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Phase II Environmental Site Assessment

Residential and Commercial Properties
266, 268, 272, and 274 Parkdale Avenue,
9, 11, and 13 Bullman Street,
Ottawa, Ontario

Prepared For

Richcraft Group of Companies

August 1, 2013

Report: PE2967-3

Table of Contents

List of Figures

List of Appendices

EXECUTIVE SUMMARY

Assessment

A Phase II ESA was conducted for the properties at 266, 268, 272, and 274 Parkdale Avenue and 9, 11, and 13 Bullman Street, Ottawa, Ontario. The purpose of the Phase II ESA was to address the areas of potential environmental concern identified during the Phase I ESA, in particular the historical presence of an outboard motor repair business on the subject site, the presence of two ASTs containing fuel oil on the subject site, and the presence of a former garage to the north of the site. The subsurface investigation at the subject site consisted of the drilling of five (5) boreholes and the installation of two (2) bedrock monitoring wells. An additional two (2) bedrock monitoring wells from a previous geotechnical investigation by Stantec were also present on-site.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. A total of two (2) soil samples were submitted for laboratory analysis of BTEX and PHCs. All soil samples were in compliance with the selected MOE Table 7 standards.

Groundwater samples were obtained from the monitoring wells at BH1, BH2, MW1, and MW2 and analyzed for VOCs and PHCs. Concentrations of cis-1,2-Dichloroethylene exceeded the MOE Table 7 standards at MW2. All other final parameter concentrations were in compliance with the MOE Table 7 standards.

Recommendations

Based on the above results, groundwater beneath the subject property in the vicinity of MW2 marginally exceeds the applicable Table 7 standards for cis-1,2-Dichloroethylene. It is our understanding that the subject site is to be redeveloped with residential condominiums several years from now. It is our recommendation that all monitoring wells on-site be re-sampled prior to site redevelopment to confirm groundwater quality.

1.0 INTRODUCTION

At the request of Richcraft Group of Companies (Richcraft), Paterson Group (Paterson) conducted a Phase II Environmental Site Assessment of the properties addressed as 266, 268, 272, and 274 Parkdale Avenue, and 9, 11, and 13 Bullman Street, in the City of Ottawa, Ontario. The purpose of this Phase II ESA was to address concerns identified in the Phase I ESA.

1.1 Site Description

Address:	266, 268, 272, and 274 Parkdale Avenue, 9, 11, and 13 Bullman Street, Ottawa, Ontario.
Legal Description:	South part of Lot 17 west of Parkdale Avenue, Lots 15 and 16 west of Parkdale Avenue, and east part of Lot 1 north of Bullman Street, Plam 58, in the City of Ottawa, Ontario.
Property Identification Number:	04034-0009; 04034-0010; 04034-0011; 04034-0012; 04034-0013; 04034-0014; 04034-0020.
Location:	The subject site is located at the northwest corner of Bullman Street and Parkdale Avenue, in the City of Ottawa, Ontario. The subject site is shown on Figure 1 - Key Plan following the body of this report.
Latitude and Longitude:	45° 24' 15" N, 75° 43' 53" W.
Configuration:	Irregular.
Site Area:	0.24 hectares (approximate).

1.2 Property Ownership

The parcels comprising the subject property are owned by Richcraft (Bullman) Ltd., with the exception of 13 Bullman Street, which is owned by Richcraft (Scott) Ltd. Paterson was retained to complete this Phase II ESA by Mr. Phil Castro of Richcraft. The offices of Richcraft are located at 2280 St. Laurent Boulevard, Ottawa, Ontario. Mr. Castro can be reached by telephone at (613) 739-7111.

1.3 Current and Proposed Future Uses

The subject site is currently occupied by seven (7) residential and commercial buildings and two (2) garage buildings developed between approximately 1895 and 1952. It is our understanding that the subject site will be redeveloped as a commercial / residential property.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 7 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 (MOE), April 2011. The MOE Table 7 Standards are based on the following considerations:

- Shallow soil site (less than 2 m of overburden)
- Coarse-grained soil conditions
- Non-potable groundwater conditions
- Residential land use

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

The subject site is currently occupied by seven (7) residential and commercial buildings and associated garages, grass landscaped areas, and gravel and paved asphalt parking areas. Site drainage consists primarily of sheet flow to catch basins along Parkdale Avenue and Bullman Street, with minor infiltration in grass and gravel areas. Site topography slopes slightly downwards towards the southwest (downward to the northeast at 266 Parkdale), while regional topography slopes gently downward in a northerly direction towards the Ottawa River.

No standing water or evidence of surficial staining was observed on the exterior of the subject property. No areas of stressed vegetation were noted on the subject site. No water wells or private sewage systems were observed on the subject property at the time of the site visit. No rail lines or loading areas were observed at the subject site. No unidentified substances were observed on-site. No water bodies are present on the subject site.

2.2 Past Investigations

Paterson has completed a Phase I ESA for the subject site, provided under separate cover. Two (2) monitoring wells were present on the subject site from a previous geotechnical investigation by Stantec, discussed in the Phase I ESA. The existing borehole locations are shown on Drawing PE2967-3 - Test Hole Location Plan.

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation conducted as a component of this Phase II ESA consisted of the drilling of five (5) boreholes at the subject properties. Two (2) of these boreholes were cored into bedrock and groundwater monitoring wells were installed. Boreholes were drilled into overburden soils to a maximum depth of 1.6 m below ground surface. Bedrock was cored to a maximum depth of 9.6 m below ground surface.

An additional two (2) monitoring wells were installed during the Stantec geotechnical investigation, for a total of four (4) monitoring wells on the subject property. The Stantec monitoring wells were installed to a maximum depth of 22.5 m below ground surface.

3.2 Media Investigated

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

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

Based on information from the Geological Survey of Canada mapping and the 2013 subsurface investigation, drift thickness in the area of the subject site is on the order of 0.9 to 1.6 m. Overburden soils consist of fill over glacial till, and bedrock consists of Bobcaygeon Formation limestone.

Contaminants of Potential Concern

The following CPCs were identified with respect to the subject site:

- BTEX - this suite of parameters includes Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), associated with gasoline and diesel fuel. These parameters were selected as CPCs based on the presence of the garage at 1518 Scott Street and the former outboard motor repair shop on-site. BTEX may be present in the soil matrix as well as in the dissolved phase in the groundwater system.

- Petroleum Hydrocarbons Fractions 1 through 4 (PHCs F1-F4) – this suite of parameters encompasses gasoline (Fraction 1), diesel and fuel oil (Fraction 2), and heavy oils (Fractions 3 and 4). PHCs F1-F4 were selected as CPCs for the Phase I property based on the presence of the automotive service garage at 1518 Scott Street and the historical use of fuel oil for heating at the subject site, including the presence of two (2) ASTs. Gasoline and diesel are commonly used motor vehicle fuels, and diesel-fraction hydrocarbons were commonly used as heating oil. Heavy oils may be present in the form of lubricants and transmission or hydraulic fluids. PHCs may be present in the soil matrix, sorbed to soil particles, as well as in free or dissolved phase in the groundwater system. PHCs are generally considered to be LNAPLs – light non-aqueous phase liquids, indicating that when present in sufficient concentrations above the solubility limit, they will partition into a separate phase above the water table, due to their lower density.

- Volatile Organic Compounds (VOCs) – this suite of parameters includes chlorinated solvents and degradation products (Tetrachloroethylene, Trichloroethylene, Dichloroethylenes, and Vinyl Chloride) associated with de-greasing and dry cleaning, as well as chloroform, a byproduct of chlorine disinfection of municipally-treated water, and BTEX parameters. These parameters were selected as CPCs for the Phase I study area due to the potential historical use of non-hydrocarbon solvents at the historical outboard motor shop on-site and the garage to the north. VOCs may be present in the soil matrix as well as in the dissolved phase in the groundwater system.

The mechanisms of contaminant transport within the site soils include physical transportation and leaching. Physical transportation includes any intentional or unintentional movement or distribution of soil by physical means. Given that no soil disturbance was evident during the site visit, physical transport is not considered to significantly contribute to contaminant transport in soils at the subject site. Leaching may occur in areas of the site where the ground surface is permeable; precipitation infiltrating in these areas may transport surficial contaminants into lower strata. The potential for leaching at the subject site is interpreted to be limited by the presence of the buildings and paved parking areas, but may still occur in permeable areas such as lawns or gravel parking areas

The mechanisms of contaminant transport within the groundwater system include advection, dispersion, and diffusion. Advection and dispersion will be the dominant mechanisms of contaminant transport in soils with higher hydraulic conductivities, such as sands, gravels, silts, and some glacial till soils, whereas diffusion will dominate in soils with lower hydraulic conductivity, such as clays.

Existing Buildings and Structures

The subject site is occupied by the following buildings:

- 266 Parkdale Avenue: Residential dwelling with a detached garage.
- 268 Parkdale Avenue: Vacant residential dwelling.
- 272 Parkdale Avenue: Former residential building converted to commercial (Café Layali Eshark) with a residential apartment on the upper floor.
- 274 Parkdale Avenue: Former residential building converted to commercial (Alfa Diner) with a residential apartment on the upper floors.
- 9 Bullman Street: Former residential building converted to commercial (office).
- 11 Bullman Street: Residential dwelling.
- 13 Bullman Street: Former residential building converted to commercial (Euro Sport bicycle sales and repair) with residential apartments on upper floors. A single-storey slab-on-grade wood frame garage is present to the north.

Water Bodies

There are no water bodies on the subject site or within the Phase I study area. The closest water body is the Ottawa River, located approximately 700 m to the north of the site.

Areas of Natural Significance

No areas of natural significance were identified on the site or in the Phase I study area.

Drinking Water Wells

No drinking water wells are located at the subject site or within the Phase I study area.

Neighbouring Land Use

Neighbouring land use in the Phase I study area is commercial and residential.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Potentially Contaminating Activities and Areas of Potential Environmental Concern identified include the historical use of the subject site as an outboard motor shop, the presence of the ASTs containing fuel oil, the historical presence of the contractor's yard and printing businesses to the south, and the presence of the garage to the north at 1518 Scott Street. Additional Potentially Contaminating Activities were identified within the Phase I study area but were not considered to represent Areas of Potential Environmental Concern.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I ESA is considered to be sufficient to conclude that there are areas of potential environmental concern on the subject site and neighbouring properties which have the potential to have impacted the subject site. The presence of potentially contaminating activities was confirmed by a variety of independent sources, including, in some cases, observations made during the Phase I site visit. As such, the conclusions of this report are not affected by uncertainty which may be present with respect to the individual sources.

3.4 Deviations from Sampling and Analysis Plan

The Sampling and Analysis Plan for this project is included in Appendix 1 of this report. Field measurement of water quality parameters was not undertaken. No other deviations were noted.

3.5 Impediments

No physical impediments or denial of access were encountered during the Phase II Environmental Site Assessment.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

The subsurface investigation was conducted on June 10, 2013, and consisted of the drilling of five (5) boreholes on the subject site. The boreholes were placed to provide general coverage of the property and to address the aforementioned areas of potential environmental concern. The boreholes were advanced using a truck-mounted CME 55 power auger drill rig. The drilling contractor was George Downing Estate Drilling of Hawkesbury, Ontario. Drilling occurred under full-time supervision of Paterson personnel. Borehole locations are shown on Drawing No. PE2967-3 – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

A total of eight (8) soil samples were obtained from the boreholes by means of split spoon sampling and the sampling of shallow soils directly from auger flights. Split spoon samples were taken at approximate 0.76 m intervals. The depths at which split spoon and auger flight samples were obtained from the boreholes are shown as "**SS**" and "**AU**" respectively on the Soil Profile and Test Data Sheets, appended to this report.

Upon refusal of the augers, two (2) boreholes were advanced into bedrock using a diamond coring system. Rock core samples were recovered, and are shown as "**RC**" on the Soil Profile and Test Data Sheets.

Site soils consist of silty sand fill material over glacial till, underlain by limestone bedrock. Practical refusal to augering was encountered at depths varying from 0.9 to 1.6 m below existing grade.

4.3 Field Screening Measurements

All soil samples collected underwent a preliminary screening procedure, which included visual screening for colour and evidence of deleterious fill, as well as screening with a MiniRae photoionization detector. The detection limit is 0.1 ppm, with a precision of +/- 0.1 ppm.

The soil vapours were measured by inserting the analyzer probe into the nominal headspace above the soil sample. Samples were then agitated and the peak readings recorded. The combustible vapour readings ranged from 0.7 ppm to

1.2 ppm. Combustible vapour readings are noted on the Soil Profile and Test Data Sheets in Appendix 1.

Soil samples were selected for analysis based on visual appearance, location, and vapour readings.

4.4 Groundwater Monitoring Well Installation

Two (2) groundwater monitoring wells were installed during the drilling program by George Downing Estate Drilling of Hawkesbury, Ontario, under full-time supervision by Paterson personnel. The monitoring wells consisted of 32 mm diameter Schedule 40 threaded PVC risers and screens. A sand pack consisting of silica sand was placed around the screen, and a bentonite seal was placed above the screen to minimize cross-contamination. Monitoring well construction details are provided on the Soil Profile and Test Data Sheets in Appendix 1. A summary of monitoring well construction details, including the monitoring wells previously installed by Stantec, is provided below in Table 1.

The groundwater monitoring wells were developed upon completion using a dedicated inertial lift pump. A minimum of three (3) well volumes were removed from the wells.

Table 1: Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
Stantec Wells						
MW1	98.78	22.50	19.45 - 22.50	18.85 - 22.50	0.00 - 18.85	Flushmount
MW2	98.92	22.50	19.45 - 22.50	18.85 - 22.50	0.00 - 18.85	Flushmount
Paterson Wells						
BH1	98.82	9.47	6.40 - 9.47	5.79 - 9.47	0.00 - 5.79	Flushmount
BH2	98.84	9.63	6.58 - 9.63	5.79 - 9.63	0.00 - 5.79	Flushmount

4.5 Field Measurement of Water Quality Parameters

Field measurement of water quality parameters was not undertaken as a part of this assessment.

4.6 Groundwater Sampling

Groundwater sampling protocols were followed using the MOE document entitled "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", dated May 1996. Groundwater samples were obtained from each monitoring well, using dedicated sampling equipment. Standing water was purged from each well prior to sampling. Samples were stored in coolers to reduce analyte volatilization during transportation. Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.7 Analytical Testing

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

Table 2: Soil Samples Submitted

Sample ID	Sample Depth/ Stratigraphic Unit	Parameters Analyzed		Rationale
		PHCs F_1-F_4	BTEX	
BH1 – SS1	0.76 - 1.37 m; fill	X	X	General coverage of site; assessment of potential impacts from garage or former business at 13 Bullman.
BH3 –AU2	0.91 - 1.22 m; fill	X	X	General coverage of site; assessment of potential impacts from garage or former business at 13 Bullman.

Table 3: Groundwater Samples Submitted

Sample ID	Screened Interval/ Stratigraphic Unit	Parameters Analyzed		Rationale
		PHCs F_1-F_4	VOCs	
BH1-GW1	5.79 - 9.47; limestone bedrock	X	X	General coverage of site groundwater quality; assessment of potential impacts from garage and historical business at 13 Bullman.
BH2-GW1	5.79 - 9.63; limestone bedrock	X	X	
MW2-GW1	18.85 - 22.50; limestone bedrock	X	X	
BH1-GW2	5.79 - 9.47; limestone bedrock		X	Confirm VOC concentrations from first sampling event
BH2-GW2	5.79 - 9.63; limestone bedrock		X	
MW2-GW2	18.85 - 22.50; limestone bedrock		X	
Duplicate1 (MW2)	18.85 - 22.50; limestone bedrock		X	QA/QC

Paracel Laboratories (Paracel), of Ottawa, Ontario, performed the laboratory analysis on the samples submitted for analytical testing. Paracel is a member of the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA). Paracel is accredited and certified by SCC/CALA for specific tests registered with the association.

4.8 Residue Management

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

4.9 Elevation Surveying

Monitoring well locations were surveyed using a laser level. Elevations were surveyed relative to a temporary benchmark, the top spindle of a fire hydrant at the northeast corner of Parkdale Avenue and Bullman Street, with an assumed elevation of 100.00 m. The location of the benchmark is shown on Drawing PE2967-3 – Test Hole Location Plan.

4.10 Quality Assurance and Quality Control Measures

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

5.0 REVIEW AND EVALUATION

5.1 Geology

Site geology details are provided in the Soil Profile and Test Data Sheets in Appendix 1. Site soils consist of silty sand and gravel fill, underlain by glacial till. The fill material extended to bedrock surface at BH3, BH4, and BH5. The fill material varied in thickness between 0.15 and 1.6 m. The fill material was not observed to contain any deleterious material and no visual or olfactory evidence of contamination was noted in the fill material.

The glacial till material, encountered in BH1 and BH2, varied in thickness between 1.3 and 1.4 m and consisted of a silty sand matrix with clay, gravel, and cobbles. Practical refusal to augering was encountered at depths ranging from 0.9 to 1.6 m. Bedrock at the site consisted of grey limestone of the Bobcaygeon Formation.

Groundwater monitoring wells were installed in the bedrock at BH1 and BH2. Site stratigraphy is shown on Drawing PE2967-5 - Cross-Section A-A'.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels were measured during the groundwater sampling events on June 17 and July 2, 2013, using an electronic water level meter. Groundwater levels are summarized below in Table 4. All measurements are relative to the site temporary benchmark.

Table 4: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH1	98.82	4.08	94.74	June 17, 2013
		5.20	93.62	July 2, 2013
BH2	98.84	5.40	93.44	June 17, 2013
		7.61	91.23	July 2, 2013
MW1	98.78	8.26	90.52	June 17, 2013
MW2	98.92	8.44	90.48	July 2, 2013

A water level was not measured at MW2 during the June monitoring event due to a water level tape malfunction. Seasonal variations in groundwater levels may occur.

Based on the groundwater elevations from the July 2013 monitoring event, groundwater contour mapping was completed for the bedrock aquifer. Groundwater contours are shown on Drawing PE2967-4 - Groundwater Contour Plan. Based on the contour mapping, groundwater flow at the subject site appears to be in a southeasterly direction. A horizontal hydraulic gradient of approximately 0.07 m/m was calculated.

No free product was observed in the monitoring wells sampled at the subject site.

5.3 Fine-Medium Soil Texture

Based on field soil observations, fine-grained soil standards are not applicable to the subject site.

5.4 Soil: Field Screening

Field screening of the soil samples collected during drilling resulted in organic vapour readings of 0.7 ppm to 1.2 ppm. Field screening results of each individual soil sample are provided on the Soil Profile and Test Data Sheets appended to this report.

The organic vapour readings obtained from field screening of soil samples indicates that there is low potential for significant VOC or PHC contamination in site soils, although higher-fraction hydrocarbons may not be as readily detectable by combustible gas or PID detectors.

5.5 Soil Quality

Two (2) soil samples were submitted for analysis of BTEX and PHCs. The results of the analytical testing are presented below. The laboratory certificates of analysis are provided in Appendix 1.

Table 5:
Analytical Test Results – Soil Sampling Program
BTEX/PHCs

Parameter	MDL (µg/g)	Soil Samples (µg/g) June 10, 2013		Table 7 Residential Coarse
		BH1-SS1	BH3-AU2	
Benzene	0.02	nd	nd	0.21
Ethylbenzene	0.05	nd	nd	2
Toluene	0.05	nd	nd	2.3
Xylenes	0.05	nd	nd	3.1
PHC F1	7	nd	nd	55
PHC F2	4	nd	nd	98
PHC F3	8	nd	170	300
PHC F4	6	nd	243	2,800

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold** – Value exceeds MOE Table 7 standards

The test results are in compliance with the selected MOE Table 7 standards.

Based on the analytical results, no contaminants were identified as being by-products of chemical or biological transformations which have or may have occurred.

The maximum concentrations of analyzed parameters in the soil at the site are summarized below in Table 6.

Table 6: Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Borehole	Depth Interval (m BGS)
PHC F3	170	BH3-AU2	0.91 - 1.22 m; fill
PHC F4	243	BH3-AU2	0.91 - 1.22 m; fill

Notes:
- **Bold** – Value exceeds MOE Table 7 standards

All other parameter concentrations were below laboratory detection limits.

5.6 Groundwater Quality

Groundwater samples from the monitoring wells at BH1, BH2, and MW2 were submitted for laboratory analysis of PHCs and VOCs. The groundwater samples were obtained from the screened intervals noted on Table 1. The results of the analytical testing are presented below in Tables 7, 8, and 9. The laboratory certificates of analysis are provided in Appendix 1.

Table 7:
Analytical Test Results – Groundwater
VOCs

Parameter	MDL (µg/L)	Groundwater Sample (µg/L)			Table 7 Residential Coarse
		June 17, 2013			
		BH1-GW1	BH2-GW1	MW2-GW1	
Acetone	5.0	nd	nd	nd	100,000
Benzene	0.5	nd	nd	nd	0.5
Bromodichloromethane	0.5	nd	2.1	1.3	67,000
Bromoform	0.5	nd	nd	nd	5
Bromomethane	0.5	nd	nd	nd	0.89
Carbon Tetrachloride	0.2	nd	nd	nd	0.2
Chlorobenzene	0.5	nd	nd	nd	140
Chloroform	0.5	**4.6**	**13.0**	1.4	2
Dibromochloromethane	0.5	nd	nd	nd	65,000
Dichlorodifluoromethane	1.0	nd	nd	nd	3,500
1,2-Dichlorobenzene	0.5	nd	nd	nd	150
1,3-Dichlorobenzene	0.5	nd	nd	nd	7,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	0.5
1,1-Dichloroethane	0.5	nd	nd	5.8	11
1,2-Dichloroethane	0.5	nd	nd	nd	0.5
1,1-Dichloroethylene	0.5	nd	nd	nd	0.5
cis-1,2-Dichloroethylene	0.5	nd	nd	**7.6**	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	0.58
1,3-Dichloropropene	0.5	nd	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	nd	54
Hexane	1.0	nd	nd	nd	5
Methyl Ethyl Ketone	5.0	nd	nd	nd	21,000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	5,200
Methyl tert-butyl Ether	2.0	nd	nd	nd	15
Methylene Chloride	5.0	nd	nd	nd	26
Styrene	0.5	nd	nd	nd	43
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	0.5
Tetrachloroethylene	0.5	nd	nd	nd	0.5
Toluene	0.5	nd	nd	nd	320
1,1,1-Trichloroethane	0.5	nd	nd	1.5	23
1,1,2-Trichloroethane	0.5	nd	nd	nd	0.5
Trichloroethylene	0.5	nd	nd	nd	0.5

Trichlorofluoromethane	1.0	nd	nd	nd	2,000
Vinyl Chloride	0.5	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	72

Notes:
- MDL – Method Detection Limit nd – not detected above the MDL
- N/V – no value provided by the MOE
- **Bold** – Value exceeds applicable MOE Standard

Table 8:
Analytical Test Results – Groundwater
PHCs

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			Table 7 Residential Coarse
		June 17, 2013			
		BH1-GW1	BH2-GW1	MW2-GW1	
PHCs F1	25	nd	nd	nd	420
PHCs F2	100	nd	nd	nd	150
PHCs F3	100	nd	nd	nd	500
PHCs F4	100	nd	nd	nd	500

Notes:
- MDL – Method Detection Limit
- nd – not detected above the MDL
- **Bold** – Value exceeds MOE Table 7 Standard

The concentration of chloroform at BH1 and BH2 exceeded the Table 7 standards for the first sampling event. Chloroform was also detected in Stantec's MW2. It is our opinion that the presence of chloroform in the initial samples at these locations is due to the use of municipally treated water as core water during the drilling process. The concentration of cis-1,2-Dichloroethylene at MW2 also exceeded the MOE Table 7 standards. All other concentrations were in compliance with Table 7 standards.

A second sampling event was conducted at the subject site to confirm the results of the initial sampling event after purging all wells to remove any potential remaining core water. Results are summarized below in Table 9.

Table 9:
Analytical Test Results – Groundwater
VOCs

Parameter	MDL (µg/L)	Groundwater Sample (µg/L)				Table 7 Residential Coarse
		July 2, 2013				
		BH1-GW2	BH2-GW2	MW2-GW2	Duplicate 1 (MW2)	
Acetone	5.0	nd	nd	nd	nd	100,000
Benzene	0.5	nd	nd	nd	nd	0.5
Bromodichloromethane	0.5	nd	nd	nd	nd	67,000
Bromoform	0.5	nd	nd	nd	nd	5
Bromomethane	0.5	nd	nd	nd	nd	0.89
Carbon Tetrachloride	0.2	nd	nd	nd	nd	0.2
Chlorobenzene	0.5	nd	nd	nd	nd	140
Chloroform	0.5	1.4	1.7	nd	nd	2
Dibromochloromethane	0.5	nd	nd	nd	nd	65,000
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	3,500
1,2-Dichlorobenzene	0.5	nd	nd	nd	nd	150
1,3-Dichlorobenzene	0.5	nd	nd	nd	nd	7,600
1,4-Dichlorobenzene	0.5	nd	nd	nd	nd	0.5
1,1-Dichloroethane	0.5	nd	nd	4.2	4.1	11
1,2-Dichloroethane	0.5	nd	nd	nd	nd	0.5
1,1-Dichloroethylene	0.5	nd	nd	nd	nd	0.5
cis-1,2-Dichloroethylene	0.5	nd	nd	**4.5**	**4.4**	1.6
trans-1,2-Dichloroethylene	0.5	nd	nd	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	nd	nd	0.58
1,3-Dichloropropene	0.5	nd	nd	nd	nd	0.5
Ethylbenzene	0.5	nd	nd	nd	nd	54
Hexane	1.0	nd	nd	nd	nd	5
Methyl Ethyl Ketone	5.0	nd	nd	nd	nd	21,000
Methyl Isobutyl Ketone	5.0	nd	nd	nd	nd	5,200
Methyl tert-butyl Ether	2.0	nd	nd	nd	nd	15
Methylene Chloride	5.0	nd	nd	nd	nd	26
Styrene	0.5	nd	nd	nd	nd	43
1,1,1,2-Tetrachloroethane	0.5	nd	nd	nd	nd	1.1
1,1,2,2-Tetrachloroethane	0.5	nd	nd	nd	nd	0.5
Tetrachloroethylene	0.5	nd	nd	nd	nd	0.5
Toluene	0.5	nd	nd	nd	nd	320
1,1,1-Trichloroethane	0.5	nd	nd	1.2	1.2	23
1,1,2-Trichloroethane	0.5	nd	nd	nd	nd	0.5
Trichloroethylene	0.5	nd	nd	nd	nd	0.5
Trichlorofluoromethane	1.0	nd	nd	nd	nd	2,000
Vinyl Chloride	0.5	nd	nd	nd	nd	0.5
Xylenes	0.5	nd	nd	nd	nd	72

Notes:
- MDL – Method Detection Limit nd – not detected above the MDL
- N/V – no value provided by the MOE
- **Bold** – Value exceeds applicable MOE Standard

The concentrations of cis-1,2-Dichloroethylene in the groundwater samples from MW2 (MW2-GW2 and Duplicate 1) exceeded the MOE Table 7 standards. All other parameter concentrations were in compliance with Table 7 standards.

It is our interpretation that the analyzed parameter concentrations do not indicate the potential presence of light non-aqueous phase liquids (LNAPLs) or dense non-aqueous phase liquids (DNAPLs). No free phase hydrocarbons were noted in the wells sampled at the time of sampling.

The maximum final concentrations of analyzed parameters in the groundwater at the site are summarized below in Table 10.

Table 10: Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/L)	Borehole	Depth Interval (m BGS)
Chloroform	1.7	BH2-GW2	5.79 - 9.63; limestone bedrock
1,1-Dichloroethane	4.2	MW2-GW2	18.85 - 22.50; limestone bedrock
cis-1,2-Dichloroethylene	**4.5**	MW2-GW2	18.85 - 22.50; limestone bedrock
1,1,1-Trichloroethane	1.2	MW2-GW2	18.85 - 22.50; limestone bedrock

Notes:
- **Bold** – Value exceeds MOE Table 7 standards

5.7 Quality Assurance and Quality Control Results

As per the Sampling and Analysis Plan, a duplicate groundwater sample was obtained at MW2 during the second sampling event and analyzed for VOCs. The relative percent difference (RPD) calculations for the original and duplicate sample are provided below.

Table 11: QA/QC Calculations – Groundwater

Parameter	MDL (µg/L)	MW2-GW2	Duplicate 1	RPD (%)	QA/QC Result
1,1-Dichloroethane	0.5	4.2	4.1	2.4%	Meets Target
cis-1,2-Dichloroethylene	0.5	4.5	4.4	2.2%	Meets Target
1,1,1-Trichloroethane	0.5	1.2	1.2	0.0%	Meets Target

Notes:
* All other parameter concentrations were below laboratory detection limits for both MW2-GW2 and Duplicate 1, and as such, are within acceptable QA/QC parameters.

All calculated RPD values meet the target value of 20%.

All samples submitted as part of the 2013 sampling event were handled in accordance with the Analytical Protocol with respect to holding time, preservation method, storage requirement, and container type.

As per Subsection 47(3) of O.Reg. 153/04 as amended by O.Reg. 269/11, a Certificate of Analysis has been received for each sample submitted for analysis during the 2013 sampling event, and all Certificates of Analysis are appended to this report.

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

5.8 Phase II Conceptual Site Model

The following section has been prepared in accordance with the requirements of O.Reg. 269/11 amending O.Reg. 153/04 - Record of Site Condition regulation, made under the Environmental Protection Act. Conclusions and recommendations are discussed in a subsequent section.

Site Description

Potentially Contaminating Activity and Areas of Potential Environmental Concern

Potentially Contaminating Activities and Areas of Potential Environmental Concern identified include the historical use of the subject site as an outboard motor shop, the presence of the ASTs containing fuel oil, the historical presence of the contractor's yard and printing businesses to the south of the subject site, and the presence of the garage to the north at 1518 Scott Street. Additional Potentially Contaminating Activities were identified within the Phase I study area but were not considered to represent Areas of Potential Environmental Concern.

BTEX and PHCs in soil and PHCs and VOCs in groundwater are identified as the Contaminants of Concern with respect to the subject site potentially resulting from these AoPECs.

Subsurface Structures and Utilities

Underground service locates were completed prior to the subsurface investigation. Underground services are primarily located along Parkdale Avenue and Bullman Street. In general, trench backfill (generally sand and gravel) may provide a preferential pathway for contaminant transport. The groundwater table at the subject site was encountered below anticipated service trench depth, and although a localized perched condition may exist within service trench backfill, service trenches are not considered to significantly affect contaminant transport at the subject site.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on Drawing PE2967-5 - Cross-Section A-A'. Stratigraphy consists of:

- Fill, consisting of silty sand and gravel, varying in thickness from 0.15 to 1.6 m. Groundwater was not observed in this stratigraphic unit. The fill material was observed to extend to bedrock at BH3, BH4, and BH5.
- An intermittent layer of glacial till, not observed in BH3, BH4, and BH5. The glacial till material consists of a silty sand matrix with clay, gravel and cobbles. This layer varied in thickness from 1.3 to 1.4 m. Groundwater was not observed in this stratigraphic unit.
- Limestone bedrock of the Bobcaygeon Formation, encountered at depths ranging from 0.9 to 1.6 m. Groundwater was encountered in the bedrock unit, and the monitoring wells at BH1, BH2, and Stantec's MW1 and MW2 were screened in the bedrock unit. The upper fractured bedrock is considered to function as an aquifer at the subject site. This is the deepest unit investigated.

Hydrogeological Characteristics

Groundwater was encountered in bedrock unit at the subject site. This unit is interpreted to function as a local unconfined aquifer at the subject site.

Water levels were measured at the subject site in June and July, 2013. Water levels are summarized above in Section 6.2 of this report and are shown on Drawing PE2967-4 and PE2967-5.

Based on the groundwater elevations from the June and July 2013 monitoring events, groundwater contour mapping was completed and the horizontal hydraulic gradient for the subject site was calculated. Groundwater flow at the subject site was in a southeasterly direction. A hydraulic gradient of approximately 0.07 m/m was calculated.

Approximate Depth to Bedrock

Bedrock surface or practical refusal to augering (potential bedrock surface) were encountered at depths ranging from 0.9 to 1.6 m below ground surface.

Approximate Depth to Water Table

Depth to water table at the subject site varies between approximately 4.1 and 8.4 m below existing grade.

Sections 41 and 43.1 of the Regulation

Section 41 of the Regulation (Site Condition Standards, Environmentally Sensitive Areas) does not apply to the subject site.

Section 43.1 of the Regulation applies to the subject site in that the subject site is a Shallow Soil Property. The subject site is not within 30 m of a water body.

Fill Placement

Fill material was identified at the subject site. This fill material did not exhibit any visual or olfactory evidence of contamination. This fill material was likely placed at the time of site development. Analytical test results indicate that the fill material is in compliance with MOE Table 7 standards.

Proposed Buildings and Other Structures

It is our understanding that the site is to be redeveloped at a later date with a residential development. No further information is available regarding the proposed redevelopment.

Existing Buildings and Structures

The subject site is currently occupied with seven (7) residential / commercial buildings and two (2) outbuildings (garages). The residential / commercial buildings generally have full or partial basements and are founded on stone, concrete block, or poured concrete foundations. The garages are slab-on-grade.

Water Bodies

No creeks, rivers, streams, lakes or any other water body was identified on the subject site. The Ottawa River is the closest significant water body and is present approximately 700 m north of the site.

Areas of Natural Significance

No areas of natural significance are present on the subject site.

Environmental Condition

Areas Where Contaminants are Present

Based on screening and analytical results, the area where contaminants are present in concentrations greater than the MOE Table 7 standards are shown on Drawing PE2967-3 and PE2967-5.

Types of Contaminants

Based on the Areas of Potential Environmental Concern identified as part of the Phase I ESA and analytical testing, contaminants found at concentrations greater than the MOE Table 7 standards at the subject site consist of VOCs (cis-1,2-Dichloroethylene) in groundwater.

Contaminated Media

Based on the results of the Phase II ESA, the contaminants of concern are present in the groundwater at the subject site. Analytical testing indicates that the subject site soil meets the selected MOE standards.

What Is Known About Areas Where Contaminants Are Present

The area of impacted groundwater exceeding Table 7 standards discussed in the previous sections is interpreted to be centered around Stantec's MW2 in the southeast portion of the subject site.

Distribution of Contaminants

The horizontal distribution of contaminants is considered to be centered around the southeastern portion of the site in the vicinity of MW2. All other monitoring wells had final analytical results which were in compliance with the selected MOE standards. Vertically, the contaminants were observed at the screened interval of MW2 (18.85 to 22.50 m below existing grade).

Discharge of Contaminants

It is our interpretation that the presence of contaminants in the vicinity of MW2 is the result of off-site activities to the south, potentially associated with one or more of the Potentially Contaminating Activities identified in the Phase I ESA. The exact location and mechanism of the discharge of these contaminants is not currently known.

Migration of Contaminants

The migration of contaminants within the site groundwater is considered to be controlled by the hydraulic gradient within the bedrock aquifer. Given the observed hydraulic gradient, contaminants are interpreted to be migrating in a southeasterly direction.

Climatic and Meteorological Conditions

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

Concentrations of CoCs in soil were in compliance with the selected MOE Table 7 standards, and as such, leaching is not considered to affect contaminant transport at the subject site. Based on the results of the subsurface investigation, contaminants are present in the groundwater at the subject site in concentrations marginally exceeding the Table 7 standards. In particular, fluctuation of groundwater levels and groundwater movement may affect contaminant transport at the subject site.

Potential for Vapour Intrusion

The potential for vapour intrusion into the current site building is considered to be negligible, given the marginal exceedences of VOC parameters and the relatively low groundwater table (approximately 8 m below existing grade in MW2). It is our understanding that if the site is to be redeveloped, any impacted soils and groundwater encountered during redevelopment will be removed, and as such the potential for vapour intrusion upon site redevelopment is considered to be negligible.

6.0 CONCLUSIONS

Assessment

A Phase II ESA was conducted for the properties at 266, 268, 272, and 274 Parkdale Avenue and 9, 11, and 13 Bullman Street, Ottawa, Ontario. The purpose of the Phase II ESA was to address the areas of potential environmental concern identified during the Phase I ESA, in particular the historical presence of an outboard motor repair business on the subject site, the presence of two ASTs containing fuel oil on the subject site, and the presence of a former garage to the north of the site. The subsurface investigation at the subject site consisted of the drilling of five (5) boreholes and the installation of two (2) bedrock monitoring wells. An additional two (2) bedrock monitoring wells from a previous geotechnical investigation by Stantec were also present on-site.

Soil samples were obtained from the boreholes and screened using visual observations and organic vapour measurements. A total of two (2) soil samples were submitted for laboratory analysis of BTEX and PHCs. All soil samples were in compliance with the selected MOE Table 7 standards.

Groundwater samples were obtained from the monitoring wells at BH1, BH2, MW1, and MW2 and analyzed for VOCs and PHCs. Concentrations of cis-1,2-Dichloroethylene exceeded the MOE Table 7 standards at MW2. All other final parameter concentrations were in compliance with the MOE Table 7 standards.

Recommendations

Based on the above results, groundwater beneath the subject property in the vicinity of MW2 marginally exceeds the applicable Table 7 standards for cis-1,2-Dichloroethylene. It is our understanding that the subject site is to be redeveloped with residential condominiums several years from now. It is our recommendation that all monitoring wells on-site be re-sampled prior to site redevelopment to confirm groundwater quality.

7.0 STATEMENT OF LIMITATIONS

This Phase II - Environmental Site Assessment report has been prepared in general accordance with the agreed scope-of-work, in compliance with O.Reg. 153/04 as amended by O.Reg. 269/11, and meets the requirements of CSA Z769-00. The conclusions presented herein are based on information gathered from a limited sampling and testing program. The test results represent conditions at specific test locations at the time of the field program.

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

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

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

Paterson Group Inc.

Daniel J. Arnott, P.Eng.

Mark S. D'Arcy, P.Eng.

Report Distribution:

- Richcraft Group of Companies (6 copies)
- Paterson Group (1 copy)

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE2967-3 – TEST HOLE LOCATION PLAN

DRAWING PE2967-4 - GROUNDWATER CONTOUR PLAN

DRAWING PE2967-5 - CROSS-SECTION A-A'

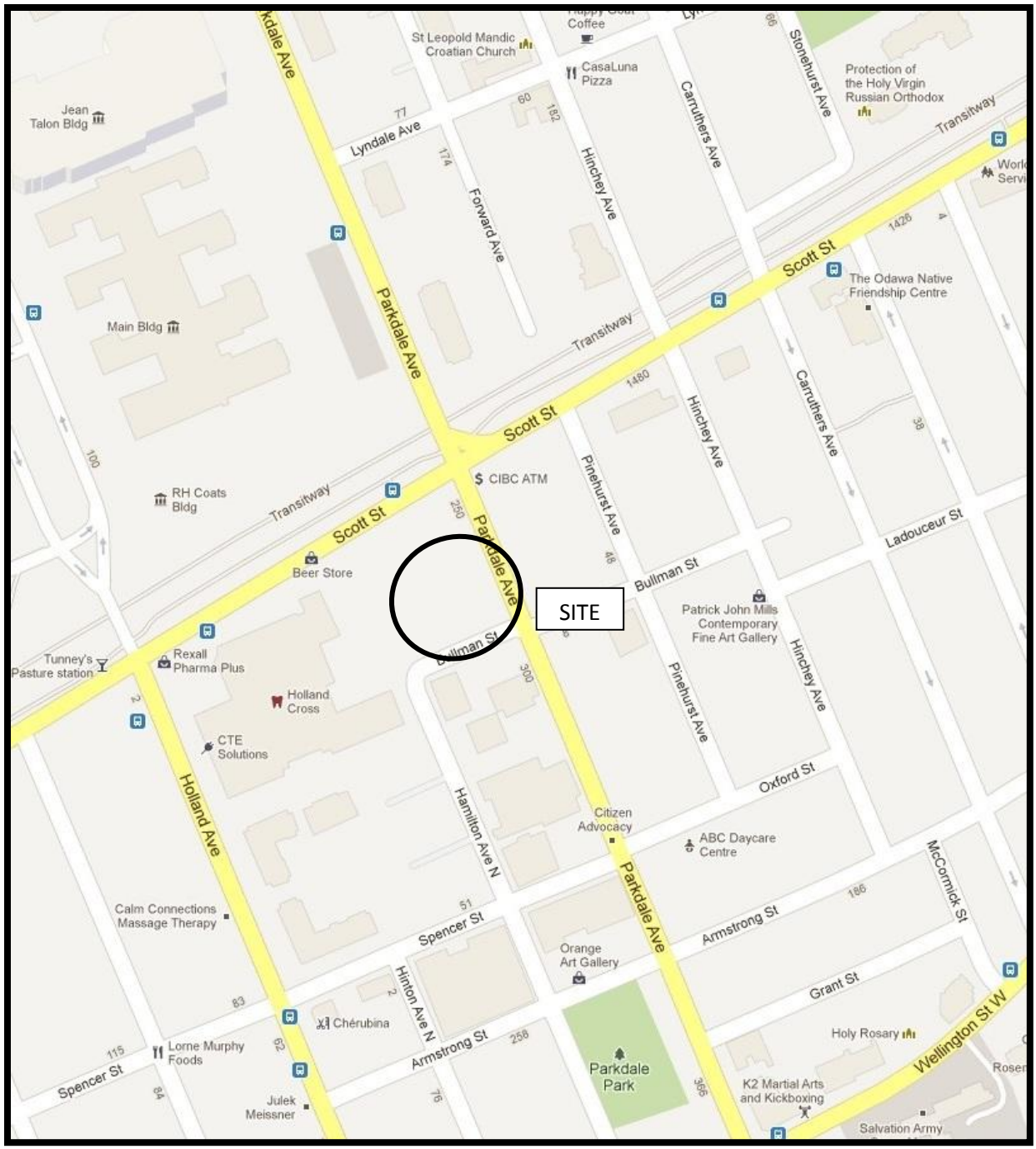
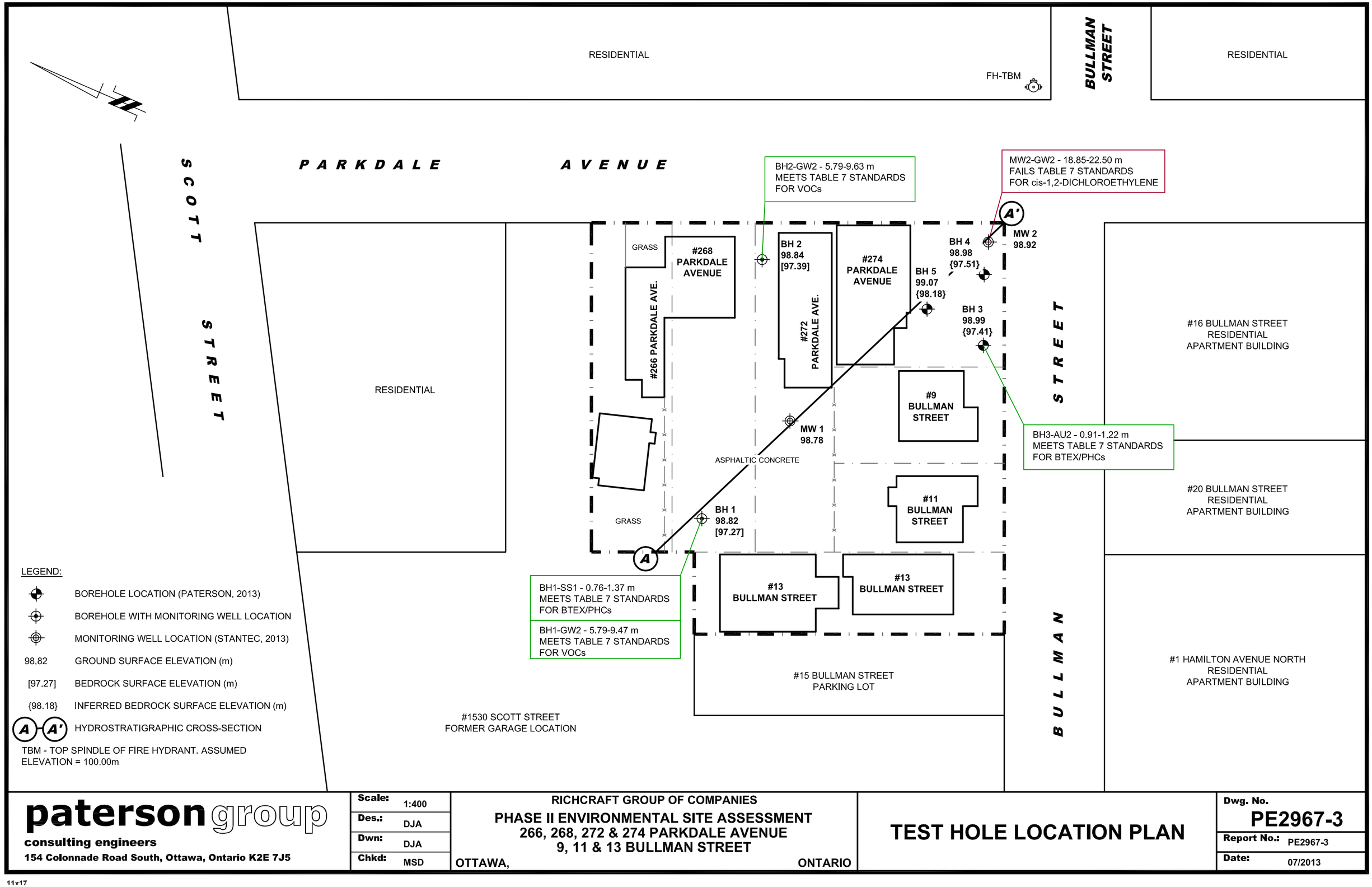


FIGURE 1

KEY PLAN



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Scale:	1:400
Des.:	DJA
Dwn:	DJA
Chkd:	MSD

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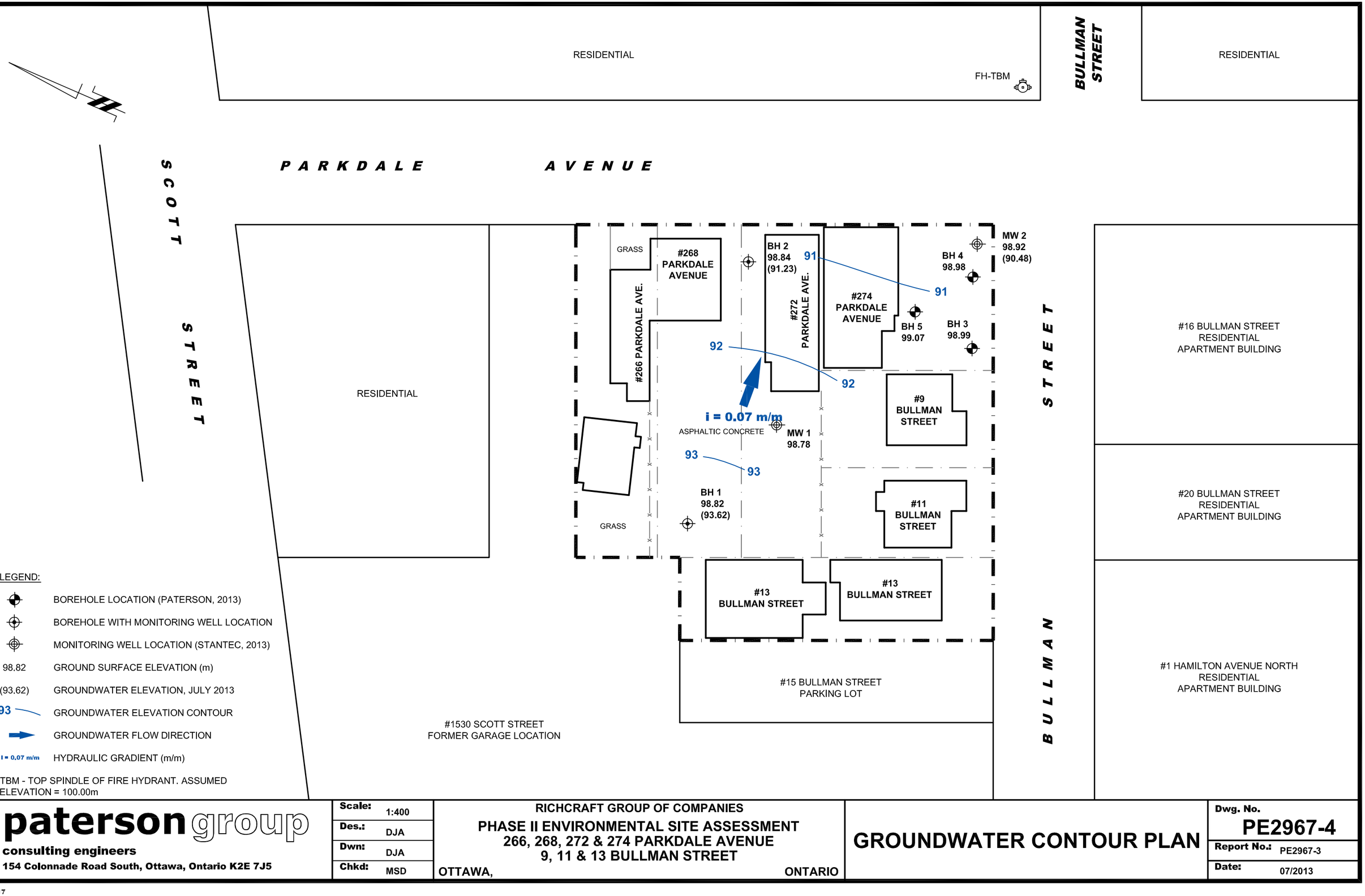
PHASE II ENVIRONMENTAL SITE ASSESSMENT
266, 268, 272 & 274 PARKDALE AVENUE
9, 11 & 13 BULLMAN STREET
OTTAWA, ONTARIO

TEST HOLE LOCATION PLAN

Dwg. No. PE2967-3
Report No.: PE2967-3
Date: 07/2013

11x17



LEGEND:

- BOREHOLE LOCATION (PATERSON, 2013)
- BOREHOLE WITH MONITORING WELL LOCATION
- MONITORING WELL LOCATION (STANTEC, 2013)
- 98.82 GROUND SURFACE ELEVATION (m)
- (93.62) GROUNDWATER ELEVATION, JULY 2013
- 93 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- I = 0.07 m/m HYDRAULIC GRADIENT (m/m)

TBM - TOP SPINDLE OF FIRE HYDRANT. ASSUMED ELEVATION = 100.00m

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Chkd:	MSD

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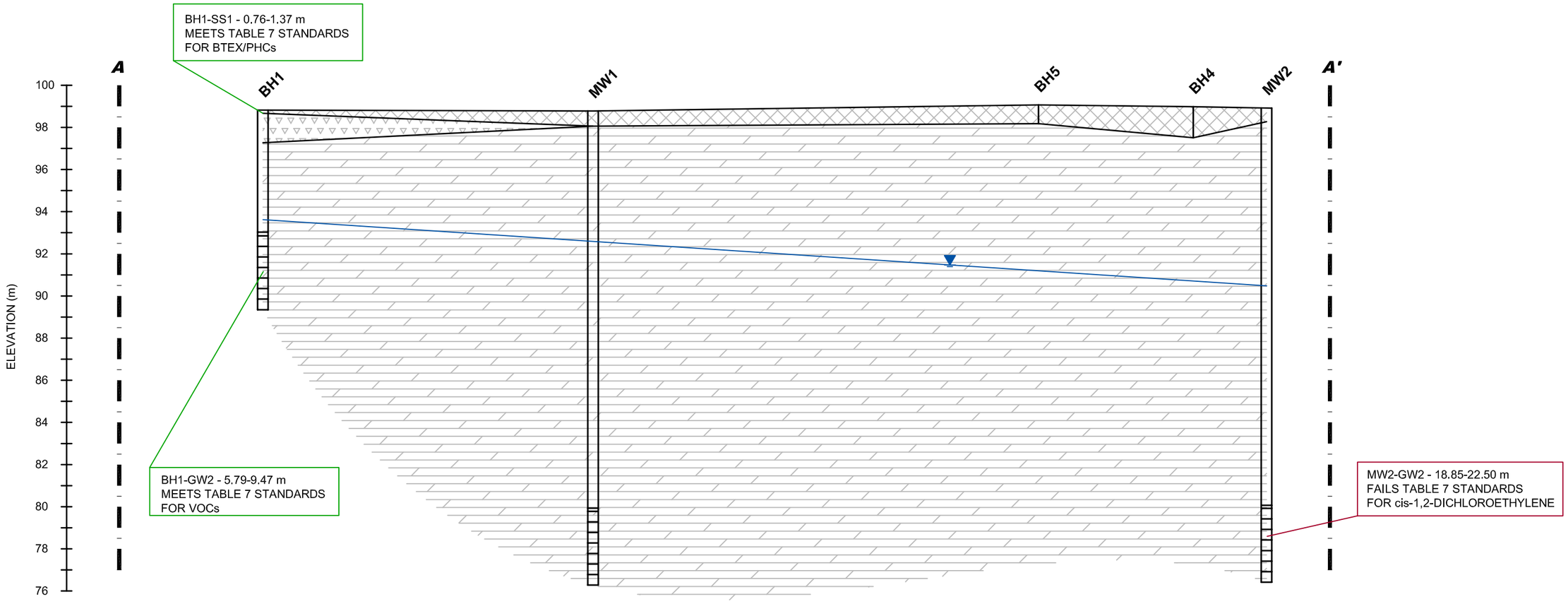
OTTAWA, ONTARIO

GROUNDWATER CONTOUR PLAN

Dwg. No. **PE2967-4**
Report No.: PE2967-3
Date: 07/2013

11x17



LEGEND

- FILL: SILTY SAND AND GRAVEL
- GLACIAL TILL: SILTY SAND MATRIX WITH CLAY, GRAVEL, COBBLES
- LIMESTONE BEDROCK
- GROUNDWATER LEVEL, JULY 2013

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Scale:	1:200
Des.:	DJA
Dwn:	DJA
Chkd:	MSD

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9, 11, & 13 BULLMAN STREET
OTTAWA, ONTARIO

CROSS-SECTION A-A'

Dwg. No. PE2967-5
Report No.: PE2967-3
Date: 07/2013

11x17

APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

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Sampling & Analysis Plan

Phase II Environmental Site Assessment
266, 268, 272, and 274 Parkdale Avenue,
9, 11, and 13 Bullman Street,
Ottawa, Ontario

Prepared For

Richcraft Group of Companies

June 2013

Report: PE2967-SAP

Table of Contents

1.0 SAMPLING PROGRAM

Paterson Group Inc. (Paterson) was commissioned by Richcraft Group of Companies to conduct a Phase II Environmental Site Assessment (ESA) for the properties located at 266, 268, 272, and 274 Parkdale Avenue and 9, 11, and 13 Bullman Street, Ottawa, Ontario. Based on the results of a Phase I ESA completed by Paterson for the subject property, the following subsurface investigation program was developed:

Borehole	Location & Rationale	Proposed Depth & Rationale
BH1	General coverage of subject site.	Drilled to intercept water table.
BH2	Located to address garage to north; general coverage of subject site.	Drilled to intercept water table.
BH3	General coverage of subject site.	Terminated at practical refusal to augering on inferred bedrock surface.
BH4	General coverage of subject site.	Terminated at practical refusal to augering on inferred bedrock surface.
BH5	General coverage of subject site.	Terminated at practical refusal to augering on inferred bedrock surface.

Borehole locations are shown on the Test Hole Location Plan appended to the main report.

At each borehole, split spoon samples of overburden soils will be obtained at 0.76 m (2'6") intervals until practical refusal to split spoon sampling. All soil samples will be retained, and samples will be selected for submission following a preliminary screening analysis. Following practical refusal to augering, BH1 and BH2 will be advanced into bedrock using a diamond coring system in order to install monitoring wells.

Following borehole drilling, monitoring wells will be installed in selected boreholes (as above) for the measurement of water levels and the collection of groundwater samples.

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure (Direct-Push)

Purpose

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

Equipment

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

- Glass soil sample jars
- latex or nitrile gloves (depending on suspected contaminant)
- RKI Eagle organic vapour meter or MiniRae photoionization detector (depending on contamination suspected)

Determining Borehole Locations

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

After drilling is completed a plan with the borehole locations must be provided. Distances and orientations of boreholes with respect to site features (buildings, roadways, etc.) must be provided. Distances should be measured using a measuring tape or wheel rather than paced off. Ground surface elevations at each borehole should be surveyed relative to a geodetic benchmark, if one is available, or a temporary site benchmark which can be tied in at a later date if necessary.

Drilling Procedure

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

- Continuous split spoon samples (every 0.6 m or 2') or semi-continuous (every 0.76 m or 2'6") are required.
- If two or more stratigraphic units are present within a 1.2 m sampling run, these units should be measured, segregated, and retained in separate bags.
- If a single stratigraphic unit is present within a 1.2 m sampling run, the sampling run should be split into two 0.6 m sections and retained in separate bags to provide more accurate vertical resolution when delineating potential contamination.
- Make sure samples are well sealed in plastic bags with no holes prior to screening and are kept cool but unfrozen.
- If sampling for VOCs, BTEX, or PHCs F1, a soil core from each soil sample which may be analyzed must be taken and placed in the laboratory-provided methanol vial.
- Note all and any odours or discolouration of samples.
- If obvious contamination is encountered, continue sampling until vertical extent of contamination is delineated.
- As a general rule, environmental boreholes should be deep enough to intercept the groundwater table (unless this is impossible/impractical - call project manager to discuss).
- If at all possible, soil samples should be submitted to a preliminary screening procedure on site, either using a RKI Eagle, PID, visual observations, etc. depending on type of suspected contamination.

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

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

3.2 Monitoring Well Installation Procedure

Equipment

- 5' x 2" threaded sections of Schedule 40 PVC slotted well screen (5' x 1 ¼" if installing in cored hole in bedrock or using direct-push rig)
- 5' x 2" threaded sections of Schedule 40 PVC riser pipe (5' x 1 ¼" if installing in cored hole in bedrock or using direct-push rig)
- Threaded end-cap
- Slip-cap or J-plug
- Asphalt cold patch or concrete
- Silica Sand
- Bentonite chips (Holeplug)
- Steel flushmount casing

Procedure

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

- Backfill remainder of borehole with holeplug or with auger cuttings (if contamination is not suspected).
- Install flushmount casing. Seal space between flushmount and borehole annulus with concrete, cold patch, or holeplug to match surrounding ground surface.

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

- Locate well and use socket wrench or Allan key to open metal flush mount protector cap. Remove plastic well cap.
- Measure water level, with respect to existing ground surface, using water level meter or interface probe. If using interface probe on suspected NAPL site, measure the thickness of free product.
- Measure total depth of well.
- Clean water level tape or interface probe using methanol and water. Change gloves between wells.
- Calculate volume of standing water within well and record.
- Insert polyethylene tubing into well and attach to peristaltic pump. Turn on peristaltic pump and purge into graduated bucket. Purge at least three well volumes of water from the well. Measure and record field chemistry. Continue to purge, measuring field chemistry after every well volume purged, until appearance or field chemistry stabilizes.

- Note appearance of purge water, including colour, opacity (clear, cloudy, silty), sheen, presence of LNAPL, and odour. Note any other unusual features (particulate matter, effervescence (bubbling) of dissolved gas, etc.).
- Fill required sample bottles. If sampling for metals, attach 75-micron filter to discharge tube and filter metals sample. If sampling for VOCs, use low flow rate to ensure continuous stream of non-turbulent flow into sample bottles. Ensure no headspace is present in VOC vials.
- Replace well cap and flushmount casing cap.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

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

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

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SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment
266, 268, 272, 274 Parkdale Ave.; 9, 11, 13 Bullman St.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of Bullman Street and Parkdale Avenue. Assumed elevation = 100.00m.

FILE NO. PE2967

REMARKS

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger **DATE** June 10, 2013

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	98.82
FILL: Gravel							
0.15							
GLACIAL TILL: Brown silty sand with clay, gravel and cobbles		SS	1	100	50+	1	97.82
1.55							
		RC	1	95	42	2	96.82
		RC	2	100	92	3	95.82
		RC	3	100	62	4	94.82
BEDROCK: Grey limestone with shale partings						5	93.82
		RC	4	97	65	6	92.82
		RC	5	100	98	7	91.82
		RC	6	88	84	8	90.82
9.47						9	89.82
End of Borehole							
(GWL @ 5.20m-July 2, 2013)							
Sample SS1 analyzed for BTEX and PHC							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment
266, 268, 272, 274 Parkdale Ave.; 9, 11, 13 Bullman St.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of Bullman Street and Parkdale Avenue. Assumed elevation = 100.00m.

FILE NO. PE2967

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** June 10, 2013

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	98.84
FILL: Gravel							
0.20							
GLACIAL TILL: Brown silty sand with gravel, and cobbles		SS	1	36	48	1	97.84
1.45							
		RC	1	100	93	2	96.84
		RC	2	100	98	3	95.84
						4	94.84
BEDROCK: Grey limestone, occasional mud seams		RC	3	100	32	5	93.84
						6	92.84
		RC	4	95	73	7	91.84
		RC	5	100	85	8	90.84
		RC	6	100	92	9	89.84
9.62							
End of Borehole							
(GWL @ 7.61m-July 2, 2013)							

Photo Ionization Detector

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment
266, 268, 272, 274 Parkdale Ave.; 9, 11, 13 Bullman St.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of Bullman Street and Parkdale Avenue. Assumed elevation = 100.00m.

FILE NO. PE2967

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** June 10, 2013

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	98.99		
75mm Asphaltic concrete over crushed stone 0.25									
FILL: Brown silty sand with gravel, cobbles and boulders		SS AU	1 2	50	50+	1	97.99		
1.58									
End of Borehole									
Practical refusal to augering at 1.58m depth									
Sample AU2 analyzed for BTEX, PHC									

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

100, 200, 300, 400, 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment
266, 268, 272, 274 Parkdale Ave.; 9, 11, 13 Bullman St.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of Bullman Street and Parkdale Avenue. Assumed elevation = 100.00m.

FILE NO. PE2967

REMARKS

HOLE NO. BH 4

BORINGS BY CME 55 Power Auger **DATE** June 10, 2013

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	98.98		
100mm Asphaltic concrete over crushed stone 0.30									
FILL: Brown silty sand with gravel and cobbles		SS AU	1 2		50+	1	97.98		
1.47									
End of Borehole									
Practical refusal to augering at 1.47m depth									

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

20 40 60 80

100 200 300 400 500

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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SOIL PROFILE AND TEST DATA

Phase II Environmental Site Assessment
266, 268, 272, 274 Parkdale Ave.; 9, 11, 13 Bullman St.
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located at the northeast corner of Bullman Street and Parkdale Avenue. Assumed elevation = 100.00m.

FILE NO. PE2967

REMARKS

HOLE NO. BH 5

BORINGS BY CME 55 Power Auger **DATE** June 10, 2013

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	99.07		
50mm Asphaltic concrete over brown silty sand with gravel		AU	1						
0.89		SS	2	0	50+				
End of Borehole									
Practical refusal to augering at 0.89m depth									

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

SYMBOLS AND TERMS

SOIL DESCRIPTION

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

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

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

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

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

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

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

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

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

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

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

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

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

CONSOLIDATION TEST

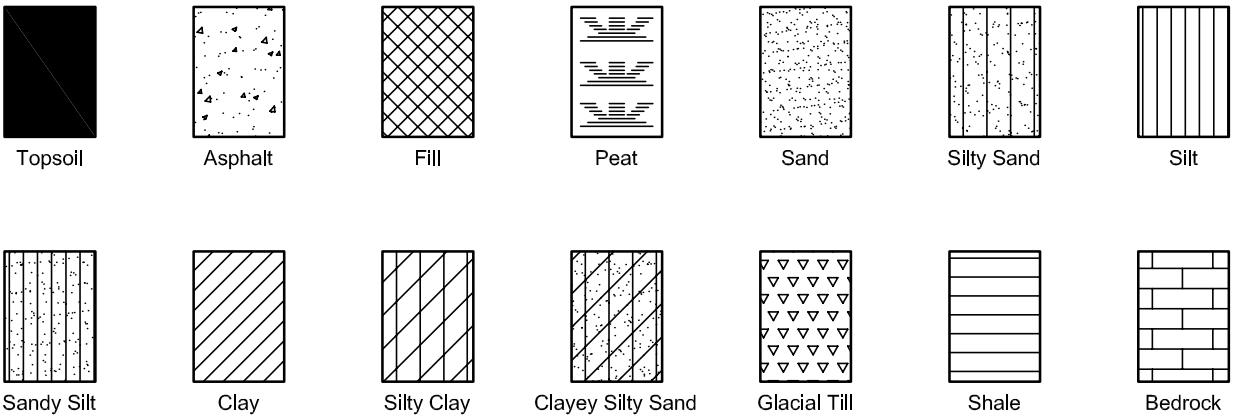
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

PERMEABILITY TEST

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

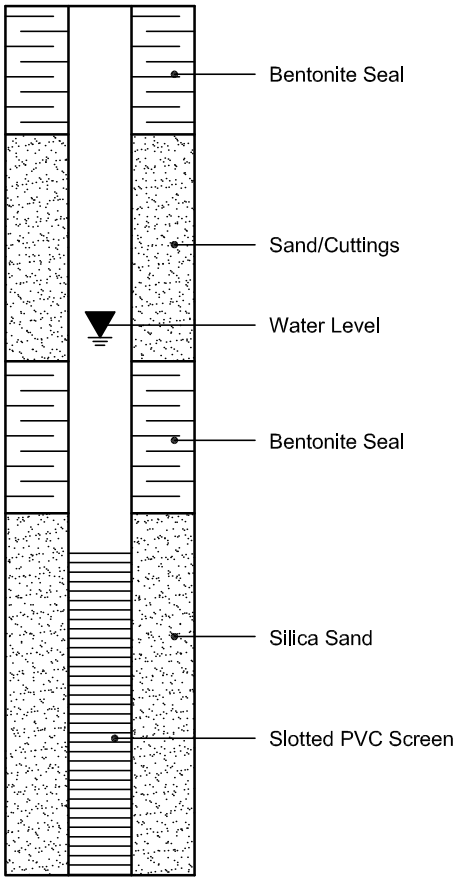
SYMBOLS AND TERMS (continued)

STRATA PLOT

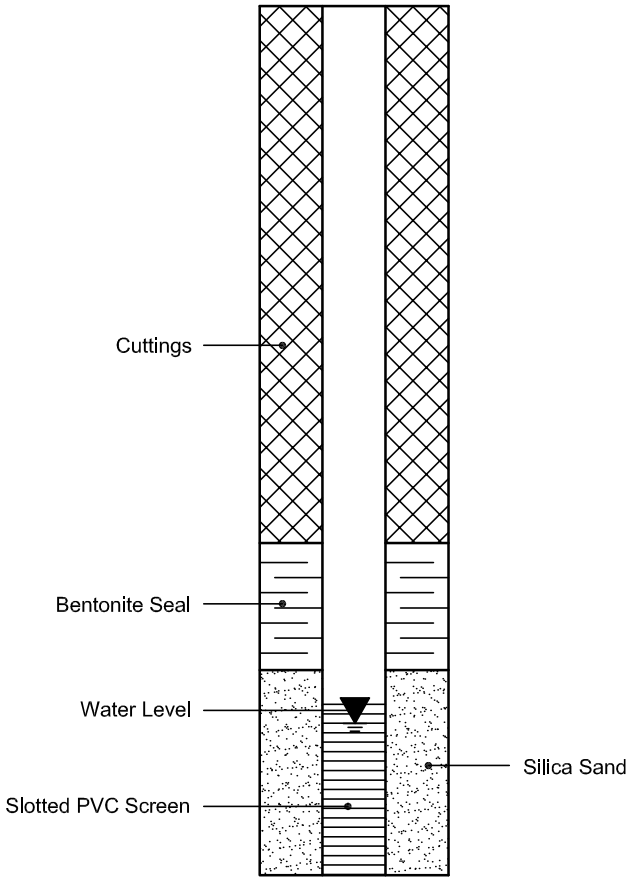


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers
154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Eric Leveque

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 13867
Project: PE2967
Custody: 97688

Report Date: 17-Jun-2013
Order Date: 11-Jun-2013
Order #: 1324097

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

Paracel ID	Client ID
1324097-01	BH1-SS1
1324097-02	BH3-AU2

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 17-Jun-2013
Order Date:11-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 13867 Project Description: PE2967

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	12-Jun-13	14-Jun-13
PHC F1	CWS Tier 1 - P&T GC-FID	12-Jun-13	14-Jun-13
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	12-Jun-13	13-Jun-13
Solids, %	Gravimetric, calculation	12-Jun-13	12-Jun-13

Certificate of Analysis

Report Date: 17-Jun-2013
Order Date:11-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 13867

Project Description: PE2967

	Client ID:	BH1-SS1	BH3-AU2	-	-
	Sample Date:	10-Jun-13	10-Jun-13	-	-
	Sample ID:	1324097-01	1324097-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	94.8	90.4	-	-
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	101%	102%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	170	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	243	-	-

Certificate of Analysis

Report Date: 17-Jun-2013
Order Date:11-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 13867 Project Description: PE2967

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.34*		*ug/g*		*104*	*50-140*			

Certificate of Analysis

Report Date: 17-Jun-2013
Order Date:11-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 13867 Project Description: PE2967

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	20	7	ug/g dry	19			4.6	40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Physical Characteristics									
% Solids	89.3	0.1	% by Wt.	91.8			2.7	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*6.51*		*ug/g dry*	*ND*	*95.2*	*50-140*			

Certificate of Analysis

Report Date: 17-Jun-2013
Order Date:11-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 13867 Project Description: PE2967

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	183	7	ug/g	ND	91.7	80-120			
F2 PHCs (C10-C16)	59	4	ug/g	ND	62.2	60-140			
F3 PHCs (C16-C34)	214	8	ug/g	ND	109	60-140			
F4 PHCs (C34-C50)	113	6	ug/g	ND	85.5	60-140			
Volatiles									
Benzene	4.11	0.02	ug/g	ND	103	60-130			
Ethylbenzene	3.90	0.05	ug/g	ND	97.6	60-130			
Toluene	3.94	0.05	ug/g	ND	98.5	60-130			
m,p-Xylenes	8.30	0.05	ug/g	ND	104	60-130			
o-Xylene	3.92	0.05	ug/g	ND	98.0	60-130			
Surrogate: Toluene-d8	*7.57*		*ug/g*		*94.6*	*50-140*			

Certificate of Analysis

Report Date: 17-Jun-2013
Order Date:11-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 13867 Project Description: PE2967

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

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Nº 97688

Page __ of __

Client Name: Paterson Group	Project Reference: PE2967	TAT: [X] Regular [ ] 3 Day
Contact Name: ERIC LEVÉQUE	Quote #	[ ] 2 Day [ ] 1 Day
Address: 154 Colonnade Rd.	PO # 13867	Date Required:
Telephone: 613-226-7381	Email Address: elevequ@patersongroup.ca.	

Criteria: [ ] O. Reg. 153/04 Table __ [X] O. Reg. 153/11 (Current) Table 2 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality:_____ [ ] Other:_____

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

Required Analyses

Paracel Order Number: 1324097

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP/MS	Hg	CrVI	B (HWS)							
1	BH1-SS1	S		2	June 10/13	9am	X											120mL+1VIAL		
2	BH3-AU2	S		2	"	10AM	X											↓		
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: Pick up

Relinquished By (Print & Sign):	Received by Driver/Depot: J Dcouse	Received at Lab: SUNEEPORN	Verified By: MC
	Date/Time: 11/06/13 4:14PM	Date/Time: JUN 11 2013 09:47	Date/Time: June 11/13 5:04
Date/Time:	Temperature: __ °C	Temperature: 18.9 °C	pH Verified [ ] By: N/A

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www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers
154 Colonnade Road South
Nepean, ON K2E 7J5
Attn: Eric Leveque

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 14518
Project: PE2967
Custody: 8197

Report Date: 20-Jun-2013
Order Date: 18-Jun-2013
Order #: 1325076

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

Paracel ID	Client ID
1325076-01	BH1-GW1
1325076-02	BH2-GW1
1325076-03	MW2-GW1

Approved By: Mark Foto

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518 Project Description: PE2967

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PHC F1	CWS Tier 1 - P&T GC-FID	18-Jun-13	19-Jun-13
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	18-Jun-13	19-Jun-13
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	18-Jun-13	19-Jun-13

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518

Project Description: PE2967

	Client ID:	BH1-GW1	BH2-GW1	MW2-GW1	-
	Sample Date:	17-Jun-13	17-Jun-13	17-Jun-13	-
	Sample ID:	1325076-01	1325076-02	1325076-03	-
	MDL/Units	Water	Water	Water	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	2.1	1.3	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Chloroform	0.5 ug/L	4.6	13.0	1.4	-
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	<0.2	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	5.8	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	7.6	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	7.6	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518

Project Description: PE2967

	Client ID:	BH1-GW1	BH2-GW1	MW2-GW1	-
	Sample Date:	17-Jun-13	17-Jun-13	17-Jun-13	-
	Sample ID:	1325076-01	1325076-02	1325076-03	-
	MDL/Units	Water	Water	Water	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	1.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
4-Bromofluorobenzene	Surrogate	118%	113%	116%	-
Dibromofluoromethane	Surrogate	117%	120%	119%	-
Toluene-d8	Surrogate	99.7%	100%	96.9%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518 Project Description: PE2967

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	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-Dichloroethylene, total	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						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	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						
1,2,4-Trichlorobenzene	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						
1,3,5-Trimethylbenzene	ND	0.5	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	*37.8*		*ug/L*		*118*	*50-140*			
Surrogate: Dibromofluoromethane	*33.7*		*ug/L*		*105*	*50-140*			
Surrogate: Toluene-d8	*33.9*		*ug/L*		*106*	*50-140*			

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518 Project Description: PE2967

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	1.89	0.5	ug/L	1.88			0.5	30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	1.70	0.5	ug/L	1.66			2.4	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	3.50	1.0	ug/L	3.89			10.6	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	ND	0.5	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*37.3*		*ug/L*	*ND*	*117*	*50-140*			
Surrogate: Dibromofluoromethane	*35.9*		*ug/L*	*ND*	*112*	*50-140*			
Surrogate: Toluene-d8	*33.6*		*ug/L*	*ND*	*105*	*50-140*			

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518 Project Description: PE2967

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	2040	25	ug/L	ND	102	68-117			
F2 PHCs (C10-C16)	1920	100	ug/L	ND	107	60-140			
F3 PHCs (C16-C34)	3970	100	ug/L	ND	107	60-140			
F4 PHCs (C34-C50)	2630	100	ug/L	ND	106	60-140			
Volatiles									
Acetone	95.1	5.0	ug/L	ND	95.1	50-140			
Benzene	38.5	0.5	ug/L	ND	96.2	50-140			
Bromodichloromethane	41.4	0.5	ug/L	2.09	98.2	50-140			
Bromoform	29.3	0.5	ug/L	ND	73.2	50-140			
Bromomethane	38.2	0.5	ug/L	ND	95.6	50-140			
Carbon Tetrachloride	38.9	0.2	ug/L	ND	97.2	50-140			
Chlorobenzene	33.3	0.5	ug/L	ND	83.2	50-140			
Chloroethane	40.0	1.0	ug/L	ND	100	50-140			
Chloroform	52.3	0.5	ug/L	13.0	98.1	50-140			
Chloromethane	42.1	3.0	ug/L	ND	105	50-140			
Dibromochloromethane	30.8	0.5	ug/L	ND	76.9	50-140			
Dichlorodifluoromethane	37.7	1.0	ug/L	ND	94.3	50-140			
1,2-Dibromoethane	30.1	0.2	ug/L	ND	75.4	50-140			
1,2-Dichlorobenzene	28.3	0.5	ug/L	ND	70.7	50-140			
1,3-Dichlorobenzene	28.6	0.5	ug/L	ND	71.4	50-140			
1,4-Dichlorobenzene	26.4	0.5	ug/L	ND	66.0	50-140			
1,1-Dichloroethane	39.1	0.5	ug/L	ND	97.7	50-140			
1,2-Dichloroethane	38.9	0.5	ug/L	ND	97.2	50-140			
1,1-Dichloroethylene	44.4	0.5	ug/L	ND	111	50-140			
cis-1,2-Dichloroethylene	36.7	0.5	ug/L	ND	91.8	50-140			
trans-1,2-Dichloroethylene	38.8	0.5	ug/L	ND	97.1	50-140			
1,2-Dichloropropane	39.0	0.5	ug/L	ND	97.6	50-140			
cis-1,3-Dichloropropylene	33.3	0.5	ug/L	ND	83.3	50-140			
trans-1,3-Dichloropropylene	36.5	0.5	ug/L	ND	91.3	50-140			
Ethylbenzene	31.0	0.5	ug/L	ND	77.5	50-140			
Hexane	8.79	1.0	ug/L	ND	22.0	50-140			QS-02
Methyl Ethyl Ketone (2-Butanone)	85.9	5.0	ug/L	ND	85.9	50-140			
Methyl Butyl Ketone (2-Hexanone)	82.4	10.0	ug/L	ND	82.4	50-140			
Methyl Isobutyl Ketone	88.6	5.0	ug/L	ND	88.6	50-140			
Methyl tert-butyl ether	101	2.0	ug/L	ND	101	50-140			
Methylene Chloride	50.8	5.0	ug/L	ND	127	50-140			
Styrene	30.1	0.5	ug/L	ND	75.3	50-140			
1,1,1,2-Tetrachloroethane	29.7	0.5	ug/L	ND	74.2	50-140			
1,1,2,2-Tetrachloroethane	34.2	0.5	ug/L	ND	85.5	50-140			
Tetrachloroethylene	30.7	0.5	ug/L	ND	76.8	50-140			
Toluene	31.0	0.5	ug/L	ND	77.4	50-140			
1,2,4-Trichlorobenzene	25.4	0.5	ug/L	ND	63.6	50-140			
1,1,1-Trichloroethane	37.4	0.5	ug/L	ND	93.4	50-140			
1,1,2-Trichloroethane	38.3	0.5	ug/L	ND	95.7	50-140			
Trichloroethylene	38.2	0.5	ug/L	ND	95.4	50-140			
Trichlorofluoromethane	31.4	1.0	ug/L	ND	78.6	50-140			
1,3,5-Trimethylbenzene	28.5	0.5	ug/L	ND	71.4	50-140			
Vinyl chloride	33.9	0.5	ug/L	ND	84.8	50-140			
m,p-Xylenes	63.8	0.5	ug/L	ND	79.7	50-140			

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518 Project Description: PE2967

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	34.7	0.5	ug/L	ND	86.8	50-140			
Surrogate: 4-Bromofluorobenzene	*28.7*		*ug/L*		*89.6*	*50-140*			

Certificate of Analysis

Report Date: 20-Jun-2013
Order Date:18-Jun-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14518 Project Description: PE2967

Qualifier Notes:

QC Qualifiers :

QS-02 : Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

CCME PHC additional information:

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

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Chain of Custody
(Lab Use Only)
№ 8197

Page 1 of 1

Client Name: PATERSON GROUP INC.	Project Reference: PE 2967	TAT: [X] Regular [ ] 3 Day
Contact Name: ERIC LEVEQUE	Quote #	[ ] 2 Day [ ] 1 Day
Address: 154 COLONNADE ROAD SOUTH	PO # 14518	Date Required:
Telephone: (613) 226-7381	Email Address: ELEVEQUE@PATERSONGROUP.CA	

Criteria: [ ] O. Reg. 153/04 Table _ [X] O. Reg. 153/11 (Current) Table 1 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

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

Paracel Order Number: 1325076

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHCs (F1-F4)	Required Analyses: VOCs								
1	BH1-GW1	GW		3	June 17, 2013	10:00am	X	X								
2	BH2-GW1	GW		3	"	10:30am	X	X								
3	MW2-GW1	GW		3	"	12:30pm	X	X								
4																
5																
6																
7																
8																
9																
10																

Comments:

Method of Delivery: Pick up

Relinquished By (Print & Sign): SEAN MCGORMAN	Received by Driver/Depot: T. Vecchio	Received at Lab: SUNDEEPORN
Date/Time: June 17, 2013 @1:15pm	Date/Time: 18/06/13 12:10pm	Date/Time: JUN 18, 2013 12:57
	Temperature: _____ °C	Temperature: 13.9 °C
Verified By: MC		
Date/Time: June 18/13 1:47		
pH Verified [ ] By: N/A		

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Certificate of Analysis

Paterson Group Consulting Engineers

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

Phone: (613) 226-7381
Fax: (613) 226-6344

Client PO: 14441
Project: PE2967
Custody: 8201

Report Date: 8-Jul-2013
Order Date: 2-Jul-2013
Order #: 1327054

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

Paracel ID	Client ID
1327054-01	BH1-GW2
1327054-02	BH2-GW2
1327054-03	MW2-GW2
1327054-04	DUP1

Approved By:

Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 08-Jul-2013
Order Date:2-Jul-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14441 Project Description: PE2967

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	2-Jul-13	4-Jul-13

Certificate of Analysis

Report Date: 08-Jul-2013
Order Date:2-Jul-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14441

Project Description: PE2967

	Client ID:	BH1-GW2	BH2-GW2	MW2-GW2	DUP1
	Sample Date:	02-Jul-13	02-Jul-13	02-Jul-13	02-Jul-13
	Sample ID:	1327054-01	1327054-02	1327054-03	1327054-04
	MDL/Units	Water	Water	Water	Water
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Chloroform	0.5 ug/L	1.4	1.7	<0.5	<0.5
Chloromethane	3.0 ug/L	<3.0	<3.0	<3.0	<3.0
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dibromoethane	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	4.2	4.1
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	4.5	4.4
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	<0.5	4.5	4.4
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	<10.0	<10.0	<10.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0

Certificate of Analysis

Report Date: 08-Jul-2013
Order Date:2-Jul-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14441

Project Description: PE2967

	Client ID:	BH1-GW2	BH2-GW2	MW2-GW2	DUP1
	Sample Date:	02-Jul-13	02-Jul-13	02-Jul-13	02-Jul-13
	Sample ID:	1327054-01	1327054-02	1327054-03	1327054-04
	MDL/Units	Water	Water	Water	Water
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	1.2	1.2
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	111%	109%	111%	110%
Dibromofluoromethane	Surrogate	116%	101%	117%	118%
Toluene-d8	Surrogate	119%	120%	119%	120%

Certificate of Analysis

Report Date: 08-Jul-2013
Order Date:2-Jul-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14441 Project Description: PE2967

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						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dibromoethane	ND	0.2	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-Dichloroethylene, total	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						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	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						
1,2,4-Trichlorobenzene	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						
1,3,5-Trimethylbenzene	ND	0.5	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	*35.4*		*ug/L*		*111*	*50-140*			
Surrogate: Dibromofluoromethane	*31.5*		*ug/L*		*98.3*	*50-140*			
Surrogate: Toluene-d8	*35.8*		*ug/L*		*112*	*50-140*			

Certificate of Analysis

Report Date: 08-Jul-2013
Order Date:2-Jul-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14441 Project Description: PE2967

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				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroethane	ND	1.0	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Chloromethane	ND	3.0	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dibromoethane	ND	0.2	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			0.0	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			0.0	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Butyl Ketone (2-Hexanone)	ND	10.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	30.5	0.5	ug/L	31.3			2.4	30	
Toluene	ND	0.5	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	
Trichloroethylene	1.92	0.5	ug/L	1.87			2.6	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*37.1*		*ug/L*	*ND*	*116*	*50-140*			
Surrogate: Dibromofluoromethane	*28.7*		*ug/L*	*ND*	*89.7*	*50-140*			
Surrogate: Toluene-d8	*36.3*		*ug/L*	*ND*	*113*	*50-140*			

Certificate of Analysis

Report Date: 08-Jul-2013
Order Date:2-Jul-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14441 Project Description: PE2967

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	66.2	5.0	ug/L	6.19	60.0	50-140			
Benzene	29.9	0.5	ug/L	ND	74.6	50-140			
Bromodichloromethane	26.7	0.5	ug/L	ND	66.8	50-140			
Bromoform	33.8	0.5	ug/L	ND	84.6	50-140			
Bromomethane	27.3	0.5	ug/L	ND	68.4	50-140			
Carbon Tetrachloride	26.5	0.2	ug/L	ND	66.2	50-140			
Chlorobenzene	35.0	0.5	ug/L	ND	87.5	50-140			
Chloroethane	24.7	1.0	ug/L	ND	61.8	50-140			
Chloroform	27.0	0.5	ug/L	ND	67.5	50-140			
Chloromethane	27.9	3.0	ug/L	ND	69.8	50-140			
Dibromochloromethane	32.7	0.5	ug/L	ND	81.8	50-140			
Dichlorodifluoromethane	31.5	1.0	ug/L	ND	78.8	50-140			
1,2-Dibromoethane	33.6	0.2	ug/L	ND	84.1	50-140			
1,2-Dichlorobenzene	34.5	0.5	ug/L	ND	86.2	50-140			
1,3-Dichlorobenzene	35.5	0.5	ug/L	ND	88.6	50-140			
1,4-Dichlorobenzene	33.1	0.5	ug/L	ND	82.7	50-140			
1,1-Dichloroethane	30.0	0.5	ug/L	ND	75.0	50-140			
1,2-Dichloroethane	25.0	0.5	ug/L	ND	62.5	50-140			
1,1-Dichloroethylene	28.6	0.5	ug/L	ND	71.6	50-140			
cis-1,2-Dichloroethylene	29.7	0.5	ug/L	0.51	72.9	50-140			
trans-1,2-Dichloroethylene	33.4	0.5	ug/L	ND	83.5	50-140			
1,2-Dichloropropane	28.7	0.5	ug/L	ND	71.8	50-140			
cis-1,3-Dichloropropylene	29.4	0.5	ug/L	ND	73.4	50-140			
trans-1,3-Dichloropropylene	30.9	0.5	ug/L	ND	77.2	50-140			
Ethylbenzene	34.4	0.5	ug/L	ND	86.0	50-140			
Hexane	29.7	1.0	ug/L	ND	74.2	50-140			
Methyl Ethyl Ketone (2-Butanone)	52.8	5.0	ug/L	ND	52.8	50-140			
Methyl Butyl Ketone (2-Hexanone)	64.9	10.0	ug/L	ND	64.9	50-140			
Methyl Isobutyl Ketone	71.8	5.0	ug/L	ND	71.8	50-140			
Methyl tert-butyl ether	84.6	2.0	ug/L	ND	84.6	50-140			
Methylene Chloride	29.5	5.0	ug/L	ND	73.6	50-140			
Styrene	36.0	0.5	ug/L	ND	90.0	50-140			
1,1,1,2-Tetrachloroethane	33.4	0.5	ug/L	ND	83.4	50-140			
1,1,2,2-Tetrachloroethane	36.5	0.5	ug/L	ND	91.2	50-140			
Tetrachloroethylene	95.9	0.5	ug/L	70.6	63.2	50-140			
Toluene	33.7	0.5	ug/L	ND	84.2	50-140			
1,2,4-Trichlorobenzene	34.6	0.5	ug/L	ND	86.4	50-140			
1,1,1-Trichloroethane	27.3	0.5	ug/L	ND	68.3	50-140			
1,1,2-Trichloroethane	28.2	0.5	ug/L	ND	70.4	50-140			
Trichloroethylene	29.3	0.5	ug/L	2.92	65.9	50-140			
Trichlorofluoromethane	22.5	1.0	ug/L	ND	56.3	50-140			
1,3,5-Trimethylbenzene	34.4	0.5	ug/L	ND	85.9	50-140			
Vinyl chloride	24.7	0.5	ug/L	ND	61.7	50-140			
m,p-Xylenes	71.3	0.5	ug/L	ND	89.2	50-140			
o-Xylene	35.5	0.5	ug/L	ND	88.8	50-140			
Surrogate: 4-Bromofluorobenzene	*31.2*		*ug/L*		*97.4*	*50-140*			

Certificate of Analysis

Report Date: 08-Jul-2013
Order Date:2-Jul-2013

Client: **Paterson Group Consulting Engineers**
Client PO: 14441 Project Description: PE2967

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.

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№ 8201

Page 1 of 1

Client Name: PATERSON GROUP INC.	Project Reference: PE2967	TAT: [X] Regular [ ] 3 Day
Contact Name: MARK D'ARCY	Quote #	[ ] 2 Day [ ] 1 Day
Address: 154 COLONNADE ROAD SOUTH	PO # 14441	Date Required:
Telephone: (613) 226-7381	Email Address: MDARCY@PATERSONGROUP.CA	

Criteria: [ ] O. Reg. 153/04 Table __ [X] O. Reg. 153/11 (Current) Table 1 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: _____ [ ] Other: _____

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

Paracel Order Number: 1327054

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: VOCs
1	BH1-GW2	GW		2	July 2, 2013	~1:25 pm	X
2	BH2-GW2	GW		2		~1:45 pm	X
3	MW2-GW2	GW		2		~1:20 pm	X
4	DUP1	GW		2		~1:22 pm	X
5							
6							
7							
8							
9							
10							

Comments:

Method of Delivery: Paracel

Relinquished By (Print & Sign): SEAN MCGLADE	Received by Driver/Depot: T. DEOUSE	Received at Lab:	Verified By:
Date/Time: July 2, 2013 ~2:30p	Date/Time: 02/07/13 4:45pm	Date/Time: July 2/13	Date/Time: July 2/13 5:59p
	Temperature: ___ °C	Temperature: 15.7 °C 5:55p	pH Verified [ ] By: N/A