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Paterson Group Inc.

Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

patersongroup

Updated Phase II-Environmental Site Assessment

3368 Carling Avenue
Ottawa, Ontario

Prepared For

Cardel Homes

January 7, 2016

Report: PE3448-1

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EXECUTIVE SUMMARY

Assessment

The purpose of the Updated Phase II-ESA was to address the following areas of potential environmental concern identified during the Phase I-ESA: an onsite furnace oil AST, fill material of unknown quality and use of de-icing agents on the adjacent municipal roadways and sidewalks. The original Phase II-ESA was carried out by SPL Consultants in August of 2014. Paterson subsequently conducted additional groundwater sampling in April of 2015 to confirm the previous results. The findings of both investigations are presented in this report.

The subsurface investigation conducted by SPL, which was carried out in conjunction with a Geotechnical Investigation, consisted of drilling four boreholes at the subject property, three of which were instrumented with groundwater monitoring wells, to assess soil and groundwater quality at the site. Based on the findings of the field program, the site stratigraphy generally consists of a pavement structure (asphalt over granular material) followed by fill material to a depth of approximately 1.4 to 1.5 m below grade underlain by native silty clay, silty sand and limestone bedrock. The fill material consists of silty clay with trace to some gravel. No building debris or other deleterious materials or signs of contaminants were noted in the fill.

Based on the analytical testing conducted in 2014, concentrations of barium and vanadium exceeding MOECC Table 3 standards were identified in the soil. More specifically, barium and vanadium exceedances were identified in the fill material BH14-3, while vanadium exceedances were identified in the native silty clay at BH14-2 and BH14-4 (at depths ranging from 1.5 to 3.5 m below grade).

Electrical conductivity (EC) and sodium adsorption ratio (SAR) were identified at levels exceeding the MOECC standards in the fill material at BH14-1. SAR exceedances were identified in both the fill and native soils (depths ranging from 1.5 to 3.5 m below grade) at the remaining borehole locations, while EC levels were in compliance with the standard. In addition to metals and inorganics, soil samples were analysed for PHCs, VOCs, PAHs and PCBs. No concentrations of these parameters were identified above the detection limits, in any of the samples submitted for analysis.

Groundwater samples recovered in 2014 were submitted for analysis of metals and inorganics, PHCs, VOCs, PAHs and PCBs. No VOC, PAH or PCB parameters were identified above their respective detection limits. Metals and inorganics were identified in each of the groundwater samples submitted for analysis. All concentrations were in compliance with the MOECC standards selected for the site, with the exception of the sodium concentration in the groundwater recovered from BH14-3. It should be noted however, that the soil and groundwater standards selected at the time of the original field work, were MOECC Table 2 standards for a potable groundwater condition. It has since been confirmed by the City of Ottawa, in a letter dated January 8, 2016, that the MOECC Table 3 standards for a non-potable groundwater condition are in fact applicable to the subject site. The sodium concentration at BH14-3, identified in 2014, is therefore in compliance with the standards. (With regard to the current use of Table 3 standards, it should also be noted that Table 3 and Table 2 standards for the soil parameters discussed above, are the same.)

Petroleum hydrocarbon parameters were identified in each of the groundwater samples submitted for analysis in 2014. PHC F3 concentrations in the groundwater recovered from BH14-1, BH14-3 and BH14-4 exceeded the MOECC Table 3 standards, as well as the F2 and F4 concentrations identified in BH14-3. Given that no PHC parameters were identified in the soil, the groundwater results were suspected to be inaccurate. During the initial groundwater sampling event, SPL purged the monitoring wells and recovered groundwater samples using polytubing with a footvalve and/or bailers, which were observed in the monitoring wells during the subsequent sampling event. Based on this information, it was our opinion that the PHC concentrations were not accurate and a result of sediment present in the groundwater samples due to the sampling method used.

Paterson conducted a second groundwater sampling event in April of 2015. At that time, a peristaltic pump was used to purge and sample the wells using a low flow, to reduce the potential for sediment in the samples. Groundwater samples from each well were submitted for analysis of BTEX and PHC parameters. A sample from BH14-3 was also submitted for sodium and chloride. No BTEX or PHC parameters were identified in any of the groundwater samples. Sodium and chloride parameters were identified in Sample BH14-3 – GW2 at concentrations were in compliance with MOECC Table 3.

The results of the original 2014 analytical testing for PHC parameters in groundwater were therefore considered inaccurate. The groundwater beneath the site is considered to be in compliance with the MOECC Table 3 standards.

Recommendations

Based on the findings of the Updated Phase II-ESA, it is recommended that a soil remediation program be conducted to remove the fill/soil with slightly elevated levels of barium, vanadium, EC and SAR. The remediation program can be conducted in conjunction with future site redevelopment.

Prior to off-site disposal at an approved waste disposal facility, a representative sample of impacted soil must be collected and submitted for a leachate (TCLP) analysis, in accordance with Ontario Regulation 347/558, to confirm the soil is classified as non-hazardous waste.

It is recommended that Paterson personnel be contacted prior to excavation activities to collect and submit the aforementioned sample. It is also recommended that Paterson be onsite during the remediation program to direct excavation activities, collect verification samples as required and to conduct final confirmatory sampling upon completion of the remedial activities.

If the monitoring wells installed are not going to be used in the future, they should be abandoned according to Ontario Regulation 903. Decommissioning of the wells can be carried out in conjunction with site redevelopment.

1.0 INTRODUCTION

At the request of Cardel Homes, Paterson Group (Paterson) prepared an Updated Phase II-Environmental Site Assessment (ESA) for the property located at 3368 Carling Avenue, in the City of Ottawa, Ontario. The purpose of this Phase II-ESA was to confirm the results of a previous Phase II-ESA conducted for the property, by SPL Consultants Ltd. (SPL) in August of 2014. This report presents the findings of the SPL investigation in addition to the findings of the subsequent investigative work conducted by Paterson.

1.1 Site Description

Address:	3368 Carling Avenue, Ottawa, Ontario.
Legal Description:	Lot 5, Registered Plan 503, save and except Part 3, Plan R-60, City of Ottawa
Parcel Identification Number:	04703-0343
Location:	The subject property is located at the southeast corner of the Carling Avenue and Bedale Drive intersection, in the City of Ottawa. Refer to Figure 1 - Key Plan, following the body of this report, for the site location.
Latitude and Longitude:	45° 21' 03" N, 75° 49' 50" W
Configuration:	Rectangular
Site Area:	0.13 hectares (approximate)

1.2 Property Ownership

The subject property is currently owned by Cardel Homes. Paterson Group was retained to complete this Phase II-ESA by Ms. Lisa Dalla Rosa, with Cardel Homes, located at 301 Moodie Drive, Suite 100, Ottawa, Ontario, K2H 8G3. Ms. Dalla Rosa can be reached by telephone at 613-820-1959.

1.3 Current and Proposed Future Uses

The subject property is currently vacant. It is our understanding that the subject property will be redeveloped for residential purposes.

1.4 Applicable Site Condition Standard

The site condition standards for the property were obtained from Table 3 of the document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", prepared by the Ontario Ministry of the Environment and Climate Change (MOECC), April 2011. The Table 3 standards are applicable to the subject site. The MOECC Table 3 Standards are based on the following considerations:

- Coarse-grained soil condition
- Non-potable groundwater condition
- Residential land use
- Full depth soil condition

It should be noted that the Phase II-ESA report prepared by SPL identified the MOECC Table 2 standards for a potable groundwater condition as the applicable site condition standards. The previous report indicated "the Phase Two Property and neighbouring properties derived their drinking water from groundwater so potable groundwater conditions are anticipated."

Paterson has since confirmed with the City of Ottawa, that there are currently no potable wells within a 250 m radius of the subject property. A letter from Michel Kearney with the City of Ottawa's Policy Development and Urban Design Branch, dated January 8, 2016, indicates that the City of Ottawa has no objection to the use of non-potable groundwater standards for the subject property.

2.0 BACKGROUND INFORMATION

2.1 Physical Setting

At the time of the subsurface investigation, the subject property was occupied by a vacant commercial building situated on the southeast portion of the site. The remainder of the site was covered with asphaltic concrete and used as a parking lot. The northern portion of the property, along Carling Avenue, is at a slightly lower elevation than the south and central portions of the site.

No obvious spills or areas of significant staining were observed at the subject site. No rail lines or loading areas were observed at the subject site. No Areas of Natural or Scientific Interest (ANSIs) are present in the vicinity of the subject site.

The nearest water body to the subject site is the Ottawa River, located approximately 100 m north of the site.

2.2 Past Investigations

In August of 2014, SPL completed a Phase I-ESA in general accordance with the new MOECC regulation, Ontario Regulation (O.Reg.) 153/04, amended by O.Reg. 269/11. Based on the findings of the report, a Phase II-ESA was recommended to address several potentially contaminating activities (PCAs) identified on the subject property. The PCAs, resulting in areas of potential environmental concern (APECs) and contaminants of potential concern (CPCs) are identified in Table 1 below.

Table 1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern (APEC)	Location of APEC on Phase One Property	Potential Contaminating Activities (PCA)	Location of PCA (on-site / off-site)	Contaminants of Potential Concern (CPC)	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC 1	Southeast area of Phase I Property	Item 28: Gasoline and Associated Products Storage in Fixed Tanks	On-site	BTEX/PHCs	Soil and Groundwater
APEC 2	Entire area of the Phase One Property	Item 30: Fill Material of Unknown Quality	On-site	Metals and Inorganics, PHCs, PAHs, PCBs	Soil and Groundwater
APEC 3	North and west and portions of the Phase One Property	Other: De-icing Activities	Off-site	EC and SAR Chloride and Sodium	Soil and Groundwater

3.0 SCOPE OF INVESTIGATION

3.1 Overview of Site Investigation

The subsurface investigation conducted as a component of the Phase II-ESA consisted of drilling four boreholes on the subject property, three of which were instrumented with groundwater monitoring wells. Final borehole depths ranged from 13 to 18 m below ground surface. It should be noted that the field program was carried out in conjunction with a Geotechnical Investigation for the proposed development. The subsurface investigation was conducted in accordance with the Sampling and Analysis Plan presented in the Appendix.

3.2 Media Investigated

During the subsurface investigation, soil samples and groundwater samples were obtained and submitted for laboratory analysis. Sediment, as defined by O.Reg 153/04 as amended, was not present at the subject property. The rationale for sampling and analyzing these media, was based on the Contaminants of Potential Concern identified in the Phase I-ESA in combination with observations made at the time of the field program. The sampling rationale is presented in more detail in the Sampling and Analysis Plan appended to this report.

3.3 Phase I Conceptual Site Model

Geological and Hydrogeological Setting

According to mapping provided on the OGS Earth website, published by the Ontario Ministry of Northern Development, Mines and Forestry, bedrock in the area of the Phase I property is of the Oxford Formation and generally consists of dolostone, minor shale and sandstone. Overburden is reported to consist of fine-textured glaciomarine deposits consisting of silt and clay, minor sand and gravel. The Phase I property is situated within clay plains.

Contaminants of Potential Concern

The following CPCs were identified with respect to the Phase II property and RSC property:

- Metals – this suite of parameters encompasses various metals for which MOECC standards exist. Metals were selected as CPCs for the Phase II property as fill material is present across the site. Metals may be present in the soil matrix or dissolved in site groundwater.

- Inorganics – this suit of parameters includes electrical conductivity (EC), sodium adsorption ratio (SAR), pH, sodium and chlorides. Inorganics were selected as CPCs due to anticipated historical de-icing activities on the adjacent roadways and possibly on the subject property. The MOECC provides standards for EC, SAR and pH in soil, while sodium and chloride standards are available for groundwater only.

- Petroleum Hydrocarbons Fractions 1 through 4 (PHCs F1-F4) – this suite of parameters encompasses gasoline (Fraction 1), diesel and fuel oil (Fraction 2), and heavy oils (Fractions 3 and 4). PHCs F1-F4 were selected as CPCs for the Phase II property based on the potential for fill material of unknown quality at the subject site, and the presence of a heating oil AST within the former building on site. PHCs may be present in the soil matrix, sorbed to soil particles, as well as in free or dissolved phase in the groundwater system. PHCs are generally considered to be LNAPLs – light non-aqueous phase liquids, indicating that when present in sufficient concentrations above the solubility limit, they will partition into a separate phase above the water table, due to their lower density.

- Volatile Organic Compounds (VOCs), including BTEX – this suite of parameters includes chlorinated solvents and degradation products (Tetrachloroethylene, Trichloroethylene, Dichloroethylenes, and Vinyl Chloride) associated with de-greasing and dry cleaning, as well as chloroform, a by-product of chlorine disinfection of municipally-treated water. Also included with VOCs are BTEX (benzene, toluene, ethylbenzene and xylenes) which is a suite of VOCs associated in part with gasoline. VOCs may be present in the soil matrix, or dissolved in the site groundwater. VOCs were selected as CPCs for the Phase II property due to former use of heating oil onsite.

- Polycyclic Aromatic Hydrocarbons (PAHs) – this suite of parameters encompasses various complex hydrocarbons, commonly associated with coal and/or combustion. PAHs may be present in the soil matrix or dissolved in site groundwater. PAHs were selected as CPCs for the Phase II property based on the potential for fill of unknown quality.

- Polychlorinated Biphenyls (PCBs) – this suite of parameters encompasses various synthetic organic compounds of chlorine attached to a biphenyl, commonly associated dielectric and coolant fluids in electrical apparatus, cutting fluids for machining operations, carbonless copy paper and in heat transfer fluids. PCBs may be present in the soil matrix or dissolve din the site groundwater. PCBs were selected as CPCs for the Phase II property due to the unknown quality of fill material present across the site.

Existing Buildings and Structures

At the time of the Phase I-ESA, a vacant, one-storey commercial building with a full basement level, was present on the subject property. The building had been used as a show room and office space by Cardel Homes, for approximately 12 years. The building was constructed in the 1960's and originally occupied by a convenience store, a pizza shop and beauty salon. The building was recently heated with natural gas fired equipment, however the original heating source was fuel oil stored in an aboveground storage tank (AST) located in the basement of the structure. The building was demolished and removed from the site in late 2015.

Underground utilities including gas, cable and water and sewer were present on the Phase I property and have since been disconnected. The exact locations are unknown of the former services are unknown.

Water Bodies

There are no bodies of water within 30 m of the Phase I property. The closest body of water is the Ottawa River located approximately 100 m north of the subject site.

Areas of Natural Significance

There are no areas of natural significance within the Phase I study area.

Drinking Water Wells

Well records were obtained from the MOECC's well record database. Based on a review of the records, twelve wells were installed within the 250 Phase I study area. The wells were used for domestic purposes with the exception of one, which was used for municipal purposes. Shale or limestone bedrock was encountered between 27.4 and 51.8 m below ground surface within the study area.

The well records are associated with the original development of the area in the 1950's/1960's and are no longer considered to be in use. The subject site and surrounding properties within the Phase I - ESA study area are currently serviced with municipal water.

Neighbouring Land Use

Neighbouring land use within the Phase I study area is mainly residential and institutional.

Fill Material

Fill material was identified in the Phase II-ESA conducted by SPL. The fill material, which consists of silty clay and traces of gravel, is considered to be native material that has been re-worked on the subject property in conjunction with the construction of the former building.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Potentially Contaminating Activities resulting in Areas of Potential Environmental Concern at the subject site consist of potential fill material of unknown quality, the former use of heating oil on-site and the possible application of de-icing salts to the parking areas of the subject property and to the adjacent sidewalks and roadways.

Assessment of Uncertainty and/or Absence of Information

It is not expected that any uncertainty or absence of information would affect the validity of the CSM.

3.4 Deviations from Sampling and Analysis Plan

The field portion of the Phase II-ESA was conducted in general accordance with the Sampling and Analysis plan provided in the Appendix.

3.5 Impediments

Physical impediments on site included the underground utilities.

4.0 INVESTIGATION METHOD

4.1 Subsurface Investigation

Following the clearance of public and private utility locates, the drilling portion of the field program was conducted during the interim of August 12 through August 19, 2014. Four boreholes (BH14-1 through BH14-4) were drilled on the subject property. Boreholes were completed to depths ranging from 12.8 to 17.9 m below ground surface. BH14-4 was instrumented with a groundwater monitoring well upon completion; monitoring wells were also installed in auger holes completed adjacent to BH14-1 and BH14-3, to depths of 7.6 m below ground surface. The drilling contractor was CCC Geotechnical and Environmental Drilling Ltd. of Ottawa, Ontario. Boreholes were advanced using a truck-mounted CME 750 power-auger drill rig, under the full-time supervision of SPL personnel. The boreholes were situated to address the APECs identified in the Phase I-ESA and to provide general coverage of the site. Borehole locations are shown on Drawing No. PE3448-1 – Test Hole Location Plan, appended to this report.

4.2 Soil Sampling

A total of 50 soil samples were obtained from the boreholes by means of split spoon sampling. Split spoon samples were taken every 0.6 m per 0.8 m for the first 6.0 m, followed by 0.6 m per 1.5 m to the termination of each borehole. The depths at which split spoon samples were obtained from the boreholes are shown as "**SS**" on the Soil Profile and Test Data Sheets, appended to this report.

Upon refusal of the augers, BH14-2 was advanced into bedrock using a diamond coring system. Rock core samples were recovered and are shown as "**CORE**" on the Soil Profile and Test Data Sheets.

Methods of minimizing cross-contamination between samples include the decontamination of sampling equipment between samples, obtaining undisturbed samples from boreholes, and the use of dedicated sampling equipment, as discussed in the Sampling and Analysis Plan, appended to this report.

Site soils generally consist a pavement structure underlain by fill and followed by native silty clay, sand and limestone bedrock. The fill material, encountered at each borehole location, consisted of silty clay with traces of gravel. The fill extended from beneath the pavement structure to depths ranging from 1.4 to 1.5 m below ground surface.

4.3 Field Screening Measurements

Samples collected from site underwent a preliminary screening procedure which included visual screening for colour and evidence of deleterious fill. A MiniRae 2000 photoionization detector (PID) was used to determine the selection of samples to be submitted for analytical testing.

4.4 Groundwater Monitoring Well Installation

Three (3) groundwater monitoring wells were installed during the drilling program. The monitoring wells consisted of 50 mm diameter Schedule 40 PVC risers and screens. A sand pack consisting of silica sand was placed around the screen, and a bentonite seal was placed above the screen. The well was finished by a flush-mount aluminium casing. Monitoring well construction details are provided on the Soil Profile and Test Data Sheets in Appendix 1. A summary of monitoring well construction details is provided below in Table 2.

Table 2: Monitoring Well Construction Details

Well ID	Ground Surface Elevation	Total Depth (m BGS)	Screened Interval (m BGS)	Sand Pack (m BGS)	Bentonite Seal (m BGS)	Casing Type
BH14-1	101.1	7.0	4.0-7.0	3.4-7.0	2.2-3.4	Flushmount
BH14-3	100.8	7.6	4.6-7.6	4.3-7.6	3.5-4.3	Flushmount
BH14-4	101.1	7.6	4.6-7.6	4.7-7.6	2.1-4.7	Flushmount

The monitoring wells were developed and purged prior to sampling using a low density polyethylene tubing and a foot valve sampling device (Waterra) to remove standing water, filter pack water and to allow for the influx of fresh formation water. In accordance with standard operating procedures, all monitoring wells were purged dry and allowed to recover, or three well volumes were removed prior to stabilization.

4.5 Field Measurement of Water Quality Parameters

The field measurement of water quality parameters was not conducted as part of this investigation.

4.6 Groundwater Sampling

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

As noted above, polyethylene tubing and a foot valve sampling device (Waterra) were used by SPL to purge the wells and recover the groundwater samples. Bailers were also noted in the wells during the subsequent sampling conducted by Paterson. Often these methods of sampling allow for sediment in the groundwater samples recovered, which can ultimately lead to inaccurate test results.

During the later sampling event conducted by Paterson, a peristaltic pump and dedicated tubing were used to purge standing water from each well prior to sampling, allowing for minimal disturbance of any sediment present. The peristaltic pump was also set at a low flow rate during sampling, to minimize loss of potential volatile substances in the groundwater.

Samples were stored in coolers to reduce analyte volatilization during transportation. Details of our standard operating procedure for groundwater sampling are provided in the Sampling and Analysis Plan in Appendix 1.

4.7 Analytical Testing

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

Table 3: Soil Samples Submitted

Sample ID	Sample Depth/ Stratigraphic Unit	Parameters Analyzed						Rationale
		Metals	EC/SAR	PHC	VOC	PAH	PCB	
BH14-1 – SS1	0.2-0.8 m; fill	X						Assess quality of fill material.
BH14-1 – SS3	1.5-2.1 m; silty clay					X		Assess quality of native material above the water table.
BH14-1 – SS6	4.6-5.2 m; silty clay			X				Assess quality of material within at the top of the water table.
BH14-1 – SS7	6.1-6.7 m; silty clay				X			Assess quality of material within the water table.
BH14-2 – SS1	0.2-0.8 m; fill		X					Assess quality of fill material.
BH14-2 – SS5	2.9-3.5 m; silty clay	X						Assess quality of native material above the water table.
BH14-3 – SS2	0.8-1.4 m; fill	X						Assess quality of fill material.
BH14-3 – SS4	2.3-2.9 m; fill		X				X	Assess quality of native material above the water table.
BH14-3 – SS8	7.6-8.2 m; silty clay			X				Assess quality of material within the water table.
BH14-4 – SS1	0.2-0.8 m; fill		X			X		Assess quality of fill material.
BH14-4 – SS3	1.5-2.1 m; fill	X						Assess quality of native material above the water table.
BH14-4 – SS7	6.1-6.7 m; silty clay				X			Assess quality of native material at the top of the water table.
QA/QC #2	7.6-8.2 m; silty clay			X				Quality Control (dup of BH14-3 – SS8)
QA/QC #3	6.1-6.7 m; silty clay				X			Quality Control (dup of BH14-4 – SS7)

Table 4: Groundwater Samples Submitted

Sample ID	Date	Screened Interval (mbgs)	Parameters Analyzed						Rationale
			Metals	BTEX/PHCs	VOCs	PAHs	PCBs	Sodium and Chloride	
BH14-1	29-Aug-2014	4.0-7.0	X	X	X	X	X		Assess quality of groundwater in overburden.
BH14-3		4.6-7.6	X	X	X	X	X		
BH14-4		4.6-7.6	X	X	X	X	X		
QA/QC		4.0-7.0			X				Blind duplicate of BH14-1.
Trip Blank					X				Quality assurance/ quality control sample.
BH14-1 – GW2	17-Apr-2015	4.0-7.0		X					Confirm the results of the previous sampling event.
BH14-3 – GW2		4.6-7.6		X				X	
BH14-4 – GW2		4.6-7.6		X					

The chemical analyses of the initial groundwater samples recovered in August of 2014, were conducted by ALS Environmental (ALS) located in Mississauga, Ontario. The chemical analyses of the second round of groundwater samples recovered in April of 2015, were conducted by Paracel Laboratories Ltd. of Ottawa (Paracel).

ALS and Paracel are members of the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA). ALS and Paracel are accredited and certified by SCC/CALA for specific tests registered with the association.

4.8 Residue Management

Soil cuttings generated during drilling activities were stored in a bin and left on-site for later disposal. Purged groundwater generated during both sampling events was also retained onsite.

4.9 Elevation Surveying

Monitoring well locations were surveyed by SPL, using the top of a catch basin located along Bedale Drive as a temporary benchmark with assumed elevation of 100.00 m. The elevations of the monitoring wells and the location of the benchmark are shown on Drawing: PE3448-1 – Test Hole Location Plan appended to this report.

4.10 Quality Assurance and Quality Control Measures

Soil and groundwater samples were collected and handled in accordance with generally accepted sampling and handling procedures used by the environmental consulting industry and in accordance with O.Reg.153/04, as amended. All sample containers, preservatives and labels were supplied by the laboratory providing the sample analyses.

A summary of the quality assurance and quality control measures used are provided in the Sampling and Analysis Plan provided in the Appendix.

As part of the QA/QC program, a blind duplicate sample was analyzed for 10% of the soil and groundwater samples completed as part of this investigation. The blind duplicate samples completed during the investigation are identified in Tables 3 and 4 above.

5.0 REVIEW AND EVALUATION

5.1 Geology

Site geology details are provided in the Soil Profile and Test Data Sheets in the Appendix. A pavement structure consisting of 40 to 120 mm of asphalt over a granular base (sand and gravel) to a depths ranging from 0.2 to 0.9 m below grade, was present across the site. Beneath the pavement structure, fill material, consisting of silty clay with trace to some gravel, was encountered across the site, to a depth of approximately 1.4 to 1.5 m below ground surface. Native material underlying the fill consisted of silty clay extending to depths ranging from 10.7 to 12.2 m below grade. Silty sand was found beneath the silty clay at all borehole locations.

Inferred limestone bedrock was encountered in BH14-1 and BH14-3 at depths ranging from 14.9 to 15.8 m below ground surface. Bedrock depth at BH14-2 was confirmed at 14.8 m below grade, by coring. Site stratigraphy is shown on Drawings: PE3448-5 and -6, Cross Section A-A` and Cross Section B-B`.

5.2 Groundwater Elevations, Flow Direction, and Hydraulic Gradient

Groundwater levels from BH14-1, BH14-3 and BH14-4 were measured by SPL and Paterson during the groundwater sampling events in August of 2014 and April of 2015, using an interface probe. Free product was not identified during either sampling event. Groundwater levels are summarized below in Table 5.

Table 5: Groundwater Level Measurements

Borehole Location	Ground Surface Elevation (m)	Water Level Depth (m below grade)	Water Level Elevation (m ASL)	Date of Measurement
BH14-1	101.1	3.7	97.4	29-Aug-2014
BH14-3	100.8	4.5	96.3	
BH14-4	101.1	3.2	97.9	
BH14-1	101.1	2.5	98.57	17-Apr-2015
BH14-3	100.8	3.9	96.89	
BH14-4	101.1	2.7	98.45	

Based on the groundwater elevations from the April, 2015 monitoring event, groundwater contour mapping was completed for the upper unconfined aquifer. Based on the contour mapping, groundwater flow at the subject site is in a north-westerly direction. An average horizontal hydraulic gradient of 0.04 m/m was calculated.

5.3 Fine-Medium Soil Texture

The more conservative coarse-grained soil conditions were used as grain-size analyses conducted by SPL were not available for review.

5.4 Soil: Field Screening

All soil samples collected underwent a preliminary screening procedure, which included visual screening for colour and evidence of deleterious fill as well as screening using a MiniRae 2000 photoionization detector (PID). No deleterious materials or signs of contamination were identified in the soil samples during the visual screening. The findings of the organic vapour survey identified readings of <0.1 ppm in each of the soil samples recovered from the subject property. These readings are considered to be negligible and representative of background conditions. Soil samples were therefore selected for analysis based on visual appearance and location.

5.5 Soil Quality

A total of 12 soil samples were submitted for analysis for a combination of metals, electrical conductivity (EC) and sodium adsorption ratio (SAR), petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbon (PAHs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs) and/or pH. The results of the analytical testing are presented below in Tables 6 through 11. The laboratory certificates of analysis are provided in the Appendix.

Table 6:
Analytical Test Results – Soil
Metals

Parameter	RDL (µg/g)	Soil Samples (µg/g)				MOECC Standards Table 3 Residential Coarse
		BH14-1 SS1	BH14-2 SS5	BH14-3 SS2	BH14-4 SS3	
		21-Aug-2014	19-Aug-2014	20-Aug-2014		
Antimony	1.0	ND	ND	ND	ND	7.5
Arsenic	1.0	2	1.4	1.9	1.6	18
Barium	1.0	309	356	**405**	349	390
Beryllium	0.50	0.75	0.71	0.84	0.76	4
Boron	5.0	5.9	5.3	5.5	ND	120
Boron (HWS)	0.10	0.18	ND	0.12	ND	1.5
Cadmium	0.50	ND	ND	ND	ND	1.2
Chromium (total)	1.0	66.7	65	82.7	74.8	160
Chromium (VI)	0.20	0.85	0.72	0.53	0.83	8
Cobalt	1.0	16.6	17.0	19.9	18.1	22
Copper	1.0	28.2	33.3	33.9	34.6	140
Cyanide	0.050	ND	ND	ND	ND	0.051
Lead	1.0	7.9	6.1	6.3	5.9	120
Mercury	0.010	0.011	ND	ND	ND	0.27
Molybdenum	1.0	ND	ND	ND	ND	6.9
Nickel	1.0	35.9	36.1	44.4	41.3	100
Selenium	1.0	ND	ND	ND	ND	2.4
Silver	0.20	ND	ND	ND	ND	20
Thallium	0.50	ND	ND	ND	ND	1
Uranium	1.0	ND	ND	ND	ND	23
Vanadium	1.0	83.9	**88**	**96**	**95.8**	86
Zinc	5.0	99.6	102	114	113	340

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above RDL
- **Bold** – Value exceeds selected MOECC Standard

The concentration of barium detected in Sample BH14-3 – SS2 (405 µg/g) exceeds the standard value of 390 µg/g. The concentrations of vanadium detected in Samples BH14-2 – SS1, BH14-3 – SS2 and BH14-4 – SS3 (88 µg/g, 96 µg/g and 95.8 µg/g) exceed the standard value of 86 µg/g. The remaining parameters identified are in compliance with the MOECC Table 3 standards for a residential land use.

Table 7:
Analytical Test Results – Soil
Electrical Conductivity, Sodium Adsorption Ratio and pH

Parameter	RDL	Soil Samples (µg/g)							MOECC Table 3 Residential Coarse
		BH14-1 SS1	BH14-2 SS1	BH14-2 SS5	BH14-3 SS2	BH14-3 SS4	BH14-4 SS1	BH14-4 SS3	
		21-Aug-2014	19-Aug-2014	19-Aug-2014	20-Aug-2014				
Electrical Conductivity (EC)	0.0040 ms/cm	**1.78**	0.508	0.561	0.695	0.595	0.502	0.458	0.7
Sodium Adsorption Ratio (SAR)	0.1	**58.5**	**5.70**	1.00	**22.20**	**7.10**	**9.80**	**6.35**	5
pH	0.1	7.55	NA	7.38	7.51	NA	NA	7.48	5 to 9

Notes:
- RDL – Reporting Detection Limit
- NA – not analyzed for this parameter
- **Bold** – Value exceeds selected MOECC Standard

The EC identified in Sample BH14-1 – SS1 exceeds the MOECC Table 3 standard (0.7). The remaining EC levels identified are in compliance with Table 3. With the exception of the SAR identified in Sample BH14-2 – SS5, all SAR values identified exceed the MOECC Table 3 standard (5). The pH level identified in each sample submitted for analysis is within the acceptable range provided by the MOECC (5 to 9).

Table 8:
Analytical Test Results – Soil
Petroleum Hydrocarbons (PHCs) and BTEX

Parameter	RDL (µg/g)	Soil Samples (µg/g)			MOECC Table 3 Residential Coarse
		BH14-1 – SS6	BH14-3 – SS8	QA/QC 2	
		21-Aug-2104	20-Aug-2104		
Benzene	0.020	ND	ND	ND	0.21
Toluene	0.20	ND	ND	ND	2.3
Ethylbenzene	0.050	ND	ND	ND	2
Xylenes	0.050	ND	ND	ND	3.1
PHC F1	5.0	ND	ND	ND	55
PHC F2	10	ND	ND	ND	98
PHC F3	50	ND	ND	ND	300
PHC F4	50	ND	ND	ND	2,800

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the RDL

No BTEX or PHC parameters were identified in any of the soil samples sumitted for analytical testing.

Table 9:
Analytical Test Results – Soil
VOCs

Parameter	RDL (µg/g)	Soil Samples (µg/g)			MOECC Table 3 Residential Coarse
		BH14-1 – SS7	BH14-4 – SS7	QA/QC 3	
		21-Aug-2014	20-Aug-2014		
Acetone	28	ND	ND	ND	16
Benzene	0.17	ND	ND	ND	0.21
Bromodichloromethane	1.9	ND	ND	ND	13
Bromoform	0.26	ND	ND	ND	0.27
Bromomethane	0.05	ND	ND	ND	0.05
Carbon Tetrachloride	0.12	ND	ND	ND	0.05
Chlorobenzene	2.7	ND	ND	ND	2.4
Dibromochloromethane	2.9	ND	ND	ND	3.4
Chloroform	0.18	ND	ND	ND	0.05
1,2-Dibromoethane	0.05	ND	ND	ND	NV
1,2-Dichlorobenzene	1.7	ND	ND	ND	3.4
1,3-Dichlorobenzene	6	ND	ND	ND	4.8
1,4-Dichlorobenzene	0.097	ND	ND	ND	0.083
Dichlorodifluoromethane	25	ND	ND	ND	16
1,1-Dichloroethane	0.6	ND	ND	ND	3.5
1,2-Dichloroethane	0.05	ND	ND	ND	0.05
1,1-Dichloroethylene	0.05	ND	ND	ND	0.05
Cis-1,2-Dichlroethylene	2.5	ND	ND	ND	3.4
Trans-1,2-Dichloroethylene	0.75	ND	ND	ND	0.084
1,3-Dichloropropene	0.081	ND	ND	ND	0.05
Methylene Chloride	0.96	ND	ND	ND	0.1
1,2-Dichloropropane	0.085	ND	ND	ND	0.05
Ethylbenzene	1.6	ND	ND	ND	2
n-hexane	34	ND	ND	ND	2.8
Methyl Ethyl Ketone	44	ND	ND	ND	16
Methyl Isobutyl Ketone	4.3	ND	ND	ND	1.7
Methyl tert-Butyl Ether	1.4	ND	ND	ND	0.75
Styrene	2.2	ND	ND	ND	0.7
1,1,1,2-Tetrachloroethane	0.05	ND	ND	ND	0.058
1,1,2,2-Tetrachloroethane	0.05	ND	ND	ND	0.05
Tetrachloroethylene	2.3	ND	ND	ND	0.28
Toluene	6	ND	ND	ND	2.3
1,1,1-Trichloroethane	3.4	ND	ND	ND	0.38
1,1,2-Trichloroethane	0.05	ND	ND	ND	0.05
Trichloroethylene	0.52	ND	ND	ND	0.061
Trichlorofluoromethane	5.8	ND	ND	ND	4
Vinyl Chloride	0.022	ND	ND	ND	0.02
Xylene	25	ND	ND	ND	3.1

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the MDL
- N/V – no value provided by the MOECC

No VOC parameters were identified above the reporting detection limits in any of the soil samples submitted for analytical testing. The soil results are in compliance with the MOECC Table 3 standards.

Table 10:
Analytical Test Results – Soil
PAHs

Parameter	RDL (µg/g)	Soil Samples (µg/g)		MOECC Table 3 Residential Coarse
		BH14-1 – SS3	BH14-4 – SS1	
		21-Aug-2014	20-Aug-2014	
Acenaphthene	0.050	ND	ND	0.67
Acenaphthylene	0.050	ND	ND	0.15
Anthracene	0.050	ND	ND	0.67
Benzo(a)anthracene	0.050	ND	ND	0.5
Benzo(a)pyrene	0.050	ND	ND	0.3
Benzo(b)fluoranthene	0.050	ND	ND	0.78
Benzo(g,h,i)perylene	0.050	ND	ND	6.6
Benzo(k)fluoranthene	0.050	ND	ND	0.78
Chrysene	0.050	ND	ND	7
Dibenzo(a,h)anthracene	0.050	ND	ND	0.1
Fluoranthene	0.050	ND	ND	0.69
Fluorene	0.050	ND	ND	62
Indeno(1,2,3-c,d)pyrene	0.050	ND	ND	0.38
1+2 Methylnaphthalenes	0.042	ND	ND	0.99
Naphthalene	0.050	ND	ND	0.6
Phenanthrene	0.050	ND	ND	6.2
Pyrene	0.050	ND	ND	78

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the MDL

No PAH parameters were detected above the reporting detection limits and therefore the results are in compliance with MOECC Table 3 standards.

Table 11:
Analytical Test Results – Soil
PCBs

Parameter	RDL (µg/g)	Soil Samples (µg/g)	MOECC Table 3 Residential Coarse
		BH14-3 – SS4	
		20-Aug-2014	
Aroclor 1242	0.010	ND	NV
Aroclor 1248	0.010	ND	NV
Aroclor 1254	0.010	ND	NV
Aroclor 1260	0.010	ND	NV
Total PCBs	0.010	ND	0.35

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the MDL
- NV – no value provided by the MOECC

No PCBs were identified in Sample BH14-3 – SS4, above the reporting detection limit. The sample is considered to be in compliance with the MOECC Table 3 standards.

Table 12:
Maximum Concentrations – Soil

Parameter	Maximum Concentration (µg/g)	Borehole	Depth Interval (m BGS)
Arsenic	2	BH14-1 – SS1	0.2-0.8
Barium	**405**	BH14-3 – SS2	0.8-1.4
Beryllium	0.84		
Boron	5.9	BH14-1 – SS1	0.2-0.8
Boron (HWS)	0.18		
Chromium (total)	82.7	BH14-3 – SS2	0.8-1.4
Chromium (VI)	0.85	BH14-1 – SS1	0.2-0.8
Cobalt	19.9	BH14-3 – SS2	0.8-1.4
Copper	34.6	BH14-4 – SS3	1.5-2.1
Lead	7.9	BH14-1 – SS1	0.2-0.8
Mercury	0.011		
Nickel	44.4	BH14-3 – SS2	0.8-1.4
Vanadium	**96**		
Zinc	114		
Electrical Conductivity	**1.78**	BH14-1 – SS1	0.2-0.8
Sodium Adsorption Ratio	**58.5**		

Notes:
- **Bold** – Value exceeds MOE Table 3 standards

Maximum soil concentrations identified on site are presented in Table 12. All other parameter concentrations were below laboratory detection limits.

5.6 Groundwater Quality

Groundwater samples from the monitoring wells installed in BH14-1, BH14-3 and BH14-4 were submitted for laboratory analysis of metals, PHCs, VOCs, PAHs and PCBs. The groundwater samples were obtained from the screened intervals noted on Table 2, above. The results of the analytical testing are presented below in Tables 13 through 18. Note that the more recent 2015 results are presented after the 2014 results, in Table 18 below. Laboratory certificates of analysis are provided in the Appendix.

Table 13:
Analytical Test Results – Groundwater (2014)
Metals

Parameter	RDL (µg/L)	Groundwater Samples (µg/L)			MOECC Table 3 Residential Coarse
		29-Aug-2014			
		BH14-1	BH14-3	BH14-4	
Antimony	0.50	ND	ND	ND	20,000
Arsenic	1.0	ND	ND	ND	1,900
Barium	2.0	51	110	157	29,000
Beryllium	0.50	ND	ND	ND	67
Boron	10	25	34	33	45,000
Cadmium	0.10	ND	ND	ND	2.7
Chromium (Total)	0.50	0.51	ND	ND	810
Cobalt	0.50	1.11	3.1	1.79	66
Copper	1.0	ND	ND	ND	87
Lead	1.0	ND	ND	ND	25
Molybdenum	0.50	0.78	2.47	1.7	9,200
Nickel	1.0	3.2	9.7	5.9	490
Selenium	5.0	ND	ND	ND	63
Silver	0.10	ND	ND	ND	1.5
Thallium	0.30	ND	ND	ND	510
Uranium	2.0	ND	6.9	3.0	420
Vanadium	0.50	ND	ND	1.1	250
Zinc	3.0	ND	6.9	3.5	1,100
Mercury	0.10	ND	ND	ND	0.29
Chromium VI	10	ND	ND	ND	140
Cyanide	2.0	ND	ND	ND	66
Sodium	500	60,600	697,000^{DLM}	265,000^{DLM}	2,300,000
Chloride	5.0	48,600	1,260,000	481,000	2,300,000
pH	0.10	7.35	7.28	7.16	5 to 9

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the RDL
- DLM – Detection limit adjusted due to sample matrix effects

All metal concentrations are in compliance with MOECC Table 3 standards.

Table 14:
Analytical Test Results – Groundwater (2014)
PHCs

Parameter	RDL (µg/L)	Groundwater Samples (µg/L)			MOECC Table 3 Residential Coarse
		BH14-1	BH14-3	BH14-4	
		29-Aug-2014			
PHC F1	25	ND	ND	ND	750
PHC F2	100	ND	**170**	ND	150
PHC F3	100	**5,190**	**31,000**	**1,600**	500
PHC F4	100	ND	**1,850**	ND	500

Notes:
- RDL – Reporting Detection Limit
- ND – no value provided by the MOECC
- **Bold** – Value exceeds applicable MOECC Standard

PHC fraction F3 exceeded the MOECC Table 3 Residential standard was identified in each of the groundwater samples submitted for analytical testing as part of the initial 2014 sampling program. PHC fractions F2 and F4 were also identified in the groundwater recovered from BH14-3, at concentrations above the standards.

Based on the findings of the Phase I-ESA in conjunction with observations made during the field program and the lack of PHCs in the soil samples analyzed, the test results were considered to be inaccurate and likely the result of sediment collected in the samples. A second round of sampling was completed by Paterson, the results of which are presented in Table 15 below.

Table 15:
Analytical Test Results – Groundwater (2015)
BTEX/PHCs, sodium and chloride

Parameter	MDL (µg/L)	Groundwater Samples (µg/L)			MOECC Table 3 Residential Coarse
		BH14-1 – GW2	BH14-3 – GW2	BH14-4 – GW2	
		17-Apr-2015			
Benzene	0.5	ND	ND	ND	44
Ethylbenzene	0.5	ND	ND	ND	2,300
Toluene	0.5	ND	ND	ND	18,000
Xylenes	0.5	ND	ND	ND	4,200
PHC F1	25	ND	ND	ND	750
PHC F2	100	ND	ND	ND	150
PHC F3	100	ND	ND	ND	500
PHC F4	100	ND	ND	ND	500
Sodium	200	NA	814,000	NA	2,300,000
Chloride	1,000	NA	1,080	NA	2,300,000

Notes:
- MDL – Method Detection Limit
- ND – no value provided by the MOECC
- NA – not analysed for this parameter

Based on the findings of the second sampling event, no PHC concentrations were identified in any of the groundwater samples submitted for analysis. As a result, it is our opinion that the original PHC concentrations identified by SPL were inaccurate and solely a result of sediment in the 2014 water samples. Sodium and chloride were re-tested in the groundwater from BH14-3 only, as the previous 2014 results from this monitoring well had failed for these parameters. It should be noted however, that when compared to Table 3 standards, which are applicable to the site versus the Table 2 standards selected by SPL, the previous test results are compliant.

Table 16:
Analytical Test Results – Groundwater (2014)
VOCs

Parameter	RDL (µg/L)	Groundwater Samples (µg/L)				MOECC Table 3 Residential Coarse
		BH14-1	BH14-3	BH14-4	QA/QC 1	
		29-Aug-2014				
Acetone	2,700	ND	ND	ND	ND	130,000
Benzene	5	ND	ND	ND	ND	44
Bromodichloromethane	16	ND	ND	ND	ND	85,000
Bromoform	25	ND	ND	ND	ND	380
Bromomethane	0.89	ND	ND	ND	ND	5.6
Carbon Tetrachloride	0.79	ND	ND	ND	ND	0.79
Chlorobenzene	30	ND	ND	ND	ND	630
Dibromochloromethane	25	ND	ND	ND	ND	82,000
Chloroform	22	ND	ND	ND	ND	2.4
1,2-Dibromoethane	0.2	ND	ND	ND	ND	NV
1,2-Dichlorobenzene	3	ND	ND	ND	ND	4,600
1,3-Dichlorobenzene	59	ND	ND	ND	ND	9,600
1,4-Dichlorobenzene	1	ND	ND	ND	ND	8
Dichlorodifluoromethane	590	ND	ND	ND	ND	4,400
1,1-Dichloroethane	5	ND	ND	ND	ND	320
1,2-Dichloroethane	1.6	ND	ND	ND	ND	1.6
1,1-Dichloroethylene	1.6	ND	ND	ND	ND	1.6
Cis-1,2-Dichlroethylene	1.6	ND	ND	ND	ND	1.6
Trans-1,2-Dichloroethylene	1.6	ND	ND	ND	ND	1.6
1,3-Dichloropropene	0.5	ND	ND	ND	ND	5.2
Methylene Chloride	50	ND	ND	ND	ND	610
1,2-Dichloropropane	5	ND	ND	ND	ND	16
Ethylbenzene	2.4	ND	ND	ND	ND	2,300
n-hexane	51	ND	ND	ND	ND	51
Methyl Ethyl Ketone	1,800	ND	ND	ND	ND	470,000
Methyl Isobutyl Ketone	640	ND	ND	ND	ND	140,000
Methyl tert-Butyl Ether	15	ND	ND	ND	ND	190
Styrene	5.4	ND	ND	ND	ND	1,300
1,1,1,2-Tetrachloroethane	1.1	ND	ND	ND	ND	3.3
1,1,2,2-Tetrachloroethane	1	ND	ND	ND	ND	3.2
Tetrachloroethylene	1.6	ND	ND	ND	ND	1.6
Toluene	24	ND	ND	ND	ND	18,000
1,1,1-Trichloroethane	200	ND	ND	ND	ND	640
1,1,2-Trichloroethane	4.7	ND	ND	ND	ND	4.7
Trichloroethylene	1.6	ND	ND	ND	ND	1.6
Trichlorofluoromethane	150	ND	ND	ND	ND	2,500
Vinyl Chloride	0.5	ND	ND	ND	ND	0.5
Xylene	300	ND	ND	ND	ND	4,200

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the MDL
- N/V – no value provided by the MOECC

There were no VOC parameters identified above the detection limits in any of the groundwater samples analysed. The sample results are therefore considered to be in compliance with MOECC Table 3.

Table 17:
Analytical Test Results – Groundwater (2014)
PAHs

Parameter	RDL (µg/L)	Groundwater Samples (µg/L)			MOECC Table 3 Residential Coarse
		BH14-1	BH14-3	BH14-4	
		29-Aug-2014			
Acenaphthene	0.020	ND	ND	ND	600
Acenaphthylene	0.020	ND	ND	ND	1.8
Anthracene	0.020	ND	ND	ND	2.4
Benzo[a]anthracene	0.020	ND	ND	ND	4.7
Benzo[a]pyrene	0.010	ND	ND	ND	0.81
Benzo[b]fluoranthene	0.020	ND	ND	ND	0.75
Benzo[g,h,i]perylene	0.020	ND	ND	ND	0.2
Benzo[k]fluoranthene	0.020	ND	ND	ND	0.4
Chrysene	0.020	ND	ND	ND	1.0
Dibenzo[a,h]anthracene	0.020	ND	ND	ND	0.52
Fluoranthene	0.020	ND	<0.030[DLM]	ND	130
Fluorene	0.020	ND	ND	ND	400
Indeno[1,2,3-cd]pyrene	0.020	ND	ND	ND	0.2
1+2 - Methylnaphthalenes	0.028	ND	ND	ND	1800
Naphthalene	0.050	ND	ND	ND	1400
Phenanthrene	0.020	ND	ND	ND	580
Pyrene	0.020	ND	<0.030[DLM]	ND	68

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the RDL
- DLM – Detection limit adjusted due to sample matrix effects

No PAH parameters were identified above the detection limit, in any of the samples submitted for analysis. The sample results are in compliance with the MOECC Table 3 standards.

Table 18:
Analytical Test Results – Groundwater (2014)
PCBs

Parameter	RDL (µg/L)	Groundwater Samples (µg/L)			MOECC Table 3 Residential Coarse
		BH14-1	BH14-2	BH14-3	
		29-Aug-2014			
Aroclor 1242	0.010	<0.10[DLM]	<0.15[DLM]	<0.060[DLM]	NV
Aroclor 1248	0.020	ND	ND	ND	NV
Aroclor 1254	0.020	ND	<0.030[DLM]	<0.060[DLM]	NV
Aroclor 1260	0.020	ND	<0.030[DLM]	<0.080[DLM]	NV
Total PCBs	0.10	<0.10[DLM]	<0.15[DLM]	<0.080[DLM]	3

Notes:
- RDL – Reporting Detection Limit
- ND – not detected above the RDL
- NV – no value provided by the MOECC
- DLM – Detection limit adjusted due to sample matrix effects

No parameters were identified above the detection limits. As noted in the table, the detection limits were elevated due to sample matrix effects, however the elevated detection limits remain below the Table 3 standard, where a value is provided by the MOECC. The results are considered to be in compliance with the MOECC Table 3.

Maximum groundwater concentrations are presented in Table 19 below. All other parameter concentrations were below laboratory detection limits.

Table 19:
Maximum Concentrations – Groundwater

Parameter	Maximum Concentration (µg/L)	Borehole
Barium	157	BH14-4
Boron (total)	34	BH14-3
Chromium (total)	0.51	
Cobalt	3.1	
Molybdenum	2.47	
Nickel	9.7	
Uranium	6.9	
Vanadium	1.1	BH14-4
Zinc	6.9	BH14-3
Sodium	814,000	
Chloride	481,000	BH14-4

5.7 Quality Assurance and Quality Control Results

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

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

Two duplicate soil samples and a duplicate groundwater sample were obtained during the field portion of the Phase II-ESA. The soil samples collected were duplicates of Samples BH14-3 – SS8 (QA/QC 2) and BH14-4 – SS7 (QA/QC 3). These samples were submitted for analysis of BTEX/PHCs and VOCs, respectively. The duplicate water sample was collected from BH14-1 (QA/QC 1) and submitted for analysis of VOC parameters.

In each case, the analytical test results for individual test parameters were found to be similar, if not identical, to their original sample (not detected above the laboratory detection limits). As such, the samples are considered to be within acceptable QA/QC parameters.

In addition to the duplicate sampling, a trip blank was analyzed for VOCs, as part of the QA/QC program carried out during the initial groundwater sampling event (2014). The trip blank, prepared by ALS and brought to site during the groundwater sampling event, indicates that the storage and transportation of the samples from the site to the laboratory was acceptable.

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

5.8 Phase II Conceptual Site Model

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

Site Description

Potentially Contaminating Activities and Areas of Potential Environmental Concern

As per column A of Table 2, outlined in Ontario Regulation 153/04 and amended by O.Reg 279/11, potentially contaminating activities identified on the subject property and/or within the Phase I-ESA study area, with the potential to impact the site include the following:

- Item 28: Gasoline and Associated Products Storage in Fixed Tanks (PCA 1);
- Item 30: Importation of Fill Material of Unknown Quality (PCA 2); and
- Other: De-Icing Activites (PCA 3).

Areas of Potential Environmental Concern

The following APECs are present on the subject property as a result of the aforementioned PCAs:

- APEC 1 - Southeast area of the Phase I property (PCA 1) in the vicinity of the former aboveground storage tank (AST) previously used to store furnace oil within the basement of the former building structure;
- APEC 2 - Entire area of the Phase I property (PCA 2), where fill material of unknown quality may have been placed;
- APEC 3 – Northern and western portions of the Phase I property (PCA 3), where salt may have been used on-site and on adjacent roadways, for de-icing activities.

Subsurface Structures and Utilities

Subsurface utility mapping indicates that underground services present on the property consist of water services, telecom lines and storm sewers. It is anticipated that these underground services are present in the fill material, above the groundwater table. The buried utilities are therefore unlikely to have an effect on groundwater flow and potential contaminant transport.

There are no subsurface structures on the subject property.

Physical Setting

Site Stratigraphy

The site stratigraphy, from ground surface to the deepest aquifer or aquitard investigated, is illustrated on Drawings PE3348-5 and PE3348-6 - Cross-Sections. Stratigraphy consists of:

- Pavement structure consisting of 40 to 120 mm of asphalt underlain by a granular base (sand and gravel) extending to depths ranging from 0.2 to 0.9 m below ground surface.
- Fill material consisting of silty clay with trace to some gravel to a depth across the site of approximately 1.4 to 1.5 m below grade.
- Native silty clay to depths ranging from 10.7 to 12.2 m below ground surface.
- Silty sand to depths ranging from 14.8 to 15.8 m below grade.
- Limestone bedrock was encountered at depths varying from 14.8 to 15.8 m below existing grade. This is the deepest unit encountered.

Hydrogeological Characteristics

Groundwater was encountered within the silty clay layer, which is interpreted to function as a local unconfined aquifer at the subject site.

Groundwater levels were most recently measured at the subject site on the on April 17, 2015. Groundwater was encountered at depths between 2.7 and 3.9 m at this time. Seasonal fluctuations in groundwater are expected to occur.

Based on the groundwater elevations, groundwater contour mapping was completed and the horizontal hydraulic gradient at the subject site was calculated. Groundwater flow at the subject site is in a northwesterly direction, with an average hydraulic gradient of 0.04 m/m.

Approximate Depth to Bedrock

Depth to bedrock at the subject site varies between approximately 14.8 and 15.8 m below existing grade.

Approximate Depth to Water Table

Depth to water table at the subject site varies between approximately 2.7 and 3.9 m below existing grade.

Sections 41 and 43.1 of the Regulation

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

Section 43.1 of the Regulation does not apply to the subject site in that the subject site is not within 30 m of a water body, and there is more than 2 m of overburden.

Fill Placement

The Phase I-ESA identified the potential for fill material across the site, related to the construction of the former building and based on the presence of a former building to the west of the existing structure. The presence of fill material was confirmed during the Phase II-ESA. As discussed above, fill material consisting of silty clay with trace to some gravel, was identified at each borehole location to depth a depth of approximately 1.4 to 1.5 m below grade. There were no deleterious materials were identified in the fill and no indications of contamination.

Proposed Buildings and Other Structures

It is our understanding that the entire Phase II property will be developed with a 12-unit residential building with one level of underground parking.

Existing Buildings and Structures

The subject property is currently vacant.

Water Bodies

The subject property is not located within 30 m of a water body. The Ottawa River is located approximately 100 m north of the Phase II property.

Areas of Natural Significance

No areas of natural significance are present on the subject site or within the 250 m of the subject site.

Environmental Condition

Areas Where Contaminants are Present

Based on analytical test results, contaminants exceeding MOECC Table 3 standards present at the subject site include barium and vanadium, in the fill and/or native silty clay at BH14-2 and BH14-3 as well as EC in the fill at BH14-1 and SAR in the fill at BH14-1, 2 and 3. Contaminants exceeding MOECC Table 3 standards were not identified in the groundwater beneath the subject site.

Types of Contaminants

Contaminants identified in the soils and groundwater at the site include metals, electrical conductivity (EC) and sodium adsorption ratio (SAR).

Contaminated Media

The impacted soils were almost exclusively confined to the fill material, with the exception of barium and vanadium concentrations in the native silty clay (approximately 3 to 3.6 m below grade) at BH14-2. As noted above, the groundwater beneath the site is in compliance with MOECC Table 3 standards.

What Is Known About Areas Where Contaminants Are Present

Concentrations of barium and vanadium exceeding MOECC Table 3 standards were identified in the fill material at BH14-3 at a depth of approximately 0.8 to 1.4 m below grade. A concentrations of vanadium exceeding MOECC Table 3 standards was also identified in BH14-2 and BH14-4 at depths ranging from 1.5 to 3.5 m below grade, within the native silty clay. It is expected that barium and vanadium concentrations are naturally occurring in the silty clay soils in the area of the subject site, which would account for its presence in the both the fill and native soils, and it is expected that concentrations exceeding the Table 3 standard may be located in isolated pockets across the site.

Electrical conductivity and SAR values exceeding the MOECC Table 3 standards were identified in the fill layer at BH14-1. SAR values exceeding the MOECC Table 3 standards were also identified in the fill material at BH14-2, BH14-3 and BH14-4 and also within the native silty clay at BH14-3 and BH14-4, at depths ranging from 1.5 to 2.9 m below grade.

Distribution of Contaminants

Physical movement of the fill material across the site would account for the main distribution of metals at the subject site. It is considered likely that the fill material predominantly consists of site excavated silty clay placed during construction. Metals are generally insoluble in water; infiltration is not considered to account for the concentrations of barium and vanadium in the native soils. It is considered more likely that these metals are naturally occurring in the silty clay soils in the area of the subject site, based on our experience with metal concentrations observed in Champlain Sea clay deposits in the Ottawa Region.

Elevated sodium and chloride, as well as EC and SAR values, are expected to have resulted from migration of dissolved salts from adjacent roadways, onto the subject property. Chloride and sodium levels are significantly higher in BH14-3 and BH14-4, located on the northern portion of the site along Carling Avenue, compared levels identified in BH14-1 located near the southeast corner of the site.

Discharge of Contaminants

The elevated concentrations of barium and vanadium identified in the fill and native soils on the subject property, are considered to be naturally occurring. It should be noted that the fill material identified across the site is considered to be reworked native silty clay placed during construction. No building debris or other deleterious materials were observed in the fill.

De-icing agents may have been placed on-site by the current and previous property owners, however private properties of this nature do not typically use significant quantities of salt. However, the municipality places significant quantities of de-icing agents, specifically salt, on municipal sidewalks and roadways.

Migration of Contaminants

Due to the low solubility of metals, is suspected that the barium and vanadium present on the RSC property have not migrated significantly. It is considered likely that salt used as a de-icing agent on the adjacent municipal roadways and sidewalks has dissolved and leached into the soil, with migration occurring via the fluctuating groundwater table.

Climatic and Meteorological Conditions

In general, climatic and meteorological conditions have the potential to affect contaminant distribution. Two ways by which climatic and meteorological conditions may affect contaminant distribution include the downward leaching of contaminants by means of the infiltration of precipitation, and the migration of contaminants via groundwater levels and/or flow, which may fluctuate seasonally. Due to the fact that the majority of the site was covered by asphaltic concrete (or occupied by a physical structure), the possibility of precipitation infiltration is significantly reduced.

Potential for Vapour Intrusion

Based on analytical test results the potential for vapour intrusion into the proposed structure is negligible.

Contaminant Transport Diagram

Due to the fact that the subject site is largely covered in asphaltic concrete and currently fenced, it is considered unlikely that there are any potential human health receptors. The asphalt is considered to be a significant barrier separating the impacted soils from users of the property. During the site remediation and excavation, potential human health receptors will be workers present on the subject property; the property will be closed to the general public at this time.

Receptor exposure points include any excavations into contaminated soil, such as remedial excavations and test pits. Routes of exposure include dermal contact, accidental ingestion, and inhalation of contaminated soil as particulate dust. Based on the nature of the contaminants, the potential for receptor exposure is considered to be low.

Traditionally, potential ecological receptors include plants whose root structures intercept contaminated soil, burrowing wildlife, and groundwater/surface water receptors downgradient of the subject site at groundwater discharge points. Since the property is largely covered in asphaltic concrete, no significant plants or wildlife are present on site. Parkland is present north of the site across Carling Avenue, where ecological receptors may be present. Receptors may be present downgradient of the subject site, however based on analytical testing, the site groundwater is clean, resulting in no potential for receptor exposure.

6.0 CONCLUSIONS

Assessment

The purpose of the Updated Phase II-ESA was to address the following areas of potential environmental concern identified during the Phase I-ESA: an onsite furnace oil AST, fill material of unknown quality and use of de-icing agents on the adjacent municipal roadways and sidewalks. The original Phase II-ESA was carried out by SPL Consultants in August of 2014. Paterson subsequently conducted additional groundwater sampling in April of 2015 to confirm the previous results. The findings of both investigations are presented in this report.

The subsurface investigation conducted by SPL, which was carried out in conjunction with a Geotechnical Investigation, consisted of drilling four boreholes at the subject property, three of which were instrumented with groundwater monitoring wells, to assess soil and groundwater quality at the site. Based on the findings of the field program, the site stratigraphy generally consists of a pavement structure (asphalt over granular material) followed by fill material to a depth of approximately 1.4 to 1.5 m below grade underlain by native silty clay, silty sand and limestone bedrock. The fill material consists of silty clay with trace to some gravel. No building debris or other deleterious materials or signs of contaminants were noted in the fill.

Based on the analytical testing conducted in 2014, concentrations of barium and vanadium exceeding MOECC Table 3 standards were identified in the soil. More specifically, barium and vanadium exceedances were identified in the fill material BH14-3, while vanadium exceedances were identified in the native silty clay at BH14-2 and BH14-4 (at depths ranging from 1.5 to 3.5 m below grade).

Electrical conductivity (EC) and sodium adsorption ratio (SAR) were identified at levels exceeding the MOECC standards in the fill material at BH14-1. SAR exceedances were identified in both the fill and native soils (depths ranging from 1.5 to 3.5 m below grade) at the remaining borehole locations, while EC levels were in compliance with the standard. In addition to metals and inorganics, soil samples were analysed for PHCs, VOCs, PAHs and PCBs. No concentrations of these parameters were identified above the detection limits, in any of the samples submitted for analysis.

Groundwater samples recovered in 2014 were submitted for analysis of metals and inorganics, PHCs, VOCs, PAHs and PCBs. No VOC, PAH or PCB parameters were identified above their respective detection limits. Metals and inorganics were identified in each of the groundwater samples submitted for analysis. All concentrations were in compliance with the MOECC standards selected for the site, with the exception of the sodium concentration in the groundwater recovered from BH14-3. It should be noted however, that the soil and groundwater standards selected at the time of the original field work, were MOECC Table 2 standards for a potable groundwater condition. It has since been confirmed by the City of Ottawa, in a letter dated January 8, 2016, that the MOECC Table 3 standards for a non-potable groundwater condition are in fact applicable to the subject site. The sodium concentration at BH14-3, identified in 2014, is therefore in compliance with the standards. (With regard to the current use of Table 3 standards, it should also be noted that Table 3 and Table 2 standards for the soil parameters discussed above, are the same.)

Petroleum hydrocarbon parameters were identified in each of the groundwater samples submitted for analysis in 2014. PHC F3 concentrations in the groundwater recovered from BH14-1, BH14-3 and BH14-4 exceeded the MOECC Table 3 standards, as well as the F2 and F4 concentrations identified in BH14-3. Given that no PHC parameters were identified in the soil, the groundwater results were suspected to be inaccurate. During the initial groundwater sampling event, SPL purged the monitoring wells and recovered groundwater samples using polytubing with a footvalve and/or bailers, which were observed in the monitoring wells during the subsequent sampling event. Based on this information, it was our opinion that the PHC concentrations were not accurate and a result of sediment present in the groundwater samples due to the sampling method used.

Paterson conducted a second groundwater sampling event in April of 2015. At that time, a peristaltic pump was used to purge and sample the wells using a low flow, to reduce the potential for sediment in the samples. Groundwater samples from each well were submitted for analysis of BTEX and PHC parameters. A sample from BH14-3 was also submitted for sodium and chloride. No BTEX or PHC parameters were identified in any of the groundwater samples. Sodium and chloride parameters were identified in Sample BH14-3 – GW2 at concentrations were in compliance with MOECC Table 3.

The results of the original 2014 analytical testing for PHC parameters in groundwater were therefore considered inaccurate. The groundwater beneath the site is considered to be in compliance with the MOECC Table 3 standards.

Recommendations

Based on the findings of the Updated Phase II-ESA, it is recommended that a soil remediation program be conducted to remove the fill/soil with slightly elevated levels of barium, vanadium, EC and SAR. The remediation program can be conducted in conjunction with future site redevelopment.

Prior to off-site disposal at an approved waste disposal facility, a representative sample of impacted soil must be collected and submitted for a leachate (TCLP) analysis, in accordance with Ontario Regulation 347/558, to confirm the soil is classified as non-hazardous waste.

It is recommended that Paterson personnel be contacted prior to excavation activities to collect and submit the aforementioned sample. It is also recommended that Paterson be onsite during the remediation program to direct excavation activities, collect verification samples as required and to conduct final confirmatory sampling upon completion of the remedial activities.

If the monitoring wells installed are not going to be used in the future, they should be abandoned according to Ontario Regulation 903. Decommissioning of the wells can be carried out in conjunction with site redevelopment.

7.0 STATEMENT OF LIMITATIONS

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

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

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

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

Paterson Group Inc.

Karyn Munch, P.Eng., QP$_{ESA}$

Mark D'Arcy, P.Eng, QP$_{ESA}$

Report Distribution:

- ❒ Cardel Homes (6 copies)
- ❒ Paterson Group (1 copy)

FIGURES

FIGURE 1 – KEY PLAN

DRAWING PE3448-1 – TEST HOLE LOCATION PLAN

DRAWING PE3448-2 – ANALYTICAL TESTING PLAN (SOIL)

DRAWING PE3448-3 – ANALYTICAL TESTING PLAN (GROUNDWATER)

DRAWING PE3448-4 – GROUNDWATER CONTOUR PLAN

DRAWING PE3448-5 - CROSS-SECTION A-A'

DRAWING PE3448-6 - CROSS-SECTION B-B'

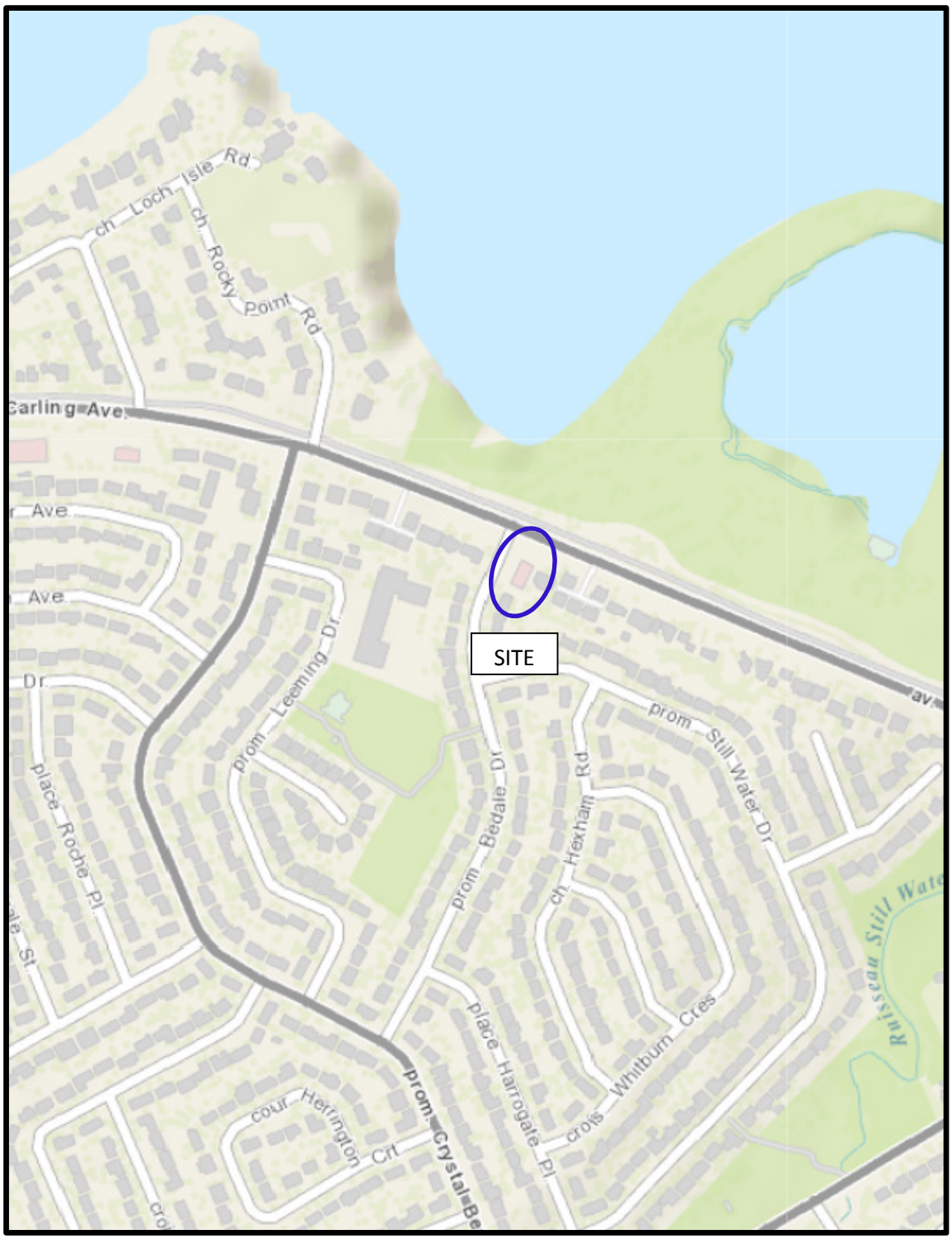

FIGURE 1

KEY PLAN

BEDALE DRIVE

CARLING AVENUE

TBM

A

A'

B

B'

BH 14-2
100.8

BH 14-3
100.8
(96.89)

BH 14-4
101.1
(98.45)

BH 14-1
101.1
(98.57)

ASPHALTIC CONCRETE

ASPHALTIC CONCRETE

RESIDENTIAL

#3368 CARLING AVENUE
(FORMER BUILDING)

COMMERCIAL

LEGEND:

- BOREHOLE LOCATION BY OTHERS
- MONITORING WELL LOCATION
- 101.1 GROUND SURFACE ELEVATION (m)
- (97.90) GROUNDWATER ELEVATIONS (APR. 17, 2015)

TBM - TOP CATCH BASIN LOCATED ON BEDALE DRIVE. ASSUMED ELEVATION OF 100.00m WAS ASSIGNED TO TBM.

SCALE: 1:200

0 1 2 3 4 5 10m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

CARDEL HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
VACANT COMMERCIAL PROPERTY - 3368 CARLING AVENUE
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:200	Date: 1/2016
Drawn by: CPB	Report No.: PE3448-1
Checked by: KM	Dwg. No.: PE3448-1
Approved by: MSD	Revision No.: 0

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BEDALE DRIVE

CARLING AVENUE

TBM

PARKING LOT

#3368 CARLING AVENUE
(FORMER BUILDING)

PARKING LOT

BH 14-2
100.8

BH 14-3
100.8
(96.89)

BH 14-1
101.1
(98.57)

BH 14-4
101.1
(98.45)

BH14-2-SS1 (0.2-0.8m) -19-Aug-2014		
Parameter	Result	MOECC
Sodium Adsorption Ratio	5.7	5
Electrical Conductivity complies with MOECC Standard		

BH14-2-SS5 (2.9-3.5m) - 19-Aug-2014		
Parameter	Result	MOECC
Vanadium	88	86
Remaining metal parameters and EC, SAR and pH comply with MOECC Standards		

BH14-3-SS2 (0.8-1.4m) - 20-Aug-2014		
Parameter	Result	MOECC
Barium	405	390
Vanadium	96	86
Sodium Adsportion Ratio	22.2	5
Remaining metal parameters, EC and pH comply with MOECC Standards		

BH14-3-SS4 (2.3-2.9m) -20-Aug-2014		
Parameter	Result	MOECC
Sodium Adsorption Ratio	7.1	5
Electrical Conductivity complies with MOECC Standard		

BH14-3-SS8 (7.6-8.2m) - 20-Aug-2014
BTEX and PHCs comply with MOECC Standards

QA/QC #2 (7.6-8.2m) - 20-Aug-2014
BTEX and PHCs comply with MOECC Standards

BH14-3-SS4 (2.3-2.9m) - 20-Aug-2014
PCBs comply with MOECC Standards

BH14-4-SS3 (1.5-2.1m) - 20-Aug-2014		
Parameter	Result	MOECC
Vanadium	95.8	86
Sodium Adsorption Ratio	6.35	5
Remaining metal parameters, EC and pH comply with MOECC Standards		

BH14-4-SS1 (0.2-0.8m) - 20-Aug-2014
PAHs comply with MOECC Standards

BH14-4-SS7 (6.1-7.6m) - 20-Aug-2014
VOCs comply with MOECC Standards

QA/QC #3 (6.1-7.6m) - 20-Aug-2014
VOCs comply with MOECC Standards

BH14-1-SS1 (0.2-0.8m) - 21-Aug-2014		
Parameter	Result	MOECC
Electrical Conductivity	1.78	0.7
Sodium Adsorption Ratio	58.5	5
Metals and pH comply with MOECC Standards		

BH14-1-SS3 (1.5-2.1m) - 21-Aug-2014
PAHs comply with MOECC Standards

BH14-1-SS6 (4.6-5.2m) - 21-Aug-2014
BTEX and PHCs comply with MOECC Standards

BH14-1-SS7 (6.1-7.6m) - 21-Aug-2014
VOCs comply with MOECC Standards

BH14-4-SS1 (0.2-0.8m) -20-Aug-2014		
Parameter	Result	MOECC
Sodium Adsorption Ratio	9.8	5
Electrical Conductivity complies with MOECC Standard		

LEGEND:

- BOREHOLE LOCATION BY OTHERS
- MONITORING WELL LOCATION
- 101.1 GROUND SURFACE ELEVATION (m)
- (98.45) GROUNDWATER ELEVATIONS (APR. 17, 2015)

TBM - TOP CATCH BASIN LOCATED ON BEDALE DRIVE. ASSUMED ELEVATION OF 100.00m WAS ASSIGNED TO TBM.

Soil: Results in compliance with MOECC Table 3 Standards

Soil: Parameters identified exceed MOECC Table 3Standards

SCALE: 1:200

0 1 2 3 4 5 10m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

CARDEL HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
VACANT COMMERCIAL PROPERTY - 3368 CARLING AVENUE

OTTAWA, ONTARIO

Title:

ANALYTICAL TESTING PLAN (SOIL)

Scale: 1:200	Date: 1/2016
Drawn by: CPB	Report No.: PE3448-1
Checked by: KM	Dwg. No.: PE3448-2
Approved by: MSD	Revision No.: 0

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BEDALE DRIVE

TBM

BH 14-2
100.8

PARKING LOT

BH 14-3
100.8
(96.89)

#3368 CARLING AVENUE
(FORMER BUILDING)

PARKING LOT

BH 14-4
101.1
(98.45)

BH 14-1
101.1
(98.57)

CARLING AVENUE

BH14-3 (4.6-7.6m) - 29-Aug-2014		
Parameter	Result	MOECC
PHC, F2	170	150
PHC, F3	31,000	500
PHC, F4	1,850	500
Metals, Sodium, Chloride, pH, VOCs, PHC (F1), PAHs and PCBs comply with MOECC Standards		

BH14-3 - GW2 (4.6-7.6m) - 17-Apr-2015
BTEX, PHCs, chloride and sodium comply with MOECC Table 3 Standards

BH14-4 (4.6-7.6m) - 29-Aug-2014		
Parameter	Result	MOECC
PHC, F3	1,600	500
Metals, Sodium, Chloride, pH, VOCs, PHCs (F1, F2, F4), PAHs and PCBs comply with MOECC Standards		

BH14-4 - GW2 (4.6-7.6) - 17-Apr-2015
BTEX and PHCs comply with MOECC Standards

BH14-1 (4.0-7.0m) - 29-Aug-2014		
Parameter	Result	MOECC
PHC, F3	5,190	500
Metals, Sodium, Chloride, pH, VOCs, PHCs (F1, F2, F4), PAHs and PCBs comply with MOECC Standards		

BH14-1 - GW2 (4.0-7.0m) - 17-Apr-2015
BTEX and PHCs comply with MOECC Standards

LEGEND:

- BOREHOLE LOCATION BY OTHERS
- MONITORING WELL LOCATION
- 101.1 GROUND SURFACE ELEVATION (m)
- (97.90) GROUNDWATER ELEVATIONS (APR. 17, 2015)

TBM - TOP CATCH BASIN LOCATED ON BEDALE DRIVE.
ASSUMED ELEVATION OF 100.00m WAS ASSIGNED TO TBM.

Groundwater: Results in compliance with MOECC Table 3 Standards

Groundwater: Parameters identified exceed MOECC Table 3 Standards

SCALE: 1:200

0 1 2 3 4 5 10m

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154 Colonnade Road South
Ottawa, Ontario K2E 7J5
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NO.	REVISIONS	DATE	INITIAL

CARDEL HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
VACANT COMMERCIAL PROPERTY - 3368 CARLING AVENUE
OTTAWA, ONTARIO

Title:
ANALYTICAL TESTING PLAN (GROUNDWATER)

Scale: 1:200	Date: 1/2016
Drawn by: CPB	Report No.: PE3448-1
Checked by: KM	Dwg. No.: PE3448-3
Approved by: MSD	Revision No.: 0

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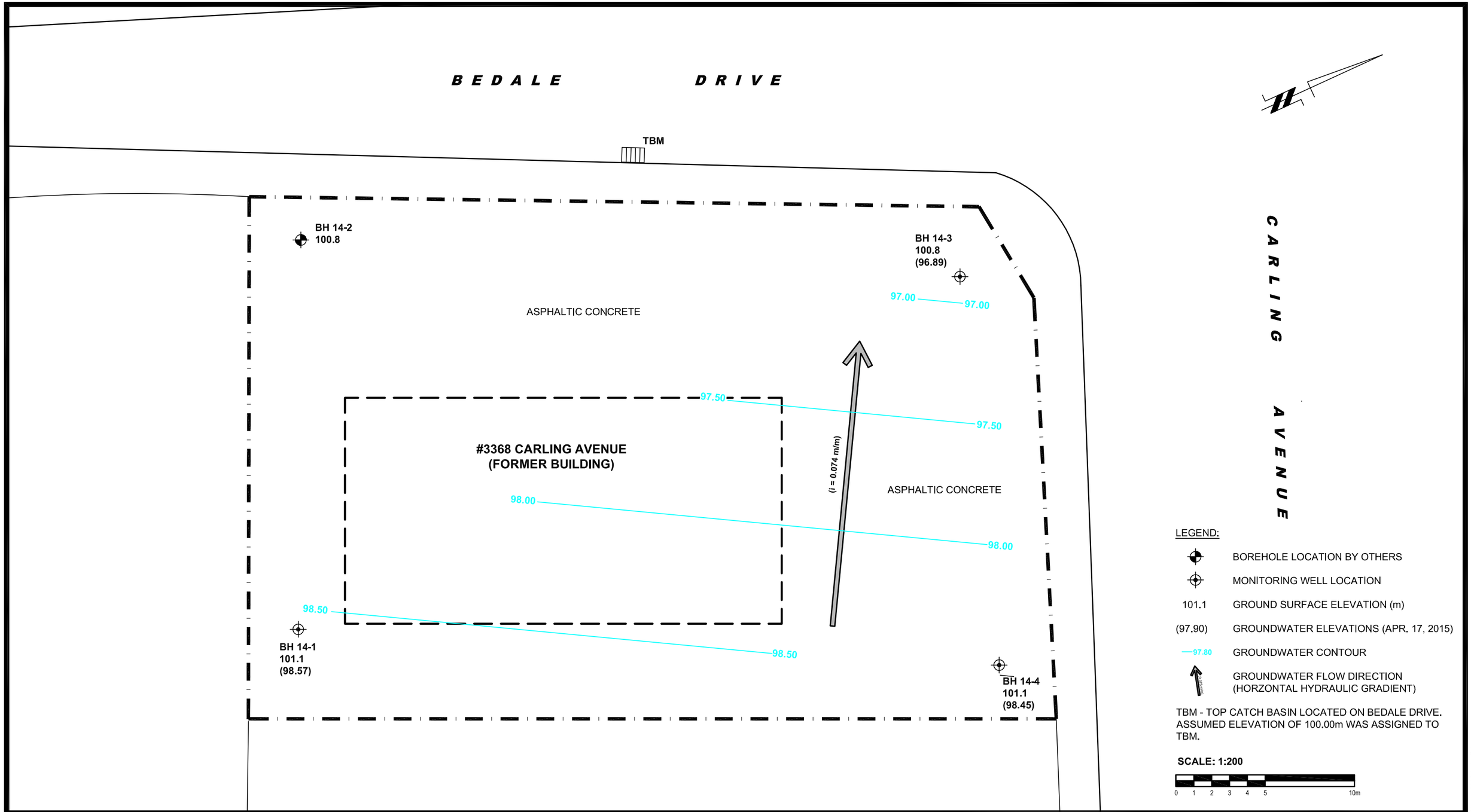

LEGEND:

- BOREHOLE LOCATION BY OTHERS
- MONITORING WELL LOCATION
- 101.1 GROUND SURFACE ELEVATION (m)
- (97.90) GROUNDWATER ELEVATIONS (APR. 17, 2015)
- 97.80 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION (HORZONTAL HYDRAULIC GRADIENT)

TBM - TOP CATCH BASIN LOCATED ON BEDALE DRIVE. ASSUMED ELEVATION OF 100.00m WAS ASSIGNED TO TBM.

SCALE: 1:200

0 1 2 3 4 5 10m

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consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

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CARDEL HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
VACANT COMMERCIAL PROPERTY - 3368 CARLING AVENUE
OTTAWA, ONTARIO

Title:

GROUNDWATER CONTOUR PLAN

Scale: 1:200	Date: 1/2016
Drawn by: CPB	Report No.: PE3448-1
Checked by: KM	Dwg. No.: PE3448-4
Approved by: MSD	Revision No.: 0

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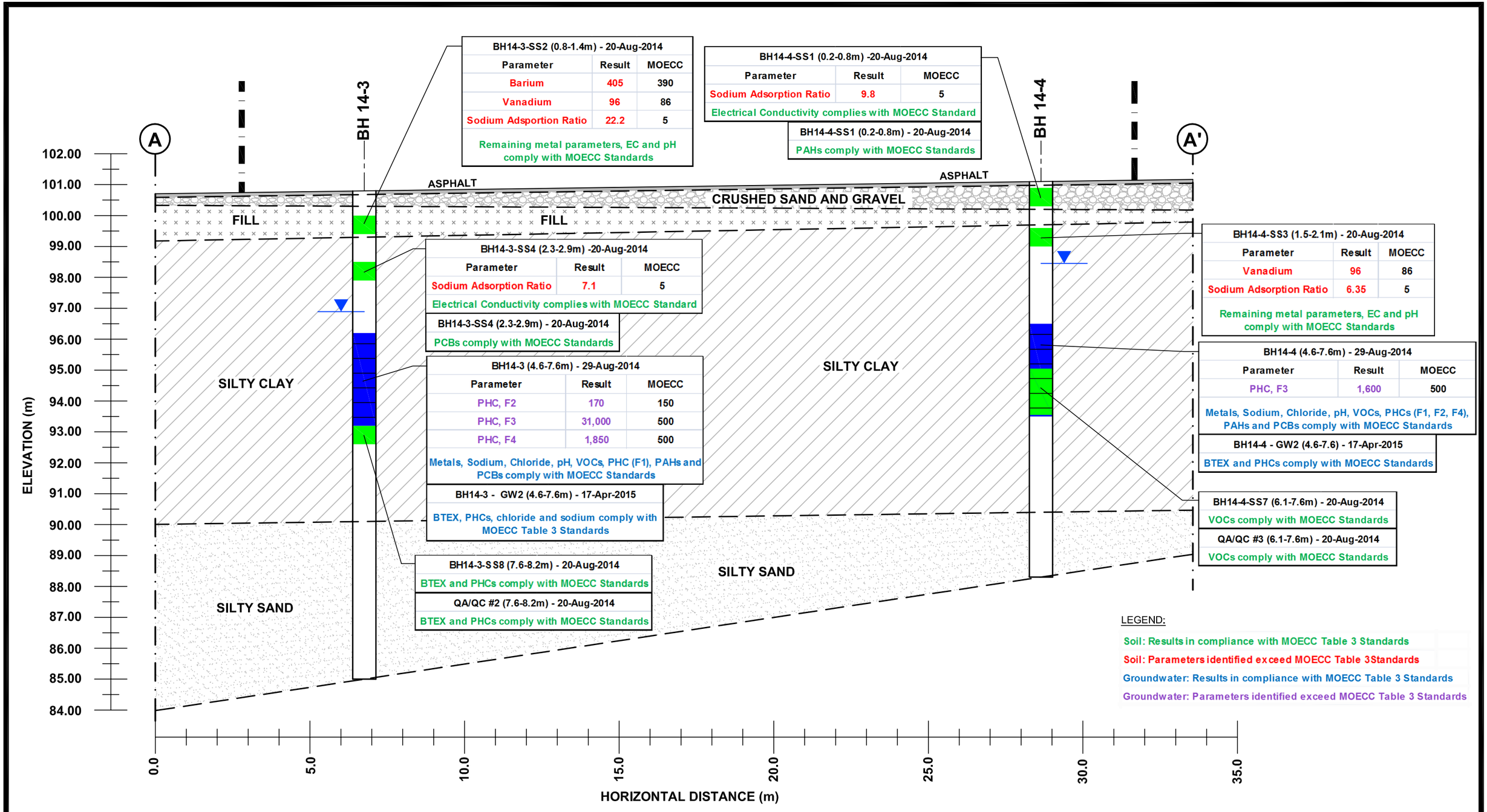

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consulting engineers
154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

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CARDEL HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
VACANT COMMERCIAL PROPERTY - 3368 CARLING AVENUE

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A'

Scale: AS SHOWN	Date: 1/2016
Drawn by: CPB	Report No.: PE3448-1
Checked by: KM	Dwg. No.: PE3448-5
Approved by: MSD	Revision No.: 0

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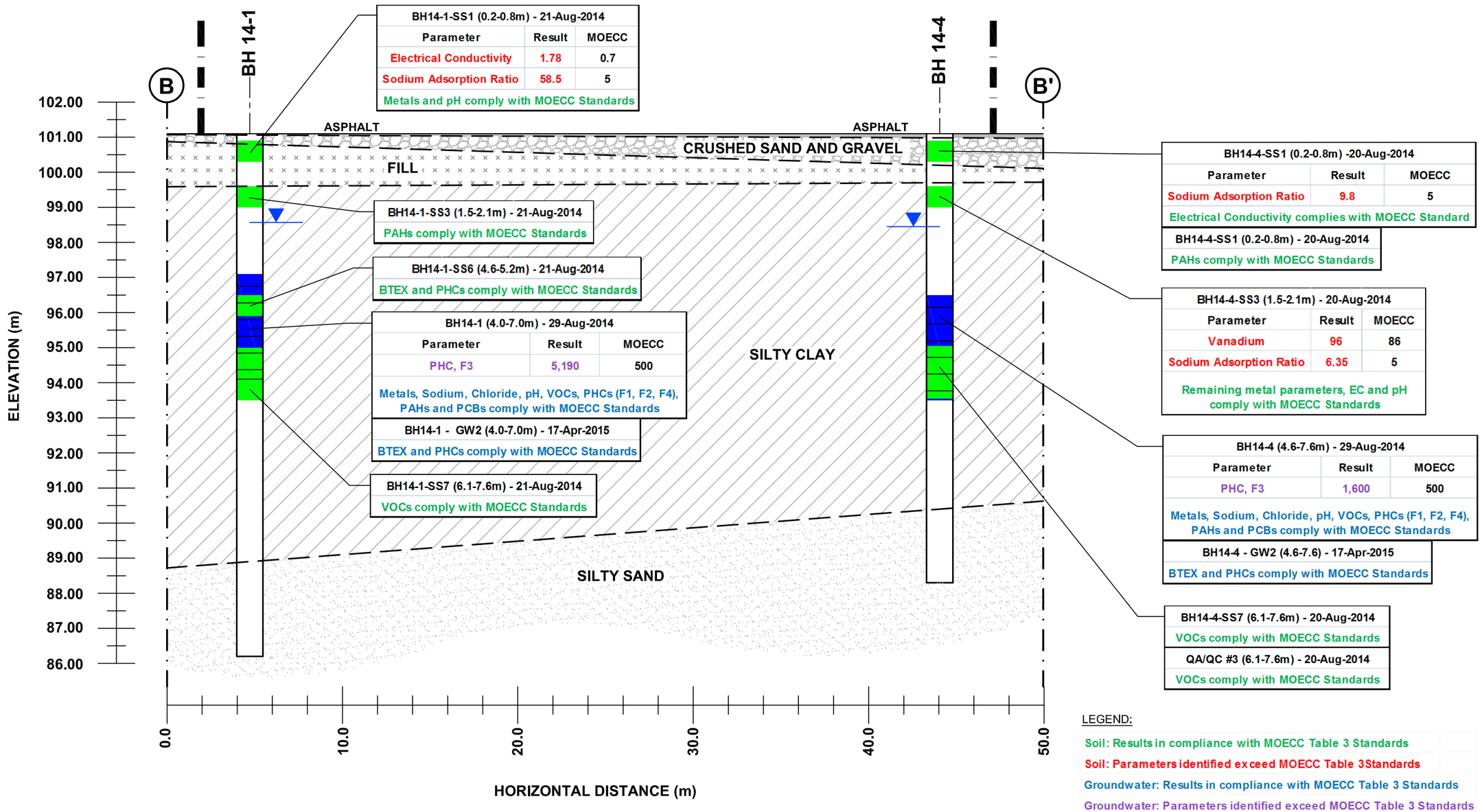

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

CARDEL HOMES

PHASE II - ENVIRONMENTAL SITE ASSESSMENT
VACANT COMMERCIAL PROPERTY - 3368 CARLING AVENUE
OTTAWA, ONTARIO

Title:
CROSS SECTION B-B'

Scale: AS SHOWN	Date: 1/2016
Drawn by: CPB	Report No.: PE3448-1
Checked by: KM	Dwg. No.: PE3448-6
Approved by: MSD	Revision No.: 0

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APPENDIX 1

SAMPLING AND ANALYSIS PLAN

SOIL PROFILE AND TEST DATA SHEETS

LABORATORY CERTIFICATES OF ANALYSIS

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

Paterson Group Inc.

Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

patersongroup

Sampling & Analysis Plan

Phase II-Environmental Site Assessment,
3368 Carling Avenue
Ottawa, Ontario

Prepared For

Cardel Homes

August 8, 2014

Report: PE3488-SAP

Table of Contents

1.0 SAMPLING PROGRAM

SPL was commissioned by Cardel Homes, to conduct a Phase II-Environmental Site Assessment (ESA) for the property addressed 3668 Carling Avenue, Ottawa, Ontario. Paterson was subsequently commissioned to update the results of the SPL's Phase II-ESA with the more recent (April, 2015) groundwater sampling program conducted by Paterson. Based on the findings from the Phase I-ESA conducted by SPL in August of 2014, a subsurface investigation program, consisting of borehole drilling, was developed. It should be noted that the Phase II-ESA was conducted in conjunction with a Geotechnical Investigation.

Borehole	Location & Rationale	Proposed Depth & Rationale
BH14-1	Located to address potential soil and groundwater impacts from historical use of furnace oil AST, imported fill and possible use of de-icing agents.	Intercept groundwater table for installation of monitoring well.
BH14-2	Located to provide general coverage of the site for geotechnical purpose and to address potential soil impacts from imported fill and use of possible de-icing agents.	Core into bedrock to confirm bedrock depth for geotechnical purposes.
BH14-3	Located to address potential soil and groundwater impacts from imported fill and use of possible de-icing agents.	Intercept groundwater table for installation of monitoring well.
BH14-4		

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

At each borehole, split-spoon samples of overburden soils will be obtained every 0.6 m per 0.8 m interval for the first 6.0 m, followed by 0.6 m per 1.5 m interval to the completion of the borehole. All soil samples will be retained, and samples will be selected for submission following a preliminary screening analysis.

Following borehole drilling, monitoring wells will be installed in 3 of 4 boreholes (as above).

2.0 ANALYTICAL TESTING PROGRAM

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

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

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

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

More specifically, the following analytical program was proposed by SPL:

- Four (4) soil samples for metal and inorganics analysis;
- Three (3) soil samples for electrical conductivity (EC) and sodium absorption ratio (SAR);
- Two (2) soil samples for petroleum hydrocarbons (PHCs);
- Two (2) soil samples for volatile organic compounds (VOCs);
- Two (2) soil samples for polycyclic aromatic hydrocarbons (PAHs);
- One (1) soil sample for polychlorinated biphenyls (PCBs);
- Two (2) soil samples for QA/QC purposes (duplicates);
- Three (3) groundwater samples for metals and inorganics, VOCs, PHCs, PAHs and PCBs; and
- Two (2) groundwater samples for QA/QC purpose (duplicate and trip blank).

The following analytical program was proposed by Paterson:

- Three (3) groundwater samples for BTEX and PHCs;
- One (1) groundwater sample from BH14-3 for sodium and chlorides.

3.0 STANDARD OPERATING PROCEDURES

3.1 Environmental Drilling Procedure

Purpose

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

Equipment

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

- glass soil sample jars
- two buckets
- cleaning brush (toilet brush works well)
- dish detergent
- methyl hydrate
- water (if not available on site - water jugs available in trailer)

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

Determining Borehole Locations

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

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

Drilling Procedure

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

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

Spoon Washing Procedure

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

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

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

Screening Procedure

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

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

- Samples should be brought to room temperature; this is specifically important in colder weather. Soil must not be frozen.
- Turn instrument on and allow to come to zero - calibrate if necessary
- If using RKI Eagle, ensure instrument is in methane elimination mode unless otherwise directed.
- Ensure measurement units are ppm (parts per million) initially. RKI Eagle will automatically switch to %LEL (lower explosive limit) if higher concentrations are encountered.
- Break up large lumps of soil in the sample bag, taking care not to puncture bag.
- Insert probe into soil bag, creating a seal with your hand around the opening.

- Gently manipulate soil in bag while observing instrument readings.
- Record the highest value obtained in the first 15 to 25 seconds
- Make sure to indicate scale (ppm or LEL); also note which instrument was used (RKI Eagle 1 or 2, or MiniRae).
- Jar samples and refrigerate as per Sampling and Analysis Plan.

3.2 Monitoring Well Installation Procedure

Equipment

- 1.5 m x 50 mm threaded sections of Schedule 40 PVC slotted well screen (1.5 m x 31 mm if installing in cored hole in bedrock)
- 1.5 m x 50 mm threaded sections of Schedule 40 PVC riser pipe (1.5 m x 31 mm if installing in cored hole in bedrock)
- Threaded end-cap
- Slip-cap or J-plug
- Asphalt cold patch or concrete
- Silica Sand
- Bentonite chips (Holeplug)
- Steel flushmount casing

Procedure

- Drill borehole to required depth, using drilling and sampling procedures described above.
- If borehole is deeper than required monitoring well, backfill with bentonite chips to required depth. This should only be done on wells where contamination is not suspected, in order to prevent downward migration of contamination.
- Only one monitoring well should be installed per borehole.
- Monitoring wells should not be screened across more than one stratigraphic unit to prevent potential migration of contaminants between units.
- Where LNAPLs are the suspected contaminants of concern, monitoring wells should be screened straddling the water table in order to capture any free product floating on top of the water table.

- Thread the end cap onto a section of screen. Thread second section of screen if required. Thread risers onto screen. Lower into borehole to required depth. Ensure slip-cap or J-plug is inserted to prevent backfill materials entering well.

- As drillers remove augers, backfill borehole annulus with silica sand until the level of sand is approximately 0.3 m above the top of the screen.
- Backfill with holeplug until at least 0.3 m of holeplug is present above the top of the silica sand.
- Backfill remainder of borehole with holeplug or with auger cuttings (if contamination is not suspected).
- Install flushmount casing. Seal space between flushmount and borehole annulus with concrete, cold patch, or holeplug to match surrounding ground surface.

3.3 Monitoring Well Sampling Procedure

Equipment

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

Sampling Procedure

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

Continue to purge, measuring field chemistry after every well volume purged, until appearance or field chemistry stabilizes.

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

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

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

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

5.0 DATA QUALITY OBJECTIVES

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

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

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

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

For the purpose of calculating the RPD, it is desirable to select field duplicates from samples for which parameters are present in concentrations above laboratory detection limits, i.e. samples which are expected to be contaminated. If parameters are below laboratory detection limits for selected samples or duplicates, the RPD may be calculated using a concentration equal to one half (0.5 x) the laboratory detection limit.

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

These considerations are discussed in the body of the report.

6.0 PHYSICAL IMPEDIMENTS TO SAMPLING & ANALYSIS PLAN

Physical impediments to the Sampling and Analysis plan may include:

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

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

LOG OF BOREHOLE BH14-1

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 1 E 4

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/21/2014

REF. NO.: 10000823
ENCL NO.:

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
101.1							101
100.8 0.3	**ASPHALT** 40 mm **CRUSHED SAND AND GRAVEL** brown, moist (Granular Base) **SILTY CLAY** trace gravel, dark brown, moist, firm (FILL)		1	SS	2		
			2	SS	6		
99.6 1.5	**SILTY CLAY** grey brown, moist, stiff to very stiff (Weathered Crust)		3	SS	10		99
			4	SS	12		
			5	SS	7		98
	- silty sand seam		6	SS	17		97
95.0 6.1	**SILTY CLAY** with silty sand seams, grey, wet, stiff to very stiff		7	SS	1		96
				VANE			95
				VANE			94
							93
							92

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
25 50 75 100 125

PLASTIC LIMIT W_P | NATURAL MOISTURE CONTENT W | LIQUID LIMIT W_L
WATER CONTENT (%)
25 50 75

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (KN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Cuttings
Bentonite
Sand
Screen
14.9 m
7.0 m
W. L. 97.4 m
Aug 28, 2014

+4
+10

-Hollow stem augered to 6.1 m then advanced casing to 14.9 m

SPL SOIL LOG-OTTAWA 10000823 - 3368 CARLING AVENUE.GPJ SPL.GDT 12/9/14

Continued Next Page

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▽ ▼

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH14-1

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 1 E 4

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/21/2014

REF. NO.: 10000823
ENCL NO.:

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (25 50 75 100 125)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (KN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY with silty sand seams, grey, wet, stiff to very stiff(Continued)						91					
			8	SS	1		90					
			9A 9B	SS SS	1							
88.9							89					
12.2	**SILTY SAND** trace clay, grey, wet, very loose to loose		10	SS	1							
			11	SS	8		88					
			12	SS	2		87					
86.2			13	SS	5							
14.9	**End of Borehole** Notes: 1 - Borehole was advanced with hollow stem augers to 6.1 m depth then advanced with casing to 14.9 m depth. Casing filled with water prior to SPT sampling below 10.7 m depth. 2 - Borehole terminated at 14.9 m below surface on casing refusal. 3 - Water level on completion of sampling at a depth of 2.5 m below surface. 4 - 50 mm dia. monitoring well installed in adjacent auger hole 5 - Date Water Level Aug 28, 2014 3.7 m											

SPL SOIL LOG-OTTAWA 10000823 - 3368 CARLING AVENUE.GPJ SPL.GDT 12/9/14

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▽ ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH14-2

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 1 E 1

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/19/2014

REF. NO.: 10000823
ENCL NO.:

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"
100.8 / 0.0	**ASPHALT** 100 mm			
100.7 / 0.1	**CRUSHED SAND AND GRAVEL** brown, moist (Granular Base)			
100.6 / 0.2	**SILTY CLAY** trace to some gravel, trace roots, brown, moist, firm (FILL)	1	SS	6
		2	SS	7
99.5 / 1.4	**SILTY CLAY** grey brown to brown, moist, stiff to very stiff (Weathered Crust)	3	SS	13
		4	SS	11
		5	SS	6
96.5 / 4.4	**SILTY CLAY** with silty sand seams, grey brown to grey, moist, stiff to very stiff	6	SS	2
			VANE	
			VANE	
	- grey below 6.0 m	7	SS	WH
			VANE	
			VANE	
		8A	SS	1
		8B	SS	
			VANE	
		9	SS	WH
			VANE	

GROUND WATER CONDITIONS

ELEVATION: 100, 99, 98, 97, 96, 95, 94, 93, 92, 91

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED
● QUICK TRIAXIAL
+ FIELD VANE & Sensitivity
× LAB VANE
25 50 75 100 125

PLASTIC LIMIT W_P | NATURAL MOISTURE CONTENT W | LIQUID LIMIT W_L
WATER CONTENT (%)
25 50 75

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (KN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▽ ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH14-2

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 1 E 1

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/19/2014

REF. NO.: 10000823
ENCL NO.:

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (KN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY with silty sand seams, grey brown to grey, moist, stiff to very stiff(Continued)			VANE								
			10	SS	WH		90					
				VANE				+3				
				VANE				+5				
88.8							89					
12.1	**SILTY SAND** trace clay, grey, wet, very loose		11	SS	WR							
							88					
			12	SS	2		87				21.1	0 73 24 3 - approx. 0.3 m of heave inside hollow stem auger when center plug removed
86.0												
14.8	**LIMESTONE** fresh, grey, thin to medium bedded with some shale seams - RQD: 99% - TCR: 100%		1	CORE			86					
							85					
	- RQD: 85% - TCR: 97%		2	CORE			84					
82.9							83					
17.9	**End of Borehole** Notes: 1 - Switched from augering to NQ rock coring at a depth of 14.8 m below surface after encountering auger refusal. 2 - Water level after augering was at a depth of 6.9 m below surface. 3 - Water level after completion of borehole was at a depth of 7.0 m below surface											

SPL SOIL LOG-OTTAWA 10000823 - 3368 CARLING AVENUE.GPJ SPL.GDT 12/9/14

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▽ ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH14-3

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 2 E 2

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/20/2014

REF. NO.: 10000823
ENCL NO.:

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS / 0.3 m "N"
100.8 / 0.0	**ASPHALT** 120 mm			
100.7 / 0.1	**CRUSHED SAND AND GRAVEL** grey brown, moist, loose (Granular Base)	1	SS	8
100.4 / 0.5	**SILTY CLAY** trace gravel, dark brown, moist, firm (FILL)	2	SS	6
99.3 / 1.5	**SILTY CLAY** grey brown, moist, stiff to very stiff (Weathered Crust)	3	SS	13
		4	SS	8
		5	SS	7
		6	SS	1
95.7 / 5.1	**SILTY CLAY** with silty sand seams, grey, wet, stiff to very stiff		VANE	
			VANE	
		7	TW	
			VANE	
			VANE	
		8	SS	1
			VANE	
			VANE	
		9	TW	

Cuttings
Bentonite
W. L. 96.3 m Aug 28, 2014
Sand Screen

SHEAR STRENGTH (kPa)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
0	1	57	42

Continued Next Page

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▽ ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

SPL SOIL LOG-OTTAWA 10000823 - 3368 CARLING AVENUE.GPJ SPL.GDT 12/9/14

LOG OF BOREHOLE BH14-3

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 2 E 2

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/20/2014

REF. NO.: 10000823
ENCL NO.:

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (25 50 75 100 125)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (KN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
90.1	**SILTY CLAY** with silty sand seams, grey, wet, stiff to very stiff(Continued)											
10.7	**SILTY SAND** trace clay, grey, wet, very loose to loose		10	SS	1		90		○			
							89					
	- some silt		11	SS	7				○		20.5	0 87 12 1
							88					
			12	SS	3		87		○			
							86					
85.0			13	SS	5				○			0 70 24 6
15.8	**End of Borehole** Notes: 1 - Borehole terminated at 15.8 m below surface on auger refusal. 2 - Water level after completion of borehole was at a depth of 8.2 m below surface. 3 - 50 mm dia. monitoring well advanced in adjacent auger hole 4 - Date Water Level Aug 28, 2014 4.5 m						85					

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▽ ▼

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

SPL SOIL LOG-OTTAWA 10000823 - 3368 CARLING AVENUE.GPJ SPL.GDT 12/9/14

LOG OF BOREHOLE BH14-4

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 2 E 3.5

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/20/2014

REF. NO.: 10000823
ENCL NO.:

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS / 0.3 m ("N")
101.1 / 0.0	**ASPHALT** 120 mm			
100.9 / 0.1	**CRUSHED SAND AND GRAVEL** some silt, brown, moist (Granular Base)	1	SS	4
100.3 / 0.9	**SILTY CLAY** brown grey, moist, firm to stiff (FILL)	2	SS	8
99.7 / 1.4	**SILTY CLAY** brown, moist, stiff to very stiff (Weathered Crust)	3	SS	11
		4	SS	11
		5	SS	6
		6	SS	2
			VANE	
			VANE	
95.0 / 6.1	**SILTY CLAY** with silty sand seams, grey, wet, stiff to very stiff	7	SS	1
			VANE	
			VANE	
		8	TW	
			VANE	
			VANE	
		9	SS	2
	- firm at 9.8 m		VANE	

GROUND WATER CONDITIONS: Cuttings; Bentonite; W. L. 97.9 m Aug 28, 2014; Sand; Screen

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (25 50 75 100 125)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
PLASTIC LIMIT W_P | NATURAL MOISTURE CONTENT W | LIQUID LIMIT W_L
WATER CONTENT (%) (25 50 75)
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (KN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▽ ▼

GRAPH NOTES
$+^{3}$, $\times^{3}$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

SPL SOIL LOG-OTTAWA 10000823 - 3368 CARLING AVENUE.GPJ SPL.GDT 12/9/14

LOG OF BOREHOLE BH14-4

PROJECT: Cardel Homes - 3368 Carling Avenue
CLIENT: Cardel Homes
PROJECT LOCATION: 3368 Carling Avenue, Ottawa, ON
DATUM: local
BH LOCATION: See Location Plan N 2 E 3.5

DRILLING DATA
Method: Hollow Stem Auger Drilling
Diameter: 203
Date: Aug/20/2014

REF. NO.: 10000823
ENCL NO.:

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) (25 50 75 100 125) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L / WATER CONTENT (%) (25 50 75)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (KN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY with silty sand seams, grey, wet, stiff to very stiff(Continued)			VANE			91	+ 2			
90.4							Cave				
10.7	**SILTY SAND** trace clay, grey, wet, very loose		10	SS	1		90		○		
							89				
88.3			11	SS	WH				○		
12.8	**End of Borehole** Notes: 1 - Borehole terminated at 12.8 m below surface. 2 - Water level upon completion of borehole was at a depth of 8.2 m below surface 3 - Date Water Level Aug 28, 2014 3.2 m										

SPL SOIL LOG-OTTAWA 10000823 - 3368 CARLING AVENUE.GPJ SPL.GDT 12/9/14

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▼ ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

SPL CONSULTANTS LIMITED
ATTN: Melissa Jordens
51 Constellation Court
Toronto ON M9W 1K4

Date Received: 25-AUG-14
Report Date: 04-SEP-14 13:46 (MT)
Version: FINAL

Client Phone: 416-798-0065

Certificate of Analysis

Lab Work Order #: L1507593

Project P.O. #: NOT SUBMITTED
Job Reference: 10000823-220
C of C Numbers:
Legal Site Desc:

Comments:

Emerson Perez
Account Manager

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-1	L1507593-2	L1507593-3	L1507593-4	L1507593-5	L1507593-6	L1507593-7	L1507593-8	L1507593-9
					Sampled Date	21-AUG-14	21-AUG-14	21-AUG-14	21-AUG-14	19-AUG-14	19-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-	-	-	-	-
					Sample ID	BH-14-1 SS1	BH-14-1 SS3	BH-14-1 SS6	BH-14-1 SS7	BH-14-2 SS1	BH-14-2 SS5	BH-14-3 SS2	BH-14-3 SS4	BH-14-3 SS8
Grouping	Analyte	Unit	Guide Limits #1	#2										
Physical Tests	Conductivity	mS/cm	1.4	1.4		1.78				0.508	0.561	0.695	0.595	
	% Moisture	%	-	-		25.3	22.0	25.5	24.6		24.3	21.3	25.2	27.5
	pH	pH units	-	-		7.55					7.38	7.51		
Cyanides	Cyanide, Weak Acid Diss	ug/g	0.051	0.051		<0.050					<0.050	<0.050		
Saturated Paste Extractables	SAR	SAR	12	12		58.5				5.70	1.00	22.2	7.10	
	Calcium (Ca)	mg/L	-	-		3.41				12.7	46.1	2.60	8.90	
	Magnesium (Mg)	mg/L	-	-		0.36				2.35	17.4	0.91	4.73	
	Sodium (Na)	mg/L	-	-		425				84.2	31.4	163	105	
Metals	Antimony (Sb)	ug/g	40	50		<1.0					<1.0	<1.0		
	Arsenic (As)	ug/g	18	18		2.0					1.4	1.9		
	Barium (Ba)	ug/g	670	670		309					356	405		
	Beryllium (Be)	ug/g	8	10		0.75					0.71	0.84		
	Boron (B)	ug/g	120	120		5.9					5.3	5.5		
	Boron (B), Hot Water Ext.	ug/g	2	2		0.18					<0.10	0.12		
	Cadmium (Cd)	ug/g	1.9	1.9		<0.50					<0.50	<0.50		
	Chromium (Cr)	ug/g	160	160		66.7					65.0	82.7		
	Cobalt (Co)	ug/g	80	100		16.6					17.0	19.9		
	Copper (Cu)	ug/g	230	300		28.2					33.3	33.9		
	Lead (Pb)	ug/g	120	120		7.9					6.1	6.3		
	Mercury (Hg)	ug/g	3.9	20		0.011					<0.010	<0.010		
	Molybdenum (Mo)	ug/g	40	40		<1.0					<1.0	<1.0		
	Nickel (Ni)	ug/g	270	340		35.9					36.1	44.4		

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-10	L1507593-11	L1507593-12	L1507593-13	L1507593-14
					Sampled Date	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	BH-14-4 SS1	BH-14-4 SS3	BH-14-4 SS7	QA/QC #2	QA/QC #3
			Guide Limits							
Grouping	Analyte	Unit	#1	#2						
Physical Tests	Conductivity	mS/cm	1.4	1.4		0.502	0.458			
	% Moisture	%	-	-		18.7	22.4	29.6	25.8	26.8
	pH	pH units	-	-			7.48			
Cyanides	Cyanide, Weak Acid Diss	ug/g	0.051	0.051			<0.050			
Saturated Paste Extractables	SAR	SAR	12	12		9.80	6.35			
	Calcium (Ca)	mg/L	-	-		13.3	6.48			
	Magnesium (Mg)	mg/L	-	-		3.18	3.77			
	Sodium (Na)	mg/L	-	-		153	82.2			
Metals	Antimony (Sb)	ug/g	40	50			<1.0			
	Arsenic (As)	ug/g	18	18			1.6			
	Barium (Ba)	ug/g	670	670			349			
	Beryllium (Be)	ug/g	8	10			0.76			
	Boron (B)	ug/g	120	120			<5.0			
	Boron (B), Hot Water Ext.	ug/g	2	2			<0.10			
	Cadmium (Cd)	ug/g	1.9	1.9			<0.50			
	Chromium (Cr)	ug/g	160	160			74.8			
	Cobalt (Co)	ug/g	80	100			18.1			
	Copper (Cu)	ug/g	230	300			34.6			
	Lead (Pb)	ug/g	120	120			5.9			
	Mercury (Hg)	ug/g	3.9	20			<0.010			
	Molybdenum (Mo)	ug/g	40	40			<1.0			
	Nickel (Ni)	ug/g	270	340			41.3			

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-1	L1507593-2	L1507593-3	L1507593-4	L1507593-5	L1507593-6	L1507593-7	L1507593-8	L1507593-9
					Sampled Date	21-AUG-14	21-AUG-14	21-AUG-14	21-AUG-14	19-AUG-14	19-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-	-	-	-	-
					Sample ID	BH-14-1 SS1	BH-14-1 SS3	BH-14-1 SS6	BH-14-1 SS7	BH-14-1 SS1	BH-14-2 SS5	BH-14-3 SS2	BH-14-3 SS4	BH-14-3 SS8
Grouping	Analyte	Unit	Guide Limits #1	#2										
Metals	Selenium (Se)	ug/g	5.5	5.5		<1.0					<1.0	<1.0		
	Silver (Ag)	ug/g	40	50		<0.20					<0.20	<0.20		
	Thallium (Tl)	ug/g	3.3	3.3		<0.50					<0.50	<0.50		
	Uranium (U)	ug/g	33	33		<1.0					<1.0	<1.0		
	Vanadium (V)	ug/g	86	86		83.9					88.0	96.0		
	Zinc (Zn)	ug/g	340	340		99.6					102	114		
Speciated Metals	Chromium, Hexavalent	ug/g	8	10		0.85					0.72	0.53		
Volatile Organic Compounds	Acetone	ug/g	16	28					<0.50					
	Benzene	ug/g	0.32	0.4				<0.020	<0.020					<0.020
	Bromodichloromethane	ug/g	1.5	1.9					<0.050					
	Bromoform	ug/g	0.61	1.7					<0.050					
	Bromomethane	ug/g	0.05	0.05					<0.050					
	Carbon tetrachloride	ug/g	0.21	0.71					<0.050					
	Chlorobenzene	ug/g	2.4	2.7					<0.050					
	Dibromochloromethane	ug/g	2.3	2.9					<0.050					
	Chloroform	ug/g	0.47	0.18					<0.050					
	1,2-Dibromoethane	ug/g	0.05	0.05					<0.050					
	1,2-Dichlorobenzene	ug/g	1.2	1.7					<0.050					
	1,3-Dichlorobenzene	ug/g	9.6	12					<0.050					
	1,4-Dichlorobenzene	ug/g	0.2	0.57					<0.050					
	Dichlorodifluoromethane	ug/g	16	25					<0.050					
	1,1-Dichloroethane	ug/g	0.47	0.6					<0.050					

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-10	L1507593-11	L1507593-12	L1507593-13	L1507593-14
					Sampled Date	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	BH-14-4 SS1	BH-14-4 SS3	BH-14-4 SS7	QA/QC #2	QA/QC #3
Grouping	Analyte	Unit	Guide Limits #1	#2						
Metals	Selenium (Se)	ug/g	5.5	5.5		<1.0				
	Silver (Ag)	ug/g	40	50		<0.20				
	Thallium (Tl)	ug/g	3.3	3.3		<0.50				
	Uranium (U)	ug/g	33	33		<1.0				
	Vanadium (V)	ug/g	86	86		95.8				
	Zinc (Zn)	ug/g	340	340		113				
Speciated Metals	Chromium, Hexavalent	ug/g	8	10		0.83				
Volatile Organic Compounds	Acetone	ug/g	16	28			<0.50		<0.50	
	Benzene	ug/g	0.32	0.4			<0.020	<0.020	<0.020	
	Bromodichloromethane	ug/g	1.5	1.9			<0.050		<0.050	
	Bromoform	ug/g	0.61	1.7			<0.050		<0.050	
	Bromomethane	ug/g	0.05	0.05			<0.050		<0.050	
	Carbon tetrachloride	ug/g	0.21	0.71			<0.050		<0.050	
	Chlorobenzene	ug/g	2.4	2.7			<0.050		<0.050	
	Dibromochloromethane	ug/g	2.3	2.9			<0.050		<0.050	
	Chloroform	ug/g	0.47	0.18			<0.050		<0.050	
	1,2-Dibromoethane	ug/g	0.05	0.05			<0.050		<0.050	
	1,2-Dichlorobenzene	ug/g	1.2	1.7			<0.050		<0.050	
	1,3-Dichlorobenzene	ug/g	9.6	12			<0.050		<0.050	
	1,4-Dichlorobenzene	ug/g	0.2	0.57			<0.050		<0.050	
	Dichlorodifluoromethane	ug/g	16	25			<0.050		<0.050	
	1,1-Dichloroethane	ug/g	0.47	0.6			<0.050		<0.050	

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-1	L1507593-2	L1507593-3	L1507593-4	L1507593-5	L1507593-6	L1507593-7	L1507593-8	L1507593-9
					Sampled Date	21-AUG-14	21-AUG-14	21-AUG-14	21-AUG-14	19-AUG-14	19-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-	-	-	-	-
					Sample ID	BH-14-1 SS1	BH-14-1 SS3	BH-14-1 SS6	BH-14-1 SS7	BH-14-2 SS1	BH-14-2 SS5	BH-14-3 SS2	BH-14-3 SS4	BH-14-3 SS8
Grouping	Analyte	Unit	Guide Limits #1	#2										
Volatile Organic Compounds	1,2-Dichloroethane	ug/g	0.05	0.05					<0.050					
	1,1-Dichloroethylene	ug/g	0.064	0.48					<0.050					
	cis-1,2-Dichloroethylene	ug/g	1.9	2.5					<0.050					
	trans-1,2-Dichloroethylene	ug/g	1.3	2.5					<0.050					
	1,3-Dichloropropene (cis & trans)	ug/g	0.059	0.081					<0.042					
	Methylene Chloride	ug/g	1.6	2					<0.050					
	1,2-Dichloropropane	ug/g	0.16	0.68					<0.050					
	cis-1,3-Dichloropropene	ug/g	-	-					<0.030					
	trans-1,3-Dichloropropene	ug/g	-	-					<0.030					
	Ethyl Benzene	ug/g	1.1	1.6				<0.050	<0.050					<0.050
	n-Hexane	ug/g	46	88					<0.050					
	Methyl Ethyl Ketone	ug/g	70	88					<0.50					
	Methyl Isobutyl Ketone	ug/g	31	210					<0.50					
	MTBE	ug/g	1.6	2.3					<0.050					
	Styrene	ug/g	34	43					<0.050					
	1,1,1,2-Tetrachloroethane	ug/g	0.087	0.11					<0.050					
	1,1,2,2-Tetrachloroethane	ug/g	0.05	0.094					<0.050					
	Tetrachloroethylene	ug/g	1.9	2.5					<0.050					
	Toluene	ug/g	6.4	9				<0.20	<0.20					<0.20
	1,1,1-Trichloroethane	ug/g	6.1	12					<0.050					
	1,1,2-Trichloroethane	ug/g	0.05	0.11					<0.050					
	Trichloroethylene	ug/g	0.55	0.61					<0.050					

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-10	L1507593-11	L1507593-12	L1507593-13	L1507593-14
					Sampled Date	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	BH-14-4 SS1	BH-14-4 SS3	BH-14-4 SS7	QA/QC #2	QA/QC #3
Grouping	Analyte	Unit	Guide Limits #1	#2						
Volatile Organic Compounds	1,2-Dichloroethane	ug/g	0.05	0.05				<0.050		<0.050
	1,1-Dichloroethylene	ug/g	0.064	0.48				<0.050		<0.050
	cis-1,2-Dichloroethylene	ug/g	1.9	2.5				<0.050		<0.050
	trans-1,2-Dichloroethylene	ug/g	1.3	2.5				<0.050		<0.050
	1,3-Dichloropropene (cis & trans)	ug/g	0.059	0.081				<0.042		<0.042
	Methylene Chloride	ug/g	1.6	2				<0.050		<0.050
	1,2-Dichloropropane	ug/g	0.16	0.68				<0.050		<0.050
	cis-1,3-Dichloropropene	ug/g	-	-				<0.030		<0.030
	trans-1,3-Dichloropropene	ug/g	-	-				<0.030		<0.030
	Ethyl Benzene	ug/g	1.1	1.6				<0.050	<0.050	<0.050
	n-Hexane	ug/g	46	88				<0.050		<0.050
	Methyl Ethyl Ketone	ug/g	70	88				<0.50		<0.50
	Methyl Isobutyl Ketone	ug/g	31	210				<0.50		<0.50
	MTBE	ug/g	1.6	2.3				<0.050		<0.050
	Styrene	ug/g	34	43				<0.050		<0.050
	1,1,1,2-Tetrachloroethane	ug/g	0.087	0.11				<0.050		<0.050
	1,1,2,2-Tetrachloroethane	ug/g	0.05	0.094				<0.050		<0.050
	Tetrachloroethylene	ug/g	1.9	2.5				<0.050		<0.050
	Toluene	ug/g	6.4	9				<0.20	<0.20	<0.20
	1,1,1-Trichloroethane	ug/g	6.1	12				<0.050		<0.050
	1,1,2-Trichloroethane	ug/g	0.05	0.11				<0.050		<0.050
	Trichloroethylene	ug/g	0.55	0.61				<0.050		<0.050

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-1	L1507593-2	L1507593-3	L1507593-4	L1507593-5	L1507593-6	L1507593-7	L1507593-8	L1507593-9
					Sampled Date	21-AUG-14	21-AUG-14	21-AUG-14	21-AUG-14	19-AUG-14	19-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-	-	-	-	-
					Sample ID	BH-14-1 SS1	BH-14-1 SS3	BH-14-1 SS6	BH-14-1 SS7	BH-14-2 SS1	BH-14-2 SS5	BH-14-3 SS2	BH-14-3 SS4	BH-14-3 SS8
Grouping	Analyte	Unit	Guide Limits #1	#2										
Volatile Organic Compounds	Trichlorofluoromethane	ug/g	4	5.8					<0.050					
	Vinyl chloride	ug/g	0.032	0.25					<0.020					
	o-Xylene	ug/g	-	-				<0.020	<0.020					<0.020
	m+p-Xylenes	ug/g	-	-				<0.030	<0.030					<0.030
	Xylenes (Total)	ug/g	26	30				<0.050	<0.050					<0.050
	Surrogate: 4-Bromofluorobenzene	%	-	-				95.9	103.9					89.5
	Surrogate: 1,4-Difluorobenzene	%	-	-				100.0	91.3					102.0
Hydrocarbons	F1 (C6-C10)	ug/g	55	65				<5.0						<5.0
	F1-BTEX	ug/g	55	65				<5.0						<5.0
	F2 (C10-C16)	ug/g	230	250				<10						<10
	F3 (C16-C34)	ug/g	1700	2500				<50						<50
	F4 (C34-C50)	ug/g	3300	6600				<50						<50
	Total Hydrocarbons (C6-C50)	ug/g	-	-				<72						<72
	Chrom. to baseline at nC50		-	-				YES						YES
	Surrogate: 2-Bromobenzotrifluoride	%	-	-				82.2						79.1
	Surrogate: 3,4-Dichlorotoluene	%	-	-				91.1						86.5
Polycyclic Aromatic Hydrocarbons	Acenaphthene	ug/g	21	29		<0.050								
	Acenaphthylene	ug/g	0.15	0.17		<0.050								
	Anthracene	ug/g	0.67	0.74		<0.050								
	Benzo(a)anthracene	ug/g	0.96	0.96		<0.050								
	Benzo(a)pyrene	ug/g	0.3	0.3		<0.050								
	Benzo(b)fluoranthene	ug/g	0.96	0.96		<0.050								

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-10	L1507593-11	L1507593-12	L1507593-13	L1507593-14
					Sampled Date	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	BH-14-4 SS1	BH-14-4 SS3	BH-14-4 SS7	QA/QC #2	QA/QC #3
Grouping	Analyte	Unit	Guide Limits #1	#2						
Volatile Organic Compounds	Trichlorofluoromethane	ug/g	4	5.8			<0.050		<0.050
	Vinyl chloride	ug/g	0.032	0.25			<0.020		<0.020
	o-Xylene	ug/g	-	-			<0.020	<0.020	<0.020
	m+p-Xylenes	ug/g	-	-			<0.030	<0.030	<0.030
	Xylenes (Total)	ug/g	26	30			<0.050	<0.050	<0.050
	Surrogate: 4-Bromofluorobenzene	%	-	-			102.1	100.8	101.1
	Surrogate: 1,4-Difluorobenzene	%	-	-			90.2	106.1	89.8
Hydrocarbons	F1 (C6-C10)	ug/g	55	65				<5.0	
	F1-BTEX	ug/g	55	65				<5.0	
	F2 (C10-C16)	ug/g	230	250				<10	
	F3 (C16-C34)	ug/g	1700	2500				<50	
	F4 (C34-C50)	ug/g	3300	6600				<50	
	Total Hydrocarbons (C6-C50)	ug/g	-	-				<72	
	Chrom. to baseline at nC50		-	-				YES	
	Surrogate: 2-Bromobenzotrifluoride	%	-	-				81.7	
	Surrogate: 3,4-Dichlorotoluene	%	-	-				97.1	
Polycyclic Aromatic Hydrocarbons	Acenaphthene	ug/g	21	29	<0.050				
	Acenaphthylene	ug/g	0.15	0.17	<0.050				
	Anthracene	ug/g	0.67	0.74	<0.050				
	Benzo(a)anthracene	ug/g	0.96	0.96	<0.050				
	Benzo(a)pyrene	ug/g	0.3	0.3	<0.050				
	Benzo(b)fluoranthene	ug/g	0.96	0.96	<0.050				

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-1	L1507593-2	L1507593-3	L1507593-4	L1507593-5	L1507593-6	L1507593-7	L1507593-8	L1507593-9
					Sampled Date	21-AUG-14	21-AUG-14	21-AUG-14	21-AUG-14	19-AUG-14	19-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-	-	-	-	-
					Sample ID	BH-14-1 SS1	BH-14-1 SS3	BH-14-1 SS6	BH-14-1 SS7	BH-14-2 SS1	BH-14-2 SS5	BH-14-3 SS2	BH-14-3 SS4	BH-14-3 SS8
Grouping	Analyte	Unit	Guide Limits #1	#2										
Polycyclic Aromatic Hydrocarbons	Benzo(g,h,i)perylene	ug/g	9.6	9.6		<0.050								
	Benzo(k)fluoranthene	ug/g	0.96	0.96		<0.050								
	Chrysene	ug/g	9.6	9.6		<0.050								
	Dibenzo(ah)anthracene	ug/g	0.1	0.1		<0.050								
	Fluoranthene	ug/g	9.6	9.6		<0.050								
	Fluorene	ug/g	62	69		<0.050								
	Indeno(1,2,3-cd)pyrene	ug/g	0.76	0.95		<0.050								
	1+2-Methylnaphthalenes	ug/g	30	42		<0.042								
	1-Methylnaphthalene	ug/g	30	42		<0.030								
	2-Methylnaphthalene	ug/g	30	42		<0.030								
	Naphthalene	ug/g	9.6	28		<0.050								
	Phenanthrene	ug/g	12	16		<0.050								
	Pyrene	ug/g	96	96		<0.050								
	Surrogate: 2-Fluorobiphenyl	%	-	-		82.3								
	Surrogate: p-Terphenyl d14	%	-	-		85.2								
Polychlorinated Biphenyls	Aroclor 1242	ug/g	-	-									<0.010	
	Aroclor 1248	ug/g	-	-									<0.010	
	Aroclor 1254	ug/g	-	-									<0.010	
	Aroclor 1260	ug/g	-	-									<0.010	
	Total PCBs	ug/g	1.1	1.1									<0.020	
	Surrogate: d14-Terphenyl	%	-	-									97.0	

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

SOIL - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1507593-10	L1507593-11	L1507593-12	L1507593-13	L1507593-14
					Sampled Date	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14	20-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	BH-14-4 SS1	BH-14-4 SS3	BH-14-4 SS7	QA/QC #2	QA/QC #3
Grouping	Analyte	Unit	Guide Limits #1	#2						
Polycyclic Aromatic Hydrocarbons	Benzo(g,h,i)perylene	ug/g	9.6	9.6		<0.050				
	Benzo(k)fluoranthene	ug/g	0.96	0.96		<0.050				
	Chrysene	ug/g	9.6	9.6		<0.050				
	Dibenzo(ah)anthracene	ug/g	0.1	0.1		<0.050				
	Fluoranthene	ug/g	9.6	9.6		<0.050				
	Fluorene	ug/g	62	69		<0.050				
	Indeno(1,2,3-cd)pyrene	ug/g	0.76	0.95		<0.050				
	1+2-Methylnaphthalenes	ug/g	30	42		<0.042				
	1-Methylnaphthalene	ug/g	30	42		<0.030				
	2-Methylnaphthalene	ug/g	30	42		<0.030				
	Naphthalene	ug/g	9.6	28		<0.050				
	Phenanthrene	ug/g	12	16		<0.050				
	Pyrene	ug/g	96	96		<0.050				
	Surrogate: 2-Fluorobiphenyl	%	-	-		82.8				
	Surrogate: p-Terphenyl d14	%	-	-		88.4				
Polychlorinated Biphenyls	Aroclor 1242	ug/g	-	-						
	Aroclor 1248	ug/g	-	-						
	Aroclor 1254	ug/g	-	-						
	Aroclor 1260	ug/g	-	-						
	Total PCBs	ug/g	1.1	1.1						
	Surrogate: d14-Terphenyl	%	-	-						

Guide Limit #1: T2-Soil-Ind/Com/Commu Property Use (Coarse)
Guide Limit #2: T2-Soil-Ind/Com/Commu Property Use (Fine)

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

Summary of Guideline Exceedances

Guideline ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Soil-Ind/Com/Commu Property Use (Coarse)						
L1507593-1	BH-14-1 SS1	Physical Tests	Conductivity	1.78	1.4	mS/cm
		Saturated Paste Extractables	SAR	58.5	12	SAR
L1507593-6	BH-14-2 SS5	Metals	Vanadium (V)	88.0	86	ug/g
L1507593-7	BH-14-3 SS2	Saturated Paste Extractables	SAR	22.2	12	SAR
		Metals	Vanadium (V)	96.0	86	ug/g
L1507593-11	BH-14-4 SS3	Metals	Vanadium (V)	95.8	86	ug/g
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Soil-Ind/Com/Commu Property Use (Fine)						
L1507593-1	BH-14-1 SS1	Physical Tests	Conductivity	1.78	1.4	mS/cm
		Saturated Paste Extractables	SAR	58.5	12	SAR
L1507593-6	BH-14-2 SS5	Metals	Vanadium (V)	88.0	86	ug/g
L1507593-7	BH-14-3 SS2	Saturated Paste Extractables	SAR	22.2	12	SAR
		Metals	Vanadium (V)	96.0	86	ug/g
L1507593-11	BH-14-4 SS3	Metals	Vanadium (V)	95.8	86	ug/g

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Soil	Hex Chrom-O.Reg 153/04 (July 2011)	SW846 3060A/7199 R511

Soil sample undergoes a alkaline digestion process where the sample is acidified and derivatized with 1,5-diphenylcarbazide (DPC) using ion chromatography.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-R511-WT	Soil	Conductivity-O.Reg 153/04 (July 2011)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC DEC-2000 - PUB# 1310-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Soil F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Soil F2-F4-O.Reg 153/04 (July 2011) MOE DECPH-E3398/CCME TIER 1

Fractions F2, F3 and F4 are determined by extracting a soil sample with a solvent mix. The solvent recovered from the extracted soil sample is dried and treated to remove polar material. The extract is analyzed by GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-R511-WT Soil Mercury-O.Reg 153/04 (July 2011) SW846 3050B/7471

Solid sample is digested with a heated, strong, mixed acid solution to convert all forms of mercury to divalent mercury. The divalent mercury is then reduced to elemental mercury, sparged from solution and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-UG/G-CCMS-WT Soil Metal Scan Collision Cell ICPMS EPA 200.2/6020A

Sample is vigorously digested with nitric and hydrochloric acid. Analysis is conducted by ICP/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Soil ABN-Calculated Parameters SW846 8270

MOISTURE-WT Soil % Moisture Gravimetric: Oven Dried

PAH-511-WT Soil PAH-O.Reg 153/04 (July 2011) SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT Soil PCB-O.Reg 153/04 (July 2011) SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-R511-WT Soil pH-O.Reg 153/04 (July 2011) MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1507593 Report Date: 04-SEP-14

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R2929870								
WG1939148-4 DUP		**WG1939148-3**						
Boron (B), Hot Water Ext.		0.27	0.29		ug/g	4.5	40	27-AUG-14
WG1939148-2 LCS								
Boron (B), Hot Water Ext.			94.0		%		70-130	27-AUG-14
WG1939148-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	27-AUG-14
WG1939148-5 MS		**WG1939148-3**						
Boron (B), Hot Water Ext.			119.7		%		60-140	27-AUG-14
BTX-511-HS-WT	**Soil**							
Batch R2929908								
WG1937407-1 CVS								
Benzene			103.0		%		75-125	26-AUG-14
Ethyl Benzene			85.9		%		75-125	26-AUG-14
m+p-Xylenes			93.9		%		75-125	26-AUG-14
o-Xylene			91.1		%		75-125	26-AUG-14
Toluene			91.6		%		75-125	26-AUG-14
WG1938663-3 DUP		**WG1938663-5**						
Benzene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	26-AUG-14
Ethyl Benzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-AUG-14
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	26-AUG-14
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	26-AUG-14
Toluene		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-AUG-14
WG1938663-2 LCS								
Benzene			100.1		%		70-130	26-AUG-14
Ethyl Benzene			86.4		%		70-130	26-AUG-14
m+p-Xylenes			96.0		%		70-130	26-AUG-14
o-Xylene			86.2		%		70-130	26-AUG-14
Toluene			93.7		%		70-130	26-AUG-14
WG1938663-1 MB								
Benzene			<0.020		ug/g		0.02	26-AUG-14
Ethyl Benzene			<0.050		ug/g		0.05	26-AUG-14
m+p-Xylenes			<0.030		ug/g		0.03	26-AUG-14
o-Xylene			<0.020		ug/g		0.02	26-AUG-14
Toluene			<0.20		ug/g		0.2	26-AUG-14
Surrogate: 1,4-Difluorobenzene			105.1		%		70-130	26-AUG-14
Surrogate: 4-Bromofluorobenzene			97.4		%		70-130	26-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R2929908								
WG1938663-4 MS		**WG1938663-5**						
Benzene			112.1		%		60-140	26-AUG-14
Ethyl Benzene			97.9		%		60-140	26-AUG-14
m+p-Xylenes			110.3		%		60-140	26-AUG-14
o-Xylene			96.2		%		60-140	26-AUG-14
Toluene			107.2		%		60-140	26-AUG-14
Batch R2931764								
WG1937409-1 CVS								
Benzene			104.1		%		75-125	28-AUG-14
Ethyl Benzene			87.7		%		75-125	28-AUG-14
m+p-Xylenes			95.8		%		75-125	28-AUG-14
o-Xylene			92.5		%		75-125	28-AUG-14
Toluene			88.9		%		75-125	28-AUG-14
WG1938442-3 DUP		**WG1938442-5**						
Benzene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	28-AUG-14
Ethyl Benzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	28-AUG-14
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	28-AUG-14
Toluene		<0.20	<0.20	RPD-NA	ug/g	N/A	40	28-AUG-14
WG1938442-2 LCS								
Benzene			109.2		%		70-130	28-AUG-14
Ethyl Benzene			100.2		%		70-130	28-AUG-14
m+p-Xylenes			107.5		%		70-130	28-AUG-14
o-Xylene			100.3		%		70-130	28-AUG-14
Toluene			97.1		%		70-130	28-AUG-14
WG1938442-1 MB								
Benzene			<0.020		ug/g		0.02	28-AUG-14
Ethyl Benzene			<0.050		ug/g		0.05	28-AUG-14
m+p-Xylenes			<0.030		ug/g		0.03	28-AUG-14
o-Xylene			<0.020		ug/g		0.02	28-AUG-14
Toluene			<0.20		ug/g		0.2	28-AUG-14
Surrogate: 1,4-Difluorobenzene			104.1		%		70-130	28-AUG-14
Surrogate: 4-Bromofluorobenzene			93.1		%		70-130	28-AUG-14
WG1938442-4 MS		**WG1938442-5**						
Benzene			117.6		%		60-140	28-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R2931764								
WG1938442-4 MS		**WG1938442-5**						
Ethyl Benzene			101.6		%		60-140	28-AUG-14
m+p-Xylenes			111.6		%		60-140	28-AUG-14
o-Xylene			102.7		%		60-140	28-AUG-14
Toluene			97.7		%		60-140	28-AUG-14
CN-WAD-R511-WT	**Soil**							
Batch R2932930								
WG1938613-7 DUP		**L1507593-11**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	28-AUG-14
WG1938613-6 LCS								
Cyanide, Weak Acid Diss			110.0		%		80-120	28-AUG-14
WG1938613-5 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	28-AUG-14
WG1938613-8 MS		**L1507593-11**						
Cyanide, Weak Acid Diss			109.1		%		70-130	28-AUG-14
CR-CR6-IC-R511-WT	**Soil**							
Batch R2931748								
WG1938630-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			99.9		%		70-130	27-AUG-14
WG1938630-3 DUP		**L1507593-11**						
Chromium, Hexavalent		0.83	0.74		ug/g	12	35	27-AUG-14
WG1938630-2 LCS								
Chromium, Hexavalent			105.7		%		80-120	27-AUG-14
WG1938630-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	27-AUG-14
EC-R511-WT	**Soil**							
Batch R2929848								
WG1939150-3 DUP		**WG1939150-2**						
Conductivity		0.0960	0.0940		mS/cm	2.1	20	27-AUG-14
WG1939397-1 LCS								
Conductivity			98.7		%		90-110	27-AUG-14
WG1939150-1 MB								
Conductivity			<0.0040		mS/cm		0.004	27-AUG-14
Batch R2932633								
WG1940096-3 DUP		**WG1940096-2**						
Conductivity		0.148	0.151		mS/cm	2.0	20	29-AUG-14
Conductivity		0.148	0.151		mS/cm	2.0	20	29-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-R511-WT	**Soil**							
Batch R2932633								
WG1941047-1 LCS								
Conductivity			100.6		%		90-110	29-AUG-14
WG1941047-2 LCS								
Conductivity			100.4		%		90-110	29-AUG-14
WG1940096-1 MB								
Conductivity			<0.0040		mS/cm		0.004	29-AUG-14
Batch R2937618								
WG1944175-3 DUP		**WG1944175-2**						
Conductivity		0.103	0.108		mS/cm	4.7	20	04-SEP-14
WG1944308-1 LCS								
Conductivity			100.6		%		90-110	04-SEP-14
WG1944308-2 LCS								
Conductivity			99.4		%		90-110	04-SEP-14
WG1944175-1 MB								
Conductivity			<0.0040		mS/cm		0.004	04-SEP-14
F1-HS-511-WT	**Soil**							
Batch R2929908								
WG1937407-1 CVS								
F1 (C6-C10)			80.7		%		80-120	26-AUG-14
WG1938663-3 DUP		**WG1938663-5**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	50	26-AUG-14
WG1938663-2 LCS								
F1 (C6-C10)			99.3		%		80-120	26-AUG-14
WG1938663-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	26-AUG-14
Surrogate: 3,4-Dichlorotoluene			103.7		%		60-140	26-AUG-14
WG1938663-7 MS		**WG1938663-6**						
F1 (C6-C10)			106.3		%		60-140	26-AUG-14
Batch R2931764								
WG1937409-1 CVS								
F1 (C6-C10)			99.95		%		80-120	28-AUG-14
WG1938442-3 DUP		**WG1938442-5**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	50	28-AUG-14
WG1938442-2 LCS								
F1 (C6-C10)			105.5		%		80-120	28-AUG-14
WG1938442-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	28-AUG-14
Surrogate: 3,4-Dichlorotoluene			90.1				60-140	

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R2931764								
WG1938442-1 MB								
Surrogate: 3,4-Dichlorotoluene			90.1		%		60-140	28-AUG-14
WG1938442-7 MS		**WG1938442-6**						
F1 (C6-C10)			101.8		%		60-140	28-AUG-14
F2-F4-511-WT	**Soil**							
Batch R2934908								
WG1940693-4 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			102.0		%		70-130	02-SEP-14
F3 (C16-C34)			108.1		%		70-130	02-SEP-14
F4 (C34-C50)			112.3		%		70-130	02-SEP-14
WG1942542-1 CVS								
F2 (C10-C16)			104.8		%		80-120	02-SEP-14
F3 (C16-C34)			102.1		%		80-120	02-SEP-14
F4 (C34-C50)			102.9		%		80-120	02-SEP-14
WG1942542-2 CVS								
F2 (C10-C16)			104.1		%		80-120	02-SEP-14
F3 (C16-C34)			101.9		%		80-120	02-SEP-14
F4 (C34-C50)			103.4		%		80-120	02-SEP-14
WG1940693-9 DUP		**L1507593-13**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	02-SEP-14
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	02-SEP-14
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	02-SEP-14
WG1940693-2 LCS								
F2 (C10-C16)			91.2		%		80-120	02-SEP-14
F3 (C16-C34)			92.7		%		80-120	02-SEP-14
F4 (C34-C50)			89.0		%		80-120	02-SEP-14
WG1940693-3 LCSD		**WG1940693-2**						
F2 (C10-C16)		91.2	91.1		%	0.2	50	02-SEP-14
F3 (C16-C34)		92.7	95.9		%	3.4	50	02-SEP-14
F4 (C34-C50)		89.0	124.1		%	33	50	02-SEP-14
WG1940693-1 MB								
F2 (C10-C16)			<10		ug/g		10	02-SEP-14
F3 (C16-C34)			<50		ug/g		50	02-SEP-14
F4 (C34-C50)			<50		ug/g		50	02-SEP-14
Surrogate: 2-Bromobenzotrifluoride			73.4		%		50-140	02-SEP-14
WG1940693-10 MS		**L1507593-13**						

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Soil**							
Batch R2934908								
WG1940693-10 MS		**L1507593-13**						
F2 (C10-C16)			98.9		%		60-140	02-SEP-14
F3 (C16-C34)			102.3		%		60-140	02-SEP-14
F4 (C34-C50)			101.6		%		60-140	02-SEP-14
HG-R511-WT	**Soil**							
Batch R2929569								
WG1939147-6 DUP		**WG1939147-5**						
Mercury (Hg)		0.019	0.018		ug/g	6.1	30	27-AUG-14
WG1939147-2 IRM		**ALS MET IRM1**						
Mercury (Hg)			92.5		%		70-130	27-AUG-14
WG1939147-4 LCS								
Mercury (Hg)			102.0		%		80-120	27-AUG-14
WG1939147-1 MB								
Mercury (Hg)			<0.010		ug/g		0.01	27-AUG-14
WG1939147-7 MS		**WG1939147-5**						
Mercury (Hg)			91.4		%		70-130	27-AUG-14
MET-UG/G-CCMS-WT	**Soil**							
Batch R2931793								
WG1939197-2 CVS								
Antimony (Sb)			99.0		%		70-130	27-AUG-14
Arsenic (As)			96.3		%		70-130	27-AUG-14
Barium (Ba)			98.0		%		70-130	27-AUG-14
Beryllium (Be)			95.3		%		70-130	27-AUG-14
Boron (B)			96.8		%		70-130	27-AUG-14
Cadmium (Cd)			99.4		%		70-130	27-AUG-14
Chromium (Cr)			97.7		%		70-130	27-AUG-14
Cobalt (Co)			100.4		%		70-130	27-AUG-14
Copper (Cu)			100.0		%		70-130	27-AUG-14
Lead (Pb)			102.8		%		70-130	27-AUG-14
Molybdenum (Mo)			98.0		%		70-130	27-AUG-14
Nickel (Ni)			100.4		%		70-130	27-AUG-14
Selenium (Se)			101.2		%		70-130	27-AUG-14
Silver (Ag)			101.8		%		70-130	27-AUG-14
Thallium (Tl)			99.0		%		70-130	27-AUG-14
Uranium (U)			97.7		%		70-130	27-AUG-14
Vanadium (V)			98.1		%		70-130	27-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-UG/G-CCMS-WT	**Soil**							
Batch R2931793								
WG1939197-2 CVS								
Zinc (Zn)			93.7		%		70-130	27-AUG-14
WG1939147-6 DUP		**WG1939147-5**						
Antimony (Sb)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	27-AUG-14
Arsenic (As)		2.42	2.28		ug/g	5.9	30	27-AUG-14
Barium (Ba)		41.5	44.5		ug/g	7.0	40	27-AUG-14
Beryllium (Be)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	27-AUG-14
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	27-AUG-14
Cadmium (Cd)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	27-AUG-14
Chromium (Cr)		26.7	28.8		ug/g	7.6	30	27-AUG-14
Cobalt (Co)		10.0	10.8		ug/g	7.9	30	27-AUG-14
Copper (Cu)		19.7	20.8		ug/g	5.3	30	27-AUG-14
Lead (Pb)		3.4	3.7		ug/g	7.0	40	27-AUG-14
Molybdenum (Mo)		<1.0	<1.0	RPD-NA	ug/g	N/A	40	27-AUG-14
Nickel (Ni)		25.3	27.9		ug/g	9.7	30	27-AUG-14
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	27-AUG-14
Silver (Ag)		<0.20	<0.20	RPD-NA	ug/g	N/A	40	27-AUG-14
Thallium (Tl)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	27-AUG-14
Uranium (U)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	27-AUG-14
Vanadium (V)		161	181		ug/g	12	30	27-AUG-14
Zinc (Zn)		46.6	51.7		ug/g	10	30	27-AUG-14
WG1939147-2 IRM		**ALS MET IRM1**						
Antimony (Sb)			95.9		%		70-130	27-AUG-14
Arsenic (As)			98.7		%		70-130	27-AUG-14
Barium (Ba)			99.1		%		70-130	27-AUG-14
Beryllium (Be)			97.8		%		70-130	27-AUG-14
Boron (B)			94.8		%		70-130	27-AUG-14
Cadmium (Cd)			102.3		%		70-130	27-AUG-14
Chromium (Cr)			99.7		%		70-130	27-AUG-14
Cobalt (Co)			103.0		%		70-130	27-AUG-14
Copper (Cu)			101.0		%		70-130	27-AUG-14
Lead (Pb)			97.4		%		70-130	27-AUG-14
Molybdenum (Mo)			1.8		ug/g		1.1-3.1	27-AUG-14
Nickel (Ni)			100.9		%		70-130	27-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-UG/G-CCMS-WT	**Soil**							
Batch R2931793								
WG1939147-2 IRM		**ALS MET IRM1**						
Selenium (Se)			95.2		%		70-130	27-AUG-14
Silver (Ag)			98.5		%		70-130	27-AUG-14
Thallium (Tl)			95.3		%		70-130	27-AUG-14
Uranium (U)			1.7		ug/g		0.8-2.8	27-AUG-14
Vanadium (V)			97.5		%		70-130	27-AUG-14
Zinc (Zn)			98.4		%		70-130	27-AUG-14
WG1939147-3 LCS								
Antimony (Sb)			97.3		%		80-120	27-AUG-14
Arsenic (As)			95.5		%		80-120	27-AUG-14
Barium (Ba)			97.0		%		80-120	27-AUG-14
Beryllium (Be)			90.4		%		80-120	27-AUG-14
Boron (B)			94.8		%		80-120	27-AUG-14
Cadmium (Cd)			97.9		%		80-120	27-AUG-14
Chromium (Cr)			98.7		%		80-120	27-AUG-14
Cobalt (Co)			96.0		%		80-120	27-AUG-14
Copper (Cu)			98.0		%		80-120	27-AUG-14
Lead (Pb)			98.6		%		80-120	27-AUG-14
Molybdenum (Mo)			98.8		%		80-120	27-AUG-14
Nickel (Ni)			98.4		%		80-120	27-AUG-14
Selenium (Se)			102.5		%		80-120	27-AUG-14
Silver (Ag)			98.3		%		80-120	27-AUG-14
Thallium (Tl)			99.2		%		80-120	27-AUG-14
Uranium (U)			103.8		%		80-120	27-AUG-14
Vanadium (V)			99.1		%		80-120	27-AUG-14
Zinc (Zn)			104.6		%		80-120	27-AUG-14
WG1939147-1 MB								
Antimony (Sb)			<1.0		ug/g		1	27-AUG-14
Arsenic (As)			<0.20		ug/g		0.2	27-AUG-14
Barium (Ba)			<1.0		ug/g		1	27-AUG-14
Beryllium (Be)			<0.50		ug/g		0.5	27-AUG-14
Boron (B)			<5.0		ug/g		5	27-AUG-14
Cadmium (Cd)			<0.50		ug/g		0.5	27-AUG-14
Chromium (Cr)			<1.0		ug/g		1	27-AUG-14
Cobalt (Co)			<1.0		ug/g		1	27-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-UG/G-CCMS-WT	**Soil**							
Batch R2931793								
WG1939147-1 MB								
Copper (Cu)			<1.0		ug/g		1	27-AUG-14
Lead (Pb)			<1.0		ug/g		1	27-AUG-14
Molybdenum (Mo)			<1.0		ug/g		1	27-AUG-14
Nickel (Ni)			<1.0		ug/g		1	27-AUG-14
Selenium (Se)			<1.0		ug/g		1	27-AUG-14
Silver (Ag)			<0.20		ug/g		0.2	27-AUG-14
Thallium (Tl)			<0.50		ug/g		0.5	27-AUG-14
Uranium (U)			<1.0		ug/g		1	27-AUG-14
Vanadium (V)			<1.0		ug/g		1	27-AUG-14
Zinc (Zn)			<5.0		ug/g		5	27-AUG-14
WG1939147-7 MS		**WG1939147-5**						
Antimony (Sb)			94.6		%		70-130	27-AUG-14
Arsenic (As)			79.7		%		70-130	27-AUG-14
Barium (Ba)			N/A	MS-B	%		-	27-AUG-14
Beryllium (Be)			102.0		%		70-130	27-AUG-14
Boron (B)			96.5		%		70-130	27-AUG-14
Cadmium (Cd)			106.9		%		70-130	27-AUG-14
Chromium (Cr)			N/A	MS-B	%		-	27-AUG-14
Cobalt (Co)			N/A	MS-B	%		-	27-AUG-14
Copper (Cu)			N/A	MS-B	%		-	27-AUG-14
Lead (Pb)			N/A	MS-B	%		-	27-AUG-14
Molybdenum (Mo)			111.0		%		70-130	27-AUG-14
Nickel (Ni)			N/A	MS-B	%		-	27-AUG-14
Selenium (Se)			100.2		%		70-130	27-AUG-14
Silver (Ag)			104.8		%		70-130	27-AUG-14
Thallium (Tl)			94.3		%		70-130	27-AUG-14
Uranium (U)			114.9		%		70-130	27-AUG-14
Vanadium (V)			N/A	MS-B	%		-	27-AUG-14
Zinc (Zn)			N/A	MS-B	%		-	27-AUG-14
MOISTURE-WT	**Soil**							
Batch R2929584								
WG1938374-3 DUP		**L1507593-14**						
% Moisture		26.8	27.6		%	3.3	30	27-AUG-14
WG1938374-2 LCS								

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R2929584								
WG1938374-2 LCS								
% Moisture			94.9		%		70-130	27-AUG-14
WG1938374-1 MB								
% Moisture			<0.10		%		0.1	27-AUG-14
PAH-511-WT	**Soil**							
Batch R2932800								
WG1940013-1 CVS								
1-Methylnaphthalene			89.2		%		50-140	28-AUG-14
2-Methylnaphthalene			91.4		%		50-140	28-AUG-14
Acenaphthene			89.7		%		50-140	28-AUG-14
Acenaphthylene			89.2		%		50-140	28-AUG-14
Anthracene			92.8		%		50-140	28-AUG-14
Benzo(a)anthracene			91.1		%		50-140	28-AUG-14
Benzo(a)pyrene			86.5		%		50-140	28-AUG-14
Benzo(b)fluoranthene			87.0		%		50-140	28-AUG-14
Benzo(g,h,i)perylene			93.8		%		50-140	28-AUG-14
Benzo(k)fluoranthene			83.7		%		50-140	28-AUG-14
Chrysene			96.8		%		50-140	28-AUG-14
Dibenzo(ah)anthracene			96.3		%		50-140	28-AUG-14
Fluoranthene			87.7		%		50-140	28-AUG-14
Fluorene			91.1		%		50-140	28-AUG-14
Indeno(1,2,3-cd)pyrene			90.6		%		50-140	28-AUG-14
Naphthalene			90.2		%		50-140	28-AUG-14
Phenanthrene			90.4		%		50-140	28-AUG-14
Pyrene			95.8		%		50-140	28-AUG-14
WG1938355-5 DUP		**WG1938355-4**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	29-AUG-14
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	29-AUG-14
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R2932800								
WG1938355-5 DUP		**WG1938355-4**						
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Naphthalene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Phenanthrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	29-AUG-14
WG1938355-2 LCS								
1-Methylnaphthalene			82.8		%		50-140	29-AUG-14
2-Methylnaphthalene			84.9		%		50-140	29-AUG-14
Acenaphthene			83.1		%		50-140	29-AUG-14
Acenaphthylene			81.8		%		50-140	29-AUG-14
Anthracene			80.4		%		50-140	29-AUG-14
Benzo(a)anthracene			82.6		%		50-140	29-AUG-14
Benzo(a)pyrene			77.5		%		50-140	29-AUG-14
Benzo(b)fluoranthene			78.6		%		50-140	29-AUG-14
Benzo(g,h,i)perylene			84.2		%		50-140	29-AUG-14
Benzo(k)fluoranthene			74.9		%		50-140	29-AUG-14
Chrysene			86.8		%		50-140	29-AUG-14
Dibenzo(ah)anthracene			86.6		%		50-140	29-AUG-14
Fluoranthene			80.3		%		50-140	29-AUG-14
Fluorene			83.6		%		50-140	29-AUG-14
Indeno(1,2,3-cd)pyrene			88.3		%		50-140	29-AUG-14
Naphthalene			83.3		%		50-140	29-AUG-14
Phenanthrene			82.3		%		50-140	29-AUG-14
Pyrene			87.6		%		50-140	29-AUG-14
WG1938355-3 LCSD		**WG1938355-2**						
1-Methylnaphthalene		82.8	75.1		%	9.7	50	29-AUG-14
2-Methylnaphthalene		84.9	75.4		%	12	50	29-AUG-14
Acenaphthene		83.1	75.2		%	9.9	50	29-AUG-14
Acenaphthylene		81.8	73.4		%	11	50	29-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R2932800								
WG1938355-3 LCSD		**WG1938355-2**						
Anthracene		80.4	88.8		%	9.9	50	29-AUG-14
Benzo(a)anthracene		82.6	74.5		%	10	50	29-AUG-14
Benzo(a)pyrene		77.5	70.0		%	10	50	29-AUG-14
Benzo(b)fluoranthene		78.6	70.1		%	11	50	29-AUG-14
Benzo(g,h,i)perylene		84.2	78.2		%	7.5	50	29-AUG-14
Benzo(k)fluoranthene		74.9	75.0		%	0.1	50	29-AUG-14
Chrysene		86.8	78.0		%	11	50	29-AUG-14
Dibenzo(ah)anthracene		86.6	77.6		%	11	50	29-AUG-14
Fluoranthene		80.3	72.7		%	10	50	29-AUG-14
Fluorene		83.6	75.0		%	11	50	29-AUG-14
Indeno(1,2,3-cd)pyrene		88.3	77.9		%	13	50	29-AUG-14
Naphthalene		83.3	75.0		%	10	50	29-AUG-14
Phenanthrene		82.3	75.3		%	8.9	50	29-AUG-14
Pyrene		87.6	78.3		%	11	50	29-AUG-14
WG1938355-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	29-AUG-14
2-Methylnaphthalene			<0.030		ug/g		0.03	29-AUG-14
Acenaphthene			<0.050		ug/g		0.05	29-AUG-14
Acenaphthylene			<0.050		ug/g		0.05	29-AUG-14
Anthracene			<0.050		ug/g		0.05	29-AUG-14
Benzo(a)anthracene			<0.050		ug/g		0.05	29-AUG-14
Benzo(a)pyrene			<0.050		ug/g		0.05	29-AUG-14
Benzo(b)fluoranthene			<0.050		ug/g		0.05	29-AUG-14
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	29-AUG-14
Benzo(k)fluoranthene			<0.050		ug/g		0.05	29-AUG-14
Chrysene			<0.050		ug/g		0.05	29-AUG-14
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	29-AUG-14
Fluoranthene			<0.050		ug/g		0.05	29-AUG-14
Fluorene			<0.050		ug/g		0.05	29-AUG-14
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	29-AUG-14
Naphthalene			<0.050		ug/g		0.05	29-AUG-14
Phenanthrene			<0.050		ug/g		0.05	29-AUG-14
Pyrene			<0.050		ug/g		0.05	29-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R2932800								
WG1938355-1 MB								
Surrogate: 2-Fluorobiphenyl			84.9		%		50-140	29-AUG-14
Surrogate: p-Terphenyl d14			88.1		%		50-140	29-AUG-14
WG1938355-6 MS		**WG1938355-4**						
1-Methylnaphthalene			78.3		%		50-140	29-AUG-14
2-Methylnaphthalene			80.5		%		50-140	29-AUG-14
Acenaphthene			80.1		%		50-140	29-AUG-14
Acenaphthylene			80.5		%		50-140	29-AUG-14
Anthracene			81.6		%		50-140	29-AUG-14
Benzo(a)anthracene			87.3		%		50-140	29-AUG-14
Benzo(a)pyrene			79.7		%		50-140	29-AUG-14
Benzo(b)fluoranthene			80.8		%		50-140	29-AUG-14
Benzo(g,h,i)perylene			85.9		%		50-140	29-AUG-14
Benzo(k)fluoranthene			76.3		%		50-140	29-AUG-14
Chrysene			86.1		%		50-140	29-AUG-14
Dibenzo(ah)anthracene			88.7		%		50-140	29-AUG-14
Fluoranthene			82.4		%		50-140	29-AUG-14
Fluorene			82.3		%		50-140	29-AUG-14
Indeno(1,2,3-cd)pyrene			91.8		%		50-140	29-AUG-14
Naphthalene			78.4		%		50-140	29-AUG-14
Phenanthrene			81.7		%		50-140	29-AUG-14
Pyrene			89.1		%		50-140	29-AUG-14
PCB-511-WT	**Soil**							
Batch R2932530								
WG1939932-1 CVS								
Aroclor 1242			96.3		%		60-140	29-AUG-14
Aroclor 1248			99.0		%		60-140	29-AUG-14
Aroclor 1254			94.3		%		60-140	29-AUG-14
Aroclor 1260			82.0		%		60-140	29-AUG-14
WG1938355-5 DUP		**WG1938355-4**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	29-AUG-14
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	29-AUG-14
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	29-AUG-14
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	29-AUG-14
WG1938355-2 LCS								

Quality Control Report

Workorder: L1507593 Report Date: 04-SEP-14

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4

Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R2932530								
WG1938355-2 LCS								
Aroclor 1242			79.8		%		60-140	29-AUG-14
Aroclor 1248			83.7		%		60-140	29-AUG-14
Aroclor 1254			77.2		%		60-140	29-AUG-14
Aroclor 1260			75.9		%		60-140	29-AUG-14
WG1938355-3 LCSD		**WG1938355-2**						
Aroclor 1242		79.8	72.1		%	10	50	29-AUG-14
Aroclor 1248		83.7	83.7		%	0.0	50	29-AUG-14
Aroclor 1254		77.2	73.5		%	5.0	50	29-AUG-14
Aroclor 1260		75.9	69.3		%	9.0	50	29-AUG-14
WG1938355-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	29-AUG-14
Aroclor 1248			<0.010		ug/g		0.01	29-AUG-14
Aroclor 1254			<0.010		ug/g		0.01	29-AUG-14
Aroclor 1260			<0.010		ug/g		0.01	29-AUG-14
Surrogate: d14-Terphenyl			101.6		%		60-140	29-AUG-14
WG1938355-6 MS		**WG1938355-4**						
Aroclor 1242			77.8		%		60-140	29-AUG-14
Aroclor 1254			76.6		%		60-140	29-AUG-14
Aroclor 1260			76.3		%		60-140	29-AUG-14
PH-R511-WT	**Soil**							
Batch R2931674								
WG1938327-1 DUP		**L1507593-1**						
pH		7.55	7.56	J	pH units	0.01	0.3	28-AUG-14
WG1940227-1 LCS								
pH			6.98		pH units		6.7-7.3	28-AUG-14
SAR-R511-WT	**Soil**							
Batch R2930478								
WG1939150-3 DUP		**WG1939150-2**						
Calcium (Ca)		21.7	20.5		mg/L	5.5	40	27-AUG-14
Sodium (Na)		0.85	0.87		mg/L	2.3	40	27-AUG-14
Magnesium (Mg)		3.42	3.35		mg/L	2.0	40	27-AUG-14
WG1939150-4 IRM		**WT SAR1**						
Calcium (Ca)			107.8		%		70-130	27-AUG-14
Sodium (Na)			108.9		%		70-130	27-AUG-14
Magnesium (Mg)			107.1		%		70-130	27-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R2930478								
WG1939150-1 MB								
Calcium (Ca)			<0.10		mg/L		0.1	27-AUG-14
Sodium (Na)			<0.50		mg/L		0.5	27-AUG-14
Magnesium (Mg)			<0.10		mg/L		0.1	27-AUG-14
Batch R2932793								
WG1940096-3 DUP		**WG1940096-2**						
Calcium (Ca)		22.1	22.0		mg/L	0.4	40	28-AUG-14
Sodium (Na)		1.28	1.26		mg/L	2.2	40	28-AUG-14
Magnesium (Mg)		1.72	1.72		mg/L	0.2	40	28-AUG-14
WG1940096-4 IRM		**WT SAR1**						
Calcium (Ca)			96.9		%		70-130	28-AUG-14
Sodium (Na)			104.4		%		70-130	28-AUG-14
Magnesium (Mg)			96.4		%		70-130	28-AUG-14
WG1940096-1 MB								
Calcium (Ca)			<0.10		mg/L		0.1	28-AUG-14
Sodium (Na)			<0.50		mg/L		0.5	28-AUG-14
Magnesium (Mg)			<0.10		mg/L		0.1	28-AUG-14
VOC-511-HS-WT	**Soil**							
Batch R2930993								
WG1939200-1 CVS								
1,1,1,2-Tetrachloroethane			93.6		%		75-125	28-AUG-14
1,1,2,2-Tetrachloroethane			83.6		%		75-125	28-AUG-14
1,1,1-Trichloroethane			94.6		%		75-125	28-AUG-14
1,1,2-Trichloroethane			91.7		%		75-125	28-AUG-14
1,1-Dichloroethane			90.5		%		75-125	28-AUG-14
1,1-Dichloroethylene			87.2		%		70-130	28-AUG-14
1,2-Dibromoethane			85.3		%		75-125	28-AUG-14
1,2-Dichlorobenzene			92.6		%		75-125	28-AUG-14
1,2-Dichloroethane			85.2		%		75-125	28-AUG-14
1,2-Dichloropropane			89.3		%		75-125	28-AUG-14
1,3-Dichlorobenzene			92.7		%		70-130	28-AUG-14
1,4-Dichlorobenzene			92.6		%		75-125	28-AUG-14
Acetone			93.1		%		70-130	28-AUG-14
Benzene			89.4		%		75-125	28-AUG-14
Bromodichloromethane			83.6		%		75-125	28-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R2930993								
WG1939200-1 CVS								
Bromoform			83.2		%		70-130	28-AUG-14
Bromomethane			85.8		%		70-130	28-AUG-14
Carbon tetrachloride			93.6		%		75-125	28-AUG-14
Chlorobenzene			93.3		%		75-125	28-AUG-14
Chloroform			92.9		%		75-125	28-AUG-14
cis-1,2-Dichloroethylene			89.5		%		75-125	28-AUG-14
cis-1,3-Dichloropropene			89.5		%		75-125	28-AUG-14
Dibromochloromethane			88.6		%		75-125	28-AUG-14
Dichlorodifluoromethane			101.5		%		60-140	28-AUG-14
Ethyl Benzene			93.8		%		75-125	28-AUG-14
n-Hexane			94.8		%		75-125	28-AUG-14
Methylene Chloride			84.9		%		75-125	28-AUG-14
MTBE			88.2		%		75-125	28-AUG-14
m+p-Xylenes			97.1		%		70-130	28-AUG-14
Methyl Ethyl Ketone			88.5		%		70-130	28-AUG-14
Methyl Isobutyl Ketone			101.5		%		70-130	28-AUG-14
o-Xylene			95.2		%		75-125	28-AUG-14
Styrene			94.0		%		75-125	28-AUG-14
Tetrachloroethylene			97.2		%		75-125	28-AUG-14
Toluene			94.0		%		75-125	28-AUG-14
trans-1,2-Dichloroethylene			87.6		%		75-125	28-AUG-14
trans-1,3-Dichloropropene			85.1		%		75-125	28-AUG-14
Trichloroethylene			89.8		%		70-130	28-AUG-14
Trichlorofluoromethane			100.4		%		70-130	28-AUG-14
Vinyl chloride			101.3		%		70-130	28-AUG-14
WG1938499-3 DUP		**WG1938499-5**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R2930993								
WG1938499-3 DUP		**WG1938499-5**						
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	28-AUG-14
Benzene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	28-AUG-14
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	28-AUG-14
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Ethyl Benzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	28-AUG-14
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	28-AUG-14
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	28-AUG-14
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	28-AUG-14
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Toluene		<0.20	<0.20	RPD-NA	ug/g	N/A	40	28-AUG-14
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	28-AUG-14
Trichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	28-AUG-14
Vinyl chloride		<0.020	<0.020		ug/g			28-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R2930993								
WG1938499-3 DUP		**WG1938499-5**						
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	28-AUG-14
WG1938499-2 LCS								
1,1,1,2-Tetrachloroethane			96.4		%		60-130	28-AUG-14
1,1,2,2-Tetrachloroethane			84.9		%		60-130	28-AUG-14
1,1,1-Trichloroethane			103.1		%		60-130	28-AUG-14
1,1,2-Trichloroethane			92.0		%		60-130	28-AUG-14
1,1-Dichloroethane			98.1		%		60-130	28-AUG-14
1,1-Dichloroethylene			95.3		%		60-130	28-AUG-14
1,2-Dibromoethane			85.3		%		70-130	28-AUG-14
1,2-Dichlorobenzene			97.3		%		70-130	28-AUG-14
1,2-Dichloroethane			89.6		%		60-130	28-AUG-14
1,2-Dichloropropane			95.4		%		70-130	28-AUG-14
1,3-Dichlorobenzene			98.4		%		70-130	28-AUG-14
1,4-Dichlorobenzene			98.9		%		70-130	28-AUG-14
Acetone			87.7		%		60-140	28-AUG-14
Benzene			96.5		%		70-130	28-AUG-14
Bromodichloromethane			90.6		%		50-140	28-AUG-14
Bromoform			84.9		%		70-130	28-AUG-14
Bromomethane			94.5		%		50-140	28-AUG-14
Carbon tetrachloride			103.4		%		70-130	28-AUG-14
Chlorobenzene			97.7		%		70-130	28-AUG-14
Chloroform			99.8		%		70-130	28-AUG-14
cis-1,2-Dichloroethylene			94.6		%		70-130	28-AUG-14
cis-1,3-Dichloropropene			100.0		%		70-130	28-AUG-14
Dibromochloromethane			90.4		%		60-130	28-AUG-14
Dichlorodifluoromethane			116.4		%		50-140	28-AUG-14
Ethyl Benzene			99.5		%		70-130	28-AUG-14
n-Hexane			106.5		%		70-130	28-AUG-14
Methylene Chloride			90.8		%		70-130	28-AUG-14
MTBE			93.6		%		70-130	28-AUG-14
m+p-Xylenes			103.6		%		70-130	28-AUG-14
Methyl Ethyl Ketone			77.2		%		60-140	28-AUG-14
Methyl Isobutyl Ketone			101.6		%		60-140	28-AUG-14
o-Xylene			100.5		%		70-130	28-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R2930993								
WG1938499-2 LCS								
Styrene			99.2		%		70-130	28-AUG-14
Tetrachloroethylene			101.5		%		60-130	28-AUG-14
Toluene			97.8		%		70-130	28-AUG-14
trans-1,2-Dichloroethylene			95.5		%		60-130	28-AUG-14
trans-1,3-Dichloropropene			90.7		%		70-130	28-AUG-14
Trichloroethylene			97.7		%		60-130	28-AUG-14
Trichlorofluoromethane			109.6		%		50-140	28-AUG-14
Vinyl chloride			109.5		%		70-130	28-AUG-14
WG1938499-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	28-AUG-14
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	28-AUG-14
1,1,1-Trichloroethane			<0.050		ug/g		0.05	28-AUG-14
1,1,2-Trichloroethane			<0.050		ug/g		0.05	28-AUG-14
1,1-Dichloroethane			<0.050		ug/g		0.05	28-AUG-14
1,1-Dichloroethylene			<0.050		ug/g		0.05	28-AUG-14
1,2-Dibromoethane			<0.050		ug/g		0.05	28-AUG-14
1,2-Dichlorobenzene			<0.050		ug/g		0.05	28-AUG-14
1,2-Dichloroethane			<0.050		ug/g		0.05	28-AUG-14
1,2-Dichloropropane			<0.050		ug/g		0.05	28-AUG-14
1,3-Dichlorobenzene			<0.050		ug/g		0.05	28-AUG-14
1,4-Dichlorobenzene			<0.050		ug/g		0.05	28-AUG-14
Acetone			<0.50		ug/g		0.5	28-AUG-14
Benzene			<0.020		ug/g		0.02	28-AUG-14
Bromodichloromethane			<0.050		ug/g		0.05	28-AUG-14
Bromoform			<0.050		ug/g		0.05	28-AUG-14
Bromomethane			<0.050		ug/g		0.05	28-AUG-14
Carbon tetrachloride			<0.050		ug/g		0.05	28-AUG-14
Chlorobenzene			<0.050		ug/g		0.05	28-AUG-14
Chloroform			<0.050		ug/g		0.05	28-AUG-14
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	28-AUG-14
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	28-AUG-14
Dibromochloromethane			<0.050		ug/g		0.05	28-AUG-14
Dichlorodifluoromethane			<0.050		ug/g		0.05	28-AUG-14
Ethyl Benzene			<0.050		ug/g		0.05	28-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R2930993								
WG1938499-1 MB								
n-Hexane			<0.050		ug/g		0.05	28-AUG-14
Methylene Chloride			<0.050		ug/g		0.05	28-AUG-14
MTBE			<0.050		ug/g		0.05	28-AUG-14
m+p-Xylenes			<0.030		ug/g		0.03	28-AUG-14
Methyl Ethyl Ketone			<0.50		ug/g		0.5	28-AUG-14
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	28-AUG-14
o-Xylene			<0.020		ug/g		0.02	28-AUG-14
Styrene			<0.050		ug/g		0.05	28-AUG-14
Tetrachloroethylene			<0.050		ug/g		0.05	28-AUG-14
Toluene			<0.20		ug/g		0.2	28-AUG-14
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	28-AUG-14
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	28-AUG-14
Trichloroethylene			<0.050		ug/g		0.05	28-AUG-14
Trichlorofluoromethane			<0.050		ug/g		0.05	28-AUG-14
Vinyl chloride			<0.020		ug/g		0.02	28-AUG-14
Surrogate: 1,4-Difluorobenzene			108.7		%		70-130	28-AUG-14
Surrogate: 4-Bromofluorobenzene			122.2		%		70-130	28-AUG-14
WG1938499-4 MS		**WG1938499-5**						
1,1,1,2-Tetrachloroethane			99.1		%		50-140	28-AUG-14
1,1,2,2-Tetrachloroethane			82.0		%		50-140	28-AUG-14
1,1,1-Trichloroethane			117.3		%		50-140	28-AUG-14
1,1,2-Trichloroethane			89.9		%		50-140	28-AUG-14
1,1-Dichloroethane			111.3		%		50-140	28-AUG-14
1,1-Dichloroethylene			106.8		%		50-140	28-AUG-14
1,2-Dibromoethane			81.3		%		50-140	28-AUG-14
1,2-Dichlorobenzene			97.1		%		50-140	28-AUG-14
1,2-Dichloroethane			93.3		%		50-140	28-AUG-14
1,2-Dichloropropane			97.8		%		50-140	28-AUG-14
1,3-Dichlorobenzene			96.1		%		50-140	28-AUG-14
1,4-Dichlorobenzene			95.8		%		50-140	28-AUG-14
Acetone			101.4		%		50-140	28-AUG-14
Benzene			101.6		%		50-140	28-AUG-14
Bromodichloromethane			98.7		%		50-140	28-AUG-14
Bromoform			84.9		%		50-140	28-AUG-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R2930993								
WG1938499-4 MS		**WG1938499-5**						
Bromomethane			99.2		%		50-140	28-AUG-14
Carbon tetrachloride			119.8		%		50-140	28-AUG-14
Chlorobenzene			96.4		%		50-140	28-AUG-14
Chloroform			112.0		%		50-140	28-AUG-14
cis-1,2-Dichloroethylene			98.5		%		50-140	28-AUG-14
cis-1,3-Dichloropropene			89.9		%		50-140	28-AUG-14
Dibromochloromethane			92.3		%		50-140	28-AUG-14
Dichlorodifluoromethane			120.1		%		50-140	28-AUG-14
Ethyl Benzene			89.5		%		50-140	28-AUG-14
n-Hexane			109.4		%		50-140	28-AUG-14
Methylene Chloride			99.6		%		50-140	28-AUG-14
MTBE			94.6		%		50-140	28-AUG-14
m+p-Xylenes			97.4		%		50-140	28-AUG-14
Methyl Ethyl Ketone			80.7		%		50-140	28-AUG-14
Methyl Isobutyl Ketone			96.4		%		50-140	28-AUG-14
o-Xylene			91.2		%		50-140	28-AUG-14
Styrene			86.5		%		50-140	28-AUG-14
Tetrachloroethylene			95.7		%		50-140	28-AUG-14
Toluene			89.6		%		50-140	28-AUG-14
trans-1,2-Dichloroethylene			101.8		%		50-140	28-AUG-14
trans-1,3-Dichloropropene			73.9		%		50-140	28-AUG-14
Trichloroethylene			99.4		%		50-140	28-AUG-14
Trichlorofluoromethane			124.9		%		50-140	28-AUG-14
Vinyl chloride			115.5		%		50-140	28-AUG-14

Quality Control Report

Workorder: L1507593 Report Date: 04-SEP-14

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: Melissa Jordens

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

60 NORTHLAND ROAD, UNIT 1
WATERLOO, ON N2V 2B8
Phone: (519) 886-6910
Fax: (519) 886-9047
Toll Free: 1-800-668-9878

ALS Environmental

L1507593-COFC

128947
C of C # 00000

ICAL SERVICES REQUEST FORM Page 1 of 1

Note: all TAT Quoted material is in business ... statutory holidays and weekends. TAT samples received past 3:00 pm or Saturday/Sunday begin the next day.

Specify date required	Service requested		2 day TAT (50%)	
	5 day (regular)	X	Next day TAT (100%)	
	3-4 day (25%)		Same day TAT (200%)	

COMPANY NAME	SPL CONSULTANTS
OFFICE	OTTAWA
PROJECT MANAGER	MICHELLE LOCKE
PROJECT #	10000823-220
PHONE	416-798-0065
FAX	416-798-0518
ACCOUNT #	0
QUOTATION #	Q38013
PO #	

CRITERIA — Criteria on report YES ✓ NO ___
Reg 153/04 ✓ Reg 511/09 ☐
Table 1 (2) 3 4 5 6 7 8 9
TCLP ___ MISA ___ PWQO ___
ODWS ___ OTHER ___

REPORT FORMAT/DISTRIBUTION
EMAIL ✓ FAX ___ BOTH ___
SELECT: PDF ___ DIGITAL ___ BOTH ✓
EMAIL 1 MLOCKE@SPLCONSULTANTS.CA
EMAIL 2 DWALL@SPLCONSULTANTS.CA

ANALYSIS REQUEST

PLEASE INDICATE FILTERED, PRESERVED OR BOTH
<----- (F, P, F/P)

SUBMISSION #: L1507593
ENTERED BY: KS
DATE/TIME ENTERED: AUG 26/14
BIN #: 481

SAMPLING INFORMATION

Sample Date/Time		TYPE		MATRIX			SAMPLE DESCRIPTION TO APPEAR ON REPORT	NUMBER OF CONTAINERS	METALS & INORGANICS (O. REG 153/04)	EC & SAR (O. REG 153/04)	PHC +BTEX (O. REG 153/04)	PAH (O. REG 153/04)	VOCs (O. REG 153/04)	PCBs (O. REG 153/04)	COMMENTS	LAB ID
Date (dd-mm-yy)	Time (24hr) (hh:mm)	COMP	GRAB	WATER	SOIL	OTHER										
21-08-14					✓		BH 14-1 SS1	1	✓							1
21-08-14					✓		BH 14-1 SS3	1				✓				2
21-08-14					✓		BH 14-1 SS6	3			✓					3
21-08-14					✓		BH 14-1 SS7	3					✓			4
19-08-14					✓		BH 14-2 ~~SS3~~ SS1	1		✓						5
19-08-14					✓		BH 14-2 SS5	1	✓							6
20-08-14					✓		BH 14-3 SS2	1	✓							7
20-08-14					✓		BH 14-3 SS4	1		✓				✓		8
20-08-14					✓		BH 14-3 SS8	3			✓					9
20-08-14					✓		BH 14-4 SS1	1		✓		✓				10
20-08-14					✓		BH 14-4 SS3	1	✓							11
20-08-14					✓		BH 14-4 SS7	3					✓			12
					✓		QA/QC #2	3			✓					13
					✓		QA/QC #3	3					✓			14

SPECIAL INSTRUCTIONS/COMMENTS

THE QUESTIONS BELOW MUST BE ANSWERED FORWATER SAMPLES (CHECK Yes OR No)

Are any samples taken from a regulated DW System? Yes ☐ No ☐
If yes, an authorized drinking water COC MUST be used for this submission.
Is the water sampled intended to be potable for human consumption? Yes ☐ No ☐

SAMPLE CONDITION

FROZEN	☐	MEAN TEMP
COLD	✓	7
COOLING INITIATED	☐	
AMBIENT	☐	
OBSERVATIONS Yes ☐ No ☐ If yes add SIF		INIT

SAMPLED BY:	D. WALL	DATE & TIME	
RELINQUISHED BY:	D. WALL	DATE & TIME	8/25/14
RECEIVED BY:		DATE & TIME	
RECEIVED AT LAB BY:	Andrew Cameron	DATE & TIME	8/25/14

Notes

1. Quote number must be provided to ensure proper pricing
2. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.
3. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

AUG 26/14 9:00 AM KS

SPL CONSULTANTS LIMITED
ATTN: MICHELLE LOCKE
51 Constellation Court
Toronto ON M9W 1K4

Date Received: 29-AUG-14
Report Date: 16-SEP-14 08:35 (MT)
Version: FINAL REV. 2

Client Phone: 416-798-0065

Certificate of Analysis

Lab Work Order #: L1510304

Project P.O. #: NOT SUBMITTED
Job Reference: 10000823-220
C of C Numbers: 128948
Legal Site Desc:

Comments: Revised RL for BAP for sample L1510304-2

Emerson Perez
Account Manager

ANALYTICAL REPORT

WATER - Ontario Regulation 153/04 - April 15, 2011 Standards

			Guide Limits						
					ALS ID	L1510304-1	L1510304-2	L1510304-3	L1510304-4	L1510304-5
					Sampled Date	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	MW14-1	MW14-3	MW14-4	QA/QC	TRIP BLANK
Grouping	Analyte	Unit	#1	#2						
Physical Tests	Conductivity	mS/cm	-	-		0.755	4.63	2.41		
	pH	pH units	-	-		7.35	7.28	7.16		
Anions and Nutrients	Chloride (Cl)	mg/L	790	790		48.6	1260	481		
Cyanides	Cyanide, Weak Acid Diss	ug/L	66	66		<2.0	<2.0	<2.0		
Dissolved Metals	Dissolved Mercury Filtration Location		-	-		FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location		-	-		FIELD	FIELD	FIELD		
	Antimony (Sb)-Dissolved	ug/L	6	6		<0.50	<0.50	<0.50		
	Arsenic (As)-Dissolved	ug/L	25	25		<1.0	<1.0	<1.0		
	Barium (Ba)-Dissolved	ug/L	1000	1000		51.0	110	157		
	Beryllium (Be)-Dissolved	ug/L	4	4		<0.50	<0.50	<0.50		
	Boron (B)-Dissolved	ug/L	5000	5000		25	34	33		
	Cadmium (Cd)-Dissolved	ug/L	2.7	2.7		<0.10	<0.10	<0.10		
	Chromium (Cr)-Dissolved	ug/L	50	50		0.51	<0.50	<0.50		
	Cobalt (Co)-Dissolved	ug/L	3.8	3.8		1.11	3.07	1.79		
	Copper (Cu)-Dissolved	ug/L	87	87		<1.0	<1.0	<1.0		
	Lead (Pb)-Dissolved	ug/L	10	10		<1.0	<1.0	<1.0		
	Mercury (Hg)-Dissolved	ug/L	0.29	1		<0.10	<0.10	<0.10		
	Molybdenum (Mo)-Dissolved	ug/L	70	70		0.78	2.47	1.66		
	Nickel (Ni)-Dissolved	ug/L	100	100		3.2	9.7	5.9		
	Selenium (Se)-Dissolved	ug/L	10	10		<5.0	<5.0	<5.0		
	Silver (Ag)-Dissolved	ug/L	1.5	1.5		<0.10	<0.10	<0.10		
	Sodium (Na)-Dissolved	ug/L	490000	490000		60600	DLM 697000	DLM 265000		

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

WATER - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1510304-1	L1510304-2	L1510304-3	L1510304-4	L1510304-5
					Sampled Date	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	MW14-1	MW14-3	MW14-4	QA/QC	TRIP BLANK
Grouping	Analyte	Unit	Guide Limits #1	#2						
Dissolved Metals	Thallium (Tl)-Dissolved	ug/L	2	2		<0.30	<0.30	<0.30		
	Uranium (U)-Dissolved	ug/L	20	20		<2.0	6.9	3.0		
	Vanadium (V)-Dissolved	ug/L	6.2	6.2		<0.50	<0.50	1.13		
	Zinc (Zn)-Dissolved	ug/L	1100	1100		<3.0	6.9	3.5		
Speciated Metals	Chromium, Hexavalent	ug/L	25	25		<10	<10	<10		
Volatile Organic Compounds	Acetone	ug/L	2700	2700		<30	<30	<30	<30	<30
	Benzene	ug/L	5	5		<0.50	<0.50	<0.50	<0.50	<0.50
	Bromodichloromethane	ug/L	16	16		<2.0	<2.0	<2.0	<2.0	<2.0
	Bromoform	ug/L	25	25		<5.0	<5.0	<5.0	<5.0	<5.0
	Bromomethane	ug/L	0.89	0.89		<0.50	<0.50	<0.50	<0.50	<0.50
	Carbon tetrachloride	ug/L	0.79	5		<0.20	<0.20	<0.20	<0.20	<0.20
	Chlorobenzene	ug/L	30	30		<0.50	<0.50	<0.50	<0.50	<0.50
	Dibromochloromethane	ug/L	25	25		<2.0	<2.0	<2.0	<2.0	<2.0
	Chloroform	ug/L	2.4	22		<1.0	<1.0	<1.0	<1.0	<1.0
	1,2-Dibromoethane	ug/L	0.2	0.2		<0.20	<0.20	<0.20	<0.20	<0.20
	1,2-Dichlorobenzene	ug/L	3	3		<0.50	<0.50	<0.50	<0.50	<0.50
	1,3-Dichlorobenzene	ug/L	59	59		<0.50	<0.50	<0.50	<0.50	<0.50
	1,4-Dichlorobenzene	ug/L	1	1		<0.50	<0.50	<0.50	<0.50	<0.50
	Dichlorodifluoromethane	ug/L	590	590		<2.0	<2.0	<2.0	<2.0	<2.0
	1,1-Dichloroethane	ug/L	5	5		<0.50	<0.50	<0.50	<0.50	<0.50
	1,2-Dichloroethane	ug/L	1.6	5		<0.50	<0.50	<0.50	<0.50	<0.50
	1,1-Dichloroethylene	ug/L	1.6	14		<0.50	<0.50	<0.50	<0.50	<0.50

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

WATER - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1510304-1	L1510304-2	L1510304-3	L1510304-4	L1510304-5
					Sampled Date	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	MW14-1	MW14-3	MW14-4	QA/QC	TRIP BLANK
Grouping	Analyte	Unit	Guide Limits #1	#2						
Volatile Organic Compounds	cis-1,2-Dichloroethylene	ug/L	1.6	17		<0.50	<0.50	<0.50	<0.50	<0.50
	trans-1,2-Dichloroethylene	ug/L	1.6	17		<0.50	<0.50	<0.50	<0.50	<0.50
	1,3-Dichloropropene (cis & trans)	ug/L	0.5	0.5		<0.50	<0.50	<0.50	<0.50	<0.50
	Methylene Chloride	ug/L	50	50		<5.0	<5.0	<5.0	<5.0	<5.0
	1,2-Dichloropropane	ug/L	5	5		<0.50	<0.50	<0.50	<0.50	<0.50
	cis-1,3-Dichloropropene	ug/L	-	-		<0.30	<0.30	<0.30	<0.30	<0.30
	trans-1,3-Dichloropropene	ug/L	-	-		<0.30	<0.30	<0.30	<0.30	<0.30
	Ethyl Benzene	ug/L	2.4	2.4		<0.50	<0.50	<0.50	<0.50	<0.50
	n-Hexane	ug/L	51	520		<0.50	<0.50	<0.50	<0.50	<0.50
	Methyl Ethyl Ketone	ug/L	1800	1800		<20	<20	<20	<20	<20
	Methyl Isobutyl Ketone	ug/L	640	640		<20	<20	<20	<20	<20
	MTBE	ug/L	15	15		<2.0	<2.0	<2.0	<2.0	<2.0
	Styrene	ug/L	5.4	5.4		<0.50	<0.50	<0.50	<0.50	<0.50
	1,1,1,2-Tetrachloroethane	ug/L	1.1	1.1		<0.50	<0.50	<0.50	<0.50	<0.50
	1,1,2,2-Tetrachloroethane	ug/L	1	1		<0.50	<0.50	<0.50	<0.50	<0.50
	Tetrachloroethylene	ug/L	1.6	17		<0.50	<0.50	<0.50	<0.50	<0.50
	Toluene	ug/L	24	24		<0.50	<0.50	<0.50	<0.50	<0.50
	1,1,1-Trichloroethane	ug/L	200	200		<0.50	<0.50	<0.50	<0.50	<0.50
	1,1,2-Trichloroethane	ug/L	4.7	5		<0.50	<0.50	<0.50	<0.50	<0.50
	Trichloroethylene	ug/L	1.6	5		<0.50	<0.50	<0.50	<0.50	<0.50
	Trichlorofluoromethane	ug/L	150	150		<5.0	<5.0	<5.0	<5.0	<5.0
	Vinyl chloride	ug/L	0.5	1.7		<0.50	<0.50	<0.50	<0.50	<0.50

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

WATER - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1510304-1	L1510304-2	L1510304-3	L1510304-4	L1510304-5
					Sampled Date	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	MW14-1	MW14-3	MW14-4	QA/QC	TRIP BLANK
Grouping	Analyte	Unit	Guide Limits #1	#2						
Volatile Organic Compounds	o-Xylene	ug/L	-	-		<0.30	<0.30	<0.30	<0.30	<0.30
	m+p-Xylenes	ug/L	-	-		<0.40	<0.40	<0.40	<0.40	<0.40
	Xylenes (Total)	ug/L	300	300		<0.50	<0.50	<0.50	<0.50	<0.50
	Surrogate: 4-Bromofluorobenzene	%	-	-		96.8	95.1	96.9	96.2	96.9
	Surrogate: 1,4-Difluorobenzene	%	-	-		101.5	101.0	100.7	101.3	100.3
Hydrocarbons	F1 (C6-C10)	ug/L	750	750		<25	<25	<25		
	F1-BTEX	ug/L	750	750		<25	<25	<25		
	F2 (C10-C16)	ug/L	150	150		<100	170	<100		
	F2-Naphth	ug/L	-	-		<100	170	<100		
	F3 (C16-C34)	ug/L	500	500		5190	31000	1600		
	F3-PAH	ug/L	-	-		5190	31000	1600		
	F4 (C34-C50)	ug/L	500	500		410	1850	<250		
	Total Hydrocarbons (C6-C50)	ug/L	-	-		5590	33100	1600		
	Chrom. to baseline at nC50		-	-		YES	YES	YES		
	Surrogate: 2-Bromobenzotrifluoride	%	-	-		83.0	81.2	90.1		
	Surrogate: 3,4-Dichlorotoluene	%	-	-		78.8	66.1	76.3		
Polycyclic Aromatic Hydrocarbons	Acenaphthene	ug/L	4.1	4.1		<0.020	<0.020	<0.020		
	Acenaphthylene	ug/L	1	1		<0.020	<0.020	<0.020		
	Anthracene	ug/L	2.4	2.4		<0.020	<0.020	<0.020		
	Benzo(a)anthracene	ug/L	1	1		<0.020	<0.020	<0.020		
	Benzo(a)pyrene	ug/L	0.01	0.01		<0.010	<0.010	<0.010		
	Benzo(b)fluoranthene	ug/L	0.1	0.1		<0.020	<0.020	<0.020		

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

WATER - Ontario Regulation 153/04 - April 15, 2011 Standards

					ALS ID	L1510304-1	L1510304-2	L1510304-3	L1510304-4	L1510304-5
					Sampled Date	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14	29-AUG-14
					Sampled Time	-	-	-	-	-
					Sample ID	MW14-1	MW14-3	MW14-4	QA/QC	TRIP BLANK
Grouping	Analyte	Unit	Guide Limits #1	#2						
Polycyclic Aromatic Hydrocarbons	Benzo(g,h,i)perylene	ug/L	0.2	0.2		<0.020	<0.020	<0.020		
	Benzo(k)fluoranthene	ug/L	0.1	0.1		<0.020	<0.020	<0.020		
	Chrysene	ug/L	0.1	0.1		<0.020	<0.020	<0.020		
	Dibenzo(ah)anthracene	ug/L	0.2	0.2		<0.020	<0.020	<0.020		
	Fluoranthene	ug/L	0.41	0.41		<0.020	DLM <0.03	<0.020		
	Fluorene	ug/L	120	120		<0.020	<0.020	<0.020		
	Indeno(1,2,3-cd)pyrene	ug/L	0.2	0.2		<0.020	<0.020	<0.020		
	1+2-Methylnaphthalenes	ug/L	3.2	3.2		<0.028	<0.028	<0.028		
	1-Methylnaphthalene	ug/L	3.2	3.2		<0.020	<0.020	<0.020		
	2-Methylnaphthalene	ug/L	3.2	3.2		<0.020	<0.020	<0.020		
	Naphthalene	ug/L	11	11		<0.050	<0.050	<0.050		
	Phenanthrene	ug/L	1	1		<0.020	<0.020	<0.020		
	Pyrene	ug/L	4.1	4.1		<0.020	DLM <0.03	<0.020		
	Surrogate: 2-Fluorobiphenyl	%	-	-		71.2	80.9	90.7		
	Surrogate: d14-Terphenyl	%	-	-		80.1	86.5	83.5		
Polychlorinated Biphenyls	Aroclor 1242	ug/L	-	-		DLM <0.10	DLM <0.15	DLM <0.060		
	Aroclor 1248	ug/L	-	-		<0.020	<0.020	<0.020		
	Aroclor 1254	ug/L	-	-		<0.020	DLM <0.030	DLM <0.060		
	Aroclor 1260	ug/L	-	-		<0.020	DLM <0.030	DLM <0.080		
	Total PCBs	ug/L	3	3		DLM <0.10	DLM <0.15	DLM <0.080		
	Surrogate: d14-Terphenyl	%	-	-		87.1	99.0	97.0		

Guide Limit #1: T2-Ground Water (Coarse Soil)-All Types of Property Use
Guide Limit #2: T2-Ground Water (Fine Soil)-All Types of Property Use

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Guideline						
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Ground Water (Coarse Soil)-All Types of Property Use						
L1510304-1	MW14-1	Hydrocarbons	F3 (C16-C34)	5190	500	ug/L
L1510304-2	MW14-3	Anions and Nutrients	Chloride (Cl)	1260	790	mg/L
		Dissolved Metals	Sodium (Na)-Dissolved	697000	490000	ug/L
		Hydrocarbons	F2 (C10-C16)	170	150	ug/L
			F3 (C16-C34)	31000	500	ug/L
			F4 (C34-C50)	1850	500	ug/L
L1510304-3	MW14-4	Hydrocarbons	F3 (C16-C34)	1600	500	ug/L
Ontario Regulation 153/04 - April 15, 2011 Standards - T2-Ground Water (Fine Soil)-All Types of Property Use						
L1510304-1	MW14-1	Hydrocarbons	F3 (C16-C34)	5190	500	ug/L
L1510304-2	MW14-3	Anions and Nutrients	Chloride (Cl)	1260	790	mg/L
		Dissolved Metals	Sodium (Na)-Dissolved	697000	490000	ug/L
		Hydrocarbons	F2 (C10-C16)	170	150	ug/L
			F3 (C16-C34)	31000	500	ug/L
			F4 (C34-C50)	1850	500	ug/L
L1510304-3	MW14-4	Hydrocarbons	F3 (C16-C34)	1600	500	ug/L

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
CINT	Cooling initiated. Samples were received packed with ice or ice packs and were sampled the same day as received.

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
CL-R511-WT	Water	Chloride-O.Reg 153/04 (July 2011)	EPA 300.0 (IC)

Aqueous samples are analyzed directly or may be filtered in the laboratory prior to analysis using ion chromatography.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04 (July 2011)	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC DEC-2000 - PUB# 1310-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Water F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Water F2-F4-O.Reg 153/04 (July 2011) MOE DECPH-E3398/CCME TIER 1

Fractions F2, F3 and F4 are determined by liquid/liquid extraction with a solvent. The solvent recovered from the extracted sample is dried and treated to remove polar material. The extract is then analyzed by GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT Water Diss. Mercury in Water by CVAAS (ug/L) EPA SW846 7470A

Liquid sample is filtered, then digested with a heated, strong, mixed acid solution to convert all forms of mercury to divalent mercury. The divalent mercury is then reduced to elemental mercury, sparged from solution and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT Water Diss. Metals in Water by ICPMS (ug/L) EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Water PAH-Calculated Parameters SW846 8270

PAH-511-WT Water PAH-O. Reg 153/04 (July 2011) SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. For Benzo (a) pyrene analysis samples are filtered. The sample extracts are concentrated and then analyzed using GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT Water PCB-O. Reg 153/04 (July 2011) SW846 3510/8082

Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-R511-WT Water pH-O. Reg 153/04 (July 2011) MOEE E3137A-R511

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT Water Regulation 153 VOCs SW8260B/SW8270C

VOC-511-HS-WT Water VOC by GCMS HS O.Reg 153/04 (July SW846 8260

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

2011)

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

128948

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information.

Quality Control Report

Workorder: L1510304 Report Date: 16-SEP-14

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-R511-WT	**Water**							
Batch R2939019								
WG1944407-10 DUP		**L1511149-4**						
Chloride (Cl)		5.3	5.3		mg/L	0.7	20	04-SEP-14
WG1944407-4 DUP		**L1510333-1**						
Chloride (Cl)		71.4	71.6		mg/L	0.2	20	04-SEP-14
WG1944407-2 LCS								
Chloride (Cl)			100.0		%		85-115	04-SEP-14
WG1944407-3 LCSD		**WG1944407-2**						
Chloride (Cl)		100.0	100.3		%	0.3	25	04-SEP-14
WG1944407-1 MB								
Chloride (Cl)			<1.0		mg/L		1	04-SEP-14
WG1944407-11 MS		**L1511149-4**						
Chloride (Cl)			97.3		%		75-125	04-SEP-14
WG1944407-5 MS		**L1510333-1**						
Chloride (Cl)			N/A	MS-B	%		-	04-SEP-14
CN-WAD-R511-WT	**Water**							
Batch R2940484								
WG1946408-4 CVS								
Cyanide, Weak Acid Diss			104.6		%		80-120	05-SEP-14
WG1946408-2 DUP		**L1509778-1**						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	ug/L	N/A	20	05-SEP-14
WG1946408-3 LCS								
Cyanide, Weak Acid Diss			104.7		%		80-120	05-SEP-14
WG1946408-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	05-SEP-14
WG1946408-5 MS		**L1509778-1**						
Cyanide, Weak Acid Diss			124.8		%		70-130	05-SEP-14
CR-CR6-IC-R511-WT	**Water**							
Batch R2940331								
WG1945414-4 DUP		**WG1945414-3**						
Chromium, Hexavalent		<10	<10	RPD-NA	ug/L	N/A	20	05-SEP-14
WG1945414-2 LCS								
Chromium, Hexavalent			102.4		%		80-120	05-SEP-14
WG1945414-1 MB								
Chromium, Hexavalent			<10		ug/L		10	05-SEP-14
WG1945414-5 MS		**WG1945414-3**						
Chromium, Hexavalent			100.9		%		70-130	05-SEP-14
EC-R511-WT	**Water**							

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-R511-WT	**Water**							
Batch R2937874								
WG1944493-5 DUP		**WG1944493-4**						
Conductivity		0.895	0.893		mS/cm	0.2	10	03-SEP-14
WG1944493-2 LCS								
Conductivity			101.6		%		90-110	03-SEP-14
WG1944493-1 MB								
Conductivity			<0.0030		mS/cm		0.003	03-SEP-14
F1-HS-511-WT	**Water**							
Batch R2940496								
WG1944000-1 CVS								
F1 (C6-C10)			82.8		%		80-120	08-SEP-14
WG1944000-4 DUP		**WG1944000-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	08-SEP-14
WG1944000-2 MB								
F1 (C6-C10)			<25		ug/L		25	08-SEP-14
Surrogate: 3,4-Dichlorotoluene			92.2		%		60-140	08-SEP-14
WG1944000-5 MS		**L1511149-20**						
F1 (C6-C10)			70.2		%		60-140	08-SEP-14
F2-F4-511-WT	**Water**							
Batch R2940929								
WG1946725-1 CVS								
F2 (C10-C16)			109.1		%		80-120	08-SEP-14
F3 (C16-C34)			102.7		%		80-120	08-SEP-14
F4 (C34-C50)			104.1		%		80-120	08-SEP-14
WG1943974-2 LCS								
F2 (C10-C16)			100.8		%		65-135	08-SEP-14
F3 (C16-C34)			111.4		%		65-135	08-SEP-14
F4 (C34-C50)			113.7		%		65-135	08-SEP-14
WG1943974-3 LCSD		**WG1943974-2**						
F2 (C10-C16)		100.8	96.2		%	4.6	50	08-SEP-14
F3 (C16-C34)		111.4	104.1		%	6.7	50	08-SEP-14
F4 (C34-C50)		113.7	104.8		%	8.1	50	08-SEP-14
WG1943974-1 MB								
F2 (C10-C16)			<100		ug/L		100	08-SEP-14
F3 (C16-C34)			<250		ug/L		250	08-SEP-14
F4 (C34-C50)			<250		ug/L		250	08-SEP-14
Surrogate: 2-Bromobenzotrifluoride			69.7		%		60-140	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-UG/L-CVAA-WT	**Water**							
Batch R2938026								
WG1944263-3 DUP		**L1510304-1**						
Mercury (Hg)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	04-SEP-14
WG1944263-2 LCS								
Mercury (Hg)-Dissolved			103.5		%		80-120	04-SEP-14
WG1944263-1 MB								
Mercury (Hg)-Dissolved			<0.10		ug/L		0.1	04-SEP-14
WG1944263-4 MS		**L1510304-2**						
Mercury (Hg)-Dissolved			101.0		%		70-130	04-SEP-14
MET-D-UG/L-MS-WT	**Water**							
Batch R2937442								
WG1943614-1 CVS								
Antimony (Sb)-Dissolved			101.0		%		80-120	03-SEP-14
Arsenic (As)-Dissolved			100.6		%		80-120	03-SEP-14
Barium (Ba)-Dissolved			97.0		%		80-120	03-SEP-14
Beryllium (Be)-Dissolved			105.2		%		80-120	03-SEP-14
Boron (B)-Dissolved			111.1		%		80-120	03-SEP-14
Cadmium (Cd)-Dissolved			99.0		%		80-120	03-SEP-14
Chromium (Cr)-Dissolved			100.6		%		80-120	03-SEP-14
Cobalt (Co)-Dissolved			100.1		%		80-120	03-SEP-14
Copper (Cu)-Dissolved			100.4		%		80-120	03-SEP-14
Lead (Pb)-Dissolved			111.0		%		80-120	03-SEP-14
Molybdenum (Mo)-Dissolved			99.1		%		80-120	03-SEP-14
Nickel (Ni)-Dissolved			100.4		%		80-120	03-SEP-14
Selenium (Se)-Dissolved			97.2		%		80-120	03-SEP-14
Silver (Ag)-Dissolved			102.2		%		80-120	03-SEP-14
Sodium (Na)-Dissolved			102.6		%		80-120	03-SEP-14
Thallium (Tl)-Dissolved			107.4		%		80-120	03-SEP-14
Uranium (U)-Dissolved			99.3		%		80-120	03-SEP-14
Vanadium (V)-Dissolved			100.9		%		80-120	03-SEP-14
Zinc (Zn)-Dissolved			92.9		%		80-120	03-SEP-14
WG1943511-4 DUP		**WG1943511-3**						
Antimony (Sb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	03-SEP-14
Arsenic (As)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	03-SEP-14
Barium (Ba)-Dissolved		28.5	29.2		ug/L	2.2	20	03-SEP-14
Beryllium (Be)-Dissolved		<0.40	<0.40	RPD-NA	ug/L	N/A	20	03-SEP-14

Quality Control Report

Workorder: L1510304 Report Date: 16-SEP-14

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R2937442								
WG1943511-4 DUP		**WG1943511-3**						
Boron (B)-Dissolved		18	18		ug/L	1.8	20	03-SEP-14
Cadmium (Cd)-Dissolved		<0.090	<0.090	RPD-NA	ug/L	N/A	20	03-SEP-14
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	03-SEP-14
Cobalt (Co)-Dissolved		<0.30	<0.30	RPD-NA	ug/L	N/A	20	03-SEP-14
Copper (Cu)-Dissolved		1.1	1.2		ug/L	1.8	20	03-SEP-14
Lead (Pb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	03-SEP-14
Molybdenum (Mo)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	03-SEP-14
Nickel (Ni)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	03-SEP-14
Selenium (Se)-Dissolved		<0.40	<0.40	RPD-NA	ug/L	N/A	20	03-SEP-14
Silver (Ag)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	03-SEP-14
Sodium (Na)-Dissolved		2800	2790		ug/L	0.4	20	03-SEP-14
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	ug/L	N/A	20	03-SEP-14
Uranium (U)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	03-SEP-14
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	03-SEP-14
Zinc (Zn)-Dissolved		5.2	5.4		ug/L	3.8	20	03-SEP-14
WG1943511-2 LCS								
Antimony (Sb)-Dissolved			95.0		%		80-120	03-SEP-14
Arsenic (As)-Dissolved			95.9		%		80-120	03-SEP-14
Barium (Ba)-Dissolved			95.3		%		80-120	03-SEP-14
Beryllium (Be)-Dissolved			109.1		%		80-120	03-SEP-14
Boron (B)-Dissolved			107.4		%		80-120	03-SEP-14
Cadmium (Cd)-Dissolved			94.3		%		80-120	03-SEP-14
Chromium (Cr)-Dissolved			94.9		%		80-120	03-SEP-14
Cobalt (Co)-Dissolved			96.1		%		80-120	03-SEP-14
Copper (Cu)-Dissolved			91.6		%		80-120	03-SEP-14
Lead (Pb)-Dissolved			100.3		%		80-120	03-SEP-14
Molybdenum (Mo)-Dissolved			95.6		%		80-120	03-SEP-14
Nickel (Ni)-Dissolved			92.3		%		80-120	03-SEP-14
Selenium (Se)-Dissolved			91.3		%		80-120	03-SEP-14
Silver (Ag)-Dissolved			93.8		%		80-120	03-SEP-14
Sodium (Na)-Dissolved			104.1		%		80-120	03-SEP-14
Thallium (Tl)-Dissolved			100.6		%		80-120	03-SEP-14
Uranium (U)-Dissolved			96.2		%		80-120	03-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R2937442								
WG1943511-2 LCS								
Vanadium (V)-Dissolved			97.9		%		80-120	03-SEP-14
Zinc (Zn)-Dissolved			94.5		%		80-120	03-SEP-14
WG1943511-1 MB								
Antimony (Sb)-Dissolved			<0.50		ug/L		0.5	03-SEP-14
Arsenic (As)-Dissolved			<1.0		ug/L		1	03-SEP-14
Barium (Ba)-Dissolved			<2.0		ug/L		2	03-SEP-14
Beryllium (Be)-Dissolved			<0.40		ug/L		0.4	03-SEP-14
Boron (B)-Dissolved			<10		ug/L		10	03-SEP-14
Cadmium (Cd)-Dissolved			<0.090		ug/L		0.09	03-SEP-14
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	03-SEP-14
Cobalt (Co)-Dissolved			<0.30		ug/L		0.3	03-SEP-14
Copper (Cu)-Dissolved			<1.0		ug/L		1	03-SEP-14
Lead (Pb)-Dissolved			<0.50		ug/L		0.5	03-SEP-14
Molybdenum (Mo)-Dissolved			<0.50		ug/L		0.5	03-SEP-14
Nickel (Ni)-Dissolved			<1.0		ug/L		1	03-SEP-14
Selenium (Se)-Dissolved			<0.40		ug/L		0.4	03-SEP-14
Silver (Ag)-Dissolved			<0.10		ug/L		0.1	03-SEP-14
Sodium (Na)-Dissolved			<500		ug/L		500	03-SEP-14
Thallium (Tl)-Dissolved			<0.20		ug/L		0.2	03-SEP-14
Uranium (U)-Dissolved			<1.0		ug/L		1	03-SEP-14
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	03-SEP-14
Zinc (Zn)-Dissolved			<3.0		ug/L		3	03-SEP-14
WG1943511-5 MS		**WG1943511-3**						
Antimony (Sb)-Dissolved			87.3		%		70-130	03-SEP-14
Arsenic (As)-Dissolved			90.9		%		70-130	03-SEP-14
Barium (Ba)-Dissolved			83.6		%		70-130	03-SEP-14
Beryllium (Be)-Dissolved			95.2		%		70-130	03-SEP-14
Boron (B)-Dissolved			88.0		%		70-130	03-SEP-14
Cadmium (Cd)-Dissolved			87.0		%		70-130	03-SEP-14
Chromium (Cr)-Dissolved			85.8		%		70-130	03-SEP-14
Cobalt (Co)-Dissolved			84.3		%		70-130	03-SEP-14
Copper (Cu)-Dissolved			79.3		%		70-130	03-SEP-14
Lead (Pb)-Dissolved			87.7		%		70-130	03-SEP-14
Molybdenum (Mo)-Dissolved			84.9		%		70-130	03-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R2937442								
WG1943511-5 MS		**WG1943511-3**						
Nickel (Ni)-Dissolved			81.7		%		70-130	03-SEP-14
Selenium (Se)-Dissolved			87.5		%		70-130	03-SEP-14
Silver (Ag)-Dissolved			102.1		%		70-130	03-SEP-14
Sodium (Na)-Dissolved			83.3		%		70-130	03-SEP-14
Thallium (Tl)-Dissolved			90.8		%		70-130	03-SEP-14
Uranium (U)-Dissolved			88.2		%		70-130	03-SEP-14
Vanadium (V)-Dissolved			88.4		%		70-130	03-SEP-14
Zinc (Zn)-Dissolved			83.2		%		70-130	03-SEP-14
PAH-511-WT	**Water**							
Batch R2941052								
WG1946752-1 CVS								
1-Methylnaphthalene			88.4		%		50-140	08-SEP-14
2-Methylnaphthalene			90.1		%		50-140	08-SEP-14
Acenaphthene			88.4		%		50-140	08-SEP-14
Acenaphthylene			88.0		%		50-140	08-SEP-14
Anthracene			93.3		%		50-140	08-SEP-14
Benzo(a)anthracene			90.3		%		50-140	08-SEP-14
Benzo(a)pyrene			87.2		%		50-140	08-SEP-14
Benzo(b)fluoranthene			86.2		%		50-140	08-SEP-14
Benzo(g,h,i)perylene			91.3		%		50-140	08-SEP-14
Benzo(k)fluoranthene			83.2		%		50-140	08-SEP-14
Chrysene			94.9		%		50-140	08-SEP-14
Dibenzo(ah)anthracene			90.7		%		50-140	08-SEP-14
Fluoranthene			88.0		%		50-140	08-SEP-14
Fluorene			89.4		%		50-140	08-SEP-14
Indeno(1,2,3-cd)pyrene			94.3		%		50-140	08-SEP-14
Naphthalene			90.2		%		50-140	08-SEP-14
Phenanthrene			90.2		%		50-140	08-SEP-14
Pyrene			97.0		%		50-140	08-SEP-14
WG1944190-2 LCS								
1-Methylnaphthalene			84.5		%		50-140	08-SEP-14
2-Methylnaphthalene			86.1		%		50-140	08-SEP-14
Acenaphthene			89.9		%		50-140	08-SEP-14
Acenaphthylene			90.7		%		50-140	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R2941052								
WG1944190-2 LCS								
Anthracene			93.8		%		50-140	08-SEP-14
Benzo(a)anthracene			91.0		%		50-140	08-SEP-14
Benzo(a)pyrene			84.4		%		50-140	08-SEP-14
Benzo(b)fluoranthene			86.6		%		50-140	08-SEP-14
Benzo(g,h,i)perylene			90.6		%		50-140	08-SEP-14
Benzo(k)fluoranthene			82.4		%		50-140	08-SEP-14
Chrysene			95.7		%		50-140	08-SEP-14
Dibenzo(ah)anthracene			90.8		%		50-140	08-SEP-14
Fluoranthene			90.0		%		50-140	08-SEP-14
Fluorene			92.5		%		50-140	08-SEP-14
Indeno(1,2,3-cd)pyrene			94.5		%		50-140	08-SEP-14
Naphthalene			85.1		%		50-140	08-SEP-14
Phenanthrene			91.5		%		50-140	08-SEP-14
Pyrene			98.4		%		50-140	08-SEP-14
WG1944190-3 LCSD		**WG1944190-2**						
1-Methylnaphthalene		84.5	86.9		%	2.8	50	08-SEP-14
2-Methylnaphthalene		86.1	88.3		%	2.6	50	08-SEP-14
Acenaphthene		89.9	92.6		%	3.0	50	08-SEP-14
Acenaphthylene		90.7	93.5		%	3.0	50	08-SEP-14
Anthracene		93.8	96.7		%	3.1	50	08-SEP-14
Benzo(a)anthracene		91.0	93.6		%	2.9	50	08-SEP-14
Benzo(a)pyrene		84.4	88.0		%	4.1	50	08-SEP-14
Benzo(b)fluoranthene		86.6	88.6		%	2.3	50	08-SEP-14
Benzo(g,h,i)perylene		90.6	93.3		%	3.0	50	08-SEP-14
Benzo(k)fluoranthene		82.4	85.1		%	3.2	50	08-SEP-14
Chrysene		95.7	93.6		%	2.3	50	08-SEP-14
Dibenzo(ah)anthracene		90.8	93.1		%	2.5	50	08-SEP-14
Fluoranthene		90.0	92.9		%	3.2	50	08-SEP-14
Fluorene		92.5	95.2		%	2.8	50	08-SEP-14
Indeno(1,2,3-cd)pyrene		94.5	97.0		%	2.6	50	08-SEP-14
Naphthalene		85.1	88.0		%	3.4	50	08-SEP-14
Phenanthrene		91.5	94.1		%	2.9	50	08-SEP-14
Pyrene		98.4	101.4		%	3.0	50	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R2941052								
WG1944190-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	08-SEP-14
2-Methylnaphthalene			<0.020		ug/L		0.02	08-SEP-14
Acenaphthene			<0.020		ug/L		0.02	08-SEP-14
Acenaphthylene			<0.020		ug/L		0.02	08-SEP-14
Anthracene			<0.020		ug/L		0.02	08-SEP-14
Benzo(a)anthracene			<0.020		ug/L		0.02	08-SEP-14
Benzo(a)pyrene			<0.010		ug/L		0.01	08-SEP-14
Benzo(b)fluoranthene			<0.020		ug/L		0.02	08-SEP-14
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	08-SEP-14
Benzo(k)fluoranthene			<0.020		ug/L		0.02	08-SEP-14
Chrysene			<0.020		ug/L		0.02	08-SEP-14
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	08-SEP-14
Fluoranthene			<0.020		ug/L		0.02	08-SEP-14
Fluorene			<0.020		ug/L		0.02	08-SEP-14
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	08-SEP-14
Naphthalene			<0.050		ug/L		0.05	08-SEP-14
Phenanthrene			<0.020		ug/L		0.02	08-SEP-14
Pyrene			<0.020		ug/L		0.02	08-SEP-14
Surrogate: 2-Fluorobiphenyl			80.3		%		50-140	08-SEP-14
Surrogate: d14-Terphenyl			83.2		%		50-140	08-SEP-14
PCB-511-WT	**Water**							
Batch R2941442								
WG1946892-1 CVS								
Aroclor 1242			99.96		%		60-140	08-SEP-14
Aroclor 1248			98.8		%		60-140	08-SEP-14
Aroclor 1254			106.7		%		60-140	08-SEP-14
Aroclor 1260			87.1		%		60-140	08-SEP-14
WG1944190-2 LCS								
Aroclor 1242			83.2		%		60-140	08-SEP-14
Aroclor 1248			102.1		%		60-140	08-SEP-14
Aroclor 1254			89.9		%		60-140	08-SEP-14
Aroclor 1260			88.8		%		60-140	08-SEP-14
WG1944190-3 LCSD		**WG1944190-2**						
Aroclor 1242		83.2	82.4		%	0.9	50	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Water**							
Batch R2941442								
WG1944190-3 LCSD		**WG1944190-2**						
Aroclor 1248		102.1	102.1		%	0.0	50	08-SEP-14
Aroclor 1254		89.9	84.7		%	6.0	50	08-SEP-14
Aroclor 1260		88.8	88.9		%	0.1	50	08-SEP-14
WG1944190-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	08-SEP-14
Aroclor 1248			<0.020		ug/L		0.02	08-SEP-14
Aroclor 1254			<0.020		ug/L		0.02	08-SEP-14
Aroclor 1260			<0.020		ug/L		0.02	08-SEP-14
Surrogate: d14-Terphenyl			94.0		%		60-140	08-SEP-14
PH-R511-WT	**Water**							
Batch R2937908								
WG1944504-2 DUP		**WG1944504-3**						
pH		7.59	7.61	J	pH units	0.02	0.2	03-SEP-14
WG1944504-1 LCS								
pH			7.02		pH units		6.9-7.1	03-SEP-14
VOC-511-HS-WT	**Water**							
Batch R2940496								
WG1944000-1 CVS								
1,1,1,2-Tetrachloroethane			96.1		%		70-130	08-SEP-14
1,1,2,2-Tetrachloroethane			89.6		%		70-130	08-SEP-14
1,1,1-Trichloroethane			101.4		%		70-130	08-SEP-14
1,1,2-Trichloroethane			93.9		%		70-130	08-SEP-14
1,1-Dichloroethane			97.0		%		70-130	08-SEP-14
1,1-Dichloroethylene			87.7		%		70-130	08-SEP-14
1,2-Dibromoethane			92.6		%		70-130	08-SEP-14
1,2-Dichlorobenzene			97.7		%		70-130	08-SEP-14
1,2-Dichloroethane			96.7		%		70-130	08-SEP-14
1,2-Dichloropropane			95.0		%		70-130	08-SEP-14
1,3-Dichlorobenzene			97.4		%		70-130	08-SEP-14
1,4-Dichlorobenzene			100.2		%		70-130	08-SEP-14
Acetone			98.4		%		60-140	08-SEP-14
Benzene			95.7		%		70-130	08-SEP-14
Bromodichloromethane			98.7		%		70-130	08-SEP-14
Bromoform			90.5		%		70-130	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R2940496								
WG1944000-1 CVS								
Bromomethane			89.0		%		60-140	08-SEP-14
Carbon tetrachloride			101.0		%		70-130	08-SEP-14
Chlorobenzene			95.7		%		70-130	08-SEP-14
Chloroform			101.4		%		70-130	08-SEP-14
cis-1,2-Dichloroethylene			97.6		%		70-130	08-SEP-14
cis-1,3-Dichloropropene			101.8		%		70-130	08-SEP-14
Dibromochloromethane			95.3		%		70-130	08-SEP-14
Dichlorodifluoromethane			79.3		%		60-140	08-SEP-14
Ethyl Benzene			93.2		%		70-130	08-SEP-14
n-Hexane			99.4		%		70-130	08-SEP-14
m+p-Xylenes			97.1		%		70-130	08-SEP-14
Methyl Ethyl Ketone			95.7		%		60-140	08-SEP-14
Methyl Isobutyl Ketone			95.3		%		60-140	08-SEP-14
Methylene Chloride			95.9		%		70-130	08-SEP-14
MTBE			92.9		%		70-130	08-SEP-14
o-Xylene			95.8		%		70-130	08-SEP-14
Styrene			95.1		%		70-130	08-SEP-14
Tetrachloroethylene			95.9		%		70-130	08-SEP-14
Toluene			89.4		%		70-130	08-SEP-14
trans-1,2-Dichloroethylene			92.4		%		70-130	08-SEP-14
trans-1,3-Dichloropropene			92.5		%		70-130	08-SEP-14
Trichloroethylene			97.0		%		70-130	08-SEP-14
Trichlorofluoromethane			102.9		%		60-140	08-SEP-14
Vinyl chloride			94.8		%		60-140	08-SEP-14
WG1944000-4 DUP		**WG1944000-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-SEP-14
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R2940496								
WG1944000-4 DUP		**WG1944000-3**						
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	08-SEP-14
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-SEP-14
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-SEP-14
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-SEP-14
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	08-SEP-14
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-SEP-14
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-SEP-14
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-SEP-14
Ethyl Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	08-SEP-14
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-SEP-14
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-SEP-14
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-SEP-14
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-SEP-14
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-SEP-14
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-SEP-14
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-SEP-14
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-SEP-14
WG1944000-2 MB								

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R2940496								
WG1944000-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	08-SEP-14
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	08-SEP-14
1,1,1-Trichloroethane			<0.50		ug/L		0.5	08-SEP-14
1,1,2-Trichloroethane			<0.50		ug/L		0.5	08-SEP-14
1,1-Dichloroethane			<0.50		ug/L		0.5	08-SEP-14
1,1-Dichloroethylene			<0.50		ug/L		0.5	08-SEP-14
1,2-Dibromoethane			<0.20		ug/L		0.2	08-SEP-14
1,2-Dichlorobenzene			<0.50		ug/L		0.5	08-SEP-14
1,2-Dichloroethane			<0.50		ug/L		0.5	08-SEP-14
1,2-Dichloropropane			<0.50		ug/L		0.5	08-SEP-14
1,3-Dichlorobenzene			<0.50		ug/L		0.5	08-SEP-14
1,4-Dichlorobenzene			<0.50		ug/L		0.5	08-SEP-14
Acetone			<30		ug/L		30	08-SEP-14
Benzene			<0.50		ug/L		0.5	08-SEP-14
Bromodichloromethane			<2.0		ug/L		2	08-SEP-14
Bromoform			<5.0		ug/L		5	08-SEP-14
Bromomethane			<0.50		ug/L		0.5	08-SEP-14
Carbon tetrachloride			<0.20		ug/L		0.2	08-SEP-14
Chlorobenzene			<0.50		ug/L		0.5	08-SEP-14
Chloroform			<1.0		ug/L		1	08-SEP-14
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-SEP-14
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	08-SEP-14
Dibromochloromethane			<2.0		ug/L		2	08-SEP-14
Dichlorodifluoromethane			<2.0		ug/L		2	08-SEP-14
Ethyl Benzene			<0.50		ug/L		0.5	08-SEP-14
n-Hexane			<0.50		ug/L		0.5	08-SEP-14
m+p-Xylenes			<0.40		ug/L		0.4	08-SEP-14
Methyl Ethyl Ketone			<20		ug/L		20	08-SEP-14
Methyl Isobutyl Ketone			<20		ug/L		20	08-SEP-14
Methylene Chloride			<5.0		ug/L		5	08-SEP-14
MTBE			<2.0		ug/L		2	08-SEP-14
o-Xylene			<0.30		ug/L		0.3	08-SEP-14
Styrene			<0.50		ug/L		0.5	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R2940496								
WG1944000-2 MB								
Tetrachloroethylene			<0.50		ug/L		0.5	08-SEP-14
Toluene			<0.50		ug/L		0.5	08-SEP-14
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-SEP-14
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	08-SEP-14
Trichloroethylene			<0.50		ug/L		0.5	08-SEP-14
Trichlorofluoromethane			<5.0		ug/L		5	08-SEP-14
Vinyl chloride			<0.50		ug/L		0.5	08-SEP-14
Surrogate: 1,4-Difluorobenzene			101.5		%		70-130	08-SEP-14
Surrogate: 4-Bromofluorobenzene			97.1		%		70-130	08-SEP-14
WG1944000-5 MS		**L1511149-20**						
1,1,1,2-Tetrachloroethane			95.1		%		50-140	08-SEP-14
1,1,2,2-Tetrachloroethane			86.5		%		50-140	08-SEP-14
1,1,1-Trichloroethane			102.3		%		50-140	08-SEP-14
1,1,2-Trichloroethane			91.1		%		50-140	08-SEP-14
1,1-Dichloroethane			97.2		%		50-140	08-SEP-14
1,1-Dichloroethylene			87.7		%		50-140	08-SEP-14
1,2-Dibromoethane			89.0		%		50-140	08-SEP-14
1,2-Dichlorobenzene			96.6		%		50-140	08-SEP-14
1,2-Dichloroethane			95.9		%		50-140	08-SEP-14
1,2-Dichloropropane			94.2		%		50-140	08-SEP-14
1,3-Dichlorobenzene			98.1		%		50-140	08-SEP-14
1,4-Dichlorobenzene			100.8		%		50-140	08-SEP-14
Acetone			99.5		%		50-140	08-SEP-14
Benzene			96.2		%		50-140	08-SEP-14
Bromodichloromethane			95.3		%		50-140	08-SEP-14
Bromoform			85.4		%		50-140	08-SEP-14
Bromomethane			83.8		%		50-140	08-SEP-14
Carbon tetrachloride			102.7		%		50-140	08-SEP-14
Chlorobenzene			94.8		%		50-140	08-SEP-14
Chloroform			101.1		%		50-140	08-SEP-14
cis-1,2-Dichloroethylene			98.5		%		50-140	08-SEP-14
cis-1,3-Dichloropropene			95.3		%		50-140	08-SEP-14
Dibromochloromethane			91.1		%		50-140	08-SEP-14
Dichlorodifluoromethane			74.5		%		50-140	08-SEP-14

Quality Control Report

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R2940496								
WG1944000-5 MS		**L1511149-20**						
Ethyl Benzene			89.4		%		50-140	08-SEP-14
n-Hexane			99.3		%		50-140	08-SEP-14
m+p-Xylenes			94.5		%		50-140	08-SEP-14
Methyl Ethyl Ketone			96.5		%		50-140	08-SEP-14
Methyl Isobutyl Ketone			89.9		%		50-140	08-SEP-14
Methylene Chloride			95.0		%		50-140	08-SEP-14
MTBE			91.7		%		50-140	08-SEP-14
o-Xylene			91.2		%		50-140	08-SEP-14
Styrene			88.5		%		50-140	08-SEP-14
Tetrachloroethylene			96.7		%		50-140	08-SEP-14
Toluene			86.3		%		50-140	08-SEP-14
trans-1,2-Dichloroethylene			92.8		%		50-140	08-SEP-14
trans-1,3-Dichloropropene			84.4		%		50-140	08-SEP-14
Trichloroethylene			97.1		%		50-140	08-SEP-14
Trichlorofluoromethane			102.1		%		50-140	08-SEP-14
Vinyl chloride			92.5		%		50-140	08-SEP-14

Quality Control Report

Workorder: L1510304 Report Date: 16-SEP-14

Client: SPL CONSULTANTS LIMITED
51 Constellation Court
Toronto ON M9W 1K4
Contact: MICHELLE LOCKE

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Head Office
300-2319 St. Laurent Blvd.
Ottawa, Ontario K1G 4J8
p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Certificate of Analysis

Paterson Group Consulting Engineers

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

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

Client PO: 17718
Project: PE3448
Custody: 21467

Report Date: 23-Apr-2015
Order Date: 17-Apr-2015
Order #: 1516364

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

Paracel ID	Client ID
1516364-01	BH14-1 GW2
1516364-02	BH14-3 GW2
1516364-03	BH14-4 GW2

Approved By: 

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

Certificate of Analysis

Report Date: 23-Apr-2015
Order Date:17-Apr-2015

Client: **Paterson Group Consulting Engineers**
Client PO: 17718 Project Description: PE3448

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC	20-Apr-15	20-Apr-15
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	20-Apr-15	21-Apr-15
Metals, ICP-MS	EPA 200.8 - ICP-MS	21-Apr-15	21-Apr-15
PHC F1	CWS Tier 1 - P&T GC-FID	20-Apr-15	21-Apr-15
PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	21-Apr-15	21-Apr-15

Certificate of Analysis

Report Date: 23-Apr-2015
Order Date:17-Apr-2015

Client: **Paterson Group Consulting Engineers**
Client PO: 17718

Project Description: PE3448

	Client ID:	BH14-1 GW2	BH14-3 GW2	BH14-4 GW2	-
	Sample Date:	17-Apr-15	17-Apr-15	17-Apr-15	-
	Sample ID:	1516364-01	1516364-02	1516364-03	-
	MDL/Units	Water	Water	Water	-
Anions					
Chloride	1 mg/L	-	1080	-	-
Metals					
Sodium	200 ug/L	-	814000	-	-
Volatiles					
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene-d8	Surrogate	103%	101%	98.5%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-
F1 + F2 PHCs	125 ug/L	<125	<125	<125	-
F3 + F4 PHCs	200 ug/L	<200	<200	<200	-

Certificate of Analysis

Report Date: 23-Apr-2015
Order Date:17-Apr-2015

Client: **Paterson Group Consulting Engineers**
Client PO: 17718 Project Description: PE3448

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
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						
Metals									
Sodium	ND	200	ug/L						
Volatiles									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	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: Toluene-d8	*36.0*		*ug/L*		*113*	*50-140*			

Certificate of Analysis

Report Date: 23-Apr-2015
Order Date:17-Apr-2015

Client: **Paterson Group Consulting Engineers**
Client PO: 17718 Project Description: PE3448

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	55.6	1	mg/L	56.4			1.5	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Metals									
Sodium	18800	200	ug/L	19700			4.9	20	
Volatiles									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	*33.1*		*ug/L*	*ND*	*103*	*50-140*			

Certificate of Analysis

Report Date: 23-Apr-2015
Order Date:17-Apr-2015

Client: **Paterson Group Consulting Engineers**
Client PO: 17718 Project Description: PE3448

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	9.65	1	mg/L	ND	96.5	78-112			
Hydrocarbons									
F1 PHCs (C6-C10)	1960	25	ug/L	ND	98.2	68-117			
F2 PHCs (C10-C16)	1220	100	ug/L	ND	67.9	60-140			
F3 PHCs (C16-C34)	3150	100	ug/L	ND	84.7	60-140			
F4 PHCs (C34-C50)	2240	100	ug/L	ND	90.4	60-140			
Metals									
Sodium	1070		ug/L	ND	107	80-120			
Volatiles									
Benzene	42.8	0.5	ug/L	ND	107	50-140			
Ethylbenzene	37.1	0.5	ug/L	ND	92.8	50-140			
Toluene	32.3	0.5	ug/L	ND	80.7	50-140			
m,p-Xylenes	62.9	0.5	ug/L	ND	78.6	50-140			
o-Xylene	38.4	0.5	ug/L	ND	96.0	50-140			
Surrogate: Toluene-d8	*30.8*		*ug/L*		*96.3*	*50-140*			

Certificate of Analysis

Report Date: 23-Apr-2015
Order Date:17-Apr-2015

Client: **Paterson Group Consulting Engineers**
Client PO: 17718 Project Description: PE3448

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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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300-2319 St. Laurent Blvd.
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p: 1-800-749-1947
e: paracel@paracellabs.com
www.paracellabs.com

Chain of Custody
(Lab Use Only)
№ 21467

Page ___ of ___

Client Name: PATERSON	Project Reference: PE3448	TAT: [X] Regular	[ ] 3 Day
Contact Name: MARK D'ARCY	Quote #	[ ] 2 Day	[ ] 1 Day
Address: 154 COLONNADE ROAD	PO # 17718	Date Required:	
Telephone: 613-226-7381	Email Address: mdarcy@patersongroup.ca		

Criteria: [X] O. Reg. 153/04 (As Amended) Table 3 [ ] RSC Filing [ ] O. Reg. 558/00 [ ] PWQO [ ] CCME [ ] SUB (Storm) [ ] SUB (Sanitary) Municipality: ___ [ ] Other: ___

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

Paracel Order Number: 1516364

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: PHCs+BTEX	Sodium	Chloride
1	BH14-1 GW2	GW		3	April 17, 2015	PM	X		
2	BH14-3 GW2	GW		5	↓	↓	X	X	X
3	BH14-4 GW2	GW		3	↓	↓	X		
4									
5									
6									
7									
8									
9									
10									

Comments:

Method of Delivery: Walk-in

Relinquished By (Sign): Xavier Redhead	Received by Driver/Depot:	Received at Lab: MC	Verified By: MC
Relinquished By (Print): Xavier Redhead	Date/Time:	Date/Time: Apr 17/15 15:38	Date/Time: Apr 17/15 15:52
Date/Time: April 17, 2015	Temperature: ___ °C	Temperature: 15.3 °C	pH Verified [✓] By: MC