July 25, 2022
File: PE5751-LET.01R

Consulting Engineers
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patersongroup.ca

Homestead Land Holdings Inc.
80 Johnson Street
Kingston, Ontario
K7L 1X7

Attention: **Mr. Jack Mangan**

Subject: **Excess Soil Quality Assessment**
210 Clearview Avenue

Dear Mr. Mangan,

Further to your request and authorization, Paterson Group (Paterson) conducted a preliminary excess soil quality assessment at the above noted site (the project area). It is our understanding that as part of the proposed development of the project area, excess soil will be generated, which will require off-site disposal at a local reuse site. The estimated total volume of excess soil is less than 2,000 m^3.

Background

Phase I – ESA

Paterson completed a Phase I – ESA for the project area in conjunction with the excess soil's quality management report. The Phase I – ESA involved a review of historical and current information on the project property and surrounding area to determine if there were any previous or currently existing potentially contaminating activities (PCAs) that resulted in areas of potential environmental concern on the Phase I Property. Based on the findings of the Phase I – ESA, four historical PCAs and one current PCA were identified on properties within the Phase I study area. Based on their separation distances, cross/down gradient orientation and/or nature of their operations, none of the identified PCAs were considered to result in APECs on the project area.

Observations

As part of a geotechnical investigation, Paterson supervised the advancement of seven boreholes across the project area throughout the interim of June 23, 2022, to July 5, 2022. Seven representative soil samples were collected and submitted for analytical testing based on vapour readings and observations made during the subsurface investigation.

The subsurface profile encountered across the project area consisted of a surficial layer of asphalt or topsoil underlain by fill material comprised of brown silty sand with gravel and crushed stone extending to a maximum depth of 1.85m. The fill material was underlain by native dense brown silty sand till with gravel and cobbles extending to a maximum depth of 2.92m in the majority of the boreholes. Bedrock consisting of dolostone interbedded with limestone was encountered immediately after the fill material within BH4-22 and BH6-22. The native till layer was underlain by dolostone interbedded with limestone bedrock. Coring was terminated at a maximum depth of 12.2 m.

All soil samples collected were subject 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 (PID). No apparent deleterious materials, signs of coal or slag, or any visual or olfactory signs of potential contamination were observed in the stockpiles at the time of the field program. All vapour readings were noted to be less than 25 ppm and are not considered to be representative of volatile organic compound impacts.

Analytical Test Results

Seven representative soil samples were submitted to Paracel Laboratories (Paracel) in Ottawa for bulk analysis of benzene, ethylbenzene, toluene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F1 to F4), metals, electrical conductivity (EC) and sodium adsorption ratio (SAR). Three samples were submitted for analysis of pH.

The test results obtained during the current investigation are presented in Table 1, appended to this letter, along with the laboratory Certificates of Analysis.

Currently, a reuse site for any excess soil has not been selected, therefore, for general soil management purposes, analytical results have been compared to Ministry of the Environment, Conservation and Parks (MECP) Table 1 Residential standards, as well as Table 2.1 Residential/Parkland/Institutional standards (RPI).

pH

Three (3) samples were submitted for pH analysis. All samples were found to be between 5 and 9 and fall within the acceptable pH range for both surface soils and subsurface soils, with the exception of Sample BH4-22-AU1/SS2, which marginally exceeds the surface soil maximum of 9.0, but complies with subsurface standards of 11.0.

Metals

All metals analysis were found to be in compliance with MECP Table 1 and 2.1 standards.

BTEX

No detections of BTEX were identified in any of the samples. All BTEX analysis were found to be in compliance with MECP Table 1 and Table 2.1 standards.

PHCs (F1-F4)

All of the analysed PHC parameters were found to be in compliance with the MECP Table 1 standards with the exceptions of: the PHC fractions F_3 concentrations identified in BH4-22-AU1/SS2 and BH6-22-AU1/SS2, within a layer of brown silty sand fill layer, were found to exceed both MECP Table 1 and Table 2.1 standards. Additionally, the PHC fraction F_4 concentration identified in BH4-22-AU1/SS2, BH6-22-AU1/SS2 and BH7-22-SS2 also exceeded Table 1 standards, however, concentrations identified in BH4-22-AU1/SS2 and BH6-22-AU1/SS2 comply with the MECP Table 2.1 standards.

EC/SAR

The EC analysis for B4-22-AU1/SS2 and BH7-22-SS2 were found to exceed the MECP Table 1 and Table 2.1 standards. Additionally, the SAR analysis results for BH5-22-SS3, BH6-22-AU1/SS2 and BH7-22-SS2 exceed the MECP Table 1 standards, however, comply with the MECP Table 2.1 standards.

Conclusion

A total of seven boreholes were advanced in the project area, and seven soil representative samples were collected and submitted to Paracel Laboratories for analysis of benzene, ethylbenzene, toluene and xylenes (BTEX), petroleum hydrocarbons (PHCs, Fractions F1 to F4), metals, electrical conductivity (EC) and sodium adsorption ratio (SAR). Three samples were submitted for analysis of pH.

The subsurface profile encountered across the project area consisted of a surficial layer of asphalt or topsoil underlain by fill material comprised of brown silty sand with gravel and crushed stone extending to a maximum depth of 1.85 m.

The fill material was underlain by native dense brown silty sand till with gravel and cobbles extending to a maximum depth of 2.92m in the majority of the boreholes. No signs of deleterious materials were observed. Bedrock consisting of dolostone interbedded with limestone was encountered immediately after the fill material within BH4-22 and BH6-22. The native till layer was underlain by dolostone interbedded with limestone bedrock.

Three borehole locations, BH4-22, BH6-22 and BH7-22 were found to have PHCs exceeding MECP Table 1 standards.

EC and SAR were also identified at BH4-22, BH5-22, BH6-22 and BH7-22. However, given that the EC and SAR are present due to the use of salt or similar substance during conditions of snow or ice, they are not considered to exceed the site standard.

In addition to the three samples identified to exceed MECP Table 1 standards, two samples were found to exceed the MECP Table 2.1 RPI standards.

Recommendations

Soil in the vicinity of boreholes BH1-22, BH2-22, BH3-22 and BH5-22 complies with MECP Table 1 residential standards and can be beneficially reused on most reuse sites. Under specific reuse site settings, soil in the vicinity of BH7-22 may also be beneficially reused.

Soil in the vicinity of BH4-22 and BH6-22 had elevated PHC concentrations. This material exceeds most excess soil reuse site standards, beyond those compared in this report. Based on current results, the material will require offsite disposal at a licensed waste management facility. Given the shallow sample depths at these two locations, it is possible that PHC exceedances are due to residual fragments of the asphalt paving structure. Further delineation of these areas should be considered at the time of excavation.

Prior to disposal, a Toxicity Characteristic Leaching Procedure (TCLP) analysis will be required. Excavation and removal of this material can be carried out at the time of site redevelopment.

In general, it is recommended that any potential soil reuse site be assessed prior excavation activities, to ensure compatibility of the excess soil with those properties.

Statement of Limitations

A soils investigation of this nature is a limited sampling program. Should any conditions at the site be encountered which differ from those at the test locations, we request that we be notified immediately in order to permit reassessment of our recommendations/conclusions.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Homestead Land Holdings Inc. or their agents, without review by this firm for the applicability of our recommendations to the altered use of the report, is prohibited.

Regards,

Paterson Group Inc.

Samuel Berube, EIT.

Adrian Menyhart, P.Eng

Attachments

- ❑ Table 1: Analytical Summary
- ❑ PE5751-3-Test Hole Location Plan
- ❑ Laboratory Certificates of Analysis

Parameter	Units	MDL	Regulation	Sample						
				BH1-22-SS2	BH2-22-SS3	BH3-22-SS1	BH4-22-AU1/SS2	BH5-22-SS3	BH6-22-AU1/SS2	BH7-22-SS2
Sample Date (m/d/y)			Reg 153/04 (2011)-Table 1 Residential	06/23/2022 09:00 AM	06/27/2022 09:00 AM	06/28/2022 09:00 AM	07/04/2022 09:00 AM	07/04/2022 09:00 AM	07/05/2022 09:00 AM	07/05/2022 09:00 AM
Physical Characteristics										
% Solids	% by Wt.	0.1		93.3	88.8	87.1	96.3	86.5	93.1	86.6
General Inorganics										
SAR	N/A	0.01	2.4 N/A	0.29	N/A	1.22	0.70	2.58	4.23	4.97
Conductivity	uS/cm	5	0.57 mS/cm (570 uS/cm)	168	N/A	146	861	296	396	816
pH	pH Units	0.05	5 pH units (5 pH Units)	N/A	7.91	N/A	9.21	7.57	N/A	N/A
Metals										
Antimony	ug/g dry	1.0	1.3 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	ug/g dry	1.0	18 ug/g dry	3.2	ND (1.0)	1.7	2.9	1.6	2.0	4.8
Barium	ug/g dry	1.0	220 ug/g dry	116	45.8	38.0	183	38.9	51.8	158
Beryllium	ug/g dry	0.5	2.5 ug/g dry	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.5
Boron	ug/g dry	5.0	36 ug/g dry	9.3	ND (5.0)	ND (5.0)	9.8	12.8	ND (5.0)	9.0
Cadmium	ug/g dry	0.5	1.2 ug/g dry	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	5.0	70 ug/g dry	21.5	12.2	10.6	12.9	9.8	8.4	19.2
Cobalt	ug/g dry	1.0	21 ug/g dry	8.6	3.6	3.5	5.4	5.3	3.7	7.7
Copper	ug/g dry	5.0	92 ug/g dry	20.3	14.4	8.0	10.2	8.3	6.7	16.0
Lead	ug/g dry	1.0	120 ug/g dry	8.2	3.4	8.5	12.1	4.6	5.0	13.1
Molybdenum	ug/g dry	1.0	2 ug/g dry	1.1	ND (1.0)	ND (1.0)	1.1	ND (1.0)	ND (1.0)	1.7
Nickel	ug/g dry	5.0	82 ug/g dry	16.0	7.0	6.8	14.0	7.9	7.1	14.5
Selenium	ug/g dry	1.0	1.5 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Silver	ug/g dry	0.3	0.5 ug/g dry	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Thallium	ug/g dry	1.0	1 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Uranium	ug/g dry	1.0	2.5 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vanadium	ug/g dry	10.0	86 ug/g dry	35.7	15.6	19.9	31.5	12.3	17.8	28.3
Zinc	ug/g dry	20.0	290 ug/g dry	36.9	ND (20.0)	21.0	ND (20.0)	ND (20.0)	ND (20.0)	32.0
Volatiles										
Benzene	ug/g dry	0.02	0.02 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	0.05	0.05 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.05	0.2 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
m/p-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	0.05	0.05 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Hydrocarbons										
F1 PHCs (C6-C10)	ug/g dry	7	25 ug/g dry	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	4	10 ug/g dry	ND (4)	ND (4)	ND (4)	ND (80)	ND (4)	ND (80)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	8	240 ug/g dry	ND (8)	16	25	263	ND (8)	573	109
F4 PHCs (C34-C50)	ug/g dry	6	120 ug/g dry	ND (6)	23	71	1520	ND (6)	1640	185
F4G PHCs (gravimetric)	ug/g dry	50	120 ug/g dry	N/A	N/A	N/A	4230	N/A	1720	381

Sample Exceeds the MECP Table 1 Standards

N/A Parameter Not Analyzed

ND Non-Detect

Parameter	Units	MDL	Regulation	Sample						
				BH1-22-SS2	BH2-22-SS4	BH3-22-SS1	BH4-22-AU1/SS2	BH5-22-SS3	BH6-22-AU1/SS2	BH7-22-SS2
Sample Date (m/d/y)			Reg 406/19-Table 2.1 Residential/Parkland/Institutional	06/23/2022 09:00 AM	06/27/2022 09:00 AM	06/28/2022 09:00 AM	07/04/2022 09:00 AM	07/04/2022 09:00 AM	07/05/2022 09:00 AM	07/05/2022 09:00 AM
Physical Characteristics										
% Solids	% by Wt.	0.1		93.3	88.8	87.1	96.3	86.5	93.1	86.6
General Inorganics										
SAR	N/A	0.01	5 N/A	0.29	N/A	1.22	0.70	2.58	4.23	4.97
Conductivity	uS/cm	5	0.7 mS/cm (700 uS/cm)	168	N/A	146	861	296	396	816
pH	pH Units	0.05	5 pH units (5 pH Units)	N/A	7.91	N/A	9.21	7.57	N/A	N/A
Metals										
Antimony	ug/g dry	1.0	7.5 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	ug/g dry	1.0	18 ug/g dry	3.2	ND (1.0)	1.7	2.9	1.6	2.0	4.8
Barium	ug/g dry	1.0	390 ug/g dry	116	45.8	38.0	183	38.9	51.8	158
Beryllium	ug/g dry	0.5	4 ug/g dry	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.5
Boron	ug/g dry	5.0	120 ug/g dry	9.3	ND (5.0)	ND (5.0)	9.8	12.8	ND (5.0)	9.0
Cadmium	ug/g dry	0.5	1.2 ug/g dry	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	5.0	160 ug/g dry	21.5	12.2	10.6	12.9	9.8	8.4	19.2
Cobalt	ug/g dry	1.0	22 ug/g dry	8.6	3.6	3.5	5.4	5.3	3.7	7.7
Copper	ug/g dry	5.0	140 ug/g dry	20.3	14.4	8.0	10.2	8.3	6.7	16.0
Lead	ug/g dry	1.0	120 ug/g dry	8.2	3.4	8.5	12.1	4.6	5.0	13.1
Molybdenum	ug/g dry	1.0	6.9 ug/g dry	1.1	ND (1.0)	ND (1.0)	1.1	ND (1.0)	ND (1.0)	1.7
Nickel	ug/g dry	5.0	100 ug/g dry	16.0	7.0	6.8	14.0	7.9	7.1	14.5
Selenium	ug/g dry	1.0	2.4 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Silver	ug/g dry	0.3	20 ug/g dry	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Thallium	ug/g dry	1.0	1 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Uranium	ug/g dry	1.0	23 ug/g dry	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vanadium	ug/g dry	10.0	86 ug/g dry	35.7	15.6	19.9	31.5	12.3	17.8	28.3
Zinc	ug/g dry	20.0	340 ug/g dry	36.9	ND (20.0)	21.0	ND (20.0)	ND (20.0)	ND (20.0)	32.0
Volatiles										
Benzene	ug/g dry	0.02	0.02 ug/g dry	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Ethylbenzene	ug/g dry	0.05	0.05 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.05	0.2 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
m/p-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	0.05		ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	0.05	0.091 ug/g dry	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Hydrocarbons										
F1 PHCs (C6-C10)	ug/g dry	7	25 ug/g dry	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)	ND (7)
F2 PHCs (C10-C16)	ug/g dry	4	10 ug/g dry	ND (4)	ND (4)	ND (4)	ND (80)	ND (4)	ND (80)	ND (4)
F3 PHCs (C16-C34)	ug/g dry	8	240 ug/g dry	ND (8)	16	25	263	ND (8)	573	109
F4 PHCs (C34-C50)	ug/g dry	6	2800 ug/g dry	ND (6)	23	71	1520	ND (6)	1640	185
F4G PHCs (gravimetric)	ug/g dry	50	2800 ug/g dry	N/A	N/A	N/A	4230	N/A	1720	381

Sample Exceeds the MECP Table 2.1 Standards

N/A Parameter Not Analyzed

ND Non-Detect

#203 CLEARVIEW AVE. RESIDENTIAL

#185 CLEARVIEW AVE. RESIDENTIAL

LANDSCAPED

SIDEWALK

CLEARVIEW AVENUE

FH
T/S=59.73

BH 3A-22
60.03
[58.18]

LANDSCAPED

#190 CLEARVIEW AVE. RESIDENTIAL

LANDSCAPED

ELLENDALE AVENUE

ISLAND CREEK PRIVATE

281 LANARK AVENUE
INSTITUTIONAL

BH 6-22
60.30
[58.44]

ASPHALTIC CONCRETE PARKING LOT

BH 1-22
60.78
[58.14]

ASPHALTIC CONCRETE DRIVEWAY

CANOPY

9126 ELLENDALE CRESCENT RESIDENTIAL

SIDEWALK

BH 5-22
61.12
[58.33]

210 CLEARVIEW AVENUE
RESIDENTIAL APT.
BUILDING

190 ISLAND CREEK PRIVATE RESIDENTIAL

BH 2-22
60.77
[58.25]

LANDSCAPED

LANDSCAPED

181 LENARK AVE RESIDENTIAL

BH 4-22
61.42
[59.49]

LANDSCAPED

FFH
T/S=61.76

SIDEWALK

LANARK AVENUE

LANDSCAPED

LANDSCAPED

#192 LANARK AVENUE RESIDENTIAL

#178 LANARK AVENUE RESIDENTIAL

LEGEND:

- BOREHOLE LOCATION
- 60.74 GROUND SURFACE ELEVATION (m)
- [58.23] BEDROCK SURFACE ELEVATION (m)

SURVEY PLAN PROVIDED BY FARLEY, SMITH & DENIS SURVEYING LTD.

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

SCALE: 1:750

0 10 20 30 50m

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

NO.	REVISIONS	DATE	INITIAL

HOMESTEAD LAND HOLDINGS LTD.

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
210 CLEARVIEW AVENUE

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:750	Date: 07/2022
Drawn by: GK	Report No.: PE5751-1
Checked by: NS	Dwg. No.: PE5751-3
Approved by: AM	Revision No.:

p:\autocad drawings\environmental\pe57xx\pe5751\pe5751-thtp.dwg

11x17

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Sam Berube

Client PO: 055086
Project: PE5751
Custody: 136679

Report Date: 30-Jun-2022
Order Date: 24-Jun-2022

Order #: 2226629

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

Paracel ID	Client ID
2226629-01	BH1-22-SS2

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 30-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Jun-2022

Client PO: 055086

Project Description: PE5751

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	28-Jun-22	28-Jun-22
Conductivity	MOE E3138 - probe @25 °C, water ext	29-Jun-22	30-Jun-22
PHC F1	CWS Tier 1 - P&T GC-FID	28-Jun-22	28-Jun-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	27-Jun-22	29-Jun-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	28-Jun-22	29-Jun-22
SAR	Calculated	30-Jun-22	30-Jun-22
Solids, %	Gravimetric, calculation	28-Jun-22	28-Jun-22

Certificate of Analysis

Report Date: 30-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Jun-2022

Client PO: 055086

Project Description: PE5751

	Client ID:	BH1-22-SS2	-	-	-
	Sample Date:	23-Jun-22 09:00	-	-	-
	Sample ID:	2226629-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	93.3	-	-	-
General Inorganics					
SAR	0.01 N/A	0.29	-	-	-
Conductivity	5 uS/cm	168	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	-	-	-
Arsenic	1.0 ug/g dry	3.2	-	-	-
Barium	1.0 ug/g dry	116	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	9.3	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5.0 ug/g dry	21.5	-	-	-
Cobalt	1.0 ug/g dry	8.6	-	-	-
Copper	5.0 ug/g dry	20.3	-	-	-
Lead	1.0 ug/g dry	8.2	-	-	-
Molybdenum	1.0 ug/g dry	1.1	-	-	-
Nickel	5.0 ug/g dry	16.0	-	-	-
Selenium	1.0 ug/g dry	<1.0	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1.0 ug/g dry	<1.0	-	-	-
Uranium	1.0 ug/g dry	<1.0	-	-	-
Vanadium	10.0 ug/g dry	35.7	-	-	-
Zinc	20.0 ug/g dry	36.9	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	123%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	-	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 055086

Report Date: 30-Jun-2022

Order Date: 24-Jun-2022

Project Description: PE5751

	Client ID:	BH1-22-SS2	-	-	-
	Sample Date:	23-Jun-22 09:00	-	-	-
	Sample ID:	2226629-01	-	-	-
	MDL/Units	Soil	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	-	-

Certificate of Analysis

Report Date: 30-Jun-2022

Client: Paterson Group Consulting Engineers

Order Date: 24-Jun-2022

Client PO: 055086

Project Description: PE5751

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	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						
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	*9.39*		*ug/g*		*117*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	1.19	0.01	N/A	1.12			6.1	30	
Conductivity	263	5	uS/cm	262			0.4	5	
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	2.4	1.0	ug/g	2.6			7.7	30	
Barium	63.6	1.0	ug/g	71.4			11.5	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	13.5	5.0	ug/g	14.9			10.2	30	
Cobalt	5.7	1.0	ug/g	6.1			7.4	30	
Copper	10.6	5.0	ug/g	9.8			7.3	30	
Lead	76.1	1.0	ug/g	85.3			11.4	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	6.4	5.0	ug/g	7.2			11.7	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	21.3	10.0	ug/g	22.7			6.7	30	
Zinc	134	20.0	ug/g	146			8.8	30	
Physical Characteristics									
% Solids	65.7	0.1	% by Wt.	66.1			0.6	25	
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	*12.0*		*ug/g*		*128*	*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)	161	7	ug/g	ND	80.4	80-120			
F2 PHCs (C10-C16)	125	4	ug/g	ND	130	60-140			
F3 PHCs (C16-C34)	269	8	ug/g	ND	114	60-140			
F4 PHCs (C34-C50)	166	6	ug/g	ND	112	60-140			
Metals									
Antimony	38.0	1.0	ug/g	ND	75.5	70-130			
Arsenic	48.3	1.0	ug/g	1.0	94.5	70-130			
Barium	69.5	1.0	ug/g	28.5	81.9	70-130			
Beryllium	50.8	0.5	ug/g	ND	102	70-130			
Boron	48.8	5.0	ug/g	ND	95.5	70-130			
Cadmium	42.5	0.5	ug/g	ND	85.0	70-130			
Chromium	59.7	5.0	ug/g	ND	110	70-130			
Cobalt	49.8	1.0	ug/g	1.1	97.5	70-130			
Copper	48.8	5.0	ug/g	ND	89.8	70-130			
Lead	72.8	1.0	ug/g	34.1	77.4	70-130			
Molybdenum	45.8	1.0	ug/g	ND	91.1	70-130			
Nickel	49.1	5.0	ug/g	ND	92.5	70-130			
Selenium	43.9	1.0	ug/g	ND	87.1	70-130			
Silver	40.0	0.3	ug/g	ND	80.0	70-130			
Thallium	45.6	1.0	ug/g	ND	91.2	70-130			
Uranium	46.7	1.0	ug/g	ND	93.1	70-130			
Vanadium	56.6	10.0	ug/g	ND	95.0	70-130			
Zinc	47.0	20.0	ug/g	ND	94.0	70-130			
Volatiles									
Benzene	3.71	0.02	ug/g	ND	92.6	60-130			
Ethylbenzene	3.85	0.05	ug/g	ND	96.3	60-130			
Toluene	3.96	0.05	ug/g	ND	99.0	60-130			
m,p-Xylenes	6.22	0.05	ug/g	ND	77.7	60-130			
o-Xylene	3.48	0.05	ug/g	ND	87.0	60-130			
Surrogate: Toluene-d8	*8.12*		*ug/g*		*102*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD.

Paracel ID: 2226629

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2226629	Nº 136679

Client Name: Paterson
Contact Name: Samuel Beube, Adrian Menyhart
Address: 9 Auriga Drive
Telephone: 613-226-7381

Project Ref: PE5751
Quote #: 055
PO #: 055086
E-mail: Sbeube@patersongroup.ca
Amenyhart@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)	Electrical Conductivity	Sodium Adsorption Ratio			
1	BH1-22-SS2	S		2	June 23/22		✓			✓				✓	✓			
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: A. LOUISE	Received at Lab:	Verified By:
Relinquished By (Print):	Date/Time: 24/06/22 3:20	Date/Time: June 24/22 16:55	Date/Time: June 24, 22 17:27
Date/Time:	Temperature: °C 21.	Temperature: 22.2 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Adrian Menyhart

Client PO: 55152
Project: PE5751
Custody: 136681

Report Date: 14-Jul-2022
Order Date: 29-Jun-2022

Order #: 2227354

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

Paracel ID	Client ID
2227354-01	BH2-22-SS3
2227354-02	BH3-22-SS1

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 29-Jun-2022

Client PO: 55152

Project Description: PE5751

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	30-Jun-22	1-Jul-22
Conductivity	MOE E3138 - probe @25 °C, water ext	12-Jul-22	12-Jul-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	1-Jul-22	1-Jul-22
PHC F1	CWS Tier 1 - P&T GC-FID	30-Jun-22	1-Jul-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-Jun-22	2-Jul-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	7-Jul-22	8-Jul-22
SAR	Calculated	13-Jul-22	14-Jul-22
Solids, %	Gravimetric, calculation	4-Jul-22	4-Jul-22

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 29-Jun-2022

Client PO: 55152

Project Description: PE5751

	Client ID:	BH2-22-SS3	BH3-22-SS1	-	-
	Sample Date:	27-Jun-22 09:00	28-Jun-22 09:00	-	-
	Sample ID:	2227354-01	2227354-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.8	87.1	-	-
General Inorganics					
SAR	0.01 N/A	-	1.22	-	-
Conductivity	5 uS/cm	-	146	-	-
pH	0.05 pH Units	7.91	-	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	<1.0	1.7	-	-
Barium	1.0 ug/g dry	45.8	38.0	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	<5.0	<5.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	12.2	10.6	-	-
Cobalt	1.0 ug/g dry	3.6	3.5	-	-
Copper	5.0 ug/g dry	14.4	8.0	-	-
Lead	1.0 ug/g dry	3.4	8.5	-	-
Molybdenum	1.0 ug/g dry	<1.0	<1.0	-	-
Nickel	5.0 ug/g dry	7.0	6.8	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	15.6	19.9	-	-
Zinc	20.0 ug/g dry	<20.0	21.0	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene-d8	Surrogate	59.8%	59.8%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	-

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 29-Jun-2022

Client PO: 55152

Project Description: PE5751

	Client ID:	BH2-22-SS3	BH3-22-SS1	-	-
	Sample Date:	27-Jun-22 09:00	28-Jun-22 09:00	-	-
	Sample ID:	2227354-01	2227354-02	-	-
	MDL/Units	Soil	Soil	-	-
F3 PHCs (C16-C34)	8 ug/g dry	16	25	-	-
F4 PHCs (C34-C50)	6 ug/g dry	23	71	-	-

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 29-Jun-2022

Client PO: 55152

Project Description: PE5751

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	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						
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	*1.86*		*ug/g*		*58.2*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	ND	0.01	N/A	ND			NC	30	
Conductivity	610	5	uS/cm	612			0.3	5	
pH	7.43	0.05	pH Units	7.44			0.1	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)	44	8	ug/g	40			11.1	30	
F4 PHCs (C34-C50)	48	6	ug/g	41			16.4	30	
Metals									
Antimony	ND	1.0	ug/g	2.0			NC	30	
Arsenic	5.4	1.0	ug/g	4.7			14.0	30	
Barium	118	1.0	ug/g	107			9.8	30	
Beryllium	0.8	0.5	ug/g	0.8			3.4	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	22.5	5.0	ug/g	20.2			10.5	30	
Cobalt	9.7	1.0	ug/g	8.8			10.1	30	
Copper	26.3	5.0	ug/g	24.3			8.1	30	
Lead	15.2	1.0	ug/g	17.5			14.6	30	
Molybdenum	1.5	1.0	ug/g	ND			NC	30	
Nickel	20.2	5.0	ug/g	18.6			8.3	30	
Selenium	1.0	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	0.5			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	1.4	1.0	ug/g	ND			NC	30	
Vanadium	32.7	10.0	ug/g	29.7			9.7	30	
Zinc	120	20.0	ug/g	109			9.2	30	
Physical Characteristics									
% Solids	90.8	0.1	% by Wt.	90.8			0.0	25	
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	*2.27*		*ug/g*		*65.8*	*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)	191	7	ug/g	ND	95.7	80-120			
F2 PHCs (C10-C16)	118	4	ug/g	ND	126	60-140			
F3 PHCs (C16-C34)	290	8	ug/g	40	109	60-140			
F4 PHCs (C34-C50)	216	6	ug/g	41	120	60-140			
Metals									
Antimony	98.3	1.0	ug/g	2.0	77.1	70-130			
Arsenic	130	1.0	ug/g	4.7	100	70-130			
Barium	229	1.0	ug/g	107	97.8	70-130			
Beryllium	122	0.5	ug/g	0.8	96.7	70-130			
Boron	108	5.0	ug/g	ND	86.0	70-130			
Cadmium	117	0.5	ug/g	ND	93.2	70-130			
Chromium	132	5.0	ug/g	20.2	89.5	70-130			
Cobalt	117	1.0	ug/g	8.8	86.3	70-130			
Copper	135	5.0	ug/g	24.3	88.6	70-130			
Lead	127	1.0	ug/g	17.5	87.6	70-130			
Molybdenum	117	1.0	ug/g	ND	93.9	70-130			
Nickel	136	5.0	ug/g	18.6	94.0	70-130			
Selenium	116	1.0	ug/g	ND	92.7	70-130			
Silver	101	0.3	ug/g	0.5	80.7	70-130			
Thallium	114	1.0	ug/g	ND	91.0	70-130			
Uranium	114	1.0	ug/g	ND	90.9	70-130			
Vanadium	143	10.0	ug/g	29.7	90.8	70-130			
Zinc	225	20.0	ug/g	109	93.1	70-130			
Volatiles									
Benzene	4.03	0.02	ug/g	ND	101	60-130			
Ethylbenzene	3.31	0.05	ug/g	ND	82.8	60-130			
Toluene	3.50	0.05	ug/g	ND	87.6	60-130			
m,p-Xylenes	7.20	0.05	ug/g	ND	90.0	60-130			
o-Xylene	3.67	0.05	ug/g	ND	91.8	60-130			
Surrogate: Toluene-d8	*2.09*		*ug/g*		*65.2*	*50-140*			

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACEL LABORATORIES LTD

Paracel ID: 2227354

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2227354	№ 136681

Client Name: Paterson	Project Ref: PE 5751	Page __ of __
Contact Name: Adrian Menyhart	Quote #:	**Turnaround Time**
Address: 9 Auriga	PO #: 55152	☐ 1 day ☐ 3 day
	E-mail:	☐ 2 day ☒ Regular
Telephone: 613 226 7381	AMenyhart@Patersongroup.ca	Date Required:

☒ REG 153/04 ☐ REG 406/19

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

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

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

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH				
1	BH2-22-SS3	S		2	June 27 2022		✓			✓				✓				
2	BH3-22-SS1	S		2	June 28 2022		✓			✓								
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

Relinquished By (Sign): GPat	Received By Driver/Depot: [signature]	Received at Lab: Suneopam Bhmai	Verified By: [signature]
Relinquished By (Print): Grant Paterson	Date/Time: 29/06/22 4:04	Date/Time: JUN 29, 2022 04.50	Date/Time: June 29/22 16:59
Date/Time: June 29 2022	Temperature: °C PM.	Temperature: 12.9 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Adrian Menyhart

Client PO: 55183
Project: PE5751
Custody: 136708

Report Date: 14-Jul-2022
Order Date: 5-Jul-2022

Order #: 2228214

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

Paracel ID	Client ID
2228214-02	BH4-22-AU1/SS2
2228214-03	BH5-22-SS3

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-Jul-2022

Client PO: 55183

Project Description: PE5751

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	6-Jul-22	7-Jul-22
Conductivity	MOE E3138 - probe @25 °C, water ext	12-Jul-22	12-Jul-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	5-Jul-22	6-Jul-22
PHC F1	CWS Tier 1 - P&T GC-FID	6-Jul-22	7-Jul-22
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	11-Jul-22	12-Jul-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Jul-22	8-Jul-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	13-Jul-22	13-Jul-22
SAR	Calculated	13-Jul-22	14-Jul-22
Solids, %	Gravimetric, calculation	6-Jul-22	7-Jul-22

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-Jul-2022

Client PO: 55183

Project Description: PE5751

	Client ID:	BH4-22-AU1/SS2	BH5-22-SS3	-	-
	Sample Date:	04-Jul-22 09:00	04-Jul-22 09:00	-	-
	Sample ID:	2228214-02	2228214-03	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	96.3	86.5	-	-
General Inorganics					
SAR	0.01 N/A	0.70	2.58	-	-
Conductivity	5 uS/cm	861	296	-	-
pH	0.05 pH Units	9.21	7.57	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	2.9	1.6	-	-
Barium	1.0 ug/g dry	183	38.9	-	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	-	-
Boron	5.0 ug/g dry	9.8	12.8	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	12.9	9.8	-	-
Cobalt	1.0 ug/g dry	5.4	5.3	-	-
Copper	5.0 ug/g dry	10.2	8.3	-	-
Lead	1.0 ug/g dry	12.1	4.6	-	-
Molybdenum	1.0 ug/g dry	1.1	<1.0	-	-
Nickel	5.0 ug/g dry	14.0	7.9	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	31.5	12.3	-	-
Zinc	20.0 ug/g dry	<20.0	<20.0	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene-d8	Surrogate	104%	115%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<80 [1]	<4	-	-

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-Jul-2022

Client PO: 55183

Project Description: PE5751

	Client ID:	BH4-22-AU1/SS2	BH5-22-SS3	-	-
	Sample Date:	04-Jul-22 09:00	04-Jul-22 09:00	-	-
	Sample ID:	2228214-02	2228214-03	-	-
	MDL/Units	Soil	Soil	-	-
F3 PHCs (C16-C34)	8 ug/g dry	263	<8	-	-
F4 PHCs (C34-C50)	6 ug/g dry	1520 [2]	<6	-	-
F4G PHCs (gravimetric)	50 ug/g dry	4230	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
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	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	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						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.11*		*ug/g*		*97.2*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	ND	0.01	N/A	ND			NC	30	
Conductivity	854	5	uS/cm	861			0.8	5	
pH	7.27	0.05	pH Units	7.28			0.1	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	1.7	1.0	ug/g	1.6			4.0	30	
Barium	12.5	1.0	ug/g	15.6			22.6	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	5.9	5.0	ug/g	6.9			16.3	30	
Cobalt	2.1	1.0	ug/g	2.2			6.5	30	
Copper	ND	5.0	ug/g	ND			NC	30	
Lead	2.1	1.0	ug/g	2.8			29.8	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	ND	5.0	ug/g	5.9			NC	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	11.9	10.0	ug/g	14.5			19.5	30	
Zinc	ND	20.0	ug/g	ND			NC	30	
Physical Characteristics									
% Solids	83.1	0.1	% by Wt.	83.0			0.2	25	
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	*3.64*		*ug/g*		*104*	*50-140*			

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 5-Jul-2022

Client PO: 55183

Project Description: PE5751

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	173	7	ug/g	ND	86.7	80-120			
F2 PHCs (C10-C16)	94	4	ug/g	ND	110	60-140			
F3 PHCs (C16-C34)	255	8	ug/g	ND	122	60-140			
F4 PHCs (C34-C50)	167	6	ug/g	ND	127	60-140			
F4G PHCs (gravimetric)	820	50	ug/g	ND	82.0	80-120			
Metals									
Antimony	36.4	1.0	ug/g	ND	72.8	70-130			
Arsenic	53.6	1.0	ug/g	ND	106	70-130			
Barium	57.0	1.0	ug/g	6.2	101	70-130			
Beryllium	50.7	0.5	ug/g	ND	101	70-130			
Boron	47.3	5.0	ug/g	ND	93.2	70-130			
Cadmium	49.9	0.5	ug/g	ND	99.8	70-130			
Chromium	55.7	5.0	ug/g	ND	105	70-130			
Cobalt	54.3	1.0	ug/g	1.0	107	70-130			
Copper	52.6	5.0	ug/g	ND	103	70-130			
Lead	49.2	1.0	ug/g	1.1	96.2	70-130			
Molybdenum	52.2	1.0	ug/g	ND	104	70-130			
Nickel	54.8	5.0	ug/g	ND	105	70-130			
Selenium	46.1	1.0	ug/g	ND	92.0	70-130			
Silver	36.4	0.3	ug/g	ND	72.7	70-130			
Thallium	48.8	1.0	ug/g	ND	97.6	70-130			
Uranium	50.9	1.0	ug/g	ND	101	70-130			
Vanadium	61.9	10.0	ug/g	ND	108	70-130			
Zinc	56.2	20.0	ug/g	ND	102	70-130			
Volatiles									
Benzene	2.86	0.02	ug/g	ND	71.6	60-130			
Ethylbenzene	3.43	0.05	ug/g	ND	85.7	60-130			
Toluene	3.70	0.05	ug/g	ND	92.5	60-130			
m,p-Xylenes	7.48	0.05	ug/g	ND	93.5	60-130			
o-Xylene	3.86	0.05	ug/g	ND	96.5	60-130			
Surrogate: Toluene-d8	*3.21*		*ug/g*		*100*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

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

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

Paracel ID: 2228214

PARACEL LABORATORIES LTD.

Paracel Order Number (Lab Use Only) 2228214

Chain Of Custody

(Lab Use Only)

Nº 136708

Client Name: Paterson Group	Project Ref: PE5751
Contact Name: Adrian Menyhart	Quote #:
Address: 9 Auriga Drive	PO #: 55183
Telephone: 613-226-7381	E-mail: amenyhart@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)	pH				
1	BH3A-22-AU1	S		2	July 4, 2022		X			X								
2	BH4-22-AU1/SS2	↓		↓	↓		X			X				X				
3	BH5-22-SS3	↓		↓	↓		X			X				X				
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Paracel Courier

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Relinquished By (Print): Nurein Saif	Date/Time: 05/07/22 3:17	Date/Time: Jul 05, 2022 14.45	Date/Time: July 05, 22 17:33
Date/Time: July 5, 2022	Temperature: °C PH	Temperature: 13.8 °C	pH Verified: ☐ By:

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Certificate of Analysis

Paterson Group Consulting Engineers

9 Auriga Drive
Ottawa, ON K2E 7T9
Attn: Adrian Menyhart

Client PO: 55215
Project: PE5751
Custody: 136710

Report Date: 14-Jul-2022
Order Date: 6-Jul-2022

Order #: 2228355

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

Paracel ID	Client ID
2228355-01	BH6-22-AU1/SS2
2228355-02	BH7-22-SS2

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2022

Client PO: 55215

Project Description: PE5751

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	8-Jul-22	8-Jul-22
Conductivity	MOE E3138 - probe @25 °C, water ext	12-Jul-22	12-Jul-22
PHC F1	CWS Tier 1 - P&T GC-FID	8-Jul-22	8-Jul-22
PHC F4G (gravimetric)	CWS Tier 1 - Extraction Gravimetric	11-Jul-22	12-Jul-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	7-Jul-22	9-Jul-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	13-Jul-22	14-Jul-22
SAR	Calculated	13-Jul-22	14-Jul-22
Solids, %	Gravimetric, calculation	8-Jul-22	8-Jul-22

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2022

Client PO: 55215

Project Description: PE5751

	Client ID:	BH6-22-AU1/SS2	BH7-22-SS2	-	-
	Sample Date:	05-Jul-22 09:00	05-Jul-22 09:00	-	-
	Sample ID:	2228355-01	2228355-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	93.1	86.6	-	-
General Inorganics					
SAR	0.01 N/A	4.23	4.97	-	-
Conductivity	5 uS/cm	396	816	-	-
Metals					
Antimony	1.0 ug/g dry	<1.0	<1.0	-	-
Arsenic	1.0 ug/g dry	2.0	4.8	-	-
Barium	1.0 ug/g dry	51.8	158	-	-
Beryllium	0.5 ug/g dry	<0.5	0.5	-	-
Boron	5.0 ug/g dry	<5.0	9.0	-	-
Cadmium	0.5 ug/g dry	<0.5	<0.5	-	-
Chromium	5.0 ug/g dry	8.4	19.2	-	-
Cobalt	1.0 ug/g dry	3.7	7.7	-	-
Copper	5.0 ug/g dry	6.7	16.0	-	-
Lead	1.0 ug/g dry	5.0	13.1	-	-
Molybdenum	1.0 ug/g dry	<1.0	1.7	-	-
Nickel	5.0 ug/g dry	7.1	14.5	-	-
Selenium	1.0 ug/g dry	<1.0	<1.0	-	-
Silver	0.3 ug/g dry	<0.3	<0.3	-	-
Thallium	1.0 ug/g dry	<1.0	<1.0	-	-
Uranium	1.0 ug/g dry	<1.0	<1.0	-	-
Vanadium	10.0 ug/g dry	17.8	28.3	-	-
Zinc	20.0 ug/g dry	<20.0	32.0	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene-d8	Surrogate	102%	107%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<80 [1]	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	573	109	-	-

Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 55215

Report Date: 14-Jul-2022

Order Date: 6-Jul-2022

Project Description: PE5751

	Client ID:	BH6-22-AU1/SS2	BH7-22-SS2	-	-
	Sample Date:	05-Jul-22 09:00	05-Jul-22 09:00	-	-
	Sample ID:	2228355-01	2228355-02	-	-
	MDL/Units	Soil	Soil	-	-
F4 PHCs (C34-C50)	6 ug/g dry	1640 [2]	185 [2]	-	-
F4G PHCs (gravimetric)	50 ug/g dry	1720	381	-	-

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2022

Client PO: 55215

Project Description: PE5751

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Conductivity	ND	5	uS/cm						
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	ND	5.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	5.0	ug/g						
Lead	ND	1.0	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						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*3.05*		*ug/g*		*95.2*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	ND	0.01	N/A	ND			NC	30	
Conductivity	610	5	uS/cm	612			0.3	5	
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	1.7	1.0	ug/g	1.6			4.0	30	
Barium	12.5	1.0	ug/g	15.6			22.6	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	5.9	5.0	ug/g	6.9			16.3	30	
Cobalt	2.1	1.0	ug/g	2.2			6.5	30	
Copper	ND	5.0	ug/g	ND			NC	30	
Lead	2.1	1.0	ug/g	2.8			29.8	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	ND	5.0	ug/g	5.9			NC	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	11.9	10.0	ug/g	14.5			19.5	30	
Zinc	ND	20.0	ug/g	ND			NC	30	
Physical Characteristics									
% Solids	90.9	0.1	% by Wt.	89.7			1.3	25	
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	*3.91*		*ug/g*		*103*	*50-140*			

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2022

Client PO: 55215

Project Description: PE5751

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	225	7	ug/g	ND	113	80-120			
F2 PHCs (C10-C16)	94	4	ug/g	ND	110	60-140			
F3 PHCs (C16-C34)	255	8	ug/g	ND	122	60-140			
F4 PHCs (C34-C50)	167	6	ug/g	ND	127	60-140			
F4G PHCs (gravimetric)	820	50	ug/g	ND	82.0	80-120			
Metals									
Antimony	36.4	1.0	ug/g	ND	72.8	70-130			
Arsenic	53.6	1.0	ug/g	ND	106	70-130			
Barium	57.0	1.0	ug/g	6.2	101	70-130			
Beryllium	50.7	0.5	ug/g	ND	101	70-130			
Boron	47.3	5.0	ug/g	ND	93.2	70-130			
Cadmium	49.9	0.5	ug/g	ND	99.8	70-130			
Chromium	55.7	5.0	ug/g	ND	105	70-130			
Cobalt	54.3	1.0	ug/g	1.0	107	70-130			
Copper	52.6	5.0	ug/g	ND	103	70-130			
Lead	49.2	1.0	ug/g	1.1	96.2	70-130			
Molybdenum	52.2	1.0	ug/g	ND	104	70-130			
Nickel	54.8	5.0	ug/g	ND	105	70-130			
Selenium	46.1	1.0	ug/g	ND	92.0	70-130			
Silver	36.4	0.3	ug/g	ND	72.7	70-130			
Thallium	48.8	1.0	ug/g	ND	97.6	70-130			
Uranium	50.9	1.0	ug/g	ND	101	70-130			
Vanadium	61.9	10.0	ug/g	ND	108	70-130			
Zinc	56.2	20.0	ug/g	ND	102	70-130			
Volatiles									
Benzene	3.07	0.02	ug/g	ND	76.8	60-130			
Ethylbenzene	3.74	0.05	ug/g	ND	93.5	60-130			
Toluene	4.00	0.05	ug/g	ND	100	60-130			
m,p-Xylenes	8.15	0.05	ug/g	ND	102	60-130			
o-Xylene	4.27	0.05	ug/g	ND	107	60-130			
Surrogate: Toluene-d8	*3.16*		*ug/g*		*98.7*	*50-140*			

Certificate of Analysis

Report Date: 14-Jul-2022

Client: Paterson Group Consulting Engineers

Order Date: 6-Jul-2022

Client PO: 55215

Project Description: PE5751

Qualifier Notes:

Sample Qualifiers :

1 : Elevated detection limits due to the nature of the sample matrix.

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

PARACE LABORATORIES LTD

Paracel ID: 2228355

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2228355	№ 136710

Client Name: Paterson | Project Ref: PE5751 | Page 1 of 1

Contact Name: Adrian Menyhart | Quote #:

Address: 9 Aonga Drive | PO #: 55215

Telephone: 613- | E-mail: ~~adrianmenyh~~ amenyhart@patersongroup.ca

Turnaround Time

☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular

Date Required:

☐ REG 153/04 ☒ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine

☐ Table 2 ☐ Ind/Comm ☐ Coarse

☐ Table 3 ☐ Agri/Other

☐ Table

For RSC: ☐ Yes ☐ No

Other Regulation

☐ REG 558 ☐ PWQO

☐ CCME ☐ MISA

☐ SU - Sani ☐ SU - Storm

Mun:

☐ Other:

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

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	EC	SAR			
1	BH6-22-AU1/SS2	S		2	July 5/22		X			X				X	X			
2	BH7-22-SS2	S		2	July 5/22		X			X				X	X			
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: PARACEL COURIER

Relinquished By (Sign):	Received By Driver/Depot: A. LOUISE	Received at Lab: BStam	Verified By: BStam
Relinquished By (Print): Mureln Seif	Date/Time: 06/07/22 316	Date/Time: July 6, 22 16:20	Date/Time: July 6, 22 17:41
Date/Time: July 6, 2022	Temperature: °C PH.	Temperature: 17.3 °C	pH Verified: ☐ By: