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Phase II Environmental Site Assessment

330 McLeod Street
Ottawa, Ontario

Prepared For

Smart Living Properties

November 24, 2021

Report: PE4548-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for 330 McLeod Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address one potentially contaminating activity (PCA) that was identified during the Phase I ESA and was considered to result in an area of potential environmental concern (APEC) on the Phase II - Property.

The current subsurface investigation consisted of drilling three boreholes, all of which were completed as groundwater monitoring wells. Monitoring wells (BH7, BH11 and BH12) installed during the previous subsurface investigation were also sampled in conjunction with current assessment.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. Fourteen soil samples including one duplicate, were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylene (BTEX) and petroleum hydrocarbons (PHCs). Soil impacted with PHC fractions F_1 and F_2 was identified in the southern portion of the subject building and Phase II – Property.

Ten groundwater samples, including one duplicate sample, were obtained from the monitoring wells installed in BH7, BH11, BH12, BH14-21, BH15-21 and BH16-21 and were analyzed for BTEX and PHCs. Groundwater impacted with PHC fractions F_2 and F_3 was identified in BH11, which was installed in the southwestern portion of the subject building. All remaining BTEX and PHC parameters were in compliance with the applicable MECP Table 3 standards.

Based on the findings of the Phase II ESA, impacted soil is present beneath the central/southern portions of the subject building and in the southern portion of the Phase II – Property. Impacted groundwater was identified beneath the southwestern portion of the subject building.

Recommendations

Monitoring Wells

It is expected that the exterior groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the remaining monitoring wells be maintained, prior to future construction, for possible further groundwater monitoring purposes.

Soil and Groundwater

Petroleum hydrocarbon (PHC) contaminated soil was identified in the boreholes placed in the southern and central portions of the subject building as well as in the southern portion of the Phase II – Property. PHC contaminated groundwater was detected in BH11 (southwest corner of the subject building).

It is recommended that the impacted soil on the exterior of the subject building be removed during the construction of the addition. The rest of the impacted soil should be dealt with during future redevelopment. Impacted groundwater encountered during construction activities will require removal from a licensed pumping contractor and the groundwater monitoring wells will be retested following the addition.

It should also be noted that if soil, which has to be removed for construction purposes and which contains contaminant concentrations that meet the Phase II - Property standards but exceed the MECP Table 1 (background) standards, it will have to be disposed of at an approved waste disposal facility at a premium.

Due Diligence Risk Assessment

It is recommended that a due diligence risk assessment be completed by a toxicology company following the retesting of the interior monitoring wells after the building addition has been constructed. This assessment would address all potential risks associated with the PHC impacted soil and groundwater water, including the potential for vapour intrusion.

1.0 INTRODUCTION

At the request of Smart Living Properties, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for 330 McLeod Street in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address an area of potential environmental concern (APEC) identified on the Phase II Property, during the Phase I ESA conducted by Paterson in October of 2021.

1.1 Site Description

Address:	330 McLeod Street, Ottawa, Ontario
Legal Description:	Part of Lot F, Concession C, Rideau Front, in the City of Ottawa Ontario.
Location:	The Phase II - Property is located on the south side of McLeod Street between Bank Street and O'Connor Street, in the City of Ottawa, Ontario. Refer to Figure 1 - Key Plan for the site location
Latitude and Longitude:	45° 23' 36.1" N, 75° 45' 15.5" W

Site Description:

Configuration:	Rectangular
Site Area:	0.11 ha (approximate)

1.2 Property Ownership

Paterson was engaged to conduct this Phase I – ESA by Mr. Jeremy Silburt of Smart Living Properties. Mr. Silburt can be contacted via his mailing address at 226 Argyle Avenue, Ottawa, Ontario, K2P 1B9.

1.3 Current and Proposed Future Uses

The Phase II – Property is occupied by a four-storey residential apartment building with a full basement. The study area consists of a mixture of commercial and residential properties. It is our understanding that an addition is to be constructed off the south side of the subject building.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 3 of the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", prepared by the Ministry of the Environment, Conservation and Parks (MECP), April 2011. The MECP selected Table 3 Standards are based on the following considerations:

- ❒ Fine-grained soil conditions
- ❒ Non-potable groundwater conditions
- ❒ Residential land use.

The residential standards were selected based on the proposed future use of the subject site. Fine-grained soil standards were chosen based on the native silty clay deposit being the predominant soil type on site.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II - Property is located in a mixed residential and commercial area and is situated on the south side of McLeod Street between Bank Street and O'Connor Street, in the City of Ottawa, Ontario.

The general area of the Phase II – Property slopes slightly down towards the east/northeast in the general direction of the Rideau Canal. Site drainage on site consists primarily of surface runoff towards manholes located along McLeod Street as well as a catch basin located in the asphaltic concrete parking lot in the southern portion of the property.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigations were conducted on February 8 and March 5, 2018, as well as October 1, 2021.

The field programs consisted of drilling a total of 16 boreholes, seven of which were instrumented with groundwater monitoring wells. The boreholes were drilled to a maximum depth of 6.10 m below the existing grade.

3.2 Media Investigated

During the subsurface investigation, soil and groundwater samples were obtained with some samples submitted for laboratory analysis. The rationale for sampling and analyzing these samples is based on the Contaminants of Potential Concern identified in the Phase I ESA.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

Based on the information from NRCAN, bedrock in the area of the site consists of shale of the Billings Formation. Based on the maps, the surficial geology consists of offshore marine sediments with an overburden thickness ranging from 10 to 15 m. Groundwater is expected to flow to the east/northeast, towards the Rideau Canal.

Contaminants of Potential Concern

The contaminants of potential concern resulting from the identified APEC are as follows:

- Petroleum Hydrocarbons (PHCs (F_1-F_4))
- Benzene, toluene, ethylbenzene, and xylene (BTEX)

Existing Buildings and Structures

The Phase I – Property is occupied by a four-story residential apartment building with an asphaltic concrete parking lot located in the southern portion of the property.

Water Bodies

No areas of natural significance were identified on the Phase I - Property or within the Phase I Study Area. The Rideau Canal is the closest body of water to the Phase I – Property and is located approximately 630 m to the east.

Areas of Natural Significance

There are no areas of natural and scientific interest on the subject property or within the Phase I ESA study area.

Water Well Records

A search of the MECPs website for all drilled well records within 250 m of the Phase I - Property was conducted on September 29, 2021. Based on the search results, no well records are documented for the Phase I - Property.

Approximately 20 well records were identified in the Phase I Study Area, all pertaining to the installation of monitoring wells and well abandonments.

Based on the well records for the surrounding area, the subsurface profile consists primarily of native brown sand or clay underlain by grey silty clay extending to a maximum depth of 14.3 m. Bedrock was not encountered in any of the installed monitoring wells and groundwater was intercepted at an average depth of 2.8 m.

Paterson installed four monitoring wells on the Phase I – Property during subsurface investigations conducted in 2018. Fill material consisting of brown silty sand with gravel and crushed stone was encountered in all of the boreholes extending to a maximum depth of 2.90 m. The fill material was underlain by native grey silty clay that extended to a maximum depth of 6.10 m.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area consists of residential and commercial properties. No PCAs were identified with respect to the neighbouring land use.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Multiple historical PCAs were identified within the Phase I study area none of which are considered to represent APECs on the Phase I – Property based on their separation distance and cross or down gradient orientation with respect to the Phase I - Property. One APEC was identified on the Phase I – Property in the form of a historical UST used for heating purposes, previously located to the south of the residential apartment building.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I ESA is considered to be sufficient to conclude that there is on PCA that results in an APEC on the Phase I - Property.

The presence of one APEC was confirmed by a variety of independent sources, and as such, the conclusions of this report are not affected by uncertainty which may be present with respect to the individual sources.

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report. No deviations from the sampling and analysis plan were identified during the Phase II ESA.

3.5 Impediments

No physical impediments aside from underground services were encountered during the Phase II ESA program.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigations were conducted on February 8 and March 5, 2018, as well as October 1, 2021. The field program consisted of the drilling a total of 16 boreholes on the Phase II Property, seven of which were completed with monitoring well installations.

The boreholes were placed to address the aforementioned area of potential environmental concern (APEC).

The boreholes were drilled with a truck-mounted geoprobe and a portable drill, operated by George Downing Estate Drilling of Hawkesbury, Ontario and CCC Group of Ottawa, Ontario, respectively, under the full-time supervision of Paterson personnel. Borehole locations are shown on Drawing PE4548-3 – Test Hole Location Plan appended to this report.

4.2 Soil Sampling

A total of 115 soil samples were obtained from the boreholes by means of sampling from shallow auger flights and split spoon sampling.

The depths at which auger samples and split spoon samples were obtained from the boreholes are shown as “**AU**” and “**SS**” on the Soil Profile and Test Data Sheets, appended to this report.

Site soils generally consist of between 0.05 and 0.10 m of asphaltic concrete or 0.08 to 0.16 of concrete slab within the subject building (BH11 – BH16-21). The surficial layer of asphaltic concrete or concrete slab (within subject building) was underlain by sandy fill with some clay and crushed stone extending to a maximum depth of 2.90 m on the exterior of the subject building. Fill material consisting of sand with gravel and cobbles was encountered at a maximum depth of 0.97 m below the concrete slab within the subject building. Native grey silty clay was encountered below the fill layer extending to a maximum depth of 6.10 m below the existing grade.

4.3 Field Screening Measurements

Soil samples recovered at the time of sampling were placed immediately into airtight plastic bags with nominal headspace. All lumps of soil inside the bags were broken by hand, and the soil was allowed to come to room temperature prior to conducting the vapour survey. Allowing the samples to stabilize to room temperature ensures consistency of readings between samples.

To measure the soil vapours, the analyser probe is inserted into the nominal headspace above the soil sample. A photo ionization detector (PID) was used to measure the volatile organic vapour concentrations. The sample is agitated/manipulated gently as the measurement is taken. The peak reading registered within the first 15 seconds is recorded as the vapour measurement.

The PID readings were found to range from 0 to 86 ppm in the soil samples obtained. These results are indicative of the potential for significant contamination from volatile contaminants. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

4.4 Groundwater Monitoring Well Installation

Four groundwater monitoring wells were installed on the Phase II – Property in 2018, one of which (BH1) was destroyed during remediation activities. Three additional groundwater monitoring wells (BH14-21 to BH16-21) were installed on the Phase II - Property as part of the current subsurface investigation. The monitoring wells consisted of 50 mm and 32 mm (within the subject building) diameter Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed below in Table 1 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Table 1: Monitoring Well Construction Details						
Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH7	70.20	6.10	3.10-6.10	2.60-6.10	0-2.60	Flush Mount
BH11	69.33	5.80	2.80-5.80	2.10-5.80	0-2.10	Flush Mount
BH12	69.33	4.91	1.91-3.91	1.50-4.91	0-1.50	Flush Mount
BH14-21	69.33	3.96	0.80-3.80	0.40-3.96	0-0.40	Flush Mount
BH15-21	69.33	3.96	0.90-3.90	0.40-3.96	0-0.40	Flush Mount
BH16-21	69.33	3.96	0.70-3.70	0.40-3.96	0-0.40	Flush Mount

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted on October 8 and 12, 2021, and water quality parameters were collected at that time. The averaged water quality parameters collected from three of the monitoring wells during the sampling program are provided below. Water quality parameters were not collected from all of the installed monitoring wells as a result of low groundwater volumes and aquifer recharge rates.

Table 2: Groundwater Quality Parameters			
Well ID	Temperature (ºC)	Conductivity (µs)	pH
BH7	14.3	1389	7.43
BH12	15.8	1391	7.52
BH14-21	14.3	1401	7.49

4.6 Groundwater Sampling

Groundwater sampling protocols were followed using the MECP document entitled “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario,” dated May 1996. Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment.

Standing water was purged from each well prior to sampling. Samples were stored in coolers to reduce analyte volatilization during transportation.

Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.7 Analytical Testing

Based on the guidelines outlined in the Sampling and Analysis Plan, appended to this report, the following soil samples were submitted for analysis:

Table 3: Soil Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameter Analyzed		Rationale
		PHCs ($F_1 – F_4$)	BTEX	
BH2-SS3	1.83-2.53 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH4-SS4	2.40-3.10 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH6-SS3	1.80-2.50 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH7-SS3	1.83-2.53 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH8-SS4	2.50-3.20 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH9-SS4	2.50-3.20m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH11-SS3	1.50-2.20 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST) vertical delineation
BH12-SS3A	1.40-1.80 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH13-SS2	1.0-1.60 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH14-21-SS4	1.50-2.10 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH15-21-SS3	0.90-1.50 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH16-21-SS3	0.90-1.50 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH16-21-SS5	2.7-3.3 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST) vertical delineation
DUP1-21*	1.50-2.10 Native grey silty clay		X	QA/QC

* - Duplicate of BH14-21-SS4

Based on the guidelines outlined in the Sampling and Analysis Plan, appended to this report, the following groundwater samples were submitted for analysis:

Table 4: Groundwater Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameters Analyzed		Rationale
		PHCs ($F_1 – F_4$)	BTEX	
BH7-GW1	3.10-6.10 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH11-GW1	2.80-5.80 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH11-GW2	2.80-5.80 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH11-GW3	2.80-5.80 m Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH12-GW1	1.91-4.91 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH12-GW2	1.91-4.91 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH14-21-GW1	0.80-3.80 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH15-21	0.90-3.90 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
BH16-21	0.70-3.70 Native grey silty clay	X	X	Assess APEC 1 (Former on-site UST)
DUP1-21-GW1*	0.80-3.80 Native grey silty clay		X	Assess APEC 1 (Former on-site UST)

- * - Duplicate of BH14-21-GW1

Paracel Laboratories (Paracel) of Ottawa, Ontario, performed the laboratory analysis on the samples submitted for analytical testing. It should be noted that BH7-GW1 is presented as BH1-GW2 in the certificate of analysis.

Paracel is a member of the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA). Paracel is accredited and certified by SCC/CALA for specific tests registered with the association.

4.8 Residue Management

All purge water and fluids from equipment cleaning were retained on-site.

4.9 Elevation Surveying

Boreholes were surveyed to geodetic elevations by Paterson personnel.

4.10 Quality Assurance and Quality Control Measures

A summary of quality assurance and quality control (QA/QC) measures, including equipment cleaning procedures and field quality control measurements is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

Site soils generally consist of between 0.05 and 0.10 m of asphaltic concrete or 0.08 to 0.16 of concrete slab within the subject building (BH11 – BH16-21). The surficial layer of asphaltic concrete or concrete slab was underlain by sandy fill with some clay and crushed stone extending to a maximum depth of 2.90 m on the exterior of the subject building. Fill material consisting of sand with gravel and cobbles was encountered at a maximum depth of 0.97 m below the concrete slab within the subject building. Native grey silty clay was encountered below the fill layer extending to a maximum depth of 6.10 m below the existing grade.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on October 8, 2021, using an electronic water level meter. Groundwater levels are summarized below in Table 4. All elevations were acquired through a GPS survey completed at the time of the subsurface investigation.

Table 5: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (Asl)	Date of Measurement
BH7	70.20	2.68	67.52	October 8, 2021
BH11	69.33	1.10	68.88	
BH12	69.33	1.12	68.86	
BH14-21	69.33	1.20	68.78	
BH15-21	69.33	1.78	68.20	
BH16-21	69.33	1.66	68.32	

Based on the groundwater levels recorded, the groundwater appears to flow to the west.

5.3 Fine-Coarse Soil Texture

No grain size analysis was completed for the subject site. Fine-grained standards were selected based on the observed stratigraphy.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in vapour readings ranging from 0.1 to 0.82 ppm in BH12.

PHC odours were noted in BH15-21 and BH16-21 at the time of the recent field investigation and BH2, BH6, BH7, BH8 and BH9 during the previous subsurface investigation.

The field screening results of each individual soil sample are provided on the Soil Profile, and Test Data Sheets appended to this report.

5.5 Soil Quality

Fourteen soil samples including one duplicate were submitted for analysis of PHCs (F_1-F_4) and BTEX. The results of the analytical testing are presented below in Table 6. The laboratory certificates of analysis are provided in Appendix 1. Analytical test results are shown on Drawing PE4548- 4 – Analytical Testing Plan.

Table 6: Analytical Test Results – Soil – BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)							MECP Table 3 Residential Standards (µg/g)
		Feb 8, 2018		March 5, 2018				July 24,2018	
		BH2-SS3	BH4-SS4	BH6-SS3	BH7-SS3	BH8-SS4	BH9-SS4	BH11-SS3	
Benzene	0.17	nd	nd	nd	nd	`nd	nd	nd	0.17
Ethylbenzene	15	1.39	nd	nd	nd	nd	nd	nd	15
Toluene	6	nd	nd	nd	nd	nd	nd	nd	6
Xylenes, total	25	nd	nd	nd	nd	nd	nd	0.07	25
F1 PHCs (C6-C10)	7	**101**	nd	nd	**120**	nd	nd	**195**	65
F2 PHCs (C10-C16)	4	**664**	nd	**156**	**535**	nd	nd	**399**	150
F3 PHCs (C16-C34)	8	519	nd	220	389	nd	nd	289	1300
F4 PHCs (C34-C50)	6	nd	nd	nd	nd	nd	nd	nd	5600

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- NA – Parameter not analysed
- **Bold and Underlined** – Results exceed the selected MECP standards

Table 6 (Continued): Analytical Test Results – Soil – BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)							MECP Table 3 Residential Standards (µg/g)
		July 24, 2018		October 1, 2021					
		BH12-SS3A	BH13-SS2	BH14-21-SS4	BH15-21-SS3	BH16-21-SS3	BH16-21-SS5	DUP1-21	
Benzene	0.17	nd	nd	nd	nd	nd	nd	nd	0.17
Ethylbenzene	15	1.39	nd	nd	nd	nd	nd	nd	15
Toluene	6	nd	nd	nd	nd	nd	nd	nd	6
Xylenes, total	25	0.08	nd	nd	nd	nd	nd	nd	25
F1 PHCs (C6-C10)	7	nd	**249**	nd	nd	nd	nd	N/A	65
F2 PHCs (C10-C16)	4	**617**	**907**	nd	nd	**210**	nd	N/A	150
F3 PHCs (C16-C34)	8	521	773	nd	nd	184	nd	N/A	1300
F4 PHCs (C34-C50)	6	nd	nd	nd	nd	nd	nd	N/A	5600

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – Results exceed the selected MECP standards

Elevated concentrations of PHC fractions F_1 and/or F_2 were identified in several of the soil samples submitted. PHC fraction F_1, impacts were identified in the soil samples BH2-SS3, BH7-SS3, BH11-SS3, and BH13-SS2. PHC fraction F_2 impacts were identified in the soil samples BH2-SS3, BH6-SS3, BH7-SS3, BH11-SS3, BH12-SS3A, BH13-SS2 and BH16-21-SS3.

All other identified PHC and BTEX concentrations were in compliance with the applicable MECP Table 3 standards.

TABLE 7: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Soil Sample	Depth Interval (m BGS)
Ethylbenzene	1.39	BH12-SS3A	1.40–1.80, Native
Xylenes, total	0.08	BH12-SS3A	1.40–1.80, Native
F1 PHCs (C6-C10)	**249**	BH13-SS2	1.0-1.60, Native
F2 PHCs (C10-C16)	**907**	BH13-SS2	1.0-1.60, Native
F3 PHCs (C16-C34)	773	BH13-SS2	1.0-1.60, Native

Notes:
- **Bold and Underlined** – Results exceed the selected MECP standards

All other analyzed parameters were non-detect.

5.6 Groundwater Quality

Groundwater samples from monitoring wells installed in BH7, BH11, BH12, BH14-21, BH15-21 and BH16-21 were submitted for laboratory analysis of BTEX and PHCs (F_1-F_4).

The groundwater samples were obtained from the screened intervals noted in Table 1. The results of the analytical testing are presented below in Table 8. The laboratory certificate of analysis is provided in Appendix 1. Analytical test results are shown on Drawing PE4548- 5 – Analytical Testing Plan – Groundwater.

Table 8: Analytical Test Results – Groundwater – BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)					MECP Table 3 Residential Standards (µg/L)
		October 8, 2021	August 1, 2018		January 25, 2019	October 12, 2021	
		BH7-GW1	BH11-GW1	BH12-GW1	BH11-GW2	BH11-GW3	
Benzene	0.5	nd	nd	nd	nd	nd	430
Ethylbenzene	0.5	nd	4.0	nd	1.8	nd	2300
Toluene	0.5	nd	nd	nd	nd	nd	18000
Xylenes, total	0.5	nd	nd	nd	nd	nd	4200
F1 PHC (C6-C10)	25	nd	186	nd	139	nd	750
F2 PHCs (C10-C16)	100	nd	**501**	nd	**102000**	**499**	150
F3 PHCs (C16-C34)	100	nd	200	nd	**71700**	**539**	500
F4 PHCs (C34-C50)	100	nd	nd	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – Results exceed the selected MECP standards

Table 8 (Continued): Analytical Test Results – Groundwater – BTEX and PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)					MECP Table 3 Residential Standards (µg/L)
		October 8, 2021	August 1, 2018		January 25, 2019	October 12, 2021	
		BH12-GW2	BH14-21-GW1	BH15-21-GW1	BH16-21-GW2	DUP1-21-GW1	
Benzene	0.5	nd	nd	nd	nd	nd	430
Ethylbenzene	0.5	nd	nd	nd	nd	nd	2300
Toluene	0.5	nd	nd	nd	nd	nd	18000
Xylenes, total	0.5	nd	nd	nd	nd	nd	4200
F1 PHCs (C6-C10)	25	nd	nd	nd	nd	N/A	750
F2 PHCs (C10-C16)	100	nd	nd	nd	147	N/A	150
F3 PHCs (C16-C34)	100	nd	nd	nd	204	N/A	500
F4 PHCs (C34-C50)	100	nd	nd	nd	nd	N/A	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold and Underlined** – Results exceed the selected MECP standards

PHC fractions F_2 and F_3 were identified in the groundwater samples BH11-GW2 and BH11-GW3. PHC fraction F_2 was also identified in the groundwater samples BH11-GW1. All remaining analyzed PHC parameters were in compliance with the applicable MECP Table 3 standards.

5.7 Quality Assurance and Quality Control Results

All soil and groundwater samples were handled in accordance with the Analytical Protocol with respect to holding time, preservation method, storage requirement, and container type.

As per Subsection 47(3) of O.Reg. 153/04 as amended, a Certificate of Analysis has been received for each sample submitted for analysis and all Certificates of Analysis are appended to this report.

As per the Sampling and Analysis Plan, a duplicate soil sample was obtained from sample BH14-21-SS4 and submitted for laboratory analysis of BTEX parameters. All of the analyzed BTEX parameters were identified as being non-detect in both the original and duplicate sample. Based on the non-detect concentrations in both the original and duplicate samples, the results are considered to be acceptable.

A duplicate groundwater sample was obtained from the monitoring well installed in BH14-21 and submitted for laboratory analysis of BTEX parameters. All of the analyzed BTEX parameters were identified as being non-detect in both the original and duplicate sample. Based on the non-detect concentrations in both the original and duplicate samples, the results are considered to be acceptable.

The quality of the field data collected during the Phase II ESA is considered to be sufficient to meet the overall objectives of the assessment.

5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O.Reg. 269/11 amended by the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

The Phase II – Property is occupied by a four-storey residential apartment building. The southern portion of the property consists of an asphaltic concrete parking lot.

Potentially Contaminating Activity and Areas of Potential Environmental Concern

As indicated in the Phase I-ESA report, the following PCAs were considered to result in APECs on the Phase I/Phase II Property:

- Former on-site UST

Contaminants of Potential Concern and Impacted Media

Contaminants of potential concern associated with the PCAs include PHCs (F_1-F_4) and BTEX in the soil and groundwater.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation. Underground utilities on the Phase II - Property include private electrical and sewer services as well as hydro, water, and gas lines.

Physical Setting

Site Stratigraphy

The site stratigraphy, from the ground surface to the deepest aquifer or aquitard investigated consists of:

- Asphaltic concrete from 0 to 0.10 m or concrete slab from 0.08 to 0.16 m (BH11 to BH16-21).
- Fill material consisting of brown silty sand with some clay and crushed stone extending to a maximum depth of 2.90 m.
- Native grey silty clay extending to a maximum depth of 6.10 m.

Hydrogeological Characteristics

Groundwater at the Phase II - Property was encountered within the native grey silty clay.

Water levels were measured at the Phase II - Property on October 8, 2021, at depths ranging from 1.10 to 2.68 m below grade.

Based on the groundwater levels recorded, the groundwater appears to flow in a westerly direction.

Approximate Depth to Bedrock

Bedrock was not encountered during the subsurface investigation.

Approximate Depth to Water Table

Depth to the water table at the subject site varies between approximately 1.10 to 2.68 m below the existing grade.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) does not apply to the Phase II - Property.

Section 43.1 of the Regulation does not apply to the Phase II - Property in that the subject site is not a Shallow Soil Property.

Fill Placement

Fill material ranging from 0.30 to 2.90 m and consisting of brown silty sand with some clay and crushed stone was identified on site.

Proposed Buildings and Other Structures

It is our understanding that an addition is to be constructed to the south side of the subject building.

Areas of Natural Significance and Water Bodies

No areas of natural significance are present on or within the vicinity of the Phase II - Property.

There are no water bodies on the subject property, or within the Phase I ESA study area. The Rideau Canal is the closest body of water to the Phase I – Property and is located approximately 630 m to the east.

Environmental Condition

Areas Where Contaminants are Present

Soil impacted with PHC fractions F1 and F2 was identified in the southern portion of the Phase II – Property. BH2-SS3, BH7-SS3, BH11-SS3 and BH13-SS2. PHC fraction F2 impacts were also identified in the soil samples BH6-SS3, BH12-SS3A and BH16-21-SS3 (central portion of the subject building).

Groundwater impacted with PHC fractions F_2 and F_3 was identified in BH11, which was installed in the southwestern corner of the subject building.

Types of Contaminants

PHC fractions F_1 and F_2 and F_3 were identified on the Phase II – Property.

Contaminated Media

Based on the findings of this Phase II ESA, soil and groundwater are contaminated.

What Is Known About Areas Where Contaminants Are Present

The impacted soil and groundwater were identified within the native grey silty clay layer as a result of the former UST located in the southern portion of the Phase II – Property.

Distribution and Migration of Contaminants

PHC impacted soil was identified below the central and southern portion of the subject building as well as within the southern portion of the Phase II – Property. PHC impacted groundwater was identified within BH11 which is located just north of the former UST. The impacted soil and groundwater are considered to be a result of a leak from the former UST located in the southern portion of the Phase II – Property.

Climatic and Meteorological Conditions

In general, climatic, and meteorological conditions have the potential to affect contaminant distribution.

Two ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally. It is our opinion that climatic and meteorological conditions have not influenced contaminant transport in the past.

Potential for Vapour Intrusion

Based on the findings of the Phase II ESA as well as the fine-grained soil characteristics across the Phase II – Property, there is little potential for vapour intrusion on the Phase II - Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for 330 McLeod Street, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address one potentially contaminating activity (PCA) that was identified during the Phase I ESA and was considered to result in an area of potential environmental concern (APEC) on the Phase II - Property.

The current subsurface investigation consisted of drilling three boreholes, all of which were completed as groundwater monitoring wells. Monitoring wells (BH7, BH11 and BH12) installed during the previous subsurface investigation were also sampled in conjunction with current assessment.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. Fourteen soil samples including one duplicate, were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylene (BTEX) and petroleum hydrocarbons (PHCs). Soil impacted with PHC fractions F_1 and F_2 was identified in the southern portion of the subject building and Phase II – Property.

Ten groundwater samples, including one duplicate sample, were obtained from the monitoring wells installed in BH7, BH11, BH12, BH14-21, BH15-21 and BH16-21 and were analyzed for BTEX and PHCs. Groundwater impacted with PHC fractions F_2 and F_3 was identified in BH11, which was installed in the southwestern portion of the subject building. All remaining BTEX and PHC parameters were in compliance with the applicable MECP Table 3 standards.

Based on the findings of the Phase II ESA, impacted soil is present beneath the central/southern portions of the subject building and in the southern portion of the Phase II – Property. Impacted groundwater was identified beneath the southwestern portion of the subject building.

Recommendations

Monitoring Wells

It is expected that the exterior groundwater monitoring wells will be abandoned in accordance with O.Reg.903, at the time of construction excavation. It is recommended that the integrity of the remaining monitoring wells be maintained, prior to future construction, for possible further groundwater monitoring purposes.

Soil and Groundwater

Petroleum hydrocarbon (PHC) contaminated soil was identified in the boreholes placed in the southern and central portions of the subject building as well as in the southern portion of the Phase II – Property. PHC contaminated groundwater was detected in BH11 (southwest corner of the subject building).

It is recommended that the impacted soil on the exterior of the subject building be removed during the construction of the addition. The rest of the impacted soil should be dealt with during future redevelopment. Impacted groundwater encountered during construction activities will require removal from a licensed pumping contractor and the groundwater monitoring wells will be retested following the addition.

It should also be noted that if soil, which has to be removed for construction purposes and which contains contaminant concentrations that meet the Phase II - Property standards but exceed the MECP Table 1 (background) standards, it will have to be disposed of at an approved waste disposal facility at a premium.

Due Diligence Risk Assessment

It is recommended that a due diligence risk assessment be completed by a toxicology company following the retesting of the interior monitoring wells after the building addition has been constructed. This assessment would address all potential risks associated with the PHC impacted soil and groundwater water, including the potential for vapour intrusion.

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared in general accordance with O.Reg. 153/04 as amended and meets the requirements of CSA Z769-00. The conclusions presented herein are based on information gathered from a limited sampling and testing program. The test results represent conditions at specific test locations at the time of the field program.

The client should be aware that any information pertaining to soils and all test hole logs are furnished as a matter of general information only and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes themselves.

Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment.

This report was prepared for the sole use of Smart Living Properties Notification from Smart Living Properties and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Samuel Berube, B.Eng.

Mark S. D'Arcy, P.Eng., QP_{ESA}

Report Distribution:

- Smart Living Properties
- Paterson Group

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE4548-3 – TEST HOLE LOCATION PLAN

DRAWING PE4548-4 ANAYTICAL TESTING PLAN - SOIL (BTEX, PHCs)

DRAWING PE4548-4A – CROSS SECTION A-A' SOIL (BTEX, PHCs)

DRAWING PE4548-4B – CROSS SECTION B-B' SOIL (BTEX, PHCs)

DRAWING PE4548-5 – ANALTICAL TESTING PLAN - GROUNDWATER (BTEX, PHCs)

DRAWING PE4548-5A – CROSS SECTION A-A' GROUNDWATER (BTEX, PHCs)

DRAWING PE4548-5B – CROSS SECTION B-B' GROUNDWATER (BTEX, PHCs)

FIGURE 1

KEY PLAN

#315 McLEOD STREET
HULSE, PLAYFAIR, McGARRY FUNERAL HOMES

#328 McLEOD STREET
RESIDENTIAL

#326 McLEOD STREET
RESIDENTIAL

#229 ARGYLE STREET
RESIDENTIAL

#321 McLEOD STREET
RESIDENTIAL

#323 McLEOD STREET
RESIDENTIAL

#333 McLEOD STREET
RESIDENTIAL

FH

S T R E E T

M c L E O D

ASPHALTIC CONCRETE DRIVEWAY

ASPHALTIC CONCRETE
PARKING AREA

#233 ARGYLE STREET
RESIDENTIAL

**#330 McLEOD STREET
RESIDENTIAL**

A

A'

B

B'

BH 14-21
69.33
(68.13)

BH 15-21
69.33
(67.55)

BH 16-21
69.33
(67.67)

BH 11
69.33
(68.23)

BH 12
69.33
(68.21)

BH 13
69.33

BH 9
70.19

BH 10
70.15

BH 5
70.21

BH 2
70.26

BH 3
70.21

BH 1
70.19

BH 4
70.18

BH 7
70.20
(67.52)

BH 8
70.18

BH 6
70.23

CB

SLOPED AREA A

SLOPED AREA B

97.6

97.7

97.8

97.85

97.9

97.95

98

(0.06m/m)

CONCRETE SLAB
(FORMER UNDERGROUND
STORAGE TANK LOCATION)

APPROXIMATE AREA OF
REMEDIATION EXCAVATION

#340 McLEOD STREET
CONDOMINIUM RESIDENTIAL
DEVELOPMENT

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- DESTROYED BOREHOLE LOCATION
- 69.98 GROUND SURFACE ELEVATION (m)
- (68.73) GROUNDWATER SURFACE ELEVATION (m) (OCTOBER 8, 2021)
- 97.7 GROUNDWATER CONTOURS (m)
- (0.06m/m) APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:200

0 1 2 3 4 5 10m

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NO.	REVISIONS	DATE	INITIAL

SMART LIVING PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 MCLEOD STREET

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:200	**Date:** 11/2021
Drawn by: YA	**Report No.:** PE4548-2
Checked by: SB	**Dwg. No.:** PE4548-3
Approved by: MSD	**Revision No.:**

11x17

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BH16-21-SS3	0.9-1.5 m	01-Oct-2021
Parameter	Result(µg/g)	Standard(µg/g)
F2	210	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH16-21-SS5 2.7-3.3 m 01-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH14-21-SS4 1.5-2.1 m 01-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH2-SS3	1.83-2.53 m	8-Feb-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	101	65
F2	664	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

RESIDENTIAL

BH12-SS3A	1.40-1.80 m	24-Jul-2018
Parameter	Result(µg/g)	Standard(µg/g)
F2	617	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH9-SS4 2.50-3.20 m 5-Mar-2018
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

#326 McLEOD STREET
RESIDENTIAL

#229 ARGYLE STREET
RESIDENTIAL

#315 McLEOD STREET

#321 McLEOD STREET
RESIDENTIAL

#323 McLEOD STREET
RESIDENTIAL

#333 McLEOD STREET
RESIDENTIAL

M c L E O D S T R E E T

ASPHALTIC CONCRETE DRIVEWAY

ASPHALTIC CONCRETE
PARKING AREA

#330 McLEOD STREET
RESIDENTIAL

#233 ARGYLE STREET
RESIDENTIAL

BH4-SS4 2.4-3.1 m 8-FEB-2018
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH8-SS4 2.50-3.20 m 5-Mar-2018
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

APPROXIMATE AREA OF
REMEDIATION EXCAVATION
(REFER TO SITE REMEDIATION PLAN)

BH 14-21
69.98
(68.78)

BH 16-21
69.98
(68.81)

BH 15-21
69.98
(68.64)

BH 13
69.98

BH 12
69.98
(68.73)

BH 11
69.98
(68.63)

BH 9
70.19

BH 10
70.15

BH 5
70.21

BH 2
70.26

BH 3
70.21

BH 1
70.19

BH 4
70.18

BH 8
70.18

BH 7
70.20
(68.00)

BH 6
70.23

SLOPED AREA A

SLOPED AREA B

CB

FH

A

A'

B

B'

BH15-21-SS3	0.9-1.5 m	01-Oct-2021

BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH13-SS2	1.0-1.60 m	24-Jul-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	249	65
F2	907	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH11-SS3	1.50-2.20 m	24-Jul-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	195	65
F2	399	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH7-SS3	1.83-2.53 m	5-Mar-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	120	65
F2	535	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH6-SS3	1.80-2.50 m	5-Mar-2018
Parameter	Result(µg/g)	Standard(µg/g)
F2	156	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

CONCRETE SLAB
(FORMER UNDERGROUND
STORAGE TANK LOCATION)

SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- DESTROYED BOREHOLE LOCATION
- 69.98 GROUND SURFACE ELEVATION (m)
- (68.73) GROUNDWATER SURFACE ELEVATION (m) (OCTOBER 8, 2021)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:200

0 1 2 3 4 5 10m

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NO.	REVISIONS	DATE	INITIAL

SMART LIVING PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 MCLEOD STREET

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL (BTEX & PHCs)

Scale: 1:200	Date: 11/2021
Drawn by: YA	Report No.: PE4548-2
Checked by: SB	Dwg. No.: PE4548-4
Approved by: MSD	Revision No.:

11x17

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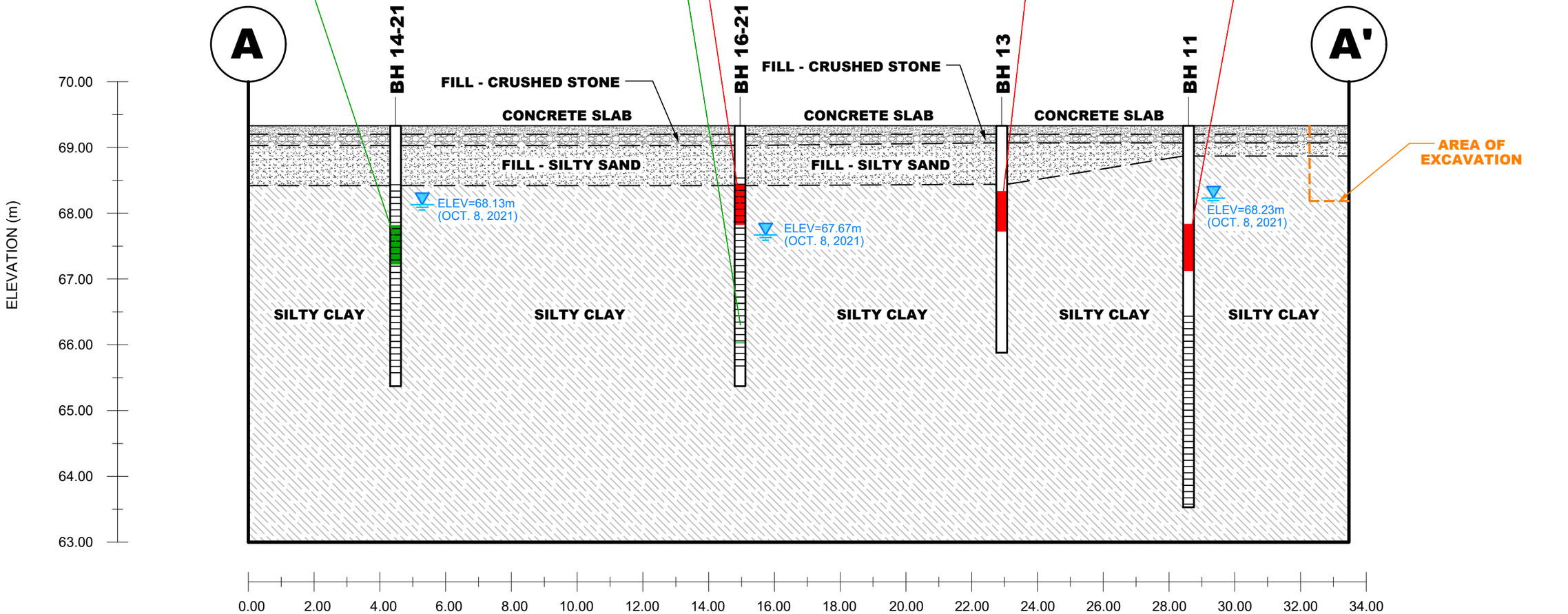
BH14-21-SS4	1.5-2.1 m	01-Oct-2021
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		

BH16-21-SS3	0.9-1.5 m	01-Oct-2021
Parameter	Result(µg/g)	Standard(µg/g)
F2	210	150
BTEX comply with MECP Table 3 Standards		
Remaining PHCs comply with MECP Table 3 Standards		

BH16-21-SS5	2.7-3.3 m	01-Oct-2021
BTEX comply with MECP Table 3 Standards		
PHCs comply with MECP Table 3 Standards		

BH13-SS2	1.0-1.60 m	24-Jul-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	249	65
F2	907	150
BTEX comply with MECP Table 3 Standards		
Remaining PHCs comply with MECP Table 3 Standards		

BH11-SS3	1.50-2.20 m	24-Jul-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	195	65
F2	399	150
BTEX comply with MECP Table 3 Standards		
Remaining PHCs comply with MECP Table 3 Standards		



SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

SMART LIVING PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 MCLEOD STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A' - SOIL (BTEX & PHCs)

Scale: AS SHOWN	Date: 11/2021
Drawn by: YA	Report No.: PE4548-2
Checked by: SB	Dwg. No.: PE4548-4A
Approved by: MSD	Revision No.:

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BH13-SS2	1.0-1.60 m	24-Jul-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	249	65
F2	907	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH12-SS3A	1.40-1.80 m	24-Jul-2018
Parameter	Result(µg/g)	Standard(µg/g)
F2	617	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH16-21-SS3	0.9-1.5 m	01-Oct-2021
Parameter	Result(µg/g)	Standard(µg/g)
F2	210	150

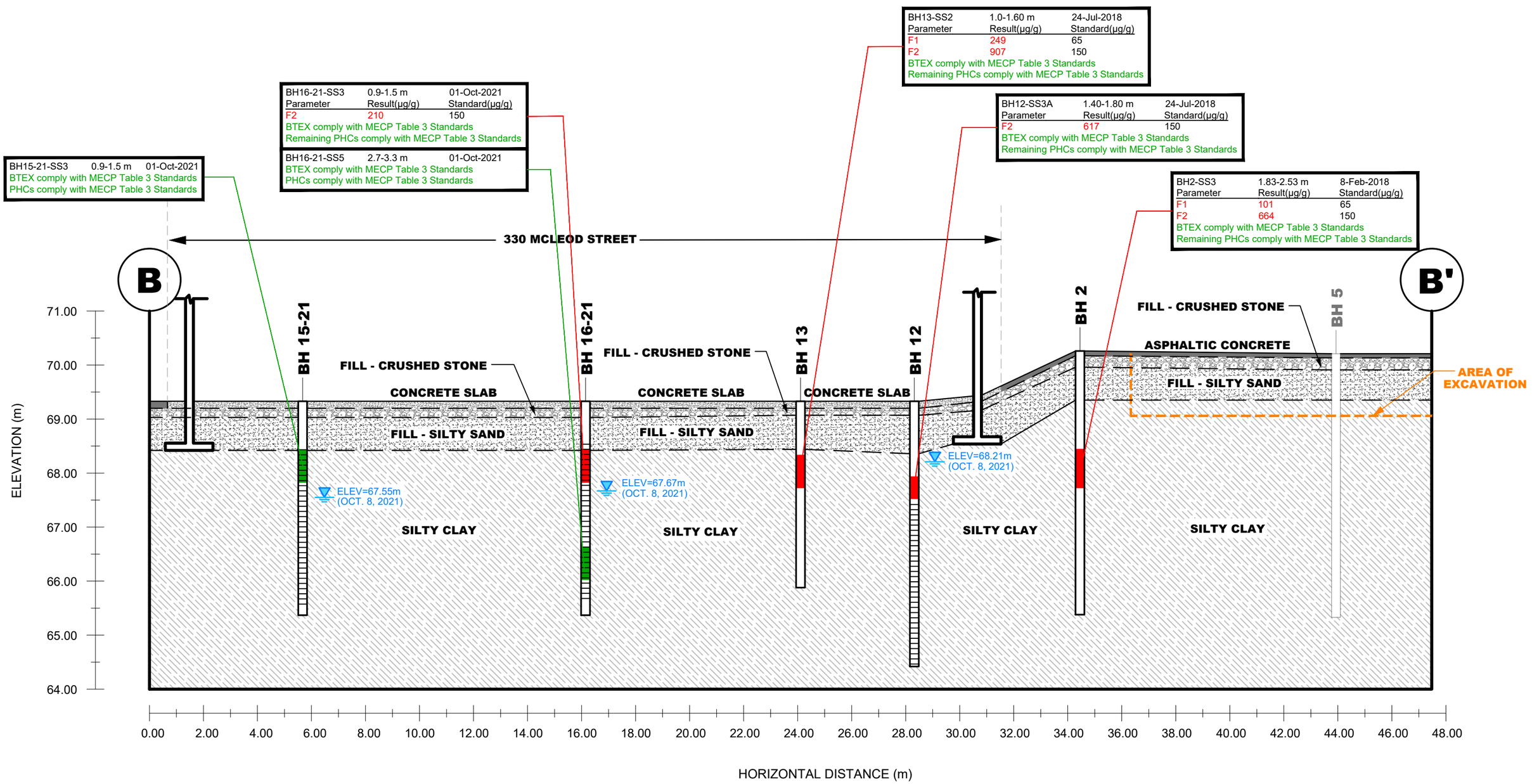
BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH16-21-SS5 2.7-3.3 m 01-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH15-21-SS3 0.9-1.5 m 01-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH2-SS3	1.83-2.53 m	8-Feb-2018
Parameter	Result(µg/g)	Standard(µg/g)
F1	101	65
F2	664	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards



SOIL RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

SOIL RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

SMART LIVING PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 MCLEOD STREET

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B' - SOIL (BTEX & PHCs)

Scale: AS SHOWN	Date: 11/2021
Drawn by: YA	Report No.: PE4548-2
Checked by: SB	Dwg. No.: PE4548-4B
Approved by: MSD	Revision No.:

11x17

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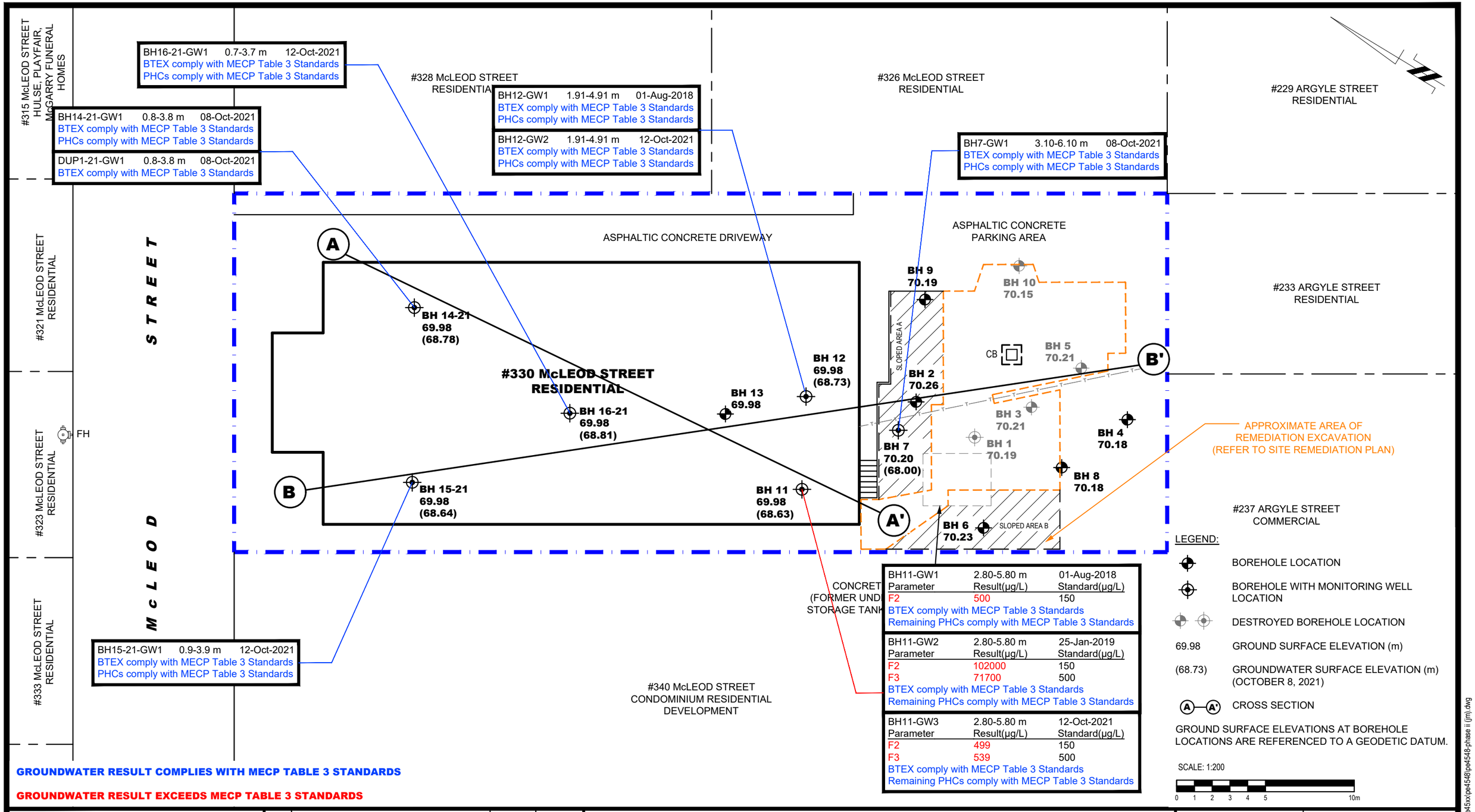

BH16-21-GW1 0.7-3.7 m 12-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH14-21-GW1 0.8-3.8 m 08-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

DUP1-21-GW1 0.8-3.8 m 08-Oct-2021
BTEX comply with MECP Table 3 Standards

BH12-GW1 1.91-4.91 m 01-Aug-2018
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH12-GW2 1.91-4.91 m 12-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH7-GW1 3.10-6.10 m 08-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH15-21-GW1 0.9-3.9 m 12-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH11-GW1 2.80-5.80 m 01-Aug-2018

Parameter	Result(µg/L)	Standard(µg/L)
F2	500	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH11-GW2 2.80-5.80 m 25-Jan-2019

Parameter	Result(µg/L)	Standard(µg/L)
F2	102000	150
F3	71700	500

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH11-GW3 2.80-5.80 m 12-Oct-2021

Parameter	Result(µg/L)	Standard(µg/L)
F2	499	150
F3	539	500

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- DESTROYED BOREHOLE LOCATION
- 69.98 GROUND SURFACE ELEVATION (m)
- (68.73) GROUNDWATER SURFACE ELEVATION (m) (OCTOBER 8, 2021)
- A—A' CROSS SECTION

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:200

0 1 2 3 4 5 10m

GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

SMART LIVING PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 MCLEOD STREET

OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN - GROUNDWATER (BTEX & PHCs)

Scale: 1:200	Date: 11/2021
Drawn by: YA	Report No.: PE4548-2
Checked by: SB	Dwg. No.: PE4548-5
Approved by: MSD	Revision No.:

11x17

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BH14-21-GW1 0.8-3.8 m 08-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

DUP1-21-GW1 0.8-3.8 m 08-Oct-2021
BTEX comply with MECP Table 3 Standards

BH16-21-GW1 0.7-3.7 m 12-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH11-GW1 2.80-5.80 m 01-Aug-2018

Parameter	Result(µg/L)	Standard(µg/L)
F2	500	150

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH11-GW2 2.80-5.80 m 25-Jan-2019

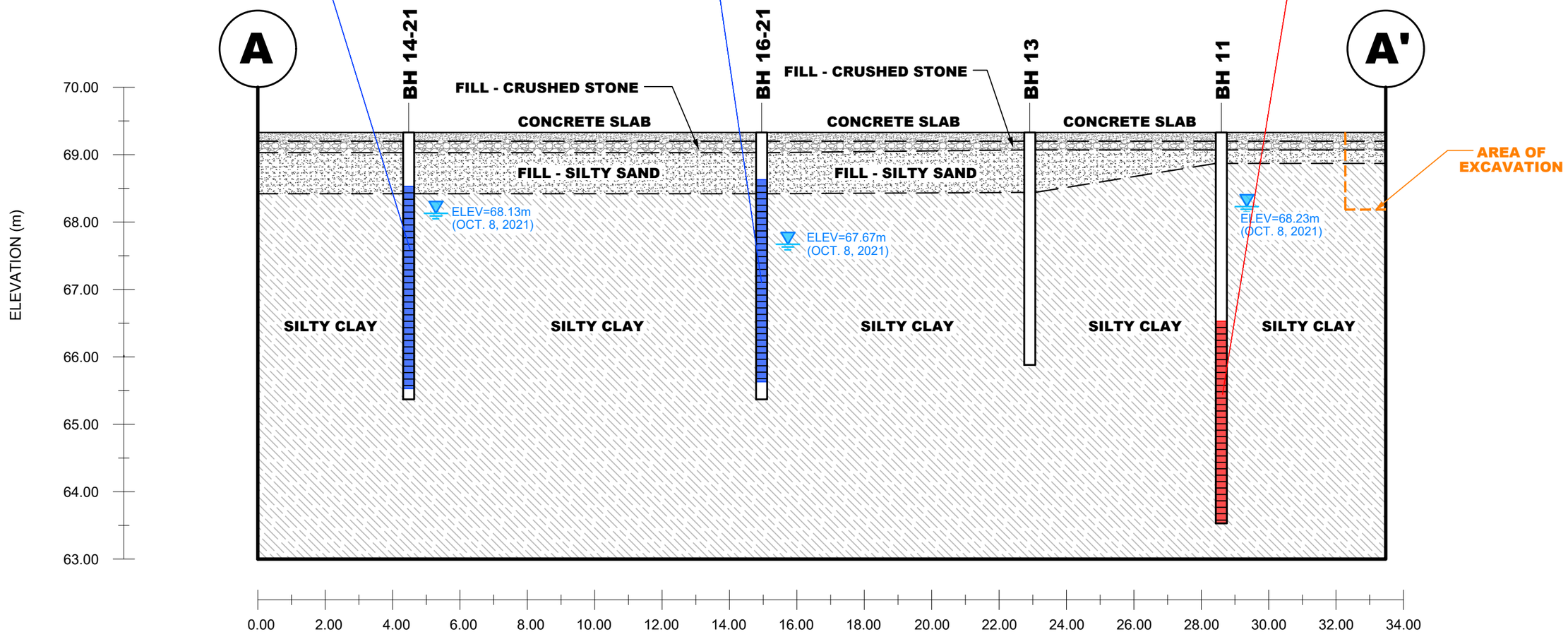
Parameter	Result(µg/L)	Standard(µg/L)
F2	102000	150
F3	71700	500

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards

BH11-GW3 2.80-5.80 m 12-Oct-2021

Parameter	Result(µg/L)	Standard(µg/L)
F2	499	150
F3	539	500

BTEX comply with MECP Table 3 Standards
Remaining PHCs comply with MECP Table 3 Standards



GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

SMART LIVING PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 MCLEOD STREET

OTTAWA, ONTARIO

Title:
CROSS SECTION A-A' - GROUNDWATER (BTEX & PHCs)

Scale: AS SHOWN	Date: 11/2021
Drawn by: YA	Report No.: PE4548-2
Checked by: SB	Dwg. No.: PE4548-5A
Approved by: MSD	Revision No.:

11x17

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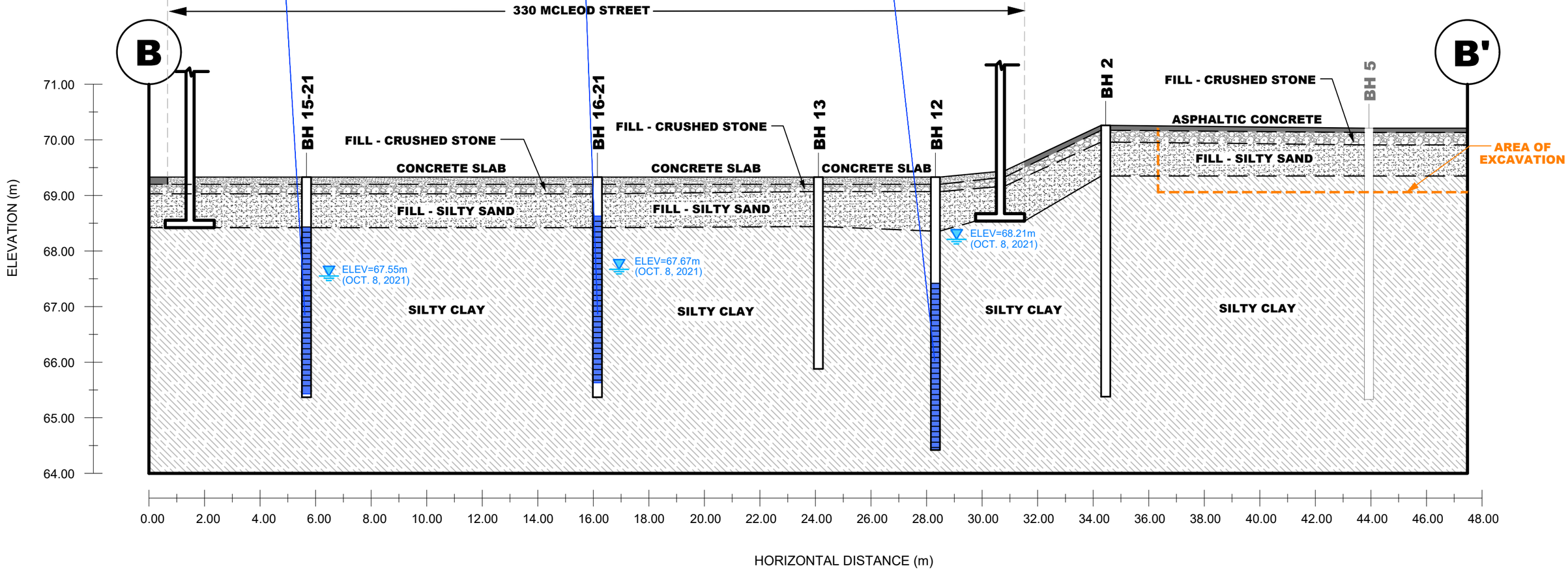
BH15-21-GW1 0.9-3.9 m 12-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH16-21-GW1 0.7-3.7 m 12-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH12-GW1 1.91-4.91 m 01-Aug-2018
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards

BH12-GW2 1.91-4.91 m 12-Oct-2021
BTEX comply with MECP Table 3 Standards
PHCs comply with MECP Table 3 Standards



GROUNDWATER RESULT COMPLIES WITH MECP TABLE 3 STANDARDS

GROUNDWATER RESULT EXCEEDS MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL

SMART LIVING PROPERTIES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
330 MCLEOD STREET

OTTAWA, ONTARIO

Title:
CROSS SECTION B-B' - GROUNDWATER (BTEX & PHCs)

Scale: AS SHOWN	Date: 11/2021
Drawn by: YA	Report No.: PE4548-2
Checked by: SB	Dwg. No.: PE4548-5B
Approved by: MSD	Revision No.:

11x17

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATE OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

patersongroup

Sampling & Analysis Plan

Phase II Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

Prepared For
Smart Living Properties

October 2021
Report: PE4548-SAP

Paterson Group Inc.

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1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Smart Living Properties to conduct a Phase II Environmental Site Assessment (ESA) of 330 McLeod Street Ottawa, Ontario. Based on our 2021 Phase I ESA completed for the subject property, a subsurface investigation program, consisting of borehole drilling, was developed.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH2	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH4	Assess APECs 1 (former UST)	Through the fill material into the native soil, and intercept the groundwater table, as applicable
BH6	Assess APECs 1 (former UST)	Through the fill material into the native soil, and intercept the groundwater table, as applicable
BH7	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH8	Assess APECs 1 (former UST)	Through the fill material into the native soil, and intercept the groundwater table, as applicable
BH9	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH11	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH12	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH13	Assess APECs 1 (former UST)	Through the fill material into the native soil, and intercept the groundwater table, as applicable
BH14-21	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH15-21	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.
BH16-21	Assess APECs 1 (former UST)	Borehole to be advanced to approximately 2m below the expected long-term groundwater table and install a monitoring well.

At each borehole, split-spoon samples of overburden soils will be obtained at 0.76 m (2'6") intervals until practical refusal to augering. All soil samples will be retained, and samples will be selected for submission following a preliminary screening analysis.

Upon refusal, rock coring shall be undertaken to the required depth. Approximately every metre the well shall be purged by inertial pumping and the water level recorded to determine if groundwater water is entering the borehole.

Following borehole drilling, monitoring wells will be installed in selected boreholes (as above) for the measurement of water levels and the collection of groundwater samples. Borehole locations are shown on the Test Hole Location Plan appended to the main report.

2.0 ANALYTICAL TESTING PROGRAM

The analytical testing program for soil at the subject site is based on the following general considerations:

- ❒ At least one sample from each borehole should be submitted, in order to delineate the horizontal extent of contamination across the site.
- ❒ At least one sample from each stratigraphic unit should be submitted, in order to delineate the vertical extent of contamination at the site.
- ❒ In boreholes where there is visual or olfactory evidence of contamination, or where organic vapour meter or photoionization detector readings indicate the presence of contamination, the 'worst-case' sample from each borehole should be submitted for comparison with MECP Site Condition Standards.
- ❒ In boreholes with evidence of contamination as described above, a sample should be submitted from the stratigraphic unit below the 'worst-case' sample to determine whether the contaminant(s) have migrated downward.
- ❒ Parameters analyzed should be consistent with the Contaminants of Potential Concern identified in the Phase I ESA.

The analytical testing program for groundwater at the subject site is based on the following general considerations:

- ❒ Groundwater monitoring wells should be installed in all boreholes with visual or olfactory evidence of soil contamination, in stratigraphic units where soil contamination was encountered, where those stratigraphic units are at or below the water table (i.e. a water sample can be obtained).
- ❒ Groundwater monitoring well screens should straddle the water table at sites where the contaminants of concern are suspected to be LNAPLs.
- ❒ At least one groundwater monitoring well should be installed in a stratigraphic unit below the suspected contamination, where said stratigraphic unit is water-bearing.
- ❒ Parameters analyzed should be consistent with the Contaminants of Concern identified in the Phase I ESA and with the contaminants identified in the soil samples.

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

The purpose of environmental boreholes is to identify and/or delineate contamination within the soil and/or to install groundwater monitoring wells in order to identify contamination within the groundwater.

Equipment

The following is a list of equipment that is in addition to regular drilling equipment stated in the geotechnical drilling SOP:

- ❒ glass soil sample jars
- ❒ two buckets
- ❒ cleaning brush (toilet brush works well)
- ❒ dish detergent
- ❒ methyl hydrate
- ❒ water (if not available on site - water jugs available in the trailer)
- ❒ latex or nitrile gloves (depending on suspected contaminant)
- ❒ RKI Eagle organic vapour meter or MiniRae photoionization detector (depending on contamination suspected)

Determining Borehole Locations

If conditions on site are not as suspected, and planned borehole locations cannot be drilled, **call the office to discuss**. Alternative borehole locations will be determined in conversation with the field technician and supervising engineer.

After drilling is completed a plan with the borehole locations must be provided. Distances and orientations of boreholes with respect to site features (buildings, roadways, etc.) must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Ground surface elevations at each borehole should be surveyed relative to a catch basin of known geodetic elevation.

Drilling Procedure

The actual drilling procedure for environmental boreholes is the same as geotechnical boreholes (see SOP for drilling and sampling) with a few exceptions as follows:

- ❒ Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.
- ❒ Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- ❒ If sampling for VOCs, BTEX, or PHCs F1, a soil core from each soil sample which may be analysed must be taken and placed in the laboratory-provided methanol vial.
- ❒ Note all and any odours or discolouration of samples.
- ❒ Split spoon samplers must be washed between samples.
- ❒ If obvious contamination is encountered, continue sampling until the vertical extent of contamination is delineated.
- ❒ As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- ❒ If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using an RKI Eagle, PID, etc. depending on the type of suspected contamination.

Spoon Washing Procedure

All sampling equipment (spilt spoons, etc.) must be washed between samples in order to prevent cross-contamination of soil samples.

- ❒ Obtain two buckets of water (preferably hot if available)
- ❒ Add a small amount of dish soap to one bucket
- ❒ Scrub spoons with a brush in soapy water, inside and out, including the tip
- ❒ Rinse in clean water
- ❒ Apply a small amount of methyl hydrate to the inside of the spoon. (A spray bottle or water bottle with a small hole in the cap works well)
- ❒ Allow to dry (takes seconds)
- ❒ Rinse with distilled water, a spray bottle works well.

The methyl hydrate eliminates any soap residue that may be on the spoon and is especially important when dealing with suspected VOCs.

Screening Procedure

The RKI Eagle is used to screen most soil samples, particularly where petroleum hydrocarbon contamination is suspected. The MiniRae is used when VOCs are suspected, however it also can be useful for detecting petroleum. These tools are for screening purposes only and cannot be used in place of laboratory testing. Vapour results obtained from the RKI Eagle and the PID are relative and must be interpreted.

Screening equipment should be calibrated on an approximately monthly basis, more frequently if heavily used.

- ❒ Samples should be brought to room temperature; this is specifically important in colder weather. Soil must not be frozen.
- ❒ Turn instrument on and allow to come to zero - calibrate if necessary
- ❒ If using RKI Eagle, ensure the instrument is in methane elimination mode unless otherwise directed.
- ❒ Ensure measurement units are ppm (parts per million) initially. RKI Eagle will automatically switch to %LEL (lower explosive limit) if higher concentrations are encountered.
- ❒ Break up large lumps of soil in the sample bag, taking care not to puncture the bag.
- ❒ Insert the probe into soil bag, creating a seal with your hand around the opening.
- ❒ Gently manipulate soil in the bag while observing instrument readings.
- ❒ Record the highest value obtained in the first 15 to 25 seconds
- ❒ Make sure to indicate scale (ppm or LEL); also note which instrument was used (RKI Eagle 1 or 2, or MiniRae).
- ❒ Jar samples and refrigerate as per the Sampling and Analysis Plan.

3.2 Monitoring Well Installation Procedure

Equipment

- ❒ 5’ x 2” [1.52 m x 50 mm] threaded sections of Schedule 40 PVC slotted well screen (5’ x 1 ¼” [1.52 m x 32 mm] if installing in a cored hole in bedrock)
- ❒ 5’ x 2” [1.52 m x 50 mm] threaded sections of Schedule 40 PVC riser pipe (5’ x 1 ¼” [1.52 m x 32 mm] if installing in a cored hole in bedrock)
- ❒ Threaded end-cap
- ❒ Slip-cap or J-plug
- ❒ Asphalt cold patch or concrete
- ❒ Silica Sand
- ❒ Bentonite chips (Holeplug)
- ❒ Steel flushmount casing

Procedure

- ❒ Drill borehole to the required depth, using drilling and sampling procedures described above.
- ❒ If the borehole is deeper than required monitoring well, backfill with bentonite chips to the required depth. This should only be done on wells where contamination is not suspected, in order to prevent downward migration of contamination.
- ❒ Only one monitoring well should be installed per borehole.
- ❒ Monitoring wells should not be screened across more than one stratigraphic unit to prevent potential migration of contaminants between units.
- ❒ Where LNAPLs are the suspected contaminants of concern, monitoring wells should be screened straddling the water table in order to capture any free product floating on top of the water table.
- ❒ Thread the end cap onto a section of the screen. Thread the second section of the screen if required. Thread risers onto the screen. Lower into the borehole to the required depth. Ensure slip-cap or J-plug is inserted to prevent backfill materials from entering the well.
- ❒ As drillers remove augers, backfill borehole annulus with silica sand until the level of sand is approximately 0.3 m above the top of the screen.
- ❒ Backfill with holeplug until at least 0.3 m of holeplug is present above the top of the silica sand.
- ❒ Backfill remainder of the borehole with holeplug or with auger cuttings (if contamination is not suspected).

- ❒ Install flushmount casing. Seal space between flushmount and borehole annulus with concrete, cold patch, or holeplug to match the surrounding ground surface.

3.3 Monitoring Well Sampling Procedure

Equipment

- ❒ Water level metre or interface probe on hydrocarbon/LNAPL sites
- ❒ Spray bottles containing water and methanol to clean water level tape or interface probe
- ❒ Peristaltic pump
- ❒ Polyethylene tubing for peristaltic pump
- ❒ Flexible tubing for peristaltic pump
- ❒ Latex or nitrile gloves (depending on suspected contaminant)
- ❒ Allen keys and/or 9/16” socket wrench to remove well caps
- ❒ Graduated bucket with volume measurements
- ❒ pH/Temperature/Conductivity combo pen
- ❒ Laboratory-supplied sample bottles

Sampling Procedure

- ❒ Locate well and use a socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- ❒ Measure water level, with respect to the existing ground surface, using water level meter or interface probe. If using an interface probe on suspected NAPL site, measure the thickness of the free product.
- ❒ Measure the total depth of well.
- ❒ Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- ❒ Calculate the volume of standing water within well and record.
- ❒ Insert polyethylene tubing into well and attach to the peristaltic pump. Turn on the peristaltic pump and purge into the graduated bucket. Purge at least three well volumes of water from the well. Measure and record field chemistry. Continue to purge, measuring field chemistry after every well volume purged, until appearance or field chemistry stabilizes.
- ❒ Note the appearance of purge water, including colour, opacity (clear, cloudy, silty), sheen, presence of LNAPL, and odour. Note any other unusual features (particulate matter, effervescence (bubbling) of dissolved gas, etc.).

- ❒ Fill the required sample bottles. If sampling for metals, attach 75-micron filter to discharge tube and filter metals sample. If sampling for VOCs, use low flow rate to ensure a continuous stream of non-turbulent flow into sample bottles. Ensure no headspace is present in VOC vials.
- ❒ Replace well cap and flushmount casing cap.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The QA/QC program for this Phase II ESA is as follows:

- ❒ All non-dedicated sampling equipment (split spoons) will be decontaminated according to the SOPs listed above.
- ❒ All groundwater sampling equipment is dedicated (polyethylene and flexible peristaltic tubing is replaced for each well).
- ❒ Where groundwater samples are to be analyzed for VOCs, one laboratory-provided trip blank will be submitted for analysis with every laboratory submission.
- ❒ Approximately one (1) field duplicate will be submitted for every ten (10) samples submitted for laboratory analysis. A minimum of one (1) field duplicate per project will be submitted. Field duplicates will be submitted for soil and groundwater samples.
- ❒ Where combo pens are used to measure field chemistry, they will be calibrated on an approximately monthly basis, according to the frequency of use.

5.0 DATA QUALITY OBJECTIVES

The purpose of setting data quality objectives (DQOs) is to ensure that the level of uncertainty in data collected during the Phase II ESA is low enough that decision-making is not affected, and that the overall objectives of the investigation are met.

The quality of data is assessed by comparing field duplicates with original samples. If the relative percent difference (RPD) between the duplicate and the sample is within 20%, the data are considered to be of sufficient quality so as not to affect decision-making. The RPD is calculated as follows:

$$RPD = \left| \frac{x_1 - x_2}{(x_1 + x_2)/2} \right| \times 100\%$$

Where x_1 is the concentration of a given parameter in an original sample and x_2 is the concentration of that same parameter in the field duplicate sample.

For the purpose of calculating the RPD, it is desirable to select field duplicates from samples for which parameters are present in concentrations above laboratory detection limits, i.e. samples which are expected to be contaminated. If parameters are below laboratory detection limits for selected samples or duplicates, the RPD may be calculated using a concentration equal to one half (0.5 x) the laboratory detection limit.

It is also important to consider data quality in the overall context of the project. For example, if the DQOs are not met for a given sample, yet the concentrations of contaminants in both the sample and the duplicate exceed the MOE site remediation standards by a large margin, the decision-making usefulness of the sample may not be considered to be impaired. The proximity of other samples which meet the DQOs must also be considered in developing the Phase II Conceptual Site Model; often there are enough data available to produce a reliable Phase II Conceptual Site Model even if DQOs are not met for certain individual samples.

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

- ❒ The location of underground utilities
- ❒ Poor recovery of split-spoon soil samples
- ❒ Insufficient groundwater volume for groundwater samples
- ❒ Breakage of sampling containers following sampling or while in transit to the laboratory
- ❒ Elevated detection limits due to matrix interference (generally related to soil colour or presence of organic material)
- ❒ Elevated detection limits due to high concentrations of certain parameters, necessitating dilution of samples in the laboratory
- ❒ Drill rig breakdowns
- ❒ Winter conditions
- ❒ Other site-specific impediments

Site-specific impediments to the Sampling and Analysis plan are discussed in the body of the Phase II ESA report.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 1

BORINGS BY Portable Drill **DATE** February 8, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	70.19
Asphaltic concrete 0.05							
FILL: Crushed stone 0.76		SS	1	42	3	1	69.19
FILL: Sand		SS	2	58	3		
		SS	3	12	2	2	68.19
2.39							
FILL: Clay with sand 2.90		SS	4	42	W		
		SS	5	100	W	3	67.19
		SS	6	100	W		
Grey **SILTY CLAY**		SS	7	100	W	4	66.19
		SS	8	100	W	5	65.19
		SS	9	100	W		
6.10						6	64.19
End of Borehole							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 2

BORINGS BY Portable Drill **DATE** February 8, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.26		
Asphaltic concrete 0.05									
FILL: Crushed stone 0.30									
FILL: Dark brown silty sand 0.91		SS	1	42	5	1	69.26		
FILL: Sand, some silt and brick 1.83		SS	2	50	6				
		SS	3	92	4	2	68.26		
		SS	4	100	W				
Grey **SILTY CLAY**		SS	5	100	W	3	67.26		
		SS	6	100	W	4	66.26		
		SS	7	100	W				
4.88 End of Borehole									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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REMARKS

HOLE NO. BH 3

BORINGS BY Portable Drill **DATE** February 8, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.21		
Asphaltic concrete 0.05									
FILL: Crushed stone 0.30									
FILL: Sand, some gravel		SS	1	42	5	1	69.21		
		SS	2	71	6				
1.78									
		SS	3	100	1	2	68.21		
		SS	4	100	W				
Grey **SILTY CLAY**						3	67.21		
		SS	5	100	W				
		SS	6	100	W	4	66.21		
4.27									
End of Borehole									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm)

○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 4

BORINGS BY Portable Drill **DATE** February 8, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.18		
Asphaltic concrete 0.05									
FILL: Crushed stone 0.30									
FILL: Dark brown sand		SS	1	67	5	1	69.18		
1.22									
FILL: Brown sand		SS	2	33	5				
1.83						2	68.18		
		SS	3	92	5				
		SS	4	100	1				
Grey **SILTY CLAY**						3	67.18		
		SS	5	100	W				
		SS	6	100	W	4	66.18		
4.27									
End of Borehole									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm)

○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 5

BORINGS BY Portable Drill **DATE** February 8, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.21		
Asphaltic concrete 0.05									
FILL: Crushed stone 0.30									
FILL: Brown sand with silt, gravel and topsoil 0.91		SS	1	75	28	1	69.21		
FILL: Brown sand, some gravel 1.83		SS	2	33	3				
		SS	3	83	6	2	68.21		
		SS	4	100	2				
Grey **SILTY CLAY**		SS	5	100	W	3	67.21		
		SS	6	100	W				
		SS	7	100	W	4	66.21		
4.88									
End of Borehole									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 6

BORINGS BY Geoprobe **DATE** March 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.23		
Asphaltic concrete 0.10									
FILL: Crushed stone 0.40									
FILL: Sand, gravel, silty clay and cobbles		SS	1	58	5	1	69.23		
		SS	2	50	5				
1.80									
		SS	3	58	3	2	68.23		
		SS	4	83	1				
Grey **SILTY CLAY**		SS	5	100	W	3	67.23		
		SS	6	100	W	4	66.23		
		SS	7	100	W				
4.88									
End of Borehole									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm); ○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
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DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 7

BORINGS BY Geoprobe **DATE** March 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.20		
Asphaltic concrete 0.10									
FILL: Crushed stone 0.34									
FILL: Sand, gravel, silty clay and cobbles		SS	1	29	3	1	69.20		
		SS	2	38	6				
1.83						2	68.20		
		SS	3	96	4				
		SS	4	100	W				
						3	67.20		
		SS	5	100	W				
Grey **SILTY CLAY**		SS	6	100	W	4	66.20		
		SS	7	100	W				
						5	65.20		
		SS	8	100	W				
		SS	9	100	W				
6.10						6	64.20		
End of Borehole									
(GWL @ 2.68m - October 8, 2021)									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
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Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 8

BORINGS BY Geoprobe **DATE** March 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.18		
Asphaltic concrete 0.10									
FILL: Crushed stone 0.34									
FILL: Sand, gravel, cobbles and topsoil, some silty clay		SS	1	33	5	1	69.18		
		SS	2	25	2				
1.83						2	68.18		
		SS	3	67	5				
		SS	4	100	W				
Grey **SILTY CLAY**		SS	5	92	W	3	67.18		
		SS	6	92	W				
		SS	7	100	W	4	66.18		
4.88									
End of Borehole									

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH 9

BORINGS BY Geoprobe **DATE** March 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	70.19		
Asphaltic concrete 0.10									
FILL: Crushed stone 0.40									
FILL: Sand, gravel, cobbles, some topsoil		SS	1	33	5	1	69.19		
		SS	2	33	18				
1.83						2	68.19		
		SS	3	50	4				
		SS	4	100	1				
Grey **SILTY CLAY**		SS	5	100	W	3	67.19		
		SS	6	100	W				
		SS	7	100	W	4	66.19		
4.88									
End of Borehole									

Photo Ionization Detector: ● Volatile Organic Rdg. (ppm)

○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH10

BORINGS BY Geoprobe **DATE** March 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Asphaltic concrete 0.10						0	70.15		
FILL: Crushed stone 0.40									
FILL: Topsoil, sand, gravel and cobbles		SS	1	58	6	1	69.15		
		SS	2	42	7				
1.83						2	68.15		
		SS	3	88	6				
		SS	4	4	W				
Grey **SILTY CLAY**		SS	5	100	1	3	67.15		
		SS	6	100	W				
		SS	7	100	W	4	66.15		
4.88									
End of Borehole									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

RKI Eagle Rdg. (ppm): 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

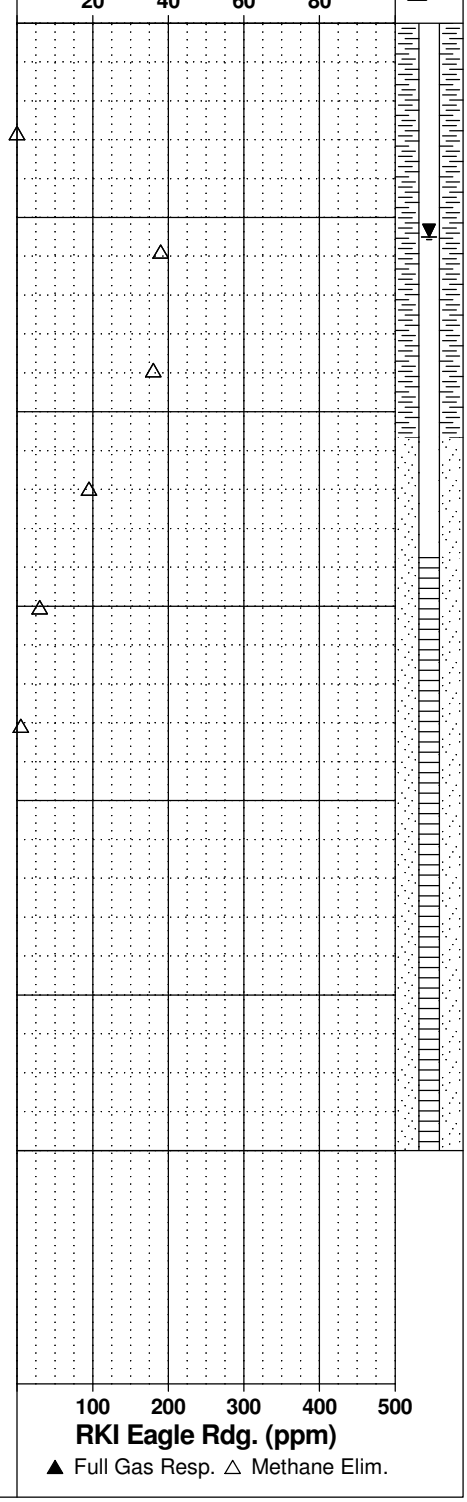
FILE NO. PE4548

REMARKS

HOLE NO. BH11

BORINGS BY Portable Drill **DATE** July 24, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Concrete slab 0.12						0	59.33		
FILL: Crushed stone 0.26									
FILL: Sand with gravel 0.46		SS	1	46					
		SS	2	67		1	58.33		
		SS	3	100					
		SS	4	54		2	57.33		
Dark grey to grey **SILTY CLAY**		SS	5	100		3	56.33		
		SS	6	100					
		SS	7	100		4	55.33		
		SS	8	100		5	54.33		
		SS	9	100					
5.80 End of Borehole									
(GWL @ 1.10m - October 8, 2021)									



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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
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DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH12

BORINGS BY Portable Drill **DATE** July 24, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Concrete slab 0.08						0	59.10
FILL: Crushed stone 0.16		SS	1	50			
FILL: Sand with gravel, cobbles 0.97		SS	2	30		1	58.10
		SS	3	100			
		SS	4	100		2	57.10
Dark grey to grey **SILTY CLAY**		SS	5	100		3	56.10
		SS	6	100			
		SS	7	100		4	55.10
4.91		SS	8	100			
End of Borehole							
(GWL @ 1.12m - October 8, 2021)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
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DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH13

BORINGS BY Portable Drill **DATE** July 24, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Concrete slab 0.16						0	59.10		
FILL: Crushed stone 0.26									
FILL: Sand		SS	1	50					
0.89						1	58.10		
		SS	2	100					
		SS	3	54		2	57.10		
Dark grey to grey **SILTY CLAY**		SS	4	100					
		SS	5	100		3	56.10		
3.45									
End of Borehole									

Photo Ionization Detector: ○ Lower Explosive Limit % — 20 40 60 80

RKI Eagle Rdg. (ppm): 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH14-21

BORINGS BY Portable Drill **DATE** October 1, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Concrete slab 0.13						0	69.98		
FILL: Grey silty clay with cobbles 0.30		AU	1						
FILL: Brown silty clay, trace sand and gravel		SS	2	83					
0.91						1	68.98		
		SS	3	75					
Grey-brown **SILTY CLAY**									
		SS	4	100		2	67.98		
- grey by 1.5m depth		SS	5	100					
		SS	6	100		3	66.98		
		SS	7	100					
3.96									
End of Borehole									
(GWL @ 1.20m - October 8, 2021)									

Lower Explosive Limit % scale: 20 40 60 80

RKI Eagle Rdg. (ppm) scale: 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

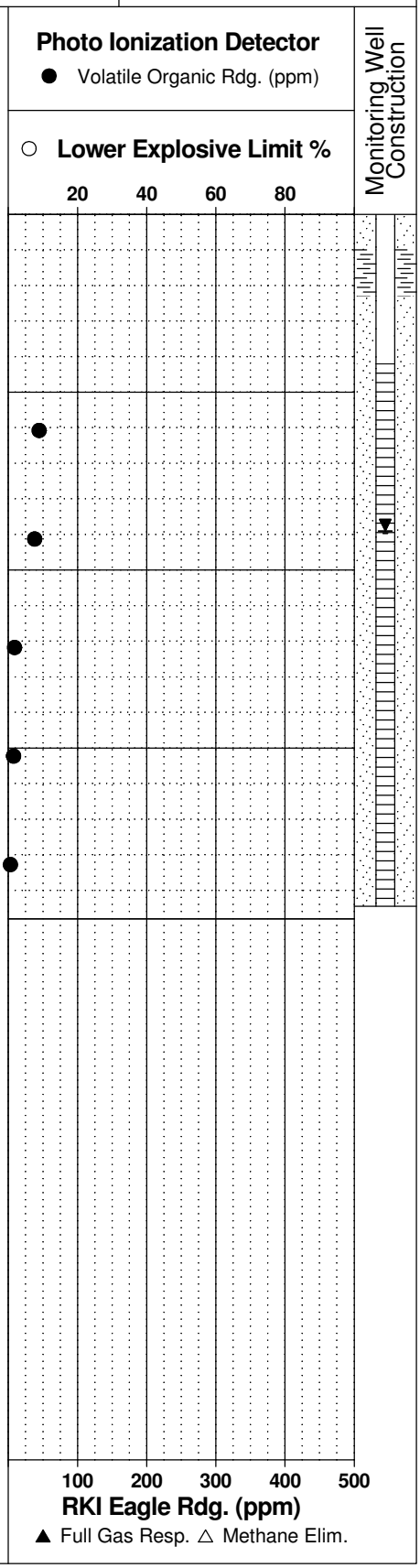
FILE NO. PE4548

REMARKS

HOLE NO. BH15-21

BORINGS BY Portable Drill **DATE** October 1, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Concrete slab 0.13						0	69.98
FILL: Crushed stone 0.30		AU	1				
FILL: Brown sandy silt with cobbles 0.91		SS	2	21		1	68.98
Grey-brown **SILTY CLAY,** trace gravel 1.50		SS	3	100			
		SS	4	100		2	67.98
Grey **SILTY CLAY**		SS	5	100			
		SS	6	100		3	66.98
		SS	7	100			
3.96 End of Borehole							
(GWL @ 1.78m - October 8, 2021)							



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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
330 McLeod Street
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE4548

REMARKS

HOLE NO. BH16-21

BORINGS BY Portable Drill **DATE** October 1, 2021

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
Concrete slab 0.13						0	69.33
FILL: Crushed stone 0.30		AU	1				
FILL: Brrown sandy silt with gravel, trace clay		SS	2	50			
0.91						1	68.33
Grey **SILTY CLAY,** some sand, trace gravel		SS	3	67			
1.50							
		SS	4	33		2	67.33
		SS	5	100			
Grey **SILTY CLAY**							
		SS	6	100		3	66.33
		SS	7	100			
3.96							
End of Borehole							
(GWL @ 1.66m - October 8, 2021)							

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the relative strength of cohesionless soils is the compactness condition, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

Compactness Condition	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity, S_t, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

Low Sensitivity:	$S_t < 2$
Medium Sensitivity:	$2 < S_t < 4$
Sensitive:	$4 < S_t < 8$
Extra Sensitive:	$8 < S_t < 16$
Quick Clay:	$S_t > 16$

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

RQD %	**ROCK QUALITY**
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube, generally recovered using a piston sampler
G	-	"Grab" sample from test pit or surface materials
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

WC%	-	Natural water content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic Limit, % (water content above which soil behaves plastically)
PI	-	Plasticity Index, % (difference between LL and PL)
Dxx	-	Grain size at which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2 / (D10 \times D60)$
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

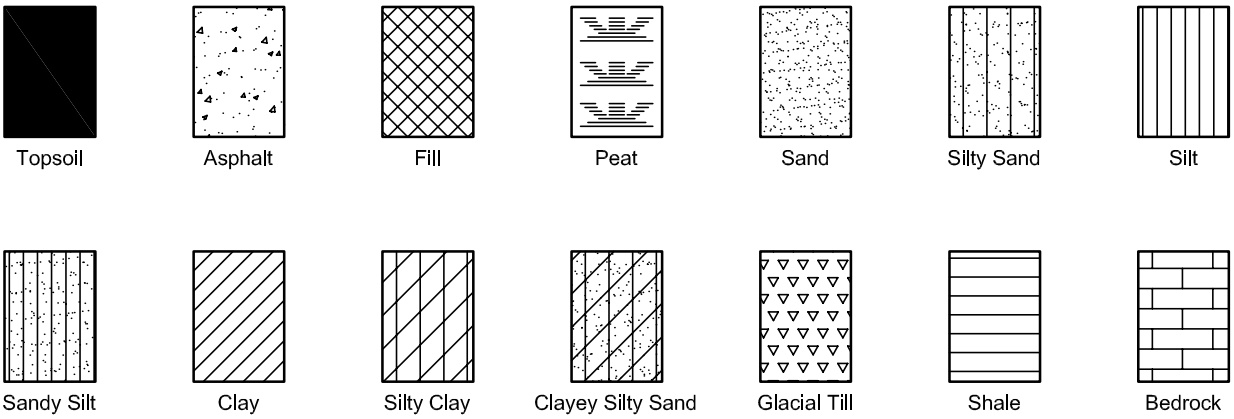
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

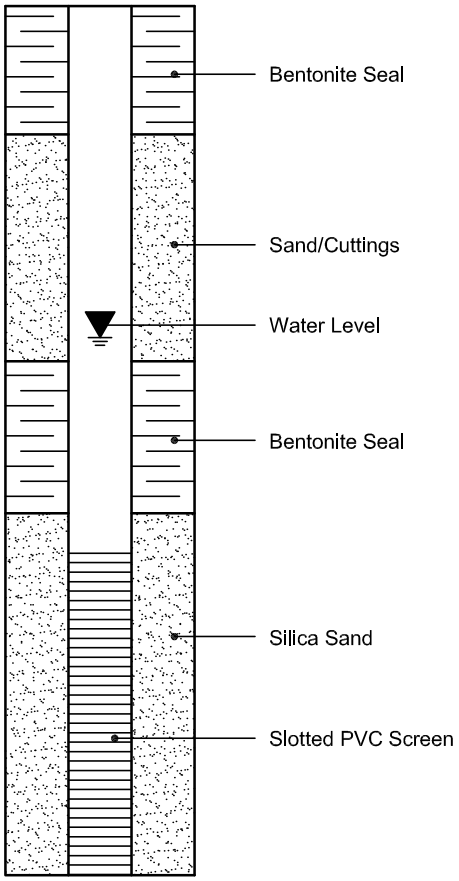
SYMBOLS AND TERMS (continued)

STRATA PLOT

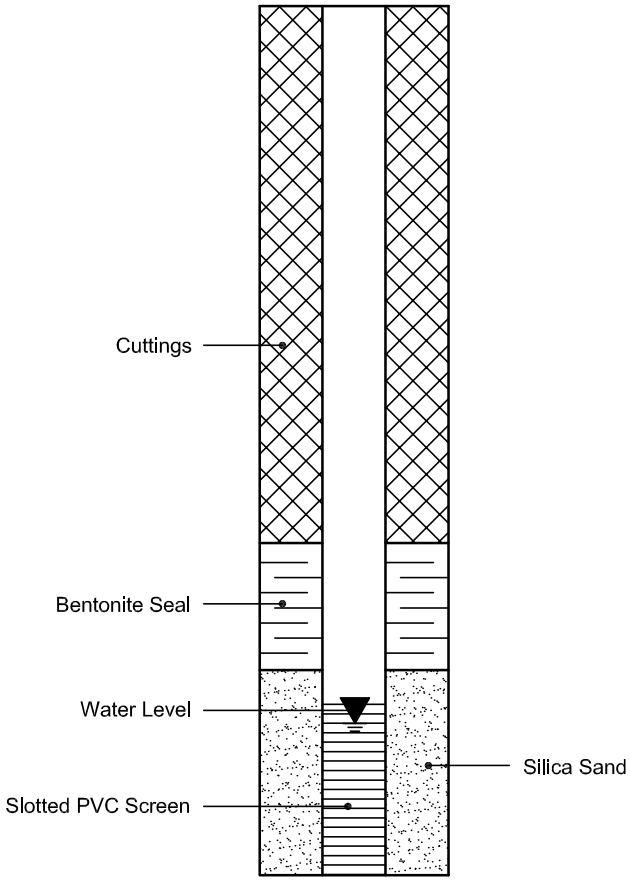


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 22059
Project: PE4223
Custody: 33472

Report Date: 15-Feb-2018
Order Date: 9-Feb-2018

Order #: 1806527

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1806527-01	BH1-SS4
1806527-02	BH2-SS3
1806527-03	BH3-SS3
1806527-04	BH4-SS4

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22059

Report Date: 15-Feb-2018
Order Date: 9-Feb-2018
Project Description: PE4223

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	12-Feb-18	14-Feb-18
PHC F1	CWS Tier 1 - P&T GC-FID	12-Feb-18	14-Feb-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Feb-18	12-Feb-18
Solids, %	Gravimetric, calculation	12-Feb-18	12-Feb-18

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 22059

Report Date: 15-Feb-2018

Order Date: 9-Feb-2018

Project Description: PE4223

	Client ID:	BH1-SS4	BH2-SS3	BH3-SS3	BH4-SS4
	Sample Date:	08-Feb-18	08-Feb-18	08-Feb-18	08-Feb-18
	Sample ID:	1806527-01	1806527-02	1806527-03	1806527-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	72.8	65.8	64.4	57.0
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	0.29	1.39	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	97.6%	98.6%	101%	104%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	99	101	15	<7
F2 PHCs (C10-C16)	4 ug/g dry	2430	664	732	<4
F3 PHCs (C16-C34)	8 ug/g dry	2230	519	563	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 22059

Report Date: 15-Feb-2018
Order Date: 9-Feb-2018
Project Description: PE4223

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.32*		*ug/g*		*104*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Physical Characteristics									
% Solids	83.1	0.1	% by Wt.	83.0			0.1	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*1.79*		*ug/g dry*		*100*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	175	7	ug/g		87.5	80-120			
F2 PHCs (C10-C16)	107	4	ug/g	ND	110	60-140			
F3 PHCs (C16-C34)	254	8	ug/g	ND	127	60-140			
F4 PHCs (C34-C50)	167	6	ug/g	ND	125	60-140			
Volatiles									
Benzene	3.34	0.02	ug/g		83.5	60-130			
Ethylbenzene	4.01	0.05	ug/g		100	60-130			
Toluene	3.90	0.05	ug/g		97.5	60-130			
m,p-Xylenes	8.17	0.05	ug/g		102	60-130			
o-Xylene	4.21	0.05	ug/g		105	60-130			
Surrogate: Toluene-d8	*2.80*		*ug/g*		*87.6*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Paracel ID: 1806527

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№ 33472

Page 1 of 1

Client Name: Paterson Group	Project Reference: PE4223	**Turnaround Time:**
Contact Name: Mark D'Arcy	Quote #	☐ 1 Day ☐ 3 Day
Address:	PO # 22059	☐ 2 Day ☑ Regular
Telephone: 226-7381	Email Address:	Date Required:

Criteria: ☑ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1806527

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	BTEX & PHC's										
1	BH1-SS4	S	-	2	Feb 8/18	9:30am	✓				250mL + vial						✓
2	BH2-SS3	S	-	2	"	10:30am	✓										✓
3	BH3-SS3	S	-	2	"	12:30pm	✓										✓
4	BH4-SS4	S	-	2	"	1 pm	✓										✓
5																	
6																	
7																	
8																	
9																	
10																	

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: A. Seguse	Received at Lab:	Verified By:
Relinquished By (Print):	Date/Time: 09/02/18 4:20 P.M.	Date/Time: 02/09/18 5:45pm	Date/Time: 02/09/18 5:42pm
Date/Time:	Temperature: ___ °C	Temperature: 15.9°C	pH Verified [ ] By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Mark D'Arcy

Client PO: 23578
Project: PE4223
Custody: 115628

Report Date: 12-Mar-2018
Order Date: 6-Mar-2018

Order #: 1810218

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1810218-01	BH6-SS3
1810218-02	BH7-SS3
1810218-03	BH8-SS4
1810218-04	BH9-SS4

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 23578

Report Date: 12-Mar-2018
Order Date: 6-Mar-2018
Project Description: PE4223

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	8-Mar-18	9-Mar-18
PHC F1	CWS Tier 1 - P&T GC-FID	8-Mar-18	9-Mar-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Mar-18	8-Mar-18
Solids, %	Gravimetric, calculation	8-Mar-18	8-Mar-18

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 23578

Report Date: 12-Mar-2018

Order Date: 6-Mar-2018

Project Description: PE4223

	Client ID:	BH6-SS3	BH7-SS3	BH8-SS4	BH9-SS4
	Sample Date:	05-Mar-18	05-Mar-18	05-Mar-18	05-Mar-18
	Sample ID:	1810218-01	1810218-02	1810218-03	1810218-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	68.3	65.2	60.5	58.7
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	91.3%	80.8%	95.8%	92.7%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	120	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	156	535	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	220	389	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 23578

Report Date: 12-Mar-2018
Order Date: 6-Mar-2018
Project Description: PE4223

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.76*		*ug/g*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Physical Characteristics									
% Solids	96.9	0.1	% by Wt.	97.1			0.2	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*10.0*		*ug/g dry*		*111*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	211	7	ug/g		106	80-120			
F2 PHCs (C10-C16)	103	4	ug/g	ND	105	60-140			
F3 PHCs (C16-C34)	237	8	ug/g	ND	116	60-140			
F4 PHCs (C34-C50)	163	6	ug/g	ND	120	60-140			
Volatiles									
Benzene	4.39	0.02	ug/g		110	60-130			
Ethylbenzene	3.67	0.05	ug/g		91.8	60-130			
Toluene	2.96	0.05	ug/g		73.9	60-130			
m,p-Xylenes	7.21	0.05	ug/g		90.2	60-130			
o-Xylene	3.65	0.05	ug/g		91.3	60-130			
Surrogate: Toluene-d8	*6.30*		*ug/g*		*78.8*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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№ 115628

Page 1 of 1

Client Name: Paterson Group.	Project Reference: PE4223	**Turnaround Time:**	
Contact Name: Mark D'Arcy	Quote #	☐ 1 Day	☐ 3 Day
Address: 154 Colonnade Rd. S Ottawa	PO # 23578	☐ 2 Day	☑ Regular
Telephone: 613-226-7381	Email Address: mdarcy@patersongroup.ca gvanloenen@patersongroup.ca	Date Required:	

Criteria: ☑ O. Reg. 153/04 (As Amended) Table 3 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1810218

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)						
1	BH6-553	S		2	MAR 5/18		✓									120 mL + 1x60 mL			
2	BH7-553	S		2	↓		✓									↓			
3	BH8-554	S		2			✓												
4	BH9-554	S		2			✓												
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: A. Teade	Received at Lab: SUNEETORN DOKMAI	Verified By:
Relinquished By (Print):	Date/Time: 06/03/18 4:10 PM	Date/Time: MAR 06, 2018 04:48	Date/Time: 03/06/18 4:50
Date/Time:	Temperature: °C	Temperature: 17.7°	pH Verified [ ] By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Eric Leveque

Client PO: 24802
Project: PE4223
Custody: 44399

Report Date: 30-Jul-2018
Order Date: 25-Jul-2018

Order #: 1830390

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1830390-01	BH11-SS3
1830390-02	BH12-SS3A
1830390-03	BH13-SS2

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24802

Report Date: 30-Jul-2018
Order Date: 25-Jul-2018
Project Description: PE4223

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	27-Jul-18	28-Jul-18
PHC F1	CWS Tier 1 - P&T GC-FID	27-Jul-18	28-Jul-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	26-Jul-18	27-Jul-18
Solids, %	Gravimetric, calculation	26-Jul-18	26-Jul-18

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24802

Report Date: 30-Jul-2018
Order Date: 25-Jul-2018
Project Description: PE4223

	Client ID:	BH11-SS3	BH12-SS3A	BH13-SS2	-
	Sample Date:	07/24/2018 13:00	07/24/2018 10:00	07/24/2018 10:00	-
	Sample ID:	1830390-01	1830390-02	1830390-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	77.7	66.6	71.4	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	0.10	-
Toluene	0.05 ug/g dry	0.16	<0.05	<0.05	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	0.07	0.08	<0.05	-
Xylenes, total	0.05 ug/g dry	0.07	0.08	<0.05	-
Toluene-d8	Surrogate	80.0%	80.8%	78.6%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	195	<7	249	-
F2 PHCs (C10-C16)	4 ug/g dry	399	617	907	-
F3 PHCs (C16-C34)	8 ug/g dry	289	521	773	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 24802

Report Date: 30-Jul-2018
Order Date: 25-Jul-2018
Project Description: PE4223

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*2.92*		*ug/g*		*91.1*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Physical Characteristics									
% Solids	83.0	0.1	% by Wt.	81.3			2.1	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*3.36*		*ug/g dry*		*75.0*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	198	7	ug/g		99.2	80-120			
F2 PHCs (C10-C16)	84	4	ug/g	ND	77.9	60-140			
F3 PHCs (C16-C34)	227	8	ug/g	ND	86.0	60-140			
F4 PHCs (C34-C50)	148	6	ug/g	ND	88.8	60-140			
Volatiles									
Benzene	4.78	0.02	ug/g		120	60-130			
Ethylbenzene	4.95	0.05	ug/g		124	60-130			
Toluene	4.61	0.05	ug/g		115	60-130			
m,p-Xylenes	9.23	0.05	ug/g		115	60-130			
o-Xylene	4.64	0.05	ug/g		116	60-130			
Surrogate: Toluene-d8	*2.38*		*ug/g*		*74.5*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

PARACEL LABORATORIES LTD.

Paracel ID: 1830390

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a, Ontario K1G 4J8
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icel@paracellabs.com

Chain of Custody
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№ 44399

Page 1 of 1

Client Name: Paterson	Project Reference: PE4223
Contact Name: E. Leveque M. Moroz	Quote #
Address: 154 Colonnade Rd S, Ottawa	PO # 24802
Telephone: 613 226 7381	Email Address:

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☒ Regular
Date Required:

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 3 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1830390

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	BTEX PHCs										
1	BH11-SS2B	S		2	July 24	1p	X	← Hold			-120ml + 1 vial-						
2	BH11-SS3	S		2	↓	1p	X						↓				
3	BH12-SS3A	S		2		10a	X										
4	BH13-SS2	S		2	↓	6p	X										
5																	
6																	
7																	
8																	
9																	
10																	

Comments: BH11-SS2B on Hold

Method of Delivery: Paracel

Relinquished By (Sign): [signature]	Received by Driver/Depot: [signature] Rouse	Received at Lab: Sunreporn Dowmai	Verified By: [signature]
Relinquished By (Print): Marek Moroz	Date/Time: 25/07/18 3:10	Date/Time: Jul 25 2018 05:44	Date/Time: Aug 25/18 7:35P
Date/Time: 2018-07-25	Temperature: °C	Temperature: 17.9 °C	pH Verified [ ] By:

Chain of Custody (Blank) - Rev 0.4 Feb 2016

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Sam Berube

Client PO: 33243
Project: PE4548
Custody: 128483

Report Date: 7-Oct-2021
Order Date: 4-Oct-2021

Revised Report

Order #: 2141171

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2141171-01	BH14-21-SS4
2141171-02	BH15-21-SS3
2141171-03	BH16-21-SS3
2141171-04	BH16-21-SS5
2141171-05	DUP1-21

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33243

Report Date: 07-Oct-2021

Order Date: 4-Oct-2021

Project Description: PE4548

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	6-Oct-21	6-Oct-21
PHC F1	CWS Tier 1 - P&T GC-FID	6-Oct-21	6-Oct-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	5-Oct-21	7-Oct-21
Solids, %	Gravimetric, calculation	5-Oct-21	5-Oct-21

Certificate of Analysis

Report Date: 07-Oct-2021

Client: Paterson Group Consulting Engineers

Order Date: 4-Oct-2021

Client PO: 33243

Project Description: PE4548

	Client ID:	BH14-21-SS4	BH15-21-SS3	BH16-21-SS3	BH16-21-SS5
	Sample Date:	01-Oct-21 09:00	01-Oct-21 09:00	01-Oct-21 09:00	01-Oct-21 09:00
	Sample ID:	2141171-01	2141171-02	2141171-03	2141171-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	70.3	69.6	71.8	66.6
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene-d8	Surrogate	104%	107%	102%	106%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
F2 PHCs (C10-C16)	4 ug/g dry	<4 [1]	<4	210 [1]	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8 [1]	<8	184 [1]	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

	Client ID:	DUP1-21	-	-	-
	Sample Date:	01-Oct-21 09:00	-	-	-
	Sample ID:	2141171-05	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	64.0	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	102%	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*7.49*		*ug/g*		*93.7*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			NC	30	
Physical Characteristics									
% Solids	95.3	0.1	% by Wt.	96.6			1.4	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g dry	ND			NC	50	
Toluene	ND	0.05	ug/g dry	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g dry	ND			NC	50	
o-Xylene	ND	0.05	ug/g dry	ND			NC	50	
Surrogate: Toluene-d8	*10.3*		*ug/g dry*		*103*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	179	7	ug/g	ND	89.5	80-120			
F2 PHCs (C10-C16)	96	4	ug/g	ND	117	60-140			
F3 PHCs (C16-C34)	236	8	ug/g	ND	117	60-140			
F4 PHCs (C34-C50)	136	6	ug/g	ND	107	60-140			
Volatiles									
Benzene	2.86	0.02	ug/g	ND	71.6	60-130			
Ethylbenzene	3.18	0.05	ug/g	ND	79.6	60-130			
Toluene	3.10	0.05	ug/g	ND	77.6	60-130			
m,p-Xylenes	6.59	0.05	ug/g	ND	82.4	60-130			
o-Xylene	3.24	0.05	ug/g	ND	80.9	60-130			
Surrogate: Toluene-d8	*7.43*		*ug/g*		*92.9*	*50-140*			

Qualifier Notes:

Sample Data Revisions

1- REV 1 : Revision 1 - PHC results updated based on review of original data.

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES	**Paracel ID: 2141171**	...ice ...St. Laurent Blvd. ...Ontario K1G 4J8 ...749-1947 ...@paracellabs.com ...acellabs.com	Paracel Order Number (Lab Use Only): 2141171

Chain Of Custody (Lab Use Only)

№ 128483

Client Name: Paterson Group Inc.		Project Ref: PE4548	Page 1 of 1
Contact Name: Samuel Berube		Quote #:	**Turnaround Time**
Address: 154 Colonnade Rd South		PO #: 33243	☐ 1 day ☐ 3 day
		E-mail: Sberube@patersongroup.ca	☐ 2 day ☑ Regular
Telephone:			Date Required:

Regulation 153/04			Other Regulation	
☐ Table 1	☐ Res/Park	☐ Med/Fine	☐ REG 558	☐ PWQO
☐ Table 2	☐ Ind/Comm	☐ Coarse	☐ CCME	☐ MISA
☑ Table 3	☐ Agri/Other		☐ SU - Sani	☐ SU - Storm
☐ Table ___			Mun:	
For RSC: ☐ Yes ☐ No			☐ Other:	

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	BTEX					
1	BH4-21-SS4	S		2	Oct. 1/21		✓												✓
2	BH5-21-SS3	↓		↓	↓		↓												✓
3	BH6-21-SS3	↓		↓	↓		↓												✓
4	BH6-21-SS5	↓		↓	↓		↓												✓
5	DUP1-21	↓		↓	↓									✓					✓
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): [signature]	Received By Driver/Depot: T. Rouse	Received at Lab: Suncepom Dohmai	Verified By: [signature]
Relinquished By (Print): Samuel Bérubé	Date/Time: 04/10/21 3:24	Date/Time: Oct 04, 2021 04.00	Date/Time: Oct 5 2021 17:35
Date/Time:	Temperature: °C PH	Temperature: 16.8 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Eric Leveque

Client PO:
Project: PE4223
Custody: 43101

Report Date: 31-Jul-2018
Order Date: 30-Jul-2018

Order #: 1831092

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1831092-01	B12
1831092-02	E6
1831092-03	S6

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO:

Report Date: 31-Jul-2018
Order Date: 30-Jul-2018
Project Description: PE4223

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	31-Jul-18	31-Jul-18
PHC F1	CWS Tier 1 - P&T GC-FID	31-Jul-18	31-Jul-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-Jul-18	31-Jul-18
Solids, %	Gravimetric, calculation	31-Jul-18	31-Jul-18

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO:

Report Date: 31-Jul-2018

Order Date: 30-Jul-2018

Project Description: PE4223

	Client ID:	B12	E6	S6	-
	Sample Date:	07/30/2018 13:00	07/30/2018 13:00	07/30/2018 13:00	-
	Sample ID:	1831092-01	1831092-02	1831092-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	67.0	69.1	68.5	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	-
Toluene-d8	Surrogate	63.9%	69.2%	63.2%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO:

Report Date: 31-Jul-2018
Order Date: 30-Jul-2018
Project Description: PE4223

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*2.92*		*ug/g*		*91.1*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	7	4	ug/g dry	8			20.9	30	
F3 PHCs (C16-C34)	60	8	ug/g dry	142			81.3	30	QR-01
F4 PHCs (C34-C50)	32	6	ug/g dry	39			20.9	30	
Physical Characteristics									
% Solids	90.4	0.1	% by Wt.	92.0			1.8	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*3.36*		*ug/g dry*		*75.0*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	198	7	ug/g		99.2	80-120			
F2 PHCs (C10-C16)	119	4	ug/g	8	131	60-140			
F3 PHCs (C16-C34)	279	8	ug/g	142	66.3	60-140			
F4 PHCs (C34-C50)	150	6	ug/g	39	85.5	60-140			
Volatiles									
Benzene	4.78	0.02	ug/g		120	60-130			
Ethylbenzene	4.95	0.05	ug/g		124	60-130			
Toluene	4.61	0.05	ug/g		115	60-130			
m,p-Xylenes	9.23	0.05	ug/g		115	60-130			
o-Xylene	4.64	0.05	ug/g		116	60-130			
Surrogate: Toluene-d8	*2.38*		*ug/g*		*74.5*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

PARACEL LABORATORIES LTD.

Paracel ID: 1831092

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acel@paracellabs.com

Chain of Custody
(Lab Use Only)
№ 43101

Page 1 of 1

Client Name: PATERSON	Project Reference: PE4223
Contact Name: Evengue M. Moroz	Quote #
Address: 154 Colonnade Rd S, Ottawa, ON	PO #
Telephone: 613 226 7381	Email Address:

Turnaround Time:
☒ 1 Day ☐ 3 Day
☐ 2 Day ☐ Regular
Date Required:

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 3 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1831092.

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analyses: BTEX + PHCs F1-F3									
1	B12	S		2	July 30	1pm	X			250mL + vial						
2	E6	S		1	↓	↓	X			120mL + vial						
3	S6	S		↓	↓	↓	X			250mL + vial						
4																
5																
6																
7																
8																
9																
10																

Comments: will email P.O.

Method of Delivery: walk-in

Relinquished By (Sign): Marek Moroz	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Marek Moroz	Date/Time:	Date/Time: July 30/18 4:21p	Date/Time: July 30/18 4:28
Date/Time: 2018-07-30	Temperature: °C	Temperature: 24.7 °C	pH Verified [ ] By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Rd South
Nepean, ON K2E 7J5
Attn: Mark St. Pierre

Client PO: 25831
Project: PE4548
Custody: 119864

Report Date: 31-Jan-2019
Order Date: 25-Jan-2019

Order #: 1904485

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1904485-01	BH11-GW2

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 25831

Report Date: 31-Jan-2019
Order Date: 25-Jan-2019
Project Description: PE4548

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	29-Jan-19	29-Jan-19
PHC F1	CWS Tier 1 - P&T GC-FID	28-Jan-19	29-Jan-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	28-Jan-19	30-Jan-19

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 25831

Report Date: 31-Jan-2019
Order Date: 25-Jan-2019
Project Description: PE4548

	Client ID:	BH11-GW2	-	-	-
	Sample Date:	01/25/2019 14:00	-	-	-
	Sample ID:	1904485-01	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Benzene	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	1.8	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
Toluene-d8	Surrogate	108%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	139	-	-	-
F2 PHCs (C10-C16)	100 ug/L	102000	-	-	-
F3 PHCs (C16-C34)	100 ug/L	71700	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<1000 [1]	-	-	-

Certificate of Analysis
Client: Paterson Group Consulting Engineers
Client PO: 25831

Report Date: 31-Jan-2019
Order Date: 25-Jan-2019
Project Description: PE4548

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*92.1*		*ug/L*		*115*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*92.8*		*ug/L*		*116*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1750	25	ug/L		87.3	68-117			
F2 PHCs (C10-C16)	1790	100	ug/L		112	60-140			
F3 PHCs (C16-C34)	3950	100	ug/L		101	60-140			
F4 PHCs (C34-C50)	1840	100	ug/L		74.1	60-140			
Volatiles									
Benzene	42.3	0.5	ug/L		106	60-130			
Ethylbenzene	45.9	0.5	ug/L		115	60-130			
Toluene	38.8	0.5	ug/L		97.1	60-130			
m,p-Xylenes	93.9	0.5	ug/L		117	60-130			
o-Xylene	46.5	0.5	ug/L		116	60-130			
Surrogate: Toluene-d8	*79.6*		*ug/L*		*99.5*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1 : Elevated detection limit due to dilution required because of high target analyte concentration.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Paracel ID: 1904485

PARACEL LABORATORIES LTD.

Head Office
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
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Chain of Custody
(Lab Use Only)
№ 119864

Page ___ of ___

Client Name: Paterson Group	Project Reference: PE 4548	**Turnaround Time:**	
Contact Name: Mark St Pierre	Quote #	☐ 1 Day	☐ 3 Day
Address: 154 Colonnade Rd. Sth	PO # 25831	☐ 2 Day	☑ Regular
Telephone: 613-226-7381	Email Address: mstpierre@patersongroup.ca	Date Required:	

Criteria: ☑ O. Reg. 153/04 (As Amended) Table 3 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Paracel Order Number: 1904485

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)							
1	BH11-GW2	GW	-	3	Jan 25.19	2:00PM	✓													✓
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: Picked.

Relinquished By (Sign):	Received by Driver/Depot: A. Lecuse	Received at Lab:	Verified By:
Relinquished By (Print): Mark St Pierre	Date/Time: 25/01/19 4:00 PM	Date/Time: Jan 25/19 5:00p	Date/Time: Jan 25/19 5:00
Date/Time:	Temperature: °C	Temperature: 4.6 °C	pH Verified [ ] By:

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Certificate of Analysis

Paterson Group Consulting Engineers

154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Sam Berube

Client PO: 33298
Project: PE4548
Custody: 129399

Report Date: 18-Oct-2021
Order Date: 12-Oct-2021

Order #: 2142173

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2142173-01	BH1-GW2
2142173-02	BH11-GW3
2142173-03	BH12-GW2
2142173-04	BH14-21-GW1
2142173-05	BH15-21-GW1
2142173-06	BH16-21-GW1
2142173-07	DUP1-21-GW1

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 18-Oct-2021

Client: Paterson Group Consulting Engineers

Order Date: 12-Oct-2021

Client PO: 33298

Project Description: PE4548

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	14-Oct-21	14-Oct-21
PHC F1	CWS Tier 1 - P&T GC-FID	14-Oct-21	14-Oct-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	15-Oct-21	15-Oct-21

Certificate of Analysis

Report Date: 18-Oct-2021

Client: **Paterson Group Consulting Engineers**

Order Date: 12-Oct-2021

Client PO: 33298

Project Description: PE4548

	Client ID:	BH1-GW2	BH11-GW3	BH12-GW2	BH14-21-GW1
	Sample Date:	08-Oct-21 09:00	12-Oct-21 09:00	12-Oct-21 09:00	08-Oct-21 09:00
	Sample ID:	2142173-01	2142173-02	2142173-03	2142173-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene-d8	Surrogate	81.0%	80.6%	78.4%	78.9%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	499	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	539	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

	Client ID:	BH15-21-GW1	BH16-21-GW1	DUP1-21-GW1	-
	Sample Date:	12-Oct-21 09:00	12-Oct-21 09:00	08-Oct-21 09:00	-
	Sample ID:	2142173-05	2142173-06	2142173-07	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene-d8	Surrogate	80.1%	79.6%	80.2%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	147	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	204	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	-	-

Certificate of Analysis

Report Date: 18-Oct-2021

Client: Paterson Group Consulting Engineers

Order Date: 12-Oct-2021

Client PO: 33298

Project Description: PE4548

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	*63.6*		*ug/L*		*79.5*	*50-140*			

Certificate of Analysis

Report Date: 18-Oct-2021

Client: Paterson Group Consulting Engineers

Order Date: 12-Oct-2021

Client PO: 33298

Project Description: PE4548

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND			NC	30	
Volatiles									
Benzene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: Toluene-d8	*63.7*		*ug/L*		*79.6*	*50-140*			

Certificate of Analysis

Report Date: 18-Oct-2021

Client: Paterson Group Consulting Engineers

Order Date: 12-Oct-2021

Client PO: 33298

Project Description: PE4548

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1870	25	ug/L	ND	93.4	68-117			
F2 PHCs (C10-C16)	1820	100	ug/L	ND	114	60-140			
F3 PHCs (C16-C34)	3880	100	ug/L	ND	98.9	60-140			
F4 PHCs (C34-C50)	3170	100	ug/L	ND	128	60-140			
Volatiles									
Benzene	40.0	0.5	ug/L	ND	100	60-130			
Ethylbenzene	41.0	0.5	ug/L	ND	102	60-130			
Toluene	41.5	0.5	ug/L	ND	104	60-130			
m,p-Xylenes	74.1	0.5	ug/L	ND	92.6	60-130			
o-Xylene	45.7	0.5	ug/L	ND	114	60-130			
Surrogate: Toluene-d8	*55.1*		*ug/L*		*68.9*	*50-140*			

Qualifier Notes:

Login Qualifiers :

Container and COC sample IDs don't match - reads "BH11-GW2" and coc reads "BH11-GW3"

Applies to samples: BH11-GW3

Container and COC sample IDs don't match - reads "BH12-GW3" and coc reads "BH12-GW2"

Applies to samples: BH12-GW2

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

PARACE LABORATORIES LT

Paracel ID: 2142173

vd. J8 com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2142173	№ 129399

Client Name: Paterson Group Inc.	Project Ref: PE4548	Page 1 of 1
Contact Name: Samuel Baïbé	Quote #:	Turnaround Time
Address: 154 Colonnade Rd South	PO #: 33298	☐ 1 day ☐ 3 day ☐ 2 day ☑ Regular
Telephone: 613-226-7381	E-mail: Sbaibe@patersongroup.ca	Date Required:

Regulation 153/04	Other Regulation
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm
☐ Table	Mun:
For RSC: ☐ Yes ☐ No	☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	BTEX
1	BH1-GW2	GW		3	Oct. 8/21		✓							
2	BH11-GW3				Oct. 12/21									
3	BH12-GW2													
4	BH14-21-GW1				Oct. 8/21									
5	BH15-21-GW1				Oct. 12/21									
6	BH16-21-GW1													
7	DUP1-21-GW1			2										✓
8														
9														
10														

Comments: - Some samples mistakenly labelled PE4223 - reference number is PE4548

Method of Delivery: Swift

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: Jurupam Dhaliwal	Verified By: BG
Relinquished By (Print): Samuel Baïbé	Date/Time:	Date/Time: Oct 12, 2021 04.50	Date/Time: Oct 13, 2021 13:50
Date/Time:	Temperature: °C	Temperature: 17.8 °C	pH Verified: ☐ By: