PATERSON GROUP

Phase II – Environmental Site Assessment

Part of 155 Dun Skipper Drive
Ottawa, Ontario

Prepared for 2668867 Ontario Inc.

Report: PE6616-2
October 25, 2024

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EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for part of the property addressed 155 Dun Skipper Drive, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the 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 for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells in order to access the water table.

In general, the subsurface soil profile encountered at the borehole locations consists of fill material (loose, brown, silty fine sand, with clay and trace gravel), underlain by native glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders). Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface. The groundwater beneath the Phase II Property was encountered within the bedrock unit at depths ranging from approximately 1.17 m to 4.79 m below the existing ground surface.

Eight soil samples were submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), metals, PAHs, and/or PCB parameters. The test results indicated that the concentrations of PHCs F_2 and F_3 detected in Sample BH1-24-SS3A exceed the selected MECP Table 2 Coarse-Grained Residential Soil Standards. All other parameters tested in the remaining soil samples comply with the standards.

Three groundwater samples were also submitted for laboratory analysis of VOC and PHC (F_1-F_4) parameters. No VOC parameters were identified in the groundwater samples analyzed, apart from a chloroform concentration in Sample BH1B-24-GW1. The chloroform concentration identified complies with the MECP Table 2 Potable Standards.

Recommendations

Impacted Soil

Based on the findings of this assessment, the lower layer of soil/fill material localized in the vicinity of BH1-24 is contaminated, requiring remedial action. This contamination was identified at a depth interval of approximately 1 m to 2 m below the existing ground surface.

Given our understanding that the Phase II Property is to be redeveloped in the near future, it is our recommendation that the contaminated soil be remediated in conjunction with site excavation activities. At such a time, the contaminated soil will be excavated from the site and transported to a licensed waste disposal facility. It is recommended that Paterson personnel be present on-site at the time of remedial activities to assist with coordination, directing the excavation and segregation of contaminated soil from clean soils, as well as to fulfill the confirmatory soil sampling requirements in accordance with Table 2 of O. Reg. 153/04.

Prior to the off-site disposal of impacted soil at a licensed waste disposal facility, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with O. Reg. 347/90 and O. Reg. 558/00.

Excess Soil

Non-impacted excess soil from the Phase II Property must be managed in accordance with O.Reg. 406/19: On-Site and Excess Soil Management. It is recommended that excess soil planning occurs prior to the site redevelopment.

Monitoring Wells

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned in accordance with O. Reg. 903/90 (Ontario Water Resources Act). Further information can be provided upon request in this regard.

It is our recommendation that the monitoring wells currently be maintained for future sampling purposes, until such a time when future site excavation activities have commenced. The monitoring wells will be registered with the MECP under this regulation.

1.0 INTRODUCTION

At the request of 2668867 Ontario Inc., Paterson Group (Paterson) conducted a Phase II – Environmental Site Assessment (Phase II ESA) for part of the property addressed 155 Dun Skipper Drive, in the City of Ottawa, Ontario (the Phase II Property).

The purpose of this Phase II ESA has been to address the areas of potential environmental concern (APECs) identified on the Phase II Property as a result of the findings of the Phase I ESA.

1.1 Site Description

Address:	Part of 155 Dun Skipper Drive, Ottawa, Ontario.
Location:	The Phase II Property is situated on the southwest side of the Bank Street and Dun Skipper Drive intersection, in the City of Ottawa, Ontario. Refer to Figure 1 – Key Plan, for the site location context.
Latitude and Longitude:	45° 18' 34.3" N, 75° 35' 16.5" W.

Site Description:

Configuration:	Rectangular.
Site Area:	5,250 m^2 (approximate).
Zoning:	GM – General Mixed-Use Zone.
Current Uses:	The Phase II Property is currently vacant of any buildings or structures.
Services:	The Phase II Property is not currently serviced. The majority of the surrounding properties are serviced with municipal sewer and water infrastructure, however, one nearby property along Bank Street is expected to have a potable water well.

1.2 Property Ownership

The Phase II Property is currently owned by 2668867 Ontario Inc. Paterson was retained to complete this Phase II ESA by Ms. Alison Clarke of the Stirling Group Development Initiatives, who can be contacted via telephone at 613-299-5654.

1.3 Applicable Site Condition Standard

The site condition standards for the subject property were obtained from Table 2 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), and dated April 15, 2011. The selected MECP standards are based on the following considerations:

- ❒ Full-depth soil conditions
- ❒ Coarse-grained soil conditions
- ❒ Potable groundwater conditions
- ❒ Residential land use

The residential standards were selected based on the proposed future land use of the Phase II Property. Grain size analysis was not conducted as part of this assessment, and as such, the coarse-grained soil standards were selected as a conservative approach.

According to the City of Ottawa, one nearby property along Bank Street, situated within a 250 m radius of the Phase II Property, is expected to have a potable water well. For this reason, the potable groundwater standards were selected for this assessment.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The Phase II Property is currently vacant of any buildings or structures and consists mainly of bare patches of exposed surficial soil with some overgrown grassy areas. A small asphalt-covered parking area is also present within the eastern portion of the site.

The site topography slopes gradually towards the east, in the direction of Bank Street, while the regional topography appears to slope down towards the northwest, in the general direction of the Rideau River. The Phase II Property is considered to be at grade with respect to the adjacent streets and surrounding properties. Water drainage on-site occurs primarily vis infiltration within the landscaped areas, as well as via sheet flow towards catch basins present on Dun Skipper Drive and towards a drainage ditch present along Bank Street.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells to access the water table.

3.2 Media Investigated

During this subsurface investigation, soil and groundwater samples were obtained from the Phase II Property and submitted for laboratory analysis. The rationale for sampling and analyzing these media is based on the contaminants of potential concern identified in the Phase I ESA.

The contaminants of potential concern for the soil and groundwater on the Phase II Property include the following:

- ❒ Volatile Organic Compounds (VOCs)
- ❒ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- ❒ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4)
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs)
- ❒ Metals (including Arsenic [As], Antimony [Sb], and Selenium [Se])
- ❒ Mercury
- ❒ Hexavalent Chromium
- ❒ Polychlorinated Biphenyls (PCBs).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

3.3 Phase I ESA Conceptual Site Model

Geological and Hydrogeological Setting

Based on the available mapping information, the bedrock beneath the Phase I Property generally consists of interbedded sandstone and dolomite of the March Formation. The surficial geology consists of glacial till plains, with an overburden ranging from approximately 3 m to 5 m in thickness.

Groundwater is anticipated to be encountered within the overburden and flow in a northerly direction.

Water Bodies and Areas of Natural and Scientific Interest

No water bodies or areas of natural and scientific interest are present on the Phase I Property.

The nearest water body with respect to the Phase II Property is an unnamed creek, approximately 125 m to the east.

Drinking Water Wells

While most of the properties within the Phase I Study Area are serviced with municipal water infrastructure, it is believed that one viable potable water well remains in use within the area.

Existing Buildings and Structures

No buildings or structures are currently present on the Phase II Property.

Current and Future Property Use

Although the Phase II Property is currently vacant, the most recent land use for the site was for commercial purposes.

It is our understanding that the Phase II Property is to be redeveloped with a residential mid-rise apartment building.

Since the proposed change in land use is considered to be more sensitive than the existing use, a record of site condition (RSC) will be required to be filed with the MECP.

Neighbouring Land Use

The surrounding lands within the Phase I Study Area consist largely of residential, institutional, and commercial properties. Current land use is depicted on Drawing PE6616-2 – Surrounding Land Use Plan, in the Figures section of this report.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per Section 7.1 of the Phase I ESA report, four potentially contaminating activities (PCAs), considered to result in areas of potential environmental concern (APECs), were identified on the Phase I Property.

APEC #1 – The presence of fill material of unknown quality, situated throughout the Phase I Property.

APEC #2 – The historical presence of an aboveground diesel fuel storage tank, located within the northern portion of the Phase I Property.

APEC #3 – The historical presence of an underground gasoline fuel storage tank, located within the central portion of the Phase I Property.

APEC #4 – The presence of an existing pole-mounted electrical transformer, located within the southern portion of the Phase I Property.

Some existing and historical off-site PCAs were identified on properties situated within the Phase I Study Area, however, due to either their separation distances or their inferred down or cross-gradient orientation with respect to the anticipated groundwater flow to the north, none of these historical off-site activities are considered to have had the potential to impact the Phase I Property.

Contaminants of Potential Concern

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- ❒ Volatile Organic Compounds (VOCs)
- ❒ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4)
- ❒ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- ❒ Metals (including Arsenic [As], Antimony [Sb], and Selenium [Se])
- ❒ Mercury
- ❒ Hexavalent Chromium
- ❒ Polychlorinated Biphenyls (PCBs).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of the Phase I ESA is considered to be sufficient to conclude that there are PCAs and APECs associated with the Phase I Property.

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

3.4 Deviations from the Sampling and Analysis Plan

No deviations from the Sampling and Analysis were made during the course of this Phase II ESA.

3.5 Physical Impediments

No physical impediments were encountered during the course of the field drilling program.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells in order to access the water table.

Under the full-time supervision of Paterson personnel, the boreholes were drilled using a low-clearance drill rig provided by George Downing Estate Drilling of Hawkesbury, Ontario. The locations of the boreholes are illustrated on "Drawing PE6616-3 – Test Hole Location Plan", appended to this report.

4.2 Soil Sampling

Soil 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.

The samples were recovered using a stainless-steel split spoon, while wearing protective gloves (changed after each sample), and immediately placed into plastic bags. If significant contamination was encountered, the samples were instead placed into glass jars. Sampling equipment was routinely washed in soapy water and rinsed with methylhydrate after each split spoon to prevent any cross contamination of the samples. The samples were also stored in coolers to reduce analyte volatilization during transportation.

A total of 31 soil samples were obtained from the boreholes by means of auger and split spoon sampling. The depths at which auger, split spoon, and rock core samples were obtained from the boreholes are shown as "**AU**", "**SS**", and "**RC**" respectively, on the Soil Profile and Test Data Sheets, appended to this report.

4.3 Field Screening Measurements

All soil samples collected were subjected to a preliminary screening procedure, which included visual screening for colour and evidence of metals, as well as soil vapour screening with a Photo Ionization Detector.

The recovered soil samples 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, ensuring consistency of readings between samples. To measure the soil vapours, the analyzer probe was inserted into the nominal headspace above the sample. The sample was then agitated and manipulated gently by hand as the measurement was taken. The peak reading registered within the first 15 seconds was recorded as the vapour measurement. The parts per million (ppm) scale was used to measure concentrations of organic vapours.

The results of the vapour survey are presented on the Soil Profile and Test Data Sheets, appended to this report.

4.4 Groundwater Monitoring Well Installation

Three groundwater monitoring wells were installed on the Phase II Property as part of this subsurface investigation. These monitoring wells were constructed using 50 mm diameter Schedule 40 threaded PVC risers and screens. A sand pack consisting of silica sand was placed around the screen with a bentonite seal placed above to minimize cross-contamination. A summary of the monitoring well construction details are listed below in Table 1 as well as on the Soil Profile and Test Data Sheets provided in Appendix 1.

Upon completion, the groundwater monitoring wells were developed using a dedicated inertial lift pump, with a minimum of three well volumes being removed from the wells at the time of installation. The wells were developed until the appearance of the water was noted to have stabilized. In addition, the ground surface elevations of each borehole were subsequently surveyed with respect to a known geodetic elevation.

Table 1
Monitoring Well Construction Details

Well ID	Ground Surface Elevation (m ASL)	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH1B-24	100.55	6.71 m	3.53-6.53	3.20-6.53	2.59-3.20	Flushmount
BH2-24	100.52	5.97 m	2.94-5.94	2.59-5.94	1.68-2.59	Flushmount
BH3-24	100.12	2.95 m	1.27-2.77	0.91-1.27	0.46-0.91	Flushmount

4.5 Field Measurement of Water Quality Parameters

Groundwater monitoring and sampling was conducted on-site on September 27, 2024. Following their development and stabilization during the field sampling event, select water quality parameters were measured at each monitoring well location using a multi-reader probe device. The stabilized field parameter values are summarized below in Table 2.

Table 2
Measurement of Water Quality Parameters

Well ID	Temperature (˚C)	Conductivity (µS)	pH (Units)
BH1B-24	16.8	803	7.72
BH2-24	18.3	2,076	7.37
BH3-24	21.8	1,123	7.38

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.

Standing water was purged from each monitoring well prior to the recovery of the groundwater samples using dedicated sampling equipment. The samples were then stored in coolers to reduce possible analyte volatilization during their transportation. Further details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan, appended to this report.

4.7 Analytical Testing

The following soil and groundwater samples were submitted for laboratory analysis:

Table 3
Testing Parameters for Submitted Soil Samples

Sample ID	Sample Depth & Stratigraphic Unit	Parameters Analyzed								Rationale
		BTEX	PHCs (F_1-F_4)	Metals	Hg+	Cr^{VI}	PAHs	PCBs	pH	
BH1-24-SS2	0.76 – 1.37 m Fill Material			X	X	X	X			To assess potential impacts resulting from the presence of fill material of unknown quality.
BH1-24-SS3A	1.52 – 1.68 m Fill Material	X	X							To assess potential impacts resulting from the identification of petroleum hydrocarbon odours detected in this sample.
BH1-24-SS4	2.29 – 2.49 m Glacial Till		X						X	For vertical delineation of soil contaminants identified in the fill material.
BH2-24-AU1	0.00 – 0.61 m Fill Material	X	X							To assess potential impacts resulting from the presence of a former aboveground diesel fuel storage tank.
BH2-24-AU1/SS2A	0.00 – 0.91 m Fill Material			X	X	X	X			To assess for potential impacts resulting from the presence of fill material of unknown quality.
BH3-24-SS2/SS3	0.76 – 2.13 m Fill Material	X	X	X	X	X	X			To assess potential impacts resulting from the presence of a former underground gasoline fuel storage tank and fill material of unknown quality.
BH4-24-AU1	0.00 – 0.61 m Fill Material			X	X	X	X		X	To assess potential impacts resulting from the presence of fill material of unknown quality.
BH5-24-AU1	0.00 – 0.61 m Fill Material		X	X	X	X	X	X		To assess potential impacts resulting from the presence of fill material of unknown quality and a pole-mounted electrical transformer.
DUP-1[1]	0.00 – 0.61 m Fill Material									For laboratory QA/QC purposes.

1 – Duplicate sample of BH5-24-AU1

Table 4
Testing Parameters for Submitted Groundwater Samples

Sample ID	Screened Interval & Stratigraphic Unit	Parameters Analyzed		Rationale
		VOCs	PHCs (F_1-F_4)	
BH1B-24-GW1	3.53 – 6.53 m Glacial Till	X	X	For geotechnical and general coverage purposes.
BH2-24-GW1	2.94 – 5.94 m Glacial Till	X	X	To assess potential groundwater impacts resulting from the presence of a former aboveground diesel fuel storage tank.
BH3-24-GW1	1.27 – 2.77 m Fill Material	X	X	To assess potential groundwater impacts resulting from the presence of a former underground gasoline fuel storage tank.
DUP1-24[1]	3.53 – 6.53 m Glacial Till	X		For laboratory QA/QC purposes.

1 – Duplicate sample of BH1B-24-GW1

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) and is accredited and certified by the SCC/CALA for specific tests registered with the association.

4.8 Residue Management

All soil cuttings were removed from the site following the field program, while all purge water and equipment cleaning fluids 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 the quality assurance and quality control (QA/QC) measures, undertaken as part of this assessment, is provided in the Sampling and Analysis Plan in Appendix 1.

5.0 REVIEW AND EVALUATION

5.1 Geology

In general, the subsurface soil profile encountered at the borehole locations consists of fill material (loose, brown, silty fine sand, with clay and trace gravel), underlain by native glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders)

Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface.

Site geology details are provided in the Soil Profile and Test Data Sheets in Appendix 1.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels beneath the Phase II Property were most recently measured using an electronic water level meter on September 27, 2024. The groundwater levels are summarized below in Table 5.

Table 5
Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1B-24	100.55	4.58 m	95.97 m	September 27, 2024
BH2-24	100.52	4.79 m	95.73 m	
BH3-24	100.12	1.17 m	98.95 m	

The groundwater at the Phase II Property was encountered within the bedrock at depths ranging from approximately 1.17 m to 4.79 m below ground surface.

No unusual visual observations were identified within the recovered groundwater samples at the time of the field sampling event.

Using the groundwater elevations recorded during the sampling event, groundwater contour mapping was completed as part of this assessment. According to the mapped contour data, illustrated on Drawing PE6616-3 – Test Hole Location Plan in the appendix, the groundwater flow beneath the Phase II Property was calculated to be in a northwesterly direction.

A horizontal hydraulic gradient of approximately 0.10 m/m was also calculated as part of this assessment.

It should be noted that groundwater levels are expected to fluctuate throughout the year with seasonal variations.

5.3 Fine/Coarse Soil Texture

Grain size analysis was not completed as part of this investigation. As a result, the coarse-grained soil standards were chosen as a conservative approach.

5.4 Field Screening

Field screening of the soil samples collected during the drilling program resulted in organic vapour readings ranging from 0.2 ppm to 23.0 ppm. While the vapour readings measured for most of the samples indicated that there is a negligible potential for the presence of volatile substances, it should be noted that Sample BH1-24-SS3A contained a noticeable petroleum hydrocarbon odour. This sample was specifically selected for additional testing to confirm the presence of petroleum hydrocarbons within the soil.

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

5.5 Soil Quality

As part of this assessment, eight soil samples were submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), metals, PAHs, and/or PCB parameters. The results of the analytical testing are presented below in Tables 6 to 9, as well as on the laboratory Certificates of Analysis included in Appendix 1.

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

Parameter	MDL (µg/g)	Soil Samples (ug/g)					MECP Table 2 Coarse-Grained Residential Soil Standards (µg/g)
		Sept. 13, 2024	Sept. 13, 2024	Sept. 13, 2024	Sept. 13, 2024	Sept. 16, 2024	
		BH1-24-SS3A	BH1-24-SS4	BH2-24-AU1	BH3-24-SS2/SS3	BH5-24-AU1	
		Sample Depth (m bgs)					
		1.52 – 1.68 m	2.29 – 2.49 m	0.00 – 0.61 m	0.76 – 2.13 m	0.00 – 0.61 m	
Benzene	0.02	nd	nt	nd	nd	nt	0.21
Ethylbenzene	0.05	nd	nt	nd	nd	nt	1.1
Toluene	0.05	nd	nt	nd	nd	nt	2.3
Xylenes	0.05	nd	nt	nd	nd	nt	3.1
PHCs F_1	7	30	nd	nd	nd	nd	55
PHCs F_2	4	**577**	44	97	21	6	98
PHCs F_3	8	**327**	37	67	115	82	300
PHCs F_4	6	nd	nd	28	105	156	2,800
PHCs F_4 gravimetric	50	nt	nt	nt	605	1,470	2,800

Notes:
- MDL – Method Detection Limit
- nt – not tested for this parameter
- nd – not detected above the MDL
- **Bold and Underlined** – value exceeds selected MECP standards

The concentrations of PHCs F_2 and F_3 detected in Sample BH1-24-SS3A exceed the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

No BTEX parameters were identified in any of the samples analyzed. All other PHC concentrations detected in the remaining soil samples comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

Table 7
Analytical Test Results – Soil
Metals

Parameter	MDL (µg/g)	Soil Samples (ug/g)					MECP Table 2 Coarse-Grained Residential Soil Standards (µg/g)
		Sept. 13, 2024	Sept. 13, 2024	Sept. 13, 2024	Sept. 13, 2024	Sept. 16, 2024	
		BH1-24-SS2	BH2-24-AU1/SS2A	BH3-24-SS2/SS3	BH4-24-AU1	BH5-24-AU1	
		Sample Depth (m bgs)					
		0.76 – 1.37 m	0.00 – 0.91 m	0.76 – 2.13 m	0.00 – 0.61 m	0.00 – 0.61 m	
Antimony	1.0	nd	nd	nd	nd	nd	7.5
Arsenic	1.0	8.4	2.9	3.7	4.7	6.6	18
Barium	1.0	138	46.2	227	63.2	59.7	390
Beryllium	0.5	0.8	nd	nd	nd	nd	4
Boron	5.0	10.1	7.7	14.5	9.7	8.6	120
Cadmium	0.5	nd	nd	nd	nd	nd	1.2
Chromium VI	0.2	nd	nd	nd	nd	nd	8
Chromium	5.0	36.7	14.1	16.7	17.0	14.6	160
Cobalt	1.0	13.1	4.8	7.4	7.3	7.5	22
Copper	5.0	29.9	15.7	16.6	23.1	16.2	140
Lead	1.0	10.7	4.6	10.1	8.4	16.0	120
Mercury	0.1	nd	nd	nd	nd	nd	0.27
Molybdenum	1.0	1.3	nd	1.4	1.4	3.6	6.9
Nickel	5.0	28.9	11.3	16.2	16.1	16.6	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	nd	nd	nd	nd	nd	23
Vanadium	10.0	51.1	23.7	20.4	24.7	23.0	86
Zinc	20.0	60.0	23.0	26.1	37.9	28.6	340

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

All detected metal parameter concentrations in the soil samples analyzed comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

Table 8
Analytical Test Results – Soil
PAHs

Parameter	MDL (µg/g)	Soil Samples (ug/g)					MECP Table 2 Coarse-Grained Residential Soil Standards (µg/g)
		Sept. 13, 2024	Sept. 13, 2024	Sept. 13, 2024	Sept. 13, 2024	Sept. 16, 2024	
		BH1-24-SS2	BH2-24-AU1/SS2A	BH3-24-SS2/SS3	BH4-24-AU1	BH5-24-AU1	
		Sample Depth (m bgs)					
		0.76 – 1.37 m	0.00 – 0.91 m	0.76 – 2.13 m	0.00 – 0.61 m	0.00 – 0.61 m	
Acenaphthene	0.02	nd	nd	nd	nd	nd	7.9
Acenaphthylene	0.02	nd	nd	0.05	nd	nd	0.15
Anthracene	0.02	nd	nd	0.03	nd	nd	0.67
Benzo[a]anthracene	0.02	nd	nd	0.05	nd	nd	0.5
Benzo[a]pyrene	0.02	nd	nd	0.06	nd	nd	0.3
Benzo[b]fluoranthene	0.02	nd	nd	0.06	nd	0.02	0.78
Benzo[g,h,i]perylene	0.02	nd	nd	0.05	nd	0.05	6.6
Benzo[k]fluoranthene	0.02	nd	nd	0.03	nd	nd	0.78
Chrysene	0.02	nd	nd	0.05	nd	nd	7
Dibenzo[a,h]anthracene	0.02	nd	nd	nd	nd	nd	0.1
Fluoranthene	0.02	nd	nd	0.10	nd	0.03	0.69
Fluorene	0.02	nd	nd	nd	nd	nd	62
Indeno [1,2,3-cd] pyrene	0.02	nd	nd	0.04	nd	0.02	0.38
1-Methylnaphthalene	0.02	nd	nd	nd	nd	nd	0.99
2-Methylnaphthalene	0.02	nd	nd	nd	nd	nd	0.99
Methylnaphthalene (1&2)	0.04	nd	nd	nd	nd	nd	0.99
Naphthalene	0.01	nd	nd	nd	nd	nd	0.6
Phenanthrene	0.02	nd	nd	0.04	nd	nd	6.2
Pyrene	0.02	nd	nd	0.12	nd	0.03	78

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

No PAH parameters were identified in Samples BH1-24-SS2, BH2-24-AU1/SS2A, or BH4-24-AU1. Parameters identified in the remaining samples analyzed comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

Table 9
Analytical Test Results – Soil
PCBs

Parameter	MDL (µg/g)	Soil Samples (ug/g)	MECP Table 2 Coarse-Grained Residential Soil Standards
		Sept. 16, 2024	
		BH5-24-AU1	
		Sample Depth (m bgs)	
		0.00 – 0.61 m	
PCBs	0.05	nd	0.35

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

No PCB parameter concentrations were detected in the soil sample analyzed. The results comply with the selected MECP Table 2 Coarse-Grained Residential Soil Standards.

Table 10
Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
PHCs F_1	30	BH1-24-SS3A	1.52 – 1.68 m
PHCs F_2	**577**	BH1-24-SS3A	1.52 – 1.68 m
PHCs F_3	**327**	BH1-24-SS3A	1.52 – 1.68 m
PHCs F_4	156	BH5-24-AU1	0.00 – 0.61 m
PHCs $F_{4\ gravimetric}$	1,470	BH5-24-AU1	0.00 – 0.61 m
Arsenic	8.4	BH1-24-SS2	0.76 – 1.37 m
Barium	227	BH3-24-SS2/SS3	0.76 – 2.13 m
Beryllium	0.8	BH1-24-SS2	0.76 – 1.37 m
Boron	14.5	BH3-24-SS2/SS3	0.76 – 2.13 m
Chromium	36.7	BH1-24-SS2	0.76 – 1.37 m
Cobalt	13.1	BH1-24-SS2	0.76 – 1.37 m
Copper	29.9	BH1-24-SS2	0.76 – 1.37 m
Lead	16.0	BH5-24-AU1	0.00 – 0.61 m
Molybdenum	3.6	BH5-24-AU1	0.00 – 0.61 m
Nickel	28.9	BH1-24-SS2	0.76 – 1.37 m
Vanadium	51.1	BH1-24-SS2	0.76 – 1.37 m
Zinc	60.0	BH1-24-SS2	0.76 – 1.37 m
Acenaphthylene	0.05	BH3-24-SS2/SS3	0.71 – 2.13 m
Anthracene	0.03	BH3-24-SS2/SS3	0.71 – 2.13 m
Benzo[a]anthracene	0.05	BH3-24-SS2/SS3	0.71 – 2.13 m
Benzo[a]pyrene	0.06	BH3-24-SS2/SS3	0.71 – 2.13 m
Benzo[b]fluoranthene	0.06	BH3-24-SS2/SS3	0.71 – 2.13 m
Benzo[g,h,i]perylene	0.05	BH3-24-SS2/SS3	0.71 – 2.13 m
Benzo[k]fluoranthene	0.03	BH3-24-SS2/SS3	0.71 – 2.13 m
Chrysene	0.05	BH3-24-SS2/SS3	0.71 – 2.13 m
Fluoranthene	0.10	BH3-24-SS2/SS3	0.71 – 2.13 m
Indeno [1,2,3-cd] pyrene	0.04	BH3-24-SS2/SS3	0.71 – 2.13 m
Phenanthrene	0.04	BH3-24-SS2/SS3	0.71 – 2.13 m
Pyrene	0.12	BH3-24-SS2/SS3	0.71 – 2.13 m

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory Certificates of Analysis are provided in Appendix 1.

5.6 Groundwater Quality

As part of this assessment, three groundwater samples were submitted for laboratory analysis of VOCs and PHCs (F_1-F_4) parameters. The results of the analytical testing are presented below in Tables 11 and 12, as well as on the laboratory Certificates of Analysis included in Appendix 1.

Table 11
Analytical Test Results – Groundwater
Volatile Organic Compounds (VOCs)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)			MECP Table 2 Potable Groundwater Standards (µg/L)
		Sept. 27, 2024	Sept. 27, 2024	Sept. 27, 2024	
		BH1B-24-GW1	BH2-24-GW1	BH3-24-GW1	
		Screening Interval (m bgs)			
		3.53 – 6.53 m	2.94 – 5.94 m	1.27 – 2.77 m	
Acetone	5.0	nd	nd	nd	2,700
Benzene	0.5	nd	nd	nd	5
Bromodichloromethane	0.5	nd	nd	nd	16
Bromoform	0.5	nd	nd	nd	25
Bromomethane	0.5	nd	nd	nd	0.89
Carbon Tetrachloride	0.2	nd	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	nd	30
Chloroform	0.5	1.0	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	nd	25
Dichlorodifluoromethane	1.0	nd	nd	nd	590
1,2-Dichlorobenzene	0.5	nd	nd	nd	3
1,3-Dichlorobenzene	0.5	nd	nd	nd	59
1,4-Dichlorobenzene	0.5	nd	nd	nd	1
1,1-Dichloroethane	0.5	nd	nd	nd	5
1,2-Dichloroethane	0.5	nd	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	5
1,3-Dichloropropene	0.5	nd	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	nd	2.4
Ethylene Dibromide	0.2	nd	nd	nd	0.2
Hexane	1.0	nd	nd	nd	51
Methyl Ethyl Ketone	5.0	nd	nd	nd	1,800
Methyl Isobutyl Ketone	5.0	nd	nd	nd	640
Methyl tert-butyl ether	2.0	nd	nd	nd	15
Methylene Chloride	5.0	nd	nd	nd	50
Styrene	0.5	nd	nd	nd	5.4
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	1
Tetrachloroethylene	0.5	nd	nd	nd	1.6
Toluene	0.5	nd	nd	nd	24
1,1,1-Trichloroethane	0.5	nd	nd	nd	200
1,1,2-Trichloroethane	0.5	nd	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	nd	1.6
Trichlorofluoromethane	1.0	nd	nd	nd	150
Vinyl Chloride	0.5	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	300

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

No VOC parameters were identified in the groundwater samples analyzed, apart from a chloroform concentration in Sample BH1B-24-GW1. The chloroform concentration identified complies with the MECP Table 2 Potable Standards.

Table 12
Analytical Test Results – Groundwater
PHCs (F_1-F_4)

Parameter	MDL (µg/L)	Groundwater Samples (ug/L)			MECP Table 2 Potable Groundwater Standards (µg/L)
		Sept. 27, 2024	Sept. 27, 2024	Sept. 27, 2024	
		BH1B-24-GW1	BH2-24-GW1	BH3-24-GW1	
		Screening Interval (m bgs)			
		3.53 – 6.53 m	2.94 – 5.94 m	1.27 – 2.77 m	
PHCs F_1	25	nd	nd	nd	750
PHCs F_2	100	nd	nd	nd	150
PHCs F_3	100	nd	nd	nd	500
PHCs F_4	100	nd	nd	nd	500

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

No PHC parameter concentrations were detected above the laboratory method detection limits in any of the groundwater samples analyzed. The results comply with the MECP Table 2 Potable Groundwater Standards.

Table 13
Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/g)	Sample ID	Depth Interval (m BGS)
Chloroform	1.0	BH1B-24-GW1	3.53 – 6.53 m

Notes:
- **Bold and Underlined** – value exceeds selected MECP standards

All other parameter concentrations analyzed were below the laboratory detection limits. The laboratory certificates of analysis are provided in Appendix 1.

5.7 Quality Assurance and Quality Control Results

All samples submitted as part of this Phase II ESA were handled in accordance with the analytical protocols with respect to holding time, preservation method, storage requirement, and container type.

As per Subsection 47(3) of O. Reg. 153/04, as amended by the Environmental Protection Act, the certificates of analysis have been received for each sample submitted for laboratory analysis and have been appended to this report.

As per the Sampling and Analysis Plan, a duplicate soil sample was obtained from sample BH5-24-AU1 and submitted for laboratory analysis of PHCs and metal parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 14.

Table 14
QA/QC Calculations – Soil

Parameter	MDL (µg/g)	BH5-24-AU1	DUP1	RPD (%)	QA/QC Result (Target: <20% RPD)
PHCs F_1	7	nd	nd	0	Meets Target
PHCs F_2	4	6	nd	N/A	Does Not Meet Target
PHCs F_3	8	82	72	13.0	Meets Target
PHCs F_4	6	156	132	16.7	Meets Target
PHCs $F_{4\ gravimetric}$	50	1,470	404	113.8	Does Not Meet Target
Antimony	1.0	nd	nd	0	Meets Target
Arsenic	1.0	6.6	6.4	3.1	Meets Target
Barium	1.0	59.7	49.1	19.5	Meets Target
Beryllium	0.5	nd	nd	0	Meets Target
Boron	5.0	8.6	7.2	17.7	Meets Target
Cadmium	0.5	nd	nd	0	Meets Target
Chromium	5.0	14.6	12.7	13.9	Meets Target
Cobalt	1.0	7.5	7.5	0	Meets Target
Copper	5.0	16.2	16.7	3.0	Meets Target
Lead	1.0	16.0	16.8	4.9	Meets Target
Molybdenum	1.0	3.6	3.4	5.7	Meets Target
Nickel	5.0	16.6	16.9	1.8	Meets Target
Selenium	1.0	nd	nd	0	Meets Target
Silver	0.3	nd	nd	0	Meets Target
Thallium	1.0	nd	nd	0	Meets Target
Uranium	1.0	nd	nd	0	Meets Target
Vanadium	10.0	23.0	21.4	7.2	Meets Target
Zinc	20.0	28.6	29.1	1.7	Meets Target

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

The RPD calculated for most of the parameters fell within the acceptable range of 20%, with two exceptions. These discrepancies are likely attributed to either the variability between the low concentrations of certain parameters detected in the samples, or the non-homogeneous nature of the fill material from where both samples were sourced. Given that there is a similarity in the list of parameters detected in both the original and duplicate sample, and that both samples comply with the site standards, the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report, are considered to have been met.

Similarly, a duplicate groundwater sample was obtained from sample BH1B-24-GW1 and submitted for laboratory analysis of VOC parameters. The relative percent difference (RPD) calculations for the original and duplicate samples are provided below in Table 14.

Table 14
QA/QC Calculations – Groundwater

Parameter	MDL (µg/L)	BH1B-24-GW1	DUP1-24	RPD (%)	QA/QC Result (Target: <20% RPD)
Acetone	5.0	nd	nd	0	Meets Target
Benzene	0.5	nd	nd	0	Meets Target
Bromodichloromethane	0.5	nd	nd	0	Meets Target
Bromoform	0.5	nd	nd	0	Meets Target
Bromomethane	0.5	nd	nd	0	Meets Target
Carbon Tetrachloride	0.2	nd	nd	0	Meets Target
Chlorobenzene	0.5	nd	nd	0	Meets Target
Chloroform	0.5	1.0	1.0	0	Meets Target
Dibromochloromethane	0.5	nd	nd	0	Meets Target
Dichlorodifluoromethane	1.0	nd	nd	0	Meets Target
1,2-Dichlorobenzene	0.5	nd	nd	0	Meets Target
1,3-Dichlorobenzene	0.5	nd	nd	0	Meets Target
1,4-Dichlorobenzene	0.5	nd	nd	0	Meets Target
1,1-Dichloroethane	0.5	nd	nd	0	Meets Target
1,2-Dichloroethane	0.5	nd	nd	0	Meets Target
1,1-Dichloroethylene	0.5	nd	nd	0	Meets Target
cis-1,2-Dichloroethylene	0.5	nd	nd	0	Meets Target
trans-1,2-Dichloroethylene	0.5	nd	nd	0	Meets Target
1,2-Dichloropropane	0.5	nd	nd	0	Meets Target
1,3-Dichloropropene	0.5	nd	nd	0	Meets Target
Ethylbenzene	0.5	nd	nd	0	Meets Target
Ethylene Dibromide	0.2	nd	nd	0	Meets Target
Hexane	1.0	nd	nd	0	Meets Target
Methyl Ethyl Ketone	5.0	nd	nd	0	Meets Target
Methyl Isobutyl Ketone	5.0	nd	nd	0	Meets Target
Methyl tert-butyl ether	2.0	nd	nd	0	Meets Target
Methylene Chloride	5.0	nd	nd	0	Meets Target
Styrene	0.5	nd	nd	0	Meets Target
1,1,1,2-Tetrachloroethane	0.5	nd	nd	0	Meets Target
1,1,2,2-Tetrachloroethane	0.5	nd	nd	0	Meets Target
Tetrachloroethylene	0.5	nd	nd	0	Meets Target
Toluene	0.5	nd	nd	0	Meets Target
1,1,1-Trichloroethane	0.5	nd	nd	0	Meets Target
1,1,2-Trichloroethane	0.5	nd	nd	0	Meets Target
Trichloroethylene	0.5	nd	nd	0	Meets Target
Trichlorofluoromethane	1.0	nd	nd	0	Meets Target
Vinyl Chloride	0.5	nd	nd	0	Meets Target
Xylenes	0.5	nd	nd	0	Meets Target

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

The RPD calculated for all parameters fell within the acceptable range of 20%, and as a result, the data quality objectives outlined in the Sampling and Analysis Plan, appended to this report, are considered to have been met.

Based on the results of the QA/QC analysis, the quality of the field data collected during this Phase II ESA is sufficient to meet the overall objectives of this assessment.

5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O. Reg. 153/04 amended by the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

As described in Section 7.1 of the Phase I ESA report, as well as Section 2.2 of this report, the following PCAs, as defined by Table 2 of O. Reg. 153/04, are considered to result in APECs on the Phase II Property:

Table 15
Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of APEC on Phase I Property	Potentially Contaminating Activity (Table 2 – O. Reg. 153/04)	Location of PCA (On-Site or Off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1 Fill Material of Unknown Quality	Entirety of Phase I Property	*"Item 30: Importation of Fill Material of Unknown Quality"*	On-Site	Metals PAHs	Soil/Fill
APEC 2 Former Aboveground Diesel Fuel Storage Tank	Northern Portion of Phase I Property	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	On-Site	VOCs BTEX PHCs (F_1-F_4)	Soil and Groundwater
APEC 3 Former Underground Gasoline Fuel Storage Tank	Central Portion of Phase I Property	*"Item 28: Gasoline and Associated Products Storage in Fixed Tanks"*	On-Site	VOCs BTEX PHCs (F_1-F_4)	Soil and Groundwater
APEC 4 Existing Pole-Mounted Electrical Transformer	Southern Portion of Phase I Property	*"Item 55: Transformer Manufacturing, Processing, and Use"*	On-Site	PHCs (F_1-F_4) PCBs	Soil and Groundwater

Contaminants of Potential Concern (CPCs)

The contaminants of potential concern (CPCs) associated with the aforementioned APECs are considered to be:

- ❒ Volatile Organic Compounds (VOCs)
- ❒ Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- ❒ Petroleum Hydrocarbons, fractions 1 – 4 (PHCs F_1-F_4)
- ❒ Polycyclic Aromatic Hydrocarbons (PAHs)
- ❒ Metals (including Arsenic [As], Antimony [Sb], and Selenium [Se])
- ❒ Mercury
- ❒ Hexavalent Chromium
- ❒ Polychlorinated Biphenyls (PCBs).

These CPCs have the potential to be present in the soil matrix and/or the groundwater situated beneath the Phase II Property.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation, which did not identify any buried utilities present beneath the Phase II Property.

Physical Setting

Site Stratigraphy

The stratigraphy of the Phase II Property generally consists of:

- ❒ Crushed stone and fill material (loose, brown, silty fine sand, with clay and trace gravel); extending to depths ranging from approximately 0.91 m to 3.38 m below ground surface.
- ❒ Glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders); extending to depths ranging from approximately 2.44 m to 5.97 m below ground surface.
- ❒ Excellent quality sandstone bedrock, encountered at a depth of approximately 5.18 m below ground surface.

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is provided in the Soil Profile and Test Data Sheets in Appendix 1.

Hydrogeological Characteristics

The groundwater beneath the Phase II Property was encountered within the shale bedrock unit at depths ranging from approximately 1.17 m to 4.79 m below the existing ground surface.

Based on the measured groundwater levels, the groundwater was calculated to flow in a northwesterly direction.

Approximate Depth to Bedrock

Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface.

Approximate Depth to Water Table

The depth to the water table is approximately 1.17 m to 4.79 m below the existing ground surface.

Section 35 of Ontario Regulation 153/04

Section 35 of the Regulation does not apply to the Phase II Property, as there are known potable water wells in use within a 250 m radius. As such, the potable groundwater standards are considered to be applicable.

Sections 41 and 43.1 of Ontario Regulation 153/04

Section 41 of the Regulation does not apply to the Phase II Property, as there are no bodies of water or areas of natural significance located on or within 30 m of the Phase II Property. The Phase II Property is therefore not considered to be environmentally sensitive.

Section 43.1 of the Regulation does not apply to the Phase II Property, since the bedrock is situated at depths greater than 2 m below ground surface, and thus is not considered to be a shallow soil property.

Existing Buildings and Structures

No buildings or structures are currently present on the Phase II Property.

Environmental Condition

Areas Where Contaminants are Present

Based on the analytical test results obtained during this assessment, the lower layer of soil/fill material identified in BH1-24, located within the eastern portion of the Phase II Property, is contaminated with petroleum hydrocarbons (fractions 2 and 3).

This impacted layer of fill material, approximately 1 meter in thickness (1.0 m to 2.0 m below ground surface), is suspected to be limited to a small radius around the vicinity of BH1-24. For vertical delineation purposes, the underlying native soil sample was also tested for these contaminant parameters, the results of which returned concentrations in compliance with the site standards. As a result, the contamination appears to be contained solely within this layer of fill material and has not migrated downwards into the underlying native soil.

The groundwater beneath the Phase II Property is not considered to be contaminated.

Types of Contaminants

The following contaminants were detected on the Phase II Property at concentrations exceeding the selected MECP Table 2 Coarse-Grained Residential Soil Standards:

Petroleum Hydrocarbons (PHCs)

- Fraction 2
- Fraction 3

These contaminants were identified solely within the lower layer of soil/fill material in BH1-24, located within the western portion of the Phase II Property.

Contaminated Media

Soil

The lower layer of soil/fill material within the vicinity of BH1-24 is considered to be contaminated with petroleum hydrocarbons.

Groundwater

The groundwater beneath the Phase II Property is not considered to be contaminated.

What Is Known About Areas Where Contaminants Are Present

Based on what is known about the history of the Phase II Property, BH1-24 is situated in what was formerly a vehicle parking lot for the former commercial retail building which occupied the site. Given the absence of any other known sources, it is suspected that the petroleum hydrocarbon impacts are the result of a minor fuel and/or oil leak originating from a vehicle.

Distribution and Migration of Contaminants

Given the suspected source of the contamination, the vertical delineation from the deeper clean native soil layer, as well as the clean groundwater results, the contamination does not appear to have migrated downwards into the underlying native soils or the water table.

Discharge of Contaminants

Based on the types of contaminants identified on the Phase II Property, as well as their containment within the layer of fill material, the discharge source of the contamination is suspected to have been the result of a minor vehicle fuel leak.

Climatic and Meteorological Conditions

In general, climatic and meteorological conditions have the potential to affect contaminant distribution. Two (2) ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants via the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally.

Based on the clean native soil results obtained from underneath the impacted layer of fill material, as well as the clean groundwater results, no significant downward migration of contaminants via leaching is suspected to have occurred. Migration of contaminants via groundwater levels and flow is not considered to have occurred at the Phase II Property.

Potential for Vapour Intrusion

Currently, no permanent structures with foundations within the impacted layer of fill material are present on the Phase II Property, and as a result, there is no risk of vapour intrusion occurring on the site.

Given that the Phase II Property will be redeveloped, all contaminated soil will be removed from the site during construction activities. As such, there is no anticipated potential for future vapour intrusion at the Phase II Property.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for part of the property addressed 155 Dun Skipper Drive, in the City of Ottawa, Ontario. The purpose of the Phase II ESA was to address the 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 for this assessment was conducted on September 13 and September 16, 2024, and consisted of drilling seven boreholes (BH1-24 to BH5-24, as well as BH1A-24 and BH1B-24) throughout the Phase II Property. The boreholes were advanced to depths ranging from approximately 2.44 m to 6.71 m below the existing ground surface and terminated either within the bedrock or within the overburden layer of glacial till on practical refusal to augering on the inferred bedrock surface. Upon completion, three of the boreholes (BH1B-24, BH2-24, and BH3-24) were instrumented with groundwater monitoring wells in order to access the water table.

In general, the subsurface soil profile encountered at the borehole locations consists of fill material (loose, brown, silty fine sand, with clay and trace gravel), underlain by native glacial till (dense, brown, silty fine sand with gravel, cobbles, and boulders). Bedrock, consisting of excellent quality sandstone, was confirmed in borehole BH1B-24 at a depth of approximately 5.18 m below ground surface. Practical refusal to augering on the inferred bedrock surface was measured in all the remaining boreholes at depths ranging from approximately 2.44 m to 5.97 m below ground surface. The groundwater beneath the Phase II Property was encountered within the bedrock unit at depths ranging from approximately 1.17 m to 4.79 m below the existing ground surface.

Eight soil samples were submitted for laboratory analysis of BTEX, PHCs (F_1-F_4), metals, PAHs, and/or PCB parameters. The test results indicated that the concentrations of PHCs F_2 and F_3 detected in Sample BH1-24-SS3A exceed the selected MECP Table 2 Coarse-Grained Residential Soil Standards. All other parameters tested in the remaining soil samples comply with the standards.

Three groundwater samples were also submitted for laboratory analysis of VOC and PHC (F_1-F_4) parameters. No VOC parameters were identified in the groundwater samples analyzed, apart from a chloroform concentration in Sample BH1B-24-GW1. The chloroform concentration identified complies with the MECP Table 2 Potable Standards.

Recommendations

Impacted Soil

Based on the findings of this assessment, the lower layer of soil/fill material localized in the vicinity of BH1-24 is contaminated, requiring remedial action. This contamination was identified at a depth interval of approximately 1 m to 2 m below the existing ground surface.

Given our understanding that the Phase II Property is to be redeveloped in the near future, it is our recommendation that the contaminated soil be remediated in conjunction with site excavation activities. At such a time, the contaminated soil will be excavated from the site and transported to a licensed waste disposal facility. It is recommended that Paterson personnel be present on-site at the time of remedial activities to assist with coordination, directing the excavation and segregation of contaminated soil from clean soils, as well as to fulfill the confirmatory soil sampling requirements in accordance with Table 2 of O. Reg. 153/04.

Prior to the off-site disposal of impacted soil at a licensed waste disposal facility, a leachate analysis of a representative sample of contaminated soil must be conducted in accordance with O. Reg. 347/90 and O. Reg. 558/00.

Excess Soil

Non-impacted excess soil from the Phase II Property must be managed in accordance with O.Reg. 406/19: On-Site and Excess Soil Management. It is recommended that excess soil planning occurs prior to the site redevelopment.

Monitoring Wells

If the groundwater monitoring wells installed on-site are not going to be used in the future, or will be destroyed during future construction activities, then they must be decommissioned in accordance with O. Reg. 903/90 (Ontario Water Resources Act). Further information can be provided upon request in this regard.

It is our recommendation that the monitoring wells currently be maintained for future sampling purposes, until such a time when future site excavation activities have commenced. The monitoring wells will be registered with the MECP under this regulation.

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 CSA Z769-00 (reaffirmed, 2022). 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 Phase II Property 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 2668867 Ontario Inc. Permission and notification from 2668867 Ontario Inc. and Paterson Group will be required prior to the release of this report to any other party.

Paterson Group Inc.

Nick Sullivan, B.Sc.

Karyn Munch, P.Eng., QP_{ESA}

Report Distribution:

- 2668867 Ontario Inc.
- Paterson Group Inc.

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE6616-1 – SITE PLAN

DRAWING PE6616-2 – SURROUNDING LAND USE PLAN

DRAWING PE6616-3 – TEST HOLE LOCATION PLAN

DRAWING PE6616-4 – ANALYTICAL TESTING PLAN – SOIL (PHCs)

DRAWING PE6616-4A – CROSS SECTION A-A' – SOIL (PHCs)

DRAWING PE6616-4B – CROSS SECTION B-B' – SOIL (PHCs)

DRAWING PE6616-5 – ANALYTICAL TESTING PLAN – SOIL (BTEX, METALS, PAHs, PCBs)

DRAWING PE6616-5A – CROSS SECTION A-A' – SOIL (BTEX, METALS, PAHs, PCBs)

DRAWING PE6616-5B – CROSS SECTION B-B' – SOIL (BTEX, METALS, PAHs, PCBs)

DRAWING PE6616-6 – ANALYTICAL TESTING PLAN – GROUNDWATER

DRAWING PE6616-6A – CROSS SECTION A-A' – GROUNDWATER

DRAWING PE6616-6B – CROSS SECTION B-B' – GROUNDWATER

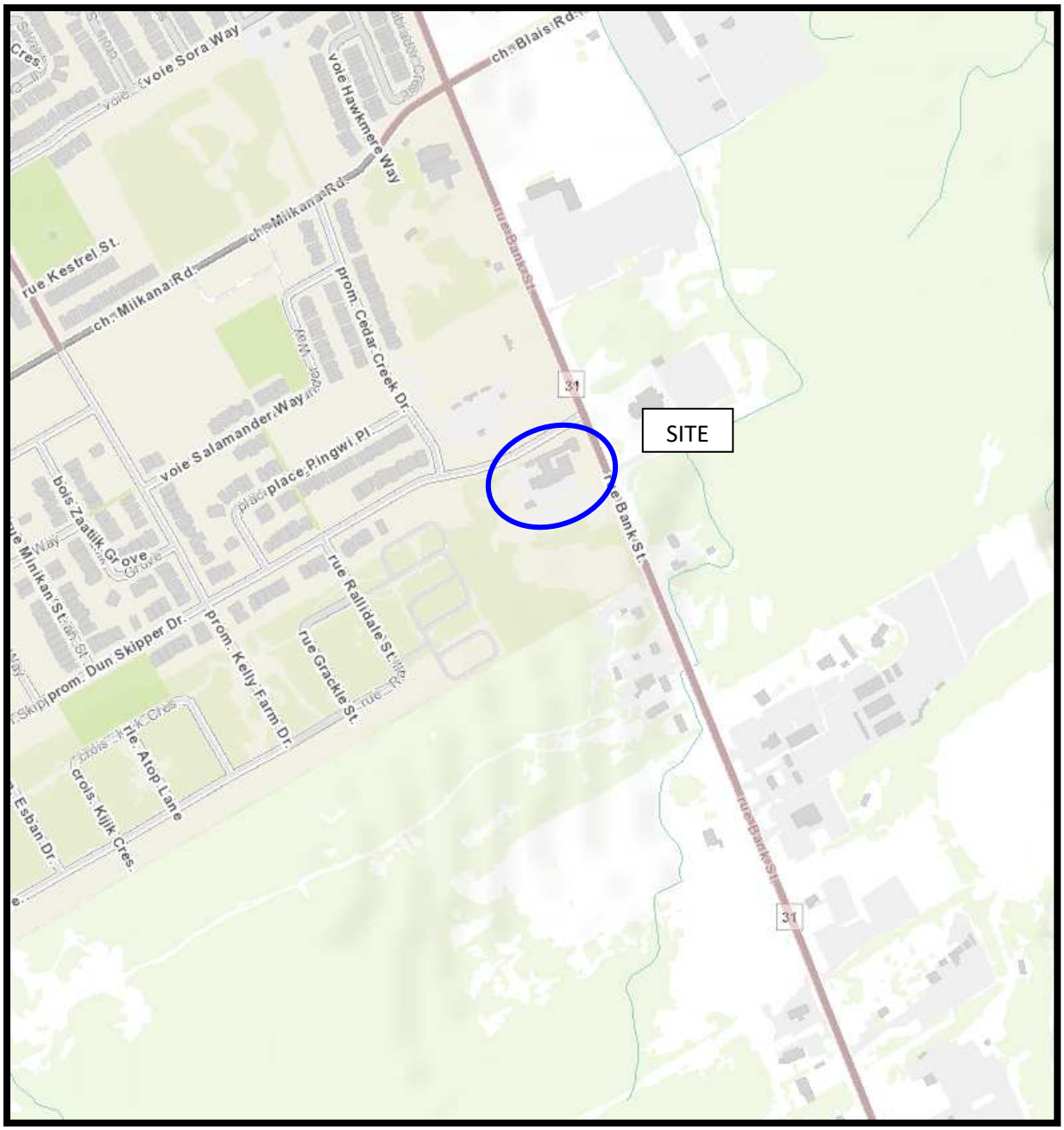

FIGURE 1

KEY PLAN

PATERSON GROUP

150 DUN SKIPPER DRIVE
VACANT
(CONSTRUCTION STAGING AREA)

DUN SKIPPER DRIVE

NO MUNICIPAL ADDRESS

APEC 2

FORMER HARDWARE STORE

FORMER STORAGE BUILDING

APPROXIMATE LOCATION OF FORMER DIESEL ABOVEGROUND STORAGE TANK

FILL / GRAVEL

FILL / GRAVEL

155 DUN SKIPPER DRIVE
COMMERCIAL
(VACANT)

FORMER HARDWARE STORE

APEC 1

APEC 3

APPROXIMATE LOCATION OF FORMER GASOLINE UNDERGROUND STORAGE TANK

APPROXIMATE LOCATION OF POLE-MOUNTED TRANSFORMER

APEC 4

LOW BRUSH

4836 BANK STREET
COMMERCIAL
(HOME HARDWARE)

4836 BANK STREET
PARKING LOT

4836 BANK STREET
COMMERCIAL

BANK STREET

4835 BANK STREET
INSTITUTIONAL
(HINDU TEMPLE OF OTTAWA CARLETON)

NO MUNICIPAL ADDRESS
AGRICULTURAL

AREAS OR POTENTIAL ENVIRONMENTAL CONCERN :

ID #	PCA ID	DESCRIPTION
1	30	FILL MATERIAL OF UNKNOWN QUALITY
2	28	FORMER ABOVEGROUND DIESEL FUEL STORAGE TANK
3	28	FORMER UNDERGROUND GASOLINE FUEL STORAGE TANK
4	55	EXISTING POLE-MOUNTED TRANSFORMER

LEGEND:

PHASE I PROPERTY BOUNDARY

SCALE: 1:600

0 5 10 15 20 25 30m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:600	Date: 10/2024
Drawn by: YA	Report No.: PE6616-1
Checked by: NS	Dwg. No.: PE6616-1
Approved by: KM	Revision No.:

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11x17

POTENTIALLY CONTAMINATING ACTIVITIES :

ID #	PCA ID	ADDRESS	DESCRIPTION
1	30	ON-SITE	FILL MATERIAL OF UNKNOWN QUALITY
2	28	ON-SITE	FORMER ABOVEGROUND DIESEL FUEL STORAGE TANK
3	28	ON-SITE	FORMER UNDERGROUND GASOLINE FUEL STORAGE TANK
4	55	ON-SITE	EXISTING POLE-MOUNTED TRANSFORMER
5	52	4852 BANK ST	EXISTING AUTOMOTIVE DEALERSHIP
6	52	4815 BANK ST	EXISTING RECREATIONAL VEHICLE DEALERSHIP

LEGEND:

PHASE I PROPERTY BOUNDARY

SCALE: 1:3000

0 25 50 75 100 125 150 200m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:3000	Date: 10/2024
Drawn by: YA	Report No.: PE6616-1
Checked by: NS	Dwg. No.: PE6616-2
Approved by: KM	Revision No.:

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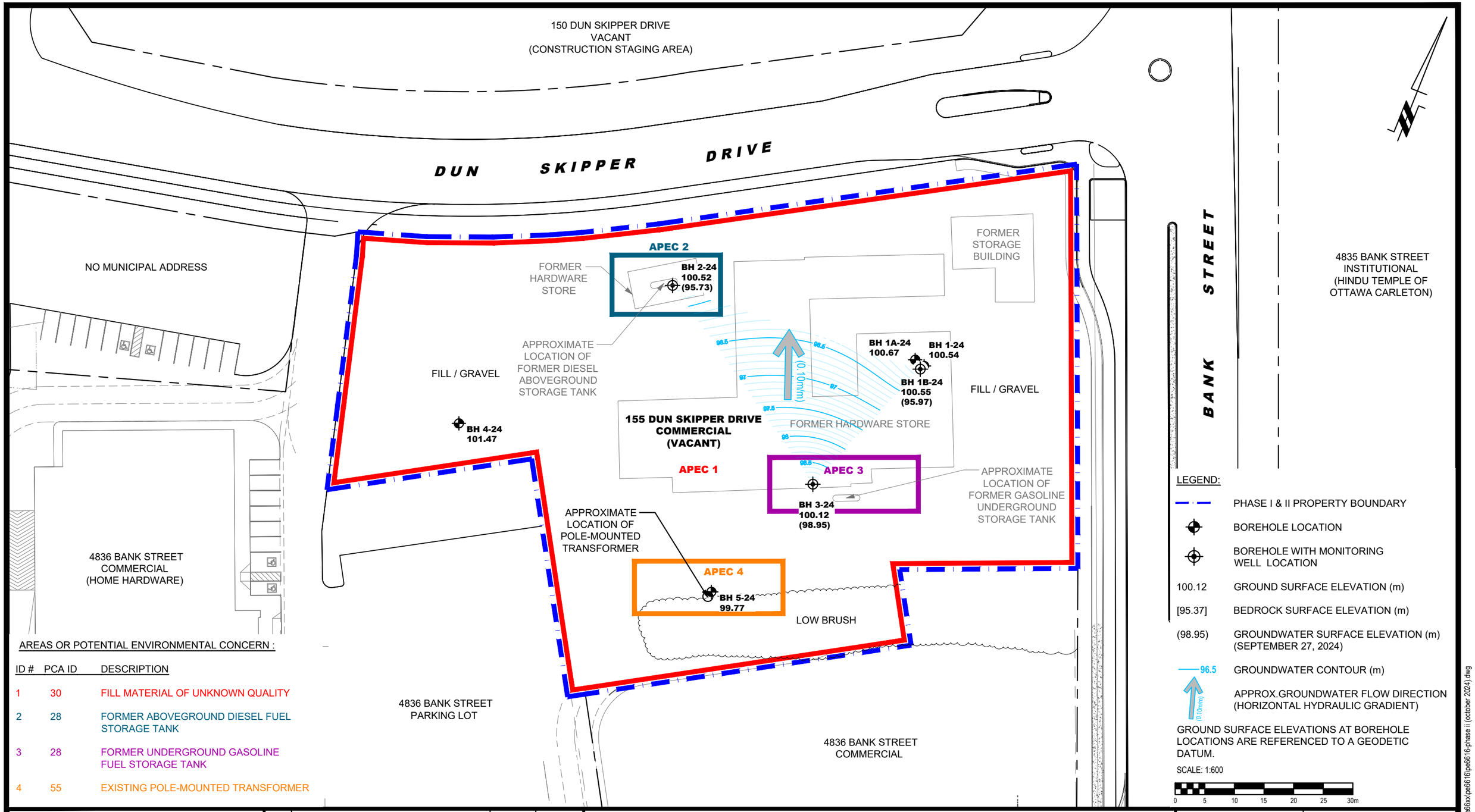

AREAS OR POTENTIAL ENVIRONMENTAL CONCERN :

ID #	PCA ID	DESCRIPTION
1	30	FILL MATERIAL OF UNKNOWN QUALITY
2	28	FORMER ABOVEGROUND DIESEL FUEL STORAGE TANK
3	28	FORMER UNDERGROUND GASOLINE FUEL STORAGE TANK
4	55	EXISTING POLE-MOUNTED TRANSFORMER

LEGEND:

- PHASE I & II PROPERTY BOUNDARY
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 100.12 GROUND SURFACE ELEVATION (m)
- [95.37] BEDROCK SURFACE ELEVATION (m)
- (98.95) GROUNDWATER SURFACE ELEVATION (m) (SEPTEMBER 27, 2024)
- 96.5 GROUNDWATER CONTOUR (m)
- APPROX.GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

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

SCALE: 1:600

0 5 10 15 20 25 30m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:600	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-3
Approved by: KM	Revision No.:

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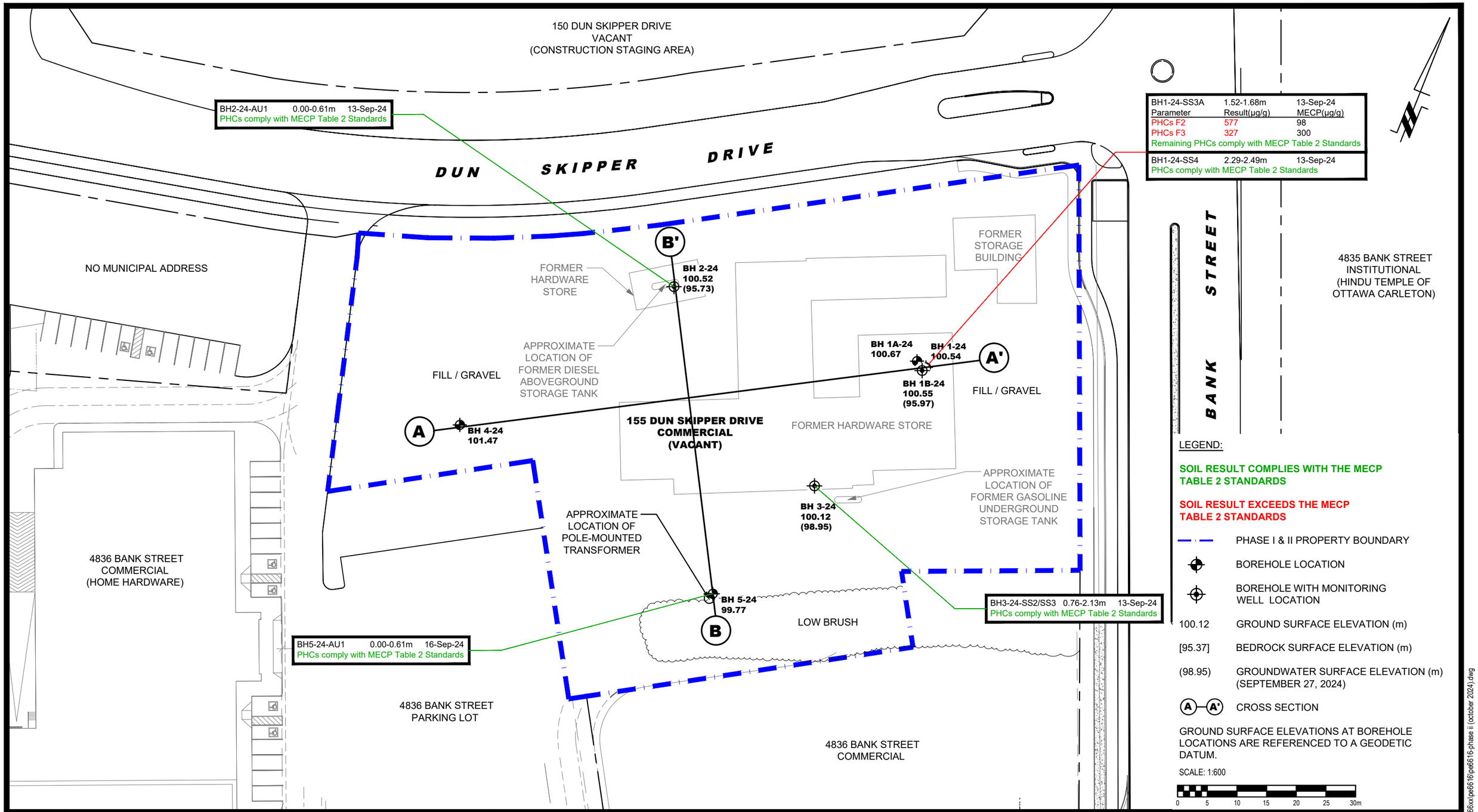

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - SOIL (PHCs)**

Scale: 1:600	**Date:** 10/2024
Drawn by: YA	**Report No.:** PE6616-2
Checked by: NS	**Dwg. No.:** PE6616-4
Approved by: KM	**Revision No.:**

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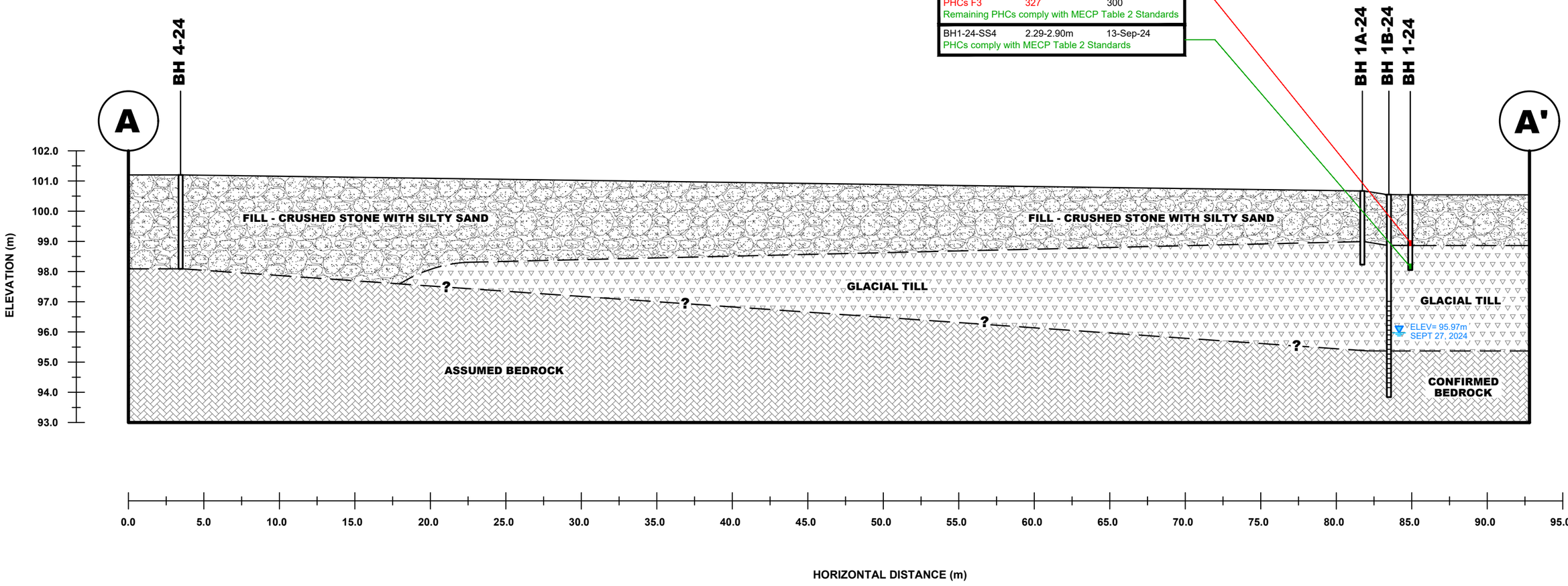
BH1-24-SS3A	1.52-1.68m	13-Sep-24
Parameter	Result(µg/g)	MECP(µg/g)
PHCs F2	577	98
PHCs F3	327	300
Remaining PHCs comply with MECP Table 2 Standards		

BH1-24-SS4	2.29-2.90m	13-Sep-24
PHCs comply with MECP Table 2 Standards		



SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

SOIL RESULT EXCEEDS THE MECP TABLE 2 STANDARDS

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: CROSS SECTION A-A' - SOIL (PHCs)

Scale: AS SHOWN	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-4A
Approved by: KM	Revision No.:

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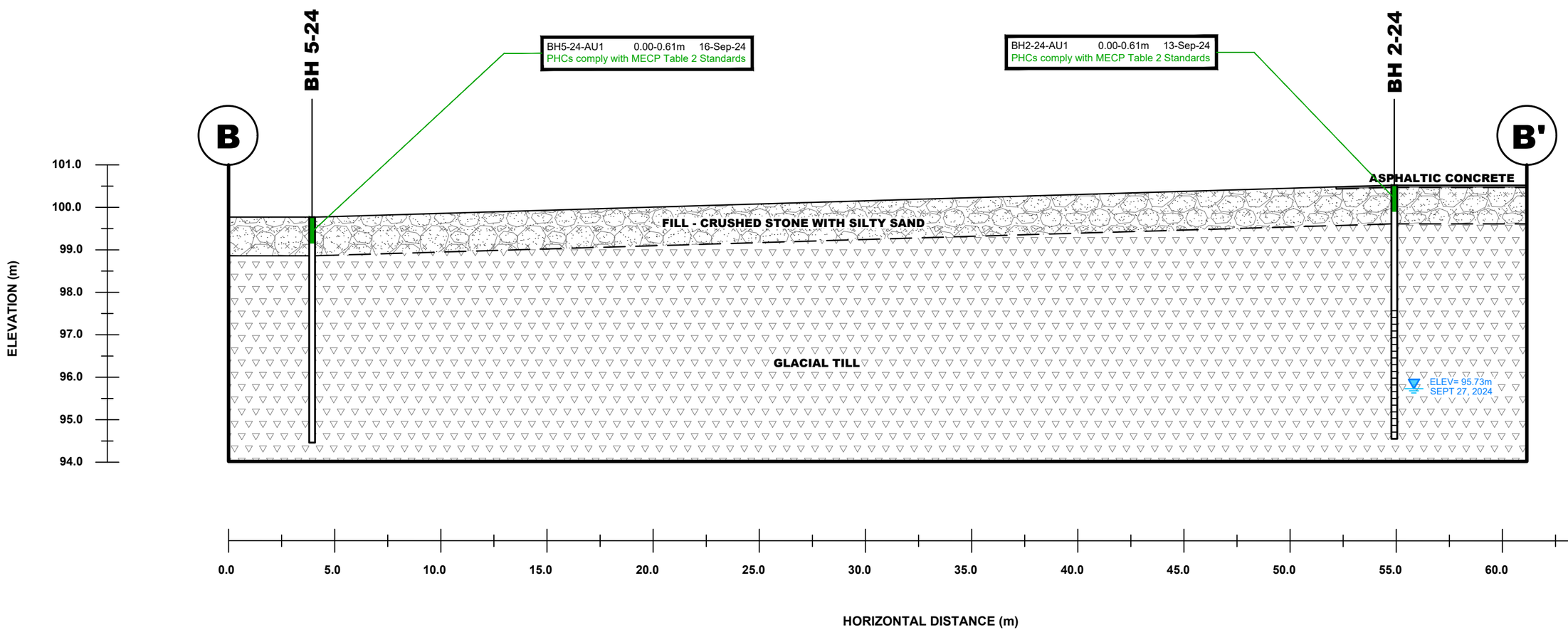

SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: **CROSS SECTION B-B' - SOIL (PHCs)**

Scale: AS SHOWN	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-4B
Approved by: KM	Revision No.:

11x17

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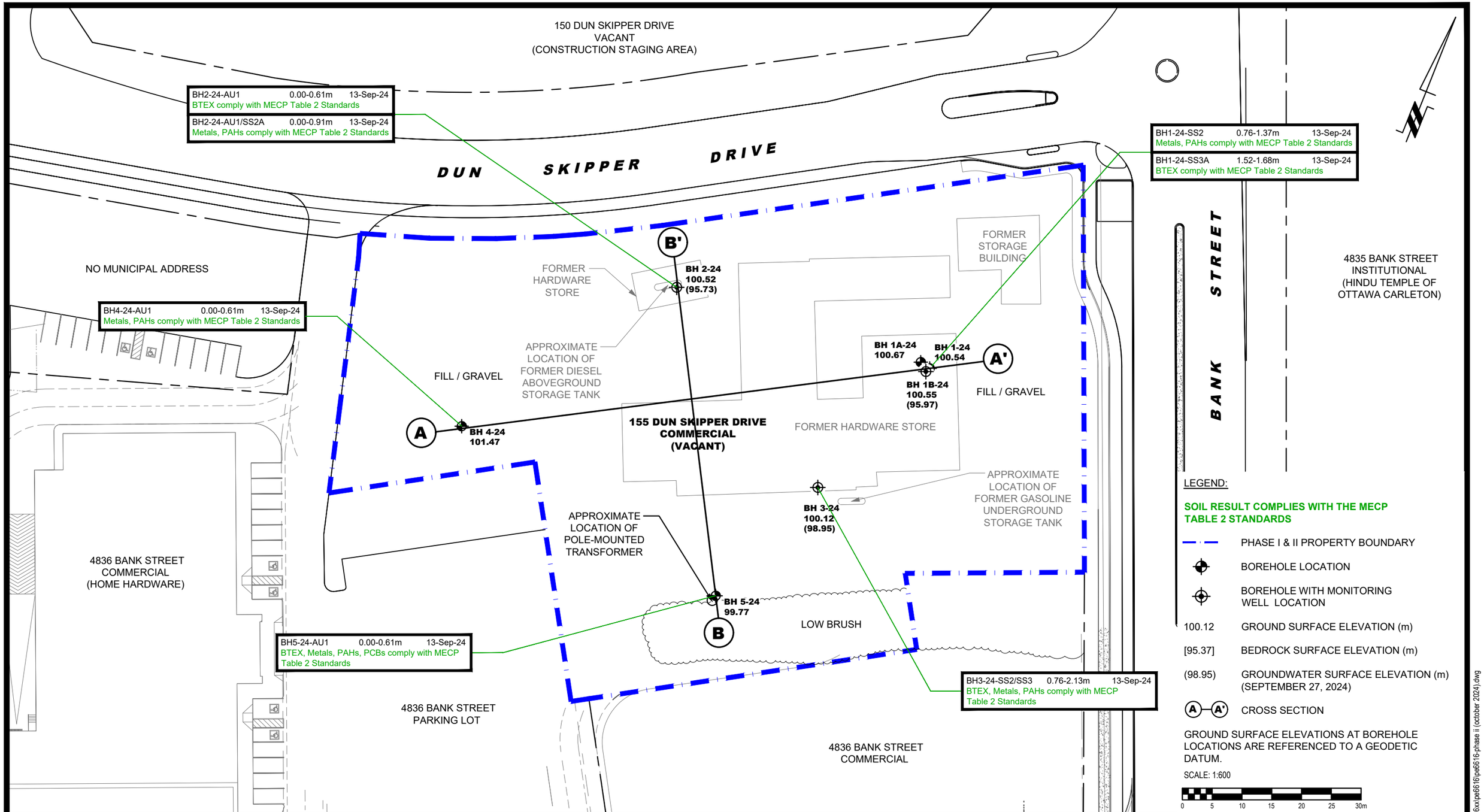

LEGEND:

SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

- PHASE I & II PROPERTY BOUNDARY
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 100.12 GROUND SURFACE ELEVATION (m)
- [95.37] BEDROCK SURFACE ELEVATION (m)
- (98.95) GROUNDWATER SURFACE ELEVATION (m) (SEPTEMBER 27, 2024)
- A—A' CROSS SECTION

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

SCALE: 1:600

0 5 10 15 20 25 30m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - SOIL (BTEX, METALS, PAHs, PCBs)**

Scale: 1:600	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-5
Approved by: KM	Revision No.:

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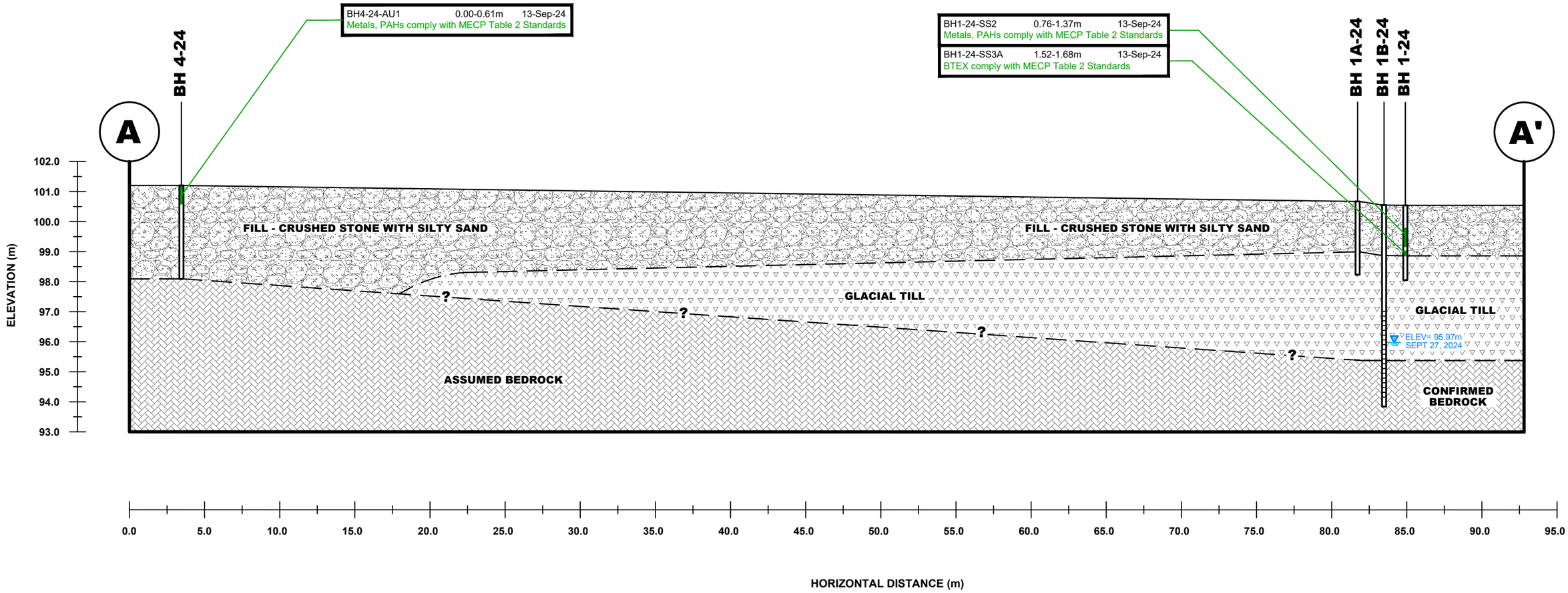

SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: CROSS SECTION A-A' - SOIL (BTEX, METALS, PAHs, PCBs)

Scale: AS SHOWN	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-5A
Approved by: KM	Revision No.:

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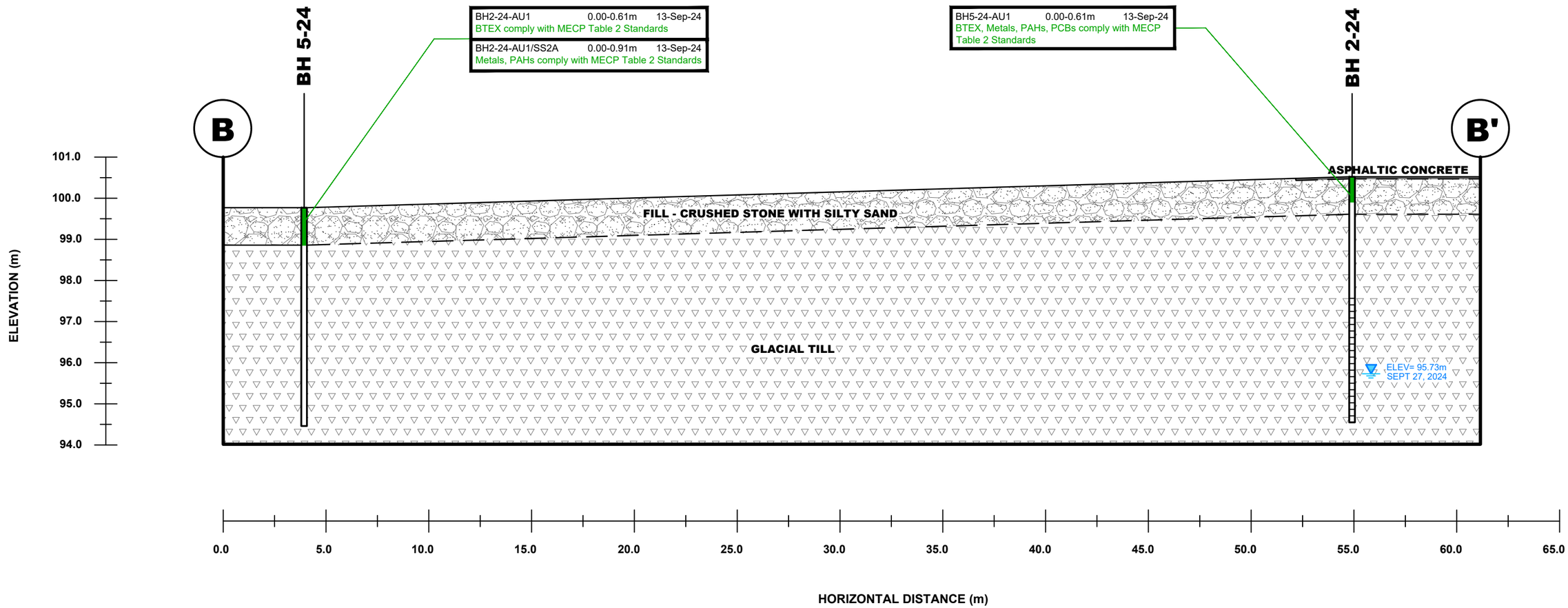

SOIL RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: CROSS SECTION B-B' - SOIL (BTEX, METALS, PAHs, PCBs)

Scale: AS SHOWN	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-5B
Approved by: KM	Revision No.:

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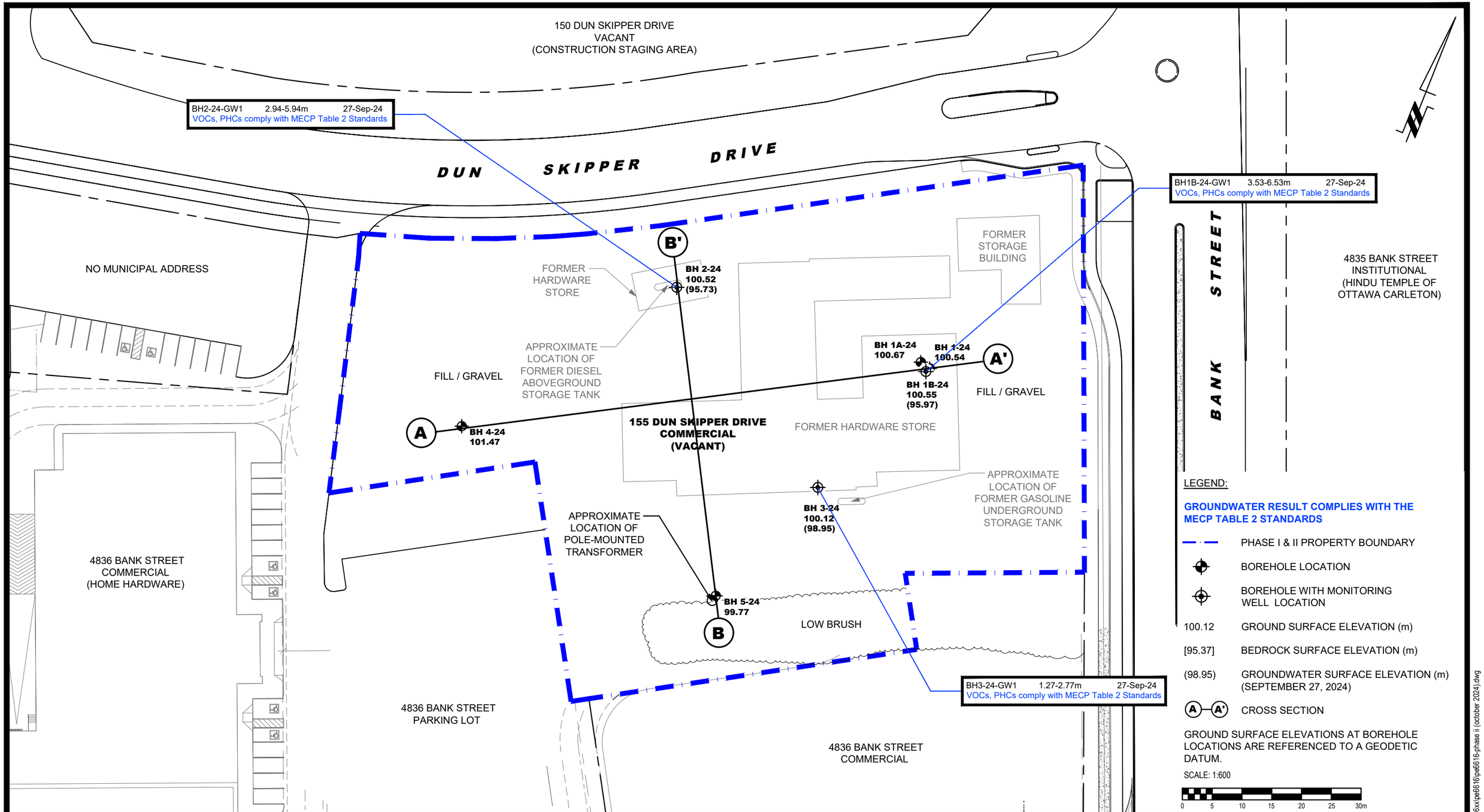

LEGEND:

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

- PHASE I & II PROPERTY BOUNDARY
- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 100.12 GROUND SURFACE ELEVATION (m)
- [95.37] BEDROCK SURFACE ELEVATION (m)
- (98.95) GROUNDWATER SURFACE ELEVATION (m) (SEPTEMBER 27, 2024)
- A—A' CROSS SECTION

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

SCALE: 1:600

0 5 10 15 20 25 30m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE
OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - GROUNDWATER (VOCs, PHCs)**

Scale: 1:600	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-6
Approved by: KM	Revision No.:

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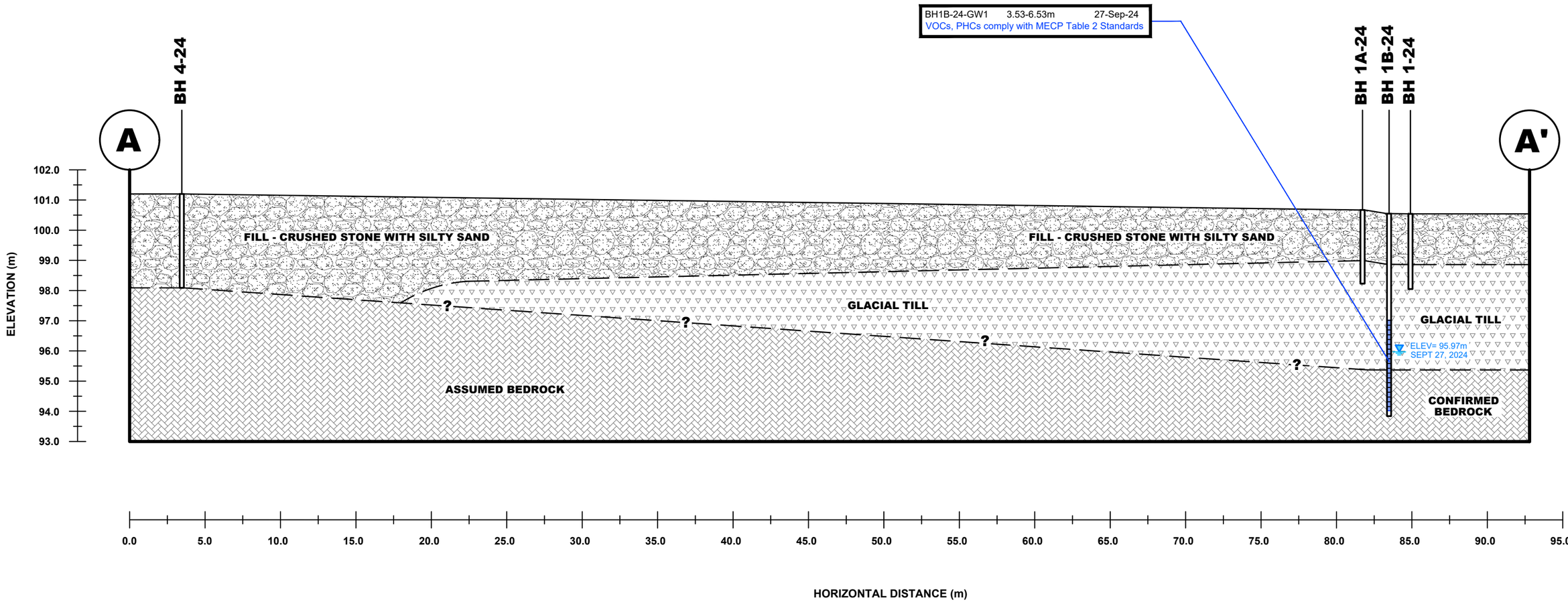

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: CROSS SECTION A-A' - GROUNDWATER (VOCs, PHCs)

Scale: AS SHOWN	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-6A
Approved by: KM	Revision No.:

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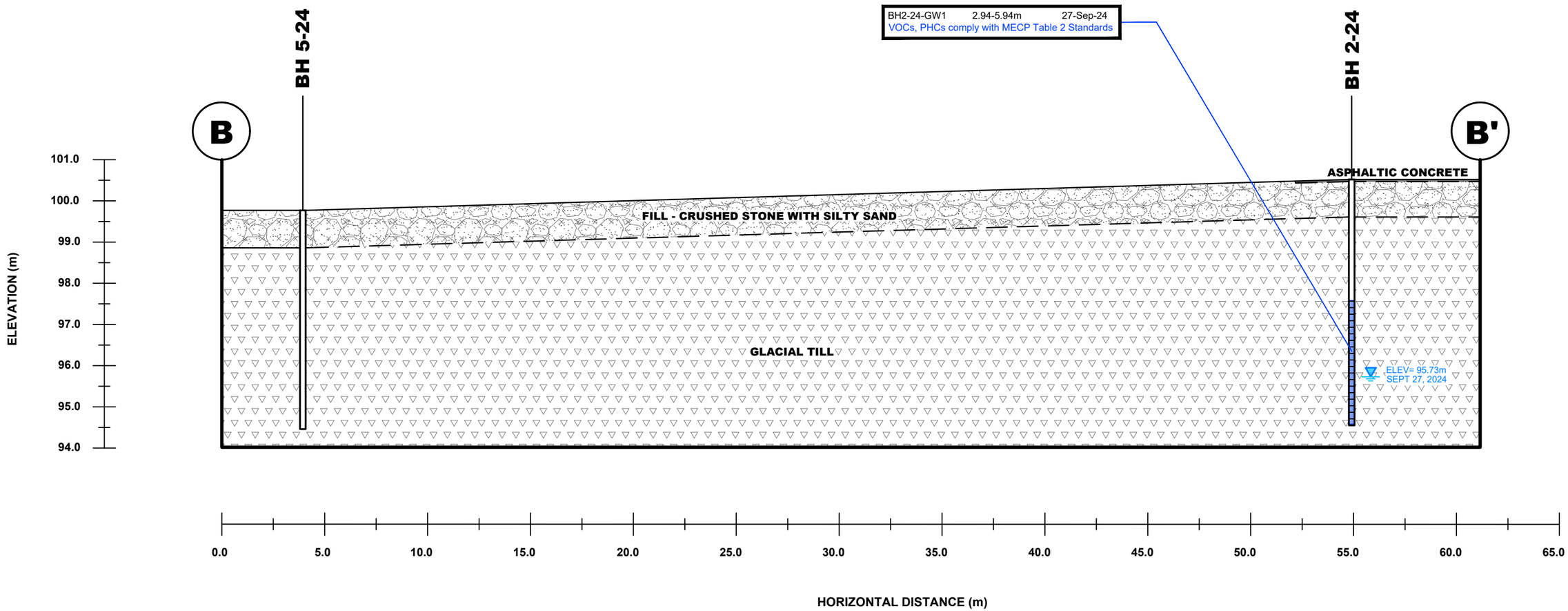

GROUNDWATER RESULT COMPLIES WITH THE MECP TABLE 2 STANDARDS

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

2668867 ONTARIO INC.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
155 DUN SKIPPER DRIVE

OTTAWA, ONTARIO

Title: CROSS SECTION B-B' - GROUNDWATER (VOCs, PHCs)

Scale: AS SHOWN	Date: 10/2024
Drawn by: YA	Report No.: PE6616-2
Checked by: NS	Dwg. No.: PE6616-6B
Approved by: KM	Revision No.:

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

LABORATORY CERTIFICATES OF ANALYSIS

PATERSON GROUP

Sampling & Analysis Plan

Part of 155 Dun Skipper Drive
Ottawa, Ontario

Prepared for 2668867 Ontario Inc.

Report: PE6616-SAP
September 2, 2024

TABLE OF CONTENTS

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1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by 2668867 Ontario Inc., to conduct a Phase II – Environmental Site Assessment (Phase II ESA) for part of 155 Dun Skipper Drive, Ottawa, Ontario.

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

Borehole	Location	Rationale	Proposed Depth & Rationale
BH1-24	Eastern portion of the Phase I Property	To assess for potential impacts resulting from the presence of fill material of unknown quality.	5-7 m; for the purpose of installing a groundwater monitoring well to access the water table.
BH2-24	Northern portion of the Phase I Property	To assess for potential impacts resulting from the presence of fill material of unknown quality and a former aboveground diesel fuel storage tank.	
BH3-24	Central portion of the Phase I Property	To assess for potential impacts resulting from the presence of fill material of unknown quality and a former underground gasoline storage tank.	
BH4-24	Western portion of the Phase I Property	To assess for potential impacts resulting from the presence of fill material of unknown quality.	3-5 m; for geotechnical and general coverage purposes.
BH5-24	Southern portion of the Phase I Property	To assess for potential impacts resulting from the presence of fill material of unknown quality and a pole-mounted electrical transformer.	

Borehole locations are shown on Drawing PE6616-3 – 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. 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 all three boreholes to allow for the collection of groundwater samples.

2.0 ANALYTICAL TESTING PROGRAM

The analytical testing program for soil at the Phase I Property 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 Phase I Property 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.

SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment

4836 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 376313.80 **NORTHING:** 5019255.98 **ELEVATION:** 100.54

PROJECT: Proposed High-rise development

BORINGS BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 13, 2024

FILE NO. : PG2934

HOLE NO. : BH 1-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N, Nc OR RQD	SAMPLE ANALYTICAL TESTS	GASTECH (ppm) / GASTECH (% LEL) / PID (ppm) / PID (% LEL)	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE		0							100
FILL: Granular and crushed stone 0.30m [100.24m]			AU 1						
FILL: Loose, brown silty fine sand, with clay, trace gravel		1	SS 2	33	4-4-5-9 9				99
1.45m [99.09m]									
FILL: Loose, grey sandy silt, trace brown silty sand 1.68m [98.86m]			SS 3	100	4-15-14-14 29				98
GLACIAL TILL: Compact, brown silty sand, with gravel, cobbles and boulders - Very dense by 2.44 m depth 2.49m [98.05m]		2	SS 4	76	P				97
End of Borehole Practical refusal to augering at 2.49 m depth		3							96
		4							95
		5							94
		6							93
		7							
		8							

GASTECH (ppm) ■ GASTECH (% LEL) □ — 50 100 150 200

PID (ppm) ▲ PID (% LEL) △ — 20 40 60 80

SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment

4836 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 376312.01 **NORTHING:** 5019256.37 **ELEVATION:** 100.67

PROJECT: Proposed High-rise development

BORINGS BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 13, 2024

FILE NO. : PG2934

HOLE NO. : BH 1A-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE: TYPE AND NO.	SAMPLE: RECOVERY (%)	SAMPLE: N, Nc OR RQD	SAMPLE: ANALYTICAL TESTS	GASTECH (ppm) / GASTECH (% LEL) 50 100 150 200 / PID (ppm) / PID (% LEL) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE		0							100
FILL: Granular and crushed stone 0.30m [100.37m]									
FILL: Loose, brown silty fine sand, with clay, trace gravel		1							99
1.45m [99.22m]									
FILL: Loose, grey sandy silt, trace brown silty sand 1.68m [98.99m]									
GLACIAL TILL: Compact, brown silty sand, with gravel, cobbles and boulders 2.44m [98.23m]		2							98
End of Borehole Practical refusal to augering at 2.44 m depth		3							97
		4							96
		5							95
		6							94
		7							93
		8							

SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment

4836 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 376313.42 **NORTHING:** 5019255.24 **ELEVATION:** 100.55

PROJECT: Proposed High-rise development

BORINGS BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 16, 2024

FILE NO. : PG2934

HOLE NO. : BH 1B-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	RECOVERY (%)	N, Nc OR RQD	ANALYTICAL TESTS	GASTECH (ppm) / GASTECH (% LEL) / PID (ppm) / PID (% LEL)	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE		0					50 100 150 200 / 20 40 60 80		100
FILL: Granular and crushed stone									
0.30m [100.25m]									
FILL: Loose, brown silty fine sand, with clay, trace gravel		1							99
1.45m [99.10m]									
FILL: Loose, grey sandy silt, trace brown silty sand									
1.68m [98.87m]		2							98
GLACIAL TILL: Very dense, brown silty fine sand to sandy silt, with gravel, cobbles and boulders		3	SS 1	99	25-50-/-/ 50/0.03				97
3.66m [96.89m]									
GLACIAL TILL: Very dense, grey silty fine sand, with gravel, cobble sand boulders		4	SS 2	91	20-50-/-/ 50/0.13				
			SS 3	94	10-30-40-50 70			4.6 m 2024-09-27	
5.18m [95.37m]		5							95
BEDROCK: Excellent quality sandstone			RC 1	95	RQD 92				
6.71m [93.84m]		6							94
End of Borehole									
(GWL at 4.58 m depth - September 27, 2024		7							93
		8							

SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment

4836 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 376269.35 **NORTHING:** 5019252.07 **ELEVATION:** 100.52

PROJECT: Proposed High-rise development

BORINGS BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 13, 2024

FILE NO. : PG2934

HOLE NO. : BH 2-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N, Nc OR RQD	SAMPLE ANALYTICAL TESTS	GASTECH (ppm) / GASTECH (% LEL) / PID (ppm) / PID (% LEL)	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE		0					50 100 150 200 / 20 40 60 80		100
ASPHALT 0.04m [100.48m]			AU 1						
FILL: Compact, brown silty fine sand, with crushed stone 0.61m [99.91m]									
FILL: Compact, grey sandy silt, trace gravel and brown sandy silt 0.91m [99.61m]		1	SS 2	75	9-17-17-29 34				99
GLACIAL TILL: Dense to very dense, brown silty fine sand to sandy silt, with gravel, cobbles and boulders			SS 3	91	11-50-50-/ 100/0.23				
		2	SS 4	91	13-50-/-/ 50/0.1				98
- Sand content increasing with depth		3	SS 5	100	7-40-50-/ 90/0.18				97
4.11m [96.41m]		4	SS 6	50	17-22-30-35 52				96
GLACIAL TILL: Very dense to compact, grey sandy silt, with gravel, cobbles and boulders			SS 7	75	6-16-32-16 48			4.8 m 2024-09-27	
- Some clay by 5.26 m depth		5	SS 8	86	3-4-20-50 24				95
5.97m [94.55m]		6							
End of Borehole									94
Practical refusal to augering at 5.97 m depth		7							
(GWL at 4.79 m depth - September 27, 2024)									93
		8							

SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment

4836 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 376304.22 **NORTHING:** 5019230.26 **ELEVATION:** 100.12

PROJECT: Proposed High-rise development

BORINGS BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 13, 2024

FILE NO. : PG2934

HOLE NO. : BH 3-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N, Nc OR RQD	SAMPLE ANALYTICAL TESTS	GASTECH (ppm) / GASTECH (% LEL) / PID (ppm) / PID (% LEL)	MONITORING WELL CONSTRUCTION	ELEVATION (m)
GROUND SURFACE		0							100
FILL: Granular and crushed stone (0.03m [100.09m])			AU 1						
FILL: Compact to loose, brown silty sand, with gravel and crushed stone		1	SS 2	42	10-8-7-4 15				99
(1.45m [98.67m])								1.2 m 2024-09-27	
FILL: Loose, brown, medium sand with gravel		2	SS 3	25	3-3-4-2 7				98
			SS 4	8	6-5-4-3 9				
(2.95m [97.17m])		3							97
End of Borehole									
Practical refusal to augering at 2.95 m depth		4							96
(GWL at 1.17 m depth - September 27, 2024)									
		5							95
		6							94
		7							93
		8							

GASTECH (ppm) / GASTECH (% LEL): 50 100 150 200

PID (ppm) / PID (% LEL): 20 40 60 80

SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment

4836 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 376245.10 **NORTHING:** 5019216.58 **ELEVATION:** 101.47

PROJECT: Proposed High-rise development

BORINGS BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 13, 2024

FILE NO. : PG2934

HOLE NO. : BH 4-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N, Nc OR RQD	SAMPLE ANALYTICAL TESTS	GASTECH (ppm) / GASTECH (% LEL) / PID (ppm) / PID (% LEL)	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE		0							101
FILL: Compact, brown silty sand, with grave, trace cobbles			AU 1						
0.91m [100.56m]		1	SS 2	27	6-37-23-19 60				100
Very dense to dense, brown silty sand, with gravel, cobbles and boulders			SS 3	17	13-15-16-8 31				
2.62m [98.85m]		2	SS 4	62	15-17-16-14 33				99
FILL: Dense, grey silty sand, with gravel, cobbles and boulders									
2.97m [98.50m]		3	SS 5	62	18-17-50-/ 67/0.18				98
FILL: Dense, grey silty fine sand, with gravel, cobbles and boulders, trace organics									
3.38m [98.09m]									
End of Borehole		4							97
Practical refusal to augering at 3.38 m depth		5							96
		6							95
		7							94
		8							

GASTECH (ppm) ■ GASTECH (% LEL) □ — 50 100 150 200

PID (ppm) ▲ PID (% LEL) △ — 20 40 60 80

SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment

4836 Bank Street, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 376295.46 **NORTHING:** 5019206.85 **ELEVATION:** 99.77

PROJECT: Proposed High-rise development

BORINGS BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 13, 2024

FILE NO. : PG2934

HOLE NO. : BH 5-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE TYPE AND NO.	SAMPLE RECOVERY (%)	SAMPLE N, Nc OR RQD	SAMPLE ANALYTICAL TESTS	GASTECH (ppm) / GASTECH (% LEL) / PID (ppm) / PID (% LEL)	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
FILL: Compact, brown silty fine sand, with gravel		0	AU 1						99
0.91m [98.86m]									
GLACIAL TILL: Dense to very dense brown silty fine sand, with gravel, cobbles and boulders		1	SS 2	100	9-12-18-19 30				
1.68m [98.09m]									
GLACIAL TILL: Very dense to dense, grey silty fine sand, with gravel, cobbles and boulders		2	SS 3	67	12-27-25-17 52				98
- Trace clay by 2.29 m depth			SS 4	100	6-18-30-32 48				
		3	SS 5	51	33-50-/-/ 50/0.05				97
		4	SS 6	100	14-22-29-31 51				96
- Sand content increasing			SS 7	139	19-22-26-50 48				95
5.31m [94.46m]		5							
End of Borehole									94
Practical refusal to augering at 5.31 m depth		6							93
		7							
		8							92

GASTECH (ppm) / GASTECH (% LEL): 50, 100, 150, 200

PID (ppm) / PID (% LEL): 20, 40, 60, 80

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

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

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

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

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

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

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

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

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

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

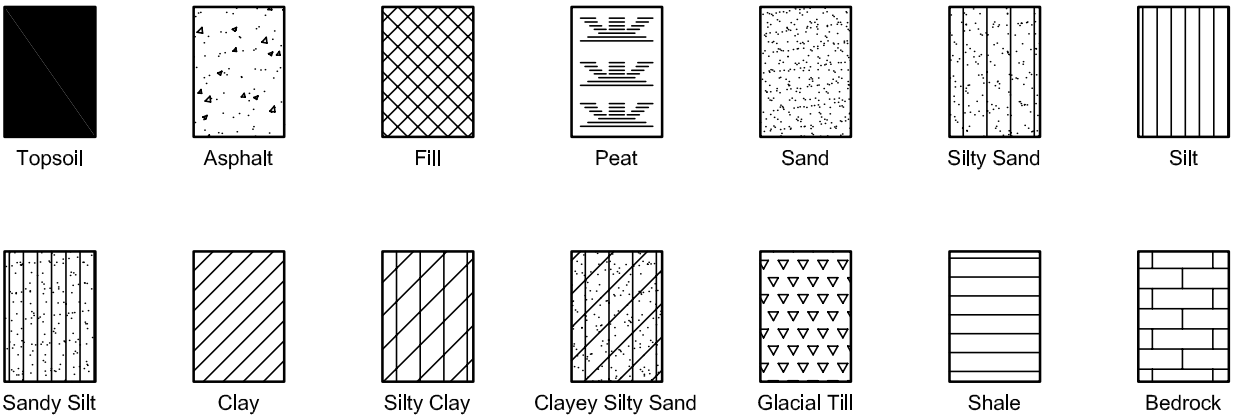
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

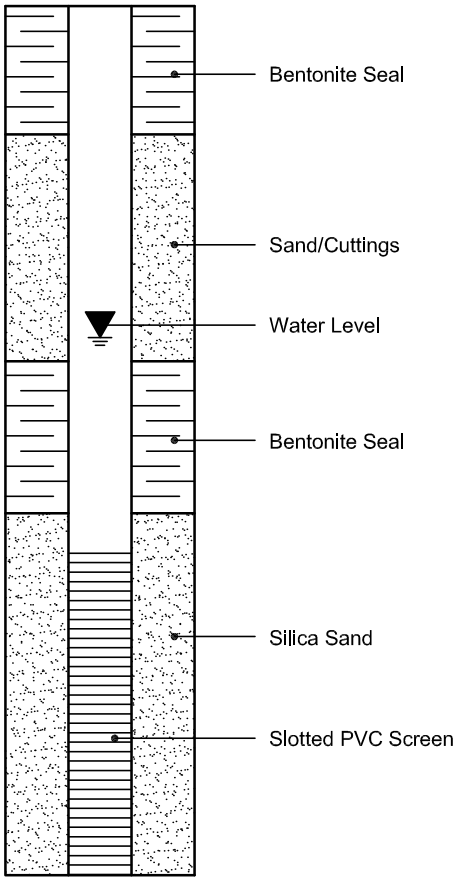
SYMBOLS AND TERMS (continued)

STRATA PLOT

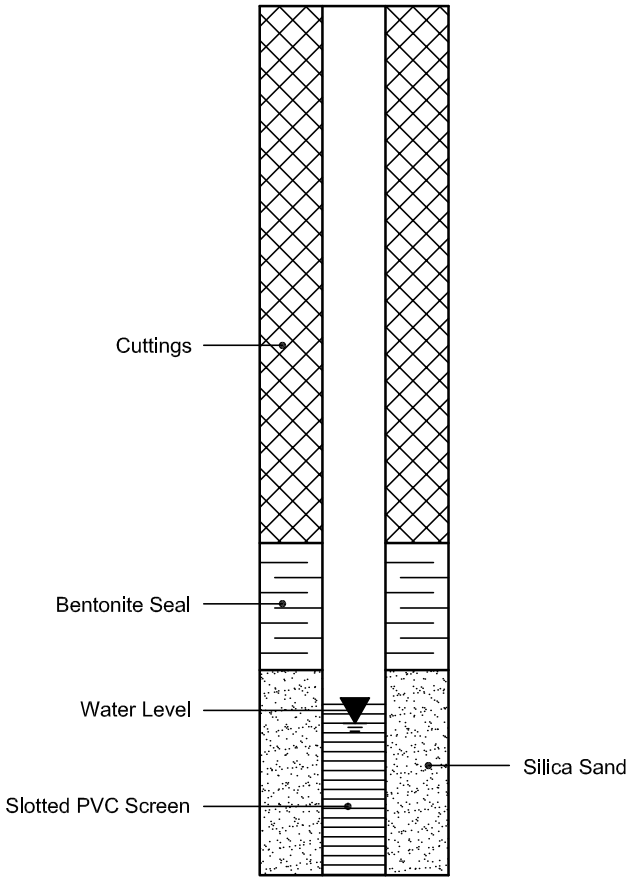


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers (Ottawa)
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Nick Sullivan

Report Date: 1-Oct-2024
Order Date: 17-Sep-2024

Client PO: 61298
Project: PE6616
Custody:

Revised Report

Order #: 2438165

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

Paracel ID	Client ID
2438165-01	BH1-24-SS2
2438165-02	BH1-24-SS3A
2438165-03	BH1-24-SS4
2438165-05	BH2-24-AU1
2438165-06	BH2-24-AU1/SS2A
2438165-07	BH3-24-SS2/SS3
2438165-08	BH4-24-AU1
2438165-09	BH5-24-AU1
2438165-10	DUP-1

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	18-Sep-24	19-Sep-24
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	19-Sep-24	23-Sep-24
Mercury by CVAA	EPA 7471B - CVAA, digestion	19-Sep-24	19-Sep-24
PCBs, total	SW846 8082A - GC-ECD	18-Sep-24	18-Sep-24
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	18-Sep-24	18-Sep-24
PHC F1	CWS Tier 1 - P&T GC-FID	18-Sep-24	19-Sep-24
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	18-Sep-24	20-Sep-24
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	18-Sep-24	18-Sep-24
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	19-Sep-24	20-Sep-24
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	18-Sep-24	18-Sep-24
Solids, %	CWS Tier 1 - Gravimetric	17-Sep-24	18-Sep-24

	Client ID:	BH1-24-SS2	BH1-24-SS3A	BH1-24-SS4	BH2-24-AU1	-	-
	Sample Date:	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00		
	Sample ID:	2438165-01	2438165-02	2438165-03	2438165-05		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	82.1	84.2	93.0	91.8	-	-
General Inorganics							
pH	0.05 pH Units	-	-	7.38	-	-	-
Metals							
Antimony	1.0 ug/g	<1.0	-	-	-	-	-
Arsenic	1.0 ug/g	8.4	-	-	-	-	-
Barium	1.0 ug/g	138	-	-	-	-	-
Beryllium	0.5 ug/g	0.8	-	-	-	-	-
Boron	5.0 ug/g	10.1	-	-	-	-	-
Cadmium	0.5 ug/g	<0.5	-	-	-	-	-
Chromium	5.0 ug/g	36.7	-	-	-	-	-
Chromium (VI)	0.2 ug/g	<0.2	-	-	-	-	-
Cobalt	1.0 ug/g	13.1	-	-	-	-	-
Copper	5.0 ug/g	29.9	-	-	-	-	-
Lead	1.0 ug/g	10.7	-	-	-	-	-
Mercury	0.1 ug/g	<0.1	-	-	-	-	-
Molybdenum	1.0 ug/g	1.3	-	-	-	-	-
Nickel	5.0 ug/g	28.9	-	-	-	-	-
Selenium	1.0 ug/g	<1.0	-	-	-	-	-
Silver	0.3 ug/g	<0.3	-	-	-	-	-
Thallium	1.0 ug/g	<1.0	-	-	-	-	-
Uranium	1.0 ug/g	<1.0	-	-	-	-	-
Vanadium	10.0 ug/g	51.1	-	-	-	-	-
Zinc	20.0 ug/g	60.0	-	-	-	-	-
Volatiles							

	Client ID:	BH1-24-SS2	BH1-24-SS3A	BH1-24-SS4	BH2-24-AU1	-	-
	Sample Date:	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00		
	Sample ID:	2438165-01	2438165-02	2438165-03	2438165-05		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Volatiles							
Benzene	0.02 ug/g	-	<0.02	-	<0.02	-	-
Ethylbenzene	0.05 ug/g	-	<0.05	-	<0.05	-	-
Toluene	0.05 ug/g	-	<0.05	-	<0.05	-	-
m,p-Xylenes	0.05 ug/g	-	<0.05	-	<0.05	-	-
o-Xylene	0.05 ug/g	-	<0.05	-	<0.05	-	-
Xylenes, total	0.05 ug/g	-	<0.05	-	<0.05	-	-
Toluene-d8	Surrogate	-	120%	-	115%	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	-	30	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	-	577	44	97	-	-
F3 PHCs (C16-C34)	8 ug/g	-	327	37	67	-	-
F4 PHCs (C34-C50)	6 ug/g	-	<6	<6	28	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	-	-	-	-	-
Acenaphthylene	0.02 ug/g	<0.02	-	-	-	-	-
Anthracene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	-	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	-	-	-	-	-
Chrysene	0.02 ug/g	<0.02	-	-	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	-	-	-	-	-
Fluoranthene	0.02 ug/g	<0.02	-	-	-	-	-
Fluorene	0.02 ug/g	<0.02	-	-	-	-	-

	Client ID:	BH1-24-SS2	BH1-24-SS3A	BH1-24-SS4	BH2-24-AU1	-	-
	Sample Date:	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00		
	Sample ID:	2438165-01	2438165-02	2438165-03	2438165-05		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Semi-Volatiles							
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	-	-	-	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	-	-	-	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	-	-	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	-	-	-	-	-
Naphthalene	0.01 ug/g	<0.01	-	-	-	-	-
Phenanthrene	0.02 ug/g	<0.02	-	-	-	-	-
Pyrene	0.02 ug/g	<0.02	-	-	-	-	-
2-Fluorobiphenyl	Surrogate	62.0%	-	-	-	-	-
Terphenyl-d14	Surrogate	87.6%	-	-	-	-	-

	Client ID:	BH2-24-AU1/SS2A	BH3-24-SS2/SS3	BH4-24-AU1	BH5-24-AU1	-	-
	Sample Date:	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00	16-Sep-24 09:00		
	Sample ID:	2438165-06	2438165-07	2438165-08	2438165-09		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	89.8	92.0	90.6	93.6	-	-
General Inorganics							
pH	0.05 pH Units	-	-	7.43	-	-	-
Metals							
Antimony	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Arsenic	1.0 ug/g	2.9	3.7	4.7	6.6	-	-
Barium	1.0 ug/g	46.2	227	63.2	59.7	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Boron	5.0 ug/g	7.7	14.5	9.7	8.6	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Chromium (VI)	0.2 ug/g	<0.2	<0.2	<0.2	<0.2	-	-
Chromium	5.0 ug/g	14.1	16.7	17.0	14.6	-	-
Cobalt	1.0 ug/g	4.8	7.4	7.3	7.5	-	-
Copper	5.0 ug/g	15.7	16.6	23.1	16.2	-	-
Lead	1.0 ug/g	4.6	10.1	8.4	16.0	-	-
Mercury	0.1 ug/g	<0.1	<0.1	<0.1	<0.1	-	-
Molybdenum	1.0 ug/g	<1.0	1.4	1.4	3.6	-	-
Nickel	5.0 ug/g	11.3	16.2	16.1	16.6	-	-
Selenium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	-	-
Thallium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Uranium	1.0 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Vanadium	10.0 ug/g	23.7	20.4	24.7	23.0	-	-
Zinc	20.0 ug/g	23.0	26.1	37.9	28.6	-	-
Volatiles							

Certificate of Analysis

Report Date: 01-Oct-2024

Client: **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 17-Sep-2024

Client PO: **61298**

Project Description: PE6616

	Client ID:	BH2-24-AU1/SS2A	BH3-24-SS2/SS3	BH4-24-AU1	BH5-24-AU1	-	-
	Sample Date:	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00	16-Sep-24 09:00		
	Sample ID:	2438165-06	2438165-07	2438165-08	2438165-09		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Volatiles							
Benzene	0.02 ug/g	-	<0.02	-	-	-	-
Ethylbenzene	0.05 ug/g	-	<0.05	-	-	-	-
Toluene	0.05 ug/g	-	<0.05	-	-	-	-
m,p-Xylenes	0.05 ug/g	-	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	-	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	-	<0.05	-	-	-	-
Toluene-d8	Surrogate	-	119%	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	-	<7	-	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	-	21	-	6	-	-
F3 PHCs (C16-C34)	8 ug/g	-	115	-	82	-	-
F4 PHCs (C34-C50)	6 ug/g	-	105 [1]	-	156 [1]	-	-
F4G PHCs (gravimetric)	50 ug/g	-	630	-	1470	-	-
Semi-Volatiles							
Acenaphthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Acenaphthylene	0.02 ug/g	<0.02	0.05	<0.02	<0.02	-	-
Anthracene	0.02 ug/g	<0.02	0.03	<0.02	<0.02	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	0.05	<0.02	<0.02	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	0.06	<0.02	<0.02	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	0.06	<0.02	0.02	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	0.05	<0.02	0.05	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	0.03	<0.02	<0.02	-	-
Chrysene	0.02 ug/g	<0.02	0.05	<0.02	<0.02	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Fluoranthene	0.02 ug/g	<0.02	0.10	<0.02	0.03	-	-

	Client ID:	BH2-24-AU1/SS2A	BH3-24-SS2/SS3	BH4-24-AU1	BH5-24-AU1	-	-
	Sample Date:	13-Sep-24 09:00	13-Sep-24 09:00	13-Sep-24 09:00	16-Sep-24 09:00		
	Sample ID:	2438165-06	2438165-07	2438165-08	2438165-09		
	Matrix:	Soil	Soil	Soil	Soil		
	MDL/Units						
Semi-Volatiles							
Fluorene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	0.04	<0.02	0.02	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g	<0.04	<0.04	<0.04	<0.04	-	-
Naphthalene	0.01 ug/g	<0.01	<0.01	<0.01	<0.01	-	-
Phenanthrene	0.02 ug/g	<0.02	0.04	<0.02	<0.02	-	-
Pyrene	0.02 ug/g	<0.02	0.12	<0.02	0.03	-	-
2-Fluorobiphenyl	Surrogate	63.7%	55.0%	68.4%	70.6%	-	-
Terphenyl-d14	Surrogate	95.0%	74.7%	102%	76.6%	-	-
PCBs							
PCBs, total	0.05 ug/g	-	-	-	<0.05	-	-
Decachlorobiphenyl	Surrogate	-	-	-	122%	-	-

	Client ID:	DUP-1				-	-
	Sample Date:	16-Sep-24 09:00					
	Sample ID:	2438165-10					
	Matrix:	Soil					
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	94.0	-	-	-	-	-
Metals							
Antimony	1.0 ug/g	<1.0	-	-	-	-	-
Arsenic	1.0 ug/g	6.4	-	-	-	-	-
Barium	1.0 ug/g	49.1	-	-	-	-	-
Beryllium	0.5 ug/g	<0.5	-	-	-	-	-
Boron	5.0 ug/g	7.2	-	-	-	-	-
Cadmium	0.5 ug/g	<0.5	-	-	-	-	-
Chromium	5.0 ug/g	12.7	-	-	-	-	-
Cobalt	1.0 ug/g	7.5	-	-	-	-	-
Copper	5.0 ug/g	16.7	-	-	-	-	-
Lead	1.0 ug/g	16.8	-	-	-	-	-
Molybdenum	1.0 ug/g	3.4	-	-	-	-	-
Nickel	5.0 ug/g	16.9	-	-	-	-	-
Selenium	1.0 ug/g	<1.0	-	-	-	-	-
Silver	0.3 ug/g	<0.3	-	-	-	-	-
Thallium	1.0 ug/g	<1.0	-	-	-	-	-
Uranium	1.0 ug/g	<1.0	-	-	-	-	-
Vanadium	10.0 ug/g	21.4	-	-	-	-	-
Zinc	20.0 ug/g	29.1	-	-	-	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	7 ug/g	<7	-	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	-	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	72	-	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	132 [1]	-	-	-	-	-

	Client ID:	DUP-1				-	-
	Sample Date:	16-Sep-24 09:00					
	Sample ID:	2438165-10					
	Matrix:	Soil					
	MDL/Units						
Hydrocarbons							
F4G PHCs (gravimetric)	50 ug/g	404	-	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%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					
F4G PHCs (gravimetric)	ND	50	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					
PCBs								
PCBs, total	ND	0.05	ug/g					
Surrogate: Decachlorobiphenyl	*0.119*		*%*	*119*	*60-140*			
Semi-Volatiles								
Acenaphthene	ND	0.02	ug/g					
Acenaphthylene	ND	0.02	ug/g					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*0.916*		*%*	*68.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.34*		*%*	*100*	*50-140*			
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	*9.03*		*%*	*113*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
pH	7.41	0.05	pH Units	7.44			0.4	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	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	2.5	1.0	ug/g	2.8			11.7	30	
Barium	136	1.0	ug/g	156			14.2	30	
Beryllium	0.5	0.5	ug/g	0.6			12.5	30	
Boron	12.2	5.0	ug/g	13.5			10.2	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	ND			NC	35	
Chromium	24.8	5.0	ug/g	30.0			18.8	30	
Cobalt	7.5	1.0	ug/g	8.9			16.2	30	
Copper	16.8	5.0	ug/g	18.6			10.4	30	
Lead	55.8	1.0	ug/g	58.0			3.9	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	15.2	5.0	ug/g	17.5			13.9	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	29.5	10.0	ug/g	34.4			15.3	30	
Zinc	69.2	20.0	ug/g	73.4			5.8	30	
PCBs									
PCBs, total	ND	0.05	ug/g	ND			NC	40	
Surrogate: Decachlorobiphenyl	*0.139*		*%*		*130*	*60-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Physical Characteristics									
% Solids	84.6	0.1	% by Wt.	85.5			1.1	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	0.021	0.02	ug/g	0.023			9.9	40	
Anthracene	0.034	0.02	ug/g	0.070			NC	40	
Benzo [a] anthracene	0.143	0.02	ug/g	0.257			NC	40	
Benzo [a] pyrene	0.142	0.02	ug/g	0.222			NC	40	
Benzo [b] fluoranthene	0.181	0.02	ug/g	0.253			32.9	40	
Benzo [g,h,i] perylene	0.137	0.02	ug/g	0.175			24.8	40	
Benzo [k] fluoranthene	0.091	0.02	ug/g	0.151			NC	40	
Chrysene	0.155	0.02	ug/g	0.260			NC	40	
Dibenzo [a,h] anthracene	0.026	0.02	ug/g	0.038			37.1	40	
Fluoranthene	0.440	0.02	ug/g	0.896			68.2	40	QR-04
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	0.107	0.02	ug/g	0.151			33.6	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	0.158	0.02	ug/g	0.409			NC	40	
Pyrene	0.367	0.02	ug/g	0.708			63.5	40	QR-04
Surrogate: 2-Fluorobiphenyl	*0.991*		*%*		*62.7*	*50-140*			
Surrogate: Terphenyl-d14	*1.36*		*%*		*86.4*	*50-140*			
Volatiles									
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	*10.2*		*%*		*112*	*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)	196	7	ug/g	ND	98.2	85-115			
F2 PHCs (C10-C16)	98	4	ug/g	ND	105	60-140			
F3 PHCs (C16-C34)	242	8	ug/g	ND	106	60-140			
F4 PHCs (C34-C50)	109	6	ug/g	ND	75.0	60-140			
F4G PHCs (gravimetric)	1040	50	ug/g	ND	104	80-120			
Metals									
Arsenic	56.2	1.0	ug/g	1.1	110	70-130			
Barium	116	1.0	ug/g	62.5	107	70-130			
Beryllium	55.2	0.5	ug/g	ND	110	70-130			
Boron	60.7	5.0	ug/g	5.4	111	70-130			
Cadmium	52.0	0.5	ug/g	ND	104	70-130			
Chromium (VI)	0.2	0.2	ug/g	ND	82.5	70-130			
Chromium	73.5	5.0	ug/g	12.0	123	70-130			
Cobalt	61.8	1.0	ug/g	3.5	117	70-130			
Copper	61.7	5.0	ug/g	7.5	109	70-130			
Lead	80.2	1.0	ug/g	23.2	114	70-130			
Mercury	1.51	0.1	ug/g	ND	101	70-130			
Molybdenum	58.2	1.0	ug/g	ND	116	70-130			
Nickel	63.7	5.0	ug/g	7.0	113	70-130			
Selenium	51.9	1.0	ug/g	ND	103	70-130			
Silver	47.0	0.3	ug/g	ND	94.0	70-130			
Thallium	50.3	1.0	ug/g	ND	100	70-130			
Uranium	55.7	1.0	ug/g	ND	111	70-130			
Vanadium	75.6	10.0	ug/g	13.8	124	70-130			
Zinc	81.7	20.0	ug/g	29.4	105	70-130			
PCBs									
PCBs, total	0.511	0.05	ug/g	ND	120	60-140			
Surrogate: Decachlorobiphenyl	*0.131*		*%*		*123*	*60-140*			
Semi-Volatiles									
Acenaphthene	0.137	0.02	ug/g	ND	82.2	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acenaphthylene	0.147	0.02	ug/g	ND	87.9	50-140			
Anthracene	0.141	0.02	ug/g	ND	84.3	50-140			
Benzo [a] anthracene	0.103	0.02	ug/g	ND	61.7	50-140			
Benzo [a] pyrene	0.087	0.02	ug/g	ND	52.0	50-140			
Benzo [b] fluoranthene	0.089	0.02	ug/g	ND	53.2	50-140			
Benzo [g,h,i] perylene	0.089	0.02	ug/g	ND	53.4	50-140			
Benzo [k] fluoranthene	0.088	0.02	ug/g	ND	53.1	50-140			
Chrysene	0.120	0.02	ug/g	ND	71.8	50-140			
Dibenzo [a,h] anthracene	0.097	0.02	ug/g	ND	58.4	50-140			
Fluoranthene	0.137	0.02	ug/g	ND	82.1	50-140			
Fluorene	0.125	0.02	ug/g	ND	74.8	50-140			
Indeno [1,2,3-cd] pyrene	0.084	0.02	ug/g	ND	50.6	50-140			
1-Methylnaphthalene	0.107	0.02	ug/g	ND	64.5	50-140			
2-Methylnaphthalene	0.114	0.02	ug/g	ND	68.5	50-140			
Naphthalene	0.138	0.01	ug/g	ND	82.7	50-140			
Phenanthrene	0.148	0.02	ug/g	ND	88.6	50-140			
Pyrene	0.144	0.02	ug/g	ND	86.4	50-140			
Surrogate: 2-Fluorobiphenyl	*0.838*		*%*		*62.9*	*50-140*			
Surrogate: Terphenyl-d14	*1.22*		*%*		*91.6*	*50-140*			
Volatiles									
Benzene	3.22	0.02	ug/g	ND	80.6	60-130			
Ethylbenzene	4.13	0.05	ug/g	ND	103	60-130			
Toluene	4.14	0.05	ug/g	ND	104	60-130			
m,p-Xylenes	8.73	0.05	ug/g	ND	109	60-130			
o-Xylene	4.57	0.05	ug/g	ND	114	60-130			
Surrogate: Toluene-d8	*8.67*		*%*		*108*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

1: GC-FID signal did not return to baseline by C50

Applies to Samples: BH3-24-SS2/SS3, BH5-24-AU1, DUP-1

QC Qualifiers:

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

Sample Data Revisions:

None

Certificate of Analysis

Report Date: 01-Oct-2024

Client: **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 17-Sep-2024

Client PO: 61298

Project Description: PE6616

Work Order Revisions / Comments:

Revision 1 - Revised report includes PHC F1-F4 analysis on sample #3 per client request.

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 unlesss otherwise noted.

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: 2438165

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2438165	

Client Name: Paterson Group	Project Ref: PE6616	Page 1 of 1	
Contact Name: Nick Sullivan	Quote #:	**Turnaround Time**	
Address: 9 Auriga Drive, Ottawa, Ontario, K2E 7T9	PO #: 61298	☐ 1 day	☐ 3 day
	E-mail: nsullivan@patersongroup.ca	☐ 2 day	☒ Regular
Telephone: 613-226-7381		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	Required Analysis: BTEX	PHCs (F1-F4)	ICP Metals	Mercury (Hg)	Chromium VI	PAHs	PCBs	pH				------HOLD------
1	BH1-24-SS2	S		1	13-Sept-2024				✔	✔	✔	✔						
2	BH1-24-SS3A	S		2	13-Sept-2024		✔	✔										
3	BH1-24-SS4	S		2	13-Sept-2024									✔				✔
4	BH1B-24-SS3	S		2	16-Sept-2024													✔
5	BH2-24-AU1	S		2	13-Sept-2024		✔	✔										
6	BH2-24-AU1/SS2A	S		1	13-Sept-2024				✔	✔	✔	✔						
7	BH3-24-SS2/SS3	S		2	13-Sept-2024		✔	✔	✔	✔	✔	✔						
8	BH4-24-AU1	S		1	13-Sept-2024				✔	✔	✔	✔		✔				
9	BH5-24-AU1	S		2	16-Sept-2024			✔	✔	✔	✔	✔	✔					
10	DUP-1	S		1				✔	✔									

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): N. Sullivan	Received at Depot:	Received at Lab: Jillian	Verified By: SO
Relinquished By (Print): Nick Sullivan	Date/Time:	Date/Time: 17-Sept-24 15:28	Date/Time: Sept 17, 2024 3:43pm
Date/Time: September 17, 2024	Temperature: °C	Temperature: 23.1	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers (Ottawa)
9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Nick Sullivan

Client PO: 61414
Project: PE6616
Custody:

Report Date: 2-Oct-2024
Order Date: 27-Sep-2024

Order #: 2439564

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

Paracel ID	Client ID
2439564-01	BH1B-24-GW1
2439564-02	BH2-24-GW1
2439564-03	BH3-24-GW1
2439564-04	DUP1-24 (BH1B-24)

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	30-Sep-24	1-Oct-24
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-Sep-24	1-Oct-24
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	30-Sep-24	1-Oct-24

	Client ID:	BH1B-24-GW1	BH2-24-GW1	BH3-24-GW1	DUP1-24 (BH1B-24)	-	-
	Sample Date:	27-Sep-24 12:00	27-Sep-24 13:00	27-Sep-24 11:00	27-Sep-24 12:30		
	Sample ID:	2439564-01	2439564-02	2439564-03	2439564-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
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	1.0	<0.5	<0.5	1.0	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<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,	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	-	-

Certificate of Analysis

Report Date: 02-Oct-2024

Client: **Paterson Group Consulting Engineers (Ottawa)**

Order Date: 27-Sep-2024

Client PO: **61414**

Project Description: **PE6616**

	Client ID:	BH1B-24-GW1	BH2-24-GW1	BH3-24-GW1	DUP1-24 (BH1B-24)	-	-
	Sample Date:	27-Sep-24 12:00	27-Sep-24 13:00	27-Sep-24 11:00	27-Sep-24 12:30		
	Sample ID:	2439564-01	2439564-02	2439564-03	2439564-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Volatiles							
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	-	-
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	-	-
Toluene-d8	Surrogate	109%	109%	108%	109%	-	-
4-Bromofluorobenzene	Surrogate	90.0%	91.2%	91.4%	90.0%	-	-
Dibromofluoromethane	Surrogate	107%	108%	109%	108%	-	-
Hydrocarbons							
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%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					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*73.6*		*%*	*92.0*	*50-140*			
Surrogate: Dibromofluoromethane	*84.2*		*%*	*105*	*50-140*			
Surrogate: Toluene-d8	*88.8*		*%*	*111*	*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	1.07	0.5	ug/L	1.02			4.8	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	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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	*71.9*		*%*		*89.9*	*50-140*			
Surrogate: Dibromofluoromethane	*87.7*		*%*		*110*	*50-140*			
Surrogate: Toluene-d8	*87.2*		*%*		*109*	*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)	1940	25	ug/L	ND	113	85-115			
F2 PHCs (C10-C16)	1920	100	ug/L	ND	120	60-140			
F3 PHCs (C16-C34)	4720	100	ug/L	ND	120	60-140			
F4 PHCs (C34-C50)	2580	100	ug/L	ND	104	60-140			
Volatiles									
Acetone	130	5.0	ug/L	ND	130	50-140			
Benzene	45.0	0.5	ug/L	ND	112	60-130			
Bromodichloromethane	43.8	0.5	ug/L	ND	110	60-130			
Bromoform	31.1	0.5	ug/L	ND	77.8	60-130			
Bromomethane	43.8	0.5	ug/L	ND	110	50-140			
Carbon Tetrachloride	38.2	0.2	ug/L	ND	95.6	60-130			
Chlorobenzene	47.4	0.5	ug/L	ND	118	60-130			
Chloroform	47.0	0.5	ug/L	ND	117	60-130			
Dibromochloromethane	36.1	0.5	ug/L	ND	90.3	60-130			
Dichlorodifluoromethane	47.6	1.0	ug/L	ND	119	50-140			
1,2-Dichlorobenzene	40.8	0.5	ug/L	ND	102	60-130			
1,3-Dichlorobenzene	40.1	0.5	ug/L	ND	100	60-130			
1,4-Dichlorobenzene	43.8	0.5	ug/L	ND	109	60-130			
1,1-Dichloroethane	46.6	0.5	ug/L	ND	116	60-130			
1,2-Dichloroethane	46.0	0.5	ug/L	ND	115	60-130			
1,1-Dichloroethylene	42.5	0.5	ug/L	ND	106	60-130			
cis-1,2-Dichloroethylene	43.4	0.5	ug/L	ND	109	60-130			
trans-1,2-Dichloroethylene	41.7	0.5	ug/L	ND	104	60-130			
1,2-Dichloropropane	44.4	0.5	ug/L	ND	111	60-130			
cis-1,3-Dichloropropylene	34.2	0.5	ug/L	ND	85.5	60-130			
trans-1,3-Dichloropropylene	37.8	0.5	ug/L	ND	94.5	60-130			
Ethylbenzene	38.6	0.5	ug/L	ND	96.5	60-130			
Ethylene dibromide (dibromoethane, 1,2-)	40.7	0.2	ug/L	ND	102	60-130			
Hexane	44.3	1.0	ug/L	ND	111	60-130			
Methyl Ethyl Ketone (2-Butanone)	79.0	5.0	ug/L	ND	79.0	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Isobutyl Ketone	84.7	5.0	ug/L	ND	84.7	50-140			
Methyl tert-butyl ether	79.1	2.0	ug/L	ND	79.1	50-140			
Methylene Chloride	41.3	5.0	ug/L	ND	103	60-130			
Styrene	39.1	0.5	ug/L	ND	97.7	60-130			
1,1,1,2-Tetrachloroethane	40.7	0.5	ug/L	ND	102	60-130			
1,1,2,2-Tetrachloroethane	46.4	0.5	ug/L	ND	116	60-130			
Tetrachloroethylene	36.7	0.5	ug/L	ND	91.8	60-130			
Toluene	44.8	0.5	ug/L	ND	112	60-130			
1,1,1-Trichloroethane	38.4	0.5	ug/L	ND	96.0	60-130			
1,1,2-Trichloroethane	47.3	0.5	ug/L	ND	118	60-130			
Trichloroethylene	42.1	0.5	ug/L	ND	105	60-130			
Trichlorofluoromethane	44.7	1.0	ug/L	ND	112	60-130			
Vinyl chloride	45.7	0.5	ug/L	ND	114	50-140			
m,p-Xylenes	83.0	0.5	ug/L	ND	104	60-130			
o-Xylene	42.2	0.5	ug/L	ND	106	60-130			
Surrogate: 4-Bromofluorobenzene	*67.6*		*%*		*84.4*	*50-140*			
Surrogate: Dibromofluoromethane	*87.2*		*%*		*109*	*50-140*			
Surrogate: Toluene-d8	*84.5*		*%*		*106*	*50-140*			

Qualifier Notes:

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 LTD.

Paracel ID: 2439564

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2439564	

Client Name: Paterson Group.
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Telephone:

Project Ref: PE6616
Quote #:
PO #: 61414
E-mail: nsullivan@patersongroup.ca
aufholz@patersongroup.ca.

Page 1 of 1

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)

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)					
1	BH1B-24-GW1	GW		3	Sept. 27, 2024	12 pm	X	X										
2	BH2-24-GW1	GW		3	↓	1 pm	X	X										
3	BH3-24-GW1	GW		3		11 am	X	X										
4	DUP1-24 (BH1B-24)	GW		2	↓	12:30 pm		X										
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): Amelia Ufholz	Received at Depot:	Received at Lab: SD	Verified By: SD
Relinquished By (Print): Amelia Ufholz	Date/Time:	Date/Time: Sept 27, 2024 4:30	Date/Time: Sept 27, 2024 4:44
Date/Time: Sept. 27, 2024	Temperature: °C	Temperature: 18.4	pH Verified: ☐ By: