



**PATERSON
GROUP**

February 13, 2023
File: PE4934-LET.02R

Scarabelli Realties
44 Chamberlain Street
Ottawa, Ontario
K1S1V9

Attention: **Mr. Darryl Scarabelli**

Subject: **Phase II-Environmental Site Assessment Update
30, 38, 42 and 48 Chamberlain Avenue
Ottawa, Ontario**

Consulting Engineers

9 Auriga Drive
Ottawa, Ontario
K2E 7T9
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Geotechnical Engineering
Environmental Engineering
Hydrogeology
Materials Testing
Building Science
Rural Development Design
Retaining Wall Design
Noise and Vibration Studies

patersongroup.ca

Dear Sir,

Further to your request, Paterson Group Inc. (Paterson) conducted a Phase II-Environmental Site Assessment (ESA) Update for the aforementioned property. This report updates a Phase II ESA entitled "Phase II Environmental Site Assessment 30-48 Chamberlain Avenue, Ottawa, Ontario," prepared by Paterson Group Inc. (Paterson), dated August 10, 2020.

This update report is intended to meet the requirements for an updated Phase II ESA, as per the MECP O.Reg. 153/04, as amended. This update report is to be read in conjunction with the 2020 report.

Background Information

Physical Setting

The Phase II Property is located on the south side of Chamberlain Avenue, approximately 110 m west of Bank Street, in the City of Ottawa, Ontario. Refer to Figure 1 - Key Plan following the text of this letter.

The Phase II Property is a rectangular shaped lot with a footprint of 2,210 m², and situated in an urban area, zoned for general mixed-use. The subject property is occupied by two commercial buildings used as a medical office at 30 Chamberlain Avenue and a commercial office at 42 Chamberlain Avenue with associated parking lots, addressed 38 and 48 Chamberlain Avenue, respectively. Both buildings were constructed prior to 1910 and originally used for residential purposes.





Ground coverage across the entire site is asphaltic paved concrete with on-site catch basins located on the 30, 38 and 48 Champlain Avenue lots.

Site drainage consists primarily of sheet flow to catch basins located on site. The majority of the site is relatively flat with the exception of the central portion of 38 and 48 Chamberlain Avenue, where they slope down towards the on-site catch basins.

The Phase I Property is slightly below the grade of the neighbouring property to the west and at the grade of the neighbouring property to the east. The regional topography slopes down in a north-westerly direction towards the Ottawa River.

Past Assessments

- ❑ “Phase I-Environmental Site Assessment, 30-48 Chamberlain Avenue, Ottawa, Ontario,” prepared by Paterson Group Inc. (Paterson), dated August 8, 2020.

Based on the findings of the Phase I ESA, the subject site was initially developed prior to 1912 with a laundry facility that occupied the eastern portion of the Phase I Property until the 1950s, while residential dwellings occupied the central and western portions of the site until the 1960s. With the exception of the present-day buildings, the residences were demolished circa 1976. The remaining buildings at 30 and 42 Chamberlain Avenue have been used primarily used as office spaces.

Based on the historical information, the laundry facility (potentially a dry cleaners) and importation of fill material of unknown quality represented potentially contaminating activities (PCAs) that were considered to result in areas of potential environmental concern (APECs) on the Phase I Property.

A Phase II ESA was recommended to address the aforementioned APECs on the Phase I Property.

- ❑ “Phase II Environmental Site Assessment, 30-48 Chamberlain Avenue, Ottawa, Ontario,” prepared by Paterson, dated August 10, 2020.

The field program consisted of drilling five (5) boreholes across the subject site, of which three (3) were completed as groundwater monitoring wells. The soil profile encountered during the program generally consisted of an asphaltic concrete underlain by fill material, followed by silty sand, underlain by silty clay, followed by glacial till.

The boreholes were terminated at refusal, where bedrock was inferred at depths of approximately 11.02 to 14.73 m below the ground surface.



The fill material consisted of a mixture of silty sand with crushed stone and some gravel. Metal, plastic and brick fragments were observed in BH2 and BH5.

Eight (8) soil samples were submitted for laboratory analysis of polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and metals (including mercury and hexavalent chromium). No detectable VOCs were identified in any of the soil samples. Metals (Lead and Mercury) and PAH (Benzo[a]anthracene, Benzo[a]pyrene and Fluoranthene) concentrations were identified in the fill samples BH1-SS2, BH2-SS2 and BH5-SS2 in excess of the selected MECP Table 3 Residential Standards. These contaminants were considered to be isolated in the fill material on the western and southern portions of the Phase II Property.

Groundwater samples were recovered and analyzed for BTEX, PHCs and VOCs. No free-phase product was observed on the groundwater at any of the monitoring well locations during the groundwater sampling events. All groundwater results are in compliance with the MECP Table 3 Standards.

Based on the findings of the Phase II ESA, fill material on the Phase II Property contained metals and PAH concentrations in excess of the selected MECP standards.

It was recommended that the impacted fill material/soil be removed from the subject site during the redevelopment process in order to meet the applicable MECP Table 3 Residential Standards, in support of filing a Record of Site Condition (RSC) due to the proposed land use change from commercial to residential.

It was also recommended to resample the groundwater to confirm the results and the quality of the groundwater prior to redevelopment.

A Phase I ESA Update was completed in January 2023, in general accordance with O.Reg 153/04, as amended. No new PCAs that would result in APECs on the Phase I Property were identified during the Phase I ESA Update.

Applicable Site Condition Standard

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



The intended use of the Phase II Property is residential, and therefore, the residential standards have been selected for the purpose of this Phase II ESA. The MECP Table 3 Residential Standards are based on the following considerations:

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

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property, and the properties within the 250 m study area do not rely upon potable groundwater.

Section 41 of O.Reg. 153/04 does not apply to the Phase II Property, as the property is not considered an environmentally sensitive area, as the pH values at the surface and subsurface are 7.40 and 7.79, respectively.

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II Property in that the property, is a not situated where Shallow Soils are present.

Impediments

Two (2) formerly installed wells (BH1 and BH2) from 2020 could not be located on-site during the recent site visit due to some snow coverage on the ground at the time of the sampling event. BH3 was the only well that was located and viable for resampling. No other impediments were encountered during this Phase II ESA Update.

Investigation Method

The groundwater level was measured and then purged prior to collecting a groundwater sample and a duplicate sample on January 12, 2023 by Paterson. The groundwater samples were submitted for analytical testing.

Review and Evaluation

Geology

The site stratigraphy generally consisted of an asphaltic concrete underlain by fill material, followed by silty sand, underlain by silty clay, overlying by glacial till.



The boreholes were terminated at refusal, where bedrock was inferred at depths of approximately 11.02 to 14.73 m below the ground surface.

The fill material consisted of a mixture of silty sand with crushed stone and some gravel. Metal, plastic and brick fragments were observed in BH2 and BH5 during the 2020 field program. Further details regarding the soil profile are provided on the Soil Profile and Test Data Sheets, appended to the original Phase II ESA Report.

Groundwater Elevations, Flow Direction and Hydraulic Gradient

The groundwater level was measured in BH3 on January 12, 2023. The groundwater level was measured at approximately 4.02 m below the ground surface (mbgs).

Based on the November 10, 2020, groundwater sampling event, a groundwater contour plan was completed. The groundwater contour mapping is shown on Drawing PE4934-3R– Groundwater Contour Plan. Based on the contour mapping, groundwater flow beneath the Phase II Property is in a northerly direction. A horizontal hydraulic gradient of approximately 0.085 m/m was calculated. The groundwater contour plan is shown on Drawing PE4934-3R.

Groundwater Quality

A groundwater sample was recovered from BH3 on January 12, 2023. The groundwater sample was submitted for laboratory analysis of volatile organic compounds (VOCs). A duplicate groundwater sample was submitted and analyzed for VOCs.

The results of the analytical testing are presented in Table 1. The laboratory certificate of analysis has been appended to this report.





Table 1 Analytical Test Results – Groundwater – VOCs				
Parameter	MDL (µg/L)	Groundwater Samples (µg/L)		MECP Table 3 Standards (µg/L)
		January 12, 2023		
		BH3-GW2	BH5-GW2	
Acetone	5	nd	nd	130000
Benzene	0.5	nd	nd	44
Bromodichloromethane	0.5	nd	nd	85000
Bromoform	0.5	nd	nd	380
Bromomethane	0.5	nd	nd	5.6
Carbon Tetrachloride	0.2	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	630
Chloroform	0.5	nd	nd	2.4
Dibromochloromethane	0.5	nd	nd	82000
Dichlorodifluoromethane	1	nd	nd	4400
1,2-Dichlorobenzene	0.5	nd	nd	4600
1,3-Dichlorobenzene	0.5	nd	nd	9600
1,4-Dichlorobenzene	0.5	nd	nd	8
1,1-Dichloroethane	0.5	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	1.6
cis-1,2-Dichloroethylene	0.5	nd	nd	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	16
1,3-Dichloropropene, total	0.5	nd	nd	5.2
Ethylbenzene	0.5	nd	nd	2300
Ethylene dibromide	0.2	nd	nd	0.25
Hexane	1	nd	nd	51
Methyl Ethyl Ketone	5	nd	nd	470000
Methyl Isobutyl Ketone	5	nd	nd	140000
Methyl tert-butyl ether	2	nd	nd	190
Methylene Chloride	5	nd	nd	610
Styrene	0.5	nd	nd	1300
1,1,1,2-Tetrachloroethane	0.5	nd	nd	3.3
1,1,2,2-Tetrachloroethane	0.5	nd	nd	3.2
Tetrachloroethylene	0.5	nd	nd	1.6
Toluene	0.5	nd	nd	18000
1,1,1-Trichloroethane	0.5	nd	nd	640
1,1,2-Trichloroethane	0.5	nd	nd	4.7
Trichloroethylene	0.5	nd	nd	1.6
Trichlorofluoromethane	1	nd	nd	2500
Vinyl Chloride	0.5	nd	nd	0.5
Xylenes, total	0.5	nd	nd	4200

Notes:

- MDL - Method Detection Limit
- nd - Not Detected (i.e <MDL)
- BH5-GW1 – Duplicate groundwater sample from BH3



No VOC concentrations were detected in the groundwater samples. All of the analytical results comply with the MECP Table 3 standards.

Phase II Conceptual Site Model

Potentially Contaminating Activity (PCA) and Area of Potential Environmental Concern (APEC)

As per the Past Investigations Section of this report, the PCAs considered to result APECs on the Phase II Property have been summarized in Table 2.

Areas of Potential Environmental Concern	Location of Area of Potential Environmental Concern	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, Soil, and/or Sediment)
APEC 1: Resulting from the historical presence of a potential dry cleaning facility	Eastern portion of the Phase I Property.	PCA 37 – <i>“Operation of Dry Cleaning Equipment,”</i>	On-site	BTEX PHCs VOCs	Soil and/or Groundwater
APEC 2: Resulting from fill material of unknown quality	Asphaltic concrete paved parking lots of the Phase I Property	PCA 30 – <i>“Importation of Fill Material of Unknown Quality.”</i>	On-site	PAHs Metals (including Hg, CrVI)	Soil

Contaminants of Potential Concern (CPCs)

The following Contaminants of Potential Concern (CPC) were identified with respect to the Phase II Property:

- Benzene, Toluene, Ethylbenzene and Xylenes (BTEXs);
- Petroleum Hydrocarbons (PHCs);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Volatile organic compounds (VOCs); and
- Metals plus Mercury (Hg), and Hexavalent Chromium (CrVI)



Subsurface Structures and Utilities

The Phase II Property is situated in a municipally serviced area. Underground utility services on the subject land include electricity, municipal water and sewer services. These utilities enter the Phase II Property from Chamberlain Avenue.

Based on the findings of the Phase II ESA, any former underground utilities were not expected to affect contaminant distribution and transport.

Physical Setting

Site Stratigraphy

The site stratigraphy consists of:

- Asphaltic concrete is underlain by fill material consisting of silty sand with crushed stone, followed by silty clay with sand and gravel fill, extending to depths of approximately 0.63 to 1.52 mbgs. Groundwater was not encountered in this layer.
- Silty sand was encountered in boreholes BH1, BH2, BH3 and BH5, extending to depths ranging from 1.52 to 2.29mbgs. Groundwater was not encountered in this layer.
- Silty clay was encountered in all of the boreholes, extending to depths ranging from 6.10 to 7.62mbgs. Groundwater was encountered in this layer in all of the boreholes.
- Sandy silty to silty sand was encountered in BH1 and extended to a depth of 9.30 mbgs.
- Glacial till consisting of silty clay with sand, gravel and cobbles was encountered in all of the boreholes. The boreholes were terminated in this layer at depths ranging from 11.02 to 14.73 mbgs.

Hydrogeological Characteristics

Groundwater at the Phase II Property was generally encountered in the native soil during the 2020 program, ranging from depths of approximately 2.62 to 4.29 mbgs.

Groundwater flow was measured in a northerly direction with a hydraulic gradient of 0.085 m/m. Groundwater contours are shown on Drawing PE4934-3R–Test Hole Location Plan.



Approximate Depth to Water Table

The depth to the water table at the Phase II Property varies between approximately 2.62 to 4.29 mbgs and is expected to fluctuate seasonal.

Approximate Depth to Bedrock

Bedrock was not confirmed during the drilling program. Refusal was reached at depths of 11.02 to 14.73 mbgs, at which depth bedrock was inferred.

Well records for the immediate area of the Phase II Property did not provide any information regarding the local stratigraphy or bedrock depth.

Sections 35, 41 and 43.1 of the Regulation

Section 35 of O.Reg. 153/04 does apply to the Phase II Property in that the property, and the properties within the 250 m study area do not rely upon potable groundwater.

Section 41 of O.Reg. 153/04 does not apply to the Phase II Property, as the property is not considered an environmentally sensitive area, as the pH values at the surface and subsurface are 7.40 and 7.79, respectively.

Section 43.1 of O.Reg. 153/04 does not apply to the Phase II Property, in that the property, is a not situated where Shallow Soils are present.

Fill Placement

Based on the findings of the subsurface investigation, the fill material encountered consisted of a mixture of silty sand with crushed stone and some gravel. Metal, plastic and brick fragments were observed in BH2 and BH5 during the field program.

Existing Buildings and Structures

The Phase II Property is occupied by two (2) commercial buildings used as a medical office at 30 Chamberlain Avenue and a commercial business (electrical company) at 42 Chamberlain Avenue with associated parking lots (38 and 48 Chamberlain Avenue). Both buildings were constructed prior to 1910 and originally used for residential purposes.



Proposed Buildings and Other Structures

The proposed development for the Phase II Property consists of a residential development which will cover the majority of the site.

Drinking Water Wells

There are no potable water wells on the Phase II Property.

Water Bodies and Areas of Natural Significance

No areas of natural significance or water bodies were identified on the Phase II Property or within a 250 m search radius.

Environmental Condition

Areas Where Contaminants are Present

Based on the Phase II ESA Update, there are no groundwater contaminants present beneath the Phase II Property.

Based on the 2020 analytical results for soil, Metals (Lead and Mercury) and PAH (Benzo[a]anthracene, Benzo[a]pyrene and Fluoranthene) concentrations in the fill samples BH1-SS2, BH2-SS2 and BH5-SS2 were in excess of the selected MECP Table 3 Residential Standards. It should be noted that impacted soil (fill material) was identified on the western and southern portions of the Phase II Property, as shown on Drawings PE4934-4 and PE4934-5, appended to the original Phase II ESA report.

Based on our findings, the extent of impact is considered to be relatively isolated in the fill material of the Phase II Property.

Types of Contaminants

Based on the Phase II ESA Update, there are no contaminants present in the groundwater beneath the Phase II Property.

Based on the 2020 Phase II ESA, the contaminants of concern include Lead (BH5-SS2), Mercury (BH1-SS2), Benzo[a]anthracene, Benzo[a]pyrene and Fluoranthene (BH1-SS2 and/or BH2-SS2).



Contaminated Media

Based on the Phase II ESA Update, there are no contaminants present in the groundwater beneath the Phase II Property.

Based on the findings of the 2020 Phase II ESA, the fill material is impacted with metals at BH1, BH2 and BH5, and PAHs in BH1 and BH2.

What Is Known About Areas Where Contaminants Are Present

Based on the 2020 subsurface investigation, the fill material across the western and southern portions of the Phase II Property is impacted with metals and PAHs due to demolition debris from the former buildings.

Distribution and Migration of Contaminants

Based on the findings of the Phase II ESA Update and the 2020 Phase II ESA, no vertical migration of contaminants is considered to have occurred as the groundwater beneath the Phase II Property complies with the MECP Table 3 Standards.

The soil impact identified in the 2020 Phase II ESA is considered to be limited to the western and southern portions of the Phase II Property with no indications of groundwater impact on site.

Discharge of Contaminants

Based on the 2020 Phase II ESA, the metals and PAH impacts is likely a result of the demolition debris from the former buildings on-site.

No other contaminants were identified in the soil or groundwater beneath the Phase II Property.

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 by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally.

Since no contaminants were identified in the groundwater, climatic and meteorological conditions are not considered to have contributed to contaminant transport in the past.



Potential for Vapour Intrusion

Based on the findings of the Phase II ESA, there is no potential for vapour intrusion on the Phase II Property.

Recommendations

As recommended in the original Phase II ESA, the Phase II Property will be redeveloped for residential land use and as such, a Record of Site Condition (RSC) will be required, once the impacted soil that does not comply with Table 3 Residential Standards is remediated.

Soil

The fill material on the Phase II Property contained metals and PAH concentrations in excess of the Table 2.1 Residential Standards, which are used to classify the soil for off-site disposal.

It is our recommendation that the impacted fill material/soil be removed from the subject site during the redevelopment process. The excavation of the soil from the property should be monitored and confirmed by Paterson. The contaminated fill will need to be removed and disposed of at an approved waste disposal facility. Based on our data, it is expected that the majority of the fill beneath the parking lot along the western and southern portions of the site will require off-site disposal as contaminated soil.

Further testing of the fill and underlying native soil will be required in conjunction with the excavation program to segregate clean soil from impacted soil and for final confirmatory purposes.

Excess Soil

Any excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19 – On-site and Excess Soil Management.

Any soils deemed excess during development will require additional analytical testing to determine the appropriate off-site disposal method.



Statement of Limitations

This Phase II - Environmental Site Assessment Update report has been prepared under the supervision of a Qualified Person, in general accordance with Ontario Regulation 153/04, as amended. The conclusions presented herein are based on information gathered from a limited historical review and field inspection program.

The findings of the Phase II - ESA Update are based on the review of the previous subsurface program completed on the Phase II Property in conjunction with the most recent analytical test results. Should any conditions be encountered at the Phase II Property that differ from our findings, we request that we be notified immediately.

This report was prepared for the sole use of Scarabelli Realities. Permission and notification from Scarabelli Realities and Paterson will be required to release this report to any other party.

We trust that this submission satisfies your current requirements. Should you have any questions please contact the undersigned.

Regards,

Paterson Group Inc.

Mandy Witteman, M.A.Sc., P.Eng.

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



Report Distribution:

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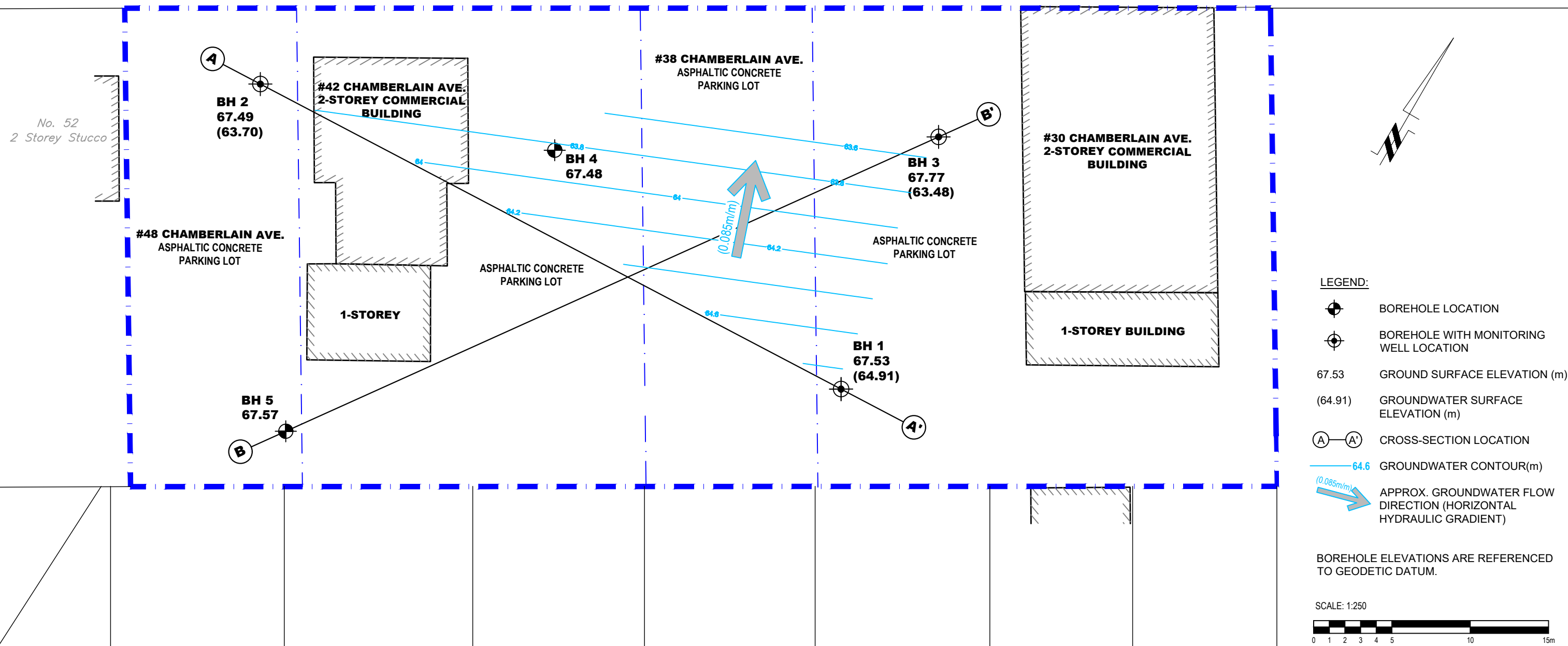
Appendix

- Drawing PE4934-3R – Test Hole Location Plan
- Drawing PE4934-7R – Analytical Testing Plan – Groundwater
- Laboratory Certificates of Analysis



KENT STREET

CHAMBERLAIN AVENUE



- LEGEND:**
- BOREHOLE LOCATION
 - BOREHOLE WITH MONITORING WELL LOCATION
 - 67.53 GROUND SURFACE ELEVATION (m)
 - (64.91) GROUNDWATER SURFACE ELEVATION (m)
 - A-A' CROSS-SECTION LOCATION
 - 64.6 GROUNDWATER CONTOUR(m)
 - APPROX. GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT)

BOREHOLE ELEVATIONS ARE REFERENCED TO GEODETIC DATUM.

SCALE: 1:250

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NO.	REVISIONS	DATE	INITIAL

QUANTUM PROJECT MANAGEMENT SERVICES INC.
PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
 30, 38, 42 & 48 CHAMBERLAIN AVENUE
 OTTAWA, ONTARIO
TEST HOLE LOCATION PLAN

Scale: 1:250
 Drawn by: MPG
 Checked by: MW
 Approved by: MSD

Date: 01/2023
 Report No.: PE4934-LET.02
 Dwg. No.: **PE4934-3R**
 Revision No.:

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KENT STREET

CHAMBERLAIN AVENUE

BH2-GW1 3.40-6.40m 28-July-20
 BTEX comply with MECP Table 3 Standards
 PHCs comply with MECP Table 3 Standards
 VOCs comply with MECP Table 3 Standards

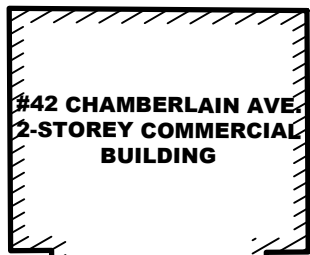
BH3-GW1 4.0-7.0m 28-July-20
 BTEX comply with MECP Table 3 Standards
 PHCs comply with MECP Table 3 Standards
 VOCs comply with MECP Table 3 Standards

BH3-GW1 (DUP) 4.0-7.0m 28-July-20
 BTEX comply with MECP Table 3 Standards
 PHCs comply with MECP Table 3 Standards
 VOCs comply with MECP Table 3 Standards

BH3-GW2 4.0-7.0m 12-Jan-23
 VOCs comply with MECP Table 3 Standards
 BH5-GW2 (DUP) 4.0-7.0m 12-Jan-23
 VOCs comply with MECP Table 3 Standards

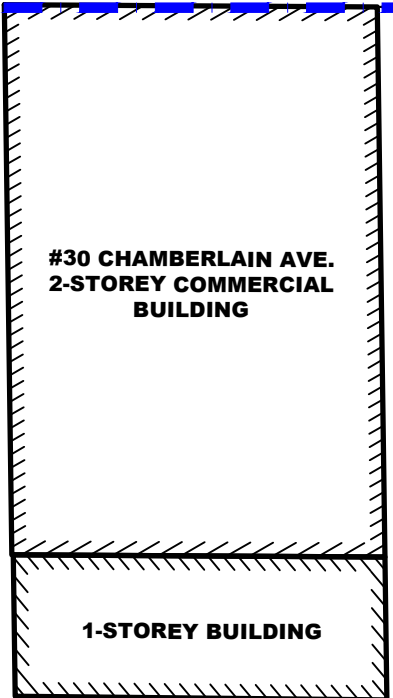
No. 52
 2 Storey Stucco

BH 2
 67.49
 (63.70)



BH 4
 67.48

BH 3
 67.77
 (63.48)



#48 CHAMBERLAIN AVE.
 ASPHALTIC CONCRETE
 PARKING LOT

ASPHALTIC CONCRETE
 PARKING LOT

#38 CHAMBERLAIN AVE.
 ASPHALTIC CONCRETE
 PARKING LOT

ASPHALTIC CONCRETE
 PARKING LOT



BH 5
 67.57

BH 1
 67.53
 (64.91)

BH1-GW1 9.60-12.60m 28-July-20
 BTEX comply with MECP Table 3 Standards
 PHCs comply with MECP Table 3 Standards
 VOCs comply with MECP Table 3 Standards

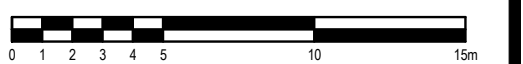
LEGEND:

GROUNDWATER PARAMETERS COMPLY WITH
 MECP TABLE 3 STANDARDS

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- 67.53 GROUND SURFACE ELEVATION (m)
- (64.91) GROUNDWATER SURFACE ELEVATION (m)

BOREHOLE ELEVATIONS ARE REFERENCED
 TO GEODETIC DATUM.

SCALE: 1:250



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 consulting engineers

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NO.	REVISIONS	DATE	INITIAL

QUANTUM PROJECT MANAGEMENT SERVICES INC.
 PHASE II - ENVIRONMENTAL SITE ASSESSMENT UPDATE
 30, 38, 42 & 48 CHAMBERLAIN AVENUE
 OTTAWA, ONTARIO
 Title: **ANALYTICAL TESTING PLAN - GROUNDWATER**

Scale: 1:250
 Drawn by: MPG
 Checked by: MW
 Approved by: MSD

Date: 01/2023
 Report No.: PE4934-LET.02
 Dwg. No.: **PE4934-7R**
 Revision No.:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Mark D'Arcy

Client PO: 56613
Project: PE4934
Custody:

Report Date: 20-Jan-2023
Order Date: 16-Jan-2023

Order #: 2303097

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

Parcel ID	Client ID
2303097-01	BH3-GW2
2303097-02	BH5-GW2

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 20-Jan-2023

Client: Paterson Group Consulting Engineers

Order Date: 16-Jan-2023

Client PO: 56613

Project Description: PE4934

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	19-Jan-23	19-Jan-23

Certificate of Analysis

Report Date: 20-Jan-2023

Client: Paterson Group Consulting Engineers

Order Date: 16-Jan-2023

Client PO: 56613

Project Description: PE4934

Client ID:	BH3-GW2	BH5-GW2	-	-
Sample Date:	12-Jan-23 09:00	12-Jan-23 09:00	-	-
Sample ID:	2303097-01	2303097-02	-	-
MDL/Units	Ground Water	Ground Water	-	-

Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	-	-
Benzene	0.5 ug/L	<0.5	<0.5	-	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	-	-
Bromoform	0.5 ug/L	<0.5	<0.5	-	-
Bromomethane	0.5 ug/L	<0.5	<0.5	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	-	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
Chloroform	0.5 ug/L	<0.5	<0.5	-	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	-	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	-	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	-	-
Hexane	1.0 ug/L	<1.0	<1.0	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	-	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	-	-
Styrene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 20-Jan-2023

Client: Paterson Group Consulting Engineers

Order Date: 16-Jan-2023

Client PO: 56613

Project Description: PE4934

	Client ID:	BH3-GW2	BH5-GW2	-	-
	Sample Date:	12-Jan-23 09:00	12-Jan-23 09:00	-	-
	Sample ID:	2303097-01	2303097-02	-	-
	MDL/Units	Ground Water	Ground Water	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	-	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	-	-
o-Xylene	0.5 ug/L	<0.5	<0.5	-	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	-	-
4-Bromofluorobenzene	Surrogate	127%	126%	-	-
Dibromofluoromethane	Surrogate	138%	138%	-	-
Toluene-d8	Surrogate	99.3%	98.4%	-	-

Certificate of Analysis

Report Date: 20-Jan-2023

Client: Paterson Group Consulting Engineers

Order Date: 16-Jan-2023

Client PO: 56613

Project Description: PE4934

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	41.4		ug/L		129	50-140			
Surrogate: Dibromofluoromethane	42.2		ug/L		132	50-140			
Surrogate: Toluene-d8	34.5		ug/L		108	50-140			

Certificate of Analysis

Report Date: 20-Jan-2023

Client: Paterson Group Consulting Engineers

Order Date: 16-Jan-2023

Client PO: 56613

Project Description: PE4934

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	ND	0.5	ug/L	ND			NC	30	
Ethylene dibromide (dibromoethane, 1,2-	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	40.1		ug/L		125	50-140			
Surrogate: Dibromofluoromethane	44.2		ug/L		138	50-140			
Surrogate: Toluene-d8	35.1		ug/L		110	50-140			

Certificate of Analysis

Report Date: 20-Jan-2023

Client: Paterson Group Consulting Engineers

Order Date: 16-Jan-2023

Client PO: 56613

Project Description: PE4934

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	97.6	5.0	ug/L	ND	97.6	50-140			
Benzene	49.2	0.5	ug/L	ND	123	60-130			
Bromodichloromethane	39.8	0.5	ug/L	ND	99.4	60-130			
Bromoform	48.5	0.5	ug/L	ND	121	60-130			
Bromomethane	49.8	0.5	ug/L	ND	124	50-140			
Carbon Tetrachloride	49.4	0.2	ug/L	ND	123	60-130			
Chlorobenzene	45.4	0.5	ug/L	ND	113	60-130			
Chloroform	49.6	0.5	ug/L	ND	124	60-130			
Dibromochloromethane	47.1	0.5	ug/L	ND	118	60-130			
Dichlorodifluoromethane	49.6	1.0	ug/L	ND	124	50-140			
1,2-Dichlorobenzene	43.3	0.5	ug/L	ND	108	60-130			
1,3-Dichlorobenzene	42.4	0.5	ug/L	ND	106	60-130			
1,4-Dichlorobenzene	40.9	0.5	ug/L	ND	102	60-130			
1,1-Dichloroethane	49.4	0.5	ug/L	ND	123	60-130			
1,2-Dichloroethane	49.9	0.5	ug/L	ND	125	60-130			
1,1-Dichloroethylene	47.1	0.5	ug/L	ND	118	60-130			
cis-1,2-Dichloroethylene	49.9	0.5	ug/L	ND	125	60-130			
trans-1,2-Dichloroethylene	47.9	0.5	ug/L	ND	120	60-130			
1,2-Dichloropropane	46.0	0.5	ug/L	ND	115	60-130			
cis-1,3-Dichloropropylene	44.9	0.5	ug/L	ND	112	60-130			
trans-1,3-Dichloropropylene	47.6	0.5	ug/L	ND	119	60-130			
Ethylbenzene	46.3	0.5	ug/L	ND	116	60-130			
Ethylene dibromide (dibromoethane, 1,2-	43.7	0.2	ug/L	ND	109	60-130			
Hexane	41.1	1.0	ug/L	ND	103	60-130			
Methyl Ethyl Ketone (2-Butanone)	104	5.0	ug/L	ND	104	50-140			
Methyl Isobutyl Ketone	108	5.0	ug/L	ND	108	50-140			
Methyl tert-butyl ether	108	2.0	ug/L	ND	108	50-140			
Methylene Chloride	42.9	5.0	ug/L	ND	107	60-130			
Styrene	43.6	0.5	ug/L	ND	109	60-130			
1,1,1,2-Tetrachloroethane	48.9	0.5	ug/L	ND	122	60-130			
1,1,2,2-Tetrachloroethane	48.9	0.5	ug/L	ND	122	60-130			
Tetrachloroethylene	47.1	0.5	ug/L	ND	118	60-130			
Toluene	47.8	0.5	ug/L	ND	119	60-130			
1,1,1-Trichloroethane	47.9	0.5	ug/L	ND	120	60-130			
1,1,2-Trichloroethane	49.1	0.5	ug/L	ND	123	60-130			
Trichloroethylene	46.4	0.5	ug/L	ND	116	60-130			
Trichlorofluoromethane	47.2	1.0	ug/L	ND	118	60-130			
Vinyl chloride	44.1	0.5	ug/L	ND	110	50-140			
m,p-Xylenes	93.2	0.5	ug/L	ND	117	60-130			
o-Xylene	47.0	0.5	ug/L	ND	118	60-130			
Surrogate: 4-Bromofluorobenzene	25.8		ug/L		80.8	50-140			
Surrogate: Dibromofluoromethane	43.5		ug/L		136	50-140			
Surrogate: Toluene-d8	33.7		ug/L		105	50-140			

Certificate of Analysis

Report Date: 20-Jan-2023

Client: Paterson Group Consulting Engineers

Order Date: 16-Jan-2023

Client PO: 56613

Project Description: PE4934

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



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Parcel Order Number (Lab Use Only) 2303097	Chain Of Custody (Lab Use Only)
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Client Name: Paterson	Project Ref: PE 4934	Page 1 of 1
Contact Name: Mark Darcy	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 9 Auriga Drive	PO #: 55613	
Telephone: 613 226 7381	E-mail: mwittelman@patersongroup.ca mdarcy@patersongroup.ca	
Date Required: _____		

<input checked="" type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19	Other Regulation	Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)	Required Analysis																			
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input checked="" type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm Mun: _____ <input type="checkbox"/> Other: _____																					
Sample ID/Location Name		Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)									
1	BH3 - GW2	GW		2	Jan 12, 2023			X														
2	BH5 - GW2	↓		↓	↓			↓														
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

Comments:		Method of Delivery: PARACEL COURIER	
Relinquished By (Sign): [Signature]	Received By Driver/Depot: A. TUNNE	Received at Lab: Jernee Poon [Signature]	Verified By: Scotley Demerios
Relinquished By (Print): Boye Lee	Date/Time: 16/01/23 1600	Date/Time: JAN 16 2023 04:35	Date/Time: Jan 16 4:42
Date/Time: Jan 16, 2023	Temperature: _____ °C	Temperature: 5.1 C	pH Verified: <input type="checkbox"/> By: _____