Maxxam Sample: JBQ771

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH2 SS3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

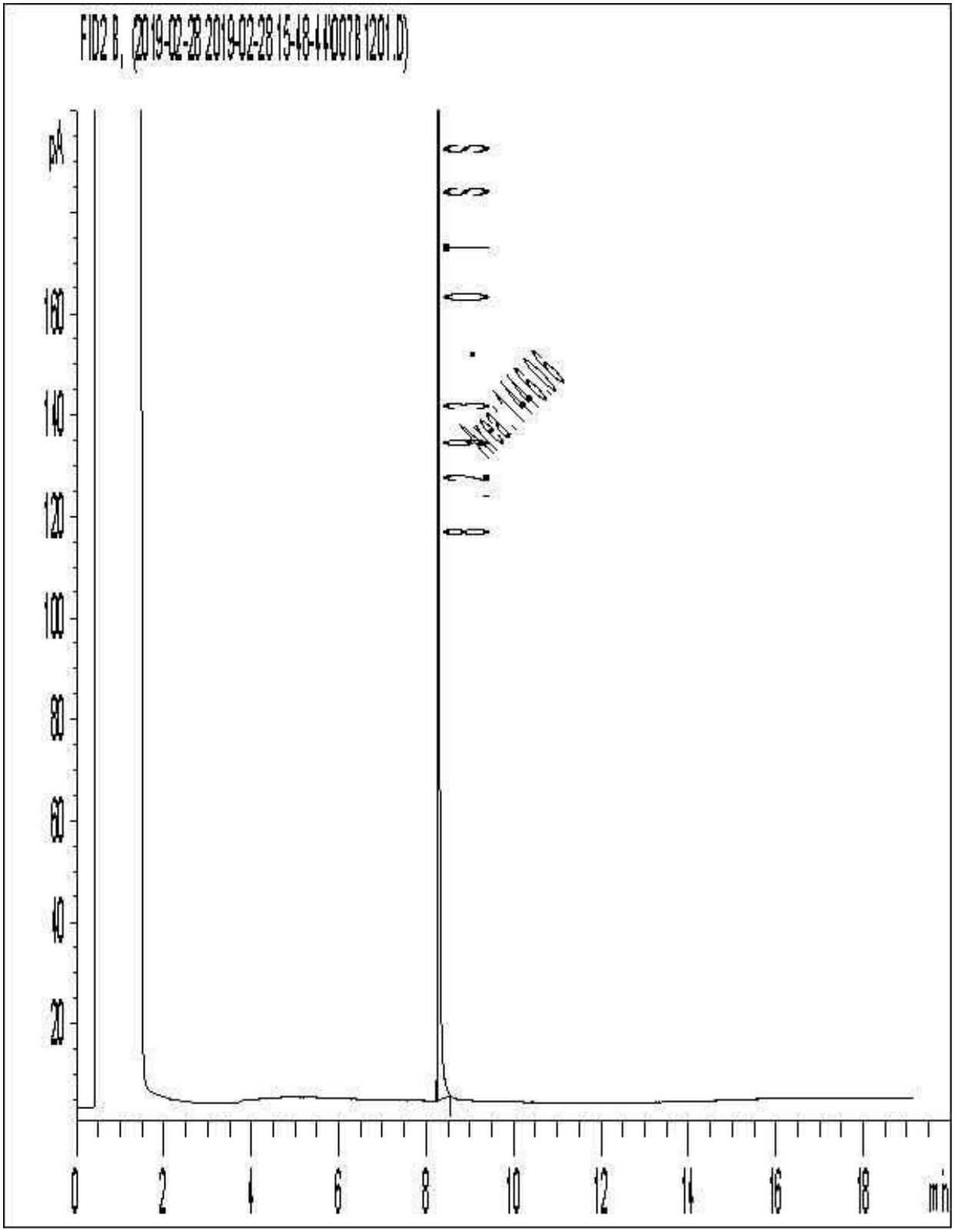


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B951492
Report Date: 2019/03/01
Maxxam Sample: JBQ772

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH3 SS2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

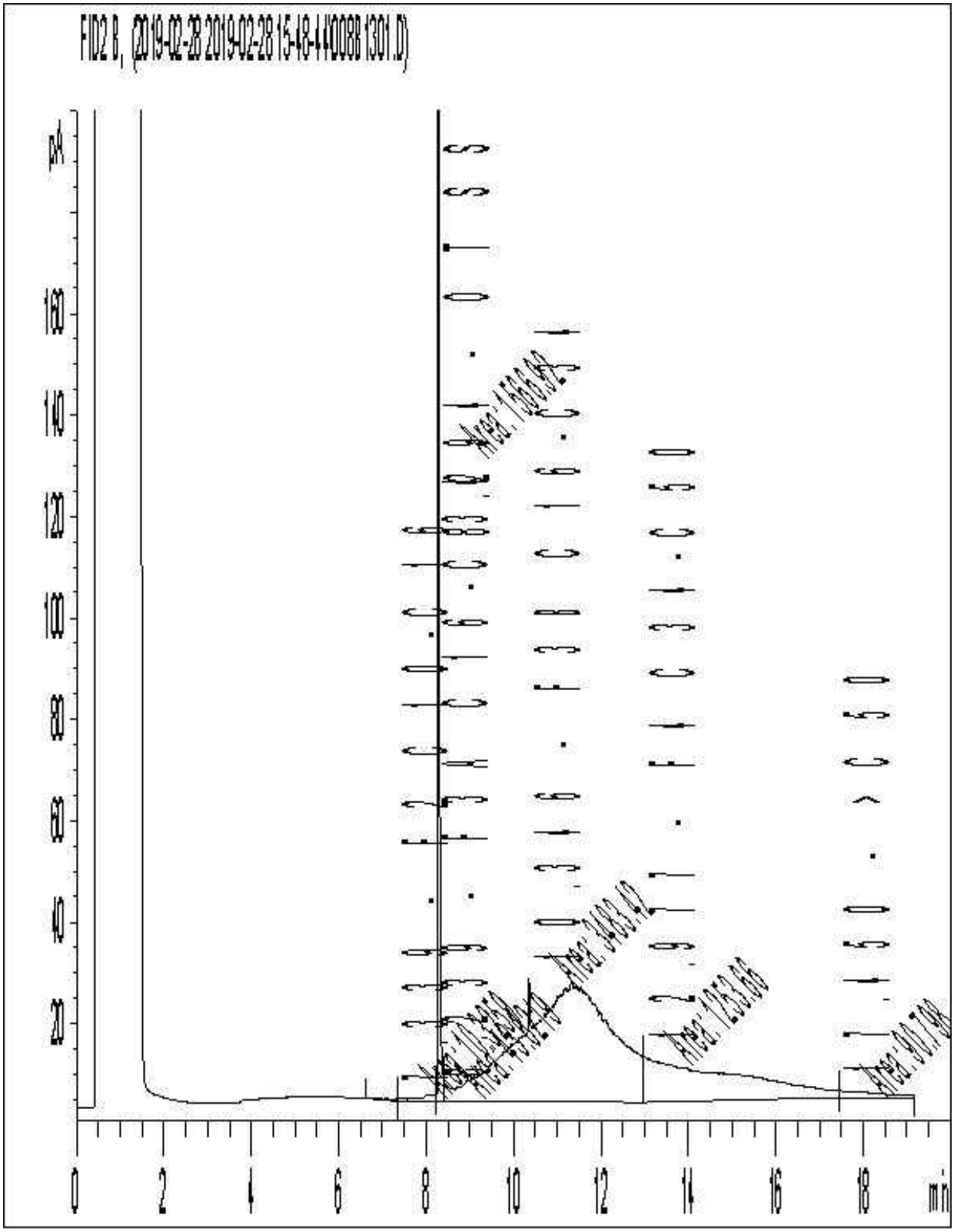


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B951492
Report Date: 2019/03/01
Maxxam Sample: JBQ773

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH4 AS1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

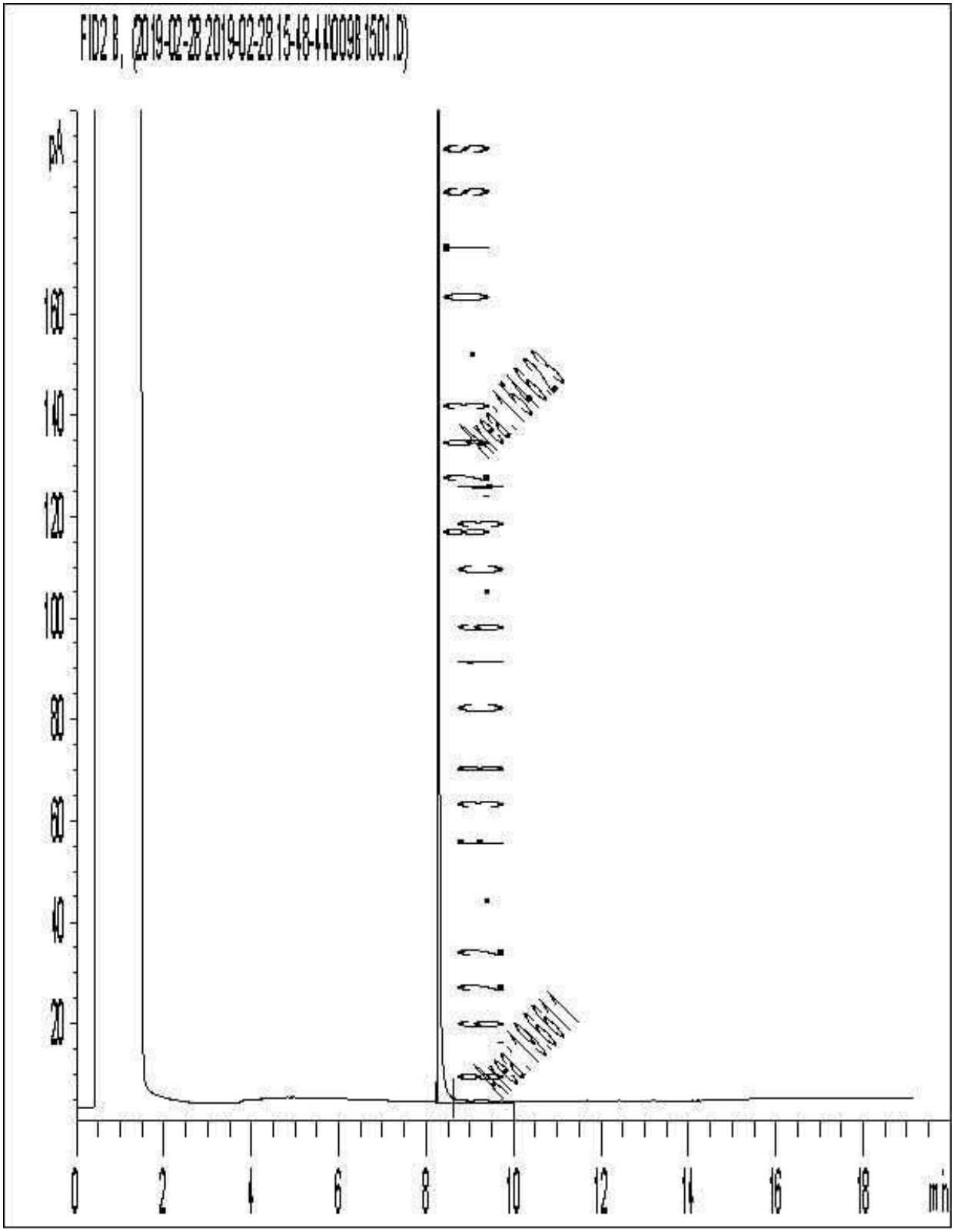


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B951492
Report Date: 2019/03/01
Maxxam Sample: JBQ774

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH5 SS2

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.

Maxxam
A Bureau Veritas Group Company

Your Project #: OTT-00250806-CO
Your C.O.C. #: 705696-01-01

Attention: Mark McCalla

exp Services Inc
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/02/28
Report #: R5611345
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B950643
Received: 2019/02/26, 15:00

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	4	N/A	2019/02/28	CAM SOP-00301	EPA 8270D m
1,3-Dichloropropene Sum	4	N/A	2019/02/28	OTT SOP-00002	EPA 8260C m
Petroleum Hydrocarbons F2-F4 in Water (2)	4	2019/02/26	2019/02/28	OTT SOP-00001	CCME Hydrocarbons
Dissolved Metals by ICPMS (1)	4	N/A	2019/02/28	CAM SOP-00447	EPA 6020B m
PAH Compounds in Water by GC/MS (SIM) (1)	4	2019/02/28	2019/02/28	CAM SOP-00318	EPA 8270D m
Volatile Organic Compounds and F1 PHCs	4	N/A	2019/02/27	OTT SOP-00002	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.
(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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your Project #: OTT-00250806-CO
Your C.O.C. #: 705696-01-01

Attention: Mark McCalla

exp Services Inc
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/02/28
Report #: R5611345
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B950643
Received: 2019/02/26, 15:00

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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B950643
Report Date: 2019/02/28

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

O.REG 153 DISSOLVED ICPMS METALS (WATER)

Maxxam ID		JBM080	JBM081	JBM082	JBM082	JBM083		
Sampling Date		2019/02/26 13:30	2019/02/26 10:30	2019/02/26 09:45	2019/02/26 09:45	2019/02/26 08:45		
COC Number		705696-01-01	705696-01-01	705696-01-01	705696-01-01	705696-01-01		
	UNITS	**MW19-1**	**MW19-3**	**MW19-4**	**MW19-4 Lab-Dup**	**MW19-5**	**RDL**	**QC Batch**
Metals								
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5993287
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	5993287
Dissolved Barium (Ba)	ug/L	150	760	140	140	120	2.0	5993287
Dissolved Beryllium (Be)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5993287
Dissolved Boron (B)	ug/L	150	54	57	57	72	10	5993287
Dissolved Cadmium (Cd)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5993287
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	5993287
Dissolved Cobalt (Co)	ug/L	2.3	0.88	0.67	0.69	0.54	0.50	5993287
Dissolved Copper (Cu)	ug/L	1.2	1.3	<1.0	<1.0	6.7	1.0	5993287
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5993287
Dissolved Molybdenum (Mo)	ug/L	44	2.2	0.97	1.0	5.4	0.50	5993287
Dissolved Nickel (Ni)	ug/L	5.1	5.1	2.4	2.4	4.6	1.0	5993287
Dissolved Selenium (Se)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	5993287
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	5993287
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	0.076	0.071	<0.050	0.050	5993287
Dissolved Uranium (U)	ug/L	1.5	0.96	0.71	0.68	4.5	0.10	5993287
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5993287
Dissolved Zinc (Zn)	ug/L	<5.0	6.1	5.4	<5.0	6.3	5.0	5993287

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B950643
Report Date: 2019/02/28

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

O.REG 153 PAHS (WATER)

Maxxam ID		JBM080		JBM081		JBM082		JBM083		
Sampling Date		2019/02/26 13:30		2019/02/26 10:30		2019/02/26 09:45		2019/02/26 08:45		
COC Number		705696-01-01		705696-01-01		705696-01-01		705696-01-01		
	UNITS	**MW19-1**	**RDL**	**MW19-3**	**RDL**	**MW19-4**	**RDL**	**MW19-5**	**RDL**	**QC Batch**
Calculated Parameters										
Methylnaphthalene, 2-(1-)	ug/L	1.3	0.071	190	0.071	<0.071	0.071	0.079	0.071	5991980
Polyaromatic Hydrocarbons										
Acenaphthene	ug/L	1.4	0.050	4.9	0.050	0.29	0.050	1.2	0.050	5995181
Acenaphthylene	ug/L	<0.050	0.050	<1.0 (1)	1.0	<0.050	0.050	<0.050	0.050	5995181
Anthracene	ug/L	0.098	0.050	0.19	0.050	0.076	0.050	0.098	0.050	5995181
Benzo(a)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	5995181
Benzo(a)pyrene	ug/L	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	5995181
Benzo(b/j)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	5995181
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	5995181
Benzo(k)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	5995181
Chrysene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	5995181
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	5995181
Fluoranthene	ug/L	<0.050	0.050	0.073	0.050	<0.050	0.050	<0.050	0.050	5995181
Fluorene	ug/L	1.4	0.050	6.4	0.050	0.27	0.050	1.6	0.050	5995181
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	5995181
1-Methylnaphthalene	ug/L	0.74	0.050	120	0.050	<0.050	0.050	0.079	0.050	5995181
2-Methylnaphthalene	ug/L	0.57	0.050	66	0.050	<0.050	0.050	<0.050	0.050	5995181
Naphthalene	ug/L	0.61	0.050	49	0.050	0.080	0.050	<0.20 (1)	0.20	5995181
Phenanthrene	ug/L	0.14	0.030	4.3	0.030	0.24	0.030	0.28	0.030	5995181
Pyrene	ug/L	<0.050	0.050	0.074	0.050	<0.050	0.050	<0.050	0.050	5995181
Surrogate Recovery (%)										
D10-Anthracene	%	103		95		107		100		5995181
D14-Terphenyl (FS)	%	87		83		94		75		5995181
D8-Acenaphthylene	%	105		100		104		98		5995181

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) DL was raised due to matrix interference.

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Maxxam Job #: B950643
Report Date: 2019/02/28

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

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

Maxxam ID		JBM080			JBM080			JBM081		
Sampling Date		2019/02/26 13:30			2019/02/26 13:30			2019/02/26 10:30		
COC Number		705696-01-01			705696-01-01			705696-01-01		
	UNITS	**MW19-1**	**RDL**	**QC Batch**	**MW19-1 Lab-Dup**	**RDL**	**QC Batch**	**MW19-3**	**RDL**	**QC Batch**
Calculated Parameters										
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	5991981				<0.50	0.50	5991981
Volatile Organics										
Acetone (2-Propanone)	ug/L	110	10	5993775	130	10	5993775	<10	10	5993775
Benzene	ug/L	1.0	0.20	5993775	0.99	0.20	5993775	5.1	0.20	5993775
Bromodichloromethane	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
Bromoform	ug/L	<1.0	1.0	5993775	<1.0	1.0	5993775	<1.0	1.0	5993775
Bromomethane	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
Carbon Tetrachloride	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
Chlorobenzene	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
Chloroform	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	0.40	0.20	5993775
Dibromochloromethane	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
1,2-Dichlorobenzene	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
1,3-Dichlorobenzene	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
1,4-Dichlorobenzene	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	5993775	<1.0	1.0	5993775	<1.0	1.0	5993775
1,1-Dichloroethane	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
1,2-Dichloroethane	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
1,1-Dichloroethylene	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
1,2-Dichloropropane	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	5993775	<0.30	0.30	5993775	<0.30	0.30	5993775
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	5993775	<0.40	0.40	5993775	<0.40	0.40	5993775
Ethylbenzene	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	5.0	0.20	5993775
Ethylene Dibromide	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
Hexane	ug/L	<1.0	1.0	5993775	<1.0	1.0	5993775	<1.0	1.0	5993775
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	5993775	<2.0	2.0	5993775	<2.0	2.0	5993775
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	5993775	<10	10	5993775	<10	10	5993775
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	5993775	<5.0	5.0	5993775	<5.0	5.0	5993775
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	0.55	0.50	5993775
Styrene	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
1,1,2,2-Tetrachloroethane	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
Tetrachloroethylene	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B950643
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exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

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

Maxxam ID		JBM080			JBM080			JBM081		
Sampling Date		2019/02/26 13:30			2019/02/26 13:30			2019/02/26 10:30		
COC Number		705696-01-01			705696-01-01			705696-01-01		
	UNITS	**MW19-1**	**RDL**	**QC Batch**	**MW19-1 Lab-Dup**	**RDL**	**QC Batch**	**MW19-3**	**RDL**	**QC Batch**
Toluene	ug/L	0.90	0.20	5993775	0.92	0.20	5993775	0.53	0.20	5993775
1,1,1-Trichloroethane	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
1,1,2-Trichloroethane	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
Trichloroethylene	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	5993775	<0.50	0.50	5993775	<0.50	0.50	5993775
Vinyl Chloride	ug/L	<0.20	0.20	5993775	<0.20	0.20	5993775	<0.20	0.20	5993775
p+m-Xylene	ug/L	0.37	0.20	5993775	0.41	0.20	5993775	2.6	0.20	5993775
o-Xylene	ug/L	0.98	0.20	5993775	0.95	0.20	5993775	6.3	0.20	5993775
Total Xylenes	ug/L	1.4	0.20	5993775	1.4	0.20	5993775	8.9	0.20	5993775
F1 (C6-C10)	ug/L	<25	25	5993775	<25	25	5993775	69	25	5993775
F1 (C6-C10) - BTEX	ug/L	<25	25	5993775	<25	25	5993775	49	25	5993775
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/L	<100	100	5991331				1400	100	5991331
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5991331				<200	200	5991331
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5991331				<200	200	5991331
Reached Baseline at C50	ug/L	Yes		5991331				Yes		5991331
Surrogate Recovery (%)										
o-Terphenyl	%	106		5991331				109		5991331
4-Bromofluorobenzene	%	102		5993775	97		5993775	95		5993775
D4-1,2-Dichloroethane	%	99		5993775	109		5993775	102		5993775
D8-Toluene	%	100		5993775	97		5993775	96		5993775

RDL = Reportable Detection Limit
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exp Services Inc
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Sampler Initials: SL

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

Maxxam ID		JBM081			JBM082	JBM083		
Sampling Date		2019/02/26 10:30			2019/02/26 09:45	2019/02/26 08:45		
COC Number		705696-01-01			705696-01-01	705696-01-01		
	UNITS	**MW19-3 Lab-Dup**	**RDL**	**QC Batch**	**MW19-4**	**MW19-5**	**RDL**	**QC Batch**
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/L				<0.50	<0.50	0.50	5991981
Volatile Organics								
Acetone (2-Propanone)	ug/L				<10	<10	10	5993775
Benzene	ug/L				<0.20	<0.20	0.20	5993775
Bromodichloromethane	ug/L				<0.50	<0.50	0.50	5993775
Bromoform	ug/L				<1.0	<1.0	1.0	5993775
Bromomethane	ug/L				<0.50	<0.50	0.50	5993775
Carbon Tetrachloride	ug/L				<0.20	<0.20	0.20	5993775
Chlorobenzene	ug/L				<0.20	<0.20	0.20	5993775
Chloroform	ug/L				0.30	0.38	0.20	5993775
Dibromochloromethane	ug/L				<0.50	<0.50	0.50	5993775
1,2-Dichlorobenzene	ug/L				<0.50	<0.50	0.50	5993775
1,3-Dichlorobenzene	ug/L				<0.50	<0.50	0.50	5993775
1,4-Dichlorobenzene	ug/L				<0.50	<0.50	0.50	5993775
Dichlorodifluoromethane (FREON 12)	ug/L				<1.0	<1.0	1.0	5993775
1,1-Dichloroethane	ug/L				<0.20	<0.20	0.20	5993775
1,2-Dichloroethane	ug/L				<0.50	<0.50	0.50	5993775
1,1-Dichloroethylene	ug/L				<0.20	<0.20	0.20	5993775
cis-1,2-Dichloroethylene	ug/L				<0.50	<0.50	0.50	5993775
trans-1,2-Dichloroethylene	ug/L				<0.50	<0.50	0.50	5993775
1,2-Dichloropropane	ug/L				<0.20	<0.20	0.20	5993775
cis-1,3-Dichloropropene	ug/L				<0.30	<0.30	0.30	5993775
trans-1,3-Dichloropropene	ug/L				<0.40	<0.40	0.40	5993775
Ethylbenzene	ug/L				<0.20	<0.20	0.20	5993775
Ethylene Dibromide	ug/L				<0.20	<0.20	0.20	5993775
Hexane	ug/L				<1.0	<1.0	1.0	5993775
Methylene Chloride(Dichloromethane)	ug/L				<2.0	<2.0	2.0	5993775
Methyl Ethyl Ketone (2-Butanone)	ug/L				<10	<10	10	5993775
Methyl Isobutyl Ketone	ug/L				<5.0	<5.0	5.0	5993775
Methyl t-butyl ether (MTBE)	ug/L				<0.50	<0.50	0.50	5993775
Styrene	ug/L				<0.50	<0.50	0.50	5993775
1,1,1,2-Tetrachloroethane	ug/L				<0.50	<0.50	0.50	5993775
1,1,2,2-Tetrachloroethane	ug/L				<0.50	<0.50	0.50	5993775
Tetrachloroethylene	ug/L				<0.20	<0.20	0.20	5993775

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Client Project #: OTT-00250806-CO
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O.REG 153 VOCS BY HS & F1-F4 (WATER)

Maxxam ID		JBM081			JBM082	JBM083		
Sampling Date		2019/02/26 10:30			2019/02/26 09:45	2019/02/26 08:45		
COC Number		705696-01-01			705696-01-01	705696-01-01		
	UNITS	**MW19-3 Lab-Dup**	**RDL**	**QC Batch**	**MW19-4**	**MW19-5**	**RDL**	**QC Batch**
Toluene	ug/L				<0.20	<0.20	0.20	5993775
1,1,1-Trichloroethane	ug/L				<0.20	<0.20	0.20	5993775
1,1,2-Trichloroethane	ug/L				<0.50	<0.50	0.50	5993775
Trichloroethylene	ug/L				<0.20	<0.20	0.20	5993775
Trichlorofluoromethane (FREON 11)	ug/L				<0.50	<0.50	0.50	5993775
Vinyl Chloride	ug/L				<0.20	<0.20	0.20	5993775
p+m-Xylene	ug/L				<0.20	<0.20	0.20	5993775
o-Xylene	ug/L				<0.20	<0.20	0.20	5993775
Total Xylenes	ug/L				<0.20	<0.20	0.20	5993775
F1 (C6-C10)	ug/L				<25	<25	25	5993775
F1 (C6-C10) - BTEX	ug/L				<25	<25	25	5993775
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/L	1400	100	5991331	<100	<100	100	5991331
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	5991331	<200	<200	200	5991331
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	5991331	<200	<200	200	5991331
Reached Baseline at C50	ug/L	Yes		5991331	Yes	Yes		5991331
Surrogate Recovery (%)								
o-Terphenyl	%	110		5991331	99	103		5991331
4-Bromofluorobenzene	%				98	93		5993775
D4-1,2-Dichloroethane	%				106	105		5993775
D8-Toluene	%				97	97		5993775

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TEST SUMMARY

Maxxam ID: JBM080
Sample ID: MW19-1
Matrix: Water

Collected: 2019/02/26
Shipped:
Received: 2019/02/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5991980	N/A	2019/02/28	Anastassia Hamanov
1,3-Dichloropropene Sum	CALC	5991981	N/A	2019/02/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5991331	2019/02/26	2019/02/28	Mariana Vascan
Dissolved Metals by ICPMS	ICP/MS	5993287	N/A	2019/02/28	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5995181	2019/02/28	2019/02/28	Bibin Alias Paul
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993775	N/A	2019/02/27	Liliana Gaburici

Maxxam ID: JBM080 Dup
Sample ID: MW19-1
Matrix: Water

Collected: 2019/02/26
Shipped:
Received: 2019/02/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993775	N/A	2019/02/27	Liliana Gaburici

Maxxam ID: JBM081
Sample ID: MW19-3
Matrix: Water

Collected: 2019/02/26
Shipped:
Received: 2019/02/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5991980	N/A	2019/02/28	Anastassia Hamanov
1,3-Dichloropropene Sum	CALC	5991981	N/A	2019/02/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5991331	2019/02/26	2019/02/28	Mariana Vascan
Dissolved Metals by ICPMS	ICP/MS	5993287	N/A	2019/02/28	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5995181	2019/02/28	2019/02/28	Bibin Alias Paul
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993775	N/A	2019/02/27	Liliana Gaburici

Maxxam ID: JBM081 Dup
Sample ID: MW19-3
Matrix: Water

Collected: 2019/02/26
Shipped:
Received: 2019/02/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5991331	2019/02/27	2019/02/28	Mariana Vascan

Maxxam ID: JBM082
Sample ID: MW19-4
Matrix: Water

Collected: 2019/02/26
Shipped:
Received: 2019/02/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5991980	N/A	2019/02/28	Anastassia Hamanov
1,3-Dichloropropene Sum	CALC	5991981	N/A	2019/02/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5991331	2019/02/26	2019/02/28	Mariana Vascan
Dissolved Metals by ICPMS	ICP/MS	5993287	N/A	2019/02/28	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5995181	2019/02/28	2019/02/28	Bibin Alias Paul
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993775	N/A	2019/02/27	Liliana Gaburici

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Maxxam Job #: B950643
Report Date: 2019/02/28

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

TEST SUMMARY

Maxxam ID: JBM082 Dup
Sample ID: MW19-4
Matrix: Water

Collected: 2019/02/26
Shipped:
Received: 2019/02/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	5993287	N/A	2019/02/28	Arefa Dabhad

Maxxam ID: JBM083
Sample ID: MW19-5
Matrix: Water

Collected: 2019/02/26
Shipped:
Received: 2019/02/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	5991980	N/A	2019/02/28	Anastassia Hamanov
1,3-Dichloropropene Sum	CALC	5991981	N/A	2019/02/28	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	5991331	2019/02/26	2019/02/28	Mariana Vascan
Dissolved Metals by ICPMS	ICP/MS	5993287	N/A	2019/02/28	Arefa Dabhad
PAH Compounds in Water by GC/MS (SIM)	GC/MS	5995181	2019/02/28	2019/02/28	Bibin Alias Paul
Volatile Organic Compounds and F1 PHCs	GC/MSFD	5993775	N/A	2019/02/27	Liliana Gaburici

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Maxxam Job #: B950643
Report Date: 2019/02/28

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

GENERAL COMMENTS

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

Package 1	6.3°C

Results relate only to the items tested.

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Maxxam Job #: B950643
Report Date: 2019/02/28

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5991331	o-Terphenyl	2019/02/27	108	30 - 130	107	30 - 130	106	%		
5993775	4-Bromofluorobenzene	2019/02/27	102	70 - 130	101	70 - 130	93	%		
5993775	D4-1,2-Dichloroethane	2019/02/27	114	70 - 130	99	70 - 130	92	%		
5993775	D8-Toluene	2019/02/27	101	70 - 130	105	70 - 130	101	%		
5995181	D10-Anthracene	2019/02/28	104	50 - 130	107	50 - 130	106	%		
5995181	D14-Terphenyl (FS)	2019/02/28	90	50 - 130	92	50 - 130	91	%		
5995181	D8-Acenaphthylene	2019/02/28	100	50 - 130	102	50 - 130	100	%		
5991331	F2 (C10-C16 Hydrocarbons)	2019/02/28	106	50 - 130	105	80 - 120	<100	ug/L	1.4	50
5991331	F3 (C16-C34 Hydrocarbons)	2019/02/28	106	50 - 130	105	80 - 120	<200	ug/L	NC	50
5991331	F4 (C34-C50 Hydrocarbons)	2019/02/28	106	50 - 130	105	80 - 120	<200	ug/L	NC	50
5993287	Dissolved Antimony (Sb)	2019/02/28	103	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
5993287	Dissolved Arsenic (As)	2019/02/28	100	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
5993287	Dissolved Barium (Ba)	2019/02/28	97	80 - 120	98	80 - 120	<2.0	ug/L	1.8	20
5993287	Dissolved Beryllium (Be)	2019/02/28	101	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
5993287	Dissolved Boron (B)	2019/02/28	96	80 - 120	95	80 - 120	<10	ug/L	0.23	20
5993287	Dissolved Cadmium (Cd)	2019/02/28	101	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
5993287	Dissolved Chromium (Cr)	2019/02/28	97	80 - 120	97	80 - 120	<5.0	ug/L	NC	20
5993287	Dissolved Cobalt (Co)	2019/02/28	98	80 - 120	102	80 - 120	<0.50	ug/L	2.2	20
5993287	Dissolved Copper (Cu)	2019/02/28	101	80 - 120	103	80 - 120	<1.0	ug/L	NC	20
5993287	Dissolved Lead (Pb)	2019/02/28	95	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
5993287	Dissolved Molybdenum (Mo)	2019/02/28	102	80 - 120	98	80 - 120	<0.50	ug/L	4.0	20
5993287	Dissolved Nickel (Ni)	2019/02/28	96	80 - 120	97	80 - 120	<1.0	ug/L	0.89	20
5993287	Dissolved Selenium (Se)	2019/02/28	100	80 - 120	101	80 - 120	<2.0	ug/L	NC	20
5993287	Dissolved Silver (Ag)	2019/02/28	89	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
5993287	Dissolved Thallium (Tl)	2019/02/28	98	80 - 120	98	80 - 120	<0.050	ug/L	6.8	20
5993287	Dissolved Uranium (U)	2019/02/28	103	80 - 120	99	80 - 120	<0.10	ug/L	4.9	20
5993287	Dissolved Vanadium (V)	2019/02/28	99	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
5993287	Dissolved Zinc (Zn)	2019/02/28	99	80 - 120	99	80 - 120	<5.0	ug/L	6.9	20
5993775	1,1,1,2-Tetrachloroethane	2019/02/27	100	70 - 130	114	70 - 130	<0.50	ug/L	NC	30
5993775	1,1,1-Trichloroethane	2019/02/27	91	70 - 130	111	70 - 130	<0.20	ug/L	NC	30
5993775	1,1,2,2-Tetrachloroethane	2019/02/27	107	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
5993775	1,1,2-Trichloroethane	2019/02/27	101	70 - 130	96	70 - 130	<0.50	ug/L	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5993775	1,1-Dichloroethane	2019/02/27	87	70 - 130	100	70 - 130	<0.20	ug/L	NC	30
5993775	1,1-Dichloroethylene	2019/02/27	80	70 - 130	98	70 - 130	<0.20	ug/L	NC	30
5993775	1,2-Dichlorobenzene	2019/02/27	98	70 - 130	109	70 - 130	<0.50	ug/L	NC	30
5993775	1,2-Dichloroethane	2019/02/27	99	70 - 130	95	70 - 130	<0.50	ug/L	NC	30
5993775	1,2-Dichloropropane	2019/02/27	92	70 - 130	99	70 - 130	<0.20	ug/L	NC	30
5993775	1,3-Dichlorobenzene	2019/02/27	95	70 - 130	115	70 - 130	<0.50	ug/L	NC	30
5993775	1,4-Dichlorobenzene	2019/02/27	100	70 - 130	119	70 - 130	<0.50	ug/L	NC	30
5993775	Acetone (2-Propanone)	2019/02/27	109	60 - 140	86	60 - 140	<10	ug/L	23	30
5993775	Benzene	2019/02/27	90	70 - 130	103	70 - 130	<0.20	ug/L	4.3	30
5993775	Bromodichloromethane	2019/02/27	100	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
5993775	Bromoform	2019/02/27	100	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
5993775	Bromomethane	2019/02/27	92	60 - 140	105	60 - 140	<0.50	ug/L	NC	30
5993775	Carbon Tetrachloride	2019/02/27	93	70 - 130	116	70 - 130	<0.20	ug/L	NC	30
5993775	Chlorobenzene	2019/02/27	93	70 - 130	109	70 - 130	<0.20	ug/L	NC	30
5993775	Chloroform	2019/02/27	97	70 - 130	102	70 - 130	<0.20	ug/L	NC	30
5993775	cis-1,2-Dichloroethylene	2019/02/27	89	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
5993775	cis-1,3-Dichloropropene	2019/02/27	100	70 - 130	102	70 - 130	<0.30	ug/L	NC	30
5993775	Dibromochloromethane	2019/02/27	102	70 - 130	106	70 - 130	<0.50	ug/L	NC	30
5993775	Dichlorodifluoromethane (FREON 12)	2019/02/27	83	60 - 140	108	60 - 140	<1.0	ug/L	NC	30
5993775	Ethylbenzene	2019/02/27	93	70 - 130	123	70 - 130	<0.20	ug/L	NC	30
5993775	Ethylene Dibromide	2019/02/27	102	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
5993775	F1 (C6-C10) - BTEX	2019/02/27					<25	ug/L	NC	30
5993775	F1 (C6-C10)	2019/02/27	99	60 - 140	99	60 - 140	<25	ug/L	NC	30
5993775	Hexane	2019/02/27	82	70 - 130	105	70 - 130	<1.0	ug/L	NC	30
5993775	Methyl Ethyl Ketone (2-Butanone)	2019/02/27	112	60 - 140	86	60 - 140	<10	ug/L	NC	30
5993775	Methyl Isobutyl Ketone	2019/02/27	118	70 - 130	91	70 - 130	<5.0	ug/L	NC	30
5993775	Methyl t-butyl ether (MTBE)	2019/02/27	99	70 - 130	102	70 - 130	<0.50	ug/L	NC	30
5993775	Methylene Chloride(Dichloromethane)	2019/02/27	89	70 - 130	91	70 - 130	<2.0	ug/L	NC	30
5993775	o-Xylene	2019/02/27	99	70 - 130	122	70 - 130	<0.20	ug/L	3.3	30
5993775	p+m-Xylene	2019/02/27	89	70 - 130	118	70 - 130	<0.20	ug/L	10	30
5993775	Styrene	2019/02/27	100	70 - 130	117	70 - 130	<0.50	ug/L	NC	30
5993775	Tetrachloroethylene	2019/02/27	89	70 - 130	115	70 - 130	<0.20	ug/L	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5993775	Toluene	2019/02/27	90	70 - 130	111	70 - 130	<0.20	ug/L	2.6	30
5993775	Total Xylenes	2019/02/27					<0.20	ug/L	0.66	30
5993775	trans-1,2-Dichloroethylene	2019/02/27	82	70 - 130	99	70 - 130	<0.50	ug/L	NC	30
5993775	trans-1,3-Dichloropropene	2019/02/27	103	70 - 130	99	70 - 130	<0.40	ug/L	NC	30
5993775	Trichloroethylene	2019/02/27	86	70 - 130	105	70 - 130	<0.20	ug/L	NC	30
5993775	Trichlorofluoromethane (FREON 11)	2019/02/27	93	70 - 130	115	70 - 130	<0.50	ug/L	NC	30
5993775	Vinyl Chloride	2019/02/27	83	70 - 130	103	70 - 130	<0.20	ug/L	NC	30
5995181	1-Methylnaphthalene	2019/02/28	111	50 - 130	100	50 - 130	<0.050	ug/L	NC	30
5995181	2-Methylnaphthalene	2019/02/28	99	50 - 130	88	50 - 130	<0.050	ug/L	NC	30
5995181	Acenaphthene	2019/02/28	95	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5995181	Acenaphthylene	2019/02/28	97	50 - 130	93	50 - 130	<0.050	ug/L	NC	30
5995181	Anthracene	2019/02/28	93	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5995181	Benzo(a)anthracene	2019/02/28	100	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
5995181	Benzo(a)pyrene	2019/02/28	96	50 - 130	93	50 - 130	<0.010	ug/L	NC	30
5995181	Benzo(b/j)fluoranthene	2019/02/28	99	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
5995181	Benzo(g,h,i)perylene	2019/02/28	98	50 - 130	95	50 - 130	<0.050	ug/L	NC	30
5995181	Benzo(k)fluoranthene	2019/02/28	94	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5995181	Chrysene	2019/02/28	100	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
5995181	Dibenz(a,h)anthracene	2019/02/28	84	50 - 130	81	50 - 130	<0.050	ug/L	NC	30
5995181	Fluoranthene	2019/02/28	98	50 - 130	96	50 - 130	<0.050	ug/L	NC	30
5995181	Fluorene	2019/02/28	94	50 - 130	91	50 - 130	<0.050	ug/L	NC	30
5995181	Indeno(1,2,3-cd)pyrene	2019/02/28	101	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
5995181	Naphthalene	2019/02/28	92	50 - 130	81	50 - 130	<0.050	ug/L	NC	30
5995181	Phenanthrene	2019/02/28	97	50 - 130	96	50 - 130	<0.030	ug/L	NC	30
5995181	Pyrene	2019/02/28	99	50 - 130	97	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 <= 2x RDL).

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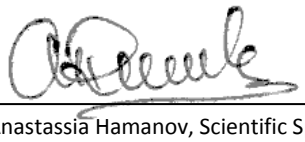
Maxxam Job #: B950643
Report Date: 2019/02/28

exp Services Inc
Client Project #: OTT-00250806-CO
Sampler Initials: SL

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist

Liliana Gaburici, VOC Lab

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.

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CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#17497 exp Services Inc	Company Name:	EXP	Quotation #:	B46066	Maxxam Job #:	Bottle Order #: 705696
Attention:	Accounts Payable	Attention:	Mark McCalla	P.O. #:			
Address:	100-2650 Queensview Drive Ottawa ON K2B 8H6	Address:		Project:	04-00250006-C0	COC #: C#705696-01-01	Project Manager: Alisha Williamson
Tel:	(613) 688-1899 Fax: (613) 225-7337	Tel:	(613) 225-9940 Ext: 243 Fax:	Project Name:			
Email:	accounting.ottawa@exp.com; Karen.Burke@exp.com;	Email:	mark.mccalla@exp.com	Site #:			
				Sampled By:	S.L.		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___	☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality ___ ☐ PWQO ☐ Other ___	

Include Criteria on Certificate of Analysis (Y/N)? ___

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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: 19.02.25 Time Required: ___ ☒
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 VOCs by HS & F1-F4	O.Reg 153 Dissolved ICPMS Metals (Water)	O.Reg 153 PAHs	# of Bottles	Comments
1	MW19-1		02.26.19	1:30p	GW	✓	✓	✓	✓	8	
2	~~MW19-2~~									8	
3	MW19-3		02.26.19	10:30a	GW	✓	✓	✓	✓	8	
4	MW19-4		↓	9:45a	↓	✓	✓	✓	✓	8	
5	MW19-5		↓	8:45 a	↓	✓	✓	✓	✓		
6											
7											
8											
9											
10											

26-Feb-19 15:00
Alisha Williamson
B950643
KIV OTT-001

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Scott Lessard	19.02.26	5:00p	[illegible]	19/02/26	15:00	

Laboratory Use Only				
Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	7.6, 6	Present		
		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/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

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

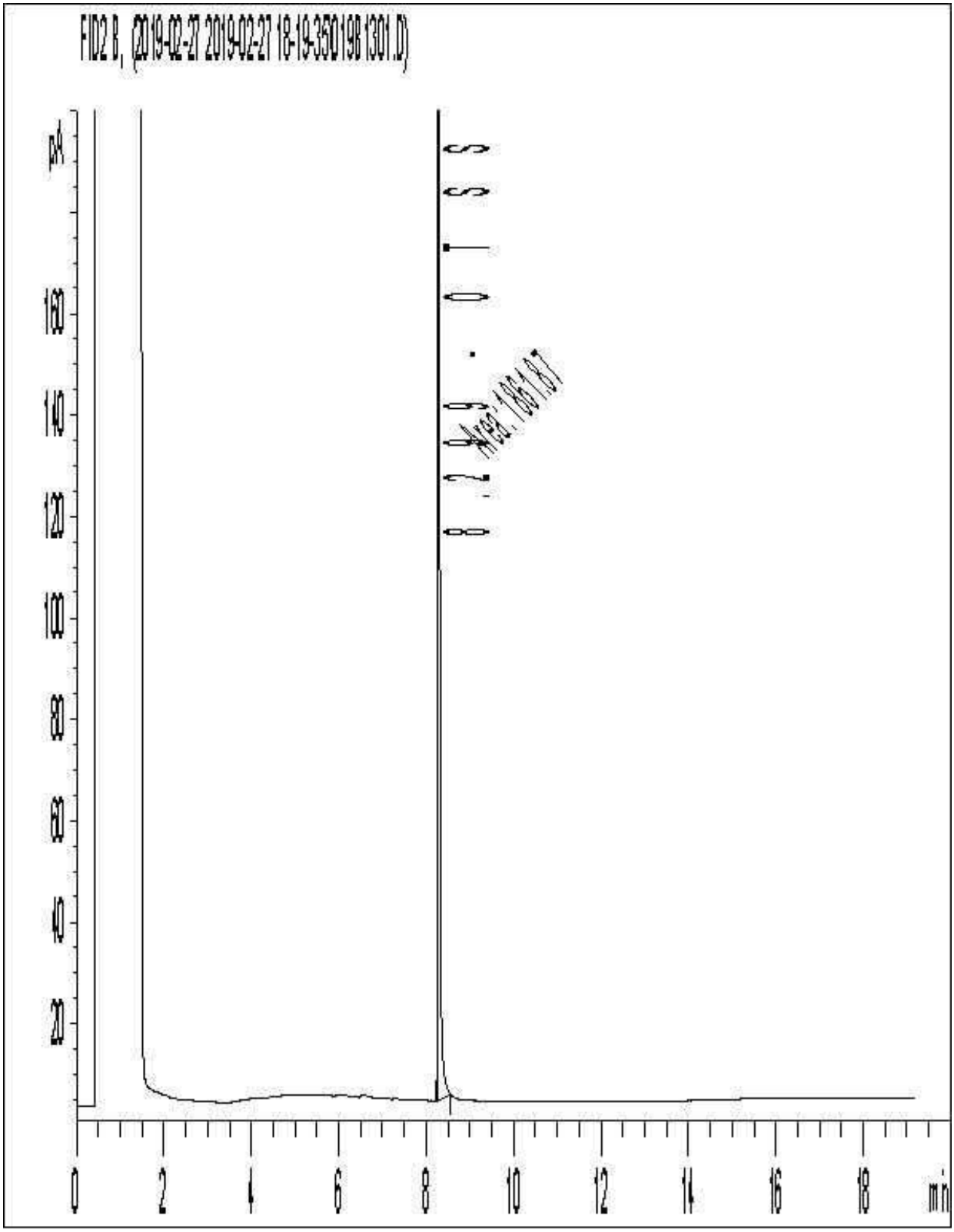
White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analyt

Maxxam Job #: B950643
Report Date: 2019/02/28
Maxxam Sample: JBM080

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: MW19-1

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

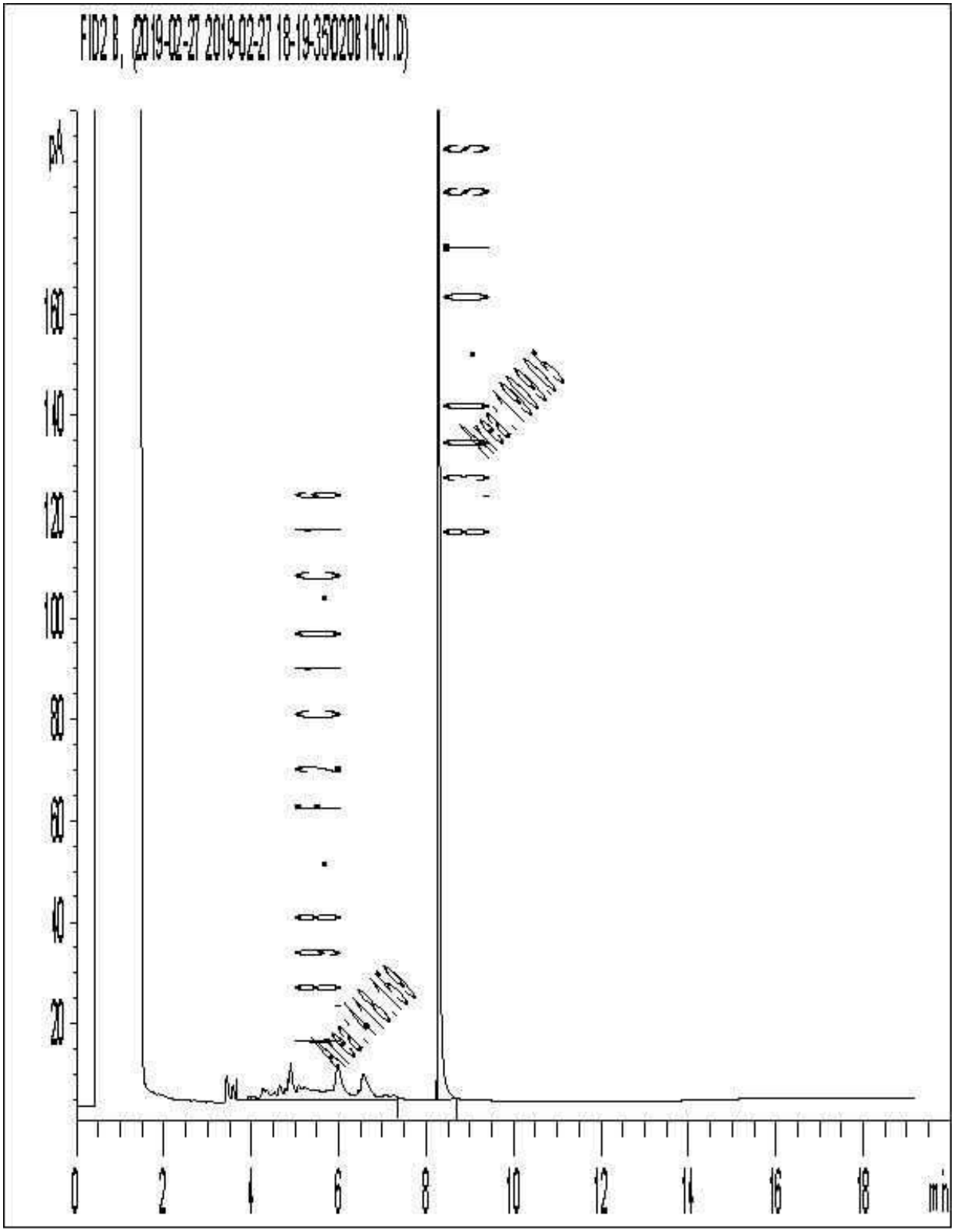


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B950643
Report Date: 2019/02/28
Maxxam Sample: JBM081

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: MW19-3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

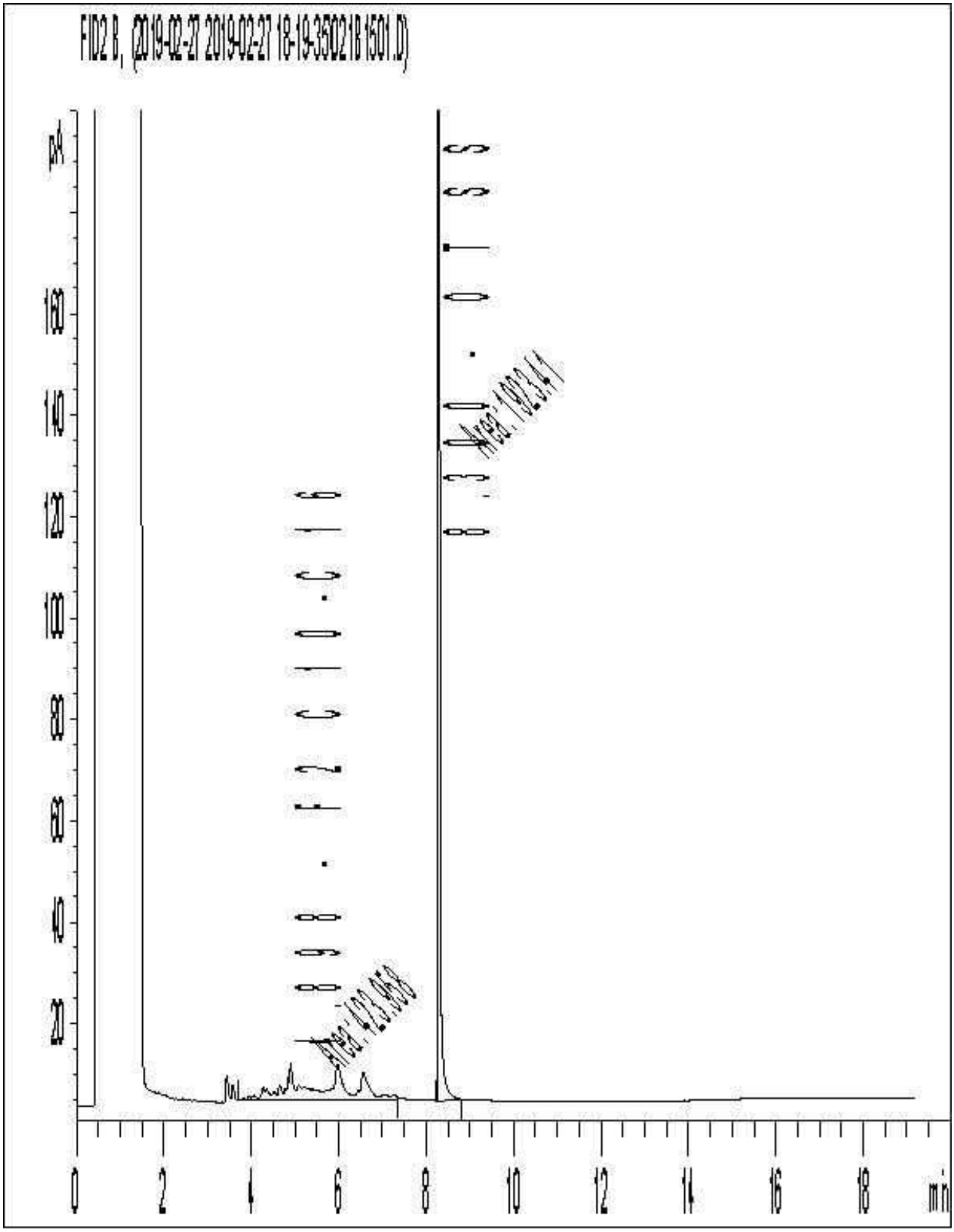


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B950643
Report Date: 2019/02/28
Maxxam Sample: JBM081 Lab-Dup

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: MW19-3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

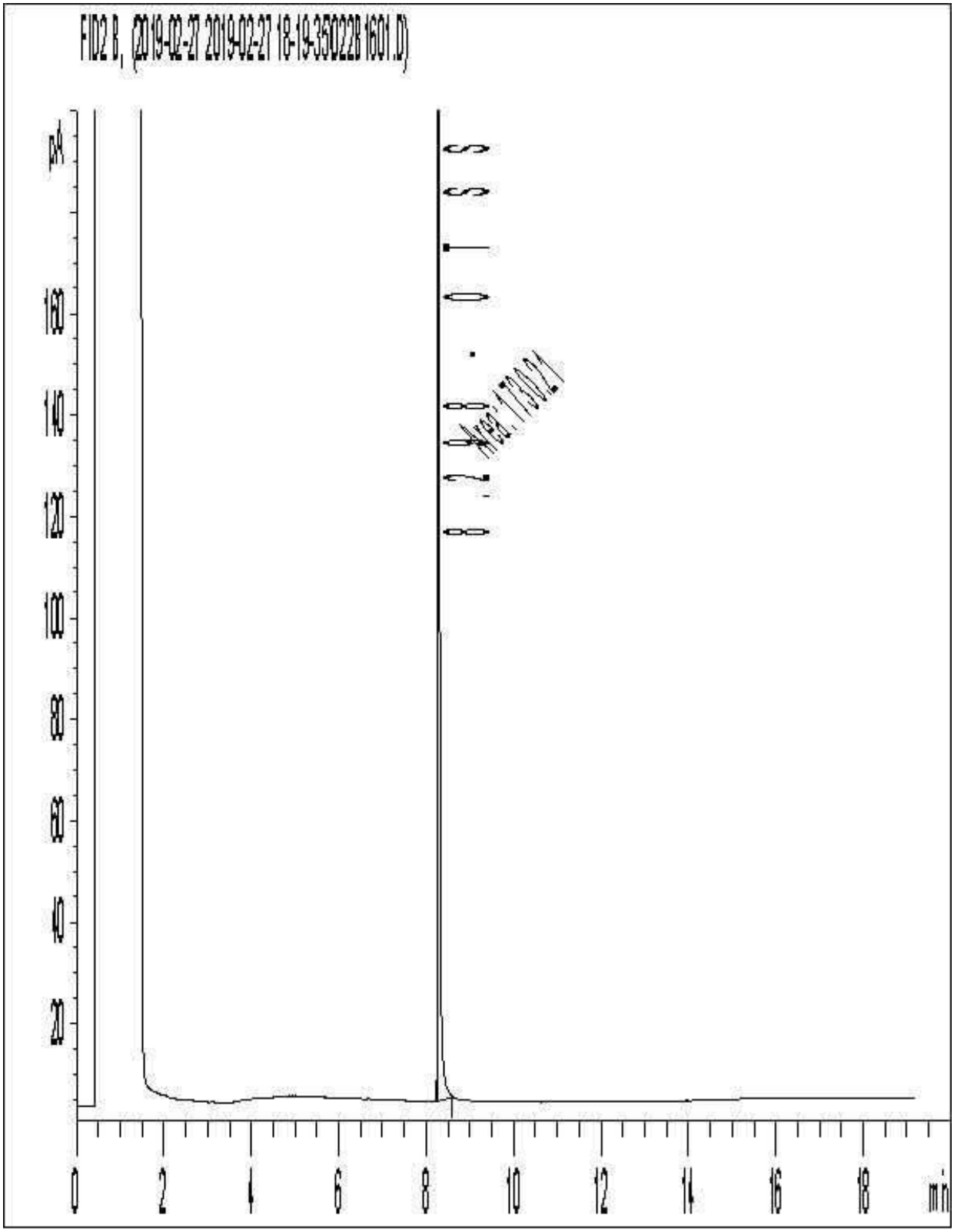


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B950643
Report Date: 2019/02/28
Maxxam Sample: JBM082

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: MW19-4

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

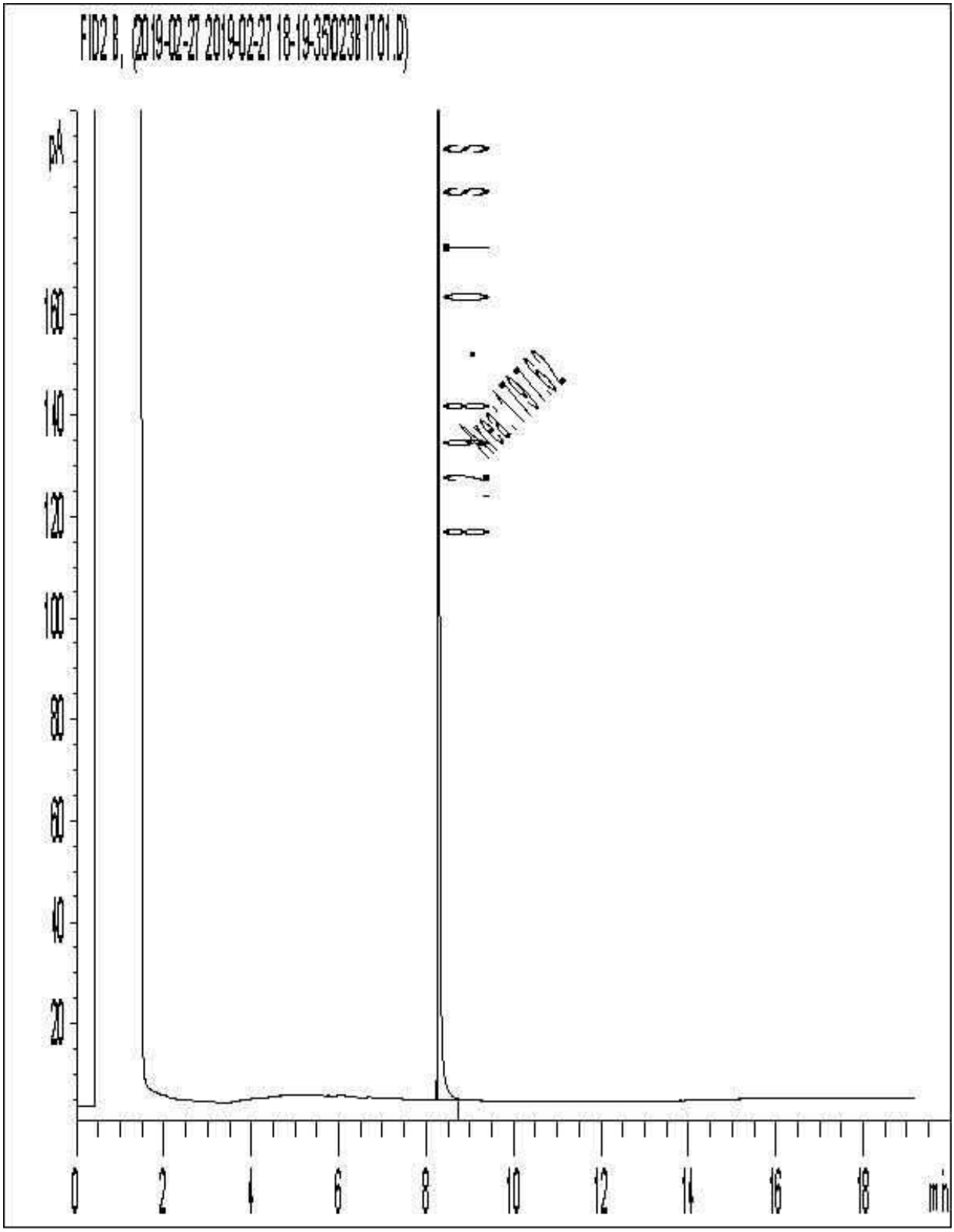


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B950643
Report Date: 2019/02/28
Maxxam Sample: JBM083

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: MW19-5

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.

Maxxam
A Bureau Veritas Group Company

Your Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Your C.O.C. #: 706994-01-01

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/04/15
Report #: R5670931
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B967561
Received: 2019/03/14, 08:04

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	6	N/A	2019/03/19	CAM SOP-00301	EPA 8270D m
Petroleum Hydro. CCME F1 & BTEX in Soil (1, 2)	6	N/A	2019/03/18	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (1, 3)	6	2019/03/18	2019/03/19	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric) (1)	2	2019/03/20	2019/03/20	CAM SOP-00316	CCME PHC-CWS m
Strong Acid Leachable Metals by ICPMS (1)	6	2019/03/16	2019/03/18	CAM SOP-00447	EPA 6020B m
Moisture (1)	6	N/A	2019/03/16	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM) (1)	6	2019/03/18	2019/03/18	CAM SOP-00318	EPA 8270D m
pH CaCl2 EXTRACT (1)	2	2019/04/11	2019/04/11	CAM SOP-00413	EPA 9045 D m
Sieve, 75um (1)	2	N/A	2019/04/12	CAM SOP-00467	Carter 2nd ed m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 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.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Analytics Mississauga
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Your Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Your C.O.C. #: 706994-01-01

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/04/15
Report #: R5670931
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B967561
Received: 2019/03/14, 08:04

(3) 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.

Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

O.REG 153 ICPMS METALS (SOIL)

Maxxam ID		JEZ013	JEZ014	JEZ015	JEZ016	JEZ017		
Sampling Date		2019/03/13 15:00	2019/03/13 16:00	2019/03/13 14:00	2019/03/13 13:00	2019/03/13 11:00		
COC Number		706994-01-01	706994-01-01	706994-01-01	706994-01-01	706994-01-01		
	UNITS	**BH6-AUG2**	**BH7-AUG1**	**BH8-AUG1**	**BH9-AUG2**	**BH10-AUG1**	**RDL**	**QC Batch**
Metals								
Acid Extractable Antimony (Sb)	ug/g	2.3	0.80	<0.20	<0.20	<0.20	0.20	6022531
Acid Extractable Arsenic (As)	ug/g	3.8	1.9	<1.0	2.1	1.6	1.0	6022531
Acid Extractable Barium (Ba)	ug/g	100	96	180	85	66	0.50	6022531
Acid Extractable Beryllium (Be)	ug/g	0.38	0.23	<0.20	0.59	0.33	0.20	6022531
Acid Extractable Boron (B)	ug/g	5.3	5.2	<5.0	5.2	9.5	5.0	6022531
Acid Extractable Cadmium (Cd)	ug/g	1.3	0.71	<0.10	0.18	<0.10	0.10	6022531
Acid Extractable Chromium (Cr)	ug/g	22	46	45	27	61	1.0	6022531
Acid Extractable Cobalt (Co)	ug/g	4.6	4.2	3.5	7.9	6.2	0.10	6022531
Acid Extractable Copper (Cu)	ug/g	85	29	6.7	14	11	0.50	6022531
Acid Extractable Lead (Pb)	ug/g	270	340	5.0	18	9.9	1.0	6022531
Acid Extractable Molybdenum (Mo)	ug/g	0.82	2.0	0.88	0.59	1.5	0.50	6022531
Acid Extractable Nickel (Ni)	ug/g	11	11	7.7	18	13	0.50	6022531
Acid Extractable Selenium (Se)	ug/g	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6022531
Acid Extractable Silver (Ag)	ug/g	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	6022531
Acid Extractable Thallium (Tl)	ug/g	0.11	0.090	0.066	0.25	0.094	0.050	6022531
Acid Extractable Uranium (U)	ug/g	0.37	0.45	0.34	0.56	0.34	0.050	6022531
Acid Extractable Vanadium (V)	ug/g	19	20	14	41	16	5.0	6022531
Acid Extractable Zinc (Zn)	ug/g	200	110	16	42	17	5.0	6022531

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

O.REG 153 ICPMS METALS (SOIL)

Maxxam ID		JEZ018		
Sampling Date		2019/03/13 17:00		
COC Number		706994-01-01		
	UNITS	**DUP 1**	**RDL**	**QC Batch**
Metals				
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	6022531
Acid Extractable Arsenic (As)	ug/g	1.0	1.0	6022531
Acid Extractable Barium (Ba)	ug/g	49	0.50	6022531
Acid Extractable Beryllium (Be)	ug/g	0.23	0.20	6022531
Acid Extractable Boron (B)	ug/g	5.6	5.0	6022531
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	6022531
Acid Extractable Chromium (Cr)	ug/g	52	1.0	6022531
Acid Extractable Cobalt (Co)	ug/g	4.5	0.10	6022531
Acid Extractable Copper (Cu)	ug/g	7.2	0.50	6022531
Acid Extractable Lead (Pb)	ug/g	6.1	1.0	6022531
Acid Extractable Molybdenum (Mo)	ug/g	1.3	0.50	6022531
Acid Extractable Nickel (Ni)	ug/g	9.4	0.50	6022531
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	6022531
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	6022531
Acid Extractable Thallium (Tl)	ug/g	0.063	0.050	6022531
Acid Extractable Uranium (U)	ug/g	0.28	0.050	6022531
Acid Extractable Vanadium (V)	ug/g	13	5.0	6022531
Acid Extractable Zinc (Zn)	ug/g	13	5.0	6022531

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

O.REG 153 PAHS (SOIL)

Maxxam ID		JEZ013			JEZ013			JEZ014		
Sampling Date		2019/03/13 15:00			2019/03/13 15:00			2019/03/13 16:00		
COC Number		706994-01-01			706994-01-01			706994-01-01		
	UNITS	**BH6-AUG2**	**RDL**	**QC Batch**	**BH6-AUG2 Lab-Dup**	**RDL**	**QC Batch**	**BH7-AUG1**	**RDL**	**QC Batch**
Calculated Parameters										
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	0.0071	6020381				0.016	0.0071	6020381
Polyaromatic Hydrocarbons										
Acenaphthene	ug/g	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306	0.023	0.0050	6024306
Acenaphthylene	ug/g	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306
Anthracene	ug/g	<0.0050	0.0050	6024306	0.0051	0.0050	6024306	0.043	0.0050	6024306
Benzo(a)anthracene	ug/g	0.036	0.0050	6024306	0.034	0.0050	6024306	0.13	0.0050	6024306
Benzo(a)pyrene	ug/g	0.035	0.0050	6024306	0.032	0.0050	6024306	0.11	0.0050	6024306
Benzo(b/j)fluoranthene	ug/g	0.047	0.0050	6024306	0.040	0.0050	6024306	0.13	0.0050	6024306
Benzo(g,h,i)perylene	ug/g	0.031	0.0050	6024306	0.028	0.0050	6024306	0.073	0.0050	6024306
Benzo(k)fluoranthene	ug/g	0.014	0.0050	6024306	0.012	0.0050	6024306	0.039	0.0050	6024306
Chrysene	ug/g	0.029	0.0050	6024306	0.026	0.0050	6024306	0.10	0.0050	6024306
Dibenz(a,h)anthracene	ug/g	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306	0.012	0.0050	6024306
Fluoranthene	ug/g	0.067	0.0050	6024306	0.062	0.0050	6024306	0.27	0.0050	6024306
Fluorene	ug/g	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306	0.024	0.0050	6024306
Indeno(1,2,3-cd)pyrene	ug/g	0.021	0.0050	6024306	0.019	0.0050	6024306	0.060	0.0050	6024306
1-Methylnaphthalene	ug/g	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306	0.0068	0.0050	6024306
2-Methylnaphthalene	ug/g	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306	0.0088	0.0050	6024306
Naphthalene	ug/g	<0.0050	0.0050	6024306	<0.0050	0.0050	6024306	0.011	0.0050	6024306
Phenanthrene	ug/g	0.020	0.0050	6024306	0.017	0.0050	6024306	0.20	0.0050	6024306
Pyrene	ug/g	0.066	0.0050	6024306	0.060	0.0050	6024306	0.24	0.0050	6024306
Surrogate Recovery (%)										
D10-Anthracene	%	97		6024306	98		6024306	98		6024306
D14-Terphenyl (FS)	%	109		6024306	111		6024306	107		6024306
D8-Acenaphthylene	%	96		6024306	101		6024306	102		6024306

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

O.REG 153 PAHS (SOIL)

Maxxam ID		JEZ015	JEZ016	JEZ017	JEZ018		
Sampling Date		2019/03/13 14:00	2019/03/13 13:00	2019/03/13 11:00	2019/03/13 17:00		
COC Number		706994-01-01	706994-01-01	706994-01-01	706994-01-01		
	UNITS	**BH8-AUG1**	**BH9-AUG2**	**BH10-AUG1**	**DUP 1**	**RDL**	**QC Batch**
Calculated Parameters							
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	<0.0071	<0.0071	0.0071	6020381
Polyaromatic Hydrocarbons							
Acenaphthene	ug/g	0.0054	<0.0050	<0.0050	<0.0050	0.0050	6024306
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6024306
Anthracene	ug/g	0.011	<0.0050	<0.0050	<0.0050	0.0050	6024306
Benzo(a)anthracene	ug/g	0.035	<0.0050	<0.0050	<0.0050	0.0050	6024306
Benzo(a)pyrene	ug/g	0.032	<0.0050	<0.0050	<0.0050	0.0050	6024306
Benzo(b/j)fluoranthene	ug/g	0.044	<0.0050	<0.0050	<0.0050	0.0050	6024306
Benzo(g,h,i)perylene	ug/g	0.019	<0.0050	<0.0050	<0.0050	0.0050	6024306
Benzo(k)fluoranthene	ug/g	0.012	<0.0050	<0.0050	<0.0050	0.0050	6024306
Chrysene	ug/g	0.031	<0.0050	<0.0050	<0.0050	0.0050	6024306
Dibenz(a,h)anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6024306
Fluoranthene	ug/g	0.086	0.0053	<0.0050	<0.0050	0.0050	6024306
Fluorene	ug/g	0.0054	<0.0050	<0.0050	<0.0050	0.0050	6024306
Indeno(1,2,3-cd)pyrene	ug/g	0.019	<0.0050	<0.0050	<0.0050	0.0050	6024306
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6024306
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6024306
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6024306
Phenanthrene	ug/g	0.055	<0.0050	<0.0050	<0.0050	0.0050	6024306
Pyrene	ug/g	0.074	<0.0050	<0.0050	<0.0050	0.0050	6024306
Surrogate Recovery (%)							
D10-Anthracene	%	102	101	90	108		6024306
D14-Terphenyl (FS)	%	108	107	98	112		6024306
D8-Acenaphthylene	%	99	101	92	102		6024306

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		JEZ013			JEZ013			JEZ014	JEZ015		
Sampling Date		2019/03/13 15:00			2019/03/13 15:00			2019/03/13 16:00	2019/03/13 14:00		
COC Number		706994-01-01			706994-01-01			706994-01-01	706994-01-01		
	UNITS	**BH6-AUG2**	**RDL**	**QC Batch**	**BH6-AUG2 Lab-Dup**	**RDL**	**QC Batch**	**BH7-AUG1**	**BH8-AUG1**	**RDL**	**QC Batch**
Inorganics											
Moisture	%	13	1.0	6022205				5.9	10	1.0	6022205
BTEX & F1 Hydrocarbons											
Benzene	ug/g	<0.020	0.020	6022457				<0.020	<0.020	0.020	6022457
Toluene	ug/g	<0.020	0.020	6022457				<0.020	<0.020	0.020	6022457
Ethylbenzene	ug/g	<0.020	0.020	6022457				<0.020	<0.020	0.020	6022457
o-Xylene	ug/g	<0.020	0.020	6022457				<0.020	<0.020	0.020	6022457
p+m-Xylene	ug/g	<0.040	0.040	6022457				<0.040	<0.040	0.040	6022457
Total Xylenes	ug/g	<0.040	0.040	6022457				<0.040	<0.040	0.040	6022457
F1 (C6-C10)	ug/g	<10	10	6022457				<10	<10	10	6022457
F1 (C6-C10) - BTEX	ug/g	<10	10	6022457				<10	<10	10	6022457
F2-F4 Hydrocarbons											
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	6024297	<10	10	6024297	<10	<10	10	6024297
F3 (C16-C34 Hydrocarbons)	ug/g	600	50	6024297	600	50	6024297	650	<50	50	6024297
F4 (C34-C50 Hydrocarbons)	ug/g	320	50	6024297	340	50	6024297	300	<50	50	6024297
Reached Baseline at C50	ug/g	No		6024297	No		6024297	No	Yes		6024297
Surrogate Recovery (%)											
1,4-Difluorobenzene	%	100		6022457				101	100		6022457
4-Bromofluorobenzene	%	102		6022457				100	101		6022457
D10-Ethylbenzene	%	96		6022457				99	98		6022457
D4-1,2-Dichloroethane	%	105		6022457				108	105		6022457
o-Terphenyl	%	109		6024297	110		6024297	107	102		6024297

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID		JEZ016	JEZ017	JEZ018		
Sampling Date		2019/03/13 13:00	2019/03/13 11:00	2019/03/13 17:00		
COC Number		706994-01-01	706994-01-01	706994-01-01		
	UNITS	**BH9-AUG2**	**BH10-AUG1**	**DUP 1**	**RDL**	**QC Batch**
Inorganics						
Moisture	%	18	10	11	1.0	6022205
BTEX & F1 Hydrocarbons						
Benzene	ug/g	<0.020	<0.020	<0.020	0.020	6022457
Toluene	ug/g	<0.020	<0.020	<0.020	0.020	6022457
Ethylbenzene	ug/g	<0.020	<0.020	<0.020	0.020	6022457
o-Xylene	ug/g	<0.020	<0.020	<0.020	0.020	6022457
p+m-Xylene	ug/g	<0.040	<0.040	<0.040	0.040	6022457
Total Xylenes	ug/g	<0.040	<0.040	<0.040	0.040	6022457
F1 (C6-C10)	ug/g	<10	<10	<10	10	6022457
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	10	6022457
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	10	6024297
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	50	6024297
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	50	6024297
Reached Baseline at C50	ug/g	Yes	Yes	Yes		6024297
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	99	100	101		6022457
4-Bromofluorobenzene	%	102	103	103		6022457
D10-Ethylbenzene	%	102	101	103		6022457
D4-1,2-Dichloroethane	%	104	105	107		6022457
o-Terphenyl	%	108	104	118		6024297

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JEZ014	JEZ017		
Sampling Date		2019/03/13 16:00	2019/03/13 11:00		
COC Number		706994-01-01	706994-01-01		
	UNITS	**BH7-AUG1**	**BH10-AUG1**	**RDL**	**QC Batch**
Inorganics					
Available (CaCl2) pH	pH	7.90	7.70		6064760
Miscellaneous Parameters					
Grain Size	%	COARSE	COARSE	N/A	6067035
Sieve - #200 (<0.075mm)	%	35	43	1	6067035
Sieve - #200 (>0.075mm)	%	65	57	1	6067035

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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exp Services Inc
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Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		JEZ013	JEZ014		
Sampling Date		2019/03/13 15:00	2019/03/13 16:00		
COC Number		706994-01-01	706994-01-01		
	UNITS	**BH6-AUG2**	**BH7-AUG1**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons					
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	1000	1000	100	6027507

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

TEST SUMMARY

Maxxam ID: JEZ013 **Collected:** 2019/03/13
Sample ID: BH6-AUG2 **Shipped:**
Matrix: Soil **Received:** 2019/03/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6020381	N/A	2019/03/19	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6022457	N/A	2019/03/18	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6024297	2019/03/18	2019/03/19	Jeevaraj Jeevaratrnam
F4G (CCME Hydrocarbons Gravimetric)	BAL	6027507	2019/03/20	2019/03/20	Debra Deslandes
Strong Acid Leachable Metals by ICPMS	ICP/MS	6022531	2019/03/16	2019/03/18	Daniel Teclu
Moisture	BAL	6022205	N/A	2019/03/16	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6024306	2019/03/18	2019/03/18	Mitesh Raj

Maxxam ID: JEZ013 Dup **Collected:** 2019/03/13
Sample ID: BH6-AUG2 **Shipped:**
Matrix: Soil **Received:** 2019/03/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6024297	2019/03/18	2019/03/19	Jeevaraj Jeevaratrnam
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6024306	2019/03/18	2019/03/18	Mitesh Raj

Maxxam ID: JEZ014 **Collected:** 2019/03/13
Sample ID: BH7-AUG1 **Shipped:**
Matrix: Soil **Received:** 2019/03/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6020381	N/A	2019/03/19	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6022457	N/A	2019/03/18	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6024297	2019/03/18	2019/03/19	Jeevaraj Jeevaratrnam
F4G (CCME Hydrocarbons Gravimetric)	BAL	6027507	2019/03/20	2019/03/20	Debra Deslandes
Strong Acid Leachable Metals by ICPMS	ICP/MS	6022531	2019/03/16	2019/03/18	Daniel Teclu
Moisture	BAL	6022205	N/A	2019/03/16	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6024306	2019/03/18	2019/03/18	Mitesh Raj
pH CaCl2 EXTRACT	AT	6064760	2019/04/11	2019/04/11	Gnana Thomas
Sieve, 75um	SIEV	6067035	N/A	2019/04/12	Chun Yan

Maxxam ID: JEZ015 **Collected:** 2019/03/13
Sample ID: BH8-AUG1 **Shipped:**
Matrix: Soil **Received:** 2019/03/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6020381	N/A	2019/03/19	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6022457	N/A	2019/03/18	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6024297	2019/03/18	2019/03/19	Jeevaraj Jeevaratrnam
Strong Acid Leachable Metals by ICPMS	ICP/MS	6022531	2019/03/16	2019/03/18	Daniel Teclu
Moisture	BAL	6022205	N/A	2019/03/16	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6024306	2019/03/18	2019/03/18	Mitesh Raj

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

TEST SUMMARY

Maxxam ID: JEZ016
Sample ID: BH9-AUG2
Matrix: Soil

Collected: 2019/03/13
Shipped:
Received: 2019/03/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6020381	N/A	2019/03/19	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6022457	N/A	2019/03/18	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6024297	2019/03/18	2019/03/19	Jeevaraj Jeevaratrnam
Strong Acid Leachable Metals by ICPMS	ICP/MS	6022531	2019/03/16	2019/03/18	Daniel Teclu
Moisture	BAL	6022205	N/A	2019/03/16	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6024306	2019/03/18	2019/03/18	Mitesh Raj

Maxxam ID: JEZ017
Sample ID: BH10-AUG1
Matrix: Soil

Collected: 2019/03/13
Shipped:
Received: 2019/03/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6020381	N/A	2019/03/19	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6022457	N/A	2019/03/18	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6024297	2019/03/18	2019/03/19	Jeevaraj Jeevaratrnam
Strong Acid Leachable Metals by ICPMS	ICP/MS	6022531	2019/03/16	2019/03/18	Daniel Teclu
Moisture	BAL	6022205	N/A	2019/03/16	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6024306	2019/03/18	2019/03/18	Mitesh Raj
pH CaCl2 EXTRACT	AT	6064760	2019/04/11	2019/04/11	Gnana Thomas
Sieve, 75um	SIEV	6067035	N/A	2019/04/12	Chun Yan

Maxxam ID: JEZ018
Sample ID: DUP 1
Matrix: Soil

Collected: 2019/03/13
Shipped:
Received: 2019/03/14

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6020381	N/A	2019/03/19	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	6022457	N/A	2019/03/18	Abdikarim Ali
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	6024297	2019/03/18	2019/03/19	Jeevaraj Jeevaratrnam
Strong Acid Leachable Metals by ICPMS	ICP/MS	6022531	2019/03/16	2019/03/18	Daniel Teclu
Moisture	BAL	6022205	N/A	2019/03/16	Min Yang
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	6024306	2019/03/18	2019/03/18	Mitesh Raj

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exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

GENERAL COMMENTS

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

Package 1	1.7°C

Revised Report[2019/04/15]: pH & Grain Size analysis has been included on samples BH7 & BH10 as per client request.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6022457	1,4-Difluorobenzene	2019/03/18	100	60 - 140	99	60 - 140	100	%				
6022457	4-Bromofluorobenzene	2019/03/18	101	60 - 140	103	60 - 140	101	%				
6022457	D10-Ethylbenzene	2019/03/18	95	60 - 140	93	60 - 140	92	%				
6022457	D4-1,2-Dichloroethane	2019/03/18	104	60 - 140	103	60 - 140	104	%				
6024297	o-Terphenyl	2019/03/18	92	60 - 130	100	60 - 130	109	%				
6024306	D10-Anthracene	2019/03/18	105	50 - 130	97	50 - 130	101	%				
6024306	D14-Terphenyl (FS)	2019/03/18	116	50 - 130	104	50 - 130	107	%				
6024306	D8-Acenaphthylene	2019/03/18	101	50 - 130	83	50 - 130	86	%				
6022205	Moisture	2019/03/16							2.5	20		
6022457	Benzene	2019/03/18	88	60 - 140	89	60 - 140	<0.020	ug/g	NC	50		
6022457	Ethylbenzene	2019/03/18	96	60 - 140	98	60 - 140	<0.020	ug/g	NC	50		
6022457	F1 (C6-C10) - BTEX	2019/03/18					<10	ug/g	NC	30		
6022457	F1 (C6-C10)	2019/03/18	93	60 - 140	89	80 - 120	<10	ug/g	NC	30		
6022457	o-Xylene	2019/03/18	99	60 - 140	100	60 - 140	<0.020	ug/g	NC	50		
6022457	p+m-Xylene	2019/03/18	99	60 - 140	99	60 - 140	<0.040	ug/g	NC	50		
6022457	Toluene	2019/03/18	98	60 - 140	101	60 - 140	<0.020	ug/g	NC	50		
6022457	Total Xylenes	2019/03/18					<0.040	ug/g	NC	50		
6022531	Acid Extractable Antimony (Sb)	2019/03/19	92	75 - 125	95	80 - 120	<0.20	ug/g	24	30		
6022531	Acid Extractable Arsenic (As)	2019/03/19	98	75 - 125	102	80 - 120	<1.0	ug/g	3.6	30		
6022531	Acid Extractable Barium (Ba)	2019/03/19	92	75 - 125	96	80 - 120	<0.50	ug/g	3.3	30		
6022531	Acid Extractable Beryllium (Be)	2019/03/19	97	75 - 125	98	80 - 120	<0.20	ug/g	NC	30		
6022531	Acid Extractable Boron (B)	2019/03/19	96	75 - 125	101	80 - 120	<5.0	ug/g	NC	30		
6022531	Acid Extractable Cadmium (Cd)	2019/03/19	96	75 - 125	96	80 - 120	<0.10	ug/g	NC	30		
6022531	Acid Extractable Chromium (Cr)	2019/03/19	100	75 - 125	100	80 - 120	<1.0	ug/g	6.1	30		
6022531	Acid Extractable Cobalt (Co)	2019/03/19	98	75 - 125	99	80 - 120	<0.10	ug/g	4.4	30		
6022531	Acid Extractable Copper (Cu)	2019/03/19	104	75 - 125	99	80 - 120	<0.50	ug/g	2.6	30		
6022531	Acid Extractable Lead (Pb)	2019/03/19	NC	75 - 125	103	80 - 120	<1.0	ug/g	22	30		
6022531	Acid Extractable Molybdenum (Mo)	2019/03/19	98	75 - 125	98	80 - 120	<0.50	ug/g	NC	30		
6022531	Acid Extractable Nickel (Ni)	2019/03/19	97	75 - 125	97	80 - 120	<0.50	ug/g	7.7	30		
6022531	Acid Extractable Selenium (Se)	2019/03/19	100	75 - 125	103	80 - 120	<0.50	ug/g	NC	30		
6022531	Acid Extractable Silver (Ag)	2019/03/19	95	75 - 125	98	80 - 120	<0.20	ug/g	NC	30		
6022531	Acid Extractable Thallium (Tl)	2019/03/19	94	75 - 125	102	80 - 120	<0.050	ug/g	NC	30		

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QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6022531	Acid Extractable Uranium (U)	2019/03/19	96	75 - 125	99	80 - 120	<0.050	ug/g	10	30		
6022531	Acid Extractable Vanadium (V)	2019/03/19	102	75 - 125	101	80 - 120	<5.0	ug/g	18	30		
6022531	Acid Extractable Zinc (Zn)	2019/03/19	101	75 - 125	100	80 - 120	<5.0	ug/g	5.3	30		
6024297	F2 (C10-C16 Hydrocarbons)	2019/03/19	89	50 - 130	95	80 - 120	<10	ug/g	NC	30		
6024297	F3 (C16-C34 Hydrocarbons)	2019/03/19	NC	50 - 130	96	80 - 120	<50	ug/g	1.5	30		
6024297	F4 (C34-C50 Hydrocarbons)	2019/03/19	90	50 - 130	99	80 - 120	<50	ug/g	4.8	30		
6024306	1-Methylnaphthalene	2019/03/18	102	50 - 130	104	50 - 130	<0.0050	ug/g	NC	40		
6024306	2-Methylnaphthalene	2019/03/18	91	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40		
6024306	Acenaphthene	2019/03/18	92	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40		
6024306	Acenaphthylene	2019/03/18	101	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40		
6024306	Anthracene	2019/03/18	88	50 - 130	82	50 - 130	<0.0050	ug/g	1.2	40		
6024306	Benzo(a)anthracene	2019/03/18	97	50 - 130	97	50 - 130	<0.0050	ug/g	6.2	40		
6024306	Benzo(a)pyrene	2019/03/18	87	50 - 130	95	50 - 130	<0.0050	ug/g	8.2	40		
6024306	Benzo(b/j)fluoranthene	2019/03/18	75	50 - 130	102	50 - 130	<0.0050	ug/g	15	40		
6024306	Benzo(g,h,i)perylene	2019/03/18	63	50 - 130	89	50 - 130	<0.0050	ug/g	8.4	40		
6024306	Benzo(k)fluoranthene	2019/03/18	71	50 - 130	89	50 - 130	<0.0050	ug/g	9.7	40		
6024306	Chrysene	2019/03/18	92	50 - 130	97	50 - 130	<0.0050	ug/g	12	40		
6024306	Dibenz(a,h)anthracene	2019/03/18	70	50 - 130	82	50 - 130	<0.0050	ug/g	NC	40		
6024306	Fluoranthene	2019/03/18	101	50 - 130	99	50 - 130	<0.0050	ug/g	8.4	40		
6024306	Fluorene	2019/03/18	97	50 - 130	94	50 - 130	<0.0050	ug/g	NC	40		
6024306	Indeno(1,2,3-cd)pyrene	2019/03/18	73	50 - 130	94	50 - 130	<0.0050	ug/g	6.5	40		
6024306	Naphthalene	2019/03/18	84	50 - 130	86	50 - 130	<0.0050	ug/g	NC	40		
6024306	Phenanthrene	2019/03/18	90	50 - 130	94	50 - 130	<0.0050	ug/g	13	40		
6024306	Pyrene	2019/03/18	101	50 - 130	103	50 - 130	<0.0050	ug/g	9.8	40		
6027507	F4G-sg (Grav. Heavy Hydrocarbons)	2019/03/20	103	65 - 135	101	65 - 135	<100	ug/g	29	50		
6064760	Available (CaCl2) pH	2019/04/11			100	97 - 103			0.52	N/A		
6067035	Sieve - #200 (<0.075mm)	2019/04/12							0.26	20	55	53 - 58

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Report Date: 2019/04/15

QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6067035	Sieve - #200 (>0.075mm)	2019/04/12							0.71	20	45	42 - 47

N/A = Not Applicable

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

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

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

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

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

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

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

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

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Maxxam Job #: B967561
Report Date: 2019/04/15

exp Services Inc
Client Project #: OTT-00250806-C0
Site Location: 5938 Hazeldean Road
Sampler Initials: MAD

VALIDATION SIGNATURE PAGE

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

Anastassia Hamanov, Scientific 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.

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Maxxam — Maxxam Analytics International Corporation o/a Maxxam Analytics

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14-Mar-19 08:04

Alisha Williamson

B967561

J L ENV-807

C#706994-01-01

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INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#17498 exp Services Inc	Company Name:		Quotation #:	B45998 Stream 3
Attention:	Accounts Payable	Attention:	Mark McCalla / Mark Devlin	P.O. #:	
Address:	100-2650 Queensview Drive	Address:		Project:	OTT-00250806-C0
	Ottawa ON K2B 8H6			Project Name:	
Tel:	(613) 688-1899 Fax: (613) 225-7337	Tel:	Fax:	Site #:	
Email:	accounting.ottawa@exp.com; Karen.Burke@exp.com;	Email:	mark.mccalla@exp.com / mark.devlin@exp...	Sampled By:	MAD

Maxxam Job #: 706994 — Project Manager: Alisha Williamson

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): [X] Table 1 [ ] Res/Park [ ] Medium/Fine [ ] Table 2 [X] Ind/Comm [X] Coarse [ ] Table 3 [ ] Agri/Other [ ] For RSC [X] Table 7

Other Regulations: [ ] CCME [ ] Sanitary Sewer Bylaw [ ] Reg 558 [ ] Storm Sewer Bylaw [ ] MISA Municipality ____ [ ] PWQO [ ] Other ____

Special Instructions:

Include Criteria on Certificate of Analysis (Y/N)? ____

Turnaround Time (TAT) Required: Please provide advance notice for rush projects

Regular (Standard) TAT: [X]
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ____ Time Required: ____
Rush Confirmation Number: ____ (call lab for #)

#	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 ICPMS Metals (Soil)	O.Reg 153 PAHs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Soil)	# of Bottles	Comments
1		BH6-Aug2	March 13 2019	3:00pm	Soil		X	X	X	4	
2		BH7-Aug1	March 13 2019	4:00pm	↓		↓	↓	↓	↓	
3		BH8-Aug1	↓	2:00pm	↓		↓	↓	↓	↓	
4		BH9-Aug2	↓	1:00pm	↓		↓	↓	↓	↓	
5		BH10-Aug1	↓	11:00am	↓		↓	↓	↓	↓	
6		Dup1	↓	5:00pm	↓		↓	↓	↓	↓	RECEIVED IN OTTAWA
7											
8											ON ICE
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
Mark Devlin	19/03/14	8:02am	Alisha Williamson	19/03/14	8:04	

Laboratory Use Only			
Time Sensitive	Temperature (°C) on Receipt: 1, 2, 2	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.

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

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

White: Maxxam Yellow: Client

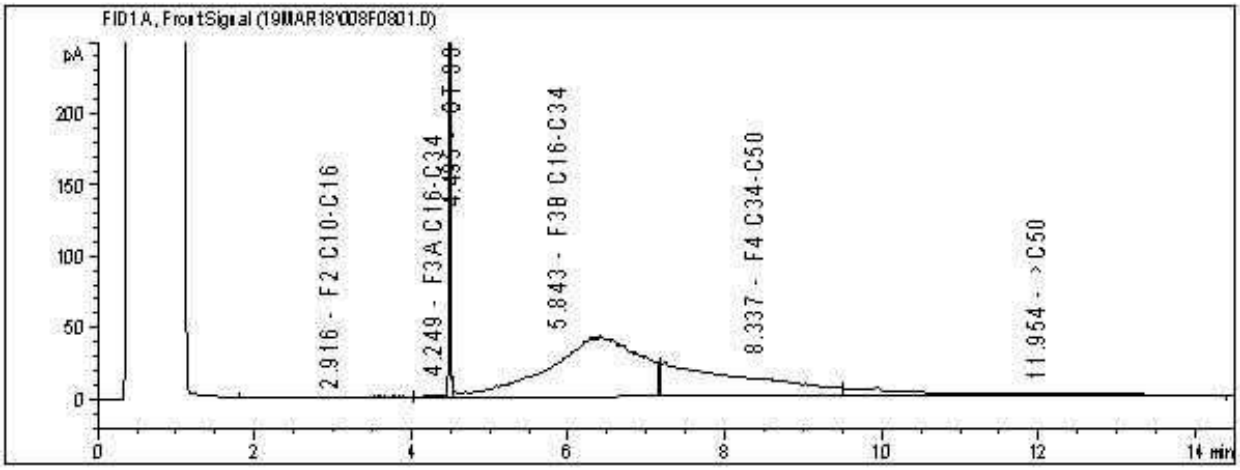
2019/03/15 1/2/3°C

Maxxam Analytics International Corporation o/a Maxxam Analytics

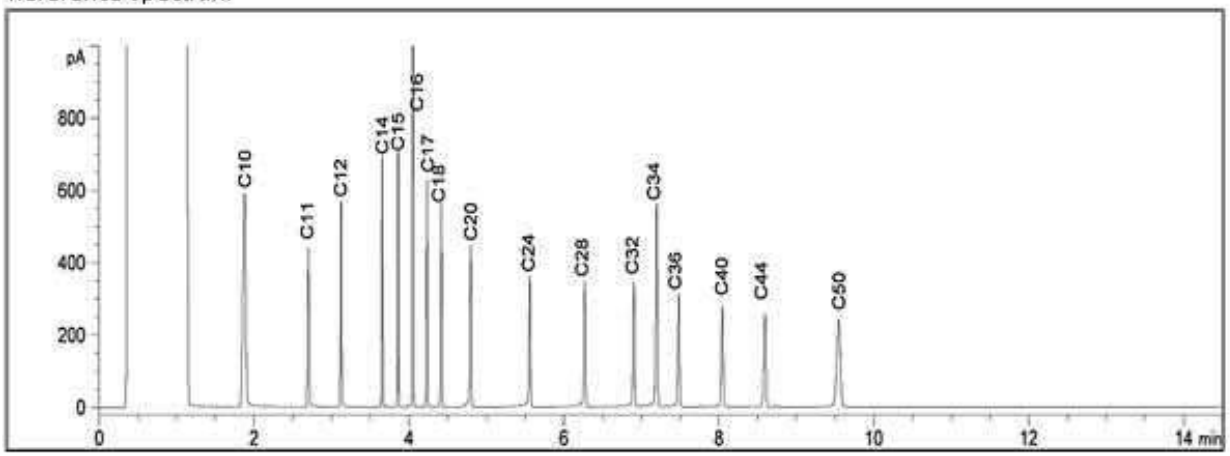
Maxxam Job #: B967561
Report Date: 2019/04/15
Maxxam Sample: JEZ013

exp Services Inc
Client Project #: OTT-00250806-C0
Project name: 5938 Hazeldean Road
Client ID: BH6-AUG2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

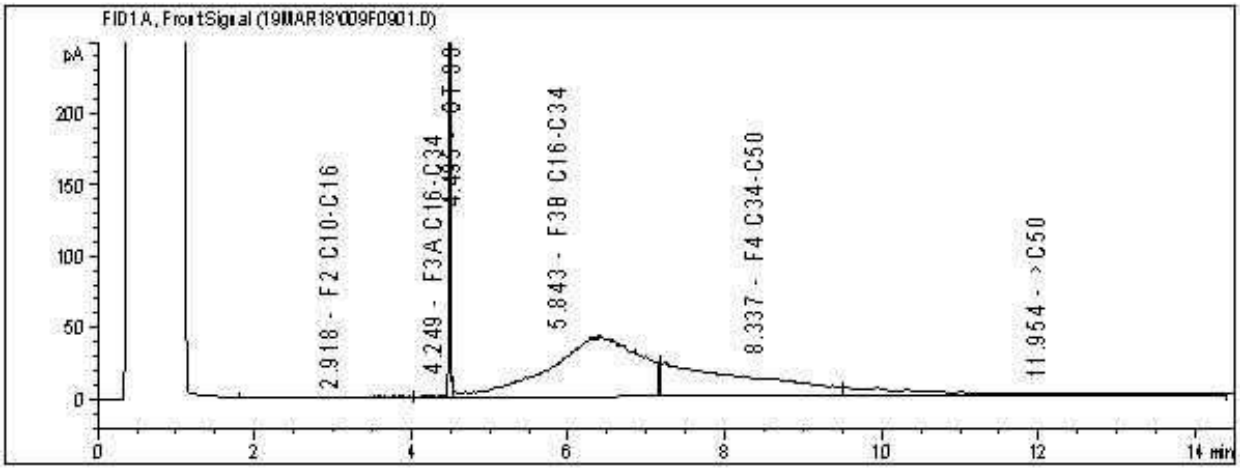
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

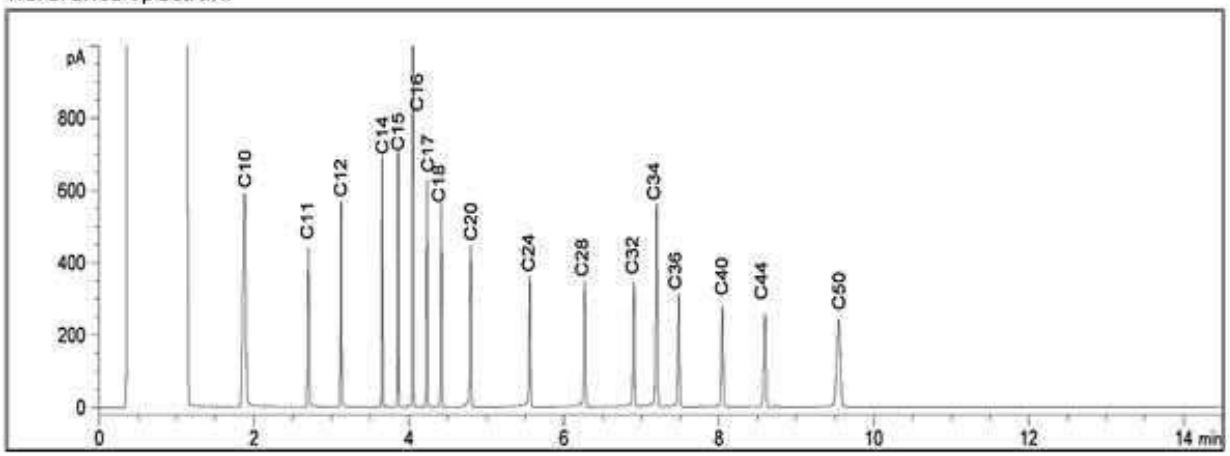
Maxxam Job #: B967561
Report Date: 2019/04/15
Maxxam Sample: JEZ013 Lab-Dup

exp Services Inc
Client Project #: OTT-00250806-C0
Project name: 5938 Hazeldean Road
Client ID: BH6-AUG2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

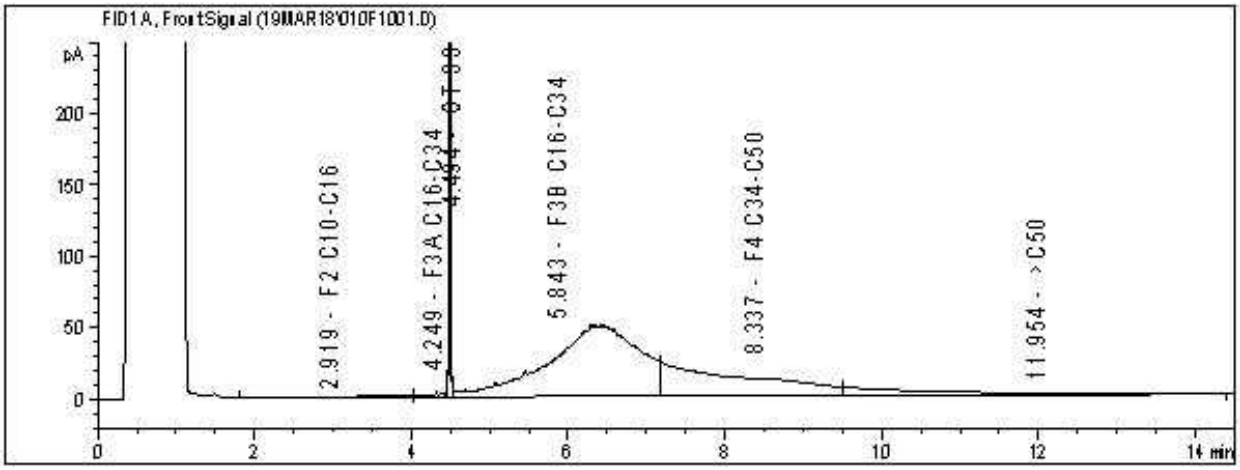
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

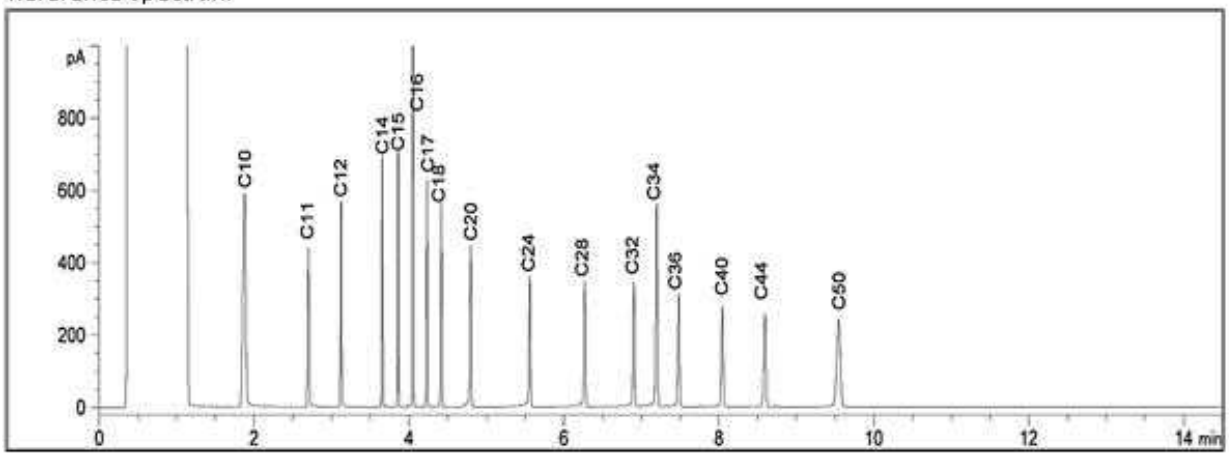
Maxxam Job #: B967561
Report Date: 2019/04/15
Maxxam Sample: JEZ014

exp Services Inc
Client Project #: OTT-00250806-C0
Project name: 5938 Hazeldean Road
Client ID: BH7-AUG1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

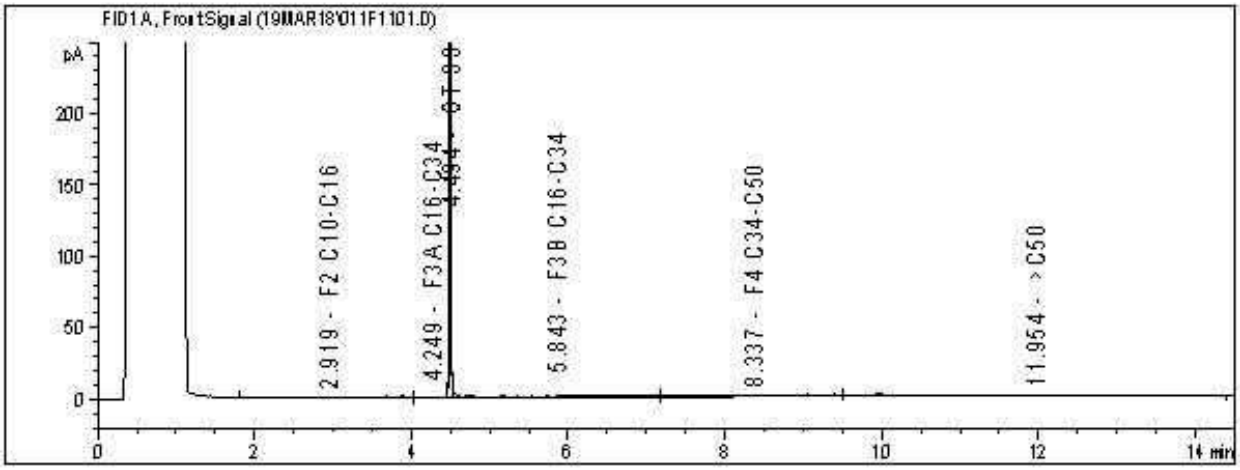
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

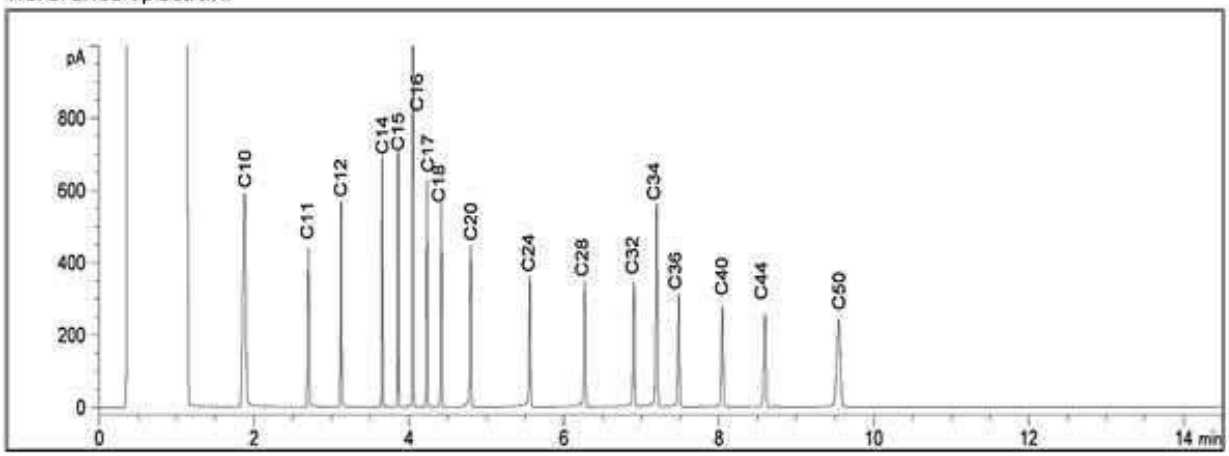
Maxxam Job #: B967561
Report Date: 2019/04/15
Maxxam Sample: JEZ015

exp Services Inc
Client Project #: OTT-00250806-C0
Project name: 5938 Hazeldean Road
Client ID: BH8-AUG1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

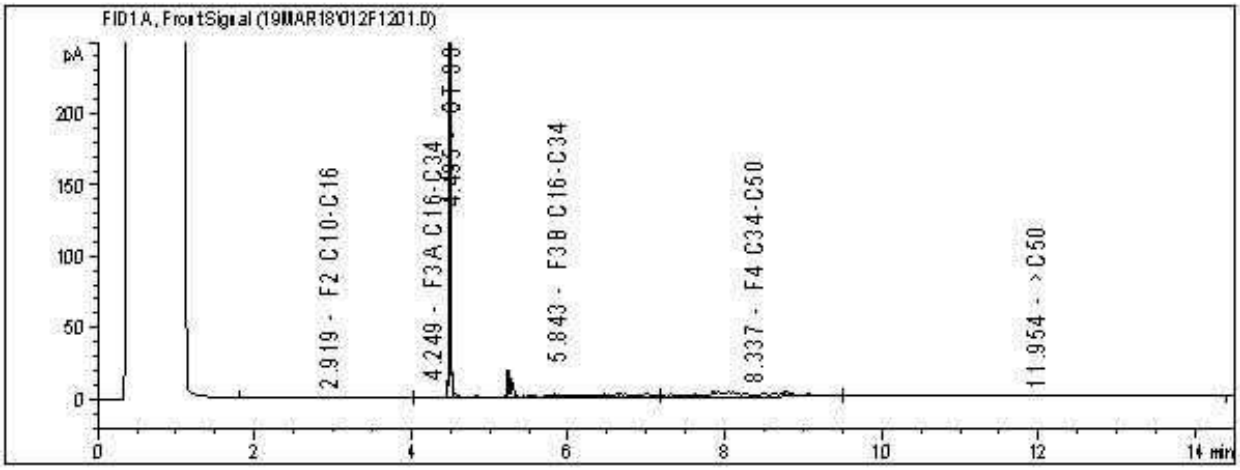
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

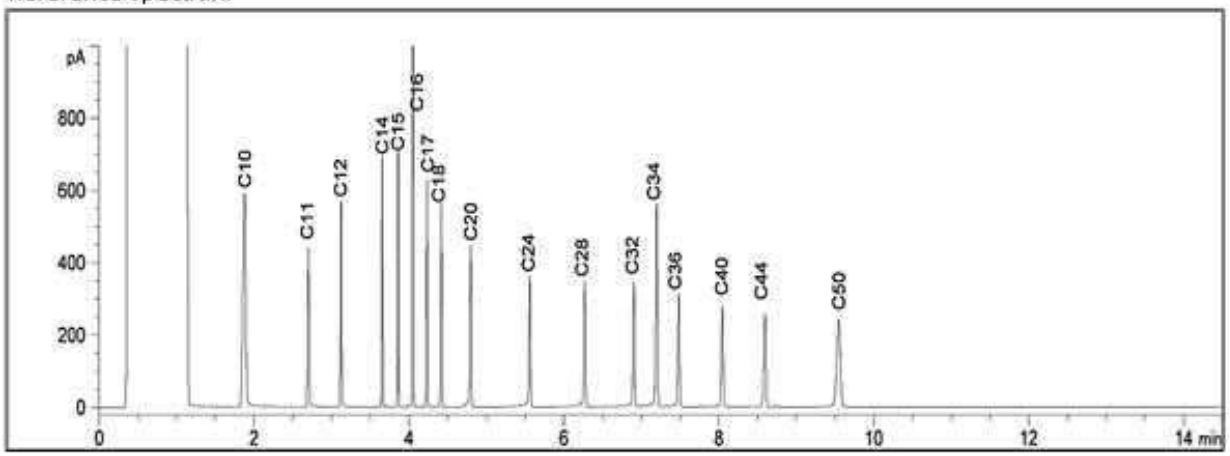
Maxxam Job #: B967561
Report Date: 2019/04/15
Maxxam Sample: JEZ016

exp Services Inc
Client Project #: OTT-00250806-C0
Project name: 5938 Hazeldean Road
Client ID: BH9-AUG2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

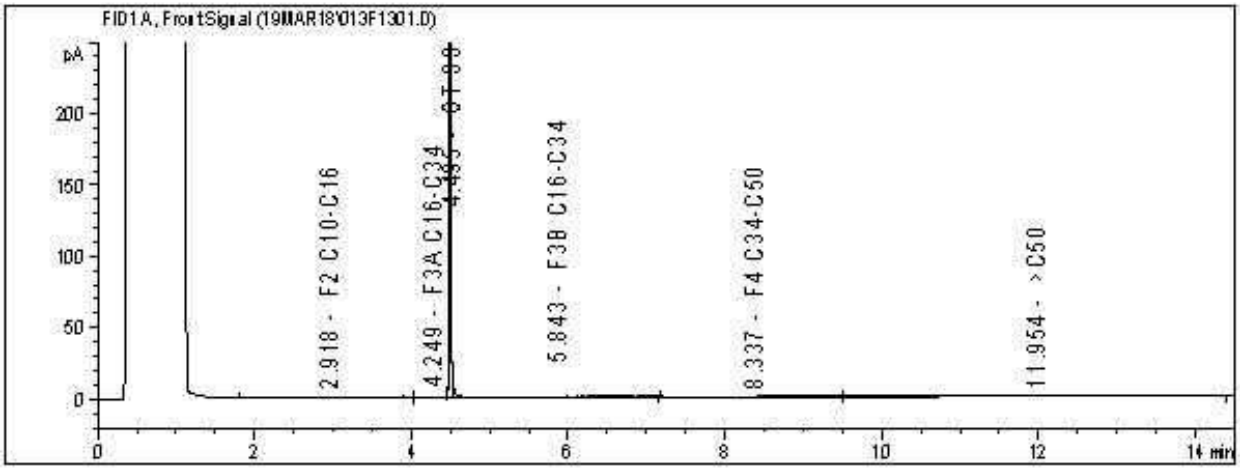
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

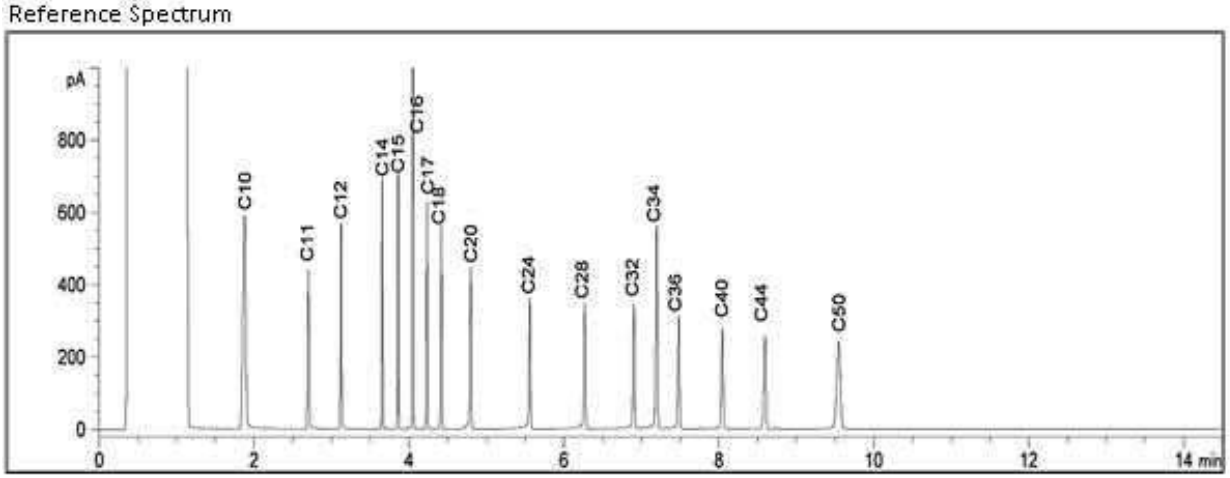
Maxxam Job #: B967561
Report Date: 2019/04/15
Maxxam Sample: JEZ017

exp Services Inc
Client Project #: OTT-00250806-C0
Project name: 5938 Hazeldean Road
Client ID: BH10-AUG1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

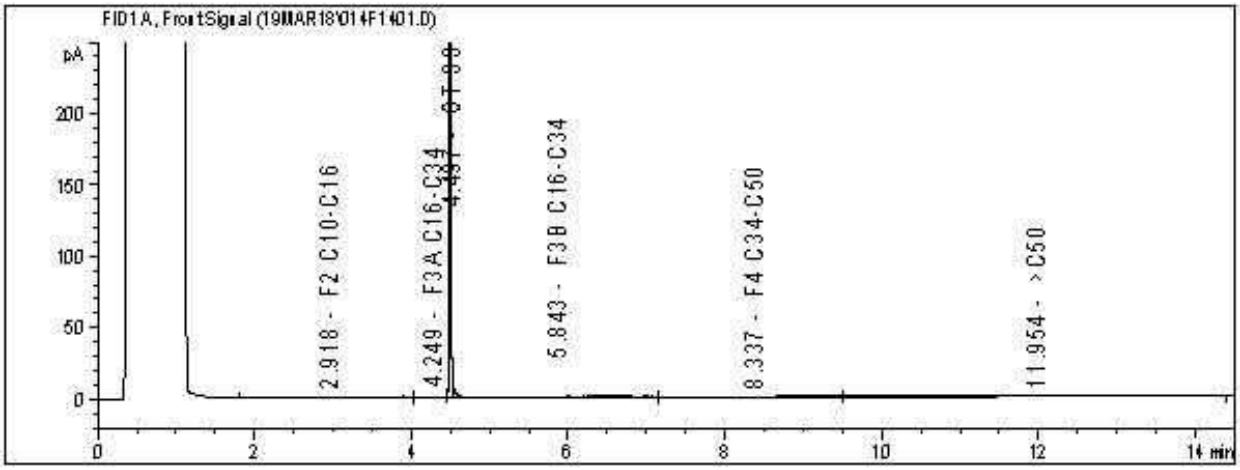
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

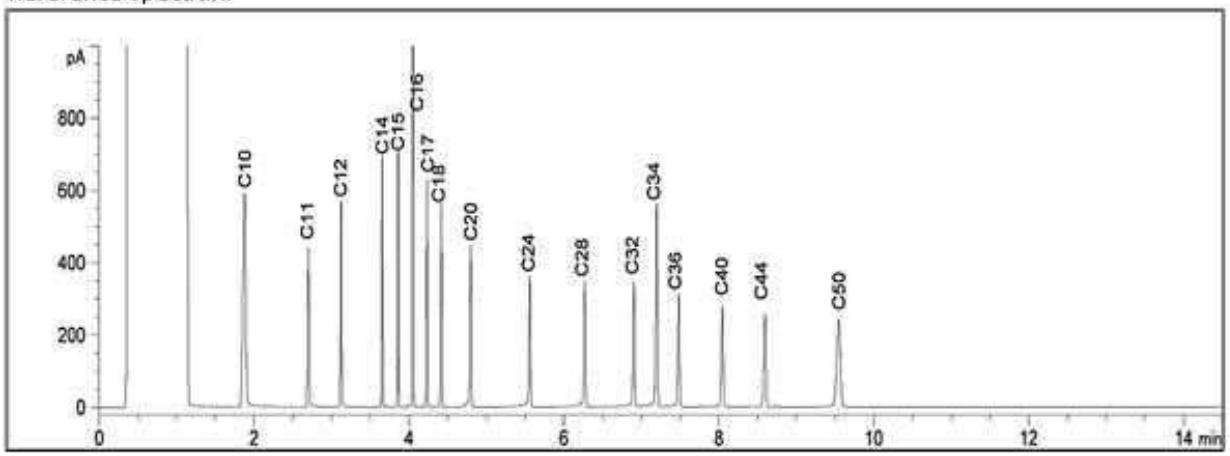
Maxxam Job #: B967561
Report Date: 2019/04/15
Maxxam Sample: JEZ018

exp Services Inc
Client Project #: OTT-00250806-C0
Project name: 5938 Hazeldean Road
Client ID: DUP 1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

Your Project #: 250806-C0
Site Location: HAZELDEAN

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/03/20
Report #: R5636622
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B969684
Received: 2019/03/18, 14:55

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	6	N/A	2019/03/20	CAM SOP-00301	EPA 8270D m
Petroleum Hydro. CCME F1 & BTEX in Water	6	N/A	2019/03/19	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water (2)	6	2019/03/19	2019/03/19	OTT SOP-00001	CCME Hydrocarbons
PAH Compounds in Water by GC/MS (SIM) (1)	3	2019/03/19	2019/03/19	CAM SOP-00318	EPA 8270D m
PAH Compounds in Water by GC/MS (SIM) (1)	3	2019/03/19	2019/03/20	CAM SOP-00318	EPA 8270D 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.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by 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.

Your Project #: 250806-C0
Site Location: HAZELDEAN

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/03/20
Report #: R5636622
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B969684
Received: 2019/03/18, 14:55

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.

Maxxam Job #: B969684
Report Date: 2019/03/20

exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

O.REG 153 PAHS (WATER)

Maxxam ID		JFL038		JFL039		JFL040	JFL041	JFL042	JFL043		
Sampling Date		2019/03/18 13:00		2019/03/18 14:00		2019/03/18 10:00	2019/03/18 11:00	2019/03/18 12:30	2019/03/18 12:00		
	UNITS	**BH1**	**RDL**	**BH3**	**RDL**	**BH9**	**BH10**	**BH11**	**BH20**	**RDL**	**QC Batch**
Calculated Parameters											
Methylnaphthalene, 2-(1-)	ug/L	0.26	0.071	62	0.071	<0.071	<0.071	<0.071	<0.071	0.071	6023116
Polyaromatic Hydrocarbons											
Acenaphthene	ug/L	0.52	0.050	3.0	0.050	<0.050	<0.050	0.21	0.24	0.050	6025392
Acenaphthylene	ug/L	<0.050	0.050	<0.50 (1)	0.50	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Anthracene	ug/L	<0.050	0.050	0.080	0.050	<0.050	<0.050	0.054	0.053	0.050	6025392
Benzo(a)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Benzo(a)pyrene	ug/L	<0.010	0.010	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	0.010	6025392
Benzo(b/j)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Benzo(k)fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Chrysene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Fluoranthene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Fluorene	ug/L	0.60	0.050	3.5	0.050	<0.050	<0.050	0.23	0.21	0.050	6025392
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
1-Methylnaphthalene	ug/L	0.15	0.050	52	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
2-Methylnaphthalene	ug/L	0.12	0.050	11	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Naphthalene	ug/L	0.22	0.050	18	0.050	<0.050	<0.050	0.086	0.082	0.050	6025392
Phenanthrene	ug/L	0.064	0.030	1.5	0.030	<0.030	<0.030	0.039	0.035	0.030	6025392
Pyrene	ug/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	<0.050	<0.050	0.050	6025392
Surrogate Recovery (%)											
D10-Anthracene	%	107		100		103	97	100	95		6025392
D14-Terphenyl (FS)	%	105		97		107	94	103	97		6025392
D8-Acenaphthylene	%	114		109		104	96	101	96		6025392

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) DL was raised due to matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B969684
Report Date: 2019/03/20

exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Maxxam ID		JFL038	JFL039	JFL039	JFL040	JFL041	JFL042	JFL043		
Sampling Date		2019/03/18 13:00	2019/03/18 14:00	2019/03/18 14:00	2019/03/18 10:00	2019/03/18 11:00	2019/03/18 12:30	2019/03/18 12:00		
	UNITS	**BH1**	**BH3**	**BH3 Lab-Dup**	**BH9**	**BH10**	**BH11**	**BH20**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons										
Benzene	ug/L	1.2	5.4	5.5	<0.20	<0.20	<0.20	<0.20	0.20	6024946
Toluene	ug/L	1.2	0.96	0.94	0.40	0.41	<0.20	<0.20	0.20	6024946
Ethylbenzene	ug/L	<0.20	14	14	<0.20	<0.20	<0.20	<0.20	0.20	6024946
o-Xylene	ug/L	0.33	5.0	5.0	<0.20	<0.20	<0.20	<0.20	0.20	6024946
p+m-Xylene	ug/L	0.73	3.3	3.3	<0.40	<0.40	<0.40	<0.40	0.40	6024946
Total Xylenes	ug/L	1.1	8.4	8.4	<0.40	<0.40	<0.40	<0.40	0.40	6024946
F1 (C6-C10)	ug/L	<25	89	94	<25	<25	<25	<25	25	6024946
F1 (C6-C10) - BTEX	ug/L	<25	61	65	<25	<25	<25	<25	25	6024946
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/L	120	850	930	<100	<100	<100	<100	100	6024982
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	<200	<200	200	6024982
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	<200	<200	<200	<200	200	6024982
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	Yes	Yes	Yes		6024982
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	103	110	110	110	112	108	113		6024946
4-Bromofluorobenzene	%	105	103	104	83	103	92	82		6024946
D10-Ethylbenzene	%	86	109	104	99	93	101	107		6024946
D4-1,2-Dichloroethane	%	101	105	105	106	108	105	107		6024946
o-Terphenyl	%	109	107	107	108	104	105	104		6024982

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B969684
Report Date: 2019/03/20

exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

TEST SUMMARY

Maxxam ID: JFL038
Sample ID: BH1
Matrix: Water

Collected: 2019/03/18
Shipped:
Received: 2019/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6023116	N/A	2019/03/20	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6024946	N/A	2019/03/19	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6024982	2019/03/19	2019/03/19	Mariana Vascan
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6025392	2019/03/19	2019/03/19	Mitesh Raj

Maxxam ID: JFL039
Sample ID: BH3
Matrix: Water

Collected: 2019/03/18
Shipped:
Received: 2019/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6023116	N/A	2019/03/20	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6024946	N/A	2019/03/19	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6024982	2019/03/19	2019/03/19	Mariana Vascan
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6025392	2019/03/19	2019/03/19	Mitesh Raj

Maxxam ID: JFL039 Dup
Sample ID: BH3
Matrix: Water

Collected: 2019/03/18
Shipped:
Received: 2019/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6024946	N/A	2019/03/19	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6024982	2019/03/19	2019/03/19	Mariana Vascan

Maxxam ID: JFL040
Sample ID: BH9
Matrix: Water

Collected: 2019/03/18
Shipped:
Received: 2019/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6023116	N/A	2019/03/20	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6024946	N/A	2019/03/19	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6024982	2019/03/19	2019/03/19	Mariana Vascan
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6025392	2019/03/19	2019/03/19	Mitesh Raj

Maxxam ID: JFL041
Sample ID: BH10
Matrix: Water

Collected: 2019/03/18
Shipped:
Received: 2019/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6023116	N/A	2019/03/20	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6024946	N/A	2019/03/19	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6024982	2019/03/19	2019/03/19	Mariana Vascan
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6025392	2019/03/19	2019/03/20	Mitesh Raj

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Maxxam Job #: B969684
Report Date: 2019/03/20

exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

TEST SUMMARY

Maxxam ID: JFL042
Sample ID: BH11
Matrix: Water

Collected: 2019/03/18
Shipped:
Received: 2019/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6023116	N/A	2019/03/20	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6024946	N/A	2019/03/19	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6024982	2019/03/19	2019/03/19	Mariana Vascan
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6025392	2019/03/19	2019/03/20	Mitesh Raj

Maxxam ID: JFL043
Sample ID: BH20
Matrix: Water

Collected: 2019/03/18
Shipped:
Received: 2019/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6023116	N/A	2019/03/20	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6024946	N/A	2019/03/19	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6024982	2019/03/19	2019/03/19	Mariana Vascan
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6025392	2019/03/19	2019/03/20	Mitesh Raj

Maxxam Analytics International Corporation o/a Maxxam Analytics 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.maxxam.ca

Maxxam Job #: B969684
Report Date: 2019/03/20

exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

GENERAL COMMENTS

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

Package 1	1.7°C

Results relate only to the items tested.

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Maxxam Job #: B969684
Report Date: 2019/03/20

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6024946	1,4-Difluorobenzene	2019/03/19	100	70 - 130	102	70 - 130	103	%		
6024946	4-Bromofluorobenzene	2019/03/19	87	70 - 130	81	70 - 130	80	%		
6024946	D10-Ethylbenzene	2019/03/19	96	70 - 130	99	70 - 130	98	%		
6024946	D4-1,2-Dichloroethane	2019/03/19	97	70 - 130	93	70 - 130	98	%		
6024982	o-Terphenyl	2019/03/19	106	30 - 130	108	30 - 130	106	%		
6025392	D10-Anthracene	2019/03/19	99	50 - 130	109	50 - 130	102	%		
6025392	D14-Terphenyl (FS)	2019/03/19	105	50 - 130	109	50 - 130	95	%		
6025392	D8-Acenaphthylene	2019/03/19	101	50 - 130	104	50 - 130	100	%		
6024946	Benzene	2019/03/19	85	70 - 130	100	70 - 130	<0.20	ug/L	1.4	40
6024946	Ethylbenzene	2019/03/19	92	70 - 130	98	70 - 130	<0.20	ug/L	1.0	40
6024946	F1 (C6-C10) - BTEX	2019/03/19					<25	ug/L	7.3	40
6024946	F1 (C6-C10)	2019/03/19	89	70 - 130	96	70 - 130	<25	ug/L	5.2	40
6024946	o-Xylene	2019/03/19	89	70 - 130	97	70 - 130	<0.20	ug/L	0.040	40
6024946	p+m-Xylene	2019/03/19	88	70 - 130	97	70 - 130	<0.40	ug/L	0.54	40
6024946	Toluene	2019/03/19	88	70 - 130	97	70 - 130	<0.20	ug/L	2.3	40
6024946	Total Xylenes	2019/03/19					<0.40	ug/L	0.19	40
6024982	F2 (C10-C16 Hydrocarbons)	2019/03/19	93	50 - 130	94	80 - 120	<100	ug/L	9.0	50
6024982	F3 (C16-C34 Hydrocarbons)	2019/03/19	93	50 - 130	94	80 - 120	<200	ug/L	NC	50
6024982	F4 (C34-C50 Hydrocarbons)	2019/03/19	93	50 - 130	94	80 - 120	<200	ug/L	NC	50
6025392	1-Methylnaphthalene	2019/03/19	107	50 - 130	108	50 - 130	<0.050	ug/L	NC	30
6025392	2-Methylnaphthalene	2019/03/19	100	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
6025392	Acenaphthene	2019/03/19	102	50 - 130	101	50 - 130	<0.050	ug/L	NC	30
6025392	Acenaphthylene	2019/03/19	102	50 - 130	102	50 - 130	<0.050	ug/L	NC	30
6025392	Anthracene	2019/03/19	90	50 - 130	92	50 - 130	<0.050	ug/L	NC	30
6025392	Benzo(a)anthracene	2019/03/19	87	50 - 130	102	50 - 130	<0.050	ug/L		
6025392	Benzo(a)pyrene	2019/03/19	80	50 - 130	100	50 - 130	<0.010	ug/L		
6025392	Benzo(b/j)fluoranthene	2019/03/19	80	50 - 130	104	50 - 130	<0.050	ug/L		
6025392	Benzo(g,h,i)perylene	2019/03/19	81	50 - 130	101	50 - 130	<0.050	ug/L		
6025392	Benzo(k)fluoranthene	2019/03/19	78	50 - 130	97	50 - 130	<0.050	ug/L		
6025392	Chrysene	2019/03/19	82	50 - 130	103	50 - 130	<0.050	ug/L		
6025392	Dibenz(a,h)anthracene	2019/03/19	77	50 - 130	96	50 - 130	<0.050	ug/L		
6025392	Fluoranthene	2019/03/19	107	50 - 130	109	50 - 130	<0.050	ug/L	NC	30

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Maxxam Job #: B969684
Report Date: 2019/03/20

QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6025392	Fluorene	2019/03/19	103	50 - 130	107	50 - 130	<0.050	ug/L	NC	30
6025392	Indeno(1,2,3-cd)pyrene	2019/03/19	82	50 - 130	106	50 - 130	<0.050	ug/L		
6025392	Naphthalene	2019/03/19	96	50 - 130	99	50 - 130	<0.050	ug/L	NC	30
6025392	Phenanthrene	2019/03/19	98	50 - 130	100	50 - 130	<0.030	ug/L	NC	30
6025392	Pyrene	2019/03/19	107	50 - 130	106	50 - 130	<0.050	ug/L		

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 <= 2x RDL).

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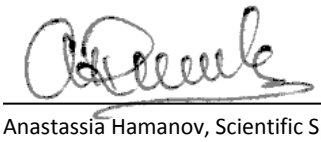
Maxxam Job #: B969684
Report Date: 2019/03/20

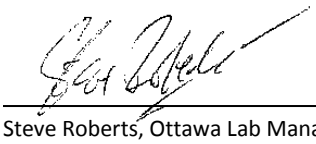
exp Services Inc
Client Project #: 250806-C0
Site Location: HAZELDEAN
Sampler Initials: MD

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist



Steve Roberts, Ottawa Lab Manager

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.

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Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RE[illegible]D

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#17498 exp Services Inc	Company Name:		Quotation #:	B46066 (Stream 3)	Maxxam Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	Mark McCalla / Mark Devlin	P.O. #:			708424
Address:	100-2650 Queensview Drive Ottawa ON K2B 8H6	Address:		Project:	25806-C0	COC #:	Project Manager:
Tel:	(613) 688-1899 Fax: (613) 225-7337	Tel:	Fax:	Project Name:		C#708424-01-01	Alisha Williamson
Email:	accounting.ottawa@exp.com; Karen.Burke@exp.com;	Email:	mark.mccalla@exp.com / mark.devlin@exp.com	Site #:	Hazeldean		
				Sampled By:	MAD		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☑ Ind/Comm ☒ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☒ Table I	☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558. ☐ Storm Sewer Bylaw ☐ MISA Municipality ☐ PWQO ☐ Other	

Include Criteria on Certificate of Analysis (Y/N)? _____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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) (48 hours)
Date Required: March 20, 2019 Time Required: ☒
Rush Confirmation Number: _____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 PAHs	O.Reg 153 PHCs, BTEX/F1-F4	# of Bottles	Comments
1		BH1	March 18 2019	1:00pm	GW		X	X	6	
2		BH3	↓	2:00pm	↓		↓	↓	↓	
3		BH9		10:00am						
4		BH10		11:00am						
5		BH11		12:30pm						
6		BH20	↓	12:00pm	↓		↓	↓	↓	
7										
8										
9										
10										On ice

18-Mar-19 14:55
Alisha Williamson
B969684

RECEIVED IN OTT[illegible]A

* 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				
Mark Devlin	19/03/18	2:55pm	[illegible] Serge Leger	19/03/1	14:55		Time Sensitive	Temperature (°C) on Recei 2, 1, 2	Custody Seal Present	Yes	No
									Intact	X	

* 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/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

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

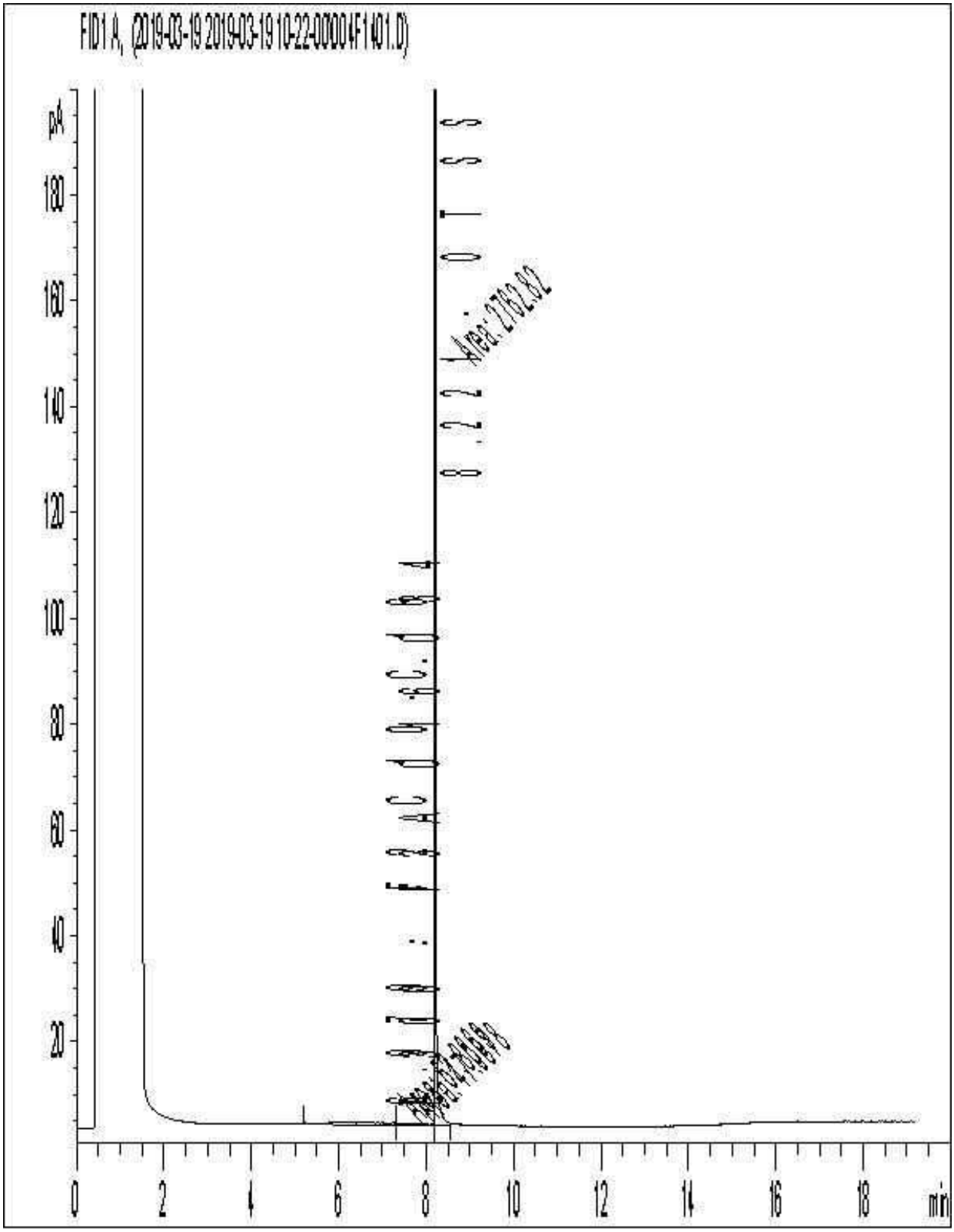
White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam Job #: B969684
Report Date: 2019/03/20
Maxxam Sample: JFL038

exp Services Inc
Client Project #: 250806-C0
Project name: HAZELDEAN
Client ID: BH1

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

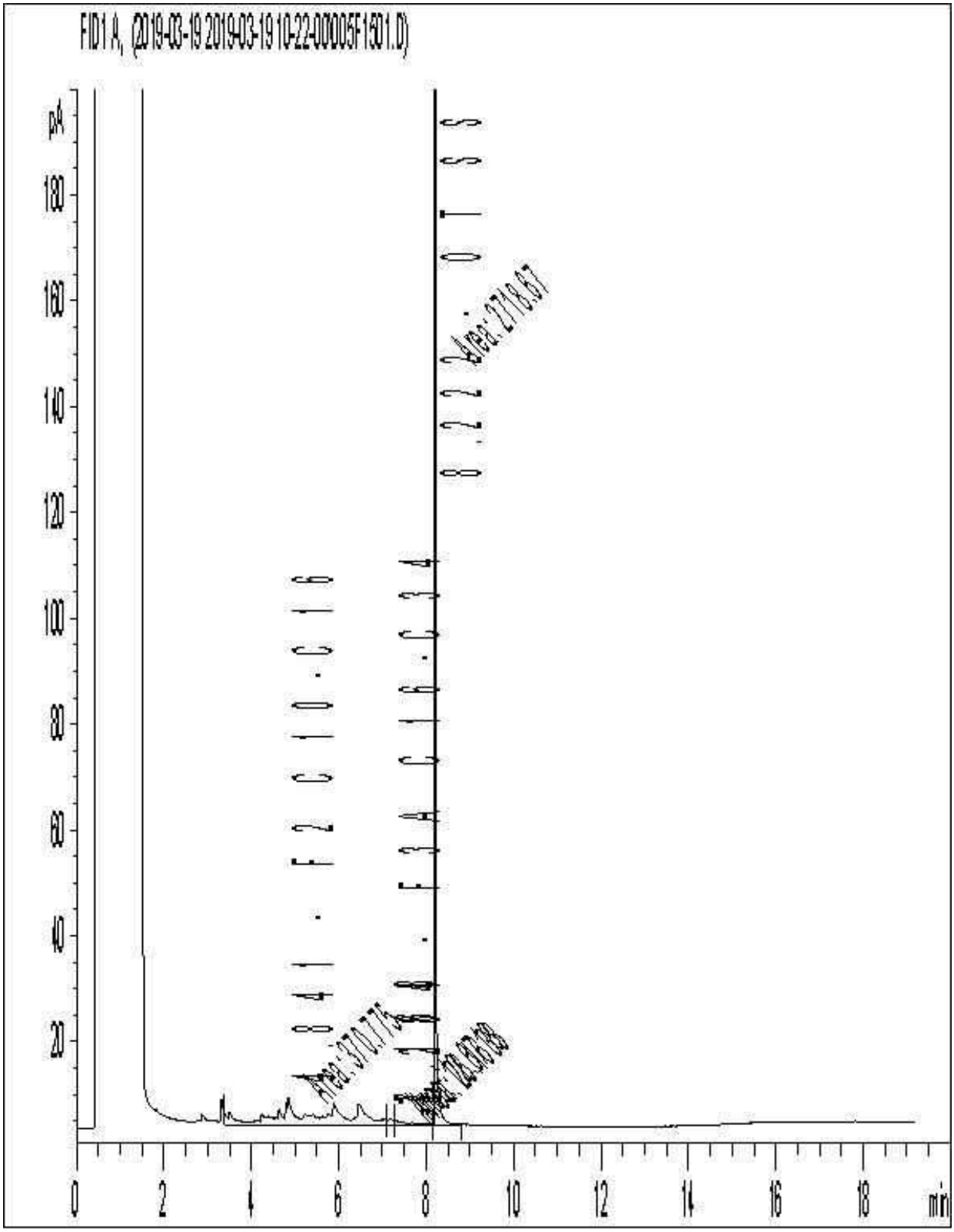


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B969684
Report Date: 2019/03/20
Maxxam Sample: JFL039

exp Services Inc
Client Project #: 250806-C0
Project name: HAZELDEAN
Client ID: BH3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

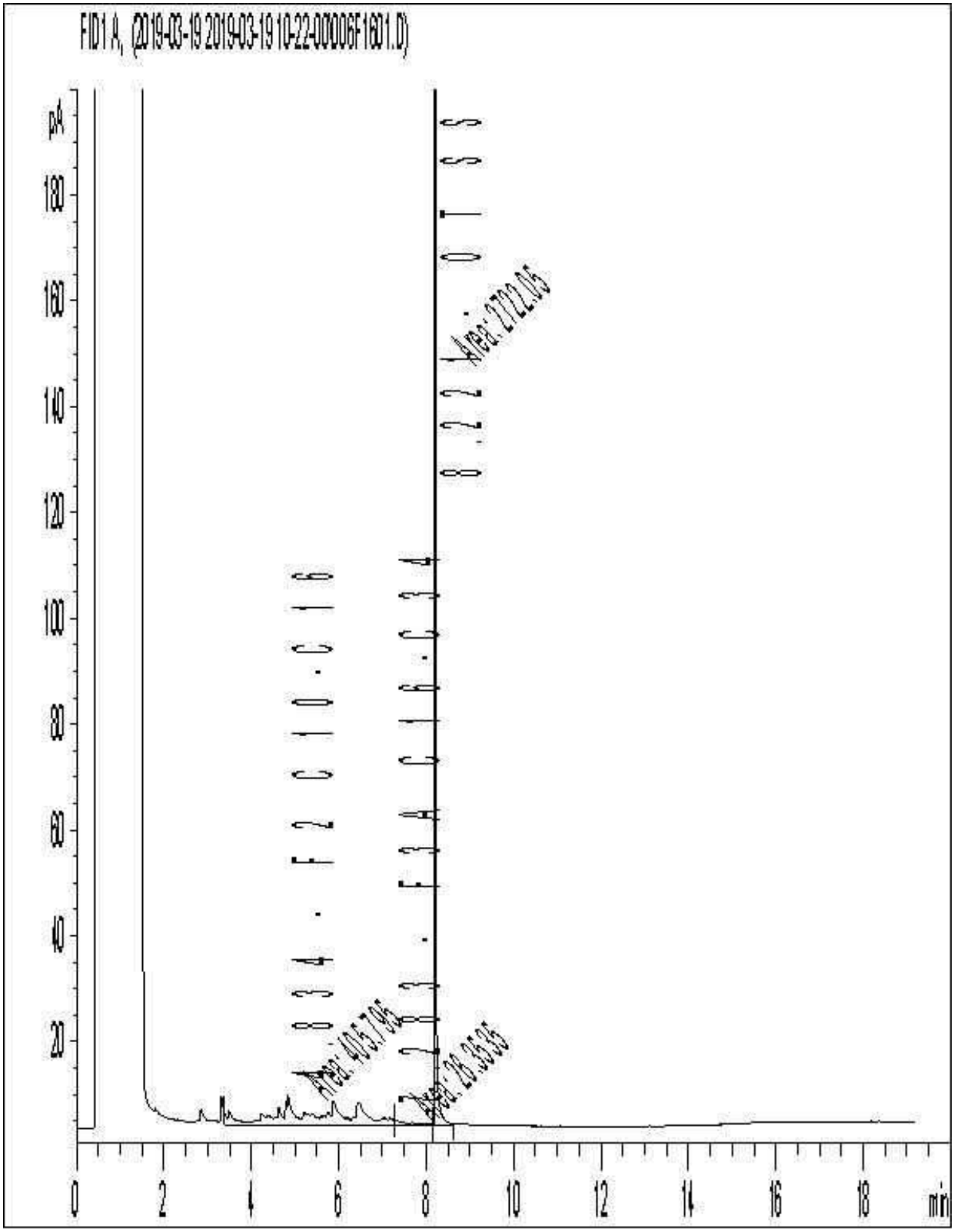


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B969684
Report Date: 2019/03/20
Maxxam Sample: JFL039 Lab-Dup

exp Services Inc
Client Project #: 250806-C0
Project name: HAZELDEAN
Client ID: BH3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

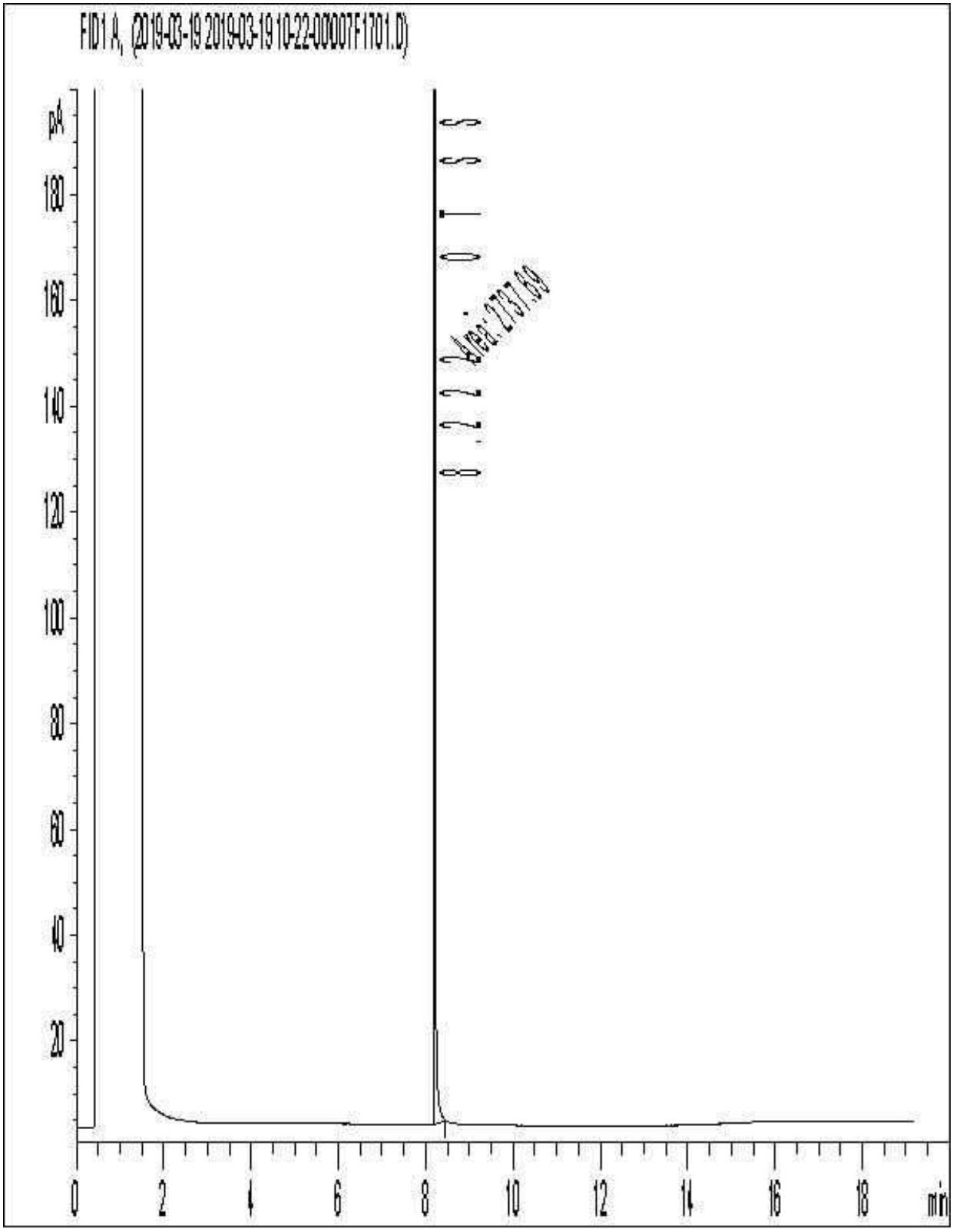


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B969684
Report Date: 2019/03/20
Maxxam Sample: JFL040

exp Services Inc
Client Project #: 250806-C0
Project name: HAZELDEAN
Client ID: BH9

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

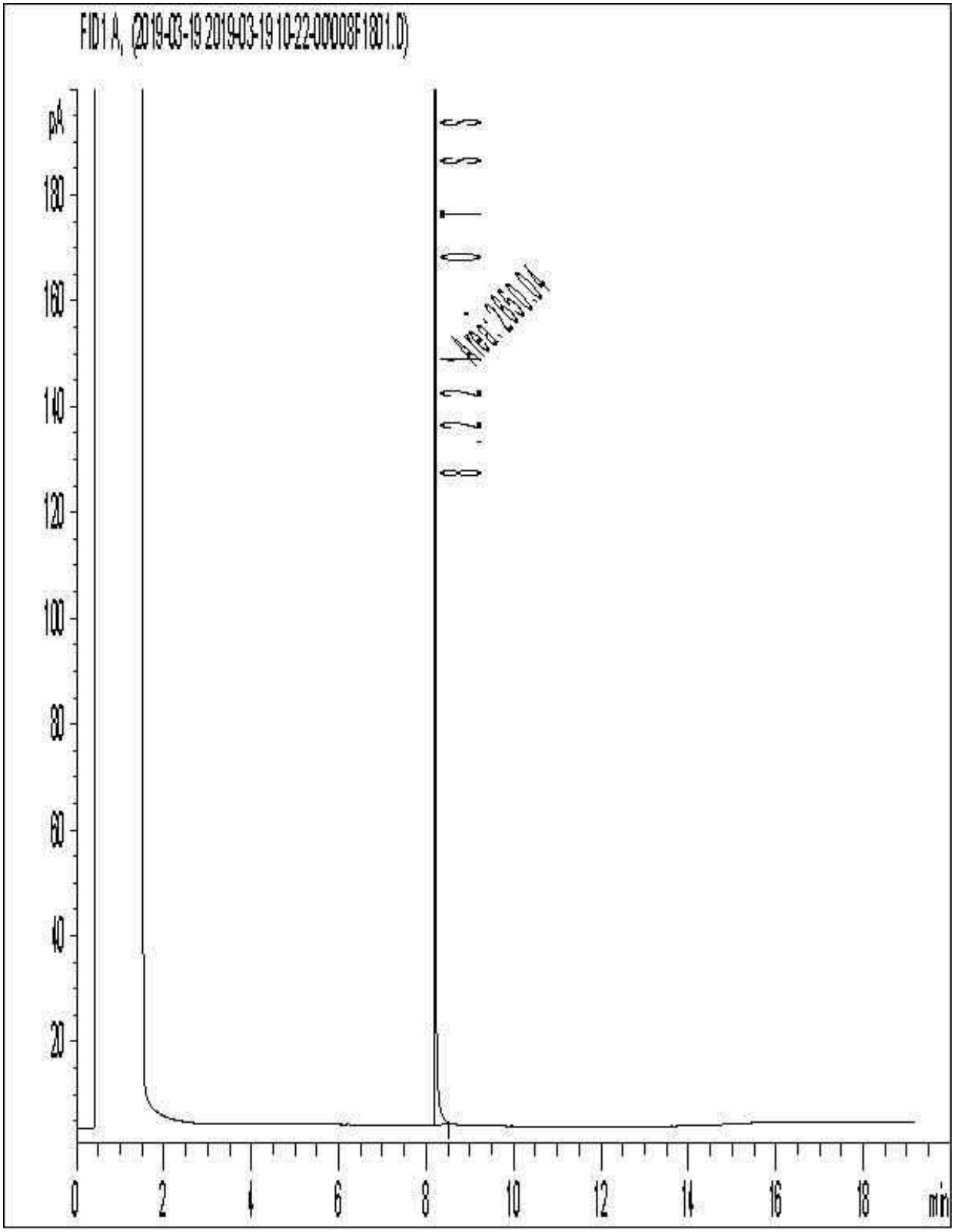


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B969684
Report Date: 2019/03/20
Maxxam Sample: JFL041

exp Services Inc
Client Project #: 250806-C0
Project name: HAZELDEAN
Client ID: BH10

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

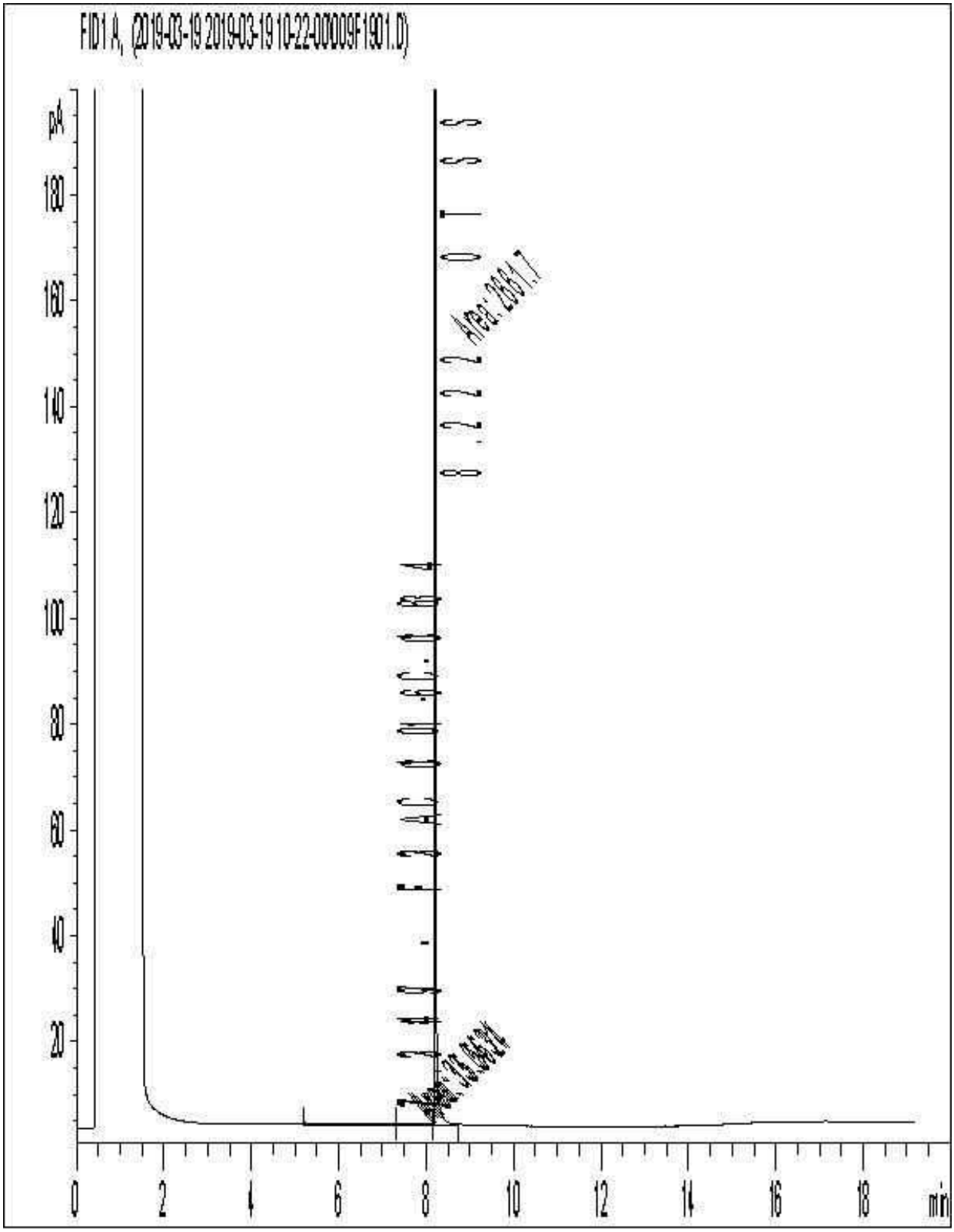


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B969684
Report Date: 2019/03/20
Maxxam Sample: JFL042

exp Services Inc
Client Project #: 250806-C0
Project name: HAZELDEAN
Client ID: BH11

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

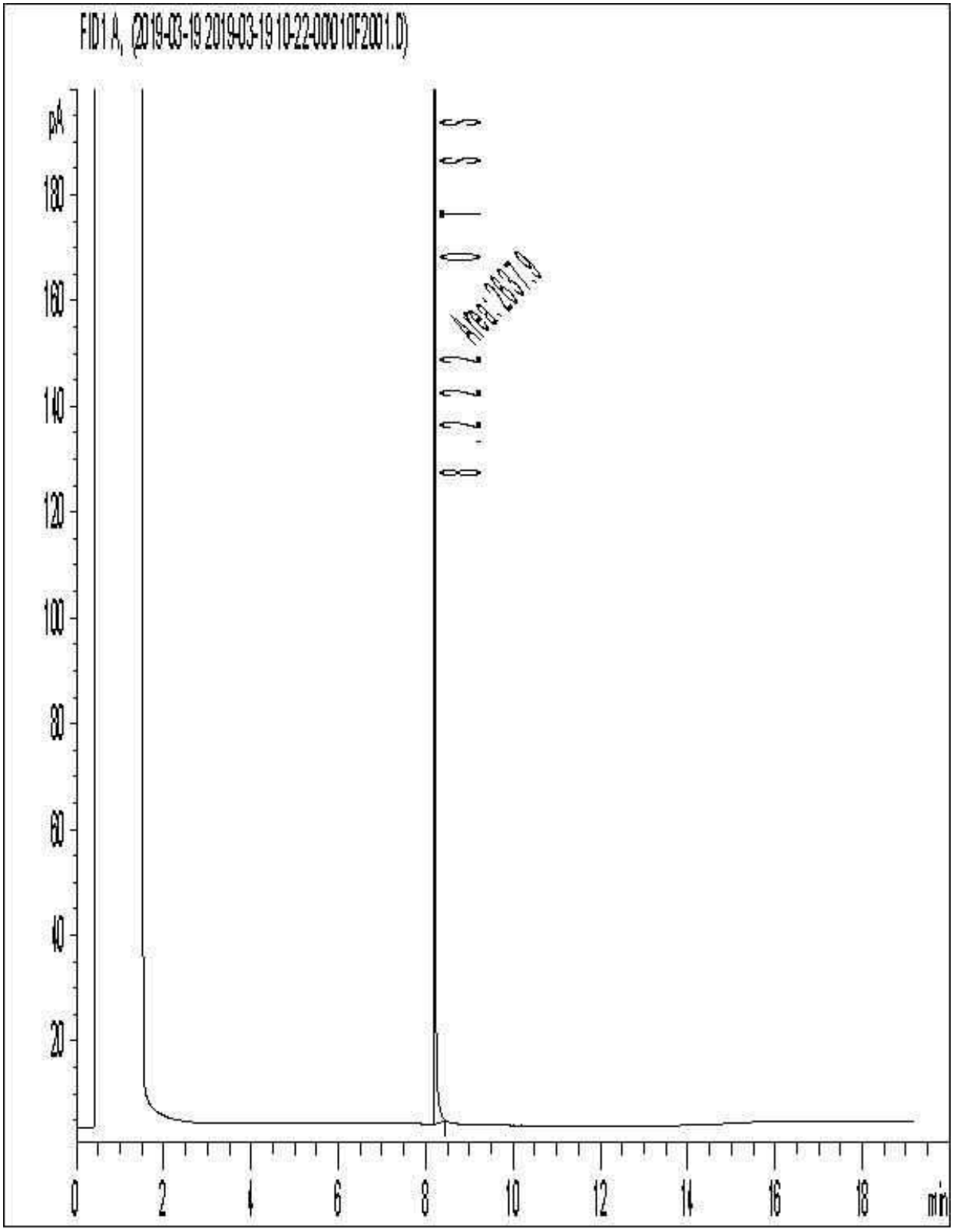


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam Job #: B969684
Report Date: 2019/03/20
Maxxam Sample: JFL043

exp Services Inc
Client Project #: 250806-C0
Project name: HAZELDEAN
Client ID: BH20

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.

Your Project #: OTT-00250806-CO
Your C.O.C. #: 117556

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/06/05
Report #: R5739765
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E8646
Received: 2019/06/03, 12:45

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	1	N/A	2019/06/04	CAM SOP-00301	EPA 8270D m
Petroleum Hydro. CCME F1 & BTEX in Water	2	N/A	2019/06/03	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water (2)	2	2019/06/03	2019/06/03	OTT SOP-00001	CCME Hydrocarbons
PAH Compounds in Water by GC/MS (SIM) (1)	1	2019/06/04	2019/06/04	CAM SOP-00318	EPA 8270D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Laboratories Mississauga
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories 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.

Your Project #: OTT-00250806-CO
Your C.O.C. #: 117556

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/06/05
Report #: R5739765
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E8646
Received: 2019/06/03, 12:45

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alisha Williamson, Project Manager
Email: Alisha.Williamson@bvlabs.com
Phone# (613)274-0573
==========

BV Labs 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 PAHS (WATER)

BV Labs ID		JWP650		
Sampling Date		2019/06/03 11:00		
COC Number		117556		
	UNITS	**BH3**	**RDL**	**QC Batch**
Calculated Parameters				
Methylnaphthalene, 2-(1-)	ug/L	2.6	0.071	6154949
Polyaromatic Hydrocarbons				
Acenaphthene	ug/L	0.34	0.050	6157129
Acenaphthylene	ug/L	<0.050	0.050	6157129
Anthracene	ug/L	<0.050	0.050	6157129
Benzo(a)anthracene	ug/L	<0.050	0.050	6157129
Benzo(a)pyrene	ug/L	<0.010	0.010	6157129
Benzo(b/j)fluoranthene	ug/L	<0.050	0.050	6157129
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	6157129
Benzo(k)fluoranthene	ug/L	<0.050	0.050	6157129
Chrysene	ug/L	<0.050	0.050	6157129
Dibenz(a,h)anthracene	ug/L	<0.050	0.050	6157129
Fluoranthene	ug/L	<0.050	0.050	6157129
Fluorene	ug/L	0.31	0.050	6157129
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	6157129
1-Methylnaphthalene	ug/L	2.6	0.050	6157129
2-Methylnaphthalene	ug/L	<0.050	0.050	6157129
Naphthalene	ug/L	0.14	0.050	6157129
Phenanthrene	ug/L	0.10	0.030	6157129
Pyrene	ug/L	<0.050	0.050	6157129
Surrogate Recovery (%)				
D10-Anthracene	%	90		6157129
D14-Terphenyl (FS)	%	99		6157129
D8-Acenaphthylene	%	97		6157129

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 PHCS, BTEX/F1-F4 (WATER)

BV Labs ID		JWP650	JWP651	JWP651		
Sampling Date		2019/06/03 11:00	2019/06/03 11:30	2019/06/03 11:30		
COC Number		117556	117556	117556		
	UNITS	**BH3**	**BH1**	**BH1 Lab-Dup**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons						
Benzene	ug/L	<0.20	<0.20	<0.20	0.20	6155108
Toluene	ug/L	<0.20	<0.20	<0.20	0.20	6155108
Ethylbenzene	ug/L	0.51	<0.20	<0.20	0.20	6155108
o-Xylene	ug/L	0.33	<0.20	<0.20	0.20	6155108
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	6155108
Total Xylenes	ug/L	<0.40	<0.40	<0.40	0.40	6155108
F1 (C6-C10)	ug/L	<25	<25	<25	25	6155108
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	25	6155108
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	6155242
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	6155242
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	6155242
Reached Baseline at C50	ug/L	Yes	Yes	Yes		6155242
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	101	94	103		6155108
4-Bromofluorobenzene	%	86	96	101		6155108
D10-Ethylbenzene	%	71	85	86		6155108
D4-1,2-Dichloroethane	%	94	95	107		6155108
o-Terphenyl	%	104	101	99		6155242

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Laboratories 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.bvlabs.com

TEST SUMMARY

BV Labs ID: JWP650
Sample ID: BH3
Matrix: Water

Collected: 2019/06/03
Shipped:
Received: 2019/06/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6154949	N/A	2019/06/04	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6155108	N/A	2019/06/03	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155242	2019/06/03	2019/06/03	Mariana Vascan
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6157129	2019/06/04	2019/06/04	Mitesh Raj

BV Labs ID: JWP651
Sample ID: BH1
Matrix: Water

Collected: 2019/06/03
Shipped:
Received: 2019/06/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6155108	N/A	2019/06/03	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155242	2019/06/03	2019/06/03	Mariana Vascan

BV Labs ID: JWP651 Dup
Sample ID: BH1
Matrix: Water

Collected: 2019/06/03
Shipped:
Received: 2019/06/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6155108	N/A	2019/06/03	Fatemeh Habibagahi
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6155242	2019/06/03	2019/06/03	Mariana Vascan

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GENERAL COMMENTS

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

Package 1	11.0°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6155108	1,4-Difluorobenzene	2019/06/03	104	70 - 130	104	70 - 130	102	%		
6155108	4-Bromofluorobenzene	2019/06/03	103	70 - 130	97	70 - 130	94	%		
6155108	D10-Ethylbenzene	2019/06/03	101	70 - 130	89	70 - 130	84	%		
6155108	D4-1,2-Dichloroethane	2019/06/03	103	70 - 130	102	70 - 130	100	%		
6155242	o-Terphenyl	2019/06/03	102	30 - 130	104	30 - 130	100	%		
6157129	D10-Anthracene	2019/06/04			105	50 - 130	113	%		
6157129	D14-Terphenyl (FS)	2019/06/04			100	50 - 130	105	%		
6157129	D8-Acenaphthylene	2019/06/04			95	50 - 130	103	%		
6155108	Benzene	2019/06/03	88	70 - 130	81	70 - 130	<0.20	ug/L	NC	40
6155108	Ethylbenzene	2019/06/03	79	70 - 130	83	70 - 130	<0.20	ug/L	NC	40
6155108	F1 (C6-C10) - BTEX	2019/06/03					<25	ug/L	NC	40
6155108	F1 (C6-C10)	2019/06/03	82	70 - 130	89	70 - 130	<25	ug/L	NC	40
6155108	o-Xylene	2019/06/03	87	70 - 130	92	70 - 130	<0.20	ug/L	NC	40
6155108	p+m-Xylene	2019/06/03	85	70 - 130	84	70 - 130	<0.40	ug/L	NC	40
6155108	Toluene	2019/06/03	88	70 - 130	86	70 - 130	<0.20	ug/L	NC	40
6155108	Total Xylenes	2019/06/03					<0.40	ug/L	NC	40
6155242	F2 (C10-C16 Hydrocarbons)	2019/06/03	103	50 - 130	106	80 - 120	<100	ug/L	NC	50
6155242	F3 (C16-C34 Hydrocarbons)	2019/06/03	103	50 - 130	106	80 - 120	<200	ug/L	NC	50
6155242	F4 (C34-C50 Hydrocarbons)	2019/06/03	103	50 - 130	106	80 - 120	<200	ug/L	NC	50
6157129	1-Methylnaphthalene	2019/06/04			70	50 - 130	<0.050	ug/L	17	30
6157129	2-Methylnaphthalene	2019/06/04			62	50 - 130	<0.050	ug/L	18	30
6157129	Acenaphthene	2019/06/04			79	50 - 130	<0.050	ug/L	9.6	30
6157129	Acenaphthylene	2019/06/04			75	50 - 130	<0.050	ug/L	8.6	30
6157129	Anthracene	2019/06/04			89	50 - 130	<0.050	ug/L	3.2	30
6157129	Benzo(a)anthracene	2019/06/04			94	50 - 130	<0.050	ug/L	2.6	30
6157129	Benzo(a)pyrene	2019/06/04			93	50 - 130	<0.010	ug/L	2.5	30
6157129	Benzo(b/j)fluoranthene	2019/06/04			94	50 - 130	<0.050	ug/L	2.5	30
6157129	Benzo(g,h,i)perylene	2019/06/04			93	50 - 130	<0.050	ug/L	1.4	30
6157129	Benzo(k)fluoranthene	2019/06/04			97	50 - 130	<0.050	ug/L	0.94	30
6157129	Chrysene	2019/06/04			92	50 - 130	<0.050	ug/L	3.5	30
6157129	Dibenz(a,h)anthracene	2019/06/04			93	50 - 130	<0.050	ug/L	1.3	30
6157129	Fluoranthene	2019/06/04			98	50 - 130	<0.050	ug/L	1.9	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6157129	Fluorene	2019/06/04			82	50 - 130	<0.050	ug/L	6.1	30
6157129	Indeno(1,2,3-cd)pyrene	2019/06/04			101	50 - 130	<0.050	ug/L	1.3	30
6157129	Naphthalene	2019/06/04			62	50 - 130	<0.050	ug/L	13	30
6157129	Phenanthrene	2019/06/04			91	50 - 130	<0.030	ug/L	2.7	30
6157129	Pyrene	2019/06/04			97	50 - 130	<0.050	ug/L	1.3	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 <= 2x RDL).

VALIDATION SIGNATURE PAGE

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

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

Steve Roberts, Ottawa Lab Manager

BV Labs 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.

Bureau Veritas Laboratories 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.bvlabs.com

Maxxam
A Bureau Veritas Group Company

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/3

CHAIN OF CUSTODY RECORD 117556 Page ____ of ____

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: EXP Services Inc	Company Name:	Quotation #: EXP Stream 3.	☐ Regular TAT (5-7 days) Most analyses
Contact Name: MARK McCALLA	Contact Name:	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 2650 Queensview Dr.	Address:	Project #: OTT-00250806-CO	Rush TAT (Surcharges will be applied)
		Site Location:	☒ 1 Day ☐ 2 Days ☐ 3-4 Days
Phone: 613 688-1899 Fax:	Phone: Fax:	Site #:	
Email: mark.mccalla@exp.com	Email:	Sampled By: P.O.	Date Required:

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Rush Confirmation #:

Regulation 153
☐ Table 1 ☒ Res/Park ☐ Med/ Fine
☐ Table 2 ☐ Ind/Comm ☒ Coarse
☐ Table 3 ☐ Agri/ Other
☐ Table 7
FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations
☐ CCME ☐ Sanitary Sewer Bylaw
☐ MISA ☐ Storm Sewer Bylaw
☐ PWQO Region
☐ Other (Specify)
☐ REG 558 (MIN. 3 DAY TAT REQUIRED)

Include Criteria on Certificate of Analysis: Y / N

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

Analysis Requested

LABORATORY USE ONLY
CUSTODY SEAL Y / N (Present / Intact)
COOLER TEMPERATURES: 10, 11, 12
COOLING MEDIA PRESENT: Y / N

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	DFM								HOLD- DO NOT ANALYZE	COMMENTS
1	BH3	2019/06/03	11h00	GW	5	-	X	X					X									
2	BH1	"	11h30	GW	4	-	X	X														
3																						
4																						
5																						
6																						
7																						ON SC.
8																						
9																						
10																						

03-Jun-19 12:45
Alisha Williamson
B9E8646

RECEIVED IN OTTAWA

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #
Philip Oliveira	2019-06-03	12h45	[illegible]	2019/06/03	12-45	
PHILIP OLIVEIRA						

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. Sample container, preservation, hold time and packages information can be viewed at http://maxxam.ca/wp-content/uploads/Ontario-COC.pdf.

COC-1004 (03/17)

White: Maxxam ~ Yellow: Client

Maxxam Analytics
A Bureau Veritas Group Company

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/3

CHAIN OF CUSTODY RECORD 117556

Page ____ of ____

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: EXP Services Inc	Company Name:	Quotation #: EXP Stream 3.	☐ Regular TAT (5-7 days) Most analyses
Contact Name: MARK McCALLA	Contact Name:	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 2650 Queensview Dr.	Address:	Project #: OTT-00250806-CO	Rush TAT (Surcharges will be applied)
Phone: 613 688-1899 Fax:	Phone: Fax:	Site Location:	☒ 1 Day ☐ 2 Days ☐ 3-4 Days
Email: mark.mccalla@exp.com	Email:	Site #:	Date Required:
		Sampled By: P.O.	Rush Confirmation #:

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153	Other Regulations
☐ Table 1 ☒ Res/Park ☐ Med/Fine	☐ CCME ☐ Sanitary Sewer Bylaw
☐ Table 2 ☐ Ind/Comm ☒ Coarse	☐ MISA ☐ Storm Sewer Bylaw
☐ Table 3 ☐ Agri/ Other	☐ PWQO Region
☐ Table 7.	☐ Other (Specify)
FOR RSC (PLEASE CIRCLE) Y / N	☐ REG 558 (MIN. 3 DAY TAT REQUIRED)

Include Criteria on Certificate of Analysis: Y / N

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

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE): Metals / Hg / CrVI	BTEX/ PHC-F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	PAH	HOLD - DO NOT ANALYZE
1	BH3	2019/06/03	11h00	GW	5	-	X	X					X	
2	BH1	"	11h30	GW	4	-	X	X						
3														
4														
5														
6														
7														
8														
9														
10														

03-Jun-19 12:45
Alisha Williamson
B9E8646

RECEIVED IN OTTAWA

LABORATORY USE ONLY

CUSTODY SEAL Y / N		COOLER TEMPERATURES
Present	Intact	
✓	✓	10, 11, 12
		5/8/6 10/9/9

COOLING MEDIA PRESENT: Y / N

COMMENTS: ON Sc.

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #
Philip Olivier	2019-06-03	12h45	Kevin Jang B	2019/06/03	12:45	
PHILIP OLIVIER			[illegible]	2019/06/04	08:40	

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. Sample container, preservation, hold time and packages information can be viewed at http://maxxam.ca/wp-content/uploads/Ontario-COC.pdf.

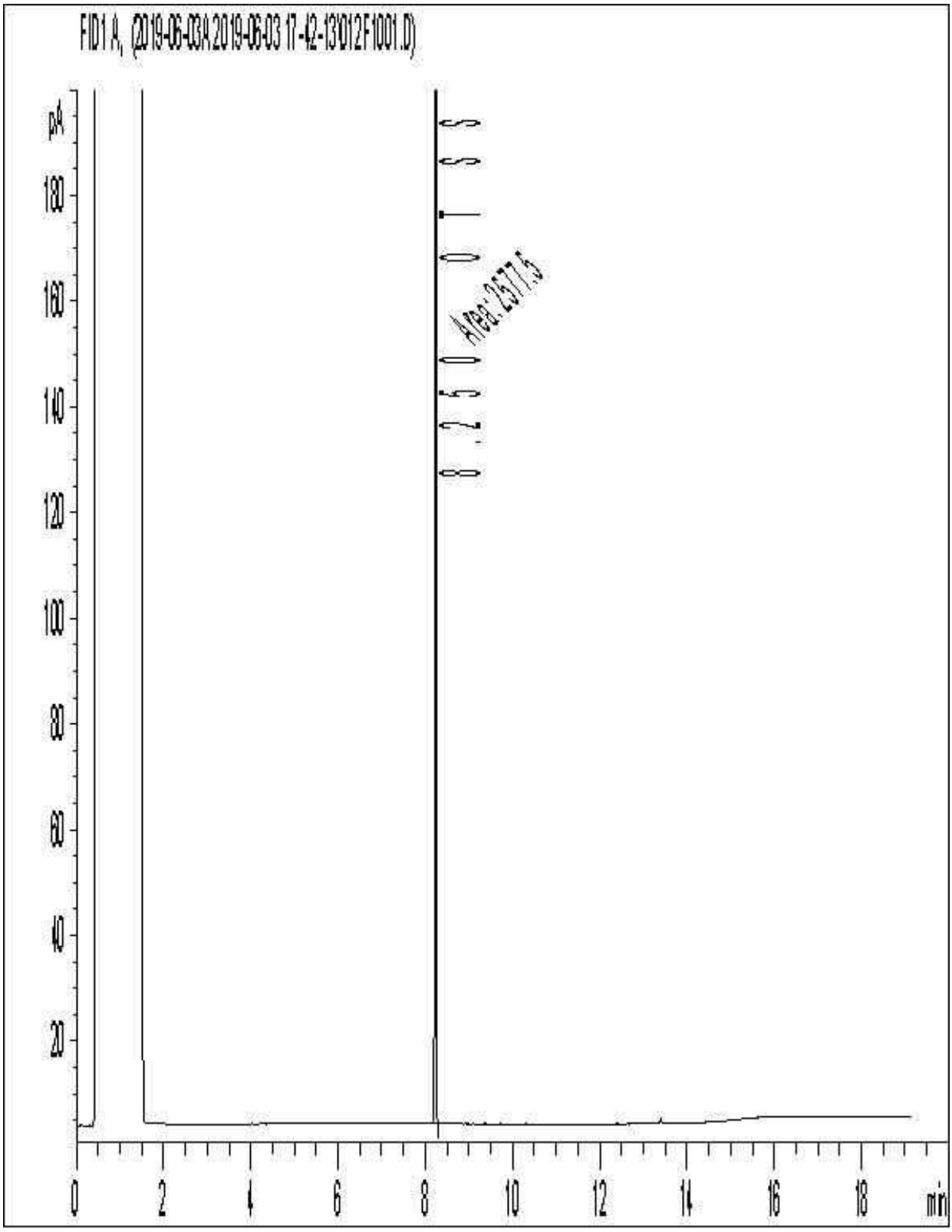
COC-1004 (03/17)

White: Maxxam – Yellow: Client

BV Labs Job #: B9E8646
Report Date: 2019/06/05
BV Labs Sample: JWP650

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

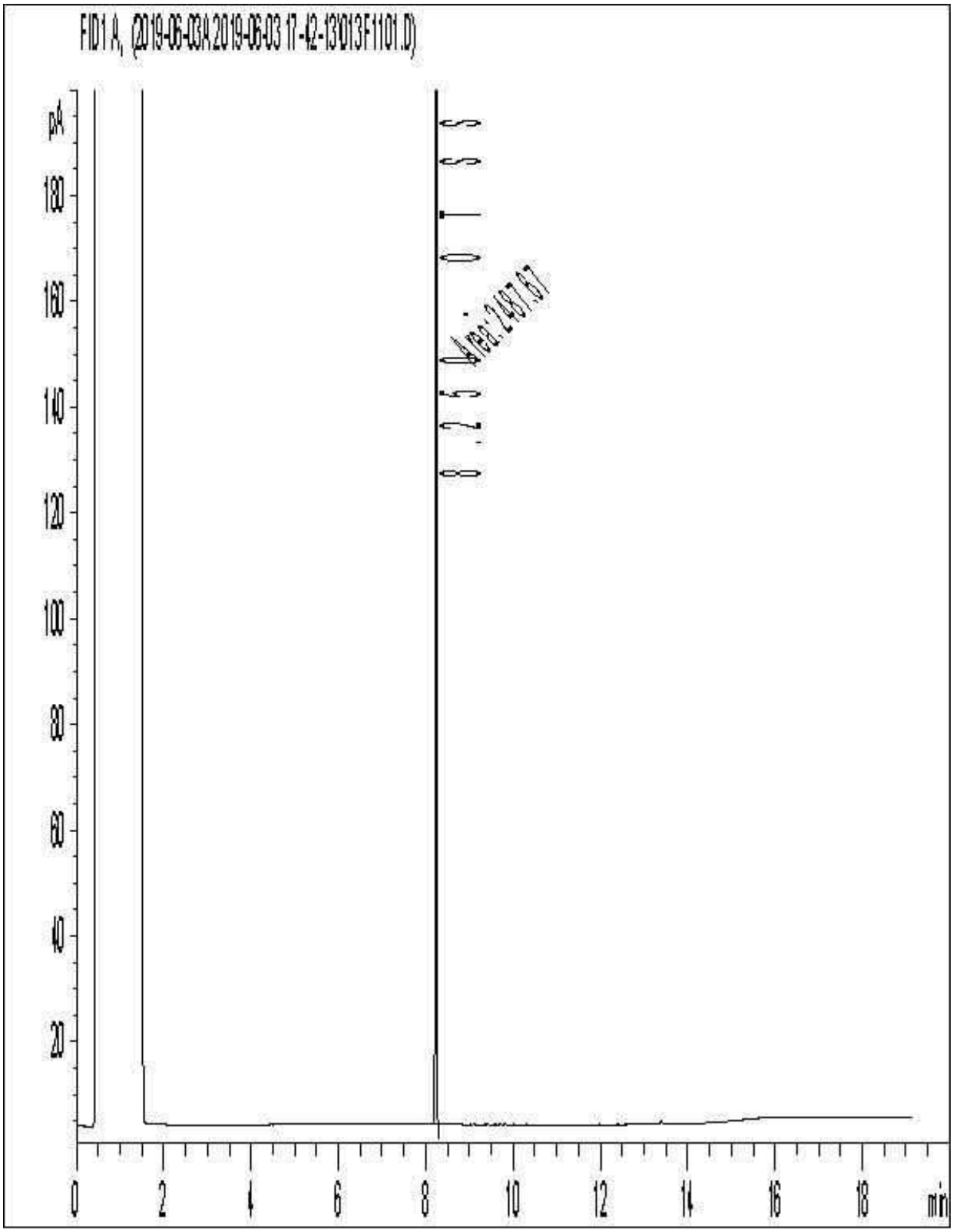


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

BV Labs Job #: B9E8646
Report Date: 2019/06/05
BV Labs Sample: JWP651

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH1

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

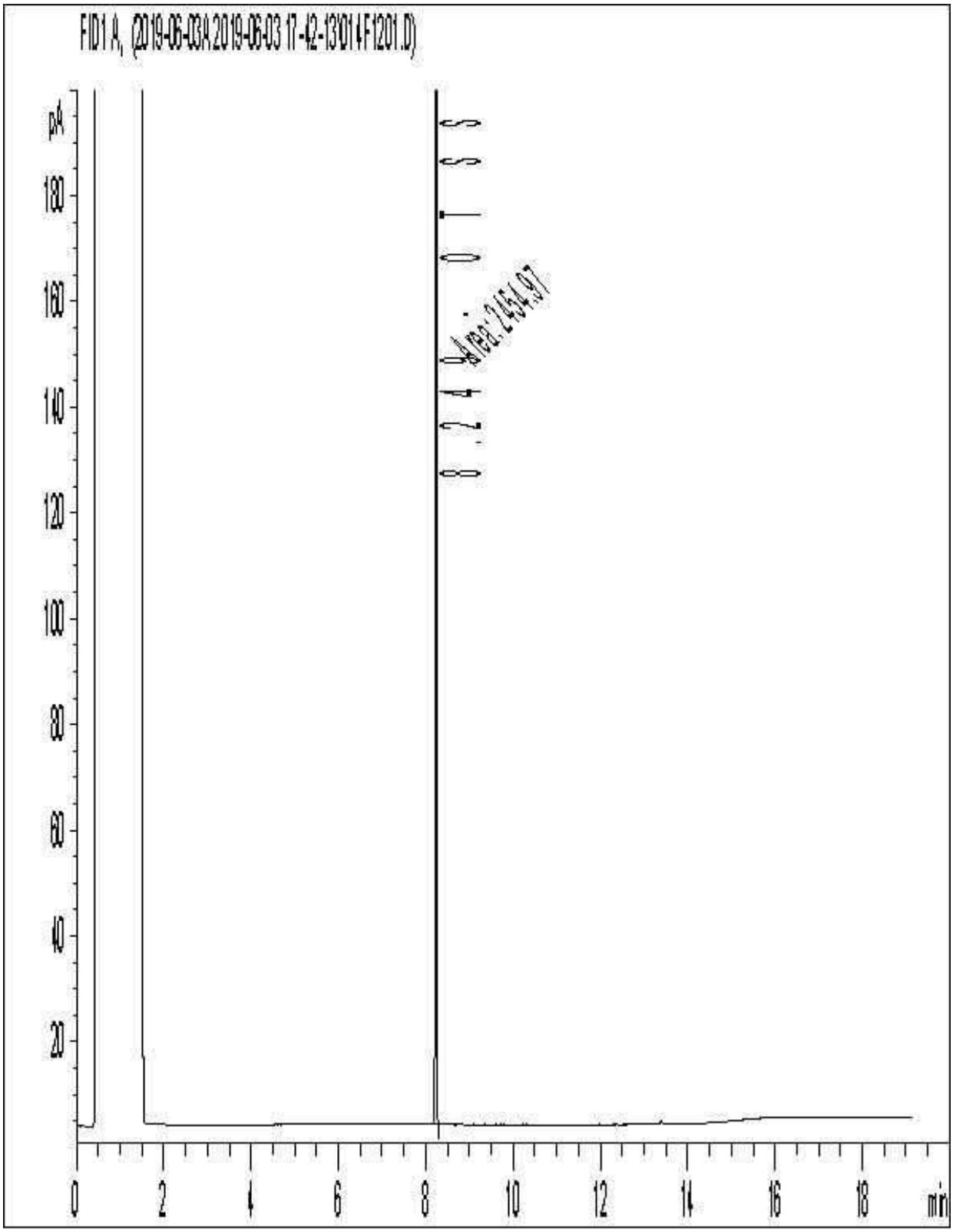


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

BV Labs Job #: B9E8646
Report Date: 2019/06/05
BV Labs Sample: JWP651 Lab-Dup

exp Services Inc
Client Project #: OTT-00250806-CO
Client ID: BH1

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.

Your Project #: OTT-00250806.00
Your C.O.C. #: 126083

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/09/10
Report #: R5873576
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9O8019
Received: 2019/09/05, 16:40

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Methylnaphthalene Sum (1)	2	N/A	2019/09/09	CAM SOP-00301	EPA 8270D m
Petroleum Hydro. CCME F1 & BTEX in Water (1)	3	N/A	2019/09/07	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 2)	3	2019/09/07	2019/09/07	CAM SOP-00316	CCME PHC-CWS m
PAH Compounds in Water by GC/MS (SIM) (1)	2	2019/09/07	2019/09/08	CAM SOP-00318	EPA 8270D m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Laboratories Mississauga
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories 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.

Your Project #: OTT-00250806.00
Your C.O.C. #: 126083

Attention: Mark McCalla

exp Services Inc
Ottawa Branch
100-2650 Queensview Drive
Ottawa, ON
CANADA K2B 8H6

Report Date: 2019/09/10
Report #: R5873576
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9O8019
Received: 2019/09/05, 16:40

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Alisha Williamson, Project Manager
Email: Alisha.Williamson@bvlabs.com
Phone# (613)274-0573
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

O.REG 153 PAHS (WATER)

BV Labs ID		KRZ041	KRZ042		
Sampling Date		2019/09/05 15:30	2019/09/05 15:45		
COC Number		126083	126083		
	UNITS	**BH3**	**BH18**	**RDL**	**QC Batch**
Calculated Parameters					
Methylnaphthalene, 2-(1-)	ug/L	0.20	0.22	0.071	6318413
Polyaromatic Hydrocarbons					
Acenaphthene	ug/L	<0.050	<0.050	0.050	6320485
Acenaphthylene	ug/L	<0.050	<0.050	0.050	6320485
Anthracene	ug/L	<0.050	<0.050	0.050	6320485
Benzo(a)anthracene	ug/L	<0.050	<0.050	0.050	6320485
Benzo(a)pyrene	ug/L	<0.010	<0.010	0.010	6320485
Benzo(b/j)fluoranthene	ug/L	<0.050	<0.050	0.050	6320485
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	0.050	6320485
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	0.050	6320485
Chrysene	ug/L	<0.050	<0.050	0.050	6320485
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	0.050	6320485
Fluoranthene	ug/L	<0.050	<0.050	0.050	6320485
Fluorene	ug/L	<0.050	<0.050	0.050	6320485
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	0.050	6320485
1-Methylnaphthalene	ug/L	0.20	0.22	0.050	6320485
2-Methylnaphthalene	ug/L	<0.050	<0.050	0.050	6320485
Naphthalene	ug/L	0.051	<0.050	0.050	6320485
Phenanthrene	ug/L	<0.030	0.039	0.030	6320485
Pyrene	ug/L	<0.050	<0.050	0.050	6320485
Surrogate Recovery (%)					
D10-Anthracene	%	108	103		6320485
D14-Terphenyl (FS)	%	128	122		6320485
D8-Acenaphthylene	%	106	102		6320485

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 PHCS, BTEX/F1-F4 (WATER)

BV Labs ID		KRZ040	KRZ041	KRZ042		
Sampling Date		2019/09/05 15:00	2019/09/05 15:30	2019/09/05 15:45		
COC Number		126083	126083	126083		
	UNITS	**MW1**	**BH3**	**BH18**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons						
Benzene	ug/L	<0.20	<0.20	<0.20	0.20	6319589
Toluene	ug/L	<0.20	<0.20	<0.20	0.20	6319589
Ethylbenzene	ug/L	<0.20	0.21	<0.20	0.20	6319589
o-Xylene	ug/L	<0.20	<0.20	<0.20	0.20	6319589
p+m-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	6319589
Total Xylenes	ug/L	<0.40	<0.40	<0.40	0.40	6319589
F1 (C6-C10)	ug/L	<25	<25	<25	25	6319589
F1 (C6-C10) - BTEX	ug/L	<25	<25	<25	25	6319589
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	6320486
F3 (C16-C34 Hydrocarbons)	ug/L	<200	<200	<200	200	6320486
F4 (C34-C50 Hydrocarbons)	ug/L	<200	<200	<200	200	6320486
Reached Baseline at C50	ug/L	Yes	Yes	Yes		6320486
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	106	103	104		6319589
4-Bromofluorobenzene	%	101	101	99		6319589
D10-Ethylbenzene	%	119	120	118		6319589
D4-1,2-Dichloroethane	%	106	107	106		6319589
o-Terphenyl	%	93	93	95		6320486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.bvlabs.com

BV Labs Job #: B9O8019
Report Date: 2019/09/10

exp Services Inc
Client Project #: OTT-00250806.00
Sampler Initials: PO

TEST SUMMARY

BV Labs ID: KRZ040
Sample ID: MW1
Matrix: Water

Collected: 2019/09/05
Shipped:
Received: 2019/09/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6319589	N/A	2019/09/07	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6320486	2019/09/07	2019/09/07	Prabhjot Gulati

BV Labs ID: KRZ041
Sample ID: BH3
Matrix: Water

Collected: 2019/09/05
Shipped:
Received: 2019/09/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6318413	N/A	2019/09/09	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6319589	N/A	2019/09/07	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6320486	2019/09/07	2019/09/07	Prabhjot Gulati
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6320485	2019/09/07	2019/09/08	Lingyun Feng

BV Labs ID: KRZ042
Sample ID: BH18
Matrix: Water

Collected: 2019/09/05
Shipped:
Received: 2019/09/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	6318413	N/A	2019/09/09	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	6319589	N/A	2019/09/07	Joe Paino
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	6320486	2019/09/07	2019/09/07	Prabhjot Gulati
PAH Compounds in Water by GC/MS (SIM)	GC/MS	6320485	2019/09/07	2019/09/08	Lingyun Feng

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GENERAL COMMENTS

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

Package 1	12.0°C

Results relate only to the items tested.

Bureau Veritas Laboratories 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.bvlabs.com

BV Labs Job #: B9O8019
Report Date: 2019/09/10

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: OTT-00250806.00
Sampler Initials: PO

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6319589	1,4-Difluorobenzene	2019/09/06	103	70 - 130	105	70 - 130	104	%		
6319589	4-Bromofluorobenzene	2019/09/06	99	70 - 130	100	70 - 130	99	%		
6319589	D10-Ethylbenzene	2019/09/06	104	70 - 130	104	70 - 130	118	%		
6319589	D4-1,2-Dichloroethane	2019/09/06	105	70 - 130	103	70 - 130	104	%		
6320485	D10-Anthracene	2019/09/07	97	50 - 130	101	50 - 130	96	%		
6320485	D14-Terphenyl (FS)	2019/09/07	106	50 - 130	120	50 - 130	112	%		
6320485	D8-Acenaphthylene	2019/09/07	85	50 - 130	95	50 - 130	91	%		
6320486	o-Terphenyl	2019/09/07	101	60 - 130	105	60 - 130	98	%		
6319589	Benzene	2019/09/06	91	70 - 130	91	70 - 130	<0.20	ug/L	NC	30
6319589	Ethylbenzene	2019/09/06	96	70 - 130	94	70 - 130	<0.20	ug/L	NC	30
6319589	F1 (C6-C10) - BTEX	2019/09/06					<25	ug/L	NC	30
6319589	F1 (C6-C10)	2019/09/06	88	70 - 130	95	70 - 130	<25	ug/L	NC	30
6319589	o-Xylene	2019/09/06	95	70 - 130	92	70 - 130	<0.20	ug/L	NC	30
6319589	p+m-Xylene	2019/09/06	102	70 - 130	99	70 - 130	<0.40	ug/L	NC	30
6319589	Toluene	2019/09/06	98	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
6319589	Total Xylenes	2019/09/06					<0.40	ug/L	NC	30
6320485	1-Methylnaphthalene	2019/09/07	110	50 - 130	111	50 - 130	<0.050	ug/L	NC	30
6320485	2-Methylnaphthalene	2019/09/07	104	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
6320485	Acenaphthene	2019/09/07	97	50 - 130	95	50 - 130	<0.050	ug/L	NC	30
6320485	Acenaphthylene	2019/09/07	92	50 - 130	97	50 - 130	<0.050	ug/L	NC	30
6320485	Anthracene	2019/09/07	91	50 - 130	92	50 - 130	<0.050	ug/L	NC	30
6320485	Benzo(a)anthracene	2019/09/07	102	50 - 130	104	50 - 130	<0.050	ug/L	NC	30
6320485	Benzo(a)pyrene	2019/09/07	101	50 - 130	101	50 - 130	<0.010	ug/L	NC	30
6320485	Benzo(b/j)fluoranthene	2019/09/07	102	50 - 130	101	50 - 130	<0.050	ug/L	NC	30
6320485	Benzo(g,h,i)perylene	2019/09/07	112	50 - 130	111	50 - 130	<0.050	ug/L	NC	30
6320485	Benzo(k)fluoranthene	2019/09/07	107	50 - 130	106	50 - 130	<0.050	ug/L	NC	30
6320485	Chrysene	2019/09/07	88	50 - 130	88	50 - 130	<0.050	ug/L	NC	30
6320485	Dibenz(a,h)anthracene	2019/09/07	125	50 - 130	122	50 - 130	<0.050	ug/L	NC	30
6320485	Fluoranthene	2019/09/07	109	50 - 130	110	50 - 130	<0.050	ug/L	NC	30
6320485	Fluorene	2019/09/07	103	50 - 130	102	50 - 130	<0.050	ug/L	NC	30
6320485	Indeno(1,2,3-cd)pyrene	2019/09/07	114	50 - 130	114	50 - 130	<0.050	ug/L	NC	30
6320485	Naphthalene	2019/09/07	93	50 - 130	93	50 - 130	<0.050	ug/L	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6320485	Phenanthrene	2019/09/07	99	50 - 130	98	50 - 130	<0.030	ug/L	NC	30
6320485	Pyrene	2019/09/07	106	50 - 130	107	50 - 130	<0.050	ug/L	NC	30
6320486	F2 (C10-C16 Hydrocarbons)	2019/09/07	99	50 - 130	104	60 - 130	<100	ug/L	NC	30
6320486	F3 (C16-C34 Hydrocarbons)	2019/09/07	100	50 - 130	110	60 - 130	<200	ug/L	NC	30
6320486	F4 (C34-C50 Hydrocarbons)	2019/09/07	100	50 - 130	110	60 - 130	<200	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 <= 2x RDL).

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

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

Bureau Veritas Laboratories 32 Colonnade Rd, Unit #1000, Nepean, ON K2E 7J6 Phone: 613 274-0573 Fax: 613 274-0574 Website: www.bvlabs.com

05-Sep-19 16:40
Alisha Williamson
B9O8019

J_L ENV-643

Presence of Visible Particulate/Sediment

Maxxam Analytics
CAM FCD-01013/5
Page 1 of 1

When there is >1cm of visible particulate/sediment, the amount will be recorded in the field below

Bottle Types

		Inorganics						Organics										Hydrocarbons							Volatiles				Other
	Sample ID	All	CrVI	CN	General	Hg	Metals (Diss.)	Organic 1 of 2	Organic 2 of 2	PCB 1 of 2	PCB 2 of 2	Pest/ Herb 1 of 2	Pest/ Herb 2 of 2	SVOC/ ABN 1 of 2	SVOC/ ABN 2 of 2	PAH 1 of 2	PAH 2 of 2	Dioxin /Furan	F1 Vial 1	F1 Vial 2	F1 Vial 3	F1 Vial 4	F2-F4 1 of 2	F2-F4 2 of 2	F4G	VOC Vial 1	VOC Vial 2	VOC Vial 3	VOC Vial 4	
1	MW1	TS																											
2	BH3	TS																											
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													

Comments:

Legend:	
P	Suspended Particulate
TS	Trace Settled Sediment (just covers bottom of container or less)
S	Sediment greater than (>) Trace, but less than (<) 1 cm

Recorded By: (signature/print)

RUSH!

Maxxam
A Bureau Veritas Group Company

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/4

CHAIN OF CUSTODY RECORD 126083

Page 1 of 1

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: EXP SERVICES	Company Name: EXP Services	Quotation #: EXP	☐ Regular TAT (5-7 days) Most analyses
Contact Name: Mark McCalla	Contact Name: Mark McCalla	P.O. #/ AFE#: Stream 3	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 2650 QUEENSVIEW DR Ottawa	Address:	Project #: OTT-00250806-00	Rush TAT (Surcharges will be applied)
Phone: 613-688-1899 Fax:	Phone: Fax:	Site Location:	☐ 1 Day ☒ 2 Days ☐ 3-4 Days
Email: Mark.McCalla@exp.com	Email: Mark.McCalla@exp.com	Site #:	Date Required:
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY		Site Location Province: Sampled By: Philip Oliveira	Rush Confirmation #:

Regulation 153	Other Regulations
☐ Table 1 ☒ Res/Park ☐ Med/ Fine	☐ CCME ☐ Sanitary Sewer Bylaw
☐ Table 2 ☐ Ind/Comm ☒ Coarse	☐ MISA ☐ Storm Sewer Bylaw
☐ Table 3 ☐ Agri/ Other	☐ PWQO Region
☒ Table 7	☐ Other (Specify)
FOR RSC (PLEASE CIRCLE) Y / N	☐ REG 558 (MIN. 3 DAY TAT REQUIRED)

Include Criteria on Certificate of Analysis: Y / N

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

Analysis Requested

LABORATORY USE ONLY

CUSTODY SEAL Y / N: Present / Intact

COOLER TEMPERATURES: 13, 12, 11

COOLING MEDIA PRESENT: (Y) N

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (INC. Cr VI, ICPMS Metals, HWS - B)	PAH	HOLD - DO NOT ANALYZE	COMMENTS
1	MW1	2019-09-05	3h00	GW	4		X	X							
2	BH3	2019-09-05	3h30	GW	5		X	X					X		
3	BH18	2019-09-05	3h45	GW	5		X	X					X		
4															
5															ON Five Pack
6															
7															
8															
9															
10															

RECEIVED IN OTTAWA

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Philip Oliveira	2019-09-05	16h58	Kevin Jung	2019/09/05	16:40
				2019/09/06	09:00

05-Sep-19 16:40
Alisha Williamson
B9O8019
J_L ENV-643

9/8/9 C

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 a
Sample container, preservation, hold time and packages information can be viewed at http://maxxam.ca/wp-content/uploads/Ontario-COC.pdf

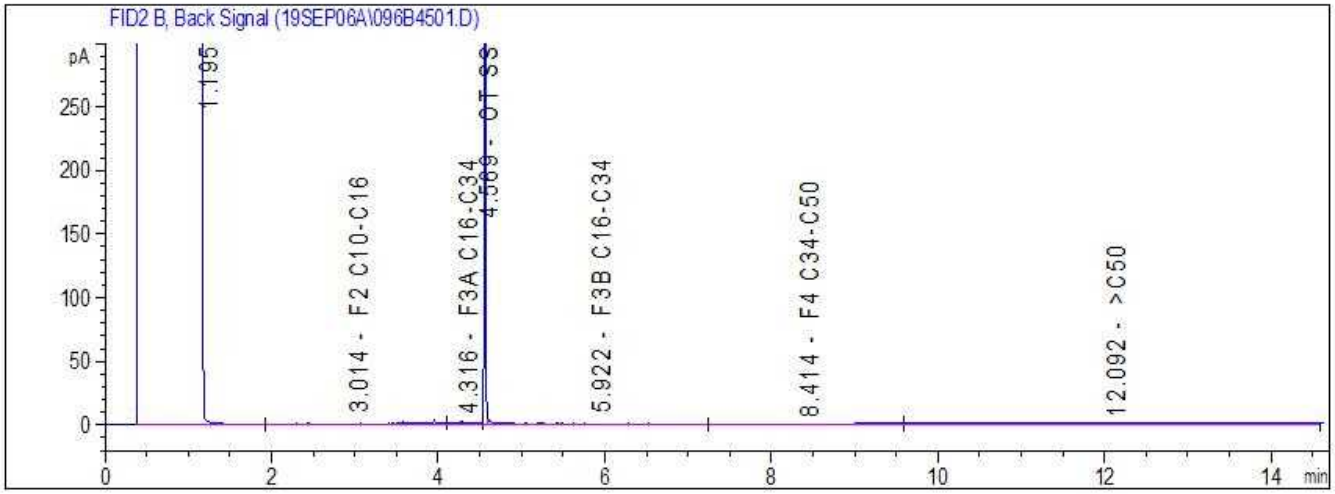
COC-1004 (01/19)

White: Maxxam - Yellow: Client

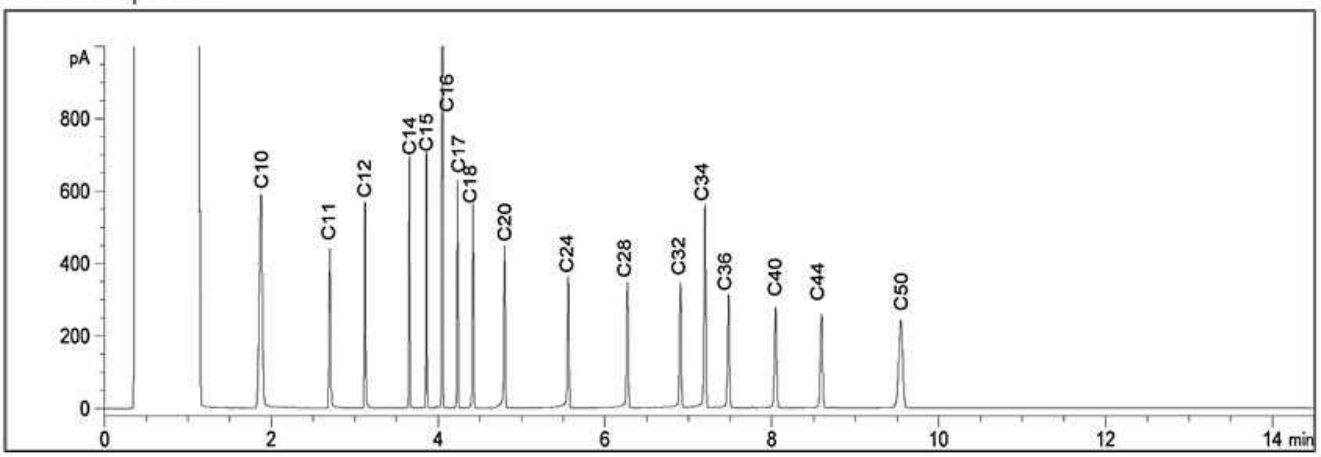
BV Labs Job #: B9O8019
Report Date: 2019/09/10
BV Labs Sample: KRZ040

exp Services Inc
Client Project #: OTT-00250806.00
Client ID: MW1

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

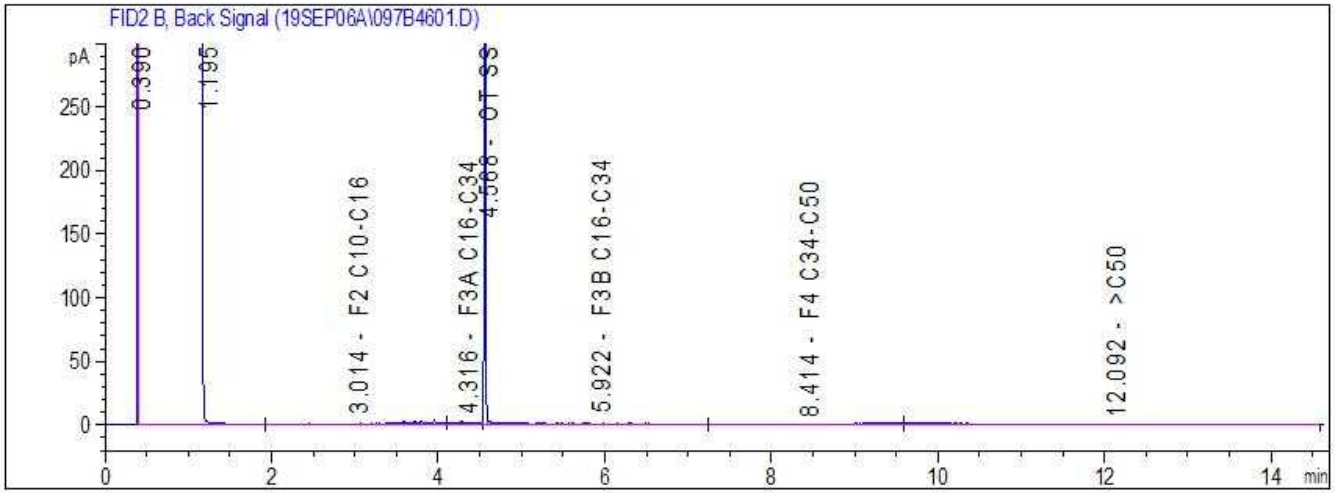
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

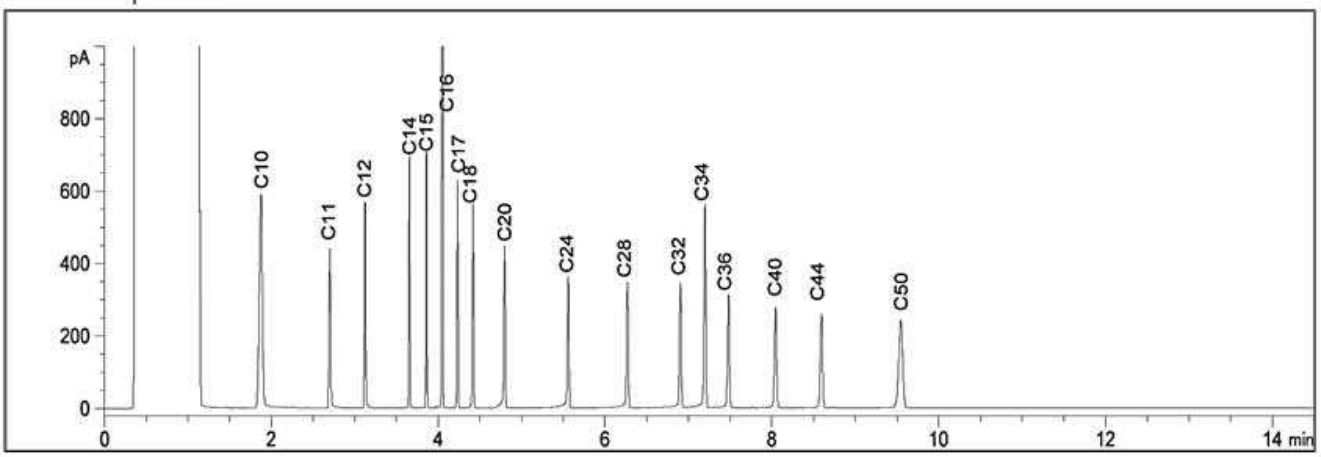
BV Labs Job #: B9O8019
Report Date: 2019/09/10
BV Labs Sample: KRZ041

exp Services Inc
Client Project #: OTT-00250806.00
Client ID: BH3

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

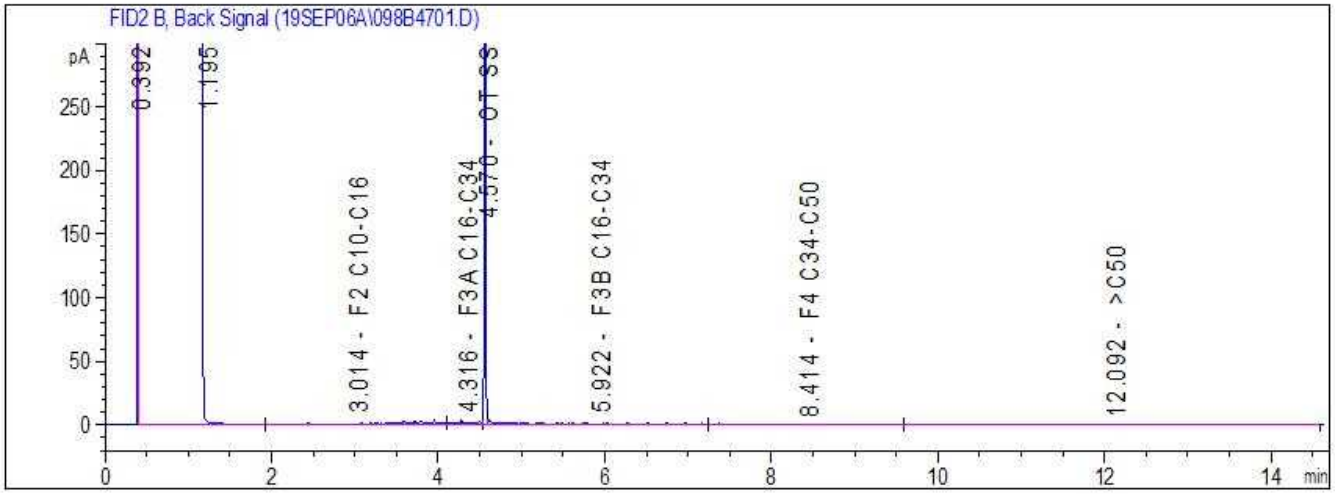
Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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

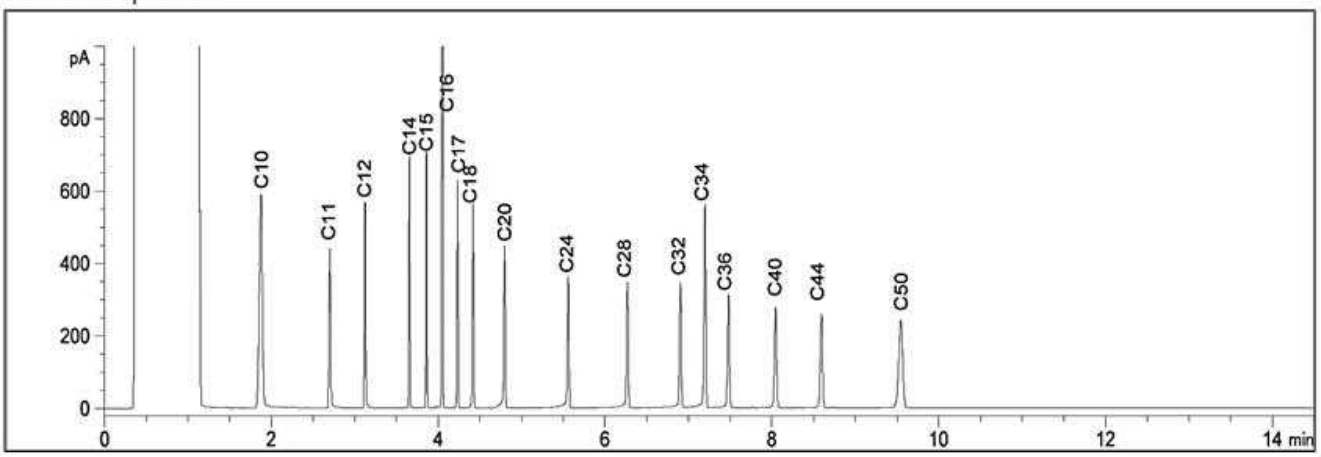
BV Labs Job #: B9O8019
Report Date: 2019/09/10
BV Labs Sample: KRZ042

exp Services Inc
Client Project #: OTT-00250806.00
Client ID: BH18

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Reference Spectrum



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: **C6 - C12**	Diesel: **C10 - C24**	Jet Fuels: **C6 - C16**
Varsol: **C8 - C12**	Fuel Oils: **C6 - C32**	Creosote: **C10 - C26**
Kerosene: **C8 - C16**	Motor Oils: **C16 - C50**	Asphalt: **C18 - C50+**

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