2650 Queensview Drive
Ottawa, Ontario, K2B 8H6, CANADA
T: 1.613.688.1899 • www.exp.com

March 13, 2018

Mr. Joey Theberge
Theberge Homes Ltd.
904 Lady Ellen Place
Ottawa, Ontario K1Z 5L5

Via Email:
joeytheberge@thebergehomes.com

Project Name:	Proposed Development, 1158 Second Line Road, Ottawa, ON
Project Number:	OTT-00245054-A0
Subject:	**Soil Sampling Program, 1158 Second Line Road, Ottawa, Ontario**

Dear Mr. Theberge:

EXP Services Inc. (EXP) was retained by Theberge Homes Ltd. to conduct soil sampling below the fill and vent pipes of an un-used interior heating oil above ground storage tank (AST) at the property located at 1158 Second Line Road in Ottawa, Ontario hereinafter referred to as the 'Site'. The objective of the soil sampling program was to address the area of potential environmental concern (APEC) identified in a Phase One Environmental Site Assessment (ESA) conducted at the Site by EXP. It is understood that this report is required as part of the permitting process with the City of Ottawa. We understand that a Record of Site Condition (RSC) is not required.

Background

The site is located on the east side of Second Line Road approximately 240 m southwest from the Old Carp Road and Second Line Road intersection, as shown on Figure 1 in Appendix A. The site has an area of approximately 0.8 hectares and is currently occupied by a residence.

EXP completed a Phase One ESA at the site on March 2, 2018. The Phase One ESA identified an interior un-used furnace oil AST in the basement of the residence. The AST was observed to be in good condition with no staining or odours and no records of spills. The exterior vent and fill pipes however represent the worst-case scenario as they would be the location where any spills or overfilling issues of the AST would occur. Therefore, it was recommended that a sample of soil at the ground surface, beneath the vent and fill pipes be obtained and analyzed for the potential contaminants of concern. Groundwater contamination was not considered to be a concern at this time.

Objective

The objective of this assessment was to determine if the area around the exterior fill pipe and/or vent pipe for the AST was impacted by petroleum hydrocarbons.

Soil Sampling

On February 22, 2018, EXP was at the site to collect a shallow soil sample beneath the vent and fill pipes. The vent and fill pipes are located on the north exterior of the residence. A hand shovel was used to dig to an approximate depth of 0.1 m. The sample location is shown on Figure 2 in Appendix A. The soil sample (SA-1) was submitted to a certified laboratory for analysis of petroleum hydrocarbons (PHCs), benzene,

toluene, ethylbenzene and xylene (BTEX). There were no visual and olfactory indications of petroleum impact in the soil sample. Photographs of the sample location are presented in Appendix A.

The soil was placed into laboratory supplied sample jars and vials containing methanol as a preservative. The jars and vials were sealed with Teflon-lined lids to minimize head-space and reduce the potential for induced volatilization during storage/transport prior to analysis. The soil samples were placed in a clean cooler containing ice prior to and during transportation to the subcontract laboratory, The samples were transported / submitted to the laboratory following chain of custody protocols for chemical analysis.

The contracted laboratory selected to perform chemical analysis is an accredited laboratory under the Standards Council of Canada/Canadian Association for Laboratory Accreditation in accordance with ISO/IEC 17025:1999- *General Requirements for the Competence of Testing and Calibration Laboratories.*

Applicable Site Conditions Standards

Analytical results obtained for the soil samples were assessed against site condition standards (SCS) as established under subsection 169.4 (1) of the Environmental Protection Act, and presented in the document MOE "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*", ("SGWS" Standards), (MOE, 2011a). Tabulated background SCS (Table 1) applicable to environmentally sensitive Sites and effects based generic SCS (Tables 2 to 9) applicable to non-environmentally sensitive Sites are provided in MOE (2011a). The effects based SCS (Tables 2 to 9) are protective of human health and the environment for different groundwater conditions (potable and non-potable), land use scenarios (residential, parkland, institutional, commercial, industrial, community and agricultural/other), soil texture (coarse or medium/fine) and restoration depth (full or stratified).

Although it is expected that the development will have a municipally served water supply, for assessment purposes, EXP selected the MOECC (2011) Table 2: Full depth SCS in a potable ground water condition for residential property use and coarse textured soil. The selection of this category was based on the following factors:

- The predominant soil type on the Site was coarse textured based on a grain size analysis in Appendix C.
- A water well was identified at the Site, suggesting that groundwater is currently being used for potable water.
- Less than two-thirds of the Site has an overburden thickness greater than 2 m.
- The Site is not located within 30 m of a surface water body or an area of natural significance.

Soil Analytical Results

The soil analytical results for PHC, and BTEX are presented in Table 1 in Appendix B. The laboratory certificates of analysis are presented in Appendix C.

The concentrations of PHCs and BTEX measured in the analysed soil sample were less than the laboratory detection limits and/or less than the MOECC 2011 Table 2 SCS.

Conclusion/ Recommendations

Based on the soil sampling program, all measured parameters (i.e., PHCs and BTEX) were either less than the laboratory detection limit and/or less than the 2011 MOECC Table 2 SCS.

Based on the findings, no further environmental investigation is recommended at this time.

General Closure

This report ("Report") is based on site conditions known or inferred by the investigation undertaken as of the date of the Report. Should changes occur which potentially impact the condition of the site the recommendations of EXP may require re-evaluation. Where special concerns exist, or Theberge Homes of Companies ("the Client") has special considerations or requirements, these should be disclosed to EXP to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

The evaluation and conclusions contained in the Report are based on conditions in evidence at the time of site inspections and information provided to EXP by the Client and others. The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose as communicated by the Client. EXP has relied in good faith upon such representations, information and instructions and accepts no responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of any misstatements, omissions, misrepresentation or fraudulent acts of persons providing information. Unless specifically stated otherwise, the applicability and reliability of the findings, recommendations, suggestions or opinions expressed in the Report are only valid to the extent that there has been no material alteration to or variation from any of the information provided to EXP. If new information about the environmental conditions at the Site is found, the information should be provided to EXP so that it can be reviewed and revisions to the conclusions and/or recommendations can be made, if warranted.

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. No other party may use or rely upon the Report in whole or in part without the written consent of EXP. Any use of the Report, or any portion of the Report, by a third party are the sole responsibility of such third party. EXP is not responsible for damages suffered by any third party resulting from unauthorised use of the Report.

We trust that the information contained in this letter will be satisfactory for your purposes. Should you have any questions, please contact this office.

Sincerely,

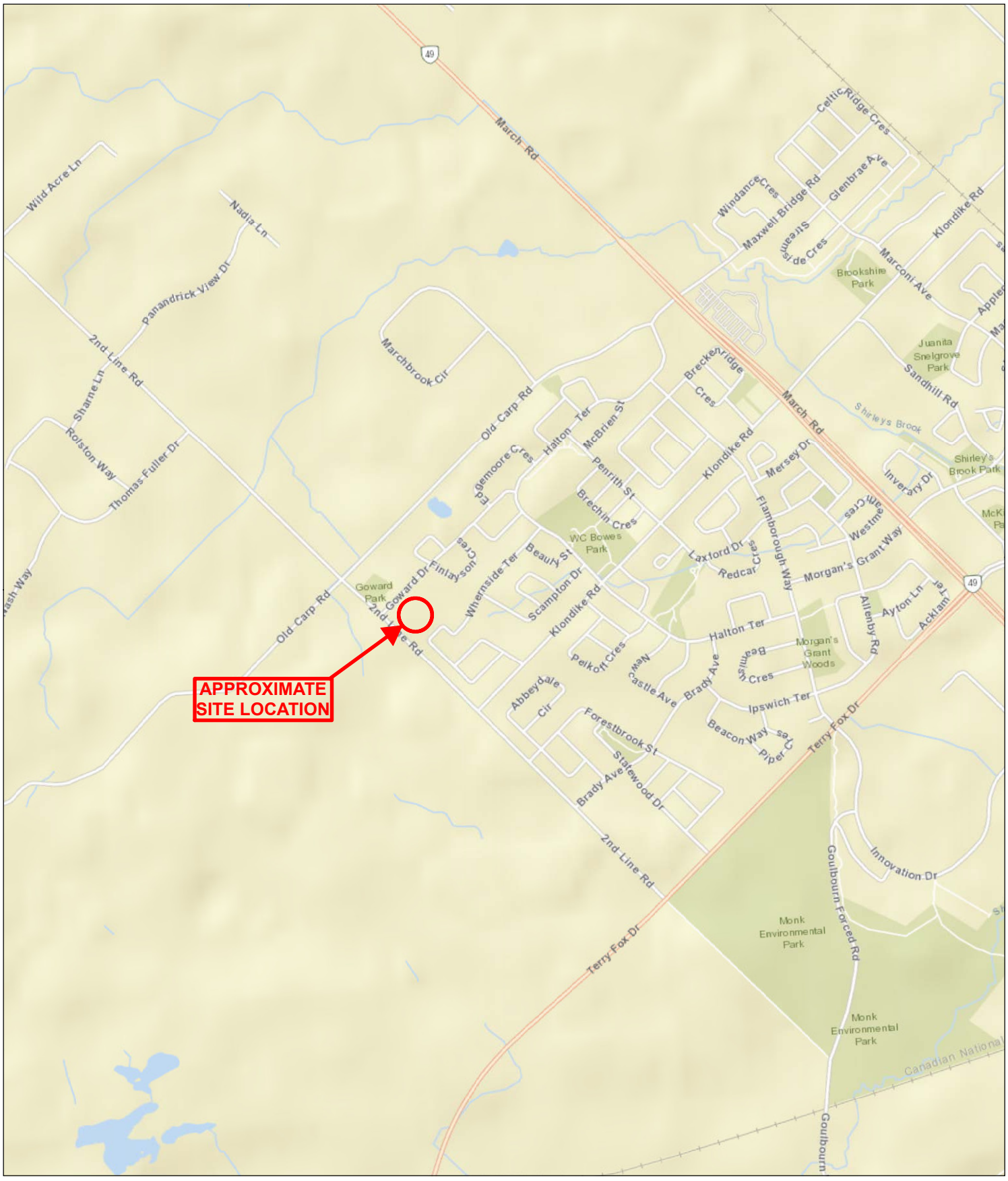
EXP Services Inc.

Mark McCalla, P.Geo.
Senior Geoscientist
Earth and Environmental

Dan McNicoll, M.Sc, P.Geo.
Manager - Environmental Services
Earth and Environmental

Attachments: *Appendix A: Figures*
Appendix B: Summary of Analytical Results
Appendix C: Laboratory Certificates of Analysis

APPENDIX A:
FIGURES and PHOTOGRAPHS



EXP Services Inc.
100-2650 Queensview Drive
Ottawa, Ontario
K2B 8H6
T - (613) - 688-1899
F - (613) - 225-7337

PROJECT TITLE:
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
1158 Second Line Road
Ottawa, Ontario

DRAWING TITLE:
SITE LOCATION PLAN

PROJECT No.: OTT-00245054-A0	DWN: ML
SCALE: AS SHOWN	CHKD: MM
DATE: MARCH 2018	FIG. No.: 1

Legend

▲ Soil Sample Location

- Current on-Site Building

0 5 10 20 30 40 50 Metres Meters

EXP Services Inc.
100-2650 Queensview Drive
Ottawa, Ontario
K2B 8H6
T - (613) - 688-1899
F - (613) - 225-7337

PROJECT TITLE:
SOIL SAMPLING PROGRAM
1158 Second Line Road
Ottawa, Ontario

DRAWING TITLE:
SITE PLAN

PROJECT No.: OTT-00245054-A0	DWN: ML
SCALE: AS SHOWN	CHKD: MM
DATE: MARCH 2018	FIG. No.: 2

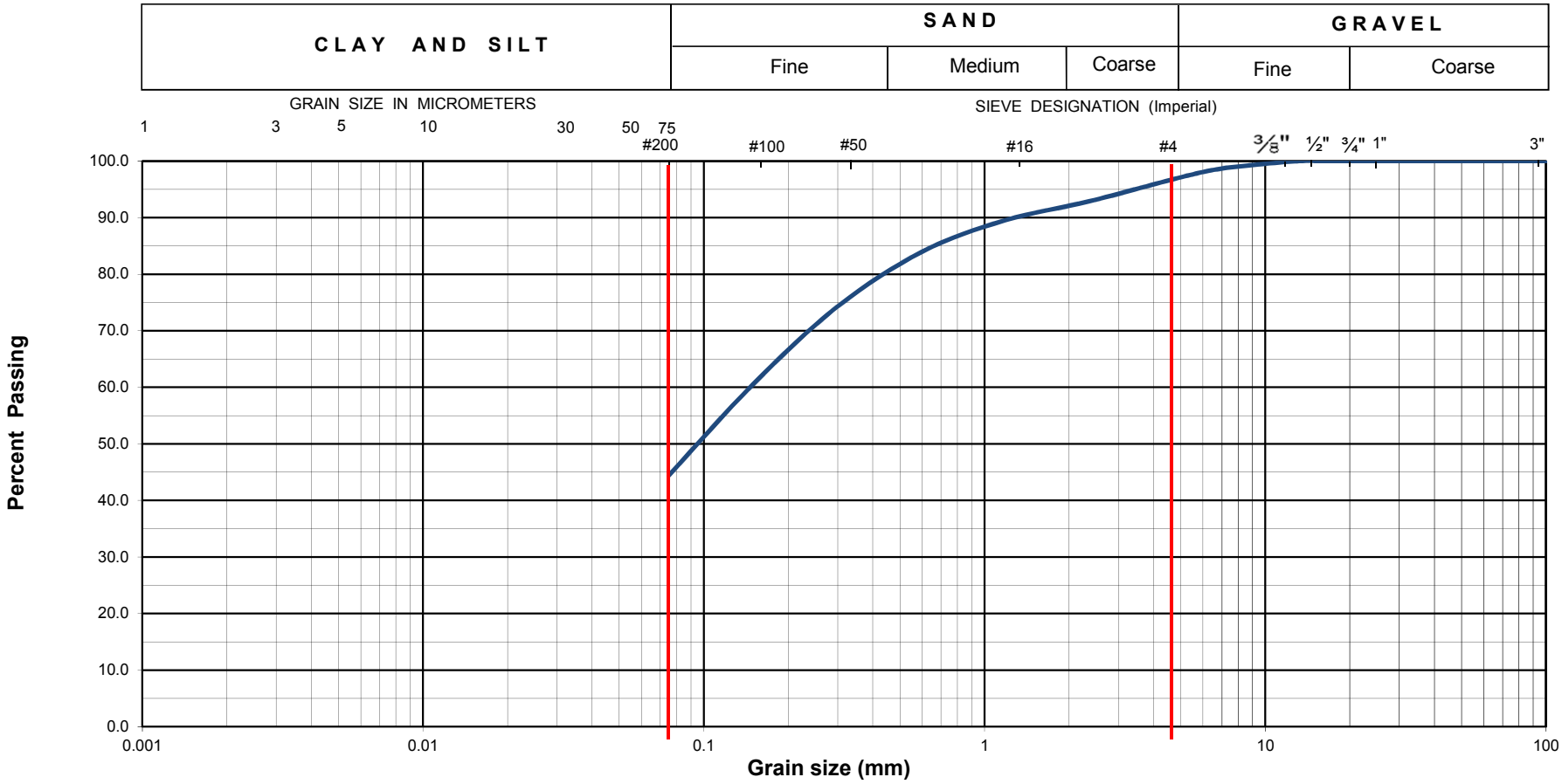
EXP Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6

Grain-Size Distribution Curve

Method of Test for Sieve Analysis of Aggregate

ASTM C-136

Unified Soil Classification System



EXP Project No.:	**OTT-00245054**	**Project Name :**	**Geotechnical Investigation Proposed Residential Development**				
Client :	**Theberge Homes**	**Project Location :**	**1158 Second Line Road, Ottawa**				
Date Sampled :	**February 16, 2018**	**Test Pit No:**	**TP1**	**Sample:**	**SS1**	**Depth (m) :**	**0.3-1.2**
Sample Description :	**Silty Sand (SM)**					**Figure :**	**15**

Photograph No. 1

View of the fill and vent pipes for the interior un-used furnace oil tank

Photograph No. 2

View of the soil sample location

APPENDIX B:
SUMMARY OF ANALITCAL RESULTS

TABLE 1 SOIL ANALYTICAL RESULTS *(µg/g)*
Petroleum Hydrocarbons (PHCs) and BTEX
1158 Second Line Road, Ottawa

Parameter	MOECC Table 2[1]	SA-1
Sample Date (d/m/y)	Residential	22-Feb-18
Sample Depth (mbsg)		0.05 - 0.15
Benzene	0.21	<0.02
Ethylbenzene	2.1	<0.05
Toluene	2.3	<0.05
Total Xylenes	26	<0.05
F1 (C6-C10)	55	<7
F2 (C10-C16 Hydrocarbons)	98	<4
F3 (C16-C34 Hydrocarbons)	300	<8
F4 (C34-C50 Hydrocarbons)	2800	<6

NOTES:

1 MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA, April 2011, Table 2 Potable Residential SCS, coarse grained soil.*

Shaded Concentration exceeds MOECC Table 2 Residential SCS.

APPENDIX C:
LABORATORY CERTIFICATES OF ANALYSIS

PARACEL LABORATORIES LTD.
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1-800-749-1947
www.paracellabs.com

Certificate of Analysis

exp Services Inc. (Ottawa)

100-2650 Queensview Dr.
Ottawa, ON K2B 8K2
Attn: Mark McCalla

Client PO:
Project: OTT00245054A0
Custody: 115920

Report Date: 28-Feb-2018
Order Date: 22-Feb-2018

Order #: 1808326

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

Paracel ID	Client ID
1808326-01	SA-1

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: exp Services Inc. (Ottawa)
Client PO:

Report Date: 28-Feb-2018
Order Date: 22-Feb-2018
Project Description: OTT00245054A0

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	23-Feb-18	24-Feb-18
PHC F1	CWS Tier 1 - P&T GC-FID	23-Feb-18	24-Feb-18
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	22-Feb-18	24-Feb-18
Solids, %	Gravimetric, calculation	23-Feb-18	23-Feb-18

Certificate of Analysis

Client: exp Services Inc. (Ottawa)

Client PO:

Report Date: 28-Feb-2018

Order Date: 22-Feb-2018

Project Description: OTT00245054A0

	Client ID:	SA-1	-	-	-
	Sample Date:	22-Feb-18	-	-	-
	Sample ID:	1808326-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	86.7	-	-	-
Volatiles					
Benzene	0.02 ug/g dry	<0.02	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
Toluene-d8	Surrogate	109%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	-	-

Certificate of Analysis
Client: exp Services Inc. (Ottawa)
Client PO:

Report Date: 28-Feb-2018
Order Date: 22-Feb-2018
Project Description: OTT00245054A0

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Volatiles									
Benzene	ND	0.02	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: Toluene-d8	*8.77*		*ug/g*		*110*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	15	8	ug/g dry	9			46.0	30	QR-01
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND			0.0	30	
Physical Characteristics									
% Solids	86.1	0.1	% by Wt.	88.3			2.6	25	
Volatiles									
Benzene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*8.01*		*ug/g dry*		*106*	*50-140*			

Certificate of Analysis
Client: exp Services Inc. (Ottawa)
Client PO:

Report Date: 28-Feb-2018
Order Date: 22-Feb-2018
Project Description: OTT00245054A0

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	193	7	ug/g		96.7	80-120			
F2 PHCs (C10-C16)	106	4	ug/g	ND	104	60-140			
F3 PHCs (C16-C34)	226	8	ug/g	9	103	60-140			
F4 PHCs (C34-C50)	164	6	ug/g	ND	117	60-140			
Volatiles									
Benzene	4.08	0.02	ug/g		102	60-130			
Ethylbenzene	3.53	0.05	ug/g		88.3	60-130			
Toluene	3.50	0.05	ug/g		87.6	60-130			
m,p-Xylenes	7.02	0.05	ug/g		87.7	60-130			
o-Xylene	3.57	0.05	ug/g		89.3	60-130			
Surrogate: Toluene-d8	*8.07*		*ug/g*		*101*	*50-140*			

Qualifier Notes:

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

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

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

CCME PHC additional information:

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

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Page 1 of 1

Client Name: EXP Services Inc.	Project Reference: OTT-00245054-A0	**Turnaround Time:**
Contact Name: MARK MCCALLA	Quote #	☐ 1 Day ☐ 3 Day
Address: 2650 QUEENSVIEW DRIVE OTTAWA	PO #	☐ 2 Day ☒ Regular
Telephone:	Email Address: MARK.MCCALLA@EXP.COM	Date Required:

Criteria: ☒ O. Reg. 153/04 (As Amended) Table 6 ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☐ Other:

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

Required Analyses

Paracel Order Number: 1808326

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	BTEX						
1	SA-1	S		3	Feb 22/18	10:30	X								2x 120ml + MEOH vial					
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments:

Method of Delivery: walk-in

Relinquished By (Sign): Mark McCalla	Received by Driver/Depot: Karen Cull	Received at Lab: Rachel Subeat	Verified By:
Relinquished By (Print): MARK MCCALLA	Date/Time: Feb 22/18 10:51	Date/Time: Feb 22/18	Date/Time: 02/22/18 2:58p
Date/Time: Feb 22/18	Temperature: 9.6 °C	Temperature: 9.6 °C 2:36	pH Verified ☒ By: N/A