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Phase II Environmental Site Assessment

2502 & 2510 St. Laurent Boulevard
1890, 1900 & 1920 Walkley Road,
2425 Don Reid Drive,
and 2990 & 3000 Conroy Road
Ottawa, Ontario

Prepared For

Claridge Homes

May 3, 2022

Report: PE5607-2

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for 2502 & 2510 St. Laurent Boulevard, 1890, 1900 & 1920 Walkley Road, 2425 Don Reid Drive and 2990 & 3000 Conroy Road, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address seven potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II - Property.

The subsurface investigation consisted of drilling 14 boreholes, 10 of which were instrumented with groundwater monitoring wells.

Soil samples were obtained from boreholes and screened using visual observations and organic vapour measurements. A total of 15 soil samples (including one duplicate) were submitted for analysis of metals (including Hg and Cr_{VI}), benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbons (PHCs, F_1-F_4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and/or pH. Cobalt and vanadium concentrations exceeding the MECP Table 3 Standards were identified in soil samples BH6-22-SS6, BH7-22-SS6, BH8-22-SS6, BH9-22-SS5 and BH10-22-SS5; these concentrations are considered to be naturally occurring and do not represent an environmental concern to the Phase II Property. Remaining metal parameter concentrations were identified in all soil samples at concentrations below the MECP Table 3 Standards. PAH concentrations identified in the soil samples submitted comply with the MECP Table 3 Standards. No BTEX, PHC or VOC concentrations were identified in any of the soil samples analysed.

Nine groundwater samples (including one duplicate) from monitoring wells installed in BH4-22, BH6-22, BH7-22, BH8-22, BH9-22, BH10-22, BH11-22 and BH12-22 were submitted for laboratory analysis of VOCs and/or PHCs (F_1-F_4). No sheen, free product or odour was noted during the groundwater sampling events. All groundwater results comply with the selected MECP Table 3 Standards.

Based on the findings of this Phase II ESA, no further environmental investigation is required.

Recommendations

Monitoring Wells

It is recommended that the monitoring wells installed on the Phase II Property remain viable for future monitoring, if required. It is expected that groundwater monitoring wells will be abandoned in accordance with O.Reg.903 at the time of the construction excavation. Further information can be provided upon request in this regard.

1.0 INTRODUCTION

At the request of Claridge Homes, Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment for 2502 & 2510 St. Laurent Boulevard, 1890, 1900 & 1920 Walkley Road, 2425 Don Reid Drive and 2990 & 3000 Conroy Road, in the City of Ottawa, Ontario. The purpose of this Phase II ESA has been to address 7 areas of potential environmental concern (APEC) identified on the Phase II Property, during the Phase I ESA conducted by Paterson in April of 2022.

1.1 Site Description

Address:	2502 & 2510 St. Laurent Boulevard, 1890, 1900 & 1920 Walkley Road, 2425 Don Reid Drive and 2990 & 3000 Conroy Road, Ottawa, Ontario
Legal Description:	Part of Lot 1 and Lot A, Concession 4, in the City of Ottawa.
Location:	The Phase I Property is located on the southeast quadrant of the Walkley Road and Don Reid Drive intersection, in the City of Ottawa, Ontario. For the purposes of this report, Walkley Road is assumed to run east-west. Refer to Figure 1 - Key Plan in the Figures section following the text.
Latitude and Longitude:	45° 22’ 53" N, 75° 37' 51" W

Site Description:

Configuration:	Irregular
Area:	5.61 ha (approximate)

1.2 Property Ownership

The current registered property owner of the Phase I Property is Loblaws Properties Ltd. Paterson was engaged to conduct this Phase I – ESA by Mr. Vincent Denomme with Claridge Homes. Mr. Denomme can be contacted via his mailing address at 210 Gladstone Avenue, Ottawa, Ontario, K2P 0Z9.

1.3 Current and Proposed Future Uses

The Phase II – Property is currently primarily vacant land with a paved roadway along the northeast property boundary. The study area consists of a mixture of commercial and residential properties. It is our understanding that a series of townhouse-style residential dwellings and a multi-storey retirement home building, which is anticipated to have one or two underground parking levels will be constructed on the Phase II Property. The proposed buildings will generally be surrounded by asphalt-paved access lanes and parking areas. It is expected that the proposed development will be municipally serviced.

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:

- ❒ Coarse-grained soil conditions
- ❒ Full depth generic site conditions
- ❒ Non-potable groundwater conditions
- ❒ Residential land use.

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property relies upon municipal drinking water.

Section 41 of O.Reg. 153/04 does not apply to the Phase II Property, as the property is not within 30m of an environmentally sensitive area.

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II Property in that the property is not a Shallow Soil property and the property is not within 30m of a water body.

The residential standards were selected based on the proposed future use of the subject site. Coarse-grained soil standards were chosen as a conservative approach. Grain size analysis was not completed.

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 southeast quadrant of the Walkley Road and Don Reid Drive intersection, in the City of Ottawa, Ontario.

The general area of the Phase II – Property slopes down towards the east. Site drainage on site consists primarily of infiltration and sheet flow to catch basins located along adjacent roadways and parking areas

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation was conducted during the interim of March 4 to March 9, 2022 in conjunction with a geotechnical program. The field program consisted of drilling 14 boreholes, 10 of which were instrumented with groundwater monitoring wells. The boreholes were drilled to a maximum depth of 13.28 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

The Geological Survey of Canada website on the Urban Geology of the National Capital Area was consulted as part of this assessment. Based on the information from NRCAN, bedrock in the area of the site consists of shale of the Carlsbad Formation. Based on the maps, the surficial geology consists of offshore marine sediments with an overburden thickness ranging from 5 to 15 m.

The regional topography in the general area of the Phase I Property slopes down towards the east. Groundwater within the Phase I Study Area is generally expected to flow towards the east.

Fill Placement

No evidence of fill placement was observed at the time of the site visit. Based on various portions of the Phase I Property being snow covered at the time of the site visit, a full analysis of surface conditions could not be completed. Although no fill material was observed at the time of the site visit, it is considered likely that fill material is present on the Phase I Property in the footprints of the former on-site buildings.

Water Bodies and Areas of Natural Significance

No areas of natural significance or water bodies were identified on the Phase I Property or within the Phase I Study Area.

Drinking Water Wells

There are no potable water wells on the Phase I Property or within the Phase I Study Area.

Monitoring Wells

A well record search was conducted on February 4, 2022, for all drilled wells within the Phase I Study Area. No potable well records were identified for the Phase I Property or properties within the Phase I Study Area. Although no monitoring wells were observed at the time of the site visit, it is possible that some existing wells may still remain on the Phase I Property from previous investigations.

Based on the borehole logs from the previous investigations conducted in the area of the Phase I Property, general stratigraphy consists of topsoil or pavement, followed by crushed stone underlain by silty clay. Bedrock was not confirmed in any of the boreholes. Static water levels were not recorded on the well records.

Existing Buildings and Structures

No buildings or permanent structures are present on the Phase I Property.

Subsurface Structures and Utilities

The Phase I Property is situated in a municipally serviced area. Based on the Phase I Property being snow covered at the time of the site inspection, a full analysis of surface conditions could not be completed.

Neighbouring Land Use

Land use within the Phase I Study is a mixture of residential, commercial and vacant land. Potentially contaminating activities identified during the site visit include the retail fuel outlet addressed 1970 Walkley Road, approximately 30 m north of the Phase I Property. The presence of this retail fuel outlet is a PCA that represents an APEC on the Phase I Property. Current land use and PCAs identified in the Phase I Study Area are presented on Drawing PE5607-2 – Surrounding Land Use Plan.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of this report, eight on-site and one off-site PCA are considered to result in nine APECs on the Phase I Property. The PCAs, APEC and associated contaminants of potential concern (CPCs) are summarized in Table 1.

Table 1 - Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 Former Printers	South portion of the Phase I Property (2510 St. Laurent Boulevard)	*"Item NA – Commercial Printers"*	On-site	VOCs PHCs	Soil Groundwater
APEC 2 Former Medical Facility	East portion of the Phase I Property (3000 Conroy Road)	*"Item 42: Pharmaceutical Manufacturing and Processing"*	On-site	Metals As, Sb, Se Hg, CrVI PHCs	Soil Groundwater
APEC 3 Fill Material of Unknown Quality	Throughout the Phase I Property	*"Item 30 – Importation of Fill Material of Unknown Quality"*	On-site	Metals As, Sb, Se Hg, CrVI PAHs	Soil
APEC 4[1] Application of Road Salt	South portion of the Phase I Property (2510 St. Laurent Boulevard)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	Electrical Conductivity (EC) Sodium Adsorption Ratio (SAR)	Soil

Table 1 - Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 5[1] Application of Road Salt	West portion of the Phase I Property (2425 Don Reid Drive)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil
APEC 6[1] Application of Road Salt	Northwest portion of the Phase I Property (1900 Walkley Road)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil
APEC 7[1] Application of Road Salt	East portion of the Phase I Property (3000 Conroy Road)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil
APEC 8[1] Application of Road Salt	Northeast portion of the Phase I Property (1920 Walkley Road and 2990 Conroy Road)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice""*	On-site	EC SAR	Soil
APEC 9 Retail Fuel Outlet	Northeast portion of the Phase I Property (1920 Walkley Road and 2990 Conroy Road)	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	Off-site	BTEX PHCs	Soil Groundwater

1 – In accordance with Section 49.1 of O.Reg. 153/04 standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. The exemption outlined in Section 49.1 is being relied up with respect to the Phase I Property.

Contaminants of Potential Concern

As per section 7.1 and Table 1, contaminants of potential concern (CPCs) in the soil/groundwater beneath the Phase I Property include the following:

- Petroleum Hydrocarbons Fractions 1 through 4 (PHCs F_1-F_4)
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
- Volatile Organic Compounds (VOCs)
- Metals (including arsenic (As), antimony (Sb) and selenium (Se))
- Mercury (Hg)
- Hexavalent Chromium (Cr_{VI})
- Polycyclic Aromatic Hydrocarbons (PAHs)

In accordance with Section 49.1 of O.Reg.153/04, as amended, electrical conductivity (EC) and sodium adsorption ratio (SAR) are not considered to be CPCs.

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 are historical on-site and an existing off-site PCA that have resulted in APECs on the Phase I Property. Additional off-site PCAs identified within the study area are not considered to represent APECs on the Phase I Property based on their separation distances and/or orientations relative to the subject land.

A variety of independent sources were consulted as part of this assessment, 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 investigation was conducted during the interim of March 4 to March 9, 2022. The field program consisted of drilling 14 boreholes, 10 of which were instrumented with groundwater monitoring wells. The boreholes were drilled to a maximum depth of 13.28 m below the existing grade.

The boreholes were placed to address the aforementioned areas of potential environmental concern (APECs) and for geotechnical purposes.

The boreholes were drilled with a track mounted drill rig, operated by George Downing Estate Drilling of Hawkesbury, Ontario, under the full-time supervision of Paterson personnel. Borehole locations are shown on Drawing PE5607-3 – Test Hole Location Plan appended to this report.

4.2 Soil Sampling

A total of 79 soil samples were obtained from the boreholes by means of grab sampling from auger flights/auger samples and split spoon sampling. Split spoon samples were taken at approximate 0.76 m intervals.

The depths at which split spoon and auger samples were obtained from the boreholes are shown as "**SS**" and "**AU**" on the Soil Profile and Test Data Sheets.

Site soils generally consist of between 0.08 and 0.15 m of topsoil. The topsoil was underlain by mostly remnant crushed stone or engineered fill to a maximum depth of 1.44 m. The fill material was followed by native silty clay to a maximum depth of 12.34 m which was underlain (in the deeper boreholes) by glacial till consisting of silty sand to sandy silt with gravel, trace clay, cobbles and boulders. The topsoil in BH9-22 was underlain directly by native silty clay. Inferred bedrock was encountered at depths ranging from 13.28 to 13.54 m below ground surface.

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 0.1 to 1.4 ppm in the soil samples obtained. These results are not considered to be indicative of 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

Ten groundwater monitoring wells were installed on the Phase II – Property as part of the current subsurface investigation. The monitoring wells consisted of 50 mm diameter Schedule 40 threaded PVC risers and screens. Monitoring well construction details are listed below in Table 2 and are also presented on the Soil Profile and Test Data Sheets provided in Appendix 1.

Table 2 - Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand /Silt Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1-22	86.19	13.59	11.59-13.11	11.28-13.11	6.71-11.28	Stick-Up
BH4-22	85.37	13.11	11.59-13.11	10.97-13.11	8.53-10.97	Stick-Up
BH6-22	85.34	6.10	3.05-6.10	2.74-6.10	1.22-2.74	Stick-Up
BH7-22	85.43	6.10	3.05-6.10	2.74-6.10	1.52-2.74	Stick-Up
BH8-22	85.36	6.10	3.05-6.10	2.60-6.10	1.22-2.60	Stick-Up
BH9-22	85.31	6.10	3.05-6.10	2.74-6.10	1.37-2.74	Stick-Up
BH10-22	85.26	6.10	2.44-5.49	2.13-5.49	0.91-2.13	Stick-Up
BH11-22	85.00	13.28	11.76-13.28	9.75-13.28	7.92-9.75	Stick-Up
BH12-22	85.59	6.10	3.05-6.10	2.74-6.10	1.22-2.74	Stick-Up

4.5 Field Measurement of Water Quality Parameters

Groundwater sampling was conducted on March 11, 2022. Water quality parameters were measured in the field using a multi-parameter analyzer. Parameters measured in the field included temperature, pH, and electrical conductivity.

Field parameters were measured after each well volume purged. Wells were purged prior to sampling until at least three well volumes had been removed, the field parameters were relatively stable or the well was dry. Stabilized field parameter values are summarized in Table 3.

Table 3 - Field Measurement of Water Quality Parameters – Mar 11, 2022

Parameter	BH1-22	BH4-22	BH6-22	BH7-22	BH8-22
Temperature (°C)	8.0	8.1	7.2	7.8	7.5
pH	9.6	10.3	9.3	9.3	9.1
Electrical Conductivity (µS/cm)	657	691	766	1138	1114

Table 3 cont. - Field Measurement of Water Quality Parameters – Mar 11, 2022

Parameter	BH9-22	BH10-22	BH11-22	BH12-22
Temperature (°C)	8.4	9.4	7.6	6.7
pH	9.4	8.8	10.1	9.6
Electrical Conductivity (µS/cm)	840	1140	1420	922

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 4 - Soil Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameter Analyzed						Rationale
		Metals[1]	BTEX	PHCs F_1-F_4	VOCs	PAHs	pH	
BH1-22-AU1	0.1 – 0.4 m Silty Sand (Fill Material)	X				X	X	Assess APEC 3 (Fill Material of Unknown Quality)
BH2-22-AU1	0.1 – 0.4 m Silty Sand (Fill Material)	X				X		Assess APEC 3 (Fill Material of Unknown Quality)
BH4-22-SS4	3.8 - 4.4 m Silty Clay (Native Material)		X	X	X		X	Assess APEC 1 (Former Printers)
BH6-22-SS2	0.8 -1.4 m Silty Clay and Silty Sand (Fill Material)	X				X		Assess APEC 3 (Fill Material of Unknown Quality)
BH6-22-SS6	3.8 - 4.4 m Silty Clay (Native Material)	X	X	X	X		X	Assess APECs 1 and 3 (Former Printers)
BH7-22-SS6	3.8 - 4.4 m Silty Clay (Native Material)	X	X	X	X			Assess APECs 1 and 3 (Former Printers)
BH8-22-SS2	0.8 - 1.4 m Silty Sand (Fill Material)	X				X		Assess APEC 3 (Fill Material of Unknown Quality)
BH8-22-SS6	3.8 - 4.4 m Silty Clay (Native Material)	X	X	X	X			Assess APECs 1 and 3 (Former Printers)
BH9-22-SS5	3.0 - 3.7 m Silty Clay (Native Material)	X	X	X	X			Assess APECs 3 and 9 (Existing Retail Fuel Outlet)
BH10-22-SS5	3.0 - 3.7 m Silty Clay (Native Material)	X	X	X	X			Assess APEC 2 (Former Medical Facility)
BH11-22-SS3	3.0 - 3.7 m Silty Clay (Native Material)		X	X	X			Assess APEC 2 (Former Medical Facility)

Table 4 - Soil Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameter Analyzed						Rationale
		Metals[1]	BTEX	PHCs F_1-F_4	VOCs	PAHs	pH	
BH12-22-AU1	0.3 – 0.6 m Silty Sand (Fill Material)	X				X		Assess APEC 3 (Fill Material of Unknown Quality)
BH12-22-SS4	3.0 - 3.7 m Silty Clay (Native Material)		X	X				Assess APEC 9 (Existing Retail Fuel Outlet)
BH13-22-AU1	0.3 – 0.6 m Silty Sand (Fill Material)	X				X		Assess APEC 3 (Fill Material of Unknown Quality)
DUP1-Mar8[2]	3.8 - 4.4 m Silty Clay (Native Material)				X			Duplicate soil samples for QA/QC purposes

Notes:
- 1 – including Hg and CrVI
- 2 - Duplicate of BH6-22-SS6

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

Table 5 - Groundwater Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameter Analyzed		Rationale
		PHCs F_1-F_4	VOCs	
BH4-22-GW1[2]	11.59 – 13.11 m Glacial Till (Native Material)		X	Assess APEC 1 (Former Printers)
BH6-22-GW1	3.05 – 6.10 m Silty Clay (Native Material)	X	X	Assess APEC 1 (Former Printers)
BH7-22-GW1	3.05 – 6.10 m Silty Clay (Native Material)	X	X	Assess APEC 1 (Former Printers)
BH8-22-GW1	3.05 – 6.10 m Silty Clay (Native Material)	X	X	Assess APEC 1 (Former Printers)
BH9-22-GW1	3.05 – 6.10 m Silty Clay (Native Material)	X	X	Assess APEC 9 (Existing Retail Fuel Outlet)
BH10-22-GW1	2.44 – 5.49 m Silty Clay (Native Material)	X	X	Assess APEC 2 (Former Medical Facility)

Table 5 - Groundwater Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameter Analyzed		Rationale
		PHCs F_1-F_4	VOCs	
BH11-22-GW1[2]	11.76 – 13.28 m Glacial Till (Native Material)		X	Assess APEC 2 (Former Medical Facility)
BH12-22-GW1	3.05 – 6.10 m Silty Clay (Native Material)	X	X	Assess APEC 9 (Existing Retail Fuel Outlet)
Dup 1[1]	3.05 – 6.10 m Silty Clay (Native Material)		X	Duplicate groundwater sample for QA/QC purposes

Notes:
- 1 – Duplicate of sample BH7-22-GW1
- 2 – Deep well

Paracel Laboratories (Paracel) of Ottawa, Ontario, performed the laboratory analysis on the samples submitted for analytical testing.

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 soil cuttings, purge water and fluids from equipment cleaning were retained on-site.

4.9 Elevation Surveying

The ground surface elevations at each borehole location were surveyed using a GPS device by Paterson personnel and referenced to a geodetic datum.

4.10 Quality Assurance and Quality Control Measures

A summary of quality assurance and quality control (QA/QC) measures, including sampling containers, preservation, labelling, handling, 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 0.08 and 0.15 m of topsoil. The topsoil was underlain by mostly remnant crushed stone or engineered fill to a maximum depth of 1.44 m. The fill material was followed by native silty clay to a maximum depth of 12.34 m which was underlain (in the deeper boreholes) by glacial till consisting of silty sand to sandy silt with gravel, trace clay, cobbles and boulders. The topsoil in BH9-22 was underlain directly by native silty clay. Inferred bedrock was encountered at depths ranging from 13.28 to 13.54 m below ground surface.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling event on March 11, 2022 using an electronic water level meter. Groundwater levels are summarized below in Table 6. All elevations were acquired through a GPS survey completed at the time of the subsurface investigation.

Table 6 - Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (Asl)	Date of Measurement
BH1-22[1]	86.19	5.15	81.04	March 11, 2022
BH4-22[1]	85.37	10.90	74.47	March 11, 2022
BH6-22	85.34	4.54	80.80	March 11, 2022
BH7-22	85.43	1.55	83.88	March 11, 2022
BH8-22	85.36	1.24	84.12	March 11, 2022
BH9-22	85.31	3.77	81.54	March 11, 2022
BH10-22	85.26	0.93	84.33	March 11, 2022
BH11-22[1]	85.00	12.28	72.72	March 11, 2022
BH12-22	85.59	0.60	84.99	March 11, 2022

Notes:
- 1 – Deep well

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

5.3 Fine-Coarse Soil Texture

No grain size analysis was completed for the subject site. Coarse-grained standards were selected based on a conservative approach.

5.4 Soil: Field Screening

Field screening of the soil samples collected resulted in vapour readings ranging 0.1 to 1.4 ppm. These results are not considered to be indicative of significant contamination from volatile contaminants. No visual or olfactory observations were noted at the time of sampling. Vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

5.5 Soil Quality

A total of 15 soil samples (including one duplicate) were submitted for analysis of metals (including Hg and Cr_{vi}), BTEX, PHCs (F_1-F_4), VOCs, PAHs and/or pH. The results of the analytical testing are presented below in Tables 7 to 11. The laboratory certificates of analysis are provided in Appendix 1.

TABLE 7 - Analytical Test Results – Soil - Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g)						MECP Table 3 Residential Standards (µg/g)
		Mar 4, 2022		Mar 8, 2022				
		BH1-22-AU1	BH2-22-AU1	BH6-22-SS2	BH6-22-SS6	BH7-22-SS6	BH8-22-SS2	
Antimony	1.0	nd	nd	nd	nd	nd	nd	7.5
Arsenic	1.0	2.8	4.0	3.8	3.0	4.1	2.8	18
Barium	1.0	184	150	77.6	388	343	66.9	390
Beryllium	0.5	0.6	0.7	nd	0.9	0.9	nd	4
Boron	5.0	nd	8.0	8.2	8.4	12.9	7.3	120
Cadmium	0.5	nd	nd	nd	nd	nd	nd	1.2
Chromium	5.0	nd	nd	nd	nd	nd	nd	8
Chromium (VI)	0.2	57.3	47.4	15.4	133	149	15.5	160
Cobalt	1.0	11.7	11.5	7.8	**26.8**	**28.0**	6.6	22
Copper	5.0	23.7	24.6	18.8	65.0	61.7	17.7	140
Lead	1.0	6.2	17.2	11.9	6.8	7.9	5.8	120
Mercury	0.1	nd	nd	nd	nd	nd	nd	0.27
Molybdenum	1.0	nd	nd	4.7	1.0	1.0	nd	6.9
Nickel	5.0	31.4	29.2	16.6	77.0	85.1	14.0	100
Selenium	1.0	nd	nd	nd	nd	nd	nd	2.4
Silver	0.3	nd	nd	nd	nd	nd	nd	20
Thallium	1.0	nd	nd	nd	nd	nd	nd	1
Uranium	1.0	nd	nd	nd	nd	1.5	nd	23
Vanadium	10.0	54.9	47.8	18.5	**126**	**122**	22.0	86
Zinc	20.0	64.4	69.6	24.0	140	138	37.0	340

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

TABLE 7 cont. - Analytical Test Results – Soil - Metals

Parameter	MDL (µg/g)	Soil Samples (µg/g)					MECP Table 3 Residential Standards (µg/g)
		Mar 8, 2022			Mar 9, 2022		
		BH8-22-SS6	BH9-22-SS5	BH10-22-SS5	BH12-22-AU1	BH13-22-AU1	
Antimony	1.0	nd	nd	nd	nd	nd	7.5
Arsenic	1.0	3.3	3.0	3.2	2.9	7.9	18
Barium	1.0	328	300	340	141	83.9	390
Beryllium	0.5	0.9	0.9	0.9	nd	nd	4
Boron	5.0	12.1	12.2	8.3	nd	6.1	120
Cadmium	0.5	nd	nd	nd	nd	nd	1.2
Chromium	5.0	nd	nd	nd	nd	nd	8
Chromium (VI)	0.2	138	123	125	38.5	36.2	160
Cobalt	1.0	**26.4**	**23.7**	**25.2**	8.5	12.4	22
Copper	5.0	60.7	51.5	60.0	19.6	16.8	140
Lead	1.0	7.5	7.4	6.6	20.5	16.8	120
Mercury	0.1	nd	nd	nd	nd	nd	0.27
Molybdenum	1.0	nd	nd	nd	1.1	5.2	6.9
Nickel	5.0	77.5	69.5	72.8	23.3	27.3	100
Selenium	1.0	nd	nd	nd	nd	nd	2.4
Silver	0.3	nd	nd	nd	nd	nd	20
Thallium	1.0	nd	nd	nd	nd	nd	1
Uranium	1.0	1.3	1.4	1.1	nd	nd	23
Vanadium	10.0	**116**	**106**	**118**	38.0	39.8	86
Zinc	20.0	131	127	130	60.5	33.8	340

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

Cobalt and vanadium parameter concentrations in soil samples BH6-22-SS6, BH7-22-SS6, BH8-22-SS6, BH9-22-SS5 and BH10-22-SS5 exceed the MECP Table 3 Standards. As further discussed below in the CSM, these exceedances are considered to be naturally occurring and are not considered to pose a concern to the Phase II Property. All remaining metal parameters identified in each of the soil samples analysed comply with the MECP Table 3 standards. The analytical results for metals in the tested soil are shown on Drawing PE5607-4 – Analytical Testing Plan – Soil.

Table 8 - 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)
		Mar 7, 2022	Mar 8, 2022				
		BH4-22-SS4	BH6-22-SS6	BH7-22-SS6	BH8-22-SS6	BH9-22-SS5	
Benzene	0.02	nd[1]	nd[1]	nd[1]	nd[1]	nd[1]	0.21

Table 8 - 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)
		Mar 7, 2022	Mar 8, 2022				
		BH4-22-SS4	BH6-22-SS6	BH7-22-SS6	BH8-22-SS6	BH9-22-SS5	
Ethylbenzene	0.05	nd[1]	nd[1]	nd[1]	nd[1]	nd[1]	2
Toluene	0.05	nd[1]	nd[1]	nd[1]	nd[1]	nd[1]	2.3
Xylenes, total	0.05	nd[1]	nd[1]	nd[1]	nd[1]	nd[1]	3.1
F1 PHC (C6-C10)	7	nd	nd	nd	nd	nd	55
F2 PHCs (C10-C16)	4	nd	nd	nd	nd	nd	98
F3 PHCs (C16-C34)	8	nd	nd	nd	nd	nd	300
F4 PHCs (C34-C50)	6	nd	nd	nd	nd	nd	2,800

Notes:
- MDL – Method Detection Limit
- NA – not analyzed
- nd – not detected above the MDL
- 1 – tested as part of the VOC parameter group

Table 8 cont. - 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)
		Mar 8, 2022		Mar 9, 2022		
		BH10-22-SS5	DUP1 – Mar 8[2]	BH11-22-SS3	BH12-22-SS4	
Benzene	0.02	nd[1]	nd[1]	nd[1]	nd	0.21
Ethylbenzene	0.05	nd[1]	nd[1]	nd[1]	nd	2
Toluene	0.05	nd[1]	nd[1]	nd[1]	nd	2.3
Xylenes, total	0.05	nd[1]	nd[1]	nd[1]	nd	3.1
F1 PHC (C6-C10)	7	nd	NA	nd	nd	55
F2 PHCs (C10-C16)	4	nd	NA	nd	nd	98
F3 PHCs (C16-C34)	8	nd	NA	nd	nd	300
F4 PHCs (C34-C50)	6	nd	NA	nd	nd	2,800

Notes:
- MDL – Method Detection Limit
- NA – not analyzed
- nd – not detected above the MDL
- 1 – tested as part of the VOC parameter group
- 2 – Duplicate of sample BH6-22-SS6

No BTEX or PHC parameter concentrations were detected in the soil samples analysed and therefore the results comply with the selected MECP Table 3 Standards. The analytical results for BTEX and PHCs in the tested soil are shown on Drawing PE5607-4 – Analytical Testing Plan – Soil.

Table 9 - Analytical Test Results – Soil – VOCs

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Residential Standards (µg/g)
		Mar 7, 2022	Mar 8, 2022			
		BH4-22-SS4	BH6-22-SS6	BH7-22-SS6	BH8-22-SS6	
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-Dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
trans-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-Dichloropropane	0.05	nd	nd	nd	nd	0.05
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl Ketone	0.50	nd	nd	nd	nd	16
Methyl Isobutyl Ketone	0.50	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Toluene	0.05	nd	nd	nd	nd	2.3
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	0.38
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	nd	nd	0.061
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes, total	0.05	nd	nd	nd	nd	3.1

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

Table 9 cont. - Analytical Test Results – Soil – VOCs

Parameter	MDL (µg/g)	Soil Samples (µg/g)				MECP Table 3 Residential Standards (µg/g)
		Mar 8, 2022			Mar 9, 2022	
		BH9-22-SS5	BH10-22-SS5	DUP1-Mar 8[1]	BH11-22-SS3	
Acetone	0.50	nd	nd	nd	nd	16
Benzene	0.02	nd	nd	nd	nd	0.21
Bromodichloromethane	0.05	nd	nd	nd	nd	13
Bromoform	0.05	nd	nd	nd	nd	0.27
Bromomethane	0.05	nd	nd	nd	nd	0.05
Carbon Tetrachloride	0.05	nd	nd	nd	nd	0.05
Chlorobenzene	0.05	nd	nd	nd	nd	2.4
Chloroform	0.05	nd	nd	nd	nd	0.05
Dibromochloromethane	0.05	nd	nd	nd	nd	9.4
Dichlorodifluoromethane	0.05	nd	nd	nd	nd	16
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	3.4
1,3-Dichlorobenzene	0.05	nd	nd	nd	nd	4.8
1,4-Dichlorobenzene	0.05	nd	nd	nd	nd	0.083
1,1-Dichloroethane	0.05	nd	nd	nd	nd	3.5
1,2-Dichloroethane	0.05	nd	nd	nd	nd	0.05
1,1-Dichloroethylene	0.05	nd	nd	nd	nd	0.05
cis-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	3.4
trans-1,2-Dichloroethylene	0.05	nd	nd	nd	nd	0.084
1,2-Dichloropropane	0.05	nd	nd	nd	nd	0.05
1,3-Dichloropropene, total	0.05	nd	nd	nd	nd	0.05
Ethylbenzene	0.05	nd	nd	nd	nd	2
Ethylene dibromide	0.05	nd	nd	nd	nd	0.05
Hexane	0.05	nd	nd	nd	nd	2.8
Methyl Ethyl Ketone	0.50	nd	nd	nd	nd	16
Methyl Isobutyl Ketone	0.50	nd	nd	nd	nd	1.7
Methyl tert-butyl ether	0.05	nd	nd	nd	nd	0.75
Methylene Chloride	0.05	nd	nd	nd	nd	0.1
Styrene	0.05	nd	nd	nd	nd	0.7
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.058
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	0.05
Tetrachloroethylene	0.05	nd	nd	nd	nd	0.28
Toluene	0.05	nd	nd	nd	nd	2.3
1,1,1-Trichloroethane	0.05	nd	nd	nd	nd	0.38
1,1,2-Trichloroethane	0.05	nd	nd	nd	nd	0.05
Trichloroethylene	0.05	nd	nd	nd	nd	0.061
Trichlorofluoromethane	0.05	nd	nd	nd	nd	4
Vinyl Chloride	0.02	nd	nd	nd	nd	0.02
Xylenes, total	0.05	nd	nd	nd	nd	3.1

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- 1 – Duplicate of sample BH6-22-SS6

No VOC parameter concentrations were detected in the soil samples analysed and therefore the results comply with the selected MECP Table 3 Standards.

The analytical results for VOCs in the tested soil are shown on Drawing PE5607-4 – Analytical Testing Plan – Soil.

TABLE 10 - Analytical Test Results – Soil - PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Standards Residential Coarse (µg/g)
		Mar 4, 2022		Mar 8, 2022	
		BH1-22-AU1	BH2-22-AU1	BH6-22-SS2	
Acenaphthene	0.02	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	nd	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	nd	0.38
Methylnaphthalene	0.04	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	nd	6.2
Pyrene	0.02	nd	nd	nd	78

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

TABLE 10 cont. - Analytical Test Results – Soil - PAHs

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Standards Residential Coarse (µg/g)
		Mar 8, 2022	Mar 9, 2022		
		BH8-22-SS2	BH12-22-AU1	BH13-22-AU1	
Acenaphthene	0.02	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	nd	0.15
Anthracene	0.02	nd	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	nd	0.78
Benzo[ghi]perylene	0.02	nd	nd	nd	6.6
Benzo[k]fluoranthene	0.02	nd	nd	nd	0.78
Chrysene	0.02	nd	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	nd	0.69
Fluorene	0.02	nd	nd	0.03	62
Indeno[1,2,3-cd]pyrene	0.02	nd	nd	0.05	0.38
Methylnaphthalene	0.04	nd	nd	0.08	0.99
Naphthalene	0.01	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	0.06	6.2
Pyrene	0.02	nd	nd	nd	78

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

PAH parameters were identified in soil sample BH13-22-AU1, all of which comply with the selected MECP Table 3 Standards. No PAH parameters were identified in the remaining soil samples submitted for analytical testing. The analytical results for PAHs in the tested soil are shown on Drawing PE5607-4 – Analytical Testing Plan – Soil.

TABLE 11 - Analytical Test Results – Soil – General Inorganics

Parameter	MDL (µg/g)	Soil Samples (µg/g)			MECP Table 3 Standards Residential Coarse
		Mar 4, 2022		Nov 11, 2021	
		BH1-22-AU1	BH4-22-SS4	BH6-22-SS6	
pH	0.05	7.35	7.85	7.89	5-11

Notes:
- MDL – Method Detection Limit

All soil samples analyzed for pH comply with the selected MECP Table 3 Standards.

The maximum concentrations of analyzed parameters in the soil at the site are summarized in Table 12.

TABLE 12 - Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
Arsenic	7.9	BH13-22-AU1	0.3 – 0.6; Fill Material
Barium	388	BH6-22-SS6	3.8 - 4.4; Native Material
Beryllium	0.9	BH6-22-SS6 BH7-22-SS6 BH8-22-SS6 BH9-22-SS5 BH10-22-SS5	3.8 - 4.4; Native Material 3.8 - 4.4; Native Material 3.8 - 4.4; Native Material 3.0 - 3.7; Native Material 3.0 - 3.7; Native Material
Boron	12.9	BH7-22-SS6	3.8 - 4.4; Native Material
Chromium	149	BH7-22-SS6	3.8 - 4.4; Native Material
Cobalt	**28.0**	BH7-22-SS6	3.8 - 4.4; Native Material
Copper	65.0	BH6-22-SS6	3.8 - 4.4; Native Material
Lead	20.5	BH12-22-AU1	3.0 - 3.7; Native Material
Molybdenum	5.2	BH13-22-AU1	0.3 – 0.6; Fill Material
Nickel	85.1	BH7-22-SS6	3.8 - 4.4; Native Material
Uranium	1.5	BH7-22-SS6	3.8 - 4.4; Native Material
Vanadium	**126**	BH6-22-SS6	3.8 - 4.4; Native Material
Zinc	140	BH6-22-SS6	3.8 - 4.4; Native Material
1-Methylnaphthalene	0.03	BH13-22-AU1	0.3 – 0.6; Fill Material
2-Methylnaphthalene	0.05	BH13-22-AU1	0.3 – 0.6; Fill Material
Methylnaphthalene (1&2)	0.08	BH13-22-AU1	0.3 – 0.6; Fill Material
Phenanthrene	0.06	BH13-22-AU1	0.3 – 0.6; Fill Material

All remaining parameter results were non-detect. The laboratory Certificates of Analysis are provided in Appendix 1.

5.6 Groundwater Quality

Nine groundwater samples (including one duplicate) from monitoring wells installed in BH4-22, BH6-22, BH7-22, BH8-22, BH9-22, BH10-22, BH11-22 and BH12-22 were submitted for laboratory analysis of VOCs and/or PHCs (F_1-F_4).

The groundwater samples were obtained from the screened intervals noted in Table 2. The results of the analytical testing are presented below in Tables 13 and 14. The laboratory certificate of analysis is provided in Appendix 1.

Table 13 - Analytical Test Results – Groundwater - VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)					MECP Table 3 Residential Standards (µg/L)
		Mar 11, 2022					
		BH4-22-GW1	BH6-22-GW1	BH7-22-GW1	Dup 1[1]	BH8-22-GW1	
Acetone	5.0	nd	nd	nd	nd	nd	130,000
Benzene	0.5	nd	nd	nd	nd	nd	44
Bromodichloromethane	0.5	nd	nd	nd	nd	nd	85,000
Bromoform	0.5	nd	nd	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	nd	nd	630
Chloroform	0.5	nd	nd	nd	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	nd	nd	nd	82,000
Dichlorodifluoromethane	1.0	nd	nd	9.8	11.0	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	nd	8
1,1-Dichlroethane	0.5	nd	nd	nd	nd	nd	320
1,2-dichlorethane	0.5	nd	nd	nd	nd	nd	1.6
1,1-Dichlroethylene	0.5	nd	nd	nd	nd	nd	1.6
Cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	nd	1.6
Trans-1,2-dichloroethylene	0.5	nd	nd	nd	nd	nd	1.6
1,2-dichloropropane	0.5	nd	nd	nd	nd	nd	16
Cis-1,3-Dichloropropylene	0.5	nd	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.5	nd	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.5	nd	nd	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	nd	nd	2,300
Ethylene dibromide	0.2	nd	nd	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	nd	nd	51
Methyl Ethyl ketone	5.0	nd	nd	nd	nd	nd	470,000
Methyl Isobutyl ketone	5.0	nd	nd	nd	nd	nd	140,000
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	nd	190
Methylene Chloride	5.0	nd	nd	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	nd	nd	2,500
Vinyl Chloride	0.5	nd	nd	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	nd	nd	4,200

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- N/V – no value provided by the MECP
- 1 – Duplicate of sample BH7-22-GW1

Table 13 cont. - Analytical Test Results – Groundwater - VOCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)				MECP Table 3 Residential Standards (µg/L)
		Mar 11, 2022				
		BH9-22-GW1	BH10-22-GW1	BH11-22-GW1	BH12-22-GW1	
Acetone	5.0	nd	nd	nd	nd	130,000
Benzene	0.5	nd	nd	nd	nd	44
Bromodichloromethane	0.5	nd	nd	nd	nd	85,000
Bromoform	0.5	nd	nd	nd	nd	380
Bromomethane	0.5	nd	nd	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	nd	630
Chloroform	0.5	nd	nd	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	nd	nd	82,000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	4,400
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	4,600
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	9,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	8
1,1-Dichlroethane	0.5	nd	nd	nd	nd	320
1,2-dichlorethane	0.5	nd	nd	nd	nd	1.6
1,1-Dichlroethylene	0.5	nd	nd	nd	nd	1.6
Cis-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
Trans-1,2-dichloroethylene	0.5	nd	nd	nd	nd	1.6
1,2-dichloropropane	0.5	nd	nd	nd	nd	16
Cis-1,3-Dichloropropylene	0.5	nd	nd	nd	nd	N/V
Trans-1,3-Dichloropropylene	0.5	nd	nd	nd	nd	N/V
1,3-Dichloropropene, total	0.5	nd	nd	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	nd	nd	2,300
Ethylene dibromide	0.2	nd	nd	nd	nd	0.25
Hexane	1.0	nd	nd	nd	nd	51
Methyl Ethyl ketone	5.0	nd	nd	nd	nd	470,000
Methyl Isobutyl ketone	5.0	nd	nd	nd	nd	140,000
Methyl tert-butyl ether	2.0	nd	nd	nd	nd	190
Methylene Chloride	5.0	nd	nd	nd	nd	610
Styrene	0.5	nd	nd	nd	nd	1,300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	nd	2,500
Vinyl Chloride	0.5	nd	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	nd	4,200

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- N/V – no value provided by the MECP

One VOC parameter was identified in groundwater sample BH7-22-GW1 which complies with the selected MECP Table 3 Standards. No VOC parameters were identified in the remaining groundwater samples submitted for analytical testing.

The analytical results for VOCs in the tested groundwater are shown on Drawing PE5607-5 – Analytical Testing Plan – Groundwater.

TABLE 14 - Analytical Test Results – Groundwater - PHCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Residential Standards (µg/L)
		Mar 11, 2022			
		BH6-22-GW1	BH7-22-GW1	BH8-22-GW1	
F1 PHC (C6-C10)	25	nd	nd	nd	750
F2 PHCs (C10-C16)	100	nd	nd	nd	150
F3 PHCs (C16-C34)	100	nd	nd	nd	500
F4 PHCs (C34-C50)	100	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

TABLE 14 cont. - Analytical Test Results – Groundwater - PHCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MECP Table 3 Residential Standards (µg/L)
		Mar 11, 2022			
		BH9-22-GW1	BH10-22-GW1	BH12-22-GW1	
F1 PHC (C6-C10)	25	nd	nd	nd	750
F2 PHCs (C10-C16)	100	nd	nd	nd	150
F3 PHCs (C16-C34)	100	nd	nd	nd	500
F4 PHCs (C34-C50)	100	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL

No PHC parameter concentrations were detected in the groundwater samples analysed and therefore the results comply with the selected MECP Table 3 Standards. The analytical results for PHCs in the tested groundwater are shown on Drawing PE5607-5 – Analytical Testing Plan – Groundwater.

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 BH6-22-SS6 and submitted for laboratory analysis of VOC

parameters. 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 BH7-22 and submitted for laboratory analysis of VOC parameters. Both the original and duplicate samples had Dichlorodifluoromethane concentrations that comply with the selected MECP Table 3 Standards. All of the remaining VOC parameters were identified as being non-detect in both the original and duplicate sample. Based on the similar results and 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 currently primarily vacant land with a paved roadway along the northeast property boundary.

Potentially Contaminating Activity and Areas of Potential Environmental Concern

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

Table 14 - Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 Former Printers	South portion of the Phase I Property (2510 St. Laurent Boulevard)	*"Item NA – Commercial Printers"*	On-site	VOCs PHCs	Soil Groundwater
APEC 2 Former Medical Facility	East portion of the Phase I Property (3000 Conroy Road)	*"Item 42: Pharmaceutical Manufacturing and Processing"*	On-site	Metals As, Sb, Se Hg, CrVI PHCs	Soil Groundwater
APEC 3 Fill Material of Unknown Quality	Throughout the Phase I Property	*"Item 30 – Importation of Fill Material of Unknown Quality"*	On-site	Metals As, Sb, Se Hg, CrVI PAHs	Soil
APEC 4[1] Application of Road Salt	South portion of the Phase I Property (2510 St. Laurent Boulevard)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	Electrical Conductivity (EC) Sodium Adsorption Ratio (SAR)	Soil
APEC 5[1] Application of Road Salt	West portion of the Phase I Property (2425 Don Reid Drive)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil
APEC 6[1] Application of Road Salt	Northwest portion of the Phase I Property (1900 Walkley Road)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil
APEC 7[1] Application of Road Salt	East portion of the Phase I Property (3000 Conroy Road)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice"*	On-site	EC SAR	Soil

Table 14 - Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern with respect to Phase I Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 8[1] Application of Road Salt	Northeast portion of the Phase I Property (1920 Walkley Road and 2990 Conroy Road)	*"Item NA: Application of road salt for the safety of vehicular or pedestrian traffic under conditions of snow or ice""*	On-site	EC SAR	Soil
APEC 9 Retail Fuel Outlet	Northeast portion of the Phase I Property (1920 Walkley Road and 2990 Conroy Road)	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	Off-site	BTEX PHCs	Soil Groundwater

1 – In accordance with Section 49.1 of O.Reg. 153/04 standards are deemed to be met if an applicable site condition standard is exceeded at a property solely because the qualified person has determined that a substance has been applied to surfaces for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both. The exemption outlined in Section 49.1 is being relied up with respect to the Phase I Property.

The APECs are shown on Drawing PE5607 – 1 Site Plan. No other PCAs identified in the Phase I ESA Study Area are considered to represent an APEC on the Phase I Property.

Contaminants of Potential Concern and Impacted Media

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

- Petroleum Hydrocarbons Fractions 1 through 4 (PHCs F_1-F_4)
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
- Volatile Organic Compounds (VOCs)
- Metals (including arsenic (As), antimony (Sb) and selenium (Se))
- Mercury (Hg)
- Hexavalent Chromium (Cr_{VI})

- ❑ Polycyclic Aromatic Hydrocarbons (PAHs)

In accordance with Section 49.1 of O.Reg.153/04, as amended, electrical conductivity (EC) and sodium adsorption ratio (SAR) are not considered to be CPCs.

Subsurface Structures and Utilities

The Phase I Property is situated in a municipally serviced area. Utilities on the Phase II Property include water, sewer and hydro connections. Based on standard practice for subsurface utility installation, service trenches are expected to be present approximately 1 to 2 m below grade.

Physical Setting

Site Stratigraphy

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

- ❒ Topsoil from 0 to 0.15 m
- ❒ Fill material consisting of mostly remnant crushed stone or engineered fill to a maximum depth of 1.44 m.
- ❒ The topsoil in BH9-22 was underlain directly by native silty clay to a depth of 6.10 m.
- ❒ Native brown or grey silty clay extending to a maximum depth of 12.34 m.
- ❒ Glacial Till consisting of silty sand or sandy silt with gravel, trac clay, cobbles and boulders to a maximum depth of 13.54 m.
- ❒ Inferred bedrock was encountered at depths ranging from 13.28 to 13.54 mbgs.

Hydrogeological Characteristics

Groundwater at the Phase II - Property was encountered within the native silty clay. Based on the groundwater levels recorded, the groundwater appears to flow in a south easterly direction with a hydraulic gradient of 0.013 m/m. Groundwater contours are shown on Drawing PE5607-3 – Test Hole Location Plan.

Approximate Depth to Bedrock

Inferred bedrock was encountered at depths ranging from approximately 13.28 to 13.54 m below ground surface as determined by auger refusal at the time of the drilling program.

Approximate Depth to Water Table

Depth to the water table at the Phase II Property varies between approximately 0.60 to 12.28 m below existing grade.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation does not apply to the Phase II Property, in that the subject property is not within 30m of an environmentally sensitive area, and the pH of surface soil is between 5 and 9.

Section 43.1 of the Regulation does not apply to the subject site as bedrock is not located less than 2 m below ground surface.

Fill Placement

Fill material ranging in thickness from to a maximum depth of 1.44m and consisting of mostly remnant crushed stone or engineered fill from previous site development was identified on the Phase II Property.

Proposed Buildings and Other Structures

It is our understanding that a series of townhouse-style residential dwellings and a multi-storey retirement home building, which is anticipated to have one or two underground parking levels will be constructed on the Phase II Property. The proposed buildings will generally be surrounded by asphalt-paved access lanes and parking areas. It is expected that the proposed development will be municipally serviced.

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 Phase II Property, or within the Phase I ESA Study Area.

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical test results for soil, there are no contaminants present on the Phase II Property.

It should be noted that cobalt and vanadium concentrations in excess of the selected MECP Table 3 Standards were identified on the Phase II Property. These parameter concentrations are considered to be representative of naturally occurring elevated levels in silty clay deposits within the Ottawa region for the reasons provided below:

- No potential sources of cobalt or vanadium were identified on the subject land during the Phase I ESA
- Concentrations of cobalt and vanadium identified in the fill material overlying the clay layer were not elevated and comply with the selected MECP Table 3 Standards.

As such, it is the opinion of the QP that cobalt and vanadium are not contaminants of concern at the Phase II Property.

Based on the analytical test results for groundwater, there are no contaminants present beneath the Phase II Property.

Types of Contaminants

Based on the findings of the Phase II ESA, there are no contaminants of concern at the Phase II Property.

Contaminated Media

Based on the findings of the Phase II ESA, there is no contaminated media at the Phase II Property.

What Is Known About Areas Where Contaminants Are Present

Based on the findings of the Phase II ESA, there are no contaminants of concern at the Phase II Property.

Distribution and Migration of Contaminants

Based on the findings of the Phase II ESA, there are no contaminants of concern at 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 this Phase II ESA, there is no potential for vapour intrusion on the Phase II Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for 2502 & 2510 St. Laurent Boulevard, 1890, 1900 & 1920 Walkley Road, 2425 Don Reid Drive and 2990 & 3000 Conroy Road, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address seven potentially contaminating activities (PCAs) that were identified during the Phase I ESA and were considered to result in areas of potential environmental concern (APECs) on the Phase II - Property.

The subsurface investigation consisted of drilling 14 boreholes, 10 of which were instrumented with groundwater monitoring wells.

Soil samples were obtained from boreholes and screened using visual observations and organic vapour measurements. A total of 15 soil samples (including one duplicate) were submitted for analysis of metals (including Hg and Cr_{vi}), benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbons (PHCs, F_1-F_4), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and/or pH. Cobalt and vanadium concentrations exceeding the MECP Table 3 Standards were identified in soil samples BH6-22-SS6, BH7-22-SS6, BH8-22-SS6, BH9-22-SS5 and BH10-22-SS5; these concentrations are considered to be naturally occurring and do not represent an environmental concern to the Phase II Property. Remaining metal parameter concentrations were identified in all soil samples at concentrations below the MECP Table 3 Standards. PAH concentrations identified in the soil samples submitted comply with the MECP Table 3 Standards. No BTEX, PHC or VOC concentrations were identified in any of the soil samples analysed.

Nine groundwater samples (including one duplicate) from monitoring wells installed in BH4-22, BH6-22, BH7-22, BH8-22, BH9-22, BH10-22, BH11-22 and BH12-22 were submitted for laboratory analysis of VOCs and/or PHCs (F_1-F_4). No sheen, free product or odour was noted during the groundwater sampling events. All groundwater results comply with the selected MECP Table 3 Standards.

Based on the findings of this Phase II ESA, no further environmental investigation is required.

Recommendations

Monitoring Wells

It is recommended that the monitoring wells installed on the Phase II Property remain viable for future monitoring, if required. It is expected that groundwater monitoring wells will be abandoned in accordance with O.Reg.903 at the time of the construction excavation. Further information can be provided upon request in this regard.

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 Claridge Homes. Notification from Claridge Homes and Paterson Group will be required to release this report to any other party.

Paterson Group Inc.

Jeremy Camposarcone, B.Eng.

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

Report Distribution:

- Claridge Homes
- Paterson Group

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE5607-1 – SITE PLAN

DRAWING PE5607-2 – SURROUNDING LAND USE PLAN

DRAWING PE5607-3 – TEST HOLE LOCATION PLAN

DRAWING PE5607-4 ANAYTICAL TESTING PLAN - SOIL

DRAWING PE5607-4A – CROSS SECTION A-A' SOIL

DRAWING PE5607-5 – ANALTICAL TESTING PLAN - GROUNDWATER

DRAWING PE5607-5A – CROSS SECTION A-A' GROUNDWATER

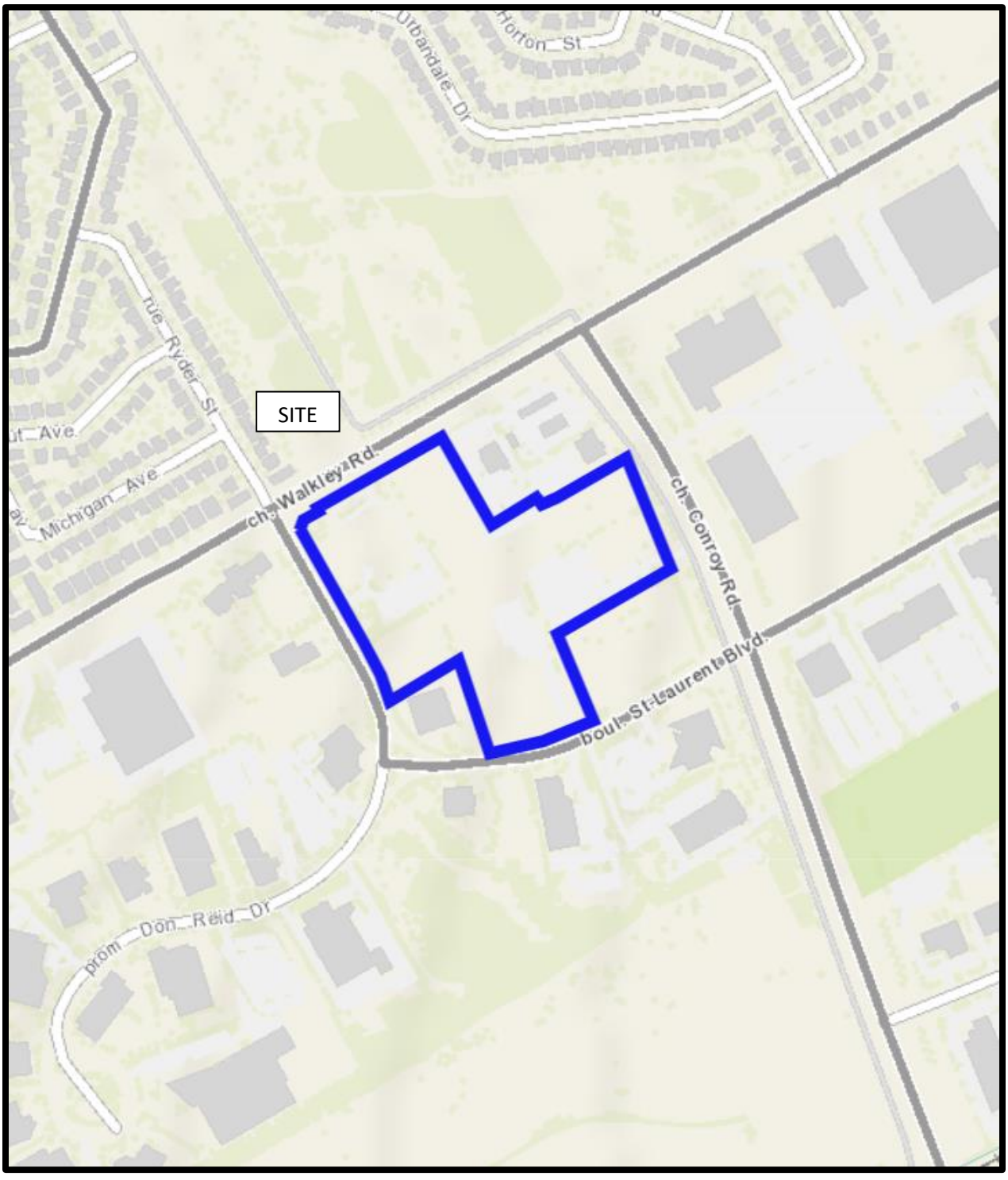
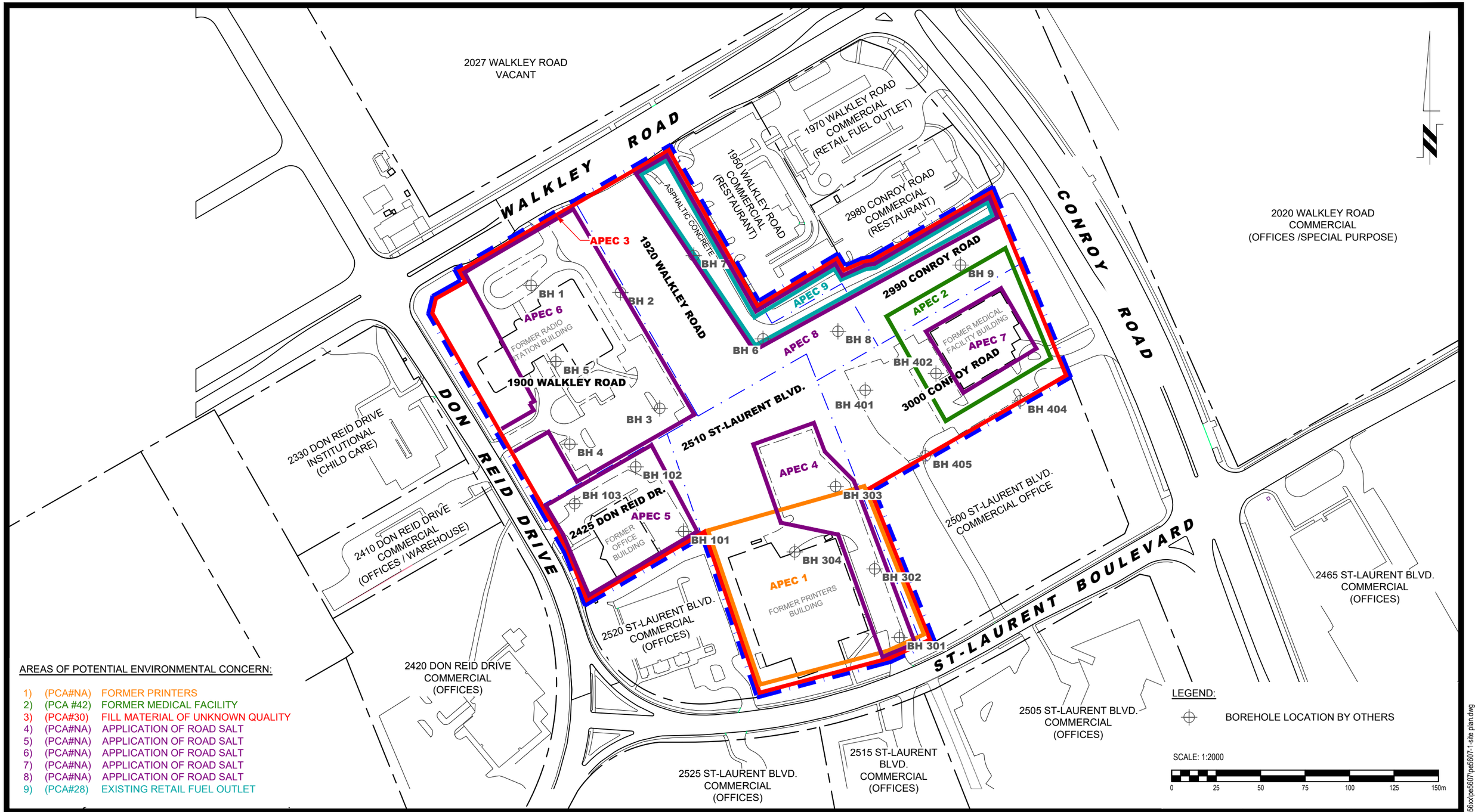


FIGURE 1

KEY PLAN



AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:

1) (PCA#NA) FORMER PRINTERS
2) (PCA #42) FORMER MEDICAL FACILITY
3) (PCA#30) FILL MATERIAL OF UNKNOWN QUALITY
4) (PCA#NA) APPLICATION OF ROAD SALT
5) (PCA#NA) APPLICATION OF ROAD SALT
6) (PCA#NA) APPLICATION OF ROAD SALT
7) (PCA#NA) APPLICATION OF ROAD SALT
8) (PCA#NA) APPLICATION OF ROAD SALT
9) (PCA#28) EXISTING RETAIL FUEL OUTLET

LEGEND:

BOREHOLE LOCATION BY OTHERS

SCALE: 1:2000

0 25 50 75 100 125 150m

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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
2502 & 2510 ST. LAURENT BOULEVARD, 1890, 1900 & 1920 WALKLEY ROAD,
2425 DON REID DRIVE AND 2990 & 3000 CONROY ROAD
OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:2000	Date: 03/2022
Drawn by: YA	Report No.: PE5607-1
Checked by: JC	Dwg. No.: PE5607-1
Approved by: MSD	Revision No.:

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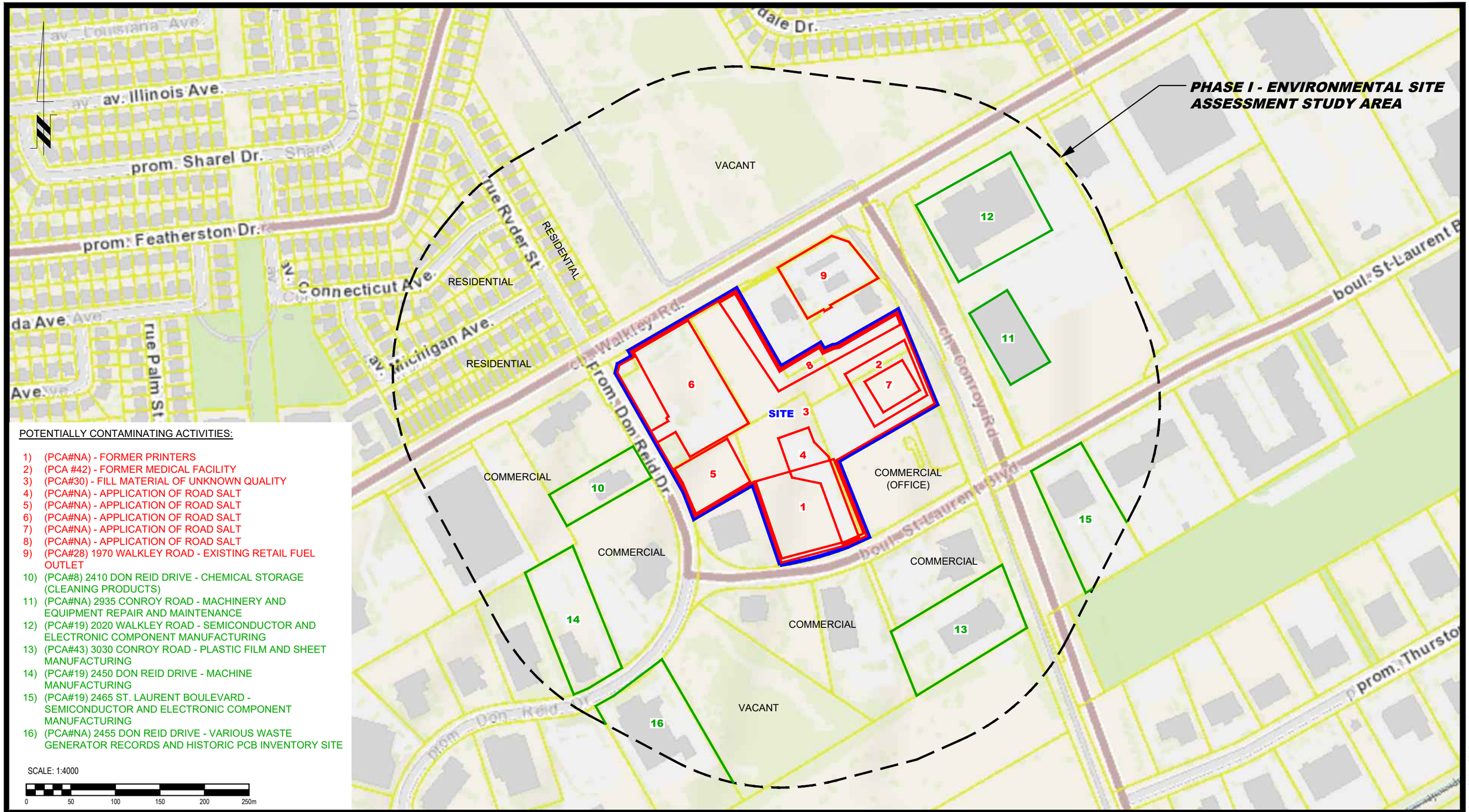

POTENTIALLY CONTAMINATING ACTIVITIES:

1) (PCA#NA) - FORMER PRINTERS
2) (PCA #42) - FORMER MEDICAL FACILITY
3) (PCA#30) - FILL MATERIAL OF UNKNOWN QUALITY
4) (PCA#NA) - APPLICATION OF ROAD SALT
5) (PCA#NA) - APPLICATION OF ROAD SALT
6) (PCA#NA) - APPLICATION OF ROAD SALT
7) (PCA#NA) - APPLICATION OF ROAD SALT
8) (PCA#NA) - APPLICATION OF ROAD SALT
9) (PCA#28) 1970 WALKLEY ROAD - EXISTING RETAIL FUEL OUTLET
10) (PCA#8) 2410 DON REID DRIVE - CHEMICAL STORAGE (CLEANING PRODUCTS)
11) (PCA#NA) 2935 CONROY ROAD - MACHINERY AND EQUIPMENT REPAIR AND MAINTENANCE
12) (PCA#19) 2020 WALKLEY ROAD - SEMICONDUCTOR AND ELECTRONIC COMPONENT MANUFACTURING
13) (PCA#43) 3030 CONROY ROAD - PLASTIC FILM AND SHEET MANUFACTURING
14) (PCA#19) 2450 DON REID DRIVE - MACHINE MANUFACTURING
15) (PCA#19) 2465 ST. LAURENT BOULEVARD - SEMICONDUCTOR AND ELECTRONIC COMPONENT MANUFACTURING
16) (PCA#NA) 2455 DON REID DRIVE - VARIOUS WASTE GENERATOR RECORDS AND HISTORIC PCB INVENTORY SITE

SCALE: 1:4000

0 50 100 150 200 250m

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CLARIDGE HOMES

PHASE I - ENVIRONMENTAL SITE ASSESSMENT

2502 & 2510 ST. LAURENT BOULEVARD, 1890, 1900 & 1920 WALKLEY ROAD, 2425 DON REID DRIVE AND 2990 & 3000 CONROY ROAD

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:4000	Date: 03/2022
Drawn by: YA	Report No.: PE5607-1
Checked by: JC	Dwg. No.: PE5607-2
Approved by: MSD	Revision No.:

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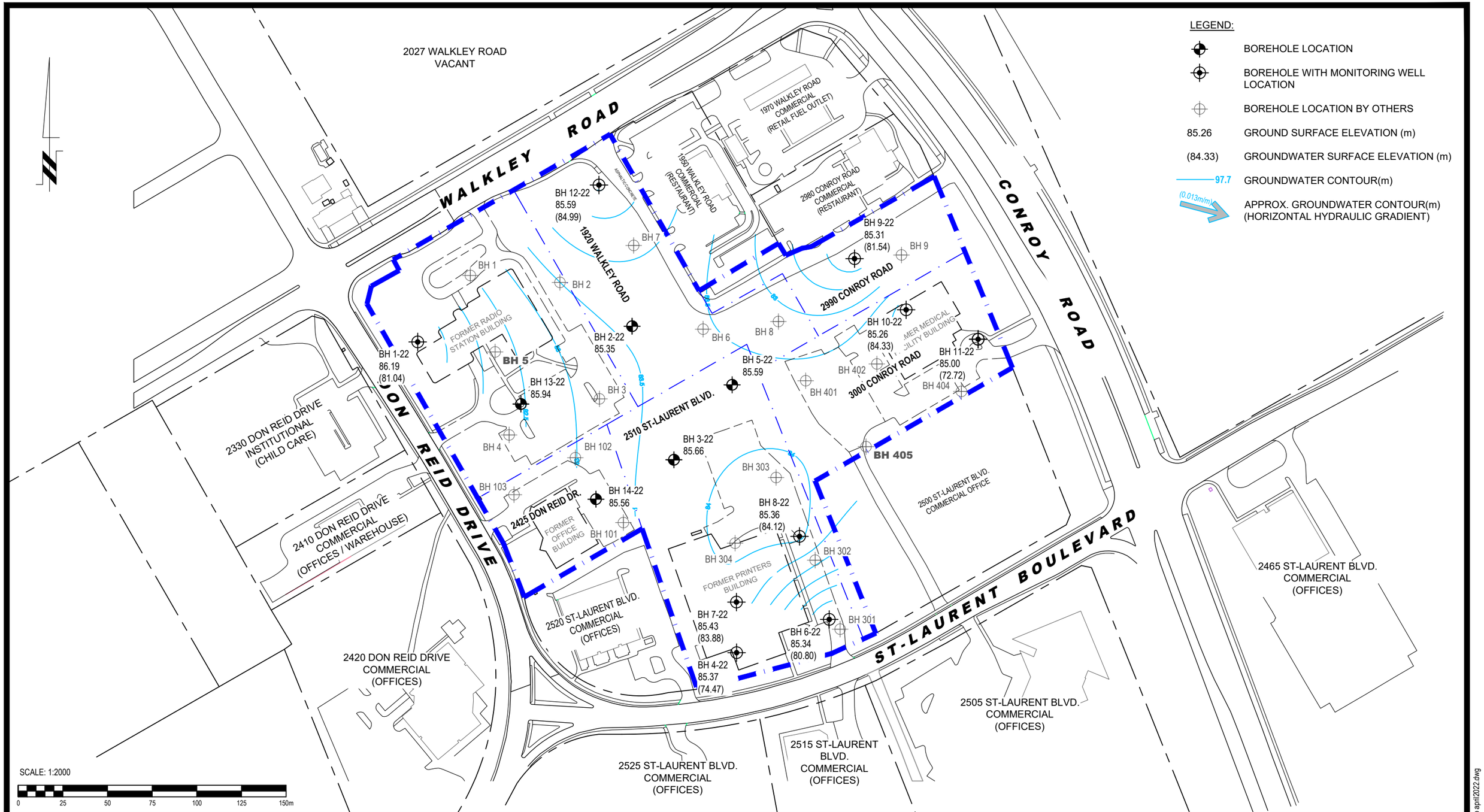

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
2502 & 2510 ST. LAURENT BLVD., 1890, 1900 & 1920 WALKLEY ROAD,
2425 DON REID DRIVE AND 2990 & 3000 CONROY ROAD
OTTAWA, ONTARIO

Title:
TEST HOLE LOCATION PLAN

Scale: 1:2000	Date: 04/2022
Drawn by: MPG	Report No.: PE5607-2
Checked by: JC	Dwg. No.: PE5607-3
Approved by: MSD	Revision No.:

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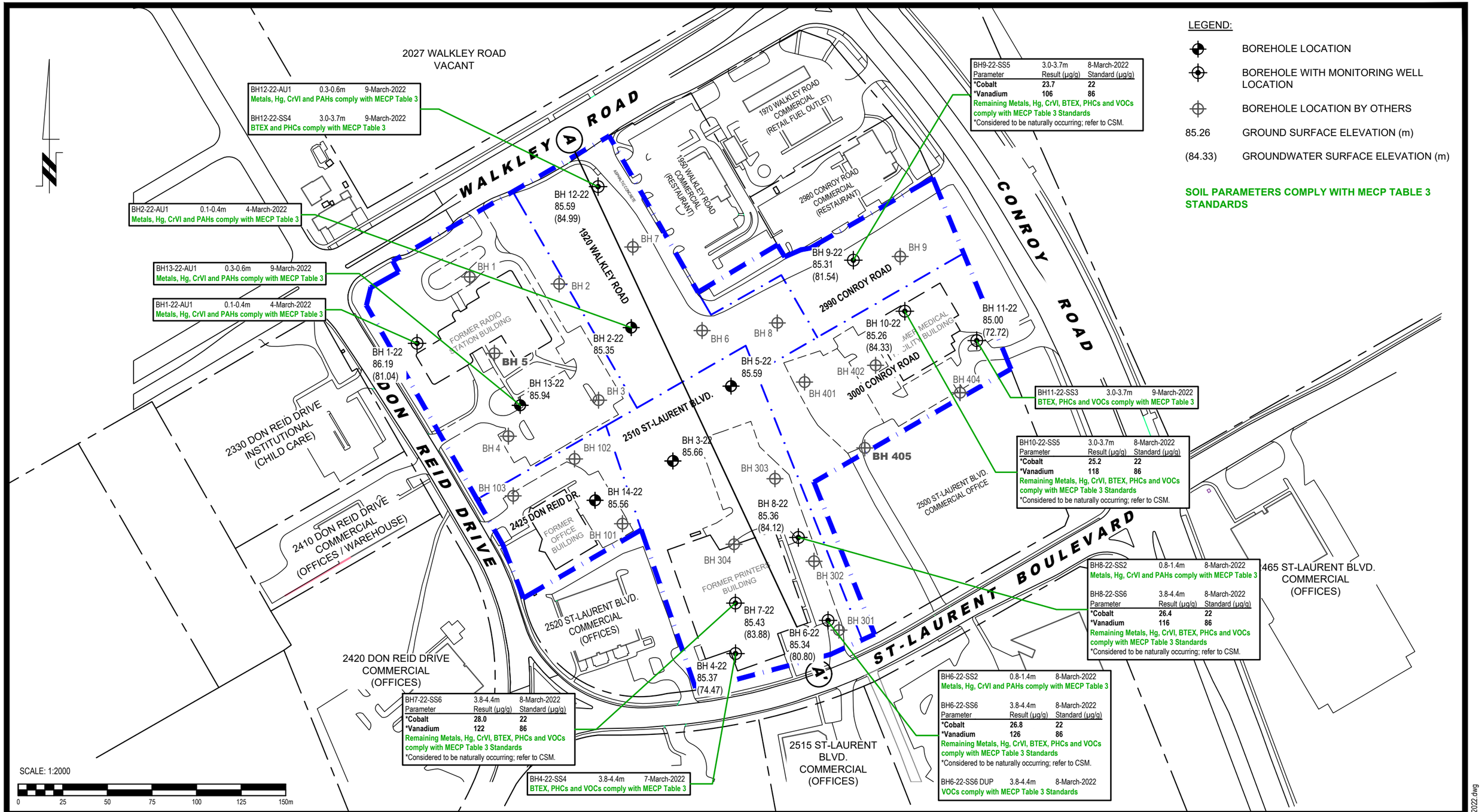

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT

2502 & 2510 ST. LAURENT BLVD., 1890, 1900 & 1920 WALKLEY ROAD, 2425 DON REID DRIVE AND 2990 & 3000 CONROY ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - SOIL

Scale: 1:2000	Date: 04/2022
Drawn by: MPG	Report No.: PE5607-2
Checked by: JC	Dwg. No.: PE5607-4
Approved by: MSD	Revision No.:

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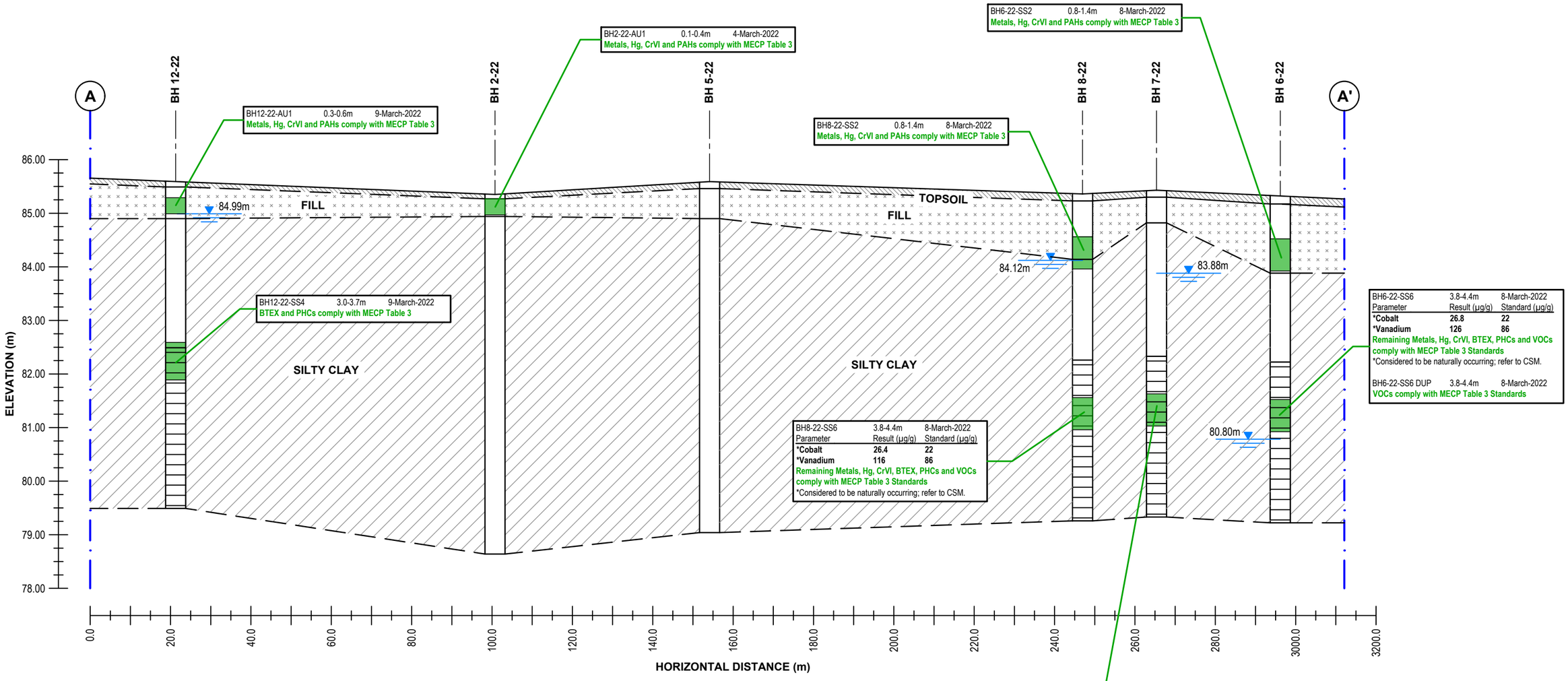

SOIL PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

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0			

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PHASE II - ENVIRONMENTAL SITE ASSESSMENT
2502 & 2510 ST. LAURENT BLVD., 1890, 1900 & 1920 WALKLEY ROAD,
2425 DON REID DRIVE AND 2990 & 3000 CONROY ROAD
OTTAWA, ONTARIO

Title:
CROSS-SECTION A-A' - SOIL

Scale: AS SHOWN	Date: 04/2022
Drawn by: MPG	Report No.: PE5607-2
Checked by: JC	Dwg. No.: PE5607-4A
Approved by: MSD	Revision No.:

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11x17

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- BOREHOLE LOCATION BY OTHERS
- 85.26 GROUND SURFACE ELEVATION (m)
- (84.33) GROUNDWATER SURFACE ELEVATION (m)

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

2027 WALKLEY ROAD
VACANT

WALKLEY ROAD

1970 WALKLEY ROAD COMMERCIAL (RETAIL FUEL OUTLET)

1950 WALKLEY ROAD COMMERCIAL (RESTAURANT)

2980 CONROY ROAD COMMERCIAL (RESTAURANT)

CONROY ROAD

1920 WALKLEY ROAD

2990 CONROY ROAD

3000 CONROY ROAD

2510 ST-LAURENT BLVD.

2425 DON REID DR.

2520 ST-LAURENT BLVD. COMMERCIAL (OFFICES)

2500 ST-LAURENT BLVD. COMMERCIAL OFFICE

2505 ST-LAURENT BLVD.

2465 ST-LAURENT BLVD. COMMERCIAL (OFFICES)

2525 ST-LAURENT BLVD. COMMERCIAL (OFFICES)

2420 DON REID DRIVE COMMERCIAL (OFFICES)

2410 DON REID DRIVE COMMERCIAL (OFFICES / WAREHOUSE)

2330 DON REID DRIVE INSTITUTIONAL (CHILD CARE)

DON REID DRIVE

ST-LAURENT BOULEVARD

FORMER RADIO STATION BUILDING

FORMER OFFICE BUILDING

FORMER PRINTERS BUILDING

MEDICAL BUILDING

ASPHALT & CONCRETE

BH 1 BH 2 BH 3 BH 4 BH 5 BH 6 BH 7 BH 8 BH 9 BH 101 BH 102 BH 103 BH 301 BH 302 BH 303 BH 304 BH 401 BH 402 BH 404 BH 405

BH 1-22 86.19 (81.04)
BH 2-22 85.35
BH 3-22 85.66
BH 4-22 85.37 (74.47)
BH 5-22 85.59
BH 6-22 85.34 (80.80)
BH 7-22 85.43 (83.88)
BH 8-22 85.36 (84.12)
BH 9-22 85.31 (81.54)
BH 10-22 85.26 (84.33)
BH 11-22 85.00 (72.72)
BH 12-22 85.59 (84.99)
BH 13-22 85.94
BH 14-22 85.56

BH12-22-GW1 3.05-6.10m 11-Mar-2022
PHCs and VOCs comply with MECP Table 3

BH9-22-GW1 3.05-6.10m 11-Mar-2022
PHCs and VOCs comply with MECP Table 3

BH11-22-GW1 11.76-13.28m 11-Mar-2022
VOCs comply with MECP Table 3 Standards

BH10-22-GW1 2.44-5.49m 11-Mar-2022
PHCs and VOCs comply with MECP Table 3

BH8-22-GW1 3.05-6.10m 11-Mar-2022
PHCs and VOCs comply with MECP Table 3

BH6-22-GW1 3.05-6.10m 11-Mar-2022
PHCs and VOCs comply with MECP Table 3

BH4-22-GW1 11.59-13.11m 11-Mar-2022
VOCs comply with MECP Table 3 Standards

BH7-22-GW1 3.05-6.10m 11-Mar-2022
PHCs and VOCs comply with MECP Table 3

BH7-22-GW1 DUP 3.05-6.10m 11-Mar-2022
VOCs comply with MECP Table 3 Standards

SCALE: 1:2000

0 25 50 75 100 125 150m

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NO.	REVISIONS	DATE	INITIAL

CLARIDGE HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT

2502 & 2510 ST. LAURENT BLVD., 1890, 1900 & 1920 WALKLEY ROAD,
2425 DON REID DRIVE AND 2990 & 3000 CONROY ROAD

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN - GROUNDWATER

Scale: 1:2000	Date: 04/2022
Drawn by: MPG	Report No.: PE5607-2
Checked by: JC	Dwg. No.: PE5607-5
Approved by: MSD	Revision No.:

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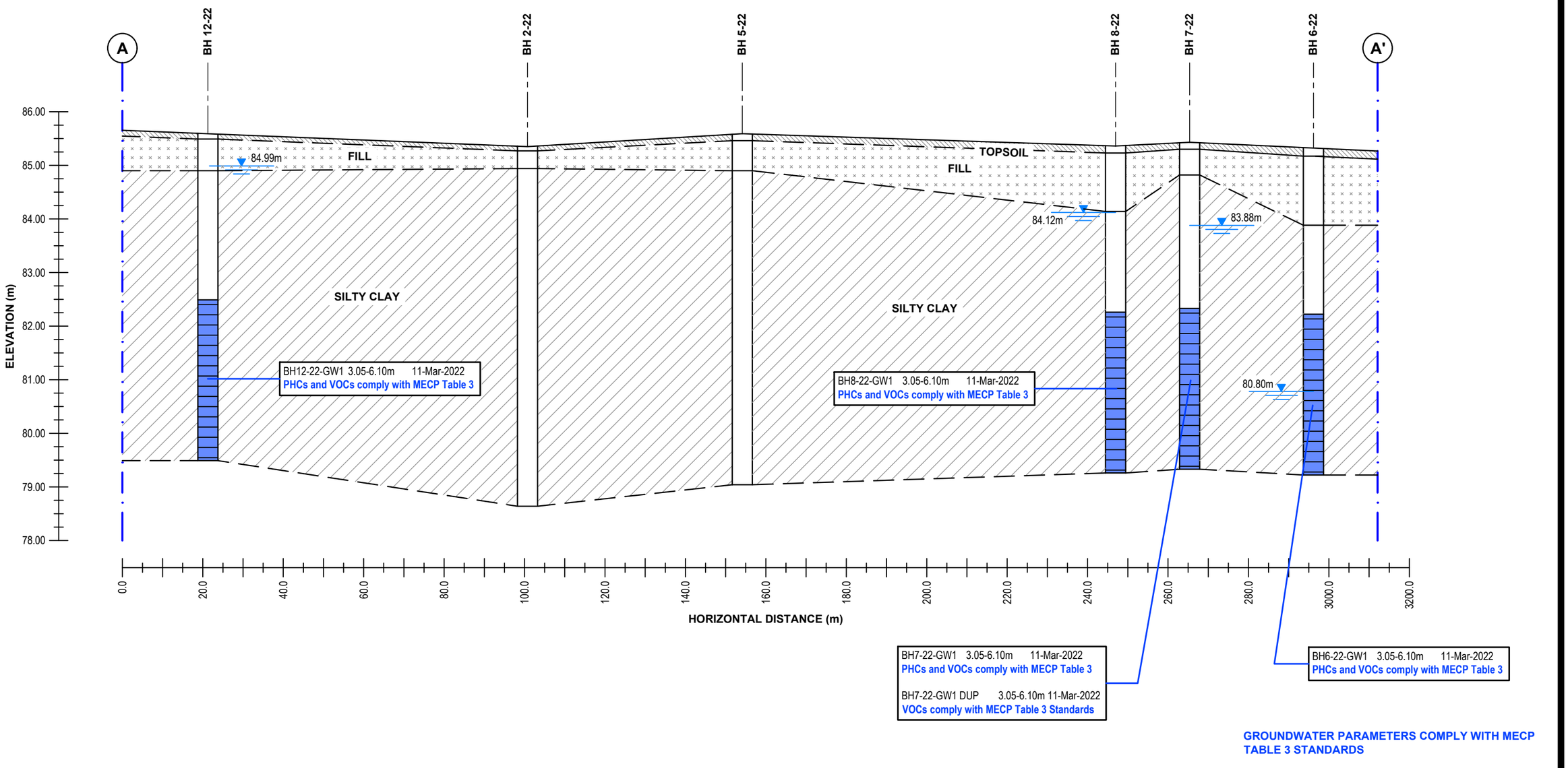

GROUNDWATER PARAMETERS COMPLY WITH MECP TABLE 3 STANDARDS

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NO.	REVISIONS	DATE	INITIAL
0			

CLARIDGE HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
2502 & 2510 ST. LAURENT BLVD., 1890, 1900 & 1920 WALKLEY ROAD,
2425 DON REID DRIVE AND 2990 & 3000 CONROY ROAD
OTTAWA, ONTARIO

Title:

CROSS-SECTION A-A' - GROUNDWATER

Scale: AS SHOWN	Date: 04/2022
Drawn by: MPG	Report No.: PE5607-2
Checked by: JC	Dwg. No.: PE5607-5A
Approved by: MSD	Revision No.:

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11x17

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

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Sampling & Analysis Plan

Phase II – Environmental Site Assessment
2502 & 2510 St. Laurent Boulevard
1890, 1900 & 1920 Walkley Road,
2425 Don Reid Drive,
and 2990 & 3000 Conroy Road
Ottawa, Ontario

Prepared For

Claridge Homes

March 2, 2022

Report: PE5607-SAP

TABLE OF CONTENTS

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Claridge Homes, to conduct a Phase II – Environmental Site Assessment (Phase II ESA) in conjunction with a geotechnical investigation at 2502 & 2510 St. Laurent Boulevard, 1890, 1900 & 1920 Walkley Road, 2425 Don Reid Drive and 2990 & 3000 Conroy Road, in the City of Ottawa, Ontario.

Based on the findings of the Phase I ESA, the following subsurface investigation program was developed.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1-22	Place on the northwest portion of the Phase II Property to assess potential fill material of unknown quality.	12-14 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH2-22	Place on the north central portion of the Phase II Property to assess potential fill material of unknown quality.	12-14 m; For geotechnical and coverage purposes
BH3-22	Place on the central portion of the Phase II Property, assess potential fill material of unknown quality.	5-7 m; For geotechnical and coverage purposes
BH4-22	Place on the south portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the historic printer and potential fill material of unknown quality	12-14 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH5-22	Place on the central portion of the Phase II Property assess potential fill material of unknown quality.	5-7 m; For geotechnical and coverage purposes
BH6-22	Place on the south portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the historic printer and potential fill material of unknown quality	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH7-22	Place on the south portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the historic printer and potential fill material of unknown quality	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH8-22	Place on the south portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the historic printer and potential fill material of unknown quality	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH9-22	Place on the northeast portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the existing retail fuel outlet and fill material of unknown quality	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH10-22	Place on the east portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the historic medical facility and fill material of unknown quality	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.

BH11-22	Place on the east portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the historic medical facility and fill material of unknown quality	12-14 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.
BH12-22	Place on the northeast portion of the Phase II Property to assess potential soil and groundwater impacts resulting from the presence of the existing retail fuel outlet and fill material of unknown quality	5-7 m; Drill to intercept water table for monitoring well installation. Core bedrock if there is no evidence of water in the overburden.

Borehole locations are shown on Drawing PE5607-3 – Test Hole Location Plan, appended to the main report.

At each borehole, split-spoon samples of the 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.

Following the borehole drilling, groundwater monitoring wells will be installed in boreholes (BH1-22, BH4-22, BH6-22 through BH12-22) for the collection of groundwater samples.

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 soil 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 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 geodetic benchmark, if one is available, or a temporary site benchmark which can be tied in at a later date if necessary.

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 F_1, a soil core from each soil sample, which may be analyzed, 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 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 a RKI Eagle, PID, etc. depending on 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 brush in soapy water, inside and out, including 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 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 bag.
- ❒ Insert probe into soil bag, creating a seal with your hand around the opening.
- ❒ Gently manipulate soil in 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 Sampling and Analysis Plan.

3.2 Monitoring Well Installation Procedure

Equipment

- ❒ 5' x 2" threaded sections of Schedule 40 PVC slotted well screen (5' x 1 ¼" if installing in cored hole in bedrock)
- ❒ 5' x 2" threaded sections of Schedule 40 PVC riser pipe (5' x 1 ¼" if installing in 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 required depth, using drilling and sampling procedures described above.
- ❒ If borehole is deeper than required monitoring well, backfill with bentonite chips to 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 screen. Thread second section of screen if required. Thread risers onto screen. Lower into borehole to required depth. Ensure slip-cap or J-plug is inserted to prevent backfill materials entering 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 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 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 socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- ❒ Measure water level, with respect to existing ground surface, using water level meter or interface probe. If using interface probe on suspected NAPL site, measure the thickness of free product.
- ❒ Measure total depth of well.
- ❒ Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- ❒ Calculate volume of standing water within well and record.
- ❒ Insert polyethylene tubing into well and attach to peristaltic pump. Turn on peristaltic pump and purge into 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 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 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 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 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 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

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 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.

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 1-22

BORINGS BY CME 55 Power Auger **DATE** March 4, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	86.19
TOPSOIL 0.10		AU	1				
FILL: Brown silty sand trace clay 0.45		SS	2	8	8	1	85.19
		SS	3	67	8	2	84.19
Hard to very stiff, brown **SILTY CLAY**		SS	4	75	2	3	83.19
- stiff to firm and grey by 3.7m depth		SS	5	75	P	4	82.19
		SS	6	33	P	5	81.19
		SS	7	67	P	6	80.19
		SS	8	0	P	7	79.19
		SS	9	33	P	8	78.19
10.97		SS	10	75	27	9	77.19
Compact, grey **SILTY SAND** to **SANDY SILT,** trace gravel 11.28		SS	11	33	17	10	76.19
GLACIAL TILL: Compact to dense, grey silty sand to sandy silt with gravel, trace clay, cobbles and boulders		SS	12	100	35	11	75.19
13.59						12	74.19
End of Borehole						13	73.19
Practical refusal to augering at 13.59m depth.							
(GWL @ 5.15m - March 11, 2022)							

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

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 2-22

BORINGS BY CME 55 Power Auger **DATE** March 4, 2022

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									
TOPSOIL 0.08		AU	1			0	85.35		
FILL: Brown silty sand trace clay 0.41						1	84.35		
						2	83.35		
Hard to very stiff, brown **SILTY CLAY**						3	82.35		
						4	81.35		
- stiff and grey by 3.7m depth						5	80.35		
						6	79.35		
6.71									
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.

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 3-22

BORINGS BY CME 55 Power Auger **DATE** March 7, 2022

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	85.66		
TOPSOIL 0.15									
FILL: Brown silty clay trace sand 0.69		AU	1						
		SS	2	33	11	1	84.66		
						2	83.66		
Hard to very stiff, brown **SILTY CLAY**						3	82.66		
						4	81.66		
- stiff to firm and grey by 3.8m depth						5	80.66		
						6	79.66		
						7	78.66		
						8	77.66		
						9	76.66		
						10	75.66		
						11	74.66		
12.34						12	73.66		
GLACIAL TILL: Compact grey silty sand to sandy silt with gravel, trace clay, cobbles and boulders		SS	3	75	17	13	72.66		
13.54									
End of Borehole									
Practical refusal to augering at 13.54m depth.									

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
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 4-22

BORINGS BY CME 55 Power Auger **DATE** March 7, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.37
TOPSOIL 0.13		AU	1				
FILL: Brown silty clay with sand and gravel 0.69		SS	2	58	11	1	84.37
		SS	3	58	2	2	83.37
Hard to very stiff, brown **SILTY CLAY**						3	82.37
		SS	4	67	1	4	81.37
- firm to stiff and grey by 3.8m depth						5	80.37
		SS	5	33	1	6	79.37
						7	78.37
						8	77.37
						9	76.37
						10	75.37
11.43						11	74.37
GLACIAL TILL: Compact, grey silty sand to sandy silt with gravel, trace clay, cobbles and boulders		SS	6	100	38	12	73.37
13.11						13	72.37
End of Borehole							
(GWL @ 10.90m - March 11, 2022)							

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

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 5-22

BORINGS BY CME 55 Power Auger **DATE** March 7, 2022

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									
TOPSOIL 0.13						0	85.59		
FILL: Brown silty clay with sand and gravel 0.69		AU	1			1	84.59		
Hard to stiff, brown **SILTY CLAY**						2	83.59		
		SS	2	42	2	3	82.59		
- grey by 3.0m depth						4	81.59		
						5	80.59		
		SS	3	8	1	6	79.59		
6.55 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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FILE NO. PE5607

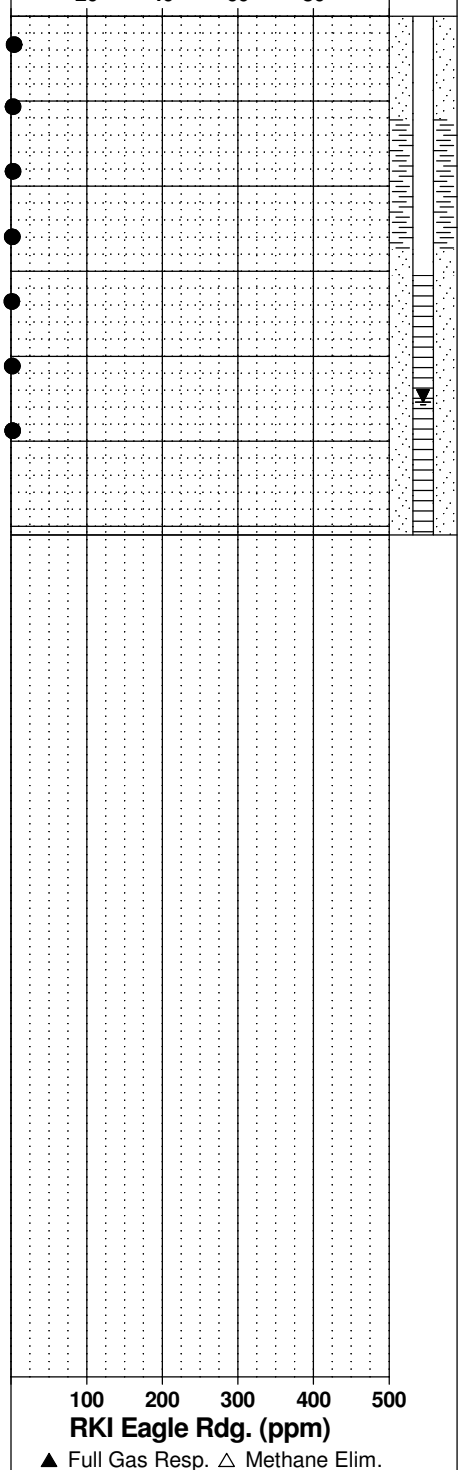
REMARKS

HOLE NO. BH 6-22

BORINGS BY CME 55 Power Auger **DATE** March 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.34
TOPSOIL 0.15		AU	1				
FILL: Brown silty clay with sand and gravel 0.69		SS	2	17	47	1	84.34
FILL: Dense brown silty sand with gravel, crushed stone and cobbles 1.44		SS	3	4	5	2	83.34
Very stiff to stiff, brown **SILTY CLAY**		SS	4	67	2	3	82.34
		SS	5	75	1		
- firm and grey by 3.0m depth		SS	6	75	1	4	81.34
		SS	7	67	1	5	80.34
		SS	8	67	1		
6.10						6	79.34
End of Borehole							
(GWL @ 4.54m - March 11, 2022)							

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



Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 7-22

BORINGS BY CME 55 Power Auger **DATE** March 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.43
TOPSOIL 0.13		AU	1				
FILL: Brown silty clay with sand, some gravel 0.61		SS	2	67	9	1	84.43
		SS	3	67	4	2	83.43
Very stiff to stiff, brown **SILTY CLAY**		SS	4	67	2		
		SS	5	67	1	3	82.43
- firm and grey by 3.0m depth		SS	6	67	1	4	81.43
		SS	7	67	1	5	80.43
		SS	8	67	1	6	79.43
6.10							
End of Borehole							
(GWL @ 1.55m - March 11, 2022)							

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.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 8-22

BORINGS BY CME 55 Power Auger **DATE** March 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.36
TOPSOIL 0.13		AU	1				
FILL: Brown silty sand with crushed stone 1.22		SS	2	25	35	1	84.36
		SS	3	33	5	2	83.36
Very stiff to stiff, brown **SILTY CLAY**		SS	4	67	2	3	82.36
		SS	5	33	1		
- firm and grey by 3.0m depth		SS	6	58	1	4	81.36
		SS	7	67	1	5	80.36
		SS	8	67	1		
6.10						6	79.36
End of Borehole							
(GWL @ 1.24m - March 11, 2022)							

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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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH 9-22

BORINGS BY CME 55 Power Auger **DATE** March 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.31
TOPSOIL 0.13		AU	1				
		SS	2	50	7	1	84.31
		SS	3	67	4	2	83.31
Very stiff to stiff, brown **SILTY CLAY**		SS	4	67	2		
- firm and grey by 2.2m depth		SS	5	75	1	3	82.31
		SS	6	50	1	4	81.31
		SS	7	67	1	5	80.31
		SS	8	50	1		
6.10						6	79.31
End of Borehole							
(GWL @ 3.77m - March 11, 2022)							

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.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH10-22

BORINGS BY CME 55 Power Auger **DATE** March 8, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.26
TOPSOIL 0.10		AU	1				
FILL: Brown silty sand with gravel, trace clay 0.69		SS	2	50	10	1	84.26
		SS	3	67	6	2	83.26
Very stiff to stiff, brown **SILTY CLAY**		SS	4	67	2		
		SS	5	67	1	3	82.26
- firm and grey by 3.0m depth		SS	6	67	1	4	81.26
		SS	7	25	1	5	80.26
		SS	8	67	1		
6.10						6	79.26
End of Borehole							
(GWL @ 0.93m - March 11, 2022)							

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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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH11-22

BORINGS BY CME 55 Power Auger **DATE** March 9, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.00
TOPSOIL 0.10		AU	1				
FILL: Brown silty sand with gravel, trace clay and cobbles 0.69		SS	2	4	8	1	84.00
						2	83.00
Hard to stiff, brown **SILTY CLAY**						3	82.00
		SS	3	75	2		
- grey by 3.0m depth						4	81.00
		SS	4	4	1	5	80.00
						6	79.00
						7	78.00
						8	77.00
						9	76.00
						10	75.00
11.43						11	74.00
GLACIAL TILL: Grey silty sand to sandy silt with gravel, cobbles, trace clay and boulders		SS	5	25	10	12	73.00
13.28		G	6			13	72.00
End of Borehole							
Practical refusal to augering at 13.28m depth							
(GWL @ 12.28m - March 11, 2022)							

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
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH12-22

BORINGS BY CME 55 Power Auger **DATE** March 9, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	85.59
TOPSOIL 0.10		AU	1				
FILL: Brown silty sand some clay 0.69		SS	2	33	8	1	84.59
Hard to very stiff, brown **SILTY CLAY**		SS	3	67	3	2	83.59
		SS	4	75	1	3	82.59
- stiff to firm and grey by 3.0m depth						4	81.59
						5	80.59
		SS	5	75	1	6	79.59
6.10							
End of Borehole							
(GWL @ 0.60m - March 11, 2022)							

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.

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

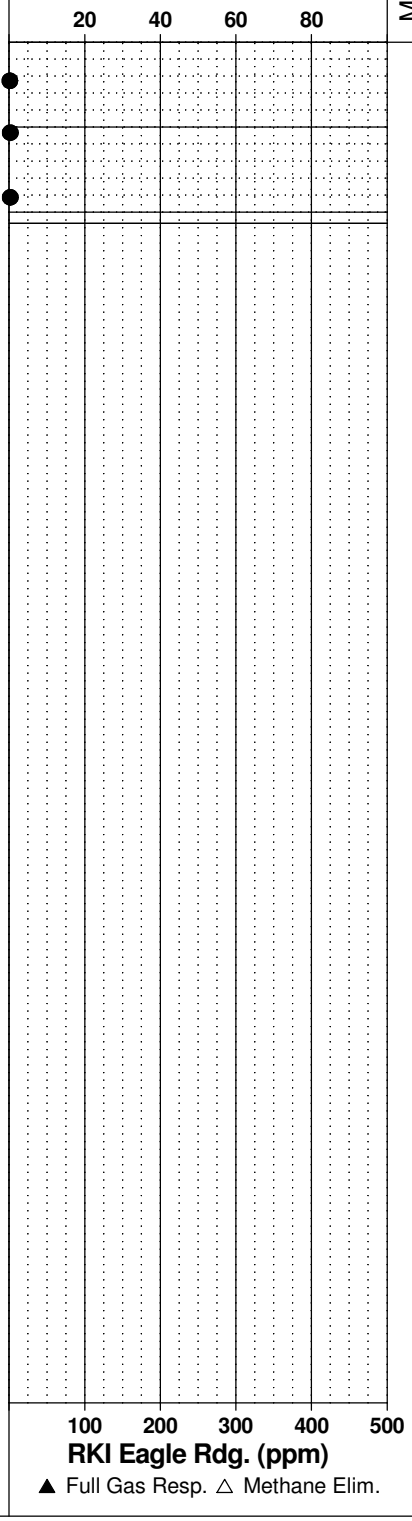
REMARKS

HOLE NO. BH13-22

BORINGS BY CME 55 Power Auger **DATE** March 9, 2022

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.13						0	85.94
FILL: Loose to compact brown silty sand with gravel, trace clay 0.69		AU	1				
		SS	2	17	11	1	84.94
Hard to very stiff brown **SILTY CLAY** 2.13		SS	3	67	6	2	83.94
End of Borehole							

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



▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II - Environmental Site Assessment
Proposed Development - Walkley Lands
Ottawa, Ontario

DATUM Geodetic

FILE NO. PE5607

REMARKS

HOLE NO. BH14-22

BORINGS BY CME 55 Power Auger **DATE** March 9, 2022

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									
TOPSOIL 0.10		AU	1			0	85.56		
FILL: Brown silty sand with crushed stone 0.69		SS	2	42	8	1	84.56		
Hard to very stiff, brown **SILTY CLAY**		SS	3	67	2	2	83.56		
		SS	4	67	2	3	82.56		
- firm to stiff and grey by 3.0m depth						4	81.56		
						5	80.56		
5.94		SS	5	67	P	6	79.56		
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.

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 x 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

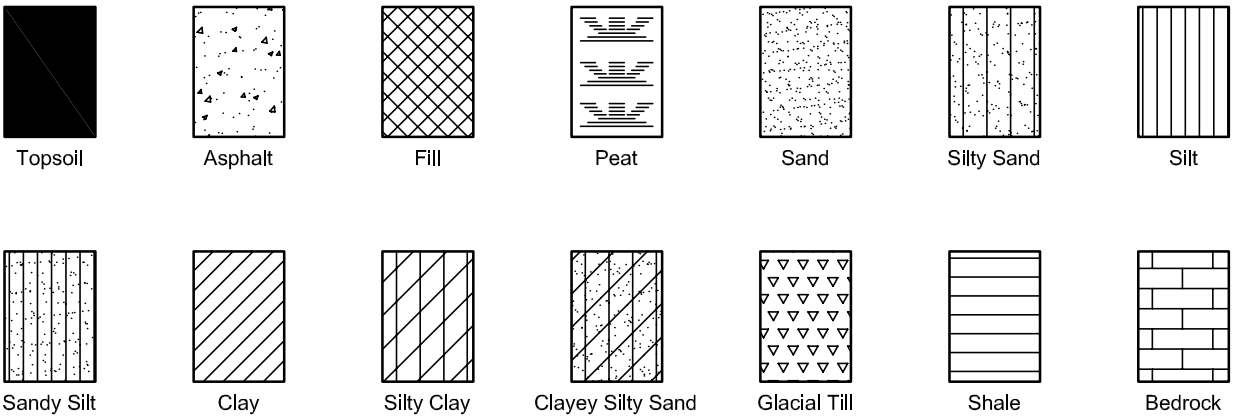
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void 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.

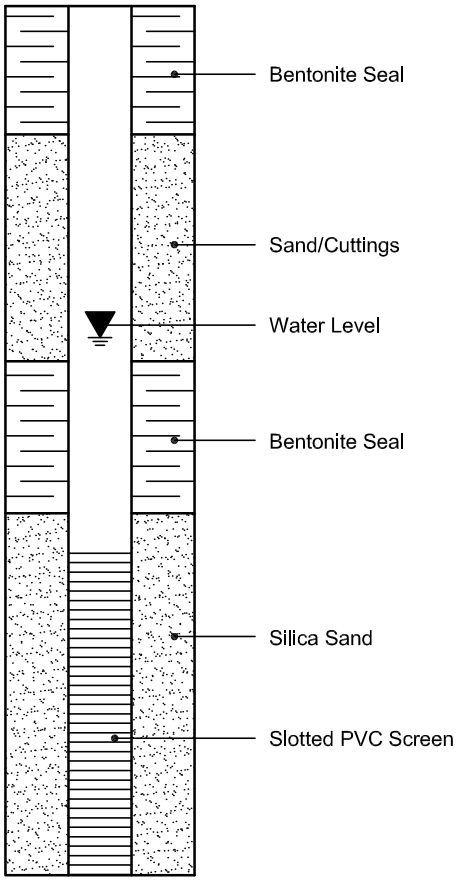
SYMBOLS AND TERMS (continued)

STRATA PLOT

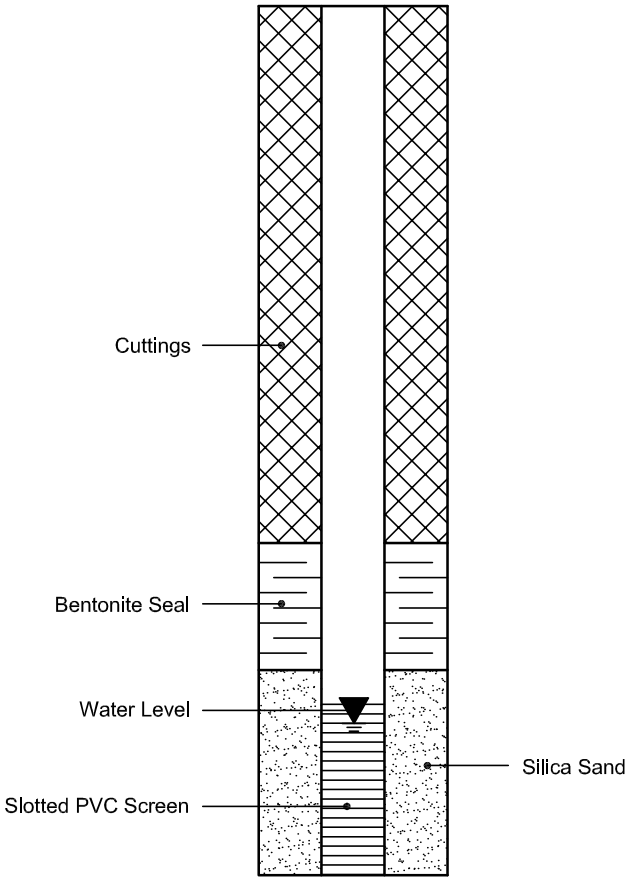


MONITORING WELL AND PIEZOMETER CONSTRUCTION

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: 33930
Project: PE5607
Custody: 136999

Report Date: 14-Mar-2022
Order Date: 8-Mar-2022

Order #: 2211252

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

Paracel ID	Client ID
2211252-01	BH1-22-AUG1
2211252-02	BH2-22-AUG1
2211252-03	BH4-22-SS4

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2022

Client PO: 33930

Project Description: PE5607

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	10-Mar-22	10-Mar-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	11-Mar-22	11-Mar-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	9-Mar-22	10-Mar-22
PHC F1	CWS Tier 1 - P&T GC-FID	10-Mar-22	10-Mar-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	9-Mar-22	11-Mar-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	10-Mar-22	10-Mar-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	8-Mar-22	13-Mar-22
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	10-Mar-22	10-Mar-22
Solids, %	Gravimetric, calculation	10-Mar-22	10-Mar-22

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2022

Client PO: 33930

Project Description: PE5607

	Client ID:	BH1-22-AUG1	BH2-22-AUG1	BH4-22-SS4	-
	Sample Date:	04-Mar-22 09:00	04-Mar-22 09:00	07-Mar-22 09:00	-
	Sample ID:	2211252-01	2211252-02	2211252-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	73.9	78.6	53.1	-
General Inorganics					
pH	0.05 pH Units	7.35	-	7.85	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	2.8	4.0	-	-
Barium	1.0 ug/g dry	184	150	-	-
Beryllium	0.5 ug/g dry	0.6	0.7	-	-
Boron	5.0 ug/g dry	<5.0	8.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	57.3	47.4	-	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	-	-
Cobalt	1.0 ug/g dry	11.7	11.5	-	-
Copper	5.0 ug/g dry	23.7	24.6	-	-
Lead	1.0 ug/g dry	6.2	17.2	-	-
Mercury	0.1 ug/g dry	<0.1	<0.1	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	5.0 ug/g dry	31.4	29.2	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	54.9	47.8	-	-
Zinc	20.0 ug/g dry	64.4	69.6	-	-
Volatiles					
Acetone	0.50 ug/g dry	-	-	<0.50	-
Benzene	0.02 ug/g dry	-	-	<0.02	-
Bromodichloromethane	0.05 ug/g dry	-	-	<0.05	-
Bromoform	0.05 ug/g dry	-	-	<0.05	-
Bromomethane	0.05 ug/g dry	-	-	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	-	-	<0.05	-
Chlorobenzene	0.05 ug/g dry	-	-	<0.05	-
Chloroform	0.05 ug/g dry	-	-	<0.05	-
Dibromochloromethane	0.05 ug/g dry	-	-	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	-	-	<0.05	-

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2022

Client PO: 33930

Project Description: PE5607

	Client ID:	BH1-22-AUG1	BH2-22-AUG1	BH4-22-SS4	-
	Sample Date:	04-Mar-22 09:00	04-Mar-22 09:00	07-Mar-22 09:00	-
	Sample ID:	2211252-01	2211252-02	2211252-03	-
	MDL/Units	Soil	Soil	Soil	-
1,2-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	-	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	-	-	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	-	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	-	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	-	<0.05	-
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	-	-	<0.05	-
Hexane	0.05 ug/g dry	-	-	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	-	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	-	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	-	-	<0.05	-
Methylene Chloride	0.05 ug/g dry	-	-	<0.05	-
Styrene	0.05 ug/g dry	-	-	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	-	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	-	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	-	<0.05	-
Trichloroethylene	0.05 ug/g dry	-	-	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	-	-	<0.05	-
Vinyl chloride	0.02 ug/g dry	-	-	<0.02	-
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	-
4-Bromofluorobenzene	Surrogate	-	-	139%	-
Dibromofluoromethane	Surrogate	-	-	110%	-
Toluene-d8	Surrogate	-	-	108%	-

Hydrocarbons

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2022

Client PO: 33930

Project Description: PE5607

	Client ID:	BH1-22-AUG1	BH2-22-AUG1	BH4-22-SS4	-
	Sample Date:	04-Mar-22 09:00	04-Mar-22 09:00	07-Mar-22 09:00	-
	Sample ID:	2211252-01	2211252-02	2211252-03	-
	MDL/Units	Soil	Soil	Soil	-
F1 PHCs (C6-C10)	7 ug/g dry	-	-	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	-	-	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	-	-	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	-	-	<6	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	<0.02	-	-
Acenaphthylene	0.02 ug/g dry	<0.02	<0.02	-	-
Anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Benzo [a] anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Benzo [a] pyrene	0.02 ug/g dry	<0.02	<0.02	-	-
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	<0.02	-	-
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	<0.02	-	-
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	<0.02	-	-
Chrysene	0.02 ug/g dry	<0.02	<0.02	-	-
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	<0.02	-	-
Fluoranthene	0.02 ug/g dry	<0.02	<0.02	-	-
Fluorene	0.02 ug/g dry	<0.02	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	<0.02	-	-
1-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g dry	<0.02	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	<0.04	-	-
Naphthalene	0.01 ug/g dry	<0.01	<0.01	-	-
Phenanthrene	0.02 ug/g dry	<0.02	<0.02	-	-
Pyrene	0.02 ug/g dry	<0.02	<0.02	-	-
2-Fluorobiphenyl	Surrogate	89.6%	62.3%	-	-
Terphenyl-d14	Surrogate	109%	66.3%	-	-

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						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.04*		*ug/g*		*78.0*	*50-140*			
Surrogate: Terphenyl-d14	*1.31*		*ug/g*		*98.6*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*8.23*		*ug/g*		*103*	*50-140*			
Surrogate: Dibromofluoromethane	*6.53*		*ug/g*		*81.6*	*50-140*			
Surrogate: Toluene-d8	*8.53*		*ug/g*		*107*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	6.99	0.05	pH Units	7.08			1.3	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	9	4	ug/g	9			0.0	30	
F3 PHCs (C16-C34)	25	8	ug/g	22			14.6	30	
F4 PHCs (C34-C50)	9	6	ug/g	9			0.0	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	8.9	1.0	ug/g	8.6			2.6	30	
Barium	69.2	1.0	ug/g	68.3			1.2	30	
Beryllium	0.8	0.5	ug/g	0.7			5.6	30	
Boron	13.7	5.0	ug/g	13.9			1.6	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	20.8	5.0	ug/g	20.5			1.4	30	
Cobalt	10.5	1.0	ug/g	10.7			2.0	30	
Copper	21.8	5.0	ug/g	21.4			1.9	30	
Lead	8.8	1.0	ug/g	8.5			3.4	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	2.3	1.0	ug/g	2.4			2.2	30	
Nickel	26.4	5.0	ug/g	26.3			0.1	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	31.2	10.0	ug/g	32.9			5.3	30	
Zinc	60.8	20.0	ug/g	60.3			0.8	30	
Physical Characteristics									
% Solids	87.4	0.1	% by Wt.	84.3			3.6	25	
Semi-Volatiles									
Acenaphthene	0.150	0.02	ug/g	0.093			46.9	40	
Acenaphthylene	1.59	0.02	ug/g	1.09			37.7	40	
Anthracene	0.818	0.02	ug/g	0.542			40.6	40	QR-04
Benzo [a] anthracene	2.14	0.02	ug/g	1.63			26.9	40	
Benzo [a] pyrene	4.93	0.02	ug/g	3.16			43.6	40	QR-04
Benzo [b] fluoranthene	4.39	0.02	ug/g	2.97			38.7	40	
Benzo [g,h,i] perylene	3.27	0.02	ug/g	2.18			39.7	40	
Benzo [k] fluoranthene	2.39	0.02	ug/g	1.59			39.9	40	
Chrysene	2.20	0.02	ug/g	1.74			23.4	40	
Dibenzo [a,h] anthracene	0.647	0.02	ug/g	0.431			40.1	40	QR-04
Fluoranthene	3.70	0.02	ug/g	2.76			29.1	40	
Fluorene	0.169	0.02	ug/g	0.118			35.0	40	
Indeno [1,2,3-cd] pyrene	2.89	0.02	ug/g	1.91			40.8	40	QR-04
1-Methylnaphthalene	0.057	0.02	ug/g	0.058			0.5	40	
2-Methylnaphthalene	0.104	0.02	ug/g	0.090			14.4	40	
Naphthalene	0.221	0.01	ug/g	0.178			21.5	40	
Phenanthrene	2.35	0.02	ug/g	1.80			26.6	40	
Pyrene	3.43	0.02	ug/g	2.65			25.8	40	
Surrogate: 2-Fluorobiphenyl	*1.45*		*ug/g*		*85.8*	*50-140*			
Surrogate: Terphenyl-d14	*1.80*		*ug/g*		*106*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*8.34*		*ug/g*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*6.71*		*ug/g*		*82.4*	*50-140*			
Surrogate: Toluene-d8	*8.68*		*ug/g*		*107*	*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)	178	7	ug/g	ND	89.1	80-120			
F2 PHCs (C10-C16)	95	4	ug/g	9	93.8	60-140			
F3 PHCs (C16-C34)	231	8	ug/g	22	93.4	60-140			
F4 PHCs (C34-C50)	153	6	ug/g	9	102	60-140			
Metals									
Antimony	40.7	1.0	ug/g	ND	80.9	70-130			
Arsenic	53.7	1.0	ug/g	3.5	101	70-130			
Barium	72.7	1.0	ug/g	27.3	90.8	70-130			
Beryllium	51.8	0.5	ug/g	ND	103	70-130			
Boron	55.4	5.0	ug/g	5.6	99.7	70-130			
Cadmium	46.0	0.5	ug/g	ND	91.8	70-130			
Chromium (VI)	0.2	0.2	ug/g	ND	77.5	70-130			
Chromium	61.9	5.0	ug/g	8.2	107	70-130			
Cobalt	54.3	1.0	ug/g	4.3	99.9	70-130			
Copper	59.0	5.0	ug/g	8.6	101	70-130			
Lead	50.3	1.0	ug/g	3.4	93.7	70-130			
Mercury	1.38	0.1	ug/g	ND	91.9	70-130			
Molybdenum	50.5	1.0	ug/g	1.0	99.1	70-130			
Nickel	60.2	5.0	ug/g	10.5	99.3	70-130			
Selenium	48.1	1.0	ug/g	ND	95.8	70-130			
Silver	54.7	0.3	ug/g	ND	109	70-130			
Thallium	45.1	1.0	ug/g	ND	89.8	70-130			
Uranium	49.4	1.0	ug/g	ND	98.1	70-130			
Vanadium	66.0	10.0	ug/g	13.2	106	70-130			
Zinc	71.9	20.0	ug/g	24.1	95.6	70-130			
Semi-Volatiles									
Acenaphthene	0.141	0.02	ug/g	ND	84.6	50-140			
Acenaphthylene	0.111	0.02	ug/g	ND	66.5	50-140			
Anthracene	0.109	0.02	ug/g	ND	65.3	50-140			
Benzo [a] anthracene	0.097	0.02	ug/g	ND	58.0	50-140			
Benzo [a] pyrene	0.109	0.02	ug/g	ND	65.7	50-140			
Benzo [b] fluoranthene	0.132	0.02	ug/g	ND	79.1	50-140			
Benzo [g,h,i] perylene	0.135	0.02	ug/g	ND	81.1	50-140			
Benzo [k] fluoranthene	0.113	0.02	ug/g	ND	67.9	50-140			
Chrysene	0.142	0.02	ug/g	ND	85.5	50-140			
Dibenzo [a,h] anthracene	0.134	0.02	ug/g	ND	80.2	50-140			
Fluoranthene	0.116	0.02	ug/g	ND	69.5	50-140			
Fluorene	0.121	0.02	ug/g	ND	72.3	50-140			
Indeno [1,2,3-cd] pyrene	0.114	0.02	ug/g	ND	68.1	50-140			
1-Methylnaphthalene	0.156	0.02	ug/g	ND	93.6	50-140			
2-Methylnaphthalene	0.179	0.02	ug/g	ND	107	50-140			
Naphthalene	0.164	0.01	ug/g	ND	98.4	50-140			
Phenanthrene	0.104	0.02	ug/g	ND	62.3	50-140			
Pyrene	0.108	0.02	ug/g	ND	64.8	50-140			
Surrogate: 2-Fluorobiphenyl	*1.20*		*ug/g*		*90.3*	*50-140*			
Surrogate: Terphenyl-d14	*1.60*		*ug/g*		*120*	*50-140*			
Volatiles									
Acetone	7.10	0.50	ug/g	ND	71.0	50-140			

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 8-Mar-2022

Client PO: 33930

Project Description: PE5607

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	3.28	0.02	ug/g	ND	81.9	60-130			
Bromodichloromethane	3.33	0.05	ug/g	ND	83.2	60-130			
Bromoform	3.15	0.05	ug/g	ND	78.8	60-130			
Bromomethane	3.70	0.05	ug/g	ND	92.4	50-140			
Carbon Tetrachloride	2.77	0.05	ug/g	ND	69.4	60-130			
Chlorobenzene	3.57	0.05	ug/g	ND	89.3	60-130			
Chloroform	3.05	0.05	ug/g	ND	76.2	60-130			
Dibromochloromethane	2.98	0.05	ug/g	ND	74.5	60-130			
Dichlorodifluoromethane	3.70	0.05	ug/g	ND	92.4	50-140			
1,2-Dichlorobenzene	3.34	0.05	ug/g	ND	83.4	60-130			
1,3-Dichlorobenzene	3.31	0.05	ug/g	ND	82.8	60-130			
1,4-Dichlorobenzene	3.48	0.05	ug/g	ND	87.0	60-130			
1,1-Dichloroethane	3.00	0.05	ug/g	ND	75.1	60-130			
1,2-Dichloroethane	3.14	0.05	ug/g	ND	78.5	60-130			
1,1-Dichloroethylene	3.06	0.05	ug/g	ND	76.4	60-130			
cis-1,2-Dichloroethylene	2.92	0.05	ug/g	ND	73.0	60-130			
trans-1,2-Dichloroethylene	3.06	0.05	ug/g	ND	76.6	60-130			
1,2-Dichloropropane	3.07	0.05	ug/g	ND	76.8	60-130			
cis-1,3-Dichloropropylene	2.76	0.05	ug/g	ND	68.9	60-130			
trans-1,3-Dichloropropylene	3.10	0.05	ug/g	ND	77.6	60-130			
Ethylbenzene	3.58	0.05	ug/g	ND	89.5	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.12	0.05	ug/g	ND	78.0	60-130			
Hexane	4.14	0.05	ug/g	ND	104	60-130			
Methyl Ethyl Ketone (2-Butanone)	9.53	0.50	ug/g	ND	95.3	50-140			
Methyl Isobutyl Ketone	8.13	0.50	ug/g	ND	81.3	50-140			
Methyl tert-butyl ether	10.4	0.05	ug/g	ND	104	50-140			
Methylene Chloride	3.16	0.05	ug/g	ND	79.1	60-130			
Styrene	2.90	0.05	ug/g	ND	72.5	60-130			
1,1,1,2-Tetrachloroethane	3.31	0.05	ug/g	ND	82.8	60-130			
1,1,2,2-Tetrachloroethane	2.73	0.05	ug/g	ND	68.2	60-130			
Tetrachloroethylene	3.78	0.05	ug/g	ND	94.5	60-130			
Toluene	3.72	0.05	ug/g	ND	93.0	60-130			
1,1,1-Trichloroethane	2.87	0.05	ug/g	ND	71.7	60-130			
1,1,2-Trichloroethane	2.83	0.05	ug/g	ND	70.7	60-130			
Trichloroethylene	3.03	0.05	ug/g	ND	75.7	60-130			
Trichlorofluoromethane	3.32	0.05	ug/g	ND	83.1	50-140			
Vinyl chloride	3.53	0.02	ug/g	ND	88.1	50-140			
m,p-Xylenes	7.00	0.05	ug/g	ND	87.5	60-130			
o-Xylene	3.45	0.05	ug/g	ND	86.3	60-130			
Surrogate: 4-Bromofluorobenzene	*8.30*		*ug/g*		*104*	*50-140*			
Surrogate: Dibromofluoromethane	*7.53*		*ug/g*		*94.1*	*50-140*			
Surrogate: Toluene-d8	*8.15*		*ug/g*		*102*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

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

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 LTD

Paracel ID: 2211252

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2211252	Nº 136999

Client Name: Paterson Group	Project Ref: PES607		Page 1 of 1
Contact Name: Mark D'Arcy	Quote #:		**Turnaround Time**
Address: 154 Colonnade Rd	PO #: 33930		☐ 1 day ☐ 3 day
	E-mail: mdarcy@patersongroup.ca		☐ 2 day ☑ Regular
Telephone:			Date Required:

☐ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☑ Table 3 ☐ Agri/Other
☑ Table ___
For RSC: ☑ Yes ☐ No

Other Regulation

☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ 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)	PH						
1	BH1-22-AUG1	S		2	March 4/2022				✓	✓	✓	✓		✓						
2	BH2-22-AUG1	↓		↓	"				✓	✓	✓	✓								
3	BH4-22-SS4	↓		↓	March 7/2022		✓	✓						✓						
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign): [signature]	Received By Driver/Depot: [signature]	Received at Lab: Sunnegurm Dohmai	Verified By: [signature]
Relinquished By (Print): Kat Linscott	Date/Time: 08/03/22 4:00	Date/Time: MAY 08, 2022 04.35	Date/Time: March 9 2022 6:47
Date/Time: March 8/2022	Temperature: °C PH	Temperature: 6.0 °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: 33934
Project: PE5607
Custody: 137005

Report Date: 14-Mar-2022
Order Date: 9-Mar-2022

Order #: 2211387

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

Paracel ID	Client ID
2211387-01	BH6-22-SS2
2211387-02	BH6-22-SS6
2211387-03	BH7-22-SS6
2211387-04	BH8-22-SS2
2211387-05	BH8-22-SS6
2211387-06	BH9-22-SS5
2211387-07	BH10-22-SS5
2211387-08	DUP1- Mar 8

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2022

Client PO: 33934

Project Description: PE5607

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	11-Mar-22	11-Mar-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	11-Mar-22	14-Mar-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	10-Mar-22	11-Mar-22
PHC F1	CWS Tier 1 - P&T GC-FID	11-Mar-22	11-Mar-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Mar-22	12-Mar-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	11-Mar-22	11-Mar-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	10-Mar-22	11-Mar-22
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	11-Mar-22	11-Mar-22
Solids, %	Gravimetric, calculation	10-Mar-22	11-Mar-22

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2022

Client PO: 33934

Project Description: PE5607

	Client ID:	BH6-22-SS2	BH6-22-SS6	BH7-22-SS6	BH8-22-SS2
	Sample Date:	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00
	Sample ID:	2211387-01	2211387-02	2211387-03	2211387-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	98.2	53.9	52.1	91.8
General Inorganics					
pH	0.05 pH Units	-	7.89	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Arsenic	1.0 ug/g dry	3.8	3.0	4.1	2.8
Barium	1.0 ug/g dry	77.6	388	343	66.9
Beryllium	0.5 ug/g dry	<0.5	0.9	0.9	<0.5
Boron	5.0 ug/g dry	8.2	8.4	12.9	7.3
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Chromium	5.0 ug/g dry	15.4	133	149	15.5
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	<0.2
Cobalt	1.0 ug/g dry	7.8	26.8	28.0	6.6
Copper	5.0 ug/g dry	18.8	65.0	61.7	17.7
Lead	1.0 ug/g dry	11.9	6.8	7.9	5.8
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	<0.1
Molybdenum	1.0 ug/g dry	4.7	1.0	1.0	<1.0
Nickel	5.0 ug/g dry	16.6	77.0	85.1	14.0
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	<1.0
Uranium	1.0 ug/g dry	<1.0	<1.0	1.5	<1.0
Vanadium	10.0 ug/g dry	18.5	126	122	22.0
Zinc	20.0 ug/g dry	24.0	140	138	37.0
Volatiles					
Acetone	0.50 ug/g dry	-	<0.50	<0.50	-
Benzene	0.02 ug/g dry	-	<0.02	<0.02	-
Bromodichloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Bromoform	0.05 ug/g dry	-	<0.05	<0.05	-
Bromomethane	0.05 ug/g dry	-	<0.05	<0.05	-
Carbon Tetrachloride	0.05 ug/g dry	-	<0.05	<0.05	-
Chlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Chloroform	0.05 ug/g dry	-	<0.05	<0.05	-
Dibromochloromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Dichlorodifluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2022

Client PO: 33934

Project Description: PE5607

	Client ID:	BH6-22-SS2	BH6-22-SS6	BH7-22-SS6	BH8-22-SS2
	Sample Date:	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00
	Sample ID:	2211387-01	2211387-02	2211387-03	2211387-04
	MDL/Units	Soil	Soil	Soil	Soil
1,2-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,4-Dichlorobenzene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,2-Dichloropropane	0.05 ug/g dry	-	<0.05	<0.05	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	-	<0.05	<0.05	-
1,3-Dichloropropene, total	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylbenzene	0.05 ug/g dry	-	<0.05	<0.05	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	-	<0.05	<0.05	-
Hexane	0.05 ug/g dry	-	<0.05	<0.05	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl Isobutyl Ketone	0.50 ug/g dry	-	<0.50	<0.50	-
Methyl tert-butyl ether	0.05 ug/g dry	-	<0.05	<0.05	-
Methylene Chloride	0.05 ug/g dry	-	<0.05	<0.05	-
Styrene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Tetrachloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Toluene	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,1-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
1,1,2-Trichloroethane	0.05 ug/g dry	-	<0.05	<0.05	-
Trichloroethylene	0.05 ug/g dry	-	<0.05	<0.05	-
Trichlorofluoromethane	0.05 ug/g dry	-	<0.05	<0.05	-
Vinyl chloride	0.02 ug/g dry	-	<0.02	<0.02	-
m,p-Xylenes	0.05 ug/g dry	-	<0.05	<0.05	-
o-Xylene	0.05 ug/g dry	-	<0.05	<0.05	-
Xylenes, total	0.05 ug/g dry	-	<0.05	<0.05	-
4-Bromofluorobenzene	Surrogate	-	127%	130%	-
Dibromofluoromethane	Surrogate	-	99.3%	101%	-
Toluene-d8	Surrogate	-	131%	135%	-
Hydrocarbons					

Certificate of Analysis

Report Date: 14-Mar-2022

Client: **Paterson Group Consulting Engineers**

Order Date: 9-Mar-2022

Client PO: **33934**

Project Description: PE5607

	Client ID:	BH6-22-SS2	BH6-22-SS6	BH7-22-SS6	BH8-22-SS2
	Sample Date:	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00
	Sample ID:	2211387-01	2211387-02	2211387-03	2211387-04
	MDL/Units	Soil	Soil	Soil	Soil
F1 PHCs (C6-C10)	7 ug/g dry	-	<7	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	-	<4	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	-	<8	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	-	<6	<6	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	<0.02	-	-	<0.02
Acenaphthylene	0.02 ug/g dry	<0.02	-	-	<0.02
Anthracene	0.02 ug/g dry	<0.02	-	-	<0.02
Benzo [a] anthracene	0.02 ug/g dry	<0.02	-	-	<0.02
Benzo [a] pyrene	0.02 ug/g dry	<0.02	-	-	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	<0.02	-	-	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	<0.02	-	-	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	<0.02	-	-	<0.02
Chrysene	0.02 ug/g dry	<0.02	-	-	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	<0.02	-	-	<0.02
Fluoranthene	0.02 ug/g dry	<0.02	-	-	<0.02
Fluorene	0.02 ug/g dry	<0.02	-	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	<0.02	-	-	<0.02
1-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	<0.02	-	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	<0.04	-	-	<0.04
Naphthalene	0.01 ug/g dry	<0.01	-	-	<0.01
Phenanthrene	0.02 ug/g dry	<0.02	-	-	<0.02
Pyrene	0.02 ug/g dry	<0.02	-	-	<0.02
2-Fluorobiphenyl	Surrogate	111%	-	-	107%
Terphenyl-d14	Surrogate	137%	-	-	133%

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2022

Client PO: 33934

Project Description: PE5607

	Client ID:	BH8-22-SS6	BH9-22-SS5	BH10-22-SS5	DUP1- Mar 8
	Sample Date:	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00
	Sample ID:	2211387-05	2211387-06	2211387-07	2211387-08
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	52.4	57.9	61.7	54.9
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Arsenic	1.0 ug/g dry	3.3	3.0	3.2	-
Barium	1.0 ug/g dry	328	300	340	-
Beryllium	0.5 ug/g dry	0.9	0.9	0.9	-
Boron	5.0 ug/g dry	12.1	12.2	8.3	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Chromium	5.0 ug/g dry	138	123	125	-
Chromium (VI)	0.2 ug/g dry	<0.2	<0.2	<0.2	-
Cobalt	1.0 ug/g dry	26.4	23.7	25.2	-
Copper	5.0 ug/g dry	60.7	51.5	60.0	-
Lead	1.0 ug/g dry	7.5	7.4	6.6	-
Mercury	0.1 ug/g dry	<0.1	<0.1	<0.1	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Nickel	5.0 ug/g dry	77.5	69.5	72.8	-
Selenium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	-
Thallium	1.0 ug/g dry	<1.0	<1.0	<1.0	-
Uranium	1.0 ug/g dry	1.3	1.4	1.1	-
Vanadium	10.0 ug/g dry	116	106	118	-
Zinc	20.0 ug/g dry	131	127	130	-
Volatiles					
Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2022

Client PO: 33934

Project Description: PE5607

	Client ID:	BH8-22-SS6	BH9-22-SS5	BH10-22-SS5	DUP1- Mar 8
	Sample Date:	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00
	Sample ID:	2211387-05	2211387-06	2211387-07	2211387-08
	MDL/Units	Soil	Soil	Soil	Soil
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethane, 1	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	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
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
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
4-Bromofluorobenzene	Surrogate	125%	136%	116%	124%
Dibromofluoromethane	Surrogate	97.0%	106%	122%	97.6%
Toluene-d8	Surrogate	128%	108%	123%	129%
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	-

Certificate of Analysis

Report Date: 14-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 9-Mar-2022

Client PO: 33934

Project Description: PE5607

	Client ID:	BH8-22-SS6	BH9-22-SS5	BH10-22-SS5	DUP1- Mar 8
	Sample Date:	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00	08-Mar-22 09:00
	Sample ID:	2211387-05	2211387-06	2211387-07	2211387-08
	MDL/Units	Soil	Soil	Soil	Soil
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	-

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						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.17*		*ug/g*		*87.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.33*		*ug/g*		*99.4*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*7.99*		*ug/g*		*99.9*	*50-140*			
Surrogate: Dibromofluoromethane	*6.28*		*ug/g*		*78.5*	*50-140*			
Surrogate: Toluene-d8	*8.54*		*ug/g*		*107*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	7.27	0.05	pH Units	7.31			0.5	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	28	7	ug/g	30			6.4	40	
F2 PHCs (C10-C16)	1430	4	ug/g	866			48.8	30	QR-05
F3 PHCs (C16-C34)	766	8	ug/g	470			48.0	30	QR-05
F4 PHCs (C34-C50)	73	6	ug/g	60			19.4	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	2.8	1.0	ug/g	2.7			3.2	30	
Barium	165	1.0	ug/g	156			5.5	30	
Beryllium	0.5	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	5.1			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	45.5	5.0	ug/g	44.9			1.3	30	
Cobalt	10.6	1.0	ug/g	10.5			1.3	30	
Copper	27.2	5.0	ug/g	26.1			4.3	30	
Lead	6.3	1.0	ug/g	6.0			4.8	30	
Mercury	1.16	0.1	ug/g	1.07			8.1	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	26.4	5.0	ug/g	25.5			3.4	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	47.3	10.0	ug/g	46.5			1.7	30	
Zinc	54.5	20.0	ug/g	52.3			4.1	30	
Physical Characteristics									
% Solids	95.3	0.1	% by Wt.	94.3			1.1	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	0.024			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	0.033			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	0.039			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	0.025			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	0.029			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	0.024			NC	40	
Chrysene	ND	0.02	ug/g	0.045			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	0.048			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	0.026			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	0.047			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.92*		*ug/g*		*79.1*	*50-140*			
Surrogate: Terphenyl-d14	*2.89*		*ug/g*		*119*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*11.5*		*ug/g*		*111*	*50-140*			
Surrogate: Dibromofluoromethane	*9.36*		*ug/g*		*90.7*	*50-140*			
Surrogate: Toluene-d8	*12.0*		*ug/g*		*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)	207	7	ug/g	ND	103	80-120			
F2 PHCs (C10-C16)	68	4	ug/g	ND	85.0	80-120			
F3 PHCs (C16-C34)	187	8	ug/g	ND	95.6	80-120			
F4 PHCs (C34-C50)	252	6	ug/g	60	112	60-140			
Metals									
Antimony	43.5	1.0	ug/g	ND	86.7	70-130			
Arsenic	50.6	1.0	ug/g	1.1	99.0	70-130			
Barium	111	1.0	ug/g	62.6	97.4	70-130			
Beryllium	48.0	0.5	ug/g	ND	95.6	70-130			
Boron	46.8	5.0	ug/g	ND	89.6	70-130			
Cadmium	48.0	0.5	ug/g	ND	95.9	70-130			
Chromium (VI)	3.9	0.2	ug/g	ND	59.5	70-130			QM-05
Chromium	67.0	5.0	ug/g	18.0	98.1	70-130			
Cobalt	54.5	1.0	ug/g	4.2	101	70-130			
Copper	59.4	5.0	ug/g	10.4	98.0	70-130			
Lead	51.7	1.0	ug/g	2.4	98.6	70-130			
Mercury	2.45	0.1	ug/g	1.07	91.8	70-130			
Molybdenum	48.2	1.0	ug/g	ND	96.1	70-130			
Nickel	59.8	5.0	ug/g	10.2	99.2	70-130			
Selenium	46.4	1.0	ug/g	ND	92.5	70-130			
Silver	57.7	0.3	ug/g	ND	115	70-130			
Thallium	47.8	1.0	ug/g	ND	95.5	70-130			
Uranium	50.1	1.0	ug/g	ND	99.6	70-130			
Vanadium	68.4	10.0	ug/g	18.6	99.6	70-130			
Zinc	67.0	20.0	ug/g	20.9	92.1	70-130			
Semi-Volatiles									
Acenaphthene	0.277	0.02	ug/g	ND	91.5	50-140			
Acenaphthylene	0.203	0.02	ug/g	0.024	59.1	50-140			
Anthracene	0.207	0.02	ug/g	ND	68.2	50-140			
Benzo [a] anthracene	0.189	0.02	ug/g	0.033	51.5	50-140			
Benzo [a] pyrene	0.202	0.02	ug/g	0.039	53.6	50-140			
Benzo [b] fluoranthene	0.218	0.02	ug/g	0.025	63.6	50-140			
Benzo [g,h,i] perylene	0.197	0.02	ug/g	0.029	55.3	50-140			
Benzo [k] fluoranthene	0.176	0.02	ug/g	0.024	50.1	50-140			
Chrysene	0.245	0.02	ug/g	0.045	66.1	50-140			
Dibenzo [a,h] anthracene	0.192	0.02	ug/g	ND	63.4	50-140			
Fluoranthene	0.206	0.02	ug/g	0.048	51.9	50-140			
Fluorene	0.264	0.02	ug/g	ND	87.2	50-140			
Indeno [1,2,3-cd] pyrene	0.189	0.02	ug/g	0.026	53.6	50-140			
1-Methylnaphthalene	0.329	0.02	ug/g	ND	108	50-140			
2-Methylnaphthalene	0.344	0.02	ug/g	ND	113	50-140			
Naphthalene	0.312	0.01	ug/g	ND	103	50-140			
Phenanthrene	0.240	0.02	ug/g	ND	79.0	50-140			
Pyrene	0.209	0.02	ug/g	0.047	53.4	50-140			
Surrogate: 2-Fluorobiphenyl	*2.17*		*ug/g*		*89.4*	*50-140*			
Surrogate: Terphenyl-d14	*2.96*		*ug/g*		*122*	*50-140*			
Volatiles									
Acetone	8.50	0.50	ug/g	ND	85.0	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	2.93	0.02	ug/g	ND	73.1	60-130			
Bromodichloromethane	2.97	0.05	ug/g	ND	74.2	60-130			
Bromoform	2.74	0.05	ug/g	ND	68.4	60-130			
Bromomethane	3.43	0.05	ug/g	ND	85.6	50-140			
Carbon Tetrachloride	4.08	0.05	ug/g	ND	102	60-130			
Chlorobenzene	3.18	0.05	ug/g	ND	79.5	60-130			
Chloroform	3.04	0.05	ug/g	ND	76.0	60-130			
Dibromochloromethane	3.13	0.05	ug/g	ND	78.3	60-130			
Dichlorodifluoromethane	4.78	0.05	ug/g	ND	120	50-140			
1,2-Dichlorobenzene	2.93	0.05	ug/g	ND	73.3	60-130			
1,3-Dichlorobenzene	2.92	0.05	ug/g	ND	73.0	60-130			
1,4-Dichlorobenzene	3.10	0.05	ug/g	ND	77.6	60-130			
1,1-Dichloroethane	2.62	0.05	ug/g	ND	65.4	60-130			
1,2-Dichloroethane	2.73	0.05	ug/g	ND	68.3	60-130			
1,1-Dichloroethylene	2.78	0.05	ug/g	ND	69.5	60-130			
cis-1,2-Dichloroethylene	2.68	0.05	ug/g	ND	67.0	60-130			
trans-1,2-Dichloroethylene	2.67	0.05	ug/g	ND	66.7	60-130			
1,2-Dichloropropane	2.67	0.05	ug/g	ND	66.7	60-130			
cis-1,3-Dichloropropylene	3.44	0.05	ug/g	ND	86.0	60-130			
trans-1,3-Dichloropropylene	3.07	0.05	ug/g	ND	76.8	60-130			
Ethylbenzene	3.18	0.05	ug/g	ND	79.6	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.99	0.05	ug/g	ND	99.7	60-130			
Hexane	3.64	0.05	ug/g	ND	91.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	9.91	0.50	ug/g	ND	99.1	50-140			
Methyl Isobutyl Ketone	7.82	0.50	ug/g	ND	78.2	50-140			
Methyl tert-butyl ether	9.09	0.05	ug/g	ND	90.9	50-140			
Methylene Chloride	2.76	0.05	ug/g	ND	69.0	60-130			
Styrene	2.80	0.05	ug/g	ND	70.0	60-130			
1,1,1,2-Tetrachloroethane	2.77	0.05	ug/g	ND	69.2	60-130			
1,1,2,2-Tetrachloroethane	3.28	0.05	ug/g	ND	82.0	60-130			
Tetrachloroethylene	3.41	0.05	ug/g	ND	85.3	60-130			
Toluene	3.34	0.05	ug/g	ND	83.4	60-130			
1,1,1-Trichloroethane	2.71	0.05	ug/g	ND	67.7	60-130			
1,1,2-Trichloroethane	2.70	0.05	ug/g	ND	67.4	60-130			
Trichloroethylene	2.70	0.05	ug/g	ND	67.5	60-130			
Trichlorofluoromethane	3.13	0.05	ug/g	ND	78.2	50-140			
Vinyl chloride	3.68	0.02	ug/g	ND	92.1	50-140			
m,p-Xylenes	6.27	0.05	ug/g	ND	78.4	60-130			
o-Xylene	3.12	0.05	ug/g	ND	78.0	60-130			
Surrogate: 4-Bromofluorobenzene	*8.36*		*ug/g*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*7.25*		*ug/g*		*90.6*	*50-140*			
Surrogate: Toluene-d8	*8.18*		*ug/g*		*102*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QM-05 : The spike recovery was outside acceptance limits for the matrix spike due to matrix interference.

QR-05 : Duplicate RPDs higher than normally accepted. Remaining batch QA\QC was acceptable. May be sample effect.

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

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 LTD.

Paracel ID: 2211387

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2211387	№ 137005

Client Name: Paterson Group	Project Ref: PE5607	Page 1 of 1
Contact Name: Mark D'ARCY	Quote #:	Turnaround Time
Address: 154 Colonnade Rd	PO #: 33934	☐ 1 day ☐ 3 day
	E-mail: mdarcy@patersongroup.ca	☐ 2 day ☒ Regular
Telephone:		Date Required:

☐ REG 153/04 ☐ REG 406/19 — 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	Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH				
1	BH6-22-SS2	S		2	Mar 8/2022				X	X	X	X						
2	BH6-22-SS6	↓		↓	↓		X	X		↓	↓	↓		X				
3	BH7-22-SS6	↓		↓	↓		X	X		↓	↓	↓						
4	BH8-22-SS2	↓		↓	↓				X	X	X	X						
5	BH8-22-SS6	↓		↓	↓		X	X		↓	↓	↓						
6	BH9-22-SS5	↓		↓	↓		X	X		↓	↓	↓						
7	BH10-22-SS5	↓		↓	↓		X	X		↓	↓	↓						
8	DUP1-Mar 8	↓		↓	↓			X										
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): [signature]	Received By Driver/Depot: [signature]	Received at Lab: Suneepam Dohmai	Verified By: [signature]
Relinquished By (Print): Kat Linscott	Date/Time: 09/03/22 4:06	Date/Time: Mar 09, 2022 04.55	Date/Time: March 10, 22 11:16
Date/Time: March 9/2022	Temperature: °C PH.	Temperature: 8.3 °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: 33935
Project: PE5607
Custody: 137006

Report Date: 16-Mar-2022
Order Date: 10-Mar-2022

Order #: 2211491

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

Paracel ID	Client ID
2211491-02	BH11-22-SS3
2211491-03	BH12-22-AUG1
2211491-04	BH12-22-SS4
2211491-05	BH13-22-AUG1

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 16-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 10-Mar-2022

Client PO: 33935

Project Description: PE5607

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	11-Mar-22	12-Mar-22
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	11-Mar-22	11-Mar-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	15-Mar-22	16-Mar-22
PHC F1	CWS Tier 1 - P&T GC-FID	11-Mar-22	12-Mar-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	11-Mar-22	12-Mar-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	14-Mar-22	15-Mar-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	11-Mar-22	16-Mar-22
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	11-Mar-22	12-Mar-22
Solids, %	Gravimetric, calculation	11-Mar-22	11-Mar-22

Certificate of Analysis

Report Date: 16-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 10-Mar-2022

Client PO: 33935

Project Description: PE5607

	Client ID:	BH11-22-SS3	BH12-22-AUG1	BH12-22-SS4	BH13-22-AUG1
	Sample Date:	09-Mar-22 09:00	09-Mar-22 09:00	09-Mar-22 09:00	09-Mar-22 09:00
	Sample ID:	2211491-02	2211491-03	2211491-04	2211491-05
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	60.9	71.3	59.3	81.3
Metals					
Antimony	1.0 ug/g dry	-	<1.0	-	<1.0
Arsenic	1.0 ug/g dry	-	2.9	-	7.9
Barium	1.0 ug/g dry	-	141	-	83.9
Beryllium	0.5 ug/g dry	-	<0.5	-	<0.5
Boron	5.0 ug/g dry	-	<5.0	-	6.1
Cadmium	0.5 ug/g dry	-	<0.5	-	<0.5
Chromium	5.0 ug/g dry	-	38.5	-	36.2
Chromium (VI)	0.2 ug/g dry	-	<0.2	-	<0.2
Cobalt	1.0 ug/g dry	-	8.5	-	12.4
Copper	5.0 ug/g dry	-	19.6	-	16.8
Lead	1.0 ug/g dry	-	20.5	-	16.8
Mercury	0.1 ug/g dry	-	<0.1	-	<0.1
Molybdenum	1.0 ug/g dry	-	1.1	-	5.2
Nickel	5.0 ug/g dry	-	23.3	-	27.3
Selenium	1.0 ug/g dry	-	<1.0	-	<1.0
Silver	0.3 ug/g dry	-	<0.3	-	<0.3
Thallium	1.0 ug/g dry	-	<1.0	-	<1.0
Uranium	1.0 ug/g dry	-	<1.0	-	<1.0
Vanadium	10.0 ug/g dry	-	38.0	-	39.8
Zinc	20.0 ug/g dry	-	60.5	-	33.8
Volatiles					
Acetone	0.50 ug/g dry	<0.50	-	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	-	-
Bromoform	0.05 ug/g dry	<0.05	-	-	-
Bromomethane	0.05 ug/g dry	<0.05	-	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	-	-
Chloroform	0.05 ug/g dry	<0.05	-	-	-
Dibromochloromethane	0.05 ug/g dry	<0.05	-	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-

Certificate of Analysis

Report Date: 16-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 10-Mar-2022

Client PO: 33935

Project Description: PE5607

	Client ID:	BH11-22-SS3	BH12-22-AUG1	BH12-22-SS4	BH13-22-AUG1
	Sample Date:	09-Mar-22 09:00	09-Mar-22 09:00	09-Mar-22 09:00	09-Mar-22 09:00
	Sample ID:	2211491-02	2211491-03	2211491-04	2211491-05
	MDL/Units	Soil	Soil	Soil	Soil
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.05 ug/g dry	<0.05	-	-	-
Hexane	0.05 ug/g dry	<0.05	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	-	-
Styrene	0.05 ug/g dry	<0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	-	-
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	-	-	-
4-Bromofluorobenzene	Surrogate	125%	-	-	-
Dibromofluoromethane	Surrogate	96.1%	-	-	-
Toluene-d8	Surrogate	128%	-	-	-
Benzene	0.02 ug/g dry	-	-	<0.02	-
Ethylbenzene	0.05 ug/g dry	-	-	<0.05	-
Toluene	0.05 ug/g dry	-	-	<0.05	-

Certificate of Analysis

Report Date: 16-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 10-Mar-2022

Client PO: 33935

Project Description: PE5607

	Client ID:	BH11-22-SS3	BH12-22-AUG1	BH12-22-SS4	BH13-22-AUG1
	Sample Date:	09-Mar-22 09:00	09-Mar-22 09:00	09-Mar-22 09:00	09-Mar-22 09:00
	Sample ID:	2211491-02	2211491-03	2211491-04	2211491-05
	MDL/Units	Soil	Soil	Soil	Soil
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	-	-	129%	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	<7	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	<4	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	-	<8	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	<6	-
Semi-Volatiles					
Acenaphthene	0.02 ug/g dry	-	<0.02	-	<0.02
Acenaphthylene	0.02 ug/g dry	-	<0.02	-	<0.02
Anthracene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [a] anthracene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [a] pyrene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [b] fluoranthene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [g,h,i] perylene	0.02 ug/g dry	-	<0.02	-	<0.02
Benzo [k] fluoranthene	0.02 ug/g dry	-	<0.02	-	<0.02
Chrysene	0.02 ug/g dry	-	<0.02	-	<0.02
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	<0.02	-	<0.02
Fluoranthene	0.02 ug/g dry	-	<0.02	-	<0.02
Fluorene	0.02 ug/g dry	-	<0.02	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	<0.02	-	<0.02
1-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	0.03
2-Methylnaphthalene	0.02 ug/g dry	-	<0.02	-	0.05
Methylnaphthalene (1&2)	0.04 ug/g dry	-	<0.04	-	0.08
Naphthalene	0.01 ug/g dry	-	<0.01	-	<0.01
Phenanthrene	0.02 ug/g dry	-	<0.02	-	0.06
Pyrene	0.02 ug/g dry	-	<0.02	-	<0.02
2-Fluorobiphenyl	Surrogate	-	86.1%	-	83.4%
Terphenyl-d14	Surrogate	-	103%	-	95.4%

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						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	5.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	10.0	ug/g						
Zinc	ND	20.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	*1.33*		*ug/g*		*99.6*	*50-140*			
Surrogate: Terphenyl-d14	*1.56*		*ug/g*		*117*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						
Dichlorodifluoromethane	ND	0.05	ug/g						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	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: 4-Bromofluorobenzene	*7.99*		*ug/g*		*99.9*	*50-140*			
Surrogate: Dibromofluoromethane	*6.28*		*ug/g*		*78.5*	*50-140*			
Surrogate: Toluene-d8	*8.54*		*ug/g*		*107*	*50-140*			
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	*8.54*		*ug/g*		*107*	*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)	28	7	ug/g	30			6.4	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	5.1	1.0	ug/g	5.5			8.5	30	
Barium	146	1.0	ug/g	164			11.7	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	58.9	5.0	ug/g	62.8			6.4	30	
Cobalt	6.3	1.0	ug/g	6.6			4.2	30	
Copper	13.9	5.0	ug/g	15.1			8.4	30	
Lead	6.2	1.0	ug/g	6.2			0.4	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	19.4	5.0	ug/g	20.7			6.4	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	31.0	10.0	ug/g	32.5			4.5	30	
Zinc	34.7	20.0	ug/g	36.5			4.9	30	
Physical Characteristics									
% Solids	96.4	0.1	% by Wt.	94.3			2.2	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	*1.49*		*ug/g*		*99.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.86*		*ug/g*		*125*	*50-140*			
Volatiles									
Acetone	ND	0.50	ug/g	ND			NC	50	
Benzene	ND	0.02	ug/g	ND			NC	50	
Bromodichloromethane	ND	0.05	ug/g	ND			NC	50	
Bromoform	ND	0.05	ug/g	ND			NC	50	
Bromomethane	ND	0.05	ug/g	ND			NC	50	
Carbon Tetrachloride	ND	0.05	ug/g	ND			NC	50	
Chlorobenzene	ND	0.05	ug/g	ND			NC	50	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloroform	ND	0.05	ug/g	ND			NC	50	
Dibromochloromethane	ND	0.05	ug/g	ND			NC	50	
Dichlorodifluoromethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,3-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,4-Dichlorobenzene	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g	ND			NC	50	
1,2-Dichloropropane	ND	0.05	ug/g	ND			NC	50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Ethylene dibromide (dibromoethane, 1,2	ND	0.05	ug/g	ND			NC	50	
Hexane	ND	0.05	ug/g	ND			NC	50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g	ND			NC	50	
Methyl Isobutyl Ketone	ND	0.50	ug/g	ND			NC	50	
Methyl tert-butyl ether	ND	0.05	ug/g	ND			NC	50	
Methylene Chloride	ND	0.05	ug/g	ND			NC	50	
Styrene	ND	0.05	ug/g	ND			NC	50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g	ND			NC	50	
Tetrachloroethylene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
1,1,1-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
1,1,2-Trichloroethane	ND	0.05	ug/g	ND			NC	50	
Trichloroethylene	ND	0.05	ug/g	ND			NC	50	
Trichlorofluoromethane	ND	0.05	ug/g	ND			NC	50	
Vinyl chloride	ND	0.02	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: 4-Bromofluorobenzene	*11.5*		*ug/g*		*111*	*50-140*			
Surrogate: Dibromofluoromethane	*9.36*		*ug/g*		*90.7*	*50-140*			
Surrogate: Toluene-d8	*12.0*		*ug/g*		*116*	*50-140*			
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	*12.0*		*ug/g*		*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)	207	7	ug/g	ND	103	80-120			
F2 PHCs (C10-C16)	132	4	ug/g	ND	100	60-140			
F3 PHCs (C16-C34)	320	8	ug/g	ND	99.5	60-140			
F4 PHCs (C34-C50)	218	6	ug/g	ND	107	60-140			
Metals									
Antimony	46.6	1.0	ug/g	ND	92.7	70-130			
Arsenic	52.9	1.0	ug/g	2.2	101	70-130			
Barium	119	1.0	ug/g	65.7	106	70-130			
Beryllium	49.2	0.5	ug/g	ND	98.1	70-130			
Boron	50.1	5.0	ug/g	ND	97.4	70-130			
Cadmium	53.2	0.5	ug/g	ND	106	70-130			
Chromium (VI)	4.7	0.2	ug/g	ND	88.0	70-130			
Chromium	78.5	5.0	ug/g	25.1	107	70-130			
Cobalt	54.6	1.0	ug/g	2.6	104	70-130			
Copper	54.8	5.0	ug/g	6.1	97.5	70-130			
Lead	50.4	1.0	ug/g	2.5	95.8	70-130			
Mercury	1.44	0.1	ug/g	ND	95.8	70-130			
Molybdenum	50.5	1.0	ug/g	ND	101	70-130			
Nickel	59.1	5.0	ug/g	8.3	102	70-130			
Selenium	45.6	1.0	ug/g	ND	90.9	70-130			
Silver	54.8	0.3	ug/g	ND	110	70-130			
Thallium	50.8	1.0	ug/g	ND	102	70-130			
Uranium	50.5	1.0	ug/g	ND	101	70-130			
Vanadium	67.1	10.0	ug/g	13.0	108	70-130			
Zinc	62.1	20.0	ug/g	ND	95.0	70-130			
Semi-Volatiles									
Acenaphthene	0.197	0.02	ug/g	ND	106	50-140			
Acenaphthylene	0.149	0.02	ug/g	ND	80.1	50-140			
Anthracene	0.148	0.02	ug/g	ND	79.2	50-140			
Benzo [a] anthracene	0.115	0.02	ug/g	ND	61.5	50-140			
Benzo [a] pyrene	0.151	0.02	ug/g	ND	81.1	50-140			
Benzo [b] fluoranthene	0.155	0.02	ug/g	ND	83.3	50-140			
Benzo [g,h,i] perylene	0.165	0.02	ug/g	ND	88.6	50-140			
Benzo [k] fluoranthene	0.128	0.02	ug/g	ND	68.4	50-140			
Chrysene	0.167	0.02	ug/g	ND	89.5	50-140			
Dibenzo [a,h] anthracene	0.155	0.02	ug/g	ND	82.9	50-140			
Fluoranthene	0.147	0.02	ug/g	ND	79.0	50-140			
Fluorene	0.182	0.02	ug/g	ND	97.8	50-140			
Indeno [1,2,3-cd] pyrene	0.132	0.02	ug/g	ND	70.9	50-140			
1-Methylnaphthalene	0.210	0.02	ug/g	ND	112	50-140			
2-Methylnaphthalene	0.209	0.02	ug/g	ND	112	50-140			
Naphthalene	0.218	0.01	ug/g	ND	117	50-140			
Phenanthrene	0.171	0.02	ug/g	ND	91.6	50-140			
Pyrene	0.145	0.02	ug/g	ND	78.0	50-140			
Surrogate: 2-Fluorobiphenyl	*1.45*		*ug/g*		*97.4*	*50-140*			
Surrogate: Terphenyl-d14	*1.72*		*ug/g*		*116*	*50-140*			
Volatiles									
Acetone	8.50	0.50	ug/g	ND	85.0	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	2.93	0.02	ug/g	ND	73.1	60-130			
Bromodichloromethane	2.97	0.05	ug/g	ND	74.2	60-130			
Bromoform	2.74	0.05	ug/g	ND	68.4	60-130			
Bromomethane	3.43	0.05	ug/g	ND	85.6	50-140			
Carbon Tetrachloride	4.08	0.05	ug/g	ND	102	60-130			
Chlorobenzene	3.18	0.05	ug/g	ND	79.5	60-130			
Chloroform	3.04	0.05	ug/g	ND	76.0	60-130			
Dibromochloromethane	3.13	0.05	ug/g	ND	78.3	60-130			
Dichlorodifluoromethane	4.78	0.05	ug/g	ND	120	50-140			
1,2-Dichlorobenzene	2.93	0.05	ug/g	ND	73.3	60-130			
1,3-Dichlorobenzene	2.92	0.05	ug/g	ND	73.0	60-130			
1,4-Dichlorobenzene	3.10	0.05	ug/g	ND	77.6	60-130			
1,1-Dichloroethane	2.62	0.05	ug/g	ND	65.4	60-130			
1,2-Dichloroethane	2.73	0.05	ug/g	ND	68.3	60-130			
1,1-Dichloroethylene	2.78	0.05	ug/g	ND	69.5	60-130			
cis-1,2-Dichloroethylene	2.68	0.05	ug/g	ND	67.0	60-130			
trans-1,2-Dichloroethylene	2.67	0.05	ug/g	ND	66.7	60-130			
1,2-Dichloropropane	2.67	0.05	ug/g	ND	66.7	60-130			
cis-1,3-Dichloropropylene	3.44	0.05	ug/g	ND	86.0	60-130			
trans-1,3-Dichloropropylene	3.07	0.05	ug/g	ND	76.8	60-130			
Ethylbenzene	3.18	0.05	ug/g	ND	79.6	60-130			
Ethylene dibromide (dibromoethane, 1,2-	3.99	0.05	ug/g	ND	99.7	60-130			
Hexane	3.64	0.05	ug/g	ND	91.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	9.91	0.50	ug/g	ND	99.1	50-140			
Methyl Isobutyl Ketone	7.82	0.50	ug/g	ND	78.2	50-140			
Methyl tert-butyl ether	9.09	0.05	ug/g	ND	90.9	50-140			
Methylene Chloride	2.76	0.05	ug/g	ND	69.0	60-130			
Styrene	2.80	0.05	ug/g	ND	70.0	60-130			
1,1,1,2-Tetrachloroethane	2.77	0.05	ug/g	ND	69.2	60-130			
1,1,2,2-Tetrachloroethane	3.28	0.05	ug/g	ND	82.0	60-130			
Tetrachloroethylene	3.41	0.05	ug/g	ND	85.3	60-130			
Toluene	3.34	0.05	ug/g	ND	83.4	60-130			
1,1,1-Trichloroethane	2.71	0.05	ug/g	ND	67.7	60-130			
1,1,2-Trichloroethane	2.70	0.05	ug/g	ND	67.4	60-130			
Trichloroethylene	2.70	0.05	ug/g	ND	67.5	60-130			
Trichlorofluoromethane	3.13	0.05	ug/g	ND	78.2	50-140			
Vinyl chloride	3.68	0.02	ug/g	ND	92.1	50-140			
m,p-Xylenes	6.27	0.05	ug/g	ND	78.4	60-130			
o-Xylene	3.12	0.05	ug/g	ND	78.0	60-130			
Surrogate: 4-Bromofluorobenzene	*8.36*		*ug/g*		*105*	*50-140*			
Surrogate: Dibromofluoromethane	*7.25*		*ug/g*		*90.6*	*50-140*			
Surrogate: Toluene-d8	*8.18*		*ug/g*		*102*	*50-140*			
Benzene	2.93	0.02	ug/g	ND	73.1	60-130			
Ethylbenzene	3.18	0.05	ug/g	ND	79.6	60-130			
Toluene	3.34	0.05	ug/g	ND	83.4	60-130			
m,p-Xylenes	6.27	0.05	ug/g	ND	78.4	60-130			
o-Xylene	3.12	0.05	ug/g	ND	78.0	60-130			
Surrogate: Toluene-d8	*8.18*		*ug/g*		*102*	*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.
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 LTD.

Paracel ID: 2211491

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2211491	№ 137006

Client Name: PATERSON GROUP
Contact Name: MARK D'ARCY
Address: 154 COLONNADE RD
Telephone:
Project Ref: PE5607
Quote #:
PO #: 33935
E-mail: MDARCY@PATERSONGROUP.CA

Page __ of __

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

☐ REG 153/04 ☐ REG 406/19

Table 1 ☐ Res/Park ☐ Med/Fine
Table 2 ☐ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

Other Regulation: ☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm
Mun:
☐ 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)					HOLD
1	BH11-22-AUG1	S		2	March 9/2022													X
2	BH11-22-SS3	↓		↓			X	X										
3	BH12-22-AUG1								X	X	X	X						
4	BH12-22-SS4						X											
5	BH13-22-AUG1								X	X	X	X						
6																		
7																		
8																		
9																		
10																		

Comments: HOLD BH11-22-AUG1

Method of Delivery: PARCEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: M. DEROSE	Received at Lab: Dhwani	Verified By:
Relinquished By (Print): KAT LINSCOTT	Date/Time: 10/03/22 4:00	Date/Time: March 10, 2022 04.50	Date/Time: March 10 2022 5:16
Date/Time: March 10/2022	Temperature: °C FH.	Temperature: 13.4 °C	pH Verified: ☐ By:

Chain of Custody (Env) xlsx

Revision 4.0

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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: 33917
Project: PE5607
Custody: 137010

Report Date: 17-Mar-2022
Order Date: 14-Mar-2022

Order #: 2212105

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

Paracel ID	Client ID
2212105-02	BH6-22-GW1
2212105-03	BH7-22-GW1
2212105-04	BH8-22-GW1
2212105-05	BH9-22-GW1
2212105-06	BH10-22-GW1
2212105-07	BH12-22-GW1
2212105-08	Dup 1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 33917

Report Date: 17-Mar-2022

Order Date: 14-Mar-2022

Project Description: PE5607

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	15-Mar-22	15-Mar-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	16-Mar-22	16-Mar-22
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	15-Mar-22	15-Mar-22

Certificate of Analysis

Report Date: 17-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 14-Mar-2022

Client PO: 33917

Project Description: PE5607

	Client ID:	BH6-22-GW1	BH7-22-GW1	BH8-22-GW1	BH9-22-GW1
	Sample Date:	11-Mar-22 09:00	11-Mar-22 09:00	11-Mar-22 09:00	11-Mar-22 09:00
	Sample ID:	2212105-02	2212105-03	2212105-04	2212105-05
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	9.8	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	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
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	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
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis

Report Date: 17-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 14-Mar-2022

Client PO: 33917

Project Description: PE5607

	Client ID:	BH6-22-GW1	BH7-22-GW1	BH8-22-GW1	BH9-22-GW1
	Sample Date:	11-Mar-22 09:00	11-Mar-22 09:00	11-Mar-22 09:00	11-Mar-22 09:00
	Sample ID:	2212105-02	2212105-03	2212105-04	2212105-05
	MDL/Units	Water	Water	Water	Water
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	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
4-Bromofluorobenzene	Surrogate	105%	105%	105%	107%
Dibromofluoromethane	Surrogate	109%	107%	107%	108%
Toluene-d8	Surrogate	104%	106%	105%	105%
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

Certificate of Analysis

Report Date: 17-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 14-Mar-2022

Client PO: 33917

Project Description: PE5607

	Client ID:	BH10-22-GW1	BH12-22-GW1	Dup 1	-
	Sample Date:	11-Mar-22 09:00	11-Mar-22 09:00	11-Mar-22 09:00	-
	Sample ID:	2212105-06	2212105-07	2212105-08	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroform	0.5 ug/L	<0.5	<0.5	<0.5	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	11.0	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylene dibromide (dibromoethane, 1	0.2 ug/L	<0.2	<0.2	<0.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis

Report Date: 17-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 14-Mar-2022

Client PO: 33917

Project Description: PE5607

	Client ID:	BH10-22-GW1	BH12-22-GW1	Dup 1	-
	Sample Date:	11-Mar-22 09:00	11-Mar-22 09:00	11-Mar-22 09:00	-
	Sample ID:	2212105-06	2212105-07	2212105-08	-
	MDL/Units	Water	Water	Water	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Vinyl chloride	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	-
4-Bromofluorobenzene	Surrogate	105%	105%	106%	-
Dibromofluoromethane	Surrogate	109%	108%	109%	-
Toluene-d8	Surrogate	105%	105%	106%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	-	-

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									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	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: 4-Bromofluorobenzene	*87.1*		*ug/L*		*109*	*50-140*			
Surrogate: Dibromofluoromethane	*90.4*		*ug/L*		*113*	*50-140*			
Surrogate: Toluene-d8	*86.1*		*ug/L*		*108*	*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			NC	30	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	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: 4-Bromofluorobenzene	*89.0*		*ug/L*		*111*	*50-140*			
Surrogate: Dibromofluoromethane	*99.0*		*ug/L*		*124*	*50-140*			
Surrogate: Toluene-d8	*84.2*		*ug/L*		*105*	*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	ND	87.3	68-117			
F2 PHCs (C10-C16)	1400	100	ug/L	ND	87.5	60-140			
F3 PHCs (C16-C34)	3760	100	ug/L	ND	95.8	60-140			
F4 PHCs (C34-C50)	2800	100	ug/L	ND	113	60-140			
Volatiles									
Acetone	65.2	5.0	ug/L	ND	65.2	50-140			
Benzene	33.9	0.5	ug/L	ND	84.8	60-130			
Bromodichloromethane	35.6	0.5	ug/L	ND	88.9	60-130			
Bromoform	32.7	0.5	ug/L	ND	81.7	60-130			
Bromomethane	42.1	0.5	ug/L	ND	105	50-140			
Carbon Tetrachloride	36.9	0.2	ug/L	ND	92.2	60-130			
Chlorobenzene	37.2	0.5	ug/L	ND	93.1	60-130			
Chloroform	33.4	0.5	ug/L	ND	83.4	60-130			
Dibromochloromethane	32.2	0.5	ug/L	ND	80.4	60-130			
Dichlorodifluoromethane	41.9	1.0	ug/L	ND	105	50-140			
1,2-Dichlorobenzene	33.5	0.5	ug/L	ND	83.6	60-130			
1,3-Dichlorobenzene	33.8	0.5	ug/L	ND	84.5	60-130			
1,4-Dichlorobenzene	35.0	0.5	ug/L	ND	87.6	60-130			
1,1-Dichloroethane	32.6	0.5	ug/L	ND	81.6	60-130			
1,2-Dichloroethane	33.0	0.5	ug/L	ND	82.5	60-130			
1,1-Dichloroethylene	34.7	0.5	ug/L	ND	86.8	60-130			
cis-1,2-Dichloroethylene	32.5	0.5	ug/L	ND	81.2	60-130			
trans-1,2-Dichloroethylene	34.2	0.5	ug/L	ND	85.4	60-130			
1,2-Dichloropropane	32.1	0.5	ug/L	ND	80.2	60-130			
cis-1,3-Dichloropropylene	29.9	0.5	ug/L	ND	74.7	60-130			
trans-1,3-Dichloropropylene	32.8	0.5	ug/L	ND	82.0	60-130			
Ethylbenzene	36.9	0.5	ug/L	ND	92.3	60-130			
Ethylene dibromide (dibromoethane, 1,2-	34.8	0.2	ug/L	ND	87.0	60-130			
Hexane	34.2	1.0	ug/L	ND	85.5	60-130			
Methyl Ethyl Ketone (2-Butanone)	68.5	5.0	ug/L	ND	68.5	50-140			
Methyl Isobutyl Ketone	81.2	5.0	ug/L	ND	81.2	50-140			
Methyl tert-butyl ether	111	2.0	ug/L	ND	111	50-140			
Methylene Chloride	33.1	5.0	ug/L	ND	82.7	60-130			
Styrene	31.6	0.5	ug/L	ND	78.9	60-130			
1,1,1,2-Tetrachloroethane	36.5	0.5	ug/L	ND	91.2	60-130			
1,1,2,2-Tetrachloroethane	35.8	0.5	ug/L	ND	89.4	60-130			
Tetrachloroethylene	37.9	0.5	ug/L	ND	94.7	60-130			
Toluene	39.1	0.5	ug/L	ND	97.7	60-130			
1,1,1-Trichloroethane	31.0	0.5	ug/L	ND	77.5	60-130			
1,1,2-Trichloroethane	29.3	0.5	ug/L	ND	73.3	60-130			
Trichloroethylene	32.0	0.5	ug/L	ND	80.1	60-130			
Trichlorofluoromethane	36.4	1.0	ug/L	ND	90.9	60-130			
Vinyl chloride	35.9	0.5	ug/L	ND	89.8	50-140			
m,p-Xylenes	71.2	0.5	ug/L	ND	89.0	60-130			
o-Xylene	35.2	0.5	ug/L	ND	87.9	60-130			
Surrogate: 4-Bromofluorobenzene	*86.8*		*ug/L*		*108*	*50-140*			
Surrogate: Dibromofluoromethane	*88.1*		*ug/L*		*110*	*50-140*			
Surrogate: Toluene-d8	*80.5*		*ug/L*		*101*	*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.
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.

PARACEL LABORATORIES L

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Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2212105	№ 137010

Client Name: PATERSON GROUP
Project Ref: PE5607
Page __ of __

Contact Name: MARK D'ARCY
Quote #:

Address: 154 COLONNADE RD
PO #: 33917

Telephone:
E-mail: mdarcy@patersongrp.ca
JCampoSarcone@patersongrp.ca

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required: _____

☐ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun: _____
☐ 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)					HOLD
1	BH1-22-GW1	GW		3	March 11/2022		X	X										X
2	BH6-22-GW1	↓		↓	↓		↓	↓										
3	BH7-22-GW1																	
4	BH8-22-GW1																	
5	BH9-22-GW1																	
6	BH10-22-GW1																	
7	BH12-22-GW1	↓		↓	↓		↓	↓										
8	DUP1	↓		2	↓			X										
9																		
10																		

Comments: HOLD BH1-22-GW1

Method of Delivery: drop box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Kat Linscott	Date/Time:	Date/Time: 5:00 mon Mar 14 2022	Date/Time: Mar 15 2022
Date/Time: March 14/2022	Temperature: °C	Temperature: 5.2 °C	pH Verified: ☐ NA 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: 27330
Project: PE5607
Custody: 137032

Report Date: 23-Mar-2022
Order Date: 21-Mar-2022

Order #: 2213101

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

Paracel ID	Client ID
2213101-01	BH4-22-GW1
2213101-02	BH11-22-GW1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 23-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 21-Mar-2022

Client PO: 27330

Project Description: PE5607

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	22-Mar-22	22-Mar-22

Certificate of Analysis

Report Date: 23-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 21-Mar-2022

Client PO: 27330

Project Description: PE5607

	Client ID:	BH4-22-GW1	BH11-22-GW1	-	-
	Sample Date:	11-Mar-22 09:00	11-Mar-22 09:00	-	-
	Sample ID:	2213101-01	2213101-02	-	-
	MDL/Units	Water	Water	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	<0.5	<0.5	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 23-Mar-2022

Client: Paterson Group Consulting Engineers

Order Date: 21-Mar-2022

Client PO: 27330

Project Description: PE5607

	Client ID:	BH4-22-GW1	BH11-22-GW1	-	-
	Sample Date:	11-Mar-22 09:00	11-Mar-22 09:00	-	-
	Sample ID:	2213101-01	2213101-02	-	-
	MDL/Units	Water	Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-
4-Bromofluorobenzene	Surrogate	99.8%	96.6%	-	-
Dibromofluoromethane	Surrogate	96.8%	97.4%	-	-
Toluene-d8	Surrogate	110%	116%	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	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: 4-Bromofluorobenzene	*85.0*		*ug/L*		*106*	*50-140*			
Surrogate: Dibromofluoromethane	*78.6*		*ug/L*		*98.3*	*50-140*			
Surrogate: Toluene-d8	*92.3*		*ug/L*		*115*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	13.5	0.5	ug/L	14.6			7.8	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	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: 4-Bromofluorobenzene	*74.4*		*ug/L*		*93.0*	*50-140*			
Surrogate: Dibromofluoromethane	*78.8*		*ug/L*		*98.5*	*50-140*			
Surrogate: Toluene-d8	*91.8*		*ug/L*		*115*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	76.7	5.0	ug/L	ND	76.7	50-140			
Benzene	35.2	0.5	ug/L	ND	88.1	60-130			
Bromodichloromethane	37.1	0.5	ug/L	ND	92.8	60-130			
Bromoform	43.8	0.5	ug/L	ND	109	60-130			
Bromomethane	31.4	0.5	ug/L	ND	78.5	50-140			
Carbon Tetrachloride	37.6	0.2	ug/L	ND	94.1	60-130			
Chlorobenzene	41.6	0.5	ug/L	ND	104	60-130			
Chloroform	36.8	0.5	ug/L	ND	92.0	60-130			
Dibromochloromethane	35.6	0.5	ug/L	ND	89.1	60-130			
Dichlorodifluoromethane	30.7	1.0	ug/L	ND	76.6	50-140			
1,2-Dichlorobenzene	38.5	0.5	ug/L	ND	96.4	60-130			
1,3-Dichlorobenzene	36.7	0.5	ug/L	ND	91.8	60-130			
1,4-Dichlorobenzene	36.8	0.5	ug/L	ND	92.0	60-130			
1,1-Dichloroethane	29.5	0.5	ug/L	ND	73.8	60-130			
1,2-Dichloroethane	34.2	0.5	ug/L	ND	85.6	60-130			
1,1-Dichloroethylene	32.4	0.5	ug/L	ND	81.0	60-130			
cis-1,2-Dichloroethylene	30.8	0.5	ug/L	ND	76.9	60-130			
trans-1,2-Dichloroethylene	34.2	0.5	ug/L	ND	85.6	60-130			
1,2-Dichloropropane	30.6	0.5	ug/L	ND	76.6	60-130			
cis-1,3-Dichloropropylene	30.8	0.5	ug/L	ND	76.9	60-130			
trans-1,3-Dichloropropylene	31.7	0.5	ug/L	ND	79.4	60-130			
Ethylbenzene	40.4	0.5	ug/L	ND	101	60-130			
Ethylene dibromide (dibromoethane, 1,2	42.9	0.2	ug/L	ND	107	60-130			
Hexane	44.4	1.0	ug/L	ND	111	60-130			
Methyl Ethyl Ketone (2-Butanone)	74.4	5.0	ug/L	ND	74.4	50-140			
Methyl Isobutyl Ketone	77.2	5.0	ug/L	ND	77.2	50-140			
Methyl tert-butyl ether	89.1	2.0	ug/L	ND	89.1	50-140			
Methylene Chloride	33.1	5.0	ug/L	ND	82.8	60-130			
Styrene	43.5	0.5	ug/L	ND	109	60-130			
1,1,1,2-Tetrachloroethane	35.4	0.5	ug/L	ND	88.5	60-130			
1,1,2,2-Tetrachloroethane	42.0	0.5	ug/L	ND	105	60-130			
Tetrachloroethylene	41.6	0.5	ug/L	ND	104	60-130			
Toluene	41.8	0.5	ug/L	ND	104	60-130			
1,1,1-Trichloroethane	38.1	0.5	ug/L	ND	95.2	60-130			
1,1,2-Trichloroethane	35.0	0.5	ug/L	ND	87.6	60-130			
Trichloroethylene	37.5	0.5	ug/L	ND	93.8	60-130			
Trichlorofluoromethane	34.8	1.0	ug/L	ND	86.9	60-130			
Vinyl chloride	29.5	0.5	ug/L	ND	73.8	50-140			
m,p-Xylenes	88.0	0.5	ug/L	ND	110	60-130			
o-Xylene	42.4	0.5	ug/L	ND	106	60-130			
Surrogate: 4-Bromofluorobenzene	*61.6*		*ug/L*		*77.0*	*50-140*			
Surrogate: Dibromofluoromethane	*76.4*		*ug/L*		*95.5*	*50-140*			
Surrogate: Toluene-d8	*78.1*		*ug/L*		*97.6*	*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.
NC: Not Calculated

PARACE LABORATORIES LTD

Paracel ID: 2213101

Blvd.
4J8
s.com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2213101	№ 137032

Client Name: Paterson Group
Contact Name: Mark D'Arcy (CC Jeremy Campeau-Corcoran)
Address: 154 Colonnade Rd
Telephone:

Project Ref: PE5607
Quote #:
PO #: 27330
E-mail: mdarcy@patersongroup.ca
+ cc: jCampeau-Corcoran@patersongroup.ca

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

☒ REG 153/04 ☐ REG 406/19

Other Regulation: ☐ REG 558 ☐ PWQO ☐ CCME ☐ MISA ☐ SU - Sani ☐ SU - Storm ☐ Mun: ☐ Other:

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☒ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

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)				
1	BH4-22-GW1	GW		2	March 11/2022			X									
2	BH11-22-GW1	↓		↓	↓			↓									
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Required Analysis

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Kat Hartt	Date/Time: 21/03/22 2:20	Date/Time: Mar 21, 2022 @3.10	Date/Time: Mar 21/2022 KYC
Date/Time: March 21/2022	Temperature: °C	Temperature: 10.3 °C	pH Verified: ☐ By: NA