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Phase I-II - Environmental Site Assessment

1050 Somerset Street West
Ottawa, Ontario

Prepared For

Claridge Homes

July 13, 2011

Report: PE2278-2

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EXECUTIVE SUMMARY

Assessment

A Phase I - Environmental Site Assessment was carried out for the property located at 1050 Somerset Street West, in the City of Ottawa, Ontario. The purpose of this environmental assessment was to research the past and current use of the site and adjacent properties and identify any environmental concerns with the potential to have impacted the subject property.

A Phase II - ESA was conducted on the subject property to address potential concerns from the presence of a reported former on-site gasoline UST and a suspected existing furnace oil UST. The current use of the southern portion of the site building as an automotive garage was also noted as a potential concern. These concerns were identified during the Phase I - ESA portion of our assignment.

Soil

A total of eight (8) boreholes and one (1) test pit were placed on the subject property (BH1 to BH8) and (TP1). It should be noted that a geotechnical investigation was carried out on the subject site in conjunction with the Phase II-ESA. The test pit was excavated adjacent to the west wall of the building in the area of the suspected furnace oil tank location. The purpose of this test pit was to determine if the UST was still in place and to determine if the subsurface environment had been impacted by the presence of this suspected tank. The presence of the UST was confirmed and olfactory signs of petroleum hydrocarbon contamination were observed in soil samples recovered from this test pit. BH4, BH6 and BH7 were placed to delineate the extent of impacted soil encountered in TP1. BH1 was placed along the southeast portion of the property in the area of the reported former gasoline UST, BH8 was placed further down-gradient of BH1 to assess potential subsurface migration from the reported former gasoline UST. BH5 was placed on the interior of the garage portion of the building to assess in-ground hoists and other ancillary equipment. BH2 and BH3 were placed at selected locations on the subject property for geotechnical purposes.

Based on visual and olfactory observations, in conjunction with our combustible vapour readings, five (5) soil samples were submitted for analysis for a combination of the following parameters: benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, fractions 1 to 4) and metals.

Soil Sample TP1-G2 identified PHC (F1, F2 and F3) and xylene concentrations in excess of the selected 2009 MOE Table 3 standards adjacent to the furnace oil UST. Soil sample BH5-SS3 had a reported concentration of the F3 range of PHCs in excess of the MOE Table 3 standards on the interior of the garage building. Lead was found to exceed the selected MOE Table 3 Standards in the analysed soil sample from BH7 in the shallow fill material. This particular fill layer was not observed in any other boreholes. No other metal parameter concentrations were detected above the selected MOE standards in the analyzed soil samples.

Groundwater

Groundwater samples were collected from the monitoring well installed in BH1 and BH5 on April 26 and July 8, 2011. A slight hydrocarbon odour and perceived sheen was noted in the groundwater sample recovered from BH5. The samples were submitted for analytical testing of volatile organic compounds (VOCs), PHCs and/or polycyclic aromatic hydrocarbons (PAHs).

The analysed groundwater sample from BH5 had PHC (F2, F3 and F4) concentrations in excess of the selected MOE Table 3 Standards. None of the other PHC, VOC or PAH parameters were detected in excess of the selected MOE standards from the analysed groundwater samples.

Recommendations

Potentially Hazardous Building Materials

Based on the approximate age of the building (1960's), asbestos containing materials (ACMs) are potentially present in the subject building. The potential ACMs include the suspended ceiling tiles, hard plaster finishes and the thermal pipe insulation. These materials were noted to be in good condition at the time of our inspection and do not represent an immediate concern. An asbestos survey of the building must be conducted in accordance with Ontario Regulation 278/05, under the Occupational Health and Safety Act, prior to the disturbance of these materials.

Lead-based paints may be present in the building based on it's approximate date of construction. Lead testing should be conducted in the building prior to the disturbance of painted surfaces. Major works involving lead painted surfaces, including demolition of the premises, must be done in accordance with Ontario Regulation 843, under the Occupational Health and Safety Act.

If the buildings are going to be demolished in the near future, a designated substance survey (which addresses lead and ACMs) should be conducted instead of the aforementioned testing.

Monitoring Wells

If the monitoring wells installed in BH1 and BH5 are not going to be used in the future, they should be abandoned according to Ontario Regulation 903. Otherwise, the wells will be registered with the MOE under this regulation. Further information can be provided upon request in this regard.

Underground Storage Tank

As previously mentioned, an underground furnace oil storage tank was encountered during the course of our field program. Under the Technical Standards and Safety Authority (TSSA), which regulates fuel oil burning systems in the province of Ontario, this underground furnace oil storage tank must be removed from the subject site along with any associated piping. Furthermore, a report from an environmental engineering firm must be prepared regarding the soil and groundwater conditions within the underground storage tank nest. As a result, it is recommended that a member of this firm be present at the time of the underground storage tank removal.

Soil and Groundwater

It is understood that the proposed redevelopment of the site is to consist of a multi-storey residential building with several levels of underground parking, which would involve the excavation and off-site disposal of the majority of the soil from the property. The most practical time to carry out a remediation program of the contaminated soil and groundwater would be in conjunction with the excavation for redevelopment. It is recommended that a soil remediation program be conducted in the area of the existing underground storage tank, interior of the garage building and asphalt parking area to the southeast of the building in order to remove and dispose of the soil in excess of the selected 2009 MOE Table 3 standards. This soil must be disposed of at a licenced waste disposal facility. Impacted groundwater may also be encountered at the time of excavation for redevelopment. If encountered, impacted groundwater should be pumped from the excavation and taken off-site by a licensed pumping contractor. It is also recommended that a member of this firm be present at the time of the removal of the impacted soil and groundwater in order to provide direction and to obtain confirmatory samples upon the completion of the remediation program.

Based on our findings to date, it is estimated that approximately 700 m^3 of contaminated soil are present on the property.

1.0 INTRODUCTION

At the request of Claridge Homes, Paterson conducted a Phase I-II - Environmental Site Assessment (ESA) of the commercial property located at 1050 Somerset Street West, in the City of Ottawa, Ontario.

This report has been prepared specifically and solely for the above noted project which is described herein. It contains all of our findings and results of the environmental conditions at this site.

2.0 SITE INFORMATION

Address: 1050 Somerset Street West, Ottawa, Ontario.

Legal Description: Plan 73, Lots 1 to 4, City of Ottawa, Ontario

Location: The subject property is located on the southwest corner of the Somerset Street West and Breezehill Avenue North intersection, in the City of Ottawa, Ontario. Refer to Figure 1- Key Plan in Appendix 2 for the site location.

Site Description:

Configuration: Rectangular

Area: 2415 m² (approximate)

Current Use: The site is currently occupied by a single storey vacant commercial building and an automotive garage. The northern portion of the building has a basement level while the southern portion is a slab-on-grade style.

Services: The property is situated in a municipally serviced neighbourhood.

3.0 SCOPE OF WORK

The scope of work for this Phase I-II - Environmental Site Assessment was as follows:

- ❑ Investigate the existing conditions present at the subject property by carrying out a field study and historical review in accordance with CSA Z768-01.
- ❑ Conduct a Phase II - ESA, according to CSA Z769-00, to assess any potential impacts from former and current uses of the subject property.
- ❑ Present the results of our findings in a comprehensive report.
- ❑ Provide a preliminary environmental site evaluation based on our findings.
- ❑ Provide preliminary remediation recommendations and further investigative work if contamination is encountered or suspected.

4.0 PHASE I - ENVIRONMENTAL SITE ASSESSMENT

4.1 Historical Research

The methodology for the Phase I - Environmental Site Assessment program was carried out in two segments. The first consisted of a historical review which included a brief research of the past use of the site. This portion of the program was carried out by personnel from our environmental division. The following is a list of the key information sources reviewed by this firm.

Federal Records

- ❑ Maps and photographs (Geological Survey of Canada surficial and subsurface mapping).
- ❑ Air photos at the Energy Mines and Resources Air Photo Library.
- ❑ National Archives.

Provincial Records

- ❑ MOE document titled “Waste Disposal Site Inventory in Ontario”.
- ❑ MOE Brownfield Registration Database website.
- ❑ MOE Freedom of Information and Privacy Office.
- ❑ Office of Technical Standards and Safety Authority, Fuels Safety Branch.

Municipal Records

- ❑ City of Ottawa website.
- ❑ City of Ottawa document entitled “Old Landfill Management Strategy; Phase 1 - Identification of Sites, City of Ottawa, Ontario”; finalized October 2004.

Local Information Sources

- ❑ Personal Interviews.

4.2 Field Assessment

The second segment of the Phase I-ESA consisted of a field investigation which included a walk-through inspection and detailed visual assessment of the environmental conditions of the subject property. The field investigation was carried out on April 13, 2011 by personnel from our Environmental Division.

As part of the field assessment, the site and existing structure were inspected for signs of the following:

- ❑ Evidence of previous or existing fuel storage tanks.
- ❑ On-site use or storage of hazardous materials.
- ❑ On-site handling or disposal of liquid or solid waste materials.
- ❑ Aboveground piping systems, including pumps, valves, and joints.
- ❑ Truck or rail loading or unloading areas.
- ❑ Electrical conduits, abandoned pipelines or pumping stations.
- ❑ Remnants of old buildings.
- ❑ Signs of surficial contamination (ie: staining, distressed vegetation).
- ❑ Unnaturally discoloured, ponded, or flowing waters.
- ❑ Surficial drainage, wetlands, natural waterways, or watercourses through the property (ie: ditches, creeks, ponds, poor drainage).
- ❑ Any evidence of potable water supply wells or groundwater monitoring wells (such as leak detection monitoring wells for underground storage tank systems or abandoned systems).
- ❑ Any abnormal odours associated with the site, whether from on-site or off-site sources.
- ❑ The presence of any recent soil disturbances such as soil removal, filling, tilling, grading, etc.
- ❑ Asbestos containing materials (ACMs).
- ❑ Urea formaldehyde foam insulation (UFFI).
- ❑ Products containing Polychlorinated Biphenyls (PCBs).
- ❑ Ozone depleting substances (ODS).
- ❑ Lead-containing materials.
- ❑ Current use of neighbouring properties.

4.3 Historical Review

Air Photo Research

Historical air photos, from the national air photo library, were reviewed for the subject property and adjacent sites. A summary of our findings is presented below.

1928 The subject and neighbouring properties to the north and west appear to be occupied by residential dwellings at this time. The neighbouring property to the south is occupied by a school while the neighbouring property to the east appears to be partially developed at this time. Somerset Street West and Breezehill Avenue North can be seen at this time.

1946 No significant changes were made to the subject site or adjacent properties.

1958 No significant changes were made to the subject site or adjacent properties.

1966 The current subject building can be seen at this time. The neighbouring properties to the south, north and east are unchanged from the previous photo. The neighbouring site to the west is vacant at this time.

1986 An addition can be seen on the southern portion of the subject building (garage portion of building). Redevelopment can be seen on the neighbouring properties to the east and west at this time. The neighbouring properties to the north and south are unchanged at this time.

2002 The subject and neighbouring properties are depicted as they appear today.

Copies of some of the aerial photographs listed above are included in Appendix 2.

National Archives

City directories from 1931 to 2000 were reviewed (at approximate ten year intervals) for the subject site and surrounding properties.

Based on the directories, the subject property has been occupied by the current building since the 1960's. Prior to this time, the subject site was occupied by residential dwellings. Based on the available information, adjacent properties have generally been used for residential, institutional or commercial purposes since their development. No specific concerns were noted with the neighbouring properties with the exception of 55 Breezehill Avenue (southeast of the site), which was listed as an automotive garage from the 1980's to 2000. The current on-site garage was also listed in the directories from the 1980's to 2000. A grocery store was listed in the northern portion of the property from the 1980's to 2000.

The 1965 Fire Insurance Plans (FIPs) were reviewed as part of this assessment. The subject site is occupied by residential dwellings at this time. The neighbouring properties to the north and west are occupied by residential dwellings in 1965. The neighbouring property to the south is occupied by a school in the FIPs reviewed. An automotive garage can be seen to the southeast of the subject site (opposite side of Breezehill Avenue).

Technical Standards and Safety Authority (TSSA)

The TSSA, Fuels Safety Branch in Toronto was contacted by email on March 30, 2011. There are no underground storage tanks recorded in the TSSA registry for the subject property. The subject site is not currently registered with the TSSA as a private fuel outlet. Surrounding properties immediately adjacent to the subject site are also not registered with the TSSA.

Ontario Ministry of Environment (MOE)

A search of the MOE Brownfields Environmental Site Registry was conducted as part of this assessment. No records of site condition (RSCs) were identified within 500 m of the site.

A requisition form was sent to the MOE requesting a search into regulatory infractions, legal undertakings against the property, spill occurrences, existing waste generator numbers, and waste registrations at the subject property and neighbouring sites. A response from the MOE is expected within the next 60 days.

The MOE search is not considered to be an exhaustive search, and is subject to any matters that an examination of the site and neighbouring lands may reveal. A copy of the MOE response letter will be forwarded to Claridge Homes, should it reveal any concerns with respect to the subject site.

The Ontario Ministry of Environment document entitled "Waste Disposal Site Inventory in Ontario, 1991" was reviewed as part of the historical research. This document includes all recorded active and closed waste disposal sites, industrial manufactured gas plants, and coal tar distillation plants in the Province of Ontario. Two (2) closed waste disposal sites were identified within 500 m of the subject property. Please refer to Table 1 below for more details regarding these closed waste disposal facilities.

City of Ottawa Landfill Document

The document prepared by Golder Associates entitled "Old Landfill Management Strategy, Phase I - Identification of Sites, City of Ottawa", was reviewed. Two (2) landfill sites were identified within 500 m of the subject property, as presented in Table 1.

Table 1
Former Landfill Site

Landfill Number	Address	Activity Period	Owner	Location
UR-41	Bayswater Avenue at Wellington Street West - west of Bayswater Avenue between Wellington Street West and Somerset Street West.	pre-1928	Private	100 m NW
UR-6	Nepean Bay - green space between Ottawa Parkway, C.P. Railway, Scott Street and LeBreton Flats.	1963-1964	NCC	400 m N

These sites are not considered to have had the potential to impact to the subject site based on their distance from the subject property and their down gradient location from the subject site.

Former Industrial Sites

The report titled "Mapping and Assessment of Former Industrial Sites, City of Ottawa" prepared by Intera Technologies Limited was reviewed. The Intera report indicated the presence of four (4) former industrial sites within 500 m of the subject property, as presented in Table 2.

Table 2
Former Industrial Sites

Site No.	Location	Types of Industry	Operator	Approx. Distance from Subject Site
61	East side of Breezehill Avenue North, north of Somerset Street West	Bulk oil and gas storage.	Canadian Oil Company Limited.	100 m NE
76	North side of Wellington Street at Breezehill Avenue North	Non-industrial site - railway workshops and roundhouses.	Canadian Pacific Railway.	200 m N
62	Northeast corner of Bayview Road and O'Mera Avenue	Non-industrial site - railway workshops and roundhouses.	Canadian Pacific Railway.	300 m N
50	975 Gladstone Avenue	Printing, publishing and allied Industries	British American Bank Note Company Limited.	400 m S

These industrial sites are not considered to have the potential to impact the subject site based on either their distance from the subject property or their suspected down gradient location.

Personal Interviews

Garage staff were interviewed at the time of the site inspection. We were informed by garage personnel that the suspected furnace oil underground storage tank on the west side of the building was used to supply heating fuel to the former on-site grocery store. We were also informed that the garage previously had an in-ground hoist, which was removed in 1995. The staff also indicated that all waste oil was stored in 200 L drums within the garage and are empted by a licenced contractor as needed. The garage staff also indicated that a former gasoline underground storage tank was located in the southeast corner of the property.

4.4 Exterior Assessment

Building

The subject site is occupied by a concrete block commercial building. The northern portion of the building is a single storey vacant former grocery store which has a basement level and a flat tar and gravel style roof. The southern portion of the building is occupied by a single storey slab on grade style automotive garage which also has a flat tar and gravel style roof. The northern portion of the building is currently heated with a natural gas fired furnace and electric baseboard heaters, while the southern portion of the building is heated with a natural gas fired HVAC unit.

Site

The building occupies the majority of the site, while the remainder of the site is asphalt covered and used for vehicular parking. The site and regional topography slope downward to the north. Site drainage consists of surface runoff to on-site catch basins or to catch basins on the adjacent roadways.

Potential Environmental Concerns

- **Fuels and Chemical Storage**

  Based on our on-site observations, more specifically the presence of vent and fill pipes, it was suspected that an underground furnace oil storage tank was situated adjacent to the west wall of the automotive portion of the garage. At the time of our initial site visit, it was not possible to determine if this suspected underground tank was in place or whether it had been removed. Please refer to Section 5.0 for more information regarding the above noted suspected underground storage tank (UST).

  Based on conversations with on-site personnel from the garage, it is our understanding that a gasoline fuel storage tank was previously located in the southeast portion of the subject site. It is our understanding that this tank has been removed from the property.

  There were no ASTs observed on the exterior of the subject property during the course of our field work.

❑ **Waste Management**

Solid non-hazardous waste and recycling is collected and stored in bins on the east side of the southern portion of the building and is removed by a licenced contractor on a regular basis. No waste is currently generated in the northern portion of the building.

❑ **PCBs**

No concerns with respect to PCBs were noted on the exterior of the subject property at the time of the site inspection.

4.5 Interior Assessment

The northern portion of the building is currently vacant (former grocery store). The southern portion of the building is occupied by an automotive garage.

A general description of the interior of the building is as follows:

- ❑ The floors are concrete.
- ❑ The walls were finished with a combination of concrete block, decorative panelling and hard plaster.
- ❑ The ceilings were finished with hard plaster, suspended tiles and steel decking.
- ❑ Lighting used throughout the building was a combination of incandescent and fluorescent.

Potentially Hazardous Building Products

❑ **Asbestos Containing Materials (ACMs)**

Based on the approximate date of construction of the structure, (1960's), some building materials are considered to have the potential to contain asbestos. The suspected ACMs include the suspended ceiling tiles, hard plaster finishes and the thermal pipe insulation. The suspected ACMs were generally in good condition and do not represent an immediate concern.

❑ **Lead-Based Paint**

Based on the approximate date of construction of the subject building, lead-based paints may be present throughout the structure. Painted surfaces were generally in fair condition.

❑ **PCBs**

Fluorescent light fixtures were observed throughout the buildings. Fluorescent light ballasts manufactured prior to 1981 may contain PCBs. It is expected that most light ballasts were replaced in the past thirty (30) years and do not contain PCBs. No leakage or staining was observed from light ballasts or any of the electrical equipment observed on site.

❑ **Urea Formaldehyde Foam Insulation (UFFI)**

No signs indicating the presence of UFFI were observed within the structures during our inspection.

Other Potential Environmental Concerns

❑ **Fuels and Chemical Storage**

No fuels or chemicals were observed on the interior of the northern portion of the building with one exception. A partially full 50 L hydraulic fluid container was observed within the basement at the time of our inspection. No concerns were noted with the storage of this container.

One (1) 205 litre waste oil AST was observed in the garage. The AST stores engine oil for vehicle oil changes. Cleaning solvents, antifreeze, and gear lube were also observed in the garage. Staining on the concrete was observed at several locations within the garage at the time of our assessment.

❑ **Waste Management**

Waste oil from the garage is stored in 200 L containers. These containers are reportedly emptied by a licenced contractor on an as-needed basis.

❑ **Ozone Depleting Substances (ODSs)**

Potential sources of ODSs include the fire extinguishers. These appliances should be regularly serviced and maintained by licenced contractors.

❑ **Wastewater Discharges**

The liquid discharge from the subject property includes the sewage and wash water from the building. The subject site discharges into the City of Ottawa sewer system.

4.6 Adjacent Properties

Land use adjacent to the subject site is as follows:

- ❑ North - *Somerset Street West followed by commercial and residential;*
- ❑ South - *School;*
- ❑ East - *Breezehill Avenue North followed by commercial*;
- ❑ West - *Laneway followed by residential*.

The current use of the adjacent properties does not pose a significant environmental concern to the subject site. Land use adjacent to the subject site is illustrated on Drawing PE2278-1 - Test Hole Location Plan in Appendix 2.

4.7 Assessment - Phase I

The purpose of the Phase I-ESA was to research the past and current uses of the subject property and neighbouring sites in order to identify potential environmental concerns associated with the site, or neighbouring properties, which have the potential to impact the subject site.

The following potential areas of concern were identified during the Phase I-ESA:

- ❑ The subject site is currently occupied by an automotive garage.

- ❑ A suspected underground furnace oil storage tank was potentially located to the west of the subject building.

- ❑ A former gasoline underground storage tank was reportedly located in the southeast portion of the property.

A Phase II-ESA was recommended and conducted on the exterior of the subject site to identify potential soil and groundwater impacts from the above noted areas of concern. A supplemental drilling program was also conducted which included the placement of two (2) boreholes inside the subject building.

5.0 PHASE II - ENVIRONMENTAL SITE ASSESSMENT

5.1 Subsurface Investigation

Field Program

The subsurface investigation was conducted on April 14 and 18 and July 5 and 6, 2011, and consisted of the placement of eight (8) boreholes and one (1) test pit on the exterior of the subject property (BH1 to BH8) and (TP1). It should be noted that a geotechnical investigation was carried out on the subject site in conjunction with the Phase II-ESA. The test pit was excavated adjacent to the west wall of the building in the area of the suspected furnace oil tank location. The purpose of this test pit was to determine if the UST was still in place and to determine if the subsurface environment had been impacted by the presence of this suspected tank. BH4, BH6 and BH7 were placed to delineate the extent of impacted soil encountered in TP1. BH1 was placed along the southeast portion of the property in the area of the reported former gasoline UST, BH8 was placed further down-gradient of BH1 to assess potential subsurface migration from the reported former gasoline UST. BH5 was placed on the interior of the garage portion of the building to assess in-ground hoists and other ancillary equipment. BH2 and BH3 were placed at selected locations on the subject property for geotechnical purposes. The borehole and test pit locations and areas of potential concern are illustrated on Drawing No. PE2278-2 - Test Hole Location Plan in Appendix 2. The boreholes were advanced using a Truck-mounted power auger drill rig while the test pit was excavated with a rubber tired back-hoe.

The boreholes were completed to depths ranging from 2.4 to 13.2 m below the existing grade. A total of seventy-seven (77) soil samples were recovered from the boreholes by means of auger and split spoon sampling. A total of two (2) soil samples were recovered from the test pit by means of grab sampling. Upon recovery, all samples were immediately sealed in appropriate containers to facilitate the preliminary screening procedure. The depths at which the auger and split spoon samples were obtained from the boreholes are shown as "**AU**" and "**SS**" respectively, on the Soil Profile & Test Data sheets in Appendix 1.

All samples recovered as part of this investigation will be stored in the laboratory for a period of one (1) month after issuance of this report. All samples will then be discarded unless this firm is otherwise directed.

Underground Storage Tank

A furnace oil underground storage tank, and associated piping, was encountered during the excavation of TP1. The tank was approximately 3 m x 2 m in size. It should be noted that the condition of the entire tank was not evaluated as only one of the sides was exposed during this portion of the field program. It should also be noted that suspected petroleum hydrocarbon impacted soil was encountered under the tank. This material was subsequently sampled for laboratory analysis.

Monitoring Well Installation

Groundwater monitoring wells were installed in BH1 and BH5 upon completion of the sampling program. Typical monitoring well construction details are described below:

- ❑ Slotted 50 mm diameter PVC screen at base of borehole, to just above the water table.
- ❑ 50 mm diameter PVC riser pipe from the top of the screen to the ground surface.
- ❑ No.3 silica sand backfill within annular space around screen.
- ❑ 300 mm thick bentonite hole plug directly above PVC slotted screen.
- ❑ Clean backfill from top of bentonite plug to the ground surface.

Refer to the Soil Profile and Test Data sheets for BH1 and BH5 in Appendix 1 for specific well construction details.

Soil Sampling Protocol

Soil sampling protocols were followed using the MOE document titled “Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario”, dated May 1996.

The auger samples and soil samples from the split spoons were recovered using a stainless steel split spoon or by hand, using protective gloves (changed after each sample). The samples were placed into plastic bags. If significant contamination was encountered, the samples were placed into glass jars. Sampling equipment was washed in soapy water and rinsed with methylhydrate after each split spoon to prevent cross contamination of the samples. Samples were stored in coolers to reduce analyte volatilization during transportation.

Analytical Testing

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

5.2 Subsurface Profile

The soil profile encountered at the boreholes consists of a layer asphalt underlain by a layer of granular fill consisting of sand and gravel. The fill layer extended to a maximum depth of 3 m below ground surface. The fill is underlain by a native silty clay layer which was underlain by glacial till. Bedrock was encountered at a depth of approximately 11 m in two borehole locations as part of the geotechnical investigation. Specific details of the soil profile at each test hole location can be seen on the Soil Profile and Test Data sheets in Appendix 1.

5.3 Groundwater

The groundwater level was measured in the monitoring wells installed in BH1 and BH5 April 26 and July 11, 2011. The groundwater was encountered at depths ranging from approximately 1.1 to 2.2 m below ground surface. It should be noted that groundwater levels fluctuate throughout the year with seasonal variations.

5.4 Soil Sample Headspace Analysis

A Gastech calibrated to hexane was used to measure the combustible vapour concentrations in the headspace of the soil samples recovered from the boreholes. The technical protocol was obtained from Appendix C of the MOE document titled “Interim Guidelines for the Remediation of Petroleum Contamination at Operating Retail and Private Fuel Outlets in Ontario”, dated March 1992.

Soil samples recovered at the time of sampling were placed immediately into airtight plastic bags with nominal headspace. All lumps of soil inside the bags were broken by hand, and the soil was allowed to come to room temperature prior to conducting the vapour survey, ensuring consistency of readings between samples.

To measure the soil vapours, the analyser probe is inserted into the nominal headspace above the soil sample. The sample is agitated/manipulated gently as the measurement is taken. The peak reading registered within the first 15 seconds is recorded as the vapour measurement.

The parts per million (ppm) scale is used to measure concentrations of combustible vapours.

Combustible vapour readings in the boreholes ranged from 0 to 25 ppm. These vapour readings are not considered to be representative of elevated concentrations of highly volatile substances such as gasoline. Vapour readings cannot be used to identify the presence of heavier hydrocarbon products such as engine oil. Vapour readings of 110 and 490 ppm were obtained from the two (2) soil samples obtained from the test pit placed adjacent to the suspected furnace oil tank. These readings are considered to be representative of petroleum hydrocarbon impacted soil.

The results of the vapour survey are presented on the Soil Profile and Test Data sheets.

5.5 Analytical Test Results

Remediation Standards

The remediation criteria for the subject site were obtained from Table 3 of the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*", dated July 27, 2009. These criteria came into effect July 1, 2011. The MOE Standards are based on the following considerations:

- ❑ Coarse grained soil conditions.
- ❑ Surface soil and groundwater conditions.
- ❑ Non-Potable groundwater situation.
- ❑ Residential land use.

Soil Analysis

Five (5) soil samples were submitted for analysis for a combination of the following parameters: benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, fractions 1 to 4) and metals. The results of the analytical testing are presented in Tables 3 and 4. A copy of the laboratory certificates of analysis are included in Appendix 1.

Table 3
Analytical Test Results - Soil
BTEX and PHCs (Fractions 1 to 4)

Parameter	MDL (µg/g)	Soil Samples (µg/g)			Table 3 Standards Residential Land Use (µg/g)
		TP1 G2	BH5 SS3	BH8 SS5	2009 Standards
Benzene	0.02	0.09	nd	-	0.21
Ethylbenzene	0.05	1.93	nd	-	2.0
Toluene	0.05	0.44	nd	-	2.3
Xylenes (Total)	0.05	**12.7**	nd	-	3.1
F_1 PHCs (C_6-C_{10})	10	**228**	nd	nd	55
F_2 PHCs (C_{10}-C_{16})	10	**7,490**	46	29	98
F_3 PHCs (C_{16}-C_{34})	10	**4,900**	**969**	39	300
F_4 PHCs (C_{34}-C_{50})	10	nd	217	nd	2,800

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (< MDL)
- \- - Not Tested
- **Bold** - Results exceed selected MOE Table 3 standards.

Soil Sample TP1-G2 identified PHC (F1, F2 and F3) and xylene concentrations in excess of the MOE Table 3 standards. Soil sample BH5-SS3 had a reported concentration of the F3 range of PHCs in excess of the MOE Table 3 standards. The remaining identified BTEX and PHC concentrations were below the selected MOE standards.

Table 4
Analytical Test Results - Soil
Metals

Parameter	MDL (µg/g)	Soil Sample - (µg/g)		MOE Table 3 Residential (µg/g)
		BH1-SS3	BH7-AU2	2009 Standards
Antimony	1	nd	nd	7.5
Arsenic	1	2	3	18
Barium	1	139	277	390
Beryllium	0.5	nd	nd	4
Boron	5	nd	8.3	120
Cadmium	0.5	nd	nd	1.2
Chromium	5	27	18	160
Chromium (VI)	0.4	nd	nd	8
Cobalt	1	7	5	22
Copper	5	19	23	140
Lead	1	32	**145**	120
Mercury	0.1	nd	0.2	0.27
Molybdenum	1	nd	nd	6.9
Nickel	5	18	13	100
Selenium	1	nd	nd	2.4
Silver	0.3	nd	nd	20
Thallium	1	nd	nd	1
Vanadium	10	36	22	86
Zinc	20	60	176	340

Notes: MDL - Method Detection Limit
nd - Not Detected (< MDL)
Bold - Results exceed selected MOE Table 3 standards.

Lead was found to exceed the selected MOE Table 3 Standards in the analysed soil (fill) sample from BH7. No other metal parameter concentrations were detected in the analyzed soil samples above the selected MOE Table 3 standards.

Groundwater Analysis

Groundwater samples were recovered from the monitoring wells installed in BH1 and BH5 on April 26 and July 11, 2011. A slight hydrocarbon odour and perceived sheen was noted in the groundwater sample recovered from BH5. The samples were submitted for analytical testing of volatile organic compounds (VOCs), PHCs and/or polycyclic aromatic hydrocarbons (PAHs). The results of the analytical testing are presented in Tables 5, 6 and 7. The laboratory reports are included in Appendix 1 of this report.

Table 5
Analytical Test Results - Groundwater
PHCs (Fractions 1 to 4)

Parameter	MDL (ug/L)	Groundwater Sample (ug/L)		MOE Table 3 Standards (ug/L)
		BH1 GW1	BH5 GW1	2009 Standards
F1 PHCs (C_6-C_{10})	25	nd	nd	750
F2 PHCs (C_{10}-C_{16})	100	nd	**408**	150
F3 PHCs (C_{16}-C_{34})	100	nd	**10,100**	500
F4 PHCs (C_{34}-C_{50})	100	nd	**1,460**	500

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (< MDL)
- **Bold** - Results exceed selected MOE Table 3 standards.

The groundwater sample analysed from BH1 did not contain any detectable PHC concentrations. The analysed groundwater sample from BH5 had PHC (F2, F3 and F4) concentrations in excess of the selected MOE Table 3 Standards.

Table 6
Analytical Test Results - Groundwater
Volatile Organic Compounds (VOCs)

Parameters	MDL (µg/L)	Groundwater Sample (ug/L)		MOE Standards (µg/L)
		BH1 GW1	BH5 GW1	Table 3
Acetone	5.0	19.8	nd	130,000
Benzene	0.5	nd	nd	44
Bromodichloromethane	0.5	nd	nd	85,000
Bromoform	0.5	nd	nd	380
Bromomethane	0.5	nd	nd	5.6
Carbon Tetrachloride	0.5	nd	nd	0.79
Chlorobenzene	0.5	nd	nd	630
Chloroethane	1.0	nd	nd	nv
Chloroform	0.5	nd	nd	2.4
Chloromethane	3.0	nd	nd	nv
Dibromochloromethane	0.5	nd	nd	82,000
1,2 - Dibromoethane	0.2	nd	nd	nv
m - Dichlorobenzene	0.5	nd	nd	9,600
o - Dichlorobenzene	0.5	nd	nd	4,600
p - Dichlorobenzene	0.5	nd	nd	8
Dichlorodifluoromethane	0.5	nd	nd	4,400
1,1-Dichloroethane	0.5	nd	nd	320
1,2-Dichloroethane	0.5	nd	nd	1.6
1,1-Dichloroethylene	0.5	nd	nd	1.6
c-1,2-Dichloroethylene	0.5	nd	nd	1.6
t-1,2-Dichloroethylene	1.0	nd	nd	1.6
1,2-Dichloropropane	0.5	nd	nd	16
c-1,3-Dichloropropene	0.5	nd	nd	5.2
t-1,3-Dichloropropene	0.5	nd	nd	
Ethylbenzene	0.5	nd	nd	2,300
Methyl Ethyl Ketone	5.0	nd	nd	470,000
Methyl Isobutyl Ketone	5.0	nd	nd	140,000
Methyl tert-Butyl Ether	2.0	nd	nd	190
Methylene Chloride	5.0	nd	nd	610
Styrene	0.5	nd	nd	1,300
1,1,1,2-tetrachloroethane	0.5	nd	nd	3.4
1,1,2,2-tetrachloroethane	0.5	nd	nd	3.2

Notes:
- MDL - Method Detection Limit
- nd - Not Detected (< MDL)
- nv - No current MOE standard

Table 6 - continued
Analytical Test Results - Groundwater
Volatile Organic Compounds (VOCs)

Parameters	MDL (µg/L)	Groundwater Sample (ug/L)		MOE Standards (µg/L)
		BH1 GW1	BH5 GW1	Table 3
Tetrachloroethylene	0.5	nd	nd	*1.6*
Toluene	0.5	nd	nd	*18,000*
1,1,1-Trichloroethane	0.5	nd	nd	*640*
1,1,2-Trichloroethane	0.5	nd	nd	*4.7*
Trichloroethylene	0.5	nd	nd	*1.6*
Trichlorofluoromethane	1.0	nd	nd	*2,500*
1,3,5-Trimethylbenzene	0.5	nd	nd	*nv*
Vinyl Chloride	0.5	nd	nd	*0.5*
Total Xylenes	0.5	nd	nd	*4,200*

Notes:
- ❑ MDL - Method Detection Limit
- ❑ nd - Not Detected (< MDL)
- ❑ nv - No current MOE standard

No detectable VOC parameter concentrations were identified in the groundwater samples analysed with one exception, acetone was identified in sample BH1-GW1. This acetone concentration was below the selected MOE Table 3 standards.

Table 7 Analytical Test Results - Groundwater Polynuclear Aromatic Hydrocarbons (PAHs)			
Parameter	**MDL (µg/L)**	**Groundwater Sample (µg/L)**	**Table 3 Standards (µg/L)**
		BH1 GW1	
Acenaphthene	0.05	nd	600
Acenaphthylene	0.05	nd	1.8
Anthracene	0.01	0.01	2.4
Benzo[a]anthracene	0.01	nd	4.7
Benzo[a]pyrene	0.01	nd	0.81
Benzo[b]fluoranthene	0.05	nd	0.75
Benzo[ghi]perylene	0.05	nd	0.2
Benzo[k]fluoranthene	0.05	nd	0.4
Biphenyl	0.05	0.07	nv
Chrysene	0.05	nd	1
Dibenzo[a,h]anthracene	0.05	nd	0.52
Fluoranthene	0.01	0.04	130
Fluorene	0.05	0.2	400
Indeno[1,2,3-cd]pyrene	0.05	nd	0.2
1-Methylnaphthalene	0.05	0.15	1800
2-Methylnaphthalene	0.05	0.18	
Naphthalene	0.05	0.2	1400
Phenanthrene	0.02	0.74	580
Pyrene	0.02	nd	68

Notes:
- ❑ MDL - Method Detection Limit
- ❑ nd - Not detected above the MDL
- ❑ nv - No current MOE standard

None of the PAH parameters detected were in excess of the MOE applicable standards.

6.0 ASSESSMENT AND RECOMMENDATIONS

6.1 Assessment

A Phase I - Environmental Site Assessment was carried out for the property located at 1050 Somerset Street West, in the City of Ottawa, Ontario. The purpose of this environmental assessment was to research the past and current use of the site and adjacent properties and identify any environmental concerns with the potential to have impacted the subject property.

A Phase II - ESA was conducted on the subject property to address potential concerns from the presence of a reported former on-site gasoline UST and a suspected existing furnace oil UST. The current use of the southern portion of the site building as an automotive garage was also noted as a potential concern. These concerns were identified during the Phase I - ESA portion of our assignment.

Soil

A total of eight (8) boreholes and one (1) test pit were placed on the subject property (BH1 to BH8) and (TP1). It should be noted that a geotechnical investigation was carried out on the subject site in conjunction with the Phase II-ESA. The test pit was excavated adjacent to the west wall of the building in the area of the suspected furnace oil tank location. The purpose of this test pit was to determine if the UST was still in place and to determine if the subsurface environment had been impacted by the presence of this suspected tank. The presence of the UST was confirmed and olfactory signs of petroleum hydrocarbon contamination were observed in soil samples recovered from this test pit. BH4, BH6 and BH7 were placed to delineate the extent of impacted soil encountered in TP1. BH1 was placed along the southeast portion of the property in the area of the reported former gasoline UST, BH8 was placed further down-gradient of BH1 to assess potential subsurface migration from the reported former gasoline UST. BH5 was placed on the interior of the garage portion of the building to assess in-ground hoists and other ancillary equipment. BH2 and BH3 were placed at selected locations on the subject property for geotechnical purposes.

Based on visual and olfactory observations, in conjunction with our combustible vapour readings, five (5) soil samples were submitted for analysis for a combination of the following parameters: benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs, fractions 1 to 4) and metals.

Soil Sample TP1-G2 identified PHC (F1, F2 and F3) and xylene concentrations in excess of the selected 2009 MOE Table 3 standards adjacent to the furnace oil UST. Soil sample BH5-SS3 had a reported concentration of the F3 range of PHCs in excess of the MOE Table 3 standards on the interior of the garage building. Lead was found to exceed the selected MOE Table 3 Standards in the analysed soil sample from BH7 in the shallow fill material. This particular fill layer was not observed in any other boreholes. No other metal parameter concentrations were detected above the selected MOE standards in the analyzed soil samples.

Groundwater

Groundwater samples were collected from the monitoring well installed in BH1 and BH5 on April 26 and July 8, 2011. A slight hydrocarbon odour and perceived sheen was noted in the groundwater sample recovered from BH5. The samples were submitted for analytical testing of volatile organic compounds (VOCs), PHCs and/or polycyclic aromatic hydrocarbons (PAHs).

The analysed groundwater sample from BH5 had PHC (F2, F3 and F4) concentrations in excess of the selected MOE Table 3 Standards. None of the other PHC, VOC or PAH parameters were detected in excess of the selected MOE standards from the analysed groundwater samples.

6.2 Recommendations

Potentially Hazardous Building Materials

Based on the approximate age of the building (1960's), asbestos containing materials (ACMs) are potentially present in the subject building. The potential ACMs include the suspended ceiling tiles, hard plaster finishes and the thermal pipe insulation. These materials were noted to be in good condition at the time of our inspection and do not represent an immediate concern. An asbestos survey of the building must be conducted in accordance with Ontario Regulation 278/05, under the Occupational Health and Safety Act, prior to the disturbance of these materials.

Lead-based paints may be present in the building based on it’s approximate date of construction. Lead testing should be conducted in the building prior to the disturbance of painted surfaces. Major works involving lead painted surfaces, including demolition of the premises, must be done in accordance with Ontario Regulation 843, under the Occupational Health and Safety Act.

If the buildings are going to be demolished in the near future, a designated substance survey (which addresses lead and ACMs) should be conducted instead of the aforementioned testing.

Monitoring Wells

If the monitoring wells installed in BH1 and BH5 are not going to be used in the future, they should be abandoned according to Ontario Regulation 903. Otherwise, the wells will be registered with the MOE under this regulation. Further information can be provided upon request in this regard.

Underground Storage Tank

As previously mentioned, an underground furnace oil storage tank was encountered during the course of our field program. Under the Technical Standards and Safety Authority (TSSA), which regulates fuel oil burning systems in the province of Ontario, this underground furnace oil storage tank must be removed from the subject site along with any associated piping. Furthermore, a report from an environmental engineering firm must be prepared regarding the soil and groundwater conditions within the underground storage tank nest. As a result, it is recommended that a member of this firm be present at the time of the underground storage tank removal.

Soil and Groundwater

It is understood that the proposed redevelopment of the site is to consist of a multi-storey residential building with several levels of underground parking, which would involve the excavation and off-site disposal of the majority of the soil from the property. The most practical time to carry out a remediation program of the contaminated soil and groundwater would be in conjunction with the excavation for redevelopment. It is recommended that a soil remediation program be conducted in the area of the existing underground storage tank, interior of the garage building and asphalt parking area to the southeast of the building in order to remove and dispose of the soil in excess of the selected 2009 MOE Table 3 standards. This soil must be disposed of at a licenced waste disposal facility. Impacted groundwater may also be encountered at the time of excavation for redevelopment. If encountered, impacted groundwater should be pumped from the excavation and taken off-site by a licensed pumping contractor. It is also recommended that a member of this firm be present at the time of the removal of the impacted soil and groundwater in order to provide direction and to obtain confirmatory samples upon the completion of the remediation program.

Based on our findings to date, it is estimated that approximately 700 m^3 of contaminated soil are present on the property.

7.0 STATEMENT OF LIMITATIONS

This Phase I-II - Environmental Site Assessment (ESA) report has been prepared in general accordance with the agreed scope-of-work and the requirements of CSA Z768-01 and CSA Z769-00. The conclusions presented herein are based on information gathered from a limited historical review along with the field inspection and testing program. The findings of the Phase I-II - ESA update are based on a review of readily available geological, historical, and regulatory information and a cursory review made at the time of the field assessment. The historical research relies on information supplied by others, such as local, provincial, and federal agencies and was limited within the scope-of-work, time, and budget of the project herein.

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 described by the test holes themselves.

This report was prepared for the sole use of Claridge Homes. Permission from the above noted party and our firm will be required to release this report to any other party.

Paterson Group Inc.

Luke Lopers, B.A.Sc.

Mark S. D'Arcy, P.Eng.

Report Distribution:

- ❑ Claridge Homes (3 copies and 1 PDF copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TEST RESULTS

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Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1050 Somerset Street West
Ottawa, Ontario

DATUM TBM - Nail in pole located on west side of subject site. Geodetic elevation = 63.136m, provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE2278

REMARKS

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger **DATE** 18 Apr 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Asphaltic concrete 0.08		AU	1			0	62.44		
FILL: Brown silty sand, some crushed stone and gravel 0.20 / 0.69		SS	2	33	15	1	61.44		
FILL: Brown silty clay with sand and crushed stone 1.45		SS	3	42	5	2	60.44		
FILL: Brown silty sand, trace clay and gravel		SS	4	0	0	3	59.44		
FILL: Brown silty sand with gravel and cobbles, trace concrete 2.97		SS	5	92	2	4	58.44		
- 600mm void encountered @ 2.3m depth		SS	6	100	2	5	57.44		
Stiff to very stiff, brown **SILTY CLAY** - grey by 3.7m depth 5.26		SS	7	100	3	6	56.44		
GLACIAL TILL: Grey silty clay with sand, gravel, cobbles and boulders 7.31		SS	8	100	7	7	55.44		
GLACIAL TILL: Compact, grey silty sand with clay, gravel, cobbles and boulders 9.07		SS	9	75	23	8	54.44		
End of Borehole (GWL @ 1.10m-Apr. 26/11)		SS	10	33	20	9	53.44		
		SS	11	33	17				

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Lower Explosive Limit %; scale 20 40 60 80

Monitoring Well Construction

Gastech 1314 Rdg. (ppm): 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

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1050 Somerset Street West
Ottawa, Ontario

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FILE NO. PE2278

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** 18 Apr 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	62.56
Asphaltic concrete 0.05		AU	1				
FILL: Brown silty sand with crushed stone and gravel		SS	2	25	35	1	61.56
1.45		SS	3	75	15	2	60.56
Very stiff, brown **SILTY CLAY**		SS	4	67	13		
		SS	5	50	13	3	59.56
- firm by 3.7m depth		SS	6	100	4	4	58.56
5.03		SS	7	92	8	5	57.56
GLACIAL TILL: Stiff, grey silty clay with sand, gravel, cobbles and boulders 5.95		SS	8	50	8		
		SS	9	8	18	6	56.56
GLACIAL TILL: Compact, grey silty sand with clay, gravel, cobbles and boulders		SS	10	50	10	7	55.56
		SS	11	8	11	8	54.56
9.07		SS	12	8	4	9	53.56
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

Gastech 1314 Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1050 Somerset Street West
Ottawa, Ontario

DATUM TBM - Nail in pole located on west side of subject site. Geodetic elevation = 63.136m, provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE2278

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** 6 Jul 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	61.84
Asphaltic concrete 0.08		AU	1				
FILL: Brown silty sand with crushed stone, gravel, cobbles and boulders		SS	2	17	63	1	60.84
		SS	3	25	46	2	59.84
- trace clay by 1.45m depth		SS	4	8	33		
2.97						3	58.84
Very stiff, brown **SILTY CLAY**		SS	5	100	10		
3.73						4	57.84
GLACIAL TILL: Stiff, brown silty clay with sand, gravel, cobbles and boulders		SS	6	75	12		
		SS	7	33	11	5	56.84
- grey by 4.5m depth		SS	8	12	13		
		SS	9	42	13	6	55.84
6.78						7	54.84
		SS	10	17	9		
GLACIAL TILL: Loose, grey silty sand with clay, gravel, cobbles and boulders		SS	11	25	3	8	53.84
		SS	12	50	8		
						9	52.84
						10	51.84
10.97						11	50.84
		RC	1	100	100		
BEDROCK: Grey limestone						12	49.84
		RC	2	100	97		
13.11						13	48.84
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

Gastech 1314 Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1050 Somerset Street West
Ottawa, Ontario

DATUM TBM - Nail in pole located on west side of subject site. Geodetic elevation = 63.136m, provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE2278

REMARKS

HOLE NO. BH 4

BORINGS BY CME 55 Power Auger **DATE** 18 Apr 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	62.69
Asphaltic concrete 0.08		AU	1				
FILL: Brown silty sand with crushed stone, gravel, cobbles and boulders		SS	2	42	77	1	61.69
2.29		SS	3	50	75	2	60.69
FILL: Grey-brown silty clay, trace sand and gravel		SS	4	25	17		
3.66		SS	5	42	7	3	59.69
Very stiff, brown **SILTY CLAY**		SS	6	67	11	4	58.69
4.50		SS	7	33	11		
GLACIAL TILL: Stiff, grey silty clay with gravel, cobbles and boulders		SS	8	50	13	5	57.69
6.78		SS	9	42	10	6	56.69
GLACIAL TILL: Loose to compact, grey silty sand with clay, gravel, cobbles and boulders		SS	10	21	7	7	55.69
9.07		SS	11	42	10	8	54.69
End of Borehole		SS	12	58	18	9	53.69

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

Gastech 1314 Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1050 Somerset Street West
Ottawa, Ontario

DATUM TBM - Nail in pole located on west side of subject site. Geodetic elevation = 63.136m, provided by Annis, O'Sullivan, Vollebekk Ltd.

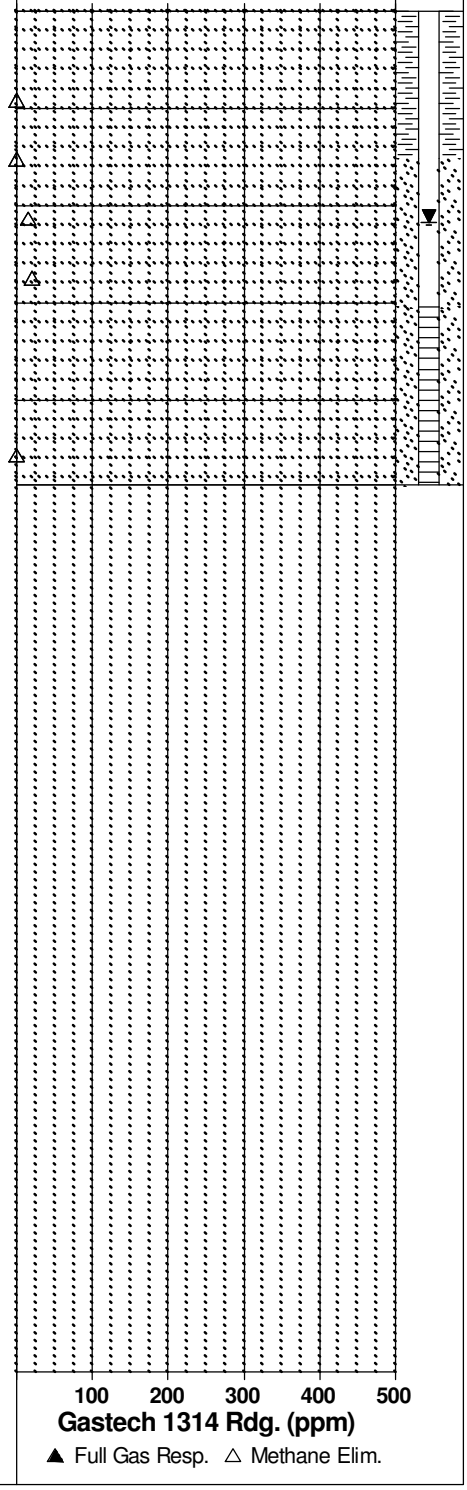
FILE NO. PE2278

REMARKS

HOLE NO. BH 5

BORINGS BY Portable Drill **DATE** 5 Jul 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE									
Concrete slab 0.15									
FILL: Crushed stone 0.60									
FILL: Brown silty sand with gravel 1.22		SS	1						
		SS	2	50					
Brown **SILTY CLAY**		SS	3	100					
- grey by 1.8m depth		SS	4	100					
		SS	5	100					
		SS	6	0					
4.88		SS	7	100					
End of Borehole									
(GWL @ 2.17m-July 11/11)									



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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1050 Somerset Street West
Ottawa, Ontario

DATUM TBM - Nail in pole located on west side of subject site. Geodetic elevation = 63.136m, provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE2278

REMARKS

HOLE NO. BH 6

BORINGS BY Portable Drill **DATE** 5 Jul 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	
Concrete slab 0.15		AU	1				
FILL: Crushed stone 0.28							
Grey **SILTY SAND** with clay 0.30		SS	2	100		1	
GLACIAL TILL; Grey silty clay with sand, gravel, cobbles and boulders		SS	3	100			
		SS	4	100		2	
2.44							
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

Monitoring Well Construction

100 200 300 400 500

Gastech 1314 Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1050 Somerset Street West
Ottawa, Ontario

DATUM TBM - Nail in pole located on west side of subject site. Geodetic elevation = 63.136m, provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE2278

REMARKS

HOLE NO. BH 7

BORINGS BY CME 55 Power Auger **DATE** 6 Jul 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Lower Explosive Limit %	Monitoring Well Construction
GROUND SURFACE						0	62.00		
Asphaltic concrete 0.13		AU	1						
FILL: Crushed stone 0.25		AU	2						
FILL: Brown silty sand with gravel, wood chips, trace brick 0.60		SS	3	50	16	1	61.00		
		SS	4	50	19	2	60.00		
Stiff, brown **SILTY CLAY**		SS	5	67	6				
- trace sand by 2.2m depth		SS	6	92	7	3	59.00		
4.50		SS	7	33	40	4	58.00		
		SS	8	25	12	5	57.00		
		SS	9	50	12				
		SS	10	75	7	6	56.00		
GLACIAL TILL: Grey silty clay with sand, gravel, cobbles and boulders						7	55.00		
						8	54.00		
						9	53.00		
						10	52.00		
11.28						11	51.00		
		RC	1	100	100				
BEDROCK: Grey limestone						12	50.00		
		RC	2	100	98				
13.18						13	49.00		
End of Borehole									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

Gastech 1314 Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

patersongroup

Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Phase I - II Environmental Site Assessment
1050 Somerset Street West
Ottawa, Ontario

DATUM TBM - Nail in pole located on west side of subject site. Geodetic elevation = 63.136m, provided by Annis, O'Sullivan, Vollebekk Ltd.

FILE NO. PE2278

REMARKS

HOLE NO. BH 8

BORINGS BY CME 55 Power Auger **DATE** 6 Jul 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	62.49
Asphaltic concrete 0.05		AU	1				
FILL: Crushed stone, trace sand 0.30		AU	2				
FILL: Brown silty sand with crushed stone		SS	3	67	50+	1	61.49
- cobbles and boulders by 2.2m depth 1.83		SS	4	50	50+	2	60.49
Brown **CLAYEY SILT,** some sand 2.97		SS	5	92	16		
Brown **SILTY CLAY** 3.73		SS	6	92	5	3	59.49
GLACIAL TILL: Grey silty clay with sand, gravel, cobbles and boulders		SS	7	50	31	4	58.49
5.26		SS	8	92	6	5	57.49
GLACIAL TILL: Grey silty sand with clay, gravel, cobbles and boulders 5.94		SS	9	21	16		
End of Borehole							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Lower Explosive Limit %

20 40 60 80

100 200 300 400 500

Gastech 1314 Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

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

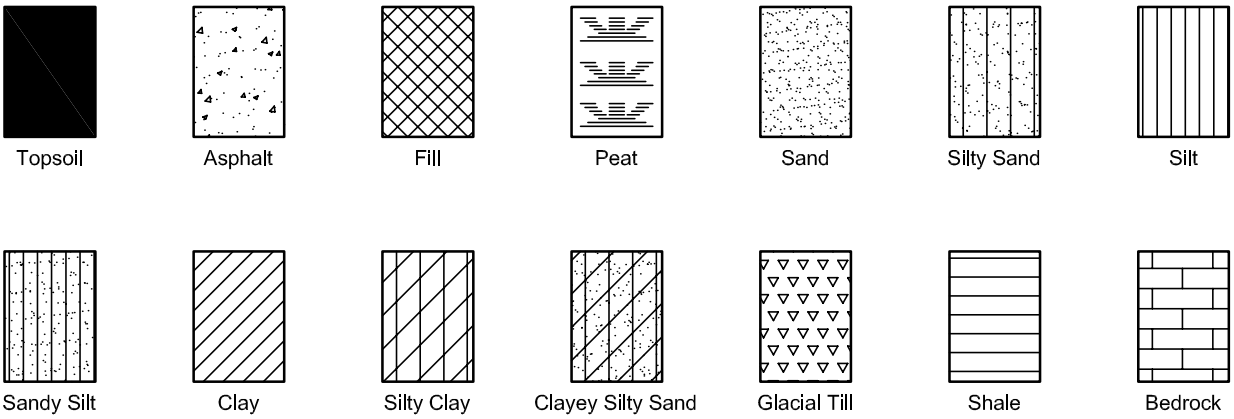
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void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

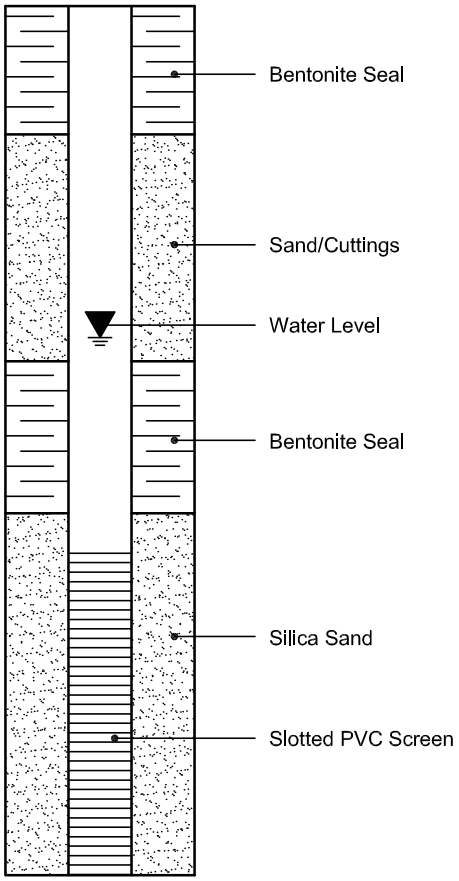
SYMBOLS AND TERMS (continued)

STRATA PLOT

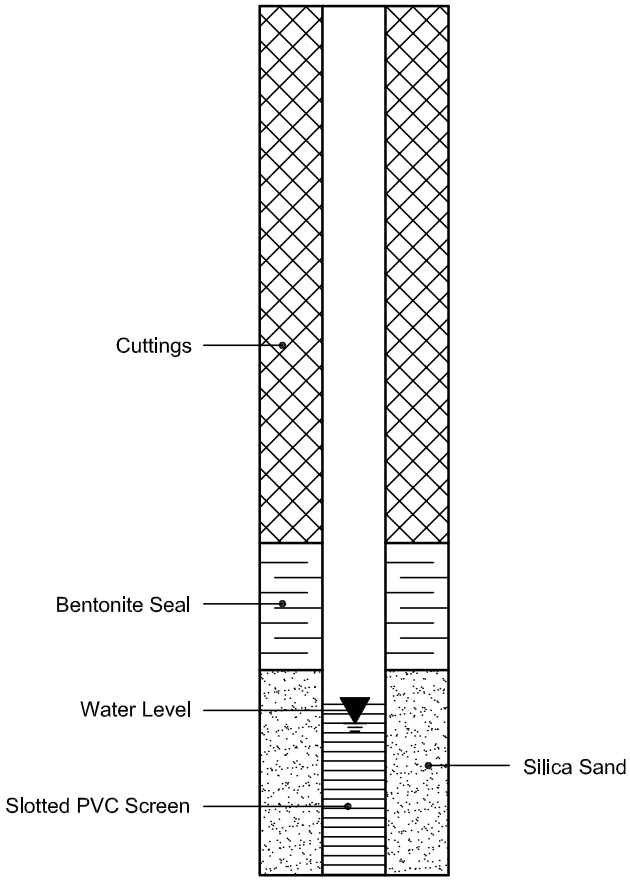


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



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Certificate of Analysis

Paterson Group Consulting Engineers

28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Eric Leveque

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

Client PO: 10941
Project: PE2278
Custody: 84353

Report Date: 21-Apr-2011
Order Date: 18-Apr-2011
Order #: 1117027

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

Paracel ID	Client ID
1117027-01	TP1-G2

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 21-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Apr-2011

Client PO: 10941 Project Description: PE2278

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	20-Apr-11	21-Apr-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	20-Apr-11	21-Apr-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	20-Apr-11	21-Apr-11
Solids, %	Gravimetric, calculation	20-Apr-11	20-Apr-11

Certificate of Analysis

Report Date: 21-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Apr-2011

Client PO: 10941

Project Description: PE2278

	Client ID:	TP1-G2	-	-	-
	Sample Date:	15-Apr-11	-	-	-
	Sample ID:	1117027-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	83.3	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	0.09	-	-	-
Ethylbenzene	0.05 ug/g dry	1.93	-	-	-
Toluene	0.05 ug/g dry	0.44	-	-	-
m,p-Xylenes	0.05 ug/g dry	7.99	-	-	-
o-Xylene	0.05 ug/g dry	4.75	-	-	-
Xylenes, total	0.05 ug/g dry	12.7	-	-	-
Toluene-d8	Surrogate	101%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	228	-	-	-
F2 PHCs (C10-C16)	10 ug/g dry	7490	-	-	-
F3 PHCs (C16-C34)	10 ug/g dry	4900	-	-	-
F4 PHCs (C34-C50)	10 ug/g dry	<10	-	-	-

Certificate of Analysis

Report Date: 21-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Apr-2011

Client PO: 10941 Project Description: PE2278

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	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	*8.49*		*ug/g*		*106*	*50-140*			

Certificate of Analysis

Report Date: 21-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Apr-2011

Client PO: 10941 Project Description: PE2278

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	10	ug/g dry	ND				50	
F3 PHCs (C16-C34)	ND	10	ug/g dry	ND				50	
F4 PHCs (C34-C50)	ND	10	ug/g dry	ND				50	
Physical Characteristics									
% Solids	92.9	0.1	% by Wt.	93.1			0.2	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	*10.1*		*ug/g dry*	*ND*	*109*	*50-140*			

Certificate of Analysis

Report Date: 21-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:18-Apr-2011

Client PO: 10941 Project Description: PE2278

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	211	10	ug/g	ND	106	80-120			
F2 PHCs (C10-C16)	77	10	ug/g	ND	96.3	61-129			
F3 PHCs (C16-C34)	201	10	ug/g	ND	101	61-129			
F4 PHCs (C34-C50)	131	10	ug/g	ND	109	61-129			
Volatiles									
Benzene	3.40	0.02	ug/g	ND	84.9	60-130			
Ethylbenzene	3.38	0.05	ug/g	ND	84.4	60-130			
Toluene	3.30	0.05	ug/g	ND	82.5	60-130			
m,p-Xylenes	6.73	0.05	ug/g	ND	84.2	60-130			
o-Xylene	3.28	0.05	ug/g	ND	82.0	60-130			
Surrogate: Toluene-d8	*7.87*		*ug/g*		*98.3*	*50-140*			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
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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Chain of Custody
(lab use only)

Nº 84353

Reg. Drinking Water

Client Name: PATERSON GROUP	Project Ref: PE 2278	Waterworks Name:	Page 1 of 1
Contact Name: [redacted] Eric Leveque	Quote #	Waterworks Number:	Sample Taken by:
Address: 28 CONCOURSE GATE, UNIT 1 OTTAWA ON K2E 7T7	PO # 10941	Address:	Print Name: DAN ARNOTT
	E-mail Address: [redacted] eleveque@patersongroup.ca	After hours Contact:	Signature:
Telephone: 613.226.7381	Fax: 613.226.6344	Public Health Unit:	TAT: [ ] 1-day [ ] 2-day [✓] Reg.

Matrix Types: S–Soil/Sed. GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P- Paint A-Air O-Other

Samples submitted under: (Indicate **ONLY** one)
☐ O. Reg 153 (511) Table 3 ☐ O. Reg 170/03 ☐ O. Reg 318/08 ☐ Private well
☐ CCME ____ ☐ O. Reg 243/07 ☐ O. Reg 319/08 ☐ Other: ____

Type of DW Sample: R = Raw; T = Treated; D = Distribution
Location Types: S = Surface Water; G = Ground Water

Paracel Order Number: 1117027

	Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken Date	Sample Taken Time	Free / Combined Chlorine Residual mg/L	Required Analyses: PHCs F1-F4	BTEX							
1	TP1-G2	S			1	15-Apr-2011	16:00		X	X		250mL					
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments:

Preservation Verification: pH N/A Temperature ____
Verified by: ____

Relinquished By (Print & Sign): #971 Swift

Date/Time:

Lab Use Only:

Received By Driver/Depot:	Received at Lab:	Verified By:
Date/Time:	Date/Time: Apr 18/11 2:23p Swift	Date/Time: Apr 18/11 2:31

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Eric Leveque

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

Client PO: 10683
Project: PE2278
Custody: 66284

Report Date: 26-Apr-2011
Order Date: 20-Apr-2011
Order #: 1117093

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

Paracel ID	Client ID
1117093-01	BH1 SS3

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 26-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:20-Apr-2011

Client PO: 10683 Project Description: PE2278

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent	MOE E3056 - Extraction, colourimetric	26-Apr-11	26-Apr-11
Mercury	EPA 7471A - CVAA, digestion	21-Apr-11	21-Apr-11
Metals	EPA 6020 - Digestion - ICP-MS	25-Apr-11	25-Apr-11
Solids, %	Gravimetric, calculation	20-Apr-11	20-Apr-11

Certificate of Analysis

Report Date: 26-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:20-Apr-2011

Client PO: 10683

Project Description: PE2278

	Client ID:	BH1 SS3	-	-	-
	Sample Date:	18-Apr-11	-	-	-
	Sample ID:	1117093-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	82.1	-	-	-
Metals					
Antimony	1 ug/g dry	<1	-	-	-
Arsenic	1 ug/g dry	2	-	-	-
Barium	1 ug/g dry	139	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	<5.0	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5 ug/g dry	27	-	-	-
Chromium (VI)	0.4 ug/g dry	<0.4	-	-	-
Cobalt	1 ug/g dry	7	-	-	-
Copper	5 ug/g dry	19	-	-	-
Lead	1 ug/g dry	32	-	-	-
Mercury	0.1 ug/g dry	<0.1	-	-	-
Molybdenum	1 ug/g dry	<1	-	-	-
Nickel	5 ug/g dry	18	-	-	-
Selenium	1 ug/g dry	<1	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1 ug/g dry	<1	-	-	-
Uranium	1 ug/g dry	<1	-	-	-
Vanadium	10 ug/g dry	36	-	-	-
Zinc	20 ug/g dry	60	-	-	-

Certificate of Analysis

Report Date: 26-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:20-Apr-2011

Client PO: 10683 Project Description: PE2278

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	1	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.4	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Lead	ND	1	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1	ug/g						
Uranium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						

Certificate of Analysis

Report Date: 26-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:20-Apr-2011

Client PO: 10683 Project Description: PE2278

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	ND	1	ug/g dry	ND				26	
Arsenic	1.6	1	ug/g dry	1.6			4.0	35	
Barium	131	1	ug/g dry	133			1.1	34	
Beryllium	ND	0.5	ug/g dry	ND				25	
Boron	ND	5.0	ug/g dry	ND				33	
Cadmium	ND	0.5	ug/g dry	ND				33	
Chromium (VI)	ND	0.4	ug/g dry	ND				35	
Chromium	37.5	5	ug/g dry	37.0			1.5	32	
Cobalt	8.3	1	ug/g dry	8.2			1.2	32	
Copper	17.7	5	ug/g dry	17.3			1.9	32	
Lead	22.2	1	ug/g dry	21.7			2.1	44	
Mercury	ND	0.1	ug/g dry	ND				35	
Molybdenum	1.8	1	ug/g dry	1.7			7.3	29	
Nickel	21.1	5	ug/g dry	21.0			0.6	29	
Selenium	ND	1	ug/g dry	ND				28	
Silver	0.39	0.3	ug/g dry	0.34			14.2	28	
Thallium	ND	1	ug/g dry	ND				27	
Uranium	ND	1	ug/g dry	ND				27	
Vanadium	41.9	10	ug/g dry	41.0			2.2	27	
Zinc	46.2	20	ug/g dry	46.2			0.1	27	
Physical Characteristics									
% Solids	92.9	0.1	% by Wt.	93.1			0.2	25	

Certificate of Analysis

Report Date: 26-Apr-2011

Client: **Paterson Group Consulting Engineers**

Order Date:20-Apr-2011

Client PO: 10683 Project Description: PE2278

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Antimony	55.7		ug/L	ND	111	80-120			
Arsenic	52.9		ug/L	ND	106	80-120			
Barium	52.2		ug/L	ND	104	80-120			
Beryllium	48.3		ug/L	ND	96.6	80-120			
Boron	45.9		ug/L	ND	91.7	80-120			
Cadmium	52.3		ug/L	ND	105	80-120			
Chromium (VI)	5.2	0.4	ug/g	ND	105	89-123			
Chromium	52.9		ug/L	ND	106	80-120			
Cobalt	52.5		ug/L	ND	105	80-120			
Copper	53.4		ug/L	ND	107	80-120			
Lead	46.9		ug/L	ND	93.9	80-120			
Mercury	1.45	0.1	ug/g	ND	96.6	72-128			
Molybdenum	50.0		ug/L	ND	100	80-120			
Nickel	52.5		ug/L	ND	105	80-120			
Selenium	56.4		ug/L	ND	113	80-120			
Silver	51.1		ug/L	ND	102	80-120			
Thallium	47.3		ug/L	ND	94.7	80-120			
Uranium	43.9		ug/L	ND	87.8	80-120			
Vanadium	52.7		ug/L	ND	105	80-120			
Zinc	49.0		ug/L	ND	97.9	80-120			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
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.

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Chain of Custody Record

Nº 66284

Pg. __ of __

Company Name: PATERSON GROUP
Contact Name: ERIC LEVESQUE
Address: 28 CONCOURSE GATE UNIT 1
Tel: 613-226-7381 Cell:
Email: elevesque@patersongroup.ca

Project Ref: ~~PG 2356~~ PE2278
PO# 10683
Quote # ☐Not Quoted

Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: [ ] 1-day [ ] 2-day [X] Regular
Regulatory/Guideline Requirements: O.Reg. 511-Table 3

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A–Air O–Other RDW-Regulated Drinking Water

Paracel Order # 1117093

	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	MOE metals	BTEX & F1-F4												Hazardous? (Y/N)
1	BH1 SS3	S		1	18/04/11	✓													
2	BH1 SS5	S		1	" "		✓	→ Dont analyze per Eric. SC. (HOLD)											
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Please hold samples until we confirm testing. Mark D'Arcy

Comments: * Go ahead with metals for sample #1 as per Eric. L. SC Apr. 20/11. (Sub-surface) Temp 16.6°C

Relinquished By: [signature] Date: APR 19/11 Time:	Received at Depot: Date: 11 9 Time:	Received at Lab: [signature] Date: Apr 19/11 Time: 2:40	Verified By: [signature] Date: Apr. 20/11 Time: 8:26am

Swift

Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements.

WHITE - Lab Copy, PINK - Client Copy

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Luke Lopers

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

Client PO: 10897
Project: PE2278
Custody: 83379

Report Date: 6-Jul-2011
Order Date: 5-Jul-2011
Order #: 1128097

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

Paracel ID	Client ID
1128097-01	BH5-SS3

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 06-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:5-Jul-2011

Client PO: 10897 Project Description: PE2278

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	6-Jul-11	6-Jul-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	6-Jul-11	6-Jul-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	6-Jul-11	6-Jul-11
Solids, %	Gravimetric, calculation	6-Jul-11	6-Jul-11

Certificate of Analysis

Report Date: 06-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:5-Jul-2011

Client PO: 10897

Project Description: PE2278

	Client ID:	BH5-SS3	-	-	-
	Sample Date:	05-Jul-11	-	-	-
	Sample ID:	1128097-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	75.4	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	98.0%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	<10	-	-	-
F2 PHCs (C10-C16)	10 ug/g dry	46	-	-	-
F3 PHCs (C16-C34)	10 ug/g dry	969	-	-	-
F4 PHCs (C34-C50)	10 ug/g dry	217	-	-	-

Certificate of Analysis

Report Date: 06-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:5-Jul-2011

Client PO: 10897 Project Description: PE2278

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	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	*7.96*		*ug/g*		*99.5*	*50-140*			

Certificate of Analysis

Report Date: 06-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:5-Jul-2011

Client PO: 10897

Project Description: PE2278

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	10	ug/g wet	ND				50	
F3 PHCs (C16-C34)	ND	10	ug/g wet	ND				50	
F4 PHCs (C34-C50)	ND	10	ug/g wet	ND				50	
Physical Characteristics									
% Solids	89.4	0.1	% by Wt.	88.2			1.4	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	*4.64*		*ug/g dry*	*ND*	*99.0*	*50-140*			

Certificate of Analysis

Report Date: 06-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:5-Jul-2011

Client PO: 10897 Project Description: PE2278

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	101	10	ug/g	ND	101	80-120			
F2 PHCs (C10-C16)	84	10	ug/g	ND	105	61-129			
F3 PHCs (C16-C34)	205	10	ug/g	ND	102	61-129			
F4 PHCs (C34-C50)	102	10	ug/g	ND	85.4	61-129			
Volatiles									
Benzene	0.684	0.02	ug/g	ND	73.3	60-130			
Ethylbenzene	1.94	0.05	ug/g	ND	87.4	60-130			
Toluene	8.66	0.05	ug/g	ND	80.1	60-130			
m,p-Xylenes	6.13	0.05	ug/g	ND	91.1	60-130			
o-Xylene	2.40	0.05	ug/g	ND	89.0	60-130			
Surrogate: Toluene-d8	*7.96*		*ug/g*		*99.5*	*50-140*			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
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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Chain of Custody
(lab use only)

Nº 83379

Reg. Drinking Water

Client Name: Paterson	Project Ref: PE 2278	Waterworks Name:	Page 1 of 1
Contact Name: Luke Lopers LLopers@patersongroup.ca	Quote #	Waterworks Number:	Sample Taken by:
Address: 28 Concourse gate Nepean, ONT	PO # 10897	Address:	Print Name: Dan. S
	E-mail Address: ~~Lloper~~	After hours Contact:	Signature:
Telephone: (613) 226 7381	Fax:	Public Health Unit:	TAT: ✓ 1-day | | 2-day | | Reg.

Matrix Types: S–Soil/Sed. GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P- Paint A-Air O-Other

Samples submitted under: (Indicate **ONLY** one)
☐ O. Reg 153 (511) Table 3 ☐ O. Reg 170/03 ☐ O. Reg 318/08 ☐ Private well
☐ CCME ____ ☐ O. Reg 243/07 ☐ O. Reg 319/08 ☐ Other: ____

Type of **DW** Sample: **R** = Raw; **T** = Treated; **D** = Distribution
Location Types: **S** = Surface Water; **G** = Ground Water

Paracel Order Number: 1128097

	Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken Date	Sample Taken Time	Free / Combined Chlorine Residual mg/L	BTEX	PHC's F1 - F4							
1	BHS - SS3	S			1	05/07/11	11:30		✓	✓		60ml + vial					
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments:

Preservation Verification: pH N/A Temperature 23.0
Verified by: MC JL

Relinquished By (Print & Sign): Dan. S

Date/Time: 05/07/11 3:00pm

Lab Use Only:

Received By Driver/Depot: Todd Beaudette	Received at Lab: MC JL	Verified By: MC JL
Date/Time:	Date/Time: July 5/11 4:15	Date/Time: July 5/11 4:52

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Mark D'Arcy

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

Client PO: 10926
Project: PE2278
Custody: 85592

Report Date: 12-Jul-2011
Order Date: 7-Jul-2011
Order #: 1128224

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

Paracel ID	Client ID
1128224-01	BH7-AU2
1128224-02	BH8-SS5

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:7-Jul-2011

Client PO: 10926 Project Description: PE2278

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.8 - ICP-MS	12-Jul-11	12-Jul-11
CCME PHC F1	CWS Tier 1 - P&T GC-FID	7-Jul-11	11-Jul-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	9-Jul-11	11-Jul-11
Chromium, hexavalent	MOE E3056 - Extraction, colourimetric	8-Jul-11	8-Jul-11
Mercury	EPA 7471A - CVAA, digestion	11-Jul-11	11-Jul-11
Metals	EPA 6020 - Digestion - ICP-MS	11-Jul-11	11-Jul-11
Solids, %	Gravimetric, calculation	11-Jul-11	11-Jul-11

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:7-Jul-2011

Client PO: 10926

Project Description: PE2278

	Client ID:	BH7-AU2	BH8-SS5	-	-
	Sample Date:	06-Jul-11	06-Jul-11	-	-
	Sample ID:	1128224-01	1128224-02	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	88.7	78.9	-	-
Metals					
Antimony	1 ug/g dry	<1	-	-	-
Arsenic	1 ug/g dry	3	-	-	-
Barium	1 ug/g dry	277	-	-	-
Beryllium	0.5 ug/g dry	<0.5	-	-	-
Boron	5.0 ug/g dry	8.3	-	-	-
Boron, available	0.5 ug/g dry	0.9	-	-	-
Cadmium	0.5 ug/g dry	<0.5	-	-	-
Chromium	5 ug/g dry	18	-	-	-
Chromium (VI)	0.4 ug/g dry	<0.4	-	-	-
Cobalt	1 ug/g dry	5	-	-	-
Copper	5 ug/g dry	23	-	-	-
Lead	1 ug/g dry	145	-	-	-
Mercury	0.1 ug/g dry	0.2	-	-	-
Molybdenum	1 ug/g dry	<1	-	-	-
Nickel	5 ug/g dry	13	-	-	-
Selenium	1 ug/g dry	<1	-	-	-
Silver	0.3 ug/g dry	<0.3	-	-	-
Thallium	1 ug/g dry	<1	-	-	-
Uranium	1 ug/g dry	<1	-	-	-
Vanadium	10 ug/g dry	22	-	-	-
Zinc	20 ug/g dry	176	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	-	<10	-	-
F2 PHCs (C10-C16)	10 ug/g dry	-	29	-	-
F3 PHCs (C16-C34)	10 ug/g dry	-	39	-	-
F4 PHCs (C34-C50)	10 ug/g dry	-	<10	-	-

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:7-Jul-2011

Client PO: 10926 Project Description: PE2278

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Metals									
Antimony	ND	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	1	ug/g						
Beryllium	ND	0.5	ug/g						
Boron, available	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.4	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Lead	ND	1	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Thallium	ND	1	ug/g						
Uranium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:7-Jul-2011

Client PO: 10926 Project Description: PE2278

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	10	ug/g wet	ND				50	
F3 PHCs (C16-C34)	ND	10	ug/g wet	ND				50	
F4 PHCs (C34-C50)	ND	10	ug/g wet	ND				50	
Metals									
Antimony	ND	1	ug/g dry	ND				26	
Arsenic	2.9	1	ug/g dry	3.1			4.6	35	
Barium	22.1	1	ug/g dry	22.3			0.9	34	
Beryllium	ND	0.5	ug/g dry	ND				25	
Boron, available	ND	0.5	ug/g dry	ND				35	
Boron	ND	5.0	ug/g dry	ND				33	
Cadmium	ND	0.5	ug/g dry	ND				33	
Chromium (VI)	ND	0.4	ug/g dry	ND				35	
Chromium	7.0	5	ug/g dry	7.1			1.9	32	
Cobalt	3.6	1	ug/g dry	3.6			0.9	32	
Copper	5.9	5	ug/g dry	6.1			3.4	32	
Lead	5.3	1	ug/g dry	5.2			1.4	44	
Mercury	0.144	0.1	ug/g dry	0.163			12.5	35	
Molybdenum	1.2	1	ug/g dry	1.1			8.7	29	
Nickel	8.5	5	ug/g dry	8.8			2.9	29	
Selenium	1.0	1	ug/g dry	1.2			13.4	28	
Silver	0.57	0.3	ug/g dry	0.82			35.2	28	QR-01
Thallium	ND	1	ug/g dry	ND				27	
Uranium	ND	1	ug/g dry	ND				27	
Vanadium	11.6	10	ug/g dry	11.0			5.1	27	
Zinc	22.6	20	ug/g dry	21.7			4.4	27	
Physical Characteristics									
% Solids	86.9	0.1	% by Wt.	85.7			1.3	25	

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:7-Jul-2011

Client PO: 10926 Project Description: PE2278

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	199	10	ug/g	ND	99.5	80-120			
F2 PHCs (C10-C16)	56	10	ug/g	ND	70.0	61-129			
F3 PHCs (C16-C34)	158	10	ug/g	ND	79.0	61-129			
F4 PHCs (C34-C50)	100	10	ug/g	ND	83.6	61-129			
Metals									
Antimony	55.1		ug/L	ND	110	80-120			
Arsenic	53.3		ug/L	ND	107	80-120			
Barium	52.2		ug/L	ND	104	80-120			
Beryllium	54.4		ug/L	ND	109	80-120			
Boron, available	4.58	0.5	ug/g	ND	91.7	70-122			
Boron	54.0		ug/L	ND	108	80-120			
Cadmium	52.1		ug/L	ND	104	80-120			
Chromium (VI)	4.8	0.4	ug/g	ND	97.0	89-123			
Chromium	54.4		ug/L	ND	109	80-120			
Cobalt	54.5		ug/L	ND	109	80-120			
Copper	53.0		ug/L	ND	106	80-120			
Lead	54.4		ug/L	ND	109	80-120			
Mercury	1.58	0.1	ug/g	ND	105	72-128			
Molybdenum	53.6		ug/L	ND	107	80-120			
Nickel	53.0		ug/L	ND	106	80-120			
Selenium	53.3		ug/L	ND	107	80-120			
Silver	52.3		ug/L	ND	105	80-120			
Thallium	57.5		ug/L	ND	115	80-120			
Uranium	56.8		ug/L	ND	114	80-120			
Vanadium	55.2		ug/L	ND	110	80-120			
Zinc	51.6		ug/L	ND	103	80-120			

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:7-Jul-2011

Client PO: 10926 Project Description: PE2278

Sample and QC Qualifiers Notes

1- LG-SMP005 : Sample - F1/BTEX/VOCs (soil) not submitted according to Reg. 179 (511) - not field preserved

2- QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

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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Chain of Custody
(Lab Use Only)
Nº 85592

Page 1 of 1

Client Name: Paterson Group.	Project Reference: PE2278	TAT: [ ] Regular
Contact Name: Mark D'Arcy	Quote #	[✓] 2 Day
Address:	PO # 10926	[ ] 1 Day
	Email Address:	[ ] Same Day
Telephone: (613) 226-7381		Date Required:

Samples Submitted Under: [ ] O. Reg. 153/04 Table __ [✓] O. Reg 511/09 Table 3 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] 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: 1128224

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	F1-F4	Full Metals									
1	BH7-AU2	S	'	1	July 6/11	12pm		✓				60	ml				
2	BH8-SS5	S	'	1	"	2pm	✓					"					
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: Full metals, surface samples per Mark. - MJC
Samples not field preserved.

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Mark D'Arcy	A. Dcouse	MJC	MJC
Date/Time: July 7/11 9:50am	Date/Time: 07/07/11 1:09pm	Date/Time: July 7/11 2:00	Date/Time: July 7/11 4:05
	Temperature: ___ °C	Temperature: 19.2 °C	pH Verified [ ] By: N/A

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www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Eric Leveque

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

Client PO: 10537
Project: PE2278
Custody: 84455

Report Date: 2-May-2011
Order Date: 26-Apr-2011
Order #: 1118076

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

Paracel ID	Client ID
1118076-01	BH1-GW1

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 02-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:26-Apr-2011

Client PO: 10537 Project Description: PE2278

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	27-Apr-11	29-Apr-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	27-Apr-11	27-Apr-11
PAHs by GC-MS, standard scan	EPA 625 - GC-MS, extraction	28-Apr-11	28-Apr-11
VOCs	EPA 624 - P&T GC-MS	27-Apr-11	29-Apr-11

Certificate of Analysis

Report Date: 02-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:26-Apr-2011

Client PO: 10537

Project Description: PE2278

	Client ID:	BH1-GW1	-	-	-
	Sample Date:	26-Apr-11	-	-	-
	Sample ID:	1118076-01	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Acetone	5.0 ug/L	19.8	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroethane	1.0 ug/L	<1.0	-	-	-
Chloroform	0.5 ug/L	<0.5	-	-	-
Chloromethane	3.0 ug/L	<3.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-

Certificate of Analysis

Report Date: 02-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:26-Apr-2011

Client PO: 10537

Project Description: PE2278

	Client ID:	BH1-GW1	-	-	-
	Sample Date:	26-Apr-11	-	-	-
	Sample ID:	1118076-01	-	-	-
	MDL/Units	Water	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
1,2,4- Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
4-Bromofluorobenzene	Surrogate	102%	-	-	-
Dibromofluoromethane	Surrogate	114%	-	-	-
Toluene-d8	Surrogate	121%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	<100	-	-	-
F3 PHCs (C16-C34)	100 ug/L	<100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	<100	-	-	-
F1 + F2 PHCs	125 ug/L	<125	-	-	-
F3 + F4 PHCs	200 ug/L	<200	-	-	-
Semi-Volatiles					
Acenaphthene	0.05 ug/L	<0.05	-	-	-
Acenaphthylene	0.05 ug/L	<0.05	-	-	-
Anthracene	0.01 ug/L	0.01	-	-	-
Benzo [a] anthracene	0.01 ug/L	<0.01	-	-	-
Benzo [a] pyrene	0.01 ug/L	<0.01	-	-	-
Benzo [b] fluoranthene	0.05 ug/L	<0.05	-	-	-
Benzo [g,h,i] perylene	0.05 ug/L	<0.05	-	-	-
Benzo [k] fluoranthene	0.05 ug/L	<0.05	-	-	-

Certificate of Analysis

Report Date: 02-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:26-Apr-2011

Client PO: 10537

Project Description: PE2278

	Client ID:	BH1-GW1	-	-	-
	Sample Date:	26-Apr-11	-	-	-
	Sample ID:	1118076-01	-	-	-
	MDL/Units	Water	-	-	-
Biphenyl	0.05 ug/L	0.07	-	-	-
Chrysene	0.05 ug/L	<0.05	-	-	-
Dibenzo [a,h] anthracene	0.05 ug/L	<0.05	-	-	-
Fluoranthene	0.01 ug/L	0.04	-	-	-
Fluorene	0.05 ug/L	0.20	-	-	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	<0.05	-	-	-
1-Methylnaphthalene	0.05 ug/L	0.15	-	-	-
2-Methylnaphthalene	0.05 ug/L	0.18	-	-	-
Methylnaphthalene (1&2)	0.10 ug/L	0.33	-	-	-
Naphthalene	0.05 ug/L	0.20	-	-	-
Phenanthrene	0.05 ug/L	0.74	-	-	-
Pyrene	0.01 ug/L	<0.01	-	-	-
2-Fluorobiphenyl	Surrogate	93.6%	-	-	-
Terphenyl-d14	Surrogate	75.7%	-	-	-

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						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Biphenyl	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	*15.7*		*ug/L*		*78.6*	*31-154*			
Surrogate: Terphenyl-d14	*14.7*		*ug/L*		*73.6*	*37-156*			
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						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
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						
1,2,4- Trimethylbenzene	ND	0.5	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	*32.4*		*ug/L*		*101*	*50-140*			
Surrogate: Dibromofluoromethane	*32.0*		*ug/L*		*100*	*50-140*			
Surrogate: Toluene-d8	*38.5*		*ug/L*		*120*	*50-140*			

Certificate of Analysis

Report Date: 02-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:26-Apr-2011

Client PO: 10537

Project Description: PE2278

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	0.53	0.5	ug/L	0.65			20.3	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				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	0.65	0.5	ug/L	0.85			26.7	30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	61.7	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	3.66	0.5	ug/L	4.33			16.8	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	
1,2,4- Trimethylbenzene	2.20	0.5	ug/L	2.68			19.7	30	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	3.28	0.5	ug/L	4.25			25.8	30	
o-Xylene	11.3	0.5	ug/L	13.1			14.4	30	
Surrogate: 4-Bromofluorobenzene	*33.5*		*ug/L*	*ND*	*105*	*50-140*			
Surrogate: Dibromofluoromethane	*35.7*		*ug/L*	*ND*	*112*	*50-140*			
Surrogate: Toluene-d8	*38.0*		*ug/L*	*ND*	*119*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1830	25	ug/L	ND	91.5	68-117			
F2 PHCs (C10-C16)	1490	100	ug/L	ND	93.1	61-129			
F3 PHCs (C16-C34)	3510	100	ug/L	ND	87.8	61-129			
F4 PHCs (C34-C50)	2100	100	ug/L	ND	87.5	61-129			
Semi-Volatiles									
Acenaphthene	3.82	0.05	ug/L	ND	76.5	32-116			
Acenaphthylene	3.82	0.05	ug/L	ND	76.4	26-120			
Anthracene	3.73	0.01	ug/L	ND	74.6	29-126			
Benzo [a] anthracene	4.23	0.01	ug/L	ND	84.5	29-126			
Benzo [a] pyrene	4.39	0.01	ug/L	ND	87.7	29-111			
Benzo [b] fluoranthene	3.51	0.05	ug/L	ND	70.2	26-111			
Benzo [g,h,i] perylene	3.86	0.05	ug/L	ND	77.1	23-128			
Benzo [k] fluoranthene	3.89	0.05	ug/L	ND	77.8	23-135			
Biphenyl	3.08	0.05	ug/L	ND	61.5	31-107			
Chrysene	4.84	0.05	ug/L	ND	96.8	29-137			
Dibenzo [a,h] anthracene	3.85	0.05	ug/L	ND	77.0	20-131			
Fluoranthene	4.68	0.01	ug/L	ND	93.5	24-131			
Fluorene	3.79	0.05	ug/L	ND	75.8	28-123			
Indeno [1,2,3-cd] pyrene	4.01	0.05	ug/L	ND	80.2	20-128			
1-Methylnaphthalene	3.76	0.05	ug/L	ND	75.2	25-127			
2-Methylnaphthalene	3.63	0.05	ug/L	ND	72.7	21-119			
Naphthalene	3.86	0.05	ug/L	ND	77.2	29-118			
Phenanthrene	3.90	0.05	ug/L	ND	78.1	34-108			
Pyrene	4.29	0.01	ug/L	ND	85.7	29-131			
Surrogate: 2-Fluorobiphenyl	*21.0*		*ug/L*		*105*	*31-154*			
Surrogate: Terphenyl-d14	*16.8*		*ug/L*		*83.9*	*37-156*			
Volatiles									
Acetone	79.5	5.0	ug/L	ND	79.5	50-140			
Benzene	29.1	0.5	ug/L	ND	72.7	60-130			
Bromodichloromethane	30.6	0.5	ug/L	ND	76.4	60-130			
Bromoform	30.4	0.5	ug/L	ND	76.0	60-130			
Bromomethane	20.9	0.5	ug/L	ND	52.3	50-140			
Carbon Tetrachloride	24.0	0.2	ug/L	ND	60.0	60-130			
Chlorobenzene	32.1	0.5	ug/L	ND	80.3	60-130			
Chloroethane	26.4	1.0	ug/L	ND	66.1	50-140			
Chloroform	31.0	0.5	ug/L	ND	77.4	60-130			
Chloromethane	31.0	3.0	ug/L	ND	77.4	50-140			
Dibromochloromethane	33.2	0.5	ug/L	ND	83.0	60-130			
Dichlorodifluoromethane	22.5	1.0	ug/L	ND	56.3	50-140			
1,2-Dibromoethane	33.1	0.2	ug/L	ND	82.8	60-130			
1,2-Dichlorobenzene	31.8	0.5	ug/L	ND	79.4	60-130			
1,3-Dichlorobenzene	31.6	0.5	ug/L	ND	79.0	60-130			
1,4-Dichlorobenzene	31.4	0.5	ug/L	ND	78.5	60-130			
1,1-Dichloroethane	29.6	0.5	ug/L	ND	73.9	60-130			
1,2-Dichloroethane	30.5	0.5	ug/L	ND	76.2	60-130			
1,1-Dichloroethylene	30.7	0.5	ug/L	ND	76.7	60-130			
cis-1,2-Dichloroethylene	32.2	0.5	ug/L	ND	80.5	60-130			
trans-1,2-Dichloroethylene	29.1	0.5	ug/L	ND	72.7	60-130			
1,2-Dichloropropane	30.2	0.5	ug/L	ND	75.6	60-130			
cis-1,3-Dichloropropylene	32.3	0.5	ug/L	ND	80.7	60-130			
trans-1,3-Dichloropropylene	34.7	0.5	ug/L	ND	86.6	60-130			
Ethylbenzene	32.1	0.5	ug/L	ND	80.2	60-130			
Hexane	21.0	1.0	ug/L	ND	52.6	60-130			QS-02

Certificate of Analysis

Report Date: 02-May-2011

Client: **Paterson Group Consulting Engineers**

Order Date:26-Apr-2011

Client PO: 10537 Project Description: PE2278

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methyl Ethyl Ketone (2-Butanone)	74.5	5.0	ug/L	ND	74.5	50-140			
Methyl Butyl Ketone (2-Hexanone)	78.8	10.0	ug/L	ND	78.8	50-140			
Methyl Isobutyl Ketone	79.1	5.0	ug/L	ND	79.1	50-140			
Methyl tert-butyl ether	73.8	2.0	ug/L	ND	73.8	50-140			
Methylene Chloride	29.6	5.0	ug/L	ND	74.1	60-130			
Styrene	34.2	0.5	ug/L	ND	85.6	60-130			
1,1,1,2-Tetrachloroethane	34.6	0.5	ug/L	ND	86.6	60-130			
1,1,2,2-Tetrachloroethane	33.3	0.5	ug/L	ND	83.2	60-130			
Tetrachloroethylene	29.7	0.5	ug/L	ND	74.3	60-130			
Toluene	29.9	0.5	ug/L	ND	74.8	60-130			
1,2,4-Trichlorobenzene	31.0	0.5	ug/L	ND	77.4	60-130			
1,1,1-Trichloroethane	29.8	0.5	ug/L	ND	74.6	60-130			
1,1,2-Trichloroethane	31.5	0.5	ug/L	ND	78.7	60-130			
Trichloroethylene	29.4	0.5	ug/L	ND	73.4	60-130			
Trichlorofluoromethane	30.3	1.0	ug/L	ND	75.6	60-130			
1,2,4- Trimethylbenzene	31.4	0.5	ug/L	ND	78.5	60-130			
1,3,5-Trimethylbenzene	36.0	0.5	ug/L	ND	90.0	60-130			
Vinyl chloride	37.0	0.5	ug/L	ND	92.6	50-140			
m,p-Xylenes	63.9	0.5	ug/L	ND	79.9	60-130			
o-Xylene	32.2	0.5	ug/L	ND	80.6	60-130			
Surrogate: 4-Bromofluorobenzene	*32.1*		*ug/L*		*100*	*50-140*			
Surrogate: Dibromofluoromethane	*31.8*		*ug/L*		*99.4*	*50-140*			
Surrogate: Toluene-d8	*33.4*		*ug/L*		*104*	*50-140*			

Sample and QC Qualifiers Notes

1- 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

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)

Nº 84455

Reg. Drinking Water

Client Name: Paterson	Project Ref: PE2278	Waterworks Name:	Page 1 of 1
Contact Name: Eric Leveque	Quote #	Waterworks Number:	Sample Taken by:
Address: 28 Concourse Gate, Unit 1	PO # 10537	Address:	Print Name: T. Robinson
	E-mail Address: eleveque@patersongroup.ca	After hours Contact:	Signature:
Telephone: 613-226-7381	Fax:	Public Health Unit:	TAT: [ ] 1-day [ ] 2-day [X] Reg.

Matrix Types: S–Soil/Sed. GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P- Paint A-Air O-Other

Samples submitted under: (Indicate **ONLY** one)
[X] O. Reg 153 (511) Table 1 [ ] O. Reg 170/03 [ ] O. Reg 318/08 [ ] Private well
[ ] CCME ____ [ ] O. Reg 243/07 [ ] O. Reg 319/08 [ ] Other: ____

Type of DW Sample: R = Raw; T = Treated; D = Distribution
Location Types: S = Surface Water; G = Ground Water

Paracel Order Number: 1118076

	Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken Date	Sample Taken Time	Free / Combined Chlorine Residual mg/L	Required Analyses: VOC's	PHC's	PAH's						
1	BH1-GW1	GW				26/4/11	12pm		X	X	X						
2						"											
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments:

Preservation Verification: pH ✓ Temperature 14.9°C
Verified by: MJC

Relinquished By (Print & Sign): T. Robinson
Date/Time: 4/26/11 2:45pm

Lab Use Only:

Received By Driver/Depot: Todd Bennett	Received at Lab: DLS	Verified By: MJC
Date/Time:	Date/Time: Apr 27/11 4:46	Date/Time: Apr 26/11 5:11

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Certificate of Analysis

Paterson Group Consulting Engineers
28 Concourse Gate, Unit 1
Nepean, ON K2E 7T7
Attn: Mark D'Arcy

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

Client PO: 10190
Project: PE2278
Custody: 85648

Report Date: 12-Jul-2011
Order Date: 11-Jul-2011
Order #: 1129059

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

Paracel ID	Client ID
1129059-01	BH5-GW1

Approved By: Mark Foto

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

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:11-Jul-2011

Client PO: 10190 Project Description: PE2278

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
CCME PHC F1	CWS Tier 1 - P&T GC-FID	11-Jul-11	11-Jul-11
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	12-Jul-11	12-Jul-11
VOCs	EPA 624 - P&T GC-MS	11-Jul-11	11-Jul-11

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:11-Jul-2011

Client PO: 10190

Project Description: PE2278

	Client ID:	BH5-GW1	-	-	-
	Sample Date:	11-Jul-11	-	-	-
	Sample ID:	1129059-01	-	-	-
	MDL/Units	Water	-	-	-
Volatiles					
Acetone	5.0 ug/L	<5.0	-	-	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.5 ug/L	<0.5	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.5 ug/L	<0.5	-	-	-
Carbon Tetrachloride	0.2 ug/L	<0.2	-	-	-
Chlorobenzene	0.5 ug/L	<0.5	-	-	-
Chloroethane	1.0 ug/L	<1.0	-	-	-
Chloroform	0.5 ug/L	<0.5	-	-	-
Chloromethane	3.0 ug/L	<3.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	-	-	-
1,2-Dibromoethane	0.2 ug/L	<0.2	-	-	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethylene, total	0.5 ug/L	<0.5	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Hexane	1.0 ug/L	<1.0	-	-	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	-	-	-
Methyl Butyl Ketone (2-Hexanone)	10.0 ug/L	<10.0	-	-	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	-	-	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	-	-	-
Methylene Chloride	5.0 ug/L	<5.0	-	-	-

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:11-Jul-2011

Client PO: 10190

Project Description: PE2278

	Client ID:	BH5-GW1	-	-	-
	Sample Date:	11-Jul-11	-	-	-
	Sample ID:	1129059-01	-	-	-
	MDL/Units	Water	-	-	-
Styrene	0.5 ug/L	<0.5	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,2,4-Trichlorobenzene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	-	-	-
Trichloroethylene	0.5 ug/L	<0.5	-	-	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
1,2,4-Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	0.5 ug/L	<0.5	-	-	-
4-Bromofluorobenzene	Surrogate	90.0%	-	-	-
Dibromofluoromethane	Surrogate	115%	-	-	-
Toluene-d8	Surrogate	112%	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	-	-	-
F2 PHCs (C10-C16)	100 ug/L	408	-	-	-
F3 PHCs (C16-C34)	100 ug/L	10100	-	-	-
F4 PHCs (C34-C50)	100 ug/L	1460	-	-	-
F1 + F2 PHCs	125 ug/L	408	-	-	-
F3 + F4 PHCs	200 ug/L	11500	-	-	-

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:11-Jul-2011

Client PO: 10190 Project Description: PE2278

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						
1,2,4-Trimethylbenzene	ND	0.5	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	*27.8*		*ug/L*		*86.8*	*50-140*			
Surrogate: Dibromofluoromethane	*33.8*		*ug/L*		*106*	*50-140*			
Surrogate: Toluene-d8	*35.8*		*ug/L*		*112*	*50-140*			

Certificate of Analysis

Report Date: 12-Jul-2011

Client: **Paterson Group Consulting Engineers**

Order Date:11-Jul-2011

Client PO: 10190 Project Description: PE2278

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	1250	ug/L	ND				30	
Volatiles									
Acetone	627	250	ug/L	596			5.2	30	
Benzene	ND	25.0	ug/L	ND				30	
Bromodichloromethane	ND	25.0	ug/L	ND				30	
Bromoform	ND	25.0	ug/L	ND				30	
Bromomethane	ND	25.0	ug/L	ND				30	
Carbon Tetrachloride	ND	10.0	ug/L	ND				30	
Chlorobenzene	ND	25.0	ug/L	ND				30	
Chloroethane	ND	50.0	ug/L	ND				30	
Chloroform	ND	25.0	ug/L	ND				30	
Chloromethane	ND	150	ug/L	ND				30	
Dibromochloromethane	ND	25.0	ug/L	ND				30	
Dichlorodifluoromethane	ND	50.0	ug/L	ND				30	
1,2-Dibromoethane	ND	10.0	ug/L	ND				30	
1,2-Dichlorobenzene	ND	25.0	ug/L	ND				30	
1,3-Dichlorobenzene	ND	25.0	ug/L	ND				30	
1,4-Dichlorobenzene	ND	25.0	ug/L	ND				30	
1,1-Dichloroethane	ND	25.0	ug/L	ND				30	
1,2-Dichloroethane	ND	25.0	ug/L	ND				30	
1,1-Dichloroethylene	ND	25.0	ug/L	ND				30	
cis-1,2-Dichloroethylene	483	25.0	ug/L	486			0.5	30	
trans-1,2-Dichloroethylene	ND	25.0	ug/L	ND				30	
1,2-Dichloropropane	ND	25.0	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	25.0	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	25.0	ug/L	ND				30	
Ethylbenzene	ND	25.0	ug/L	ND				30	
Hexane	ND	50.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	2790	250	ug/L	2790			0.1	30	
Methyl Butyl Ketone (2-Hexanone)	ND	500	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	250	ug/L	ND				30	
Methyl tert-butyl ether	ND	100	ug/L	ND				30	
Methylene Chloride	ND	250	ug/L	ND				30	
Styrene	ND	25.0	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	25.0	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	25.0	ug/L	ND				30	
Tetrachloroethylene	ND	25.0	ug/L	ND				30	
Toluene	ND	25.0	ug/L	ND				30	
1,2,4-Trichlorobenzene	ND	25.0	ug/L	ND				30	
1,1,1-Trichloroethane	ND	25.0	ug/L	ND				30	
1,1,2-Trichloroethane	ND	25.0	ug/L	ND				30	
Trichloroethylene	ND	25.0	ug/L	ND				30	
Trichlorofluoromethane	ND	50.0	ug/L	ND				30	
1,2,4-Trimethylbenzene	ND	25.0	ug/L	ND				30	
1,3,5-Trimethylbenzene	ND	25.0	ug/L	ND				30	
Vinyl chloride	ND	25.0	ug/L	ND				30	
m,p-Xylenes	ND	25.0	ug/L	ND				30	
o-Xylene	ND	25.0	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	*1480*		*ug/L*	*ND*	*92.7*	*50-140*			
Surrogate: Dibromofluoromethane	*1970*		*ug/L*	*ND*	*123*	*50-140*			
Surrogate: Toluene-d8	*1700*		*ug/L*	*ND*	*106*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1870	25	ug/L	ND	93.4	68-117			
F2 PHCs (C10-C16)	1270	100	ug/L	ND	79.1	61-129			
F3 PHCs (C16-C34)	3680	100	ug/L	ND	92.0	61-129			
F4 PHCs (C34-C50)	2430	100	ug/L	ND	101	61-129			
Volatiles									
Acetone	110	5.0	ug/L	ND	110	50-140			
Benzene	28.7	0.5	ug/L	ND	71.7	60-130			
Bromodichloromethane	51.0	0.5	ug/L	ND	127	60-130			
Bromoform	47.0	0.5	ug/L	ND	118	60-130			
Bromomethane	38.9	0.5	ug/L	ND	97.4	50-140			
Carbon Tetrachloride	49.1	0.2	ug/L	ND	123	60-130			
Chlorobenzene	43.7	0.5	ug/L	ND	109	60-130			
Chloroethane	42.6	1.0	ug/L	ND	106	50-140			
Chloroform	48.8	0.5	ug/L	ND	122	60-130			
Chloromethane	45.7	3.0	ug/L	ND	114	50-140			
Dibromochloromethane	39.0	0.5	ug/L	ND	97.6	60-130			
Dichlorodifluoromethane	29.7	1.0	ug/L	ND	74.3	50-140			
1,2-Dibromoethane	45.0	0.2	ug/L	ND	112	60-130			
1,2-Dichlorobenzene	38.6	0.5	ug/L	ND	96.5	60-130			
1,3-Dichlorobenzene	40.0	0.5	ug/L	ND	100	60-130			
1,4-Dichlorobenzene	40.4	0.5	ug/L	ND	101	60-130			
1,1-Dichloroethane	36.7	0.5	ug/L	ND	91.7	60-130			
1,2-Dichloroethane	48.0	0.5	ug/L	ND	120	60-130			
1,1-Dichloroethylene	28.8	0.5	ug/L	ND	72.0	60-130			
cis-1,2-Dichloroethylene	29.0	0.5	ug/L	ND	72.6	60-130			
trans-1,2-Dichloroethylene	29.8	0.5	ug/L	ND	74.4	60-130			
1,2-Dichloropropane	28.3	0.5	ug/L	ND	70.8	60-130			
cis-1,3-Dichloropropylene	26.4	0.5	ug/L	ND	65.9	60-130			
trans-1,3-Dichloropropylene	31.4	0.5	ug/L	ND	78.4	60-130			
Ethylbenzene	42.1	0.5	ug/L	ND	105	60-130			
Hexane	31.7	1.0	ug/L	ND	79.2	60-130			
Methyl Ethyl Ketone (2-Butanone)	88.3	5.0	ug/L	ND	88.3	50-140			
Methyl Butyl Ketone (2-Hexanone)	92.7	10.0	ug/L	ND	92.7	50-140			
Methyl Isobutyl Ketone	72.6	5.0	ug/L	ND	72.6	50-140			
Methyl tert-butyl ether	71.7	2.0	ug/L	ND	71.7	50-140			
Methylene Chloride	38.4	5.0	ug/L	ND	96.1	60-130			
Styrene	39.3	0.5	ug/L	ND	98.3	60-130			
1,1,1,2-Tetrachloroethane	42.4	0.5	ug/L	ND	106	60-130			
1,1,2,2-Tetrachloroethane	51.4	0.5	ug/L	ND	129	60-130			
Tetrachloroethylene	37.7	0.5	ug/L	ND	94.3	60-130			
Toluene	28.9	0.5	ug/L	ND	72.3	60-130			
1,2,4-Trichlorobenzene	32.7	0.5	ug/L	ND	81.7	60-130			
1,1,1-Trichloroethane	44.4	0.5	ug/L	ND	111	60-130			
1,1,2-Trichloroethane	37.5	0.5	ug/L	ND	93.7	60-130			
Trichloroethylene	27.0	0.5	ug/L	ND	67.5	60-130			
Trichlorofluoromethane	41.1	1.0	ug/L	ND	103	60-130			
1,3,5-Trimethylbenzene	30.5	0.5	ug/L	ND	76.3	60-130			
Vinyl chloride	52.4	0.5	ug/L	ND	131	50-140			
m,p-Xylenes	86.8	0.5	ug/L	ND	109	60-130			
o-Xylene	44.8	0.5	ug/L	ND	112	60-130			
Surrogate: 4-Bromofluorobenzene	*34.6*		*ug/L*		*108*	*50-140*			
Surrogate: Dibromofluoromethane	*34.1*		*ug/L*		*107*	*50-140*			
Surrogate: Toluene-d8	*29.4*		*ug/L*		*91.9*	*50-140*			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
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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Ottawa, Ontario K1G 4J8
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e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody
(Lab Use Only)
Nº 85648

Page 1 of 1

Client Name: Paterson	Project Reference: PE2278	TAT: [ ] Regular
Contact Name: Mark D'Arcy	Quote #	[ ] 2 Day
Address: 28 Concourse Gate, Unit 1 Ottawa, ON	PO # 10190	[X] 1 Day
	Email Address: mdarcy@patersongroup.ca	[ ] Same Day
Telephone: 613 226-7381		Date Required:

Samples Submitted Under: [ ] O. Reg. 153/04 Table ___ [X] O. Reg 511/09 Table 3 [ ] PWQO [ ] CCME [ ] Sewer Use (Storm) [ ] Sewer Use (Sanitary) [ ] 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: 1129059

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: VOCs	F1 - F4
1	BH5-GW1	GW		3	July 11, '11	9am	X	X
2								
3								
4								
5								
6								
7								
8								
9								
10								

Comments:

Method of Delivery: Paracel

Relinquished By (Print & Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
T. Robinson	A. Blouse	M/C	M/C
Date/Time: July 11, 2011 12pm	Date/Time: 11/07/11 12:50pm	Date/Time: July 11/11 2:45	Date/Time: July 11/11 3:54
	Temperature: ___ °C	Temperature: 17.9 °C	pH Verified [ ] By: N/A

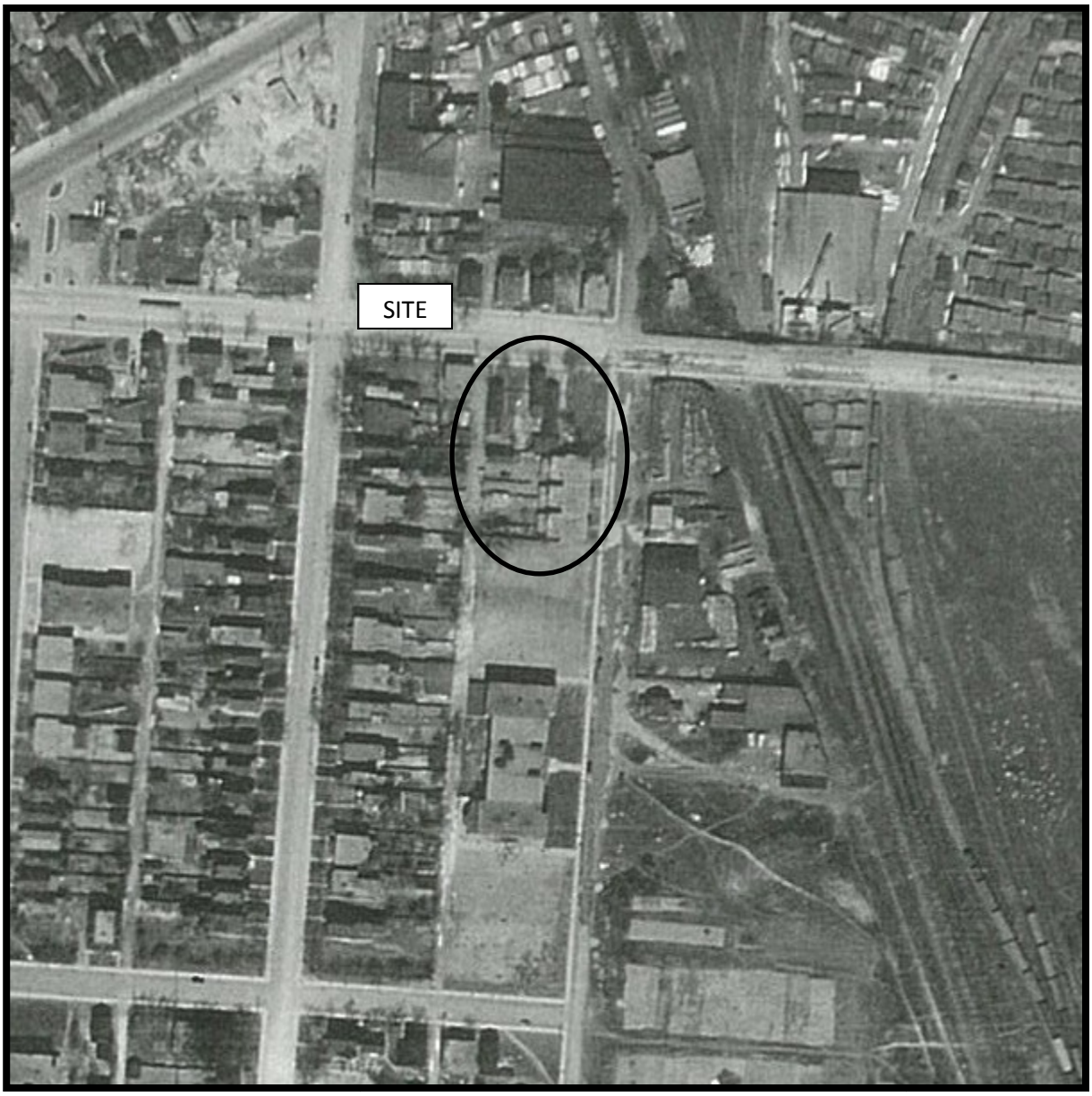
APPENDIX 2

AERIAL PHOTOGRAPHS

MOE FREEDOM OF INFORMATION REQUEST

FIGURE 1 - KEY PLAN

DRAWING NO. PE2278-2 - TEST HOLE LOCATION PLAN

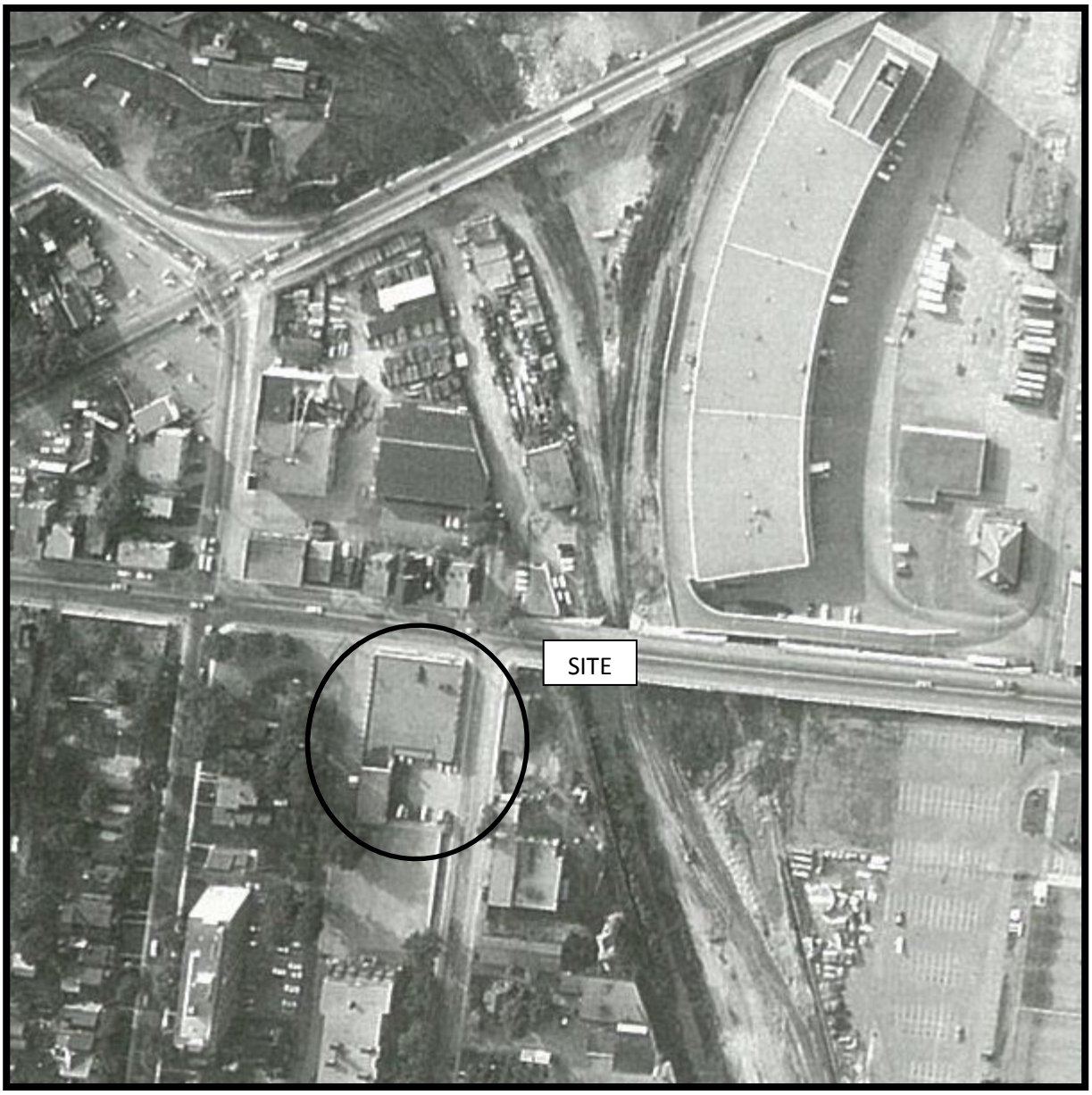


AERIAL PHOTOGRAPH
1928

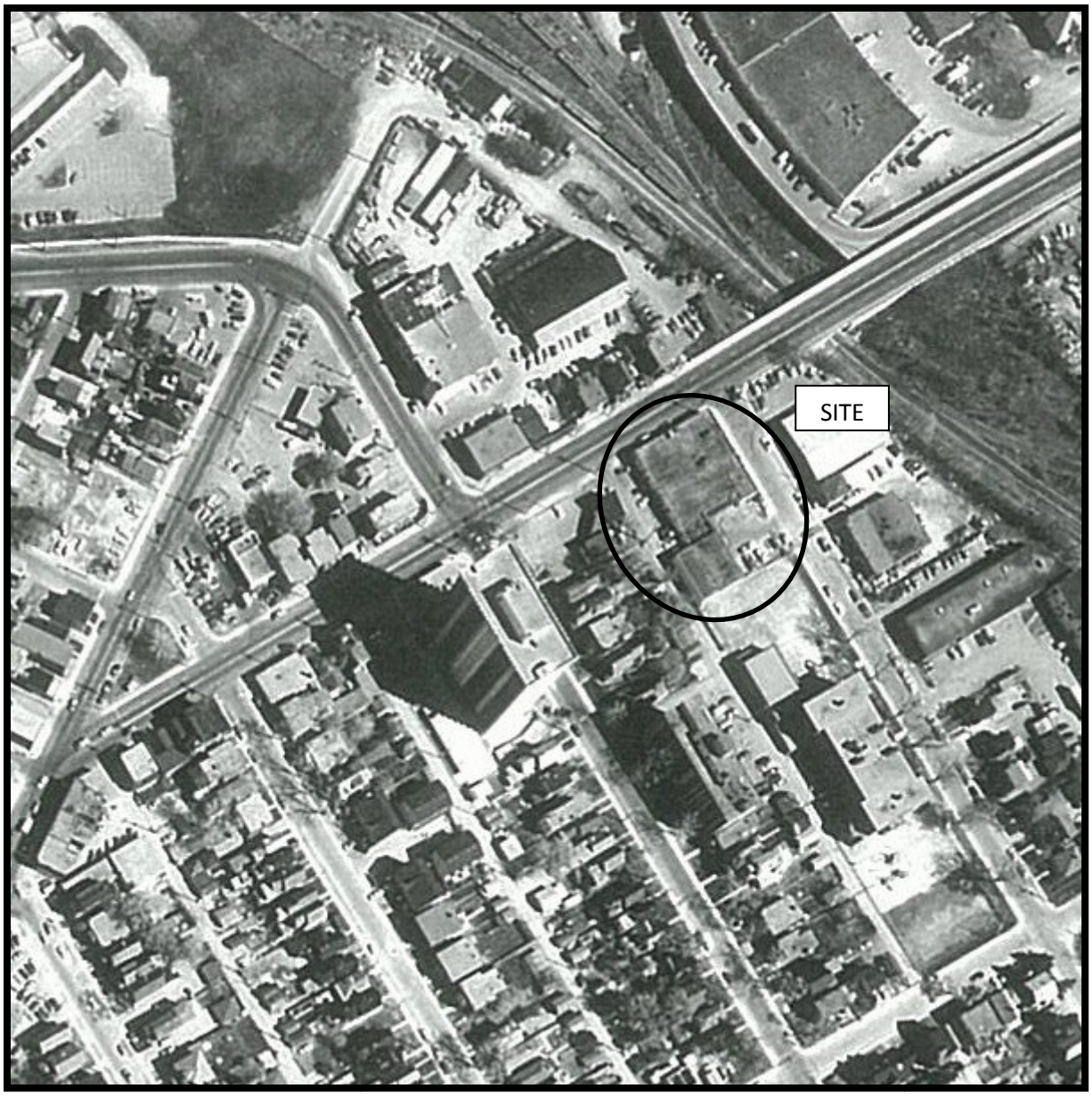
AERIAL PHOTOGRAPH
1946

patersongroup

AERIAL PHOTOGRAPH
1958



AERIAL PHOTOGRAPH
1966



AERIAL PHOTOGRAPH
1986

AERIAL PHOTOGRAPH
2002

Ontario

Ministry of
Environment
and Energy

Freedom of Information Request

This form is for requesting documents which are in the Ministry's files on environmental concerns related to properties. Please refer to the guide on completion and use of this form. Our fax no. is (416) 314-4285.

Requester Data			For Ministry Use Only	
Name, Company Name, Mailing Address and Email Address of Requester Eric Leveque Paterson Group Inc. 28 Concourse Gate - Unit 1 Ottawa, ON K2E 7T7 **Email address:** eleveque@patersongroup.ca			FOI Request No.	Date Request Received
			Fee Paid ☐ ACCT ☐ CHQ ☐ VISA/MC ☐ CASH	
Telephone/Fax Nos. Tel. 613-226-7381 Fax 613-226-6344	Your Project/Reference No. PE2278	Signature/Print /Name of Requester Eric Leveque	☐ CNR ☐ ER ☐ NOR ☐ SWR ☐ WCR ☐ SAC ☐ IEB ☐ EAA ☐ EMR ☐ SWA	

Request Parameters

Municipal Address / Lot, Concession, Geographic Township **(Municipal address essential for cities, towns or regions)**

1050 Somerset Street West, Ottawa Ontario

Present Property Owner(s) and Date(s) of Ownership

Previous Property Owner(s) and Date(s) of Ownership

Present/Previous Tenant(s),(if applicable)

Finateri Boyd (garage) and vacant

Search Parameters *Files older than 2 years may require $60.00 retrieval cost. There is no guarantee that records responsive to your request will be located.*	**Specify Year(s) Requested**
Environmental concerns (General correspondence, occurrence reports, abatement)	all
Orders	all
Spills	all
Investigations/prosecutions ➤ Owner **AND** tenant information must be provided	all
Waste Generator number/classes	all

Certificates of Approval ➤ Proponent information must be provided

1985 and prior records are searched manually. **Search fees in excess of $300.00** could be incurred, depending on the types and years to be searched. Specify Certificates of Approval number(s) (if known). **If supporting documents are also required, mark SD box** and specify type e.g. maps, plans, reports, etc.

	SD	**Specify Year(s) Requested**
air - *emissions*		
water - *mains, treatment, ground level, standpipes & elevated storage, pumping stations (local & booster)*		
sewage - *sanitary, storm, treatment, stormwater, leachate & leachate treatment & sewage pump stations*		
waste water - *industrial discharges*		
waste sites - *disposal, landfill sites, transfer stations, processing sites, incinerator* sites		
waste systems - *PCB destruction, mobile waste processing units, haulers: sewage, non-hazardous & hazardous waste*		
pesticides - *licenses*		

A $5.00 non-refundable application fee, payable to the Minister of Finance, is mandatory. The cost of locating on-site and/or preparing any record is $30.00/hour and 20 cents/page for photocopying and you will be contacted for approval for fees in excess of $30.00.

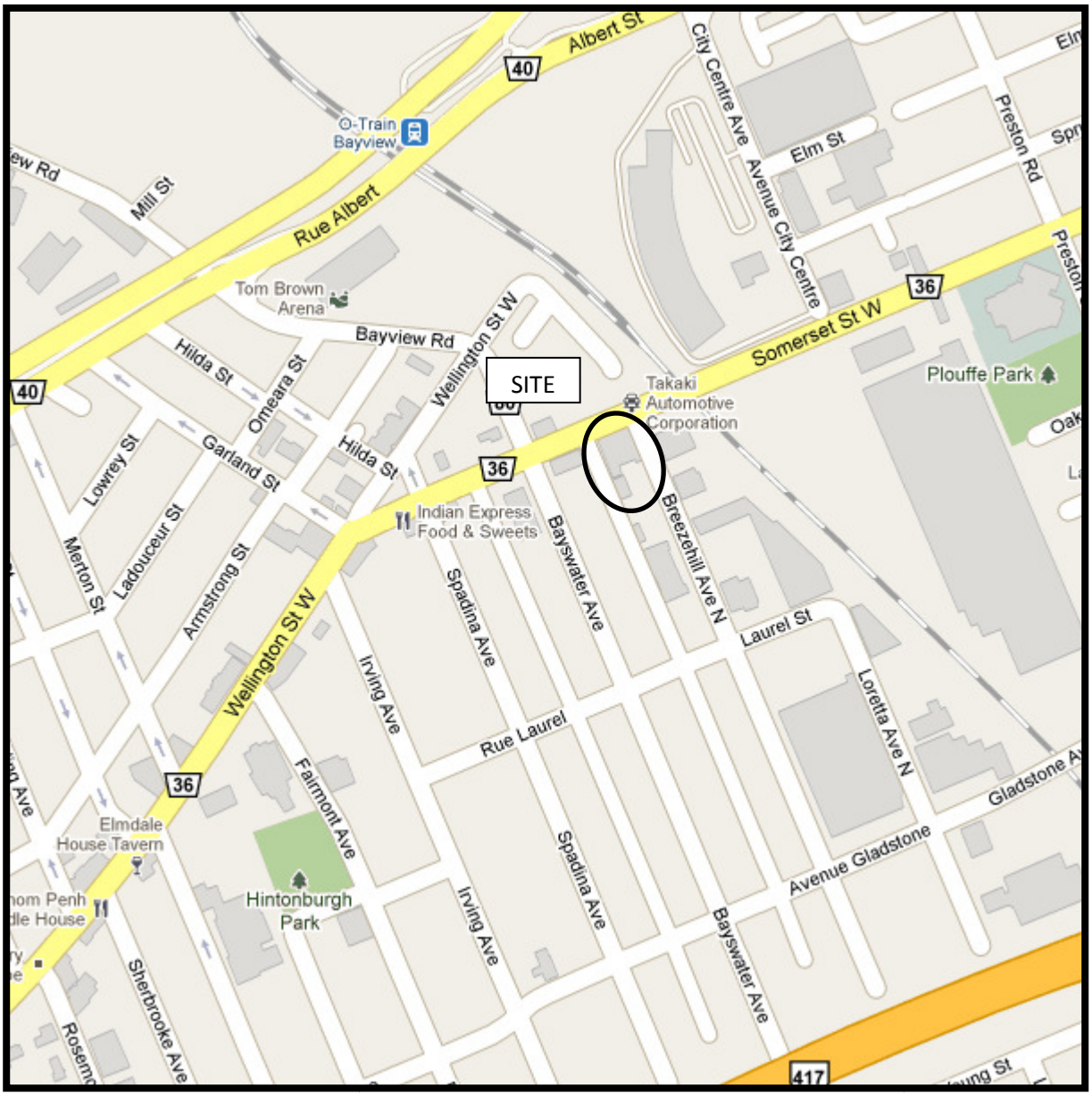


FIGURE 1

KEY PLAN

RAILROAD (O-TRAIN)

#47 BREEZEHILL AVENUE N.
TAKAKI AUTOMOTIVE

#1040 SOMERSET STREET W.
COMMERCIAL

OFFICE/
CHURCH

#47 BREEZEHILL AVE. N.
JAPAN AUTO SERVICE

#73 BREEZEHILL AVENUE N.
COMMERCIAL

BREEZEHILL AVE. N.

BREEZEHILL AVENUE NORTH

WEST

#1047-1049
SOMERSET ST. W.
RESIDENTIAL

#1053
SOMERSET ST. W.
RESTAURANT

#1055
SOMERSET ST. W.
RESTAURANT

RESIDENTIAL

#29 BAYSWATER AVE.
OFFICE BUILDING

SOMERSET STREET

#1050 SOMERSET STREET W.
VACANT
(FORMER GROCERY STORE)

BH 2
62.56

BH 1
62.44

BH 7
62.00
[50.72]

ASPHALTIC CONCRETE
PARKING LOT

BH 6

BH 5

AUTOMOTIVE
GARAGE

BH 3
61.84
[50.87]

ASPHALTIC CONCRETE
PARKING LOT

BH 8
62.49

TP 1

UNDERGROUND FURNACE
OIL STORAGE TANK

BH 4
62.69

UP

TBM

#100 BREEZEHILL AVENUE N.
DEVONSHIRE PUBLIC SCHOOL

ACCESS LANEWAY

#1066 SOMERSET STREET W.
OFFICES/DANCE STUDIO/RESTAURANT

#43-53 BAYSWATER AVENUE
RESIDENTIAL

#57 BAYSWATER AVENUE
RESIDENTIAL APARTMENT
BUILDING

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL INSTALLED
- TEST PIT LOCATION
- 62.00 GROUND SURFACE ELEVATION (m)
- [50.72] BEDROCK SURFACE ELEVATION (m)

TBM - MAG NAIL IN HYDRO POST. GEODETIC ELEVATION = 63.136m, PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LIMITED.

paterson group
consulting engineers
28 Concourse Gate, Unit 1, Ottawa, Ontario K2E 7T7

Scale:	1:500
Des.:	EJL
Dwn:	MPG
Chkd:	MSD

CLARIDGE HOMES

PHASE I - II ENVIRONMENTAL SITE ASSESSMENT
1050 SOMERSET STREET WEST

OTTAWA, ONTARIO

TEST HOLE LOCATION PLAN

Dwg. No. **PE2278-2**
Report No.: PE2278
Date: 07/2011

11x17