

**A G E N D A**

**THE ELEVENTH MEETING OF THE COMMITTEE OF ADJUSTMENT  
OF THE CITY OF ST. THOMAS 2018**

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**COMMITTEE ROOM #415  
CITY HALL**

**10:00 A.M.**

**THURSDAY  
NOVEMBER 22, 2018**

**DISCLOSURE OF INTEREST**

**MINUTES**

Confirmation of the minutes of the meeting held on October 11, 2018.

**HEARING OF APPLICATIONS**

**UNFINISHED BUSINESS**

**NEW BUSINESS**

**B07-2018 - 1055 Talbot Street - Talbot Development ULC**

A letter has been received from Matthew Campbell, Zelinka Priamo Ltd. regarding two small changes to the severance application for 1055 Talbot Street. **Pages 2-120**

**Next Meeting**

To be determined.

**ADJOURNMENT**



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-2-

November 15, 2018

Patrick Keenan – Director of Planning and Building Services  
City of St. Thomas- Planning and Building Department  
9 Mondamin St.  
St. Thomas, ON  
N5P 2T9

Dear Mr. Keenan,

**RE: Revised R-Plan and Consent Sketch to Approved Consent to Sever (B07-18)  
1055 Talbot Street (Former Timken site)  
Talbot Development ULC  
Our File: KAM/STT/17-01**

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As discussed with City staff, please find enclosed a revised draft R-Plan and revised Consent Sketch for the above noted Consent to Sever Application, which previously received approval from the Committee of Adjustment to sever the northerly 2.996ha (7.4ac) from the vacant 8.03ha (19.84ac) parcel at 1055 Talbot Street (the "subject lands") on September 27<sup>th</sup>, 2018.

The revised R-Plan and Consent Sketch show an area to be severed of 2.428ha (6.0ac), with a frontage along First Street of 113.27m (371.6ft). The land area to be severed has decreased due to a tenant of the proposed commercial development rescinding their intent to lease space. As such, the purchaser of the lands to be severed requires less land to develop for commercial uses.

A road widening dedication of 2.84m along the east side of First Avenue shown as Parts 2 and 3 on both the draft R-Plan and Consent Sketch. It is also noted that the triangular portion of land at the northwest corner of the subject lands (denoted as Part 21, Plan 11R-7558) is included in the subject lands after further investigation by the surveyor, and is not owned by the abutting property owner as originally understood.

As per the above, please find enclosed the following:

- Two (2) copies of the revised consent sketch; and,
- Two (2) copies of the revised draft reference plan, showing lands to be severed as Part 1.

We trust that the enclosed information is complete and satisfactory, and look forward to a timely approval process. Should you have any questions or require additional information, please feel free to contact our office.

Yours very truly,

ZELINKA PRIAMO LTD.

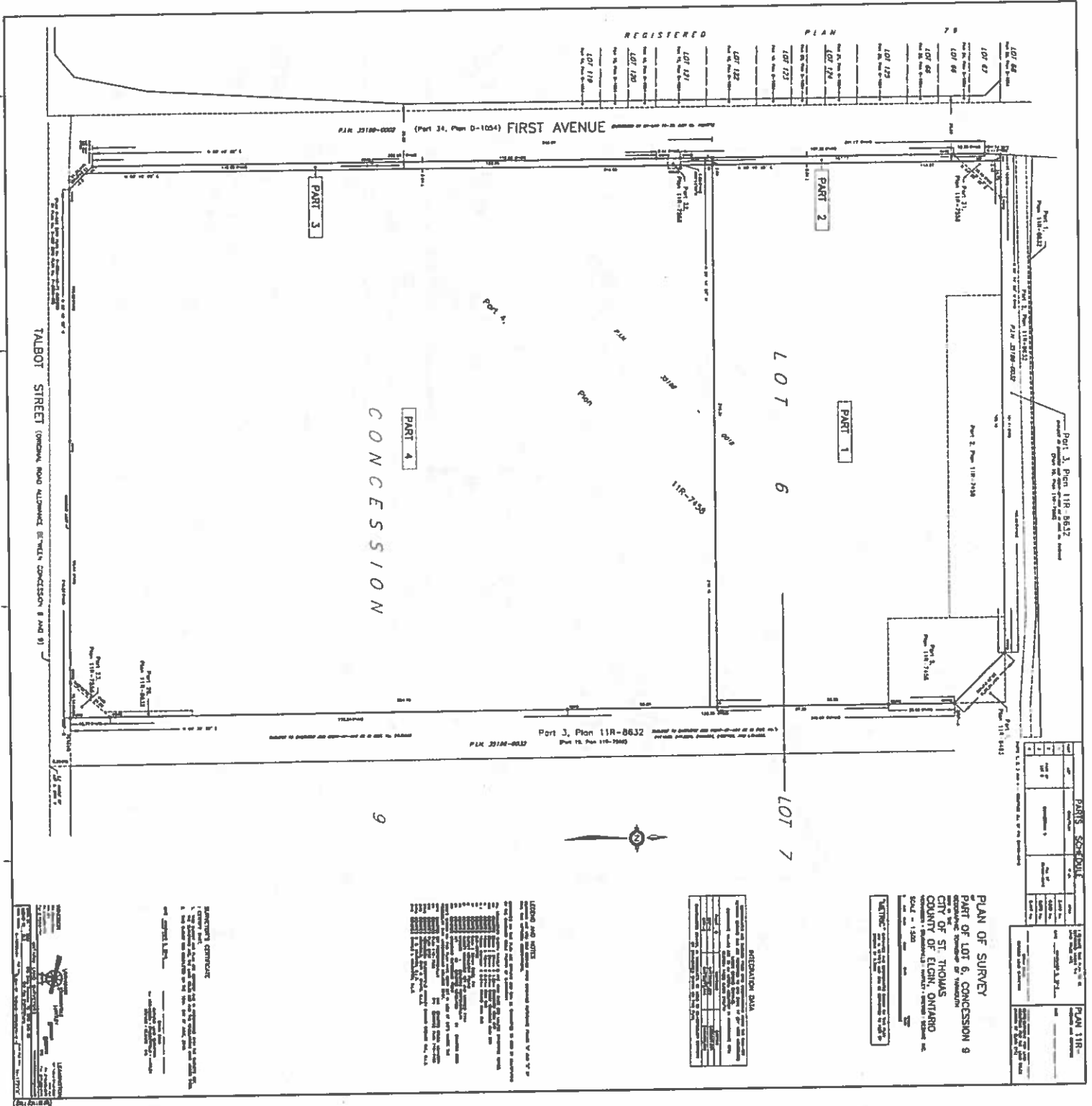
Mathew Campbell, BA, CPT

cc. Michael Kam, Talbot Developments ULC

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Email: zp@zpplan.com • Website: zpplan.com

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REGISTERED PLAN

LOT 124	Part 1, Plan 118-8632
LOT 123	Part 1, Plan 118-8632
LOT 122	Part 1, Plan 118-8632
LOT 121	Part 1, Plan 118-8632
LOT 120	Part 1, Plan 118-8632
LOT 119	Part 1, Plan 118-8632

PARTS SCHEDULE

Part	Description	Area (Acres)	Area (Sq. Ft.)
1	Part 1 of Lot 6, Concession 9	0.10	6,917
2	Part 2 of Lot 6, Concession 9	0.10	6,917
3	Part 3 of Lot 6, Concession 9	0.10	6,917
4	Part 4 of Lot 6, Concession 9	0.10	6,917

**PLAN OF SURVEY**  
**PART OF LOT 6, CONCESSION 9**  
 REPRESENTING TOWNSHIP OF WILKINSON  
 CITY OF ST. THOMAS  
 COUNTY OF ELGIN, ONTARIO  
 COMMENCED BY PLAN 118-8632  
 SCALE = 1:500

METRIC DATA

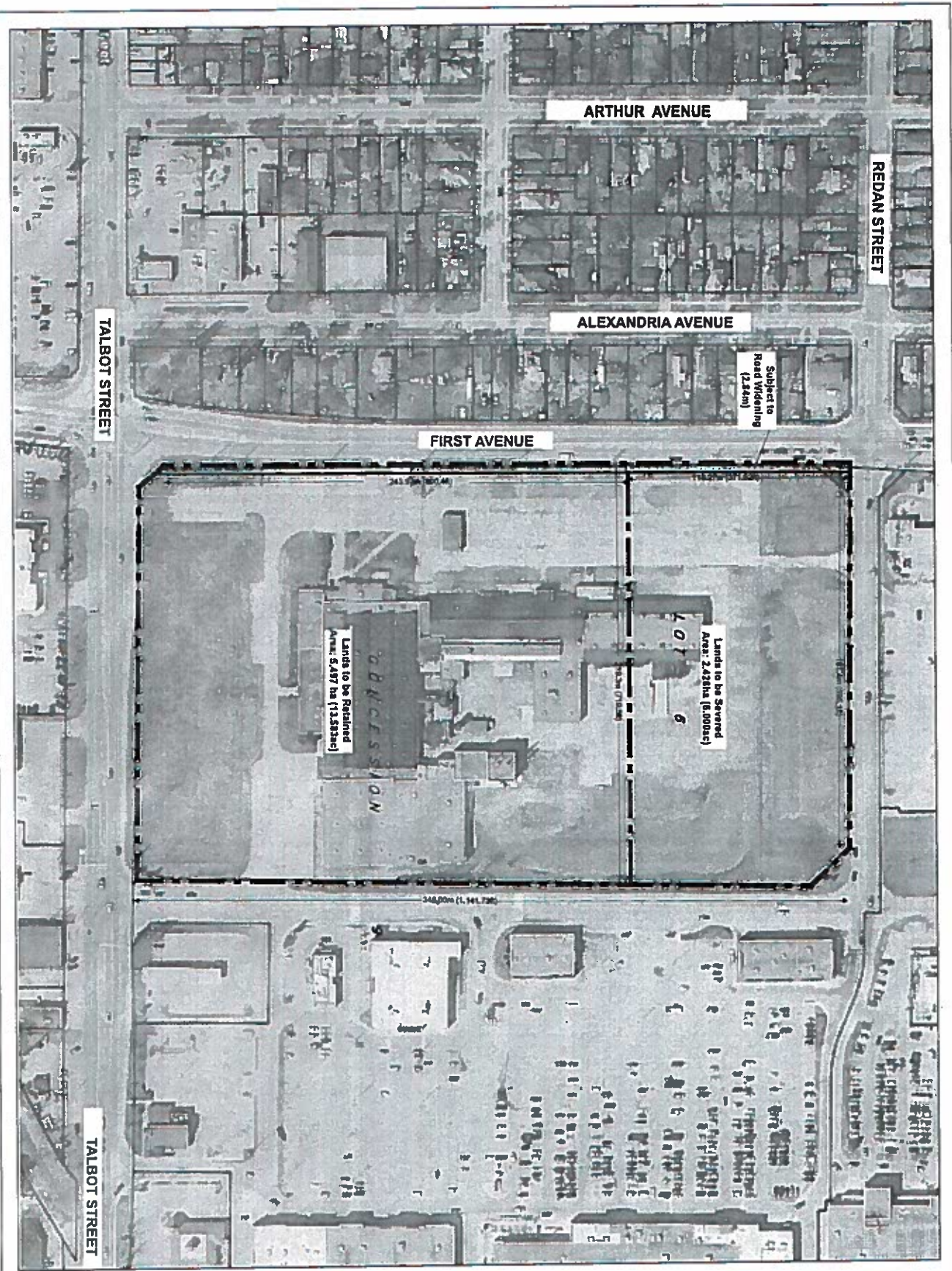
Lot Area (Acres)	0.40
Lot Area (Sq. Ft.)	27,668
Perimeter (Feet)	1,120
Area (Acres)	0.40
Area (Sq. Ft.)	27,668

**LEGEND AND NOTES**  
 1. The boundaries shown on this plan were determined by a traverse survey conducted by the undersigned on the 15th day of August, 1982.  
 2. The bearings and distances were measured and reduced to Mean Sea Level.  
 3. The area of the lot is 0.40 acres, or 27,668 square feet.  
 4. The perimeter of the lot is 1,120 feet.  
 5. The survey was conducted in accordance with the provisions of the Survey Act, R.S.O. 1980, Chapter S.5.

**PLANNING CERTIFICATE**  
 I, the undersigned, being a duly qualified and licensed Professional Engineer in the Province of Ontario, do hereby certify that the above is a true and correct copy of the original plan as filed in my office, and that the same conforms to the requirements of the Survey Act, R.S.O. 1980, Chapter S.5.

**APPROVED AND AUTHORIZED FOR SIGNATURE**  
 Surveyor General of Ontario  
 1982





**CONSENT SKETCH**  
PART OF LOT 6  
CONCESSION 9

(CORPORATE TOWNSHIP OF VANOUNG)  
CITY OF ST. THOMAS  
COUNTY OF ELGIN

**SITE STATISTICS**

Proposed Zone (Retained): MU  
Proposed Zone (Severed): MU  
Total Lot Area: 8,016

Lands to be Retained: 1,216  
Lands to be Severed: 6,800

Lot Area	Proposed	Retained
Lot 6	8,016	6,800
Lot 7	1,216	1,216
Lot 8	1,216	1,216
Lot 9	1,216	1,216
Lot 10	1,216	1,216
Lot 11	1,216	1,216
Lot 12	1,216	1,216
Lot 13	1,216	1,216
Lot 14	1,216	1,216
Lot 15	1,216	1,216
Lot 16	1,216	1,216
Lot 17	1,216	1,216
Lot 18	1,216	1,216
Lot 19	1,216	1,216
Lot 20	1,216	1,216
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Lot 94	1,216	1,216
Lot 95	1,216	1,216
Lot 96	1,216	1,216
Lot 97	1,216	1,216
Lot 98	1,216	1,216
Lot 99	1,216	1,216
Lot 100	1,216	1,216

DRAWING BASED ON CITY OF ST. THOMAS  
BASE MAPS AND DRAFT REFERENCE PLAN

NO.	REVISION	DATE	INITIALS

**TALBOT DEVELOPMENTS U.L.C.**  
1055 TALBOT STREET

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www.zenaka.com  
K04-37717-01

NOVEMBER 2018



## Phase II Environmental Site Assessment



1055 Talbot Street,  
St. Thomas, Ontario

Prepared For

***Talbot Development, ULC***

September 2018

**BAE**

**Environmental**

18 Parkview Ave., Oro Medonte, ON L0L 2E0

Phone 705 715 1881

[envsol@rogers.com](mailto:envsol@rogers.com)

*Providing Environmental Solutions Since 1997!*





September 2018

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## Executive Summary

BAE Environmental (BAE) was retained by *Talbot Development ULC* to conduct a Phase II Environmental Site Assessment (ESA) of the property located at 1055 Talbot Street, St. Thomas, Ontario (Site). The purpose of the Phase II ESA was to verify subsurface soil and groundwater conditions following remediation and verify that the Site meets the applicable MOECC/EPA Table 3 Criteria for Commercial/Industrial/Community property usage.

The Site is a 2.97-hectare (ha) parcel which was previously the north part of an 8.03-hectare, rectangular shaped, parcel of land located on the north side of Talbot Street and east of the intersection with First Avenue in St. Thomas, Ontario.

It is known that the entire 8 ha Property has had several previous ESAs and the north subject Site 2.97 ha section has had remediation completed. The most recent ESA investigation was completed by Pinchin Environmental (Pinchin) in October of 2017. Pinchin had delineated petroleum hydrocarbon (PHC) impairment in the soil and groundwater in the north section of the Site. The delineated impacted area measured approximately 35m x 60m.

BAE completed impacted soil excavation and groundwater remediation from June-August of 2018. Approximately 1,200m<sup>3</sup> of impacted materials were excavated for appropriate offsite disposal to an MOECC Licensed receiver. Any remaining impacted groundwater was treated with a proprietary enzyme and surfactant solution to neutralize any/all contaminants. Dedicated Monitoring Wells in and outside of the impacted area were maintained for ongoing groundwater monitoring during remediation and representative final sampling and independent chemical analysis upon completion.

The current investigation entailed obtaining representative soil samples from the walls and floor of the remedial excavation and test pits advanced outside of this area to verify the remaining soil conditions and obtaining representative groundwater samples from the dedicated Monitoring Wells to verify the remaining groundwater conditions.

In summary, the Environmental Site Assessment results verify there is no remaining impairment associated with current or historical activities at the subject property and has determined that there is no evidence of any offsite impaction, or is likely to impact in the future, any adjacent public Right of Ways at levels in excess of applicable criteria.

**No further environmental investigations are required or recommended at this time.**



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LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Materials
AEC	Area of Environmental Concern
a.k.a.	Also Known As
APEC	Area of Potential Environmental Concern
AST	Aboveground Storage Tank
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CCEA	Central Canada Exhibition Association
CFC	Chlorofluorocarbon
CNSC	Canadian Nuclear Safety Commission
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CSA	Canadian Standards Association
CSFL	Contaminated Site on Federal Land
CWAC	Canadian Women's Army Corporation
CWS	Canada Wide Standards
DSS	Designated Substance Survey
DSHMS	Designated Substance and Hazardous Materials Survey
ESA	Environmental Site Assessment
FIP	Fire Insurance Plan
FOI	Freedom of Information
HCFC	Hydro chlorofluorocarbon
HLUI	Historical Land Use Inventory
HVAC	Heating Ventilation and Air Conditioning
LCP	Lead-Containing Paint
masl	Metres Above Sea Level
mbgl	Metres Below Ground Level
MOE	Ministry of the Environment
MOL	Ministry of Labour
MSDS	Material Safety Data Sheet
MW	Monitoring Well
ODS	Ozone Depleting Substance
OHSA	Occupational Health and Safety Act
OLMS	Old Landfill Management Strategy
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PHC	Petroleum Hydrocarbon
RSC	Record of Site Condition
SCS	Site Condition Standard
TPH	Total Petroleum Hydrocarbons
TSSA	Technical Standards and Safety Authority
UST	Underground Storage Tank
UFFI	Urea Formaldehyde Foam Insulation
VOC	Volatile Organic Compounds
WL	Working Level



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## 2.0 INTRODUCTION

BAE Environmental (BAE) was retained by *Talbot Development ULC* to conduct a Phase II Environmental Site Assessment (ESA) of the property located at 1055 Talbot Street, St. Thomas, Ontario (hereinafter referred to as the "Site"). The purpose of the Phase II ESA was to verify subsurface soil and groundwater conditions following remediation and verify that the Site meets the applicable MOECC/EPA Table 3 Criteria for Commercial/Industrial/Community property usage. A map showing the location of the Site is provided on Figure 1.

The Phase Two ESA was undertaken to assess all areas of actual and/or potential environmental concern and to provide a Phase Two ESA report generally compliant with the requirements of Ontario Regulation 153/04 as amended by Ontario Regulations 511/09 and 179/11 ("O.Reg. 153/04, as amended") and verify that the Site meets the applicable MOECC/EPA Table 3 Criteria for Commercial/Industrial/Community property usage.

### 2.1 Site Description

The Phase Two Property (Site) is the north 2.97-hectare (7.3-acre) parcel which was previously part of a 8.03-hectare (19.84-acre), rectangular shaped, parcel of land located on the north side of Talbot Street and east of the intersection with First Avenue in St. Thomas, Ontario, as shown in Figure 1. Site buildings previously occupied approximately 15,800 square meters of the entire property but have since been removed. The remaining parts of the site comprise asphalt-paved, grass, and gravel surfaced areas.

The municipal address is 1055 Talbot Street, St. Thomas, with Property Identification Number (PIN) 35188-0018. The legal description of the property is Part of Lot 6, Concession 9, Geographic Township of Yarmouth, City of St. Thomas, County of Elgin.

### 2.2 Property Ownership

BAE was commissioned by the property owner, *Talbot Development, ULC*, to carry out this Phase Two ESA in anticipation of the Site being sold.

### 2.3 Current and Proposed Future Uses

The site is anticipated to maintain its current zoning of Commercial/ Industrial/ Community.



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## 2.4 Applicable Site Condition Standards

The terms of reference for the current investigation was conducted generally in accordance with Part XV.1 of the Environmental Protection Act and Ontario Regulation 153/04 (O. Reg. 153/04) - as amended by O. Reg. 511 (July, 2011). All analysis was performed in accordance with O. Reg. 153/04 and compared to Part XV.1 of the *Environmental Protection Act* – Table 3: Generic Site Condition Standards for Use in a Non-Potable Groundwater Condition (July 2011) Criteria. The following rationale was used to determine the applicable site criteria:

**Site Sensitivity:** There are no sensitive environmental receivers identified within 30m of the site. Based on the information gathered during this investigation and previous investigations in the area, there is more than 2 m of overburden at the site.

**Land Use:** Site and surrounding land uses are predominantly commercial/ industrial properties, therefore the site will be considered to be commercial land use.

**Groundwater Use:** This area is serviced by a municipal water supply obtained from Lake Ontario. Based on this situation, the non-potable groundwater criteria would apply.

**Depth and Soil Texture Criteria Selection:** Based upon field observations, and soil grain size analyses conducted by Maxxam Analytics, the site stratigraphy generally comprises clayey silt till. Therefore, for the purpose of this report, the assessment criteria corresponding to fine-medium textured soils were selected for comparison in laboratory analytical results.

Based on the above information, the applicable Environmental Protection Act (EPA) and MOECC site assessment criteria selected for use at this site is the Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition (Table 3) criteria for industrial/commercial/community land uses with medium and fine textured soils.

## 3.0 Background Information

### 3.1 Physical Setting

The subject site is located at a topographic elevation of approximately 235 m above mean sea level. Topography at and in the general vicinity of the Site is relatively flat with a slight southwesterly slope.



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The Phase Two Property is underlain by sediments of glacial origin including the Pleistocene Age Port Stanley Till (Ontario-Erie Lobe), which is described as having a silt to sandy silt matrix becoming silt to silty clay near Lake Erie, strongly calcareous, moderate to low clast content decreasing southward (EcoLog ERIS, August 17, 2012).

Local surficial geologic mapping of the St. Thomas area indicates Late Wisconsin Stage glaciolacustrine sediments, predominately composed of clay and clayey silt, underlie the Phase Two Property.

Bedrock geologic mapping of Southern Ontario indicates that the glacially derived overburden soil at the Site is underlain by Middle Devonian Age limestone, dolostone, and shale of the Dundee Formation.

No water bodies or areas of natural significance were observed on the subject property, or in the Phase One Study Area. The closest water body is an unnamed tributary to Kettle Creek located approximately 1.6 km southwest of the Site.

Previous investigations revealed shallow perched ground water which was measured at depths between 1.28 to 1.34 m in the silty clay fill (upper unit) materials. Ground water was also measured at depths between 1.64 to 7.61 m in the native clayey silt (deeper unit) materials. Previous investigations also revealed that the flow of shallow ground water perched in the silty clay soil appears to be controlled in part by the surface morphology of the native clayey silt soil, which results in a radial shallow ground water flow pattern in the central portion of the Site. In the westerly and southwesterly portions of the Site, local ground water flow directions are inferred to be generally southerly to southwesterly. In the northwesterly portion of the Site, local ground water flow directions are inferred to be generally northwesterly. Typically, and as expected, the local components of shallow ground water flow at the Phase Two Property appear to be consistent with the local direction of downward slope in the surface of the native clayey silt soil.

### **3.2 Past Investigations and Remediation Undertaken**

It is known that the entire Property has had several previous ESAs and the north subject Site section has had remediation completed.

The most recent ESA investigation was completed by Pinchin Environmental (Pinchin) in October of 2017. Pinchin had delineated petroleum hydrocarbon (PHC) impairment in the soil and groundwater in the central section of the Site. The delineated impacted area measured approximately 35m x 60m.

BAE completed impacted soil excavation and groundwater remediation from June-August of 2018. Approximately 1,200m<sup>3</sup> of impacted materials were excavated for



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appropriate offsite disposal to an MOECC Licensed receiver. Any remaining impacted groundwater was treated with a proprietary enzyme and surfactant solution to neutralize any/all contaminants. Dedicated Monitoring Wells (MWs) in and outside of the impacted area were maintained for ongoing groundwater monitoring during treatment and representative final sampling and independent chemical analysis upon completion.

#### 4.0 Scope of the Investigation

##### 4.1 Overview of Site Investigation

The current investigation entailed: (i) reviewing available previous environmental reports; (ii) maintaining representative existing monitoring wells to address all areas of potential environmental concern; (iii) obtaining representative soil samples from the walls and floor of the excavation and Test Pits advanced to verify the remaining soil conditions for the selected parameters of concern (PHCs). (iv) obtaining representative groundwater samples from the dedicated Monitoring Wells to verify the remaining groundwater conditions for the selected parameters of concern (PHCs).

The scope of work for the Phase II ESA included the following tasks:

- Excavating across the Site in the areas of known concern to facilitate the collection of representative soil samples; logging and field screening for evidence of negative impact using visual, olfactory and sample headspace screening methods. Sampling and submitting select soil samples deemed representative of the environmental quality conditions for independent laboratory chemical analyses for suspect COPCs being predominantly PHCs F3 and F4;
- Sampling and submitting select groundwater samples from the dedicated Monitoring Wells deemed representative of the environmental quality conditions for independent laboratory chemical analyses for suspect COPCs being predominantly PHCs F3 and F4;
- Sampling and submitting select groundwater samples from the dedicated Monitoring Wells deemed representative of the environmental quality conditions for independent laboratory chemical analyses for suspect COPCs being predominantly PHCs F3 and F4;
- Comparing the analytical results reported for the groundwater samples to the appropriate generic Site Conditions Standards established under O.Reg. 153/04, as amended, as provided in "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act", 15 April 2011, and,





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• Preparing a report documenting the findings of the Phase II ESA prepared in general accordance with the requirements of Schedule E of O.Reg. 153/04, as amended.

#### **4.2 Media Investigated**

Soil and groundwater sampling and analysis was undertaken to offset potential COPC issues. Sediment was not sampled as sediment was not encountered.

#### **4.3 Deviations from Sampling and Analysis Plan**

No deviations from the sampling and analysis plan occurred during the investigation.

#### **4.4 Impediments**

No impediments were encountered and thus no minor adjustments in sample locations were required.

### **5.0 Investigation Method**

#### **5.1 General**

BAE personnel commenced the onsite investigations in August of 2018, and completed the soil and groundwater sampling, analysis and reporting in September of 2018. Background information was performed to determine parameters of potential concern for the subject and neighbouring properties. From this data it was determined that the predominant potential parameters of concern were PHCs F3 and F4 from previous onsite sources.

#### **5.2 Verification Soil and Groundwater Sampling Program**

Representative soil samples were obtained from the walls and floor of the excavation as well as from test pits advanced across the Site. Logging and field screening for evidence of negative impact using visual, olfactory and sample headspace screening methods were followed. Sampling and submitting select soil samples deemed representative of the environmental quality conditions for independent laboratory chemical analyses for suspect COPCs including PHCs.



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Sampling and submitting select groundwater samples from the dedicated Monitoring Wells deemed representative of the environmental quality conditions for independent laboratory chemical analyses for suspect COPCs including PHCs; Figures 4 and 5 show the monitoring well and soil sample locations.

### 5.3 Soil: Sampling

Soil samples were collected from the walls of the excavation at an average depth of 1.75mbgl which is where the high water table was encountered. Soil samples were collected from the floor of the excavation at an average depth of 2.25mbgl. Soil samples were collected from the from test pits (TPs) advanced across the Site for the purpose of subsurface characterisation and field screening and testing from varying depths between 0.5mbgl and 3.5mbgl. Soil samples were taken at appropriate intervals and obtained with a dedicated hand-held trowel. Each sample was logged with respect to nature, depth, thickness and evidence of impairment. The soil samples were placed in sterile polyethylene soil bags and labelled. The headspace vapours in each soil bag were tested for total petroleum hydrocarbon vapour concentrations using an RKI Eagle, One to Six Gas Portable Monitor and a MiniRae 3000 Portable Handheld VOC Monitor. The RKI Eagle measures total petroleum hydrocarbon vapours in the range of 0ppm to 50,000ppm. The MiniRae 3000 monitors Volatile Organic Compounds (VOCs) using a photo ionization detector (PID) measures VOC vapours in the range of 0ppm to 15,000ppm. All samples registered 0ppm on the Eagle. Samples registered between 1 and 1.8ppm with the MiniRae 3000. This field screening process indicated no volatile gasoline/diesel/solvent impairment in the surface or subsurface soils in these areas.

As a tertiary onsite verification of the soil conditions, twenty representative samples were removed and tested using the Petroflag Turbidimetric Screening Method For Total Recoverable Petroleum Hydrocarbons in Soil - Official Method US EPA SW-846 Method 9074. All samples were <20 ppm which indicated that there was no petroleum in these samples.

All soil sampling equipment (auger tips, stainless steel trowels, spatulas, etc.) was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination.

Decontamination activities included:

- Physical removal of any adhered debris;
- Wash/scrub in soap solution;
- Distilled water rinse; and
- Air dry.



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#### **5.4 Field Screening Measurements**

Soil samples were collected for the purpose of subsurface characterisation and field screening and testing. All soil samples were screened in the field for gross evidence of negative environmental impact including staining and odours. Each sample was logged with respect to nature, depth, thickness and evidence of impairment. The soil samples were placed in sterile polyethylene soil bags and labelled. The headspace vapours in each soil bag were tested for total petroleum hydrocarbon vapour concentrations using an RKI Eagle, One to Six Gas Portable Monitor. The RKI Eagle measures total petroleum hydrocarbon vapours in the range of 0ppm to 50,000ppm.

Field analysis was also performed for lead content in the soil. Representative soil samples were obtained and field tested using Leadcheck Lead Test Kits with no indication of lead in any of these samples.

As a tertiary onsite verification of the soil conditions, representative samples were removed and tested using the Petroflag Turbidimetric Screening Method For Total Recoverable Petroleum Hydrocarbons in Soil - Official Method US EPA SW-846 Method 9074.

#### **5.5 Ground Water: Field Measurement of Water Quality Parameters**

Ground water monitoring, including measuring depth to the static water level and assessing the presence/absence of measurable accumulations of LPH, was conducted and included all dedicated MWs previously advanced as part of this investigation. Free phase LPH layering was not detected in any of the dedicated Monitoring Wells installed at the Site.

#### **5.6 Ground Water: Sampling**

Groundwater samples were obtained from the eleven dedicated monitoring wells. These were the areas most likely to exhibit concerns if they existed as they were under or adjacent to potential concerns.

Water samples were collected directly into laboratory supplied sample containers preinoculated with any necessary preservatives. Dedicated (one pair per sample), disposable nitrile gloves were used throughout the proceedings. Vials that contained samples to be analyzed for volatile compounds were inverted after filling and inspected to ensure that no head space was present in any vial. Samples were placed in a cooler and stored on ice until delivered to the analytical laboratory. The



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water samples were analyzed for the selected parameters as outlined in the following tables.

### 5.7 Sediment: Sampling

No sediment sampling was conducted as part of this investigation as no sediment was encountered.

### 5.8 Analytical Testing

All laboratory analyses were completed by an independent, accredited lab, ALS Laboratory Group of Richmond Hill/ Waterloo, Ontario (ALS). ALS is a CAEAL Registered and Accredited laboratory according to O. Reg. 153/04 section 47 (1) and ALS used the analytical methods as described in *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act* (MOE 2004, O. Reg. 153/04 section 47 (2)). Representative soil and water samples were submitted to ALS Environmental Laboratory for independent chemical analysis of the Ontario Regulation 511/010 Volatilic Organic Compounds (VOCs) Parameters, the F1, F2, F3 and F4 Petroleum Hydrocarbon Fractions (PHCs), the Polycyclic Aromatic Hydrocarbons (PAHs), the R511 Dissolved Metals / Standard Metal Scan Parameters and the SAR Parameters.

### 5.9 Quality Assurance and Quality Control Measures

A strict Quality Assurance/Quality Control (QA/QC) program was implemented and maintained throughout the project to ensure the Site data are representative of the actual Site conditions. The QA/QC program provides a method of documented checks to assess the precision and accuracy of collected data. The QA/QC program includes a set of standard procedures or protocols to be followed throughout the investigations. To this end, BAE field and QA/QC protocols have been developed to meet or exceed those defined in the MOE documents entitled "*Guideline for Phase II Environmental Site Assessments in Ontario*" (Draft, March 2006) and "*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*" (1996) and Canadian Council of Ministers of the Environment (CCME) "*Guidance Manual Sampling, Analysis, and Data Management for Contaminated Sites*" (1993). The field QA/QC program included the following components:

- 1) The use of personnel protective equipment including hard hats, safety glasses, safety work boots, and chemically resistant latex/nitrile gloves for sample handling;



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- 2) Thorough documentation of all field activities and sample handling practices including field notes, chain of custody forms, memos to file, etc.;
- 3) Thorough decontamination of all non-dedicated sampling equipment employed in all investigation phases;
- 4) The use of laboratory analytical protocols and method detection limits that have been established in accordance with regulatory requirements of the Province of Ontario;
- 5) The RKI Eagle was re-calibrated to Hexane during the planning process;
- 6) The Petroflag Turbidimetric Screening Method For Total Recoverable Petroleum Hydrocarbons in Soil - Official Method US EPA SW-846 Method 9074 was re-calibrated with the appropriate blanks and standards (each 10 samples) prior to and during usage in the field;
- 7) The MiniRae 3000 Portable Handheld VOC Monitor was calibrated using isobutylene calibration gas prior to use; and,
- 8) The ALS Quality Control Report was provided by ALS at the request of BAE.

ALS includes comprehensive QC checks with every analysis to ensure high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

The primary sample fractions were placed in 200 ml sample jars with Teflon-lined lids or were cored and methanol reserved (samples for VOC and PHC F1 only) and subsequently stored in coolers on ice for future potential laboratory analysis. The duplicate sample fractions were placed in "Ziploc" sample bags and stored at ambient temperature for subsequent field vapour screening purposes. All soil samples were collected in accordance with strict environmental sampling protocols to minimize loss of volatile organics and to ensure reliable and representative results. Disposable nitrile gloves were used and replaced between the handling of successive samples. All soil sampling equipment (auger tips, stainless steel trowels, spatulas, etc.) was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination.

Decontamination activities included:

- Physical removal of any adhered debris;
- Wash/scrub in "Alconox" soap solution;





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- Distilled water rinse;
- Methanol rinse; and
- Air dry.

Ground water samples were collected directly into laboratory supplied sample containers preinoculated with any necessary preservatives. Dedicated (one pair per sample), disposable nitrile gloves were used throughout the proceedings. Vials that contained samples to be analyzed for volatile compounds were inverted after filling and inspected to ensure that no head space was present in any vial. Samples were placed in a cooler and stored on ice until delivered to the analytical laboratory.

All sample containers and preservatives, where applicable, were supplied by the laboratory and were consistent with the specifications provided in Tables A (soil/sediment) and B (ground water) of the Analytical Protocol (MOE, 2011e). Similarly, all samples were placed on ice in coolers after collection to meet the storage requirements of the Analytical Protocol (MOE, 2011e). All samples were labelled with unique identifiers indicating the borehole/monitoring well of origin and depth interval (soil samples). All samples were transported by BAE staff directly to the laboratory under continuous Chain of Custody documentation.

Each Chain of Custody form had a unique serial number. No deviations from the sampling and analysis plan occurred.

## 6.0 Review and Evaluation

### 6.1 Geology

The subject site is located at a topographic elevation of approximately 235 m above mean sea level. Topography at and in the general vicinity of the Site is relatively flat with a slight southwesterly slope.

The Phase Two Property is underlain by sediments of glacial origin including the Pleistocene Age Port Stanley Till (Ontario-Erie Lobe), which is described as having a silt to sandy silt matrix becoming silt to silty clay near Lake Erie, strongly calcareous, moderate to low clast content decreasing southward (EcoLog ERIS, August 17, 2012).

Local surficial geologic mapping of the St. Thomas area indicates Late Wisconsin Stage glaciolacustrine sediments, predominately composed of clay and clayey silt, underlie the Phase Two Property.



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Bedrock geologic mapping of Southern Ontario indicates that the glacially derived overburden soil at the Site is underlain by Middle Devonian Age limestone, dolostone, and shale of the Dundee Formation.

No water bodies or areas of natural significance were observed on the subject property, or in the Phase One Study Area. The closest water body is an unnamed tributary to Kettle Creek located approximately 1.6 km southwest of the Site.

Previous investigations revealed shallow perched ground water which was measured at depths between 1.28 to 1.34 m in the silty clay fill (upper unit) materials. Ground water was also measured at depths between 1.64 to 7.61 m in the native clayey silt (deeper unit) materials. Previous investigations also revealed that the flow of shallow ground water perched in the silty clay soil appears to be controlled in part by the surface morphology of the native clayey silt soil, which results in a radial shallow ground water flow pattern in the central portion of the Site. In the westerly and southwesterly portions of the Site, local ground water flow directions are inferred to be generally southerly to southwesterly. In the northwesterly portion of the Site, local ground water flow directions are inferred to be generally northwesterly. Typically, and as expected, the local components of shallow ground water flow at the Phase Two Property appear to be consistent with the local direction of downward slope in the surface of the native clayey silt soil.

The following general soil types were encountered in the excavation and test pit borings performed at the site:

Brown Sand, gravel, cobble and boulders, some silt and clay was encountered beneath the surface down to 2.5m. This material was in a loose to compact state. Silt with clay followed this to depth.

Detailed description of the type of soil layers encountered during previous drilling is given in the 2017 borehole logs (*Appendix F*). The lines designating the interface between soil strata on the boring logs represent approximate boundaries; transition between materials may be gradual.

## 6.2 Ground Water: Elevations and Flow Direction

Based on the overburden ground water elevations and the Site topography, the ground water in the overburden layer is interpreted in a radial pattern flowing from the centre of the property outwards (in all directions). The ground water elevations and interpreted flow directions taken from a 2013 investigation are shown in Figure 6.

## 6.3 Ground Water: Hydraulic Gradients

Based on grain size analysis testing, the hydraulic conductivity of the silty clay fill materials is  $1.3 \times 10^{-6}$  m/s and the clayey silt till is  $0.6 \times 10^{-8}$  m/s. Therefore, the



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soil's ability to transmit water across the site (in the fill or native till materials) is very slow and verifies that the potential for migration of contamination is limited on the Phase Two Property.

#### **6.4 Fine-Medium Soil Texture**

Based upon field observations, and soil grain size analyses conducted by Maxxam Analytics, the site stratigraphy generally comprises clayey silt till. Therefore, for the purpose of this report, the assessment criteria corresponding to fine-medium textured soils were selected for comparison in laboratory analytical results.

#### **6.5 Soil: Field Screening**

Soil samples were collected from each area for the purpose of subsurface characterisation and field screening and testing. Soil samples were taken at appropriate intervals and obtained from the auger tip. Each sample was logged with respect to nature, depth, thickness and evidence of impairment. The soil samples were placed in sterile polyethylene soil bags and labelled. The headspace vapours in each soil bag were tested for total petroleum hydrocarbon vapour concentrations using an RKI Eagle, One to Six Gas Portable Monitor and a MiniRae 3000 Portable Handheld VOC Monitor. The RKI Eagle measures total petroleum hydrocarbon vapours in the range of 0ppm to 50,000ppm. The MiniRae 3000 monitors Volatile Organic Compounds (VOCs) using a photo ionization detector (PID) measures VOC vapours in the range of 0ppm to 15,000ppm. All samples registered 0ppm on the Eagle.

Samples registered between 1 and 1.8ppm on the MiniRae. This field screening process indicated no volatilis gasoline/diesel/solvent impairment in the surface or subsurface soils in these areas. As a tertiary onsite verification of the soil conditions, representative samples were tested using the Petroflag Turbidimetric Screening Method For Total Recoverable Petroleum Hydrocarbons in Soil - Official Method US EPA SW-846 Method 9074. All samples measured <25ppm.

#### **6.6 Soil Quality**

Representative soil samples were submitted to ALS Environmental Laboratory for independent chemical analysis of the Ontario Regulation 511/010 Volatilic Organic Compounds (VOCs) Parameters, the F1, F2, F3 and F4 Petroleum Hydrocarbon Fractions (PHCs), the Polycyclic Aromatic Hydrocarbons (PAHs), the R511 Dissolved Metals / Standard Metal Scan Parameters and ABN-Calculated Parameters.

All final analyzed samples submitted for chemical analysis had measured concentrations below Table 3 SCS for commercial land use.



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## 6.7 Ground Water Quality

Representative groundwater samples were submitted to ALS Environmental Laboratory for independent chemical analysis of the Ontario Regulation 511/010 Volatile Organic Compounds (VOCs) Parameters and the F1, F2, F3 and F4 Petroleum Hydrocarbon Fractions (PHCs). All final analyzed samples submitted for chemical analysis had measured concentrations below Table 3 SCS for commercial land use.

## 6.8 Sediment Quality

No sediment sampling was conducted as part of this investigation as no sediment was encountered.

## 6.9 Quality Assurance Program and Quality Control Results

The laboratory included QA/QC results with the certificate of analysis as described in Section 5.12. The Relative Percentage Difference (RPD) values are within acceptable ranges for the industry and are reported in Appendix D. The laboratory reported acceptable QA/QC results.

## 7.0 CONCLUSIONS

The investigation program included the collection of representative soil and groundwater samples in areas deemed most likely to have been affected by potentially contaminating activities. Representative soil samples were collected in locations selected to be most likely to contain contaminated materials. Representative groundwater samples were collected in locations selected to be most likely to contain contaminated materials. The purpose of the study was to investigate the potential for the presence of any remaining on-site impairment related to potential concerns stemming from previous onsite sources.

Soil and Groundwater samples were compared to the applicable Soil and Groundwater Standards - Part XV.1 of the *Environmental Protection Act* – Table 3: Generic Site Condition Standards for Use in a Non-Potable Groundwater Condition (July 2011). The results of the groundwater analyses indicated that all samples submitted met the applicable Table 3 SCS.

Based on the findings of our soil and groundwater sampling and analysis program, contamination was not identified on the property for the parameters of concern above the applicable EPA/MOECC criteria. No further investigations are required or recommended at this time.



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## 7.1 LIMITATIONS

1. This assessment was conducted in accordance with generally accepted engineering standards. It is possible that materials other than those described in this report are present at the site. The client acknowledges that no assessment can necessarily identify the existence of all contaminants, potential contaminants or environmental conditions;
2. This report was prepared for the sole and exclusive use of *Talbot Development, ULC*. BAE Environmental accepts no responsibility or liability for any loss, damage, expense, fine or any other claim of any nature or type, including any liability or potential liability arising from its own negligence, for any use of this report or reliance on it, in whole or in part, by anyone other than *Talbot Development, ULC*;
3. There is no representation, warranty or condition, express or implied, by BAE Environmental or its officers, directors, employees or agents that this assessment has identified all contaminants, potential contaminants or environmental conditions at the site or that the site is free from contamination, potential contaminants or environmental conditions other than those noted in this report;
4. This assessment has been completed from information and documentation described in this report. We have assumed that any such information and documentation is accurate and complete. We can accept no responsibility or liability for any errors, deficiencies or inaccuracies in this report arising from errors or omissions in the information and documentation provided by others;
5. This assessment was based on information and the results of investigations obtained on the dates specified. BAE Environmental accepts no responsibility or liability for any changes or potential changes in the condition of the site subsequent to the date of our investigations;
6. This assessment pertains only to the site specifically described in this report and not to any adjacent or other property;
7. This assessment does not include, nor is it intended to include, any opinion regarding the suitability of any structure on the site for any particular function, or the geotechnical conditions on the site, with the exception of how they may identify with environmental concerns. Inspections do not include compliance with building, gas, electrical, fuel safety or boiler codes, or any other federal, provincial or municipal codes not associated with environmental concerns; and,
8. This report is not to be reproduced or released to any other party, other than *Talbot Development, ULC* in whole or in part, without the express written consent of BAE Environmental.





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**7.2 QUALIFICATIONS OF ASSESSORS**

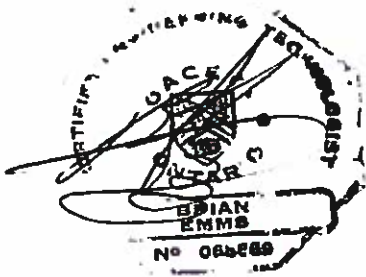
This investigation was completed by Brian A. Emms, C.E.T. and reviewed by G. Jan Van Iterson, P. Eng. Mr. Van Iterson is registered with the Ministry of Environment as a Qualified Person as per Ontario Regulation 153/04. Jointly, the above have performed hundreds of ESAs and site remediation for various financial institutions, municipal governments, insurance companies, law firms and the private sector.

**7.3 SIGNATURES**

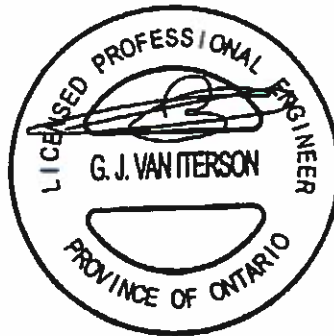
The undersigned carried out the Phase Two ESA documented herein, including developing the Sampling and Analysis Plan, supervising all field activities, reviewing the resulting data and preparing this report, including the findings and conclusions presented herein, acting either as a Qualified Person or under the supervision of a Qualified Person. Any practice of geoscience documented within this report was undertaken by or under the supervision of a Professional Engineer licensed in the Province of Ontario.

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Respectfully submitted,  
**BAE Environmental**



Brian A. Emms, C.E.T.  
Senior Env. Technologist



G. Jan Van Iterson, P. Eng.<sup>QP</sup>  
Associate



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## 8.0 REFERENCES

Ministry of the Environment; (2004a): "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the *Environmental Protection Act*", March 9, 2004.

Ministry of the Environment; (2004e): "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the *Environmental Protection Act*", March 9, 2004.

Ministry of the Environment; (2011a): "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the *Environmental Protection Act*", April 15, 2011.

## 9.0 FIGURES AND TABLES

TABLE 1: GROUNDWATER CHEMICAL ANALYSES – VOCs

TABLE 2: GROUNDWATER CHEMICAL ANALYSES –PHCs

TABLE 3: SOIL CHEMICAL ANALYSES- Metals and SAR

TABLE 4: SOIL CHEMICAL ANALYSES- VOCs

TABLE 5: SOIL CHEMICAL ANALYSES- PHCs

TABLE 6: SOIL CHEMICAL ANALYSES- PAHs

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FIGURE 2: Site Layout

FIGURE 3: Excavation and Remediated Area

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FIGURE 5: Soil Sample Locations

FIGURE 6: GW Flow Direction

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Appendix A Sampling and Analysis Plan

Appendix B Part XV.1 of the *Environmental Protection Act* Table 9: Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Groundwater Condition

Appendix C Field Screening Apparatus

Appendix Laboratory Certificates of Analysis

Appendix E Borehole Records

Appendix F Qualifications of Assessors



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**TABLE 1: GROUNDWATER CHEMICAL ANALYSES - VOCs**

PARAMETER	CRITERIA	MDL	MW17-3	MW17-4	SH-05
Acetone	130000	30	<30	<30	<30
Benzene	430	0.50	<0.50	<0.50	<0.50
Bromodichloromethane	85000	2.0	<2.0	<2.0	<2.0
Bromoform	770	5.0	<5.0	<5.0	<5.0
Bromomethane	56	0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	8.4	0.20	<0.20	<0.20	<0.20
Chlorobenzene	630	0.50	<0.50	<0.50	<0.50
Dibromochloromethane	82000	2.0	<2.0	<2.0	<2.0
Chloroform	22	1.0	17.8	<1.0	10.8
1,2-Dibromoethane	0.83	0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	9600	0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	9600	0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	67	0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	4400	2.0	<2.0	<2.0	<2.0
1,1-Dichloroethane	3100	0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	12	0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
1,3-Dichloropropene (cis & trans)	45	0.50	<0.50	<0.50	<0.50
Methylene Chloride	5500	5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	140	0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	<0.30
Ethylbenzene	2300	0.50	<0.50	<0.50	<0.50
n-Hexane	520	0.50	<0.50	<0.50	<0.50
Methyl Ethyl Ketone	1500000	20	114	<20	<20
Methyl Isobutyl Ketone	580000	20	<20	<20	<20
MTBE	1400	2.0	<2.0	<2.0	<2.0
Styrene	9100	0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	28	0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	*17	0.50	<0.50	<0.50	<0.50
Toluene	18000	0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	6700	0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	30	0.50	<0.50	<0.50	<0.50
Trichloroethylene	17	0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	2500	5.0	<5.0	<5.0	<5.0



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PARAMETER	CRITERIA	MDL	MW17-3	MW17-4	SH-05
Vinyl chloride	1.7	0.50	<0.50	<0.50	<0.50
o-Xylene		0.50	<0.50	<0.50	<0.50
m+p-Xylenes		0.50	<0.50	<0.50	<0.50
Xylenes (Total)	4200	0.71	<0.71	<0.71	<0.71

PARAMETER	CRITERIA	MDL	SH-17	SH-21	SH-22
Acetone	130000	30	<30	<30	<30
Benzene	430	0.50	<0.50	<0.50	<0.50
Bromodichloromethane	85000	2.0	<2.0	<2.0	<2.0
Bromoform	770	5.0	<5.0	<5.0	<5.0
Bromomethane	56	0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	8.4	0.20	<0.20	<0.20	<0.20
Chlorobenzene	630	0.50	<0.50	<0.50	<0.50
Dibromochloromethane	82000	2.0	<2.0	<2.0	<2.0
Chloroform	22	1.0	<1.0	<1.0	<1.0
1,2-Dibromoethane	0.83	0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	9600	0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	9600	0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	67	0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	4400	2.0	<2.0	<2.0	<2.0
1,1-Dichloroethane	3100	0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	12	0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
1,3-Dichloropropene (cis & trans)	45	0.50	<0.50	<0.50	<0.50
Methylene Chloride	5500	5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	140	0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	<0.30
Ethylbenzene	2300	0.50	<0.50	<0.50	<0.50
n-Hexane	520	0.50	<0.50	<0.50	<0.50
Methyl Ethyl Ketone	1500000	20	<20	<20	<20
Methyl Isobutyl Ketone	580000	20	<20	<20	<20
MTBE	1400	2.0	<2.0	<2.0	<2.0
Styrene	9100	0.50	<0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	28	0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	*17	0.50	<0.50	<0.50	<0.50



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PARAMETER	CRITERIA	MDL	SH-17	SH-21	SH-22
Toluene	18000	0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	6700	0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	30	0.50	<0.50	<0.50	<0.50
Trichloroethylene	17	0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	2500	5.0	<5.0	<5.0	<5.0
Vinyl chloride	1.7	0.50	<0.50	<0.50	<0.50
o-Xylene		0.50	<0.50	<0.50	<0.50
m+p-Xylenes		0.50	<0.50	<0.50	<0.50
Xylenes (Total)	4200	0.71	<0.71	<0.71	<0.71

PARAMETER	CRITERIA	MDL	SH-23	SH-35	SH-36
Acetone	130000	30	<30	<30	<30
Benzene	430	0.50	<0.50	<0.50	<0.50
Bromodichloromethane	85000	2.0	<2.0	7.3	<2.0
Bromoform	770	5.0	<5.0	<5.0	<5.0
Bromomethane	56	0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	8.4	0.20	<0.20	<0.20	<0.20
Chlorobenzene	630	0.50	<0.50	<0.50	<0.50
Dibromochloromethane	82000	2.0	<2.0	2.8	<2.0
Chloroform	22	1.0	<1.0	4.9	<1.0
1,2-Dibromoethane	0.83	0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	9600	0.50	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	9600	0.50	<0.50	<0.50	<0.50
1,4-Dichlorobenzene	67	0.50	<0.50	<0.50	<0.50
Dichlorodifluoromethane	4400	2.0	<2.0	<2.0	<2.0
1,1-Dichloroethane	3100	0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	12	0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
cis-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	<0.50
1,3-Dichloropropene (cis & trans)	45	0.50	<0.50	<0.50	<0.50
Methylene Chloride	5500	5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	140	0.50	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	<0.30
trans-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	<0.30
Ethylbenzene	2300	0.50	<0.50	<0.50	<0.50
n-Hexane	520	0.50	<0.50	<0.50	<0.50
Methyl Ethyl Ketone	1500000	20	<20	<20	<20
Methyl Isobutyl Ketone	580000	20	<20	<20	<20
MTBE	1400	2.0	<2.0	<2.0	<2.0
Styrene	9100	0.50	<0.50	<0.50	<0.50



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PARAMETER	CRITERIA	MDL	SH-23	SH-35	SH-36
1,1,1,2-Tetrachloroethane	28	0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	*17	0.50	<0.50	<0.50	<0.50
Toluene	18000	0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	6700	0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	30	0.50	<0.50	<0.50	<0.50
Trichloroethylene	17	0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	2500	5.0	<5.0	<5.0	<5.0
Vinyl chloride	1.7	0.50	<0.50	<0.50	<0.50
o-Xylene		0.50	<0.50	<0.50	<0.50
m+p-Xylenes		0.50	<0.50	<0.50	<0.50
Xylenes (Total)	4200	0.71	<0.71	<0.71	<0.71

PARAMETER	CRITERIA	MDL	SH-44	SH-45	
Acetone	130000	30	<30	<30	
Benzene	430	0.50	<0.50	<0.50	
Bromodichloromethane	85000	2.0	<2.0	<2.0	
Bromoform	770	5.0	<5.0	<5.0	
Bromomethane	56	0.50	<0.50	<0.50	
Carbon tetrachloride	8.4	0.20	<0.20	<0.20	
Chlorobenzene	630	0.50	<0.50	<0.50	
Dibromochloromethane	82000	2.0	<2.0	<2.0	
Chloroform	22	1.0	<1.0	<1.0	
1,2-Dibromoethane	0.83	0.20	<0.20	<0.20	
1,2-Dichlorobenzene	9600	0.50	<0.50	<0.50	
1,3-Dichlorobenzene	9600	0.50	<0.50	<0.50	
1,4-Dichlorobenzene	67	0.50	<0.50	<0.50	
Dichlorodifluoromethane	4400	2.0	<2.0	<2.0	
1,1-Dichloroethane	3100	0.50	<0.50	<0.50	
1,2-Dichloroethane	12	0.50	0.94	<0.50	
1,1-Dichloroethylene	17	0.50	<0.50	<0.50	
cis-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	
trans-1,2-Dichloroethylene	17	0.50	<0.50	<0.50	
1,3-Dichloropropene (cis & trans)	45	0.50	<0.50	<0.50	
Methylene Chloride	5500	5.0	<5.0	<5.0	
1,2-Dichloropropane	140	0.50	<0.50	<0.50	
cis-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	
trans-1,3-Dichloropropene	NV	0.30	<0.30	<0.30	
Ethylbenzene	2300	0.50	<0.50	<0.50	



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PARAMETER	CRITERIA	MDL	SH-44	SH-45	
n-Hexane	520	0.50	<0.50	<0.50	
Methyl Ethyl Ketone	1500000	20	<20	<20	
Methyl Isobutyl Ketone	580000	20	<20	<20	
MTBE	1400	2.0	<2.0	<2.0	
Styrene	9100	0.50	<0.50	<0.50	
1,1,1,2-Tetrachloroethane	28	0.50	<0.50	<0.50	
1,1,2,2-Tetrachloroethane	15	0.50	<0.50	<0.50	
Tetrachloroethylene	*17	0.50	<0.50	<0.50	
Toluene	18000	0.50	<0.50	<0.50	
1,1,1-Trichloroethane	6700	0.50	<0.50	<0.50	
1,1,2-Trichloroethane	30	0.50	<0.50	<0.50	
Trichloroethylene	17	0.50	<0.50	<0.50	
Trichlorofluoromethane	2500	5.0	<5.0	<5.0	
Vinyl chloride	1.7	0.50	<0.50	<0.50	
o-Xylene		0.50	<0.50	<0.50	
m+p-Xylenes		0.50	<0.50	<0.50	
Xylenes (Total)	4200	0.71	<0.71	<0.71	

All values in ug/l - ppb - parts per billion MDL- Method Detection Limit, N/V - No Value. \*Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011).

**TABLE 2: GROUNDWATER CHEMICAL ANALYSES –PHCs F1, F2, F3, F4**

PARAMETER	CRITERIA	MDL	MW17-3	MW17-4	SH-05	SH-17
PHCs						
F1 (C6-C10)	750	25	<25	<25	<25	<25
F1-BTEX	750	25	<25	<25	<25	<25
F2 (C10-C16)	150	100	<100	<100	<100	<100
F3 (C16-C34)	500	250	<250	<250	<250	<250
F4 (C34-C50)	500	250	<250	<250	<250	<250
Total PHCs		250	<250	<250	<250	<250

PARAMETER	CRITERIA	MDL	SH-21	SH-22	SH-23	SH-35
PHCs						
F1 (C6-C10)	750	25	<25	<25	<25	<25
F1-BTEX	750	25	<25	<25	<25	<25
F2 (C10-C16)	150	100	<100	<100	<100	<100
F3 (C16-C34)	500	250	<250	<250	<250	<250
F4 (C34-C50)	500	250	<250	<250	<250	<250
Total PHCs		250	<250	<250	<250	<250



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PARAMETER	CRITERIA	MDL	SH-36	SH-44	SH-45	SH-35
PHCs						
F1 (C6-C10)	750	25	<25	<25	<25	<25
F1-BTEX	750	25	<25	<25	<25	<25
F2 (C10-C16)	150	100	<100	<110	110	110
F3 (C16-C34)	500	250	<250	<250	<250	<250
F4 (C34-C50)	500	250	<250	<250	<250	<250
Total PHCs		250	<250	<250	<250	<250

All values in ug/l - ppb - parts per billion MDL- Method Detection Limit, N/V - No Value. \*Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011).

**TABLE 3: SOIL CHEMICAL ANALYSIS- METALS and SAR**

PARAMETER:	CRITERIA	MDL	TP18-2	TP18-3	TP18-4	TP8-7
Antimony (Sb)	50	1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	18	1.0	4.3	4.9	5.0	4.0
Barium (Ba)	670	1.0	59.8	170	62.9	109
Beryllium (Be)	10	0.50	<0.50	0.93	<0.50	0.68
Boron (B)	120	5.0	7.9	17.1	8.2	11.8
Cadmium (Cd)	1.9	0.50	<0.50	<0.50	<0.50	<0.50
Chromium (Cr)	160	1.0	16.4	31.2	17.7	20.8
Cobalt (Co)	100	1.0	7.8	14.1	8.2	9.6
Copper (Cu)	300	1.0	22.8	25.1	26.9	19.3
Lead (Pb)	120	1.0	8.1	11.2	7.6	8.2
Molybdenum (Mo)	40	1.0	<1.0	<1.0	<1.0	<1.0
Nickel (Ni)	340	1.0	18.3	33.0	18.3	21.8
Selenium (Se)	5.5	1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	50	0.20	<0.20	<0.20	<0.20	<0.20
Thallium (Tl)	3.3	0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	33	1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	86	1.0	28.5	42.5	29.5	31.8
Zinc (Zn)	340	0.10	45.2	73.8	46.2	50.3
SAR	12	0.10	0.77		0.79	

**TABLE 4: SOIL CHEMICAL ANALYSES - VOCs**

PARAMETER	CRITERIA A	MDL	F18-1	F18-2	F18-4	EW18-3
Acetone	28	0.50	<0.50	<0.50	<0.50	<0.50
Benzene	0.4	0.020	<0.020	<0.020	<0.020	<0.020
Bromodichloromethane	1.9	0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	1.7	0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	0.05	0.050	<0.050	<0.050	<0.050	<0.050



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PARAMETER	CRITERIA A	MDL	F18-1	F18-2	F18-4	EW18-3
Carbon tetrachloride	0.71	0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	2.7	0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	2.9	0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	0.18	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dibromoethane	0.05	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	1.7	0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	12	0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.57	0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	25	0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	0.6	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.05	0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.48	0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	2.5	0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	2.5	0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichloropropene (cis & trans)	0.081	0.042	<0.042	<0.042	<0.042	<0.042
Methylene Chloride	2	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.68	0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene		0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene		0.030	<0.030	<0.030	<0.030	<0.030
Ethyl Benzene	1.6	0.050	<0.050	<0.050	<0.050	<0.050
n-Hexane	88	0.050	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	88	0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	210	0.50	<0.50	<0.50	<0.50	<0.50
MTBE	2.3	0.050	<0.050	<0.050	<0.050	<0.050
Styrene	43	0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.11	0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.094	0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	2.5	0.050	<0.050	<0.050	<0.050	<0.050
Toluene	9	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	12	0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.11	0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	0.61	0.050	<0.050	<0.050	<0.050	<0.050
Trichlorofluoromethane	5.8	0.050	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	0.25	0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene		0.020	<0.020	<0.020	<0.020	<0.020
m+p-Xylenes		0.030	<0.030	<0.030	<0.030	<0.030
Xylenes (Total)	30	0.050	<0.050	<0.050	<0.050	<0.050





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PARAMETER	CRITERIA	MDL	SW18-2	WW18-3	TP18-1	TP18-5
Acetone	28	0.50	<0.50	<0.50	<0.50	<0.50
Benzene	0.4	0.020	<0.020	<0.020	<0.020	<0.020
Bromodichloromethane	1.9	0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	1.7	0.050	<0.050	<0.050	<0.050	<0.050
Bromomethane	0.05	0.050	<0.050	<0.050	<0.050	<0.050
Carbon tetrachloride	0.71	0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	2.7	0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane	2.9	0.050	<0.050	<0.050	<0.050	<0.050
Chloroform	0.18	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dibromoethane	0.05	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	1.7	0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichlorobenzene	12	0.050	<0.050	<0.050	<0.050	<0.050
1,4-Dichlorobenzene	0.57	0.050	<0.050	<0.050	<0.050	<0.050
Dichlorodifluoromethane	25	0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethane	0.6	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloroethane	0.05	0.050	<0.050	<0.050	<0.050	<0.050
1,1-Dichloroethylene	0.48	0.050	<0.050	<0.050	<0.050	<0.050
cis-1,2-Dichloroethylene	2.5	0.050	<0.050	<0.050	<0.050	<0.050
trans-1,2-Dichloroethylene	2.5	0.050	<0.050	<0.050	<0.050	<0.050
1,3-Dichloropropene (cis & trans)	0.081	0.042	<0.042	<0.042	<0.042	<0.042
Methylene Chloride	2	0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.68	0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropene		0.030	<0.030	<0.030	<0.030	<0.030
trans-1,3-Dichloropropene		0.030	<0.030	<0.030	<0.030	<0.030
Ethyl Benzene	1.6	0.050	<0.050	<0.050	<0.050	<0.050
n-Hexane	88	0.050	<0.050	<0.050	<0.050	<0.050
Methyl Ethyl Ketone	88	0.50	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	210	0.50	<0.50	<0.50	<0.50	<0.50
MTBE	2.3	0.050	<0.050	<0.050	<0.050	<0.050
Styrene	43	0.050	<0.050	<0.050	<0.050	<0.050
1,1,1,2-Tetrachloroethane	0.11	0.050	<0.050	<0.050	<0.050	<0.050
1,1,2,2-Tetrachloroethane	0.094	0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	2.5	0.050	<0.050	<0.050	<0.050	<0.050
Toluene	9	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	12	0.050	<0.050	<0.050	<0.050	<0.050
1,1,2-Trichloroethane	0.11	0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	0.61	0.050	<0.050	<0.050	<0.050	<0.050



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PARAMETER	CRITERIA	MDL	SW18-2	WW18-3	TP18-1	TP18-5
Trichlorofluoromethane	5.8	0.050	<0.050	<0.050	<0.050	<0.050
Vinyl chloride	0.25	0.020	<0.020	<0.020	<0.020	<0.020
o-Xylene		0.020	<0.020	<0.020	<0.020	<0.020
m+p-Xylenes		0.030	<0.030	<0.030	<0.030	<0.030
Xylenes (Total)	30	0.050	<0.050	<0.050	<0.050	<0.050

All values in ug/g - ppm - parts per million, MDL- Method Detection Limit, \*Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, (July 2011).

**TABLE 5: SOIL CHEMICAL ANALYSES –PETROLEUM HYDROCARBONS**

PARAMETER	CRITERIA	MDL	F18-1	F18-2	F18-3	F18-4	F18-5
PHCs							
F1 (C6-C10)	65	5	<5	<5	<5	<5	<5
F1-BTEX	65	5	<5	<5	<5	<5	<5
F2 (C10-C16)	250	10	<10	<10	<10	<10	<10
F3 (C16-C34)	2500	50	<50	<50	<50	<50	<50
F4 (C34-C50)	6600	50	<50	<50	<50	<50	<50
Total PHCs		50	<50	<50	<50	<50	<50

PARAMETER	CRITERIA	MDL	EW18-1	EW18-2	EW18-3	SW18-1	SW18-2
PHCs							
F1 (C6-C10)	65	5	<5	<5	<5	<5	<5
F1-BTEX	65	5	<5	<5	<5	<5	<5
F2 (C10-C16)	250	10	<10	<10	<10	<10	<10
F3 (C16-C34)	2500	50	<50	<50	<50	<50	<50
F4 (C34-C50)	6600	50	<50	<50	<50	<50	<50
Total PHCs		50	<50	<50	<50	<50	<50

PARAMETER	CRITERIA	MDL	SW18-3	NW18-1	NW18-2	WW18-1	WW18-2
PHCs							
F1 (C6-C10)	65	5	<5	<5	<5	<5	<5
F1-BTEX	65	5	<5	<5	<5	<5	<5
F2 (C10-C16)	250	10	<10	<10	<10	<10	<10
F3 (C16-C34)	2500	50	<50	<50	<50	<50	<50
F4 (C34-C50)	6600	50	<50	<50	<50	<50	<50
Total PHCs		50	<50	<50	<50	<50	<50

PARAMETER	CRITERIA	MDL	WW18-3	WW18-4	TP18-1	TP18-4	TP18-5/6
PHCs							
F1 (C6-C10)	65	5	<5	<5	<5	<5	<5
F1-BTEX	65	5	<5	<5	<5	<5	<5
F2 (C10-C16)	250	10	<10	<10	<10	<10	<10
F3 (C16-C34)	2500	50	<50	<50	<50	<50	<50





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F4 (C34-C50)	6600	50	<50	<50	<50	<50	<50
Total PHCs		50	<50	<50	<50	<50	<50

All values in ug/l - ppm - parts per million MDL- Method Detection Limit,  
 \*Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011).

**TABLE 6: SOIL CHEMICAL ANALYSES - PAHs**

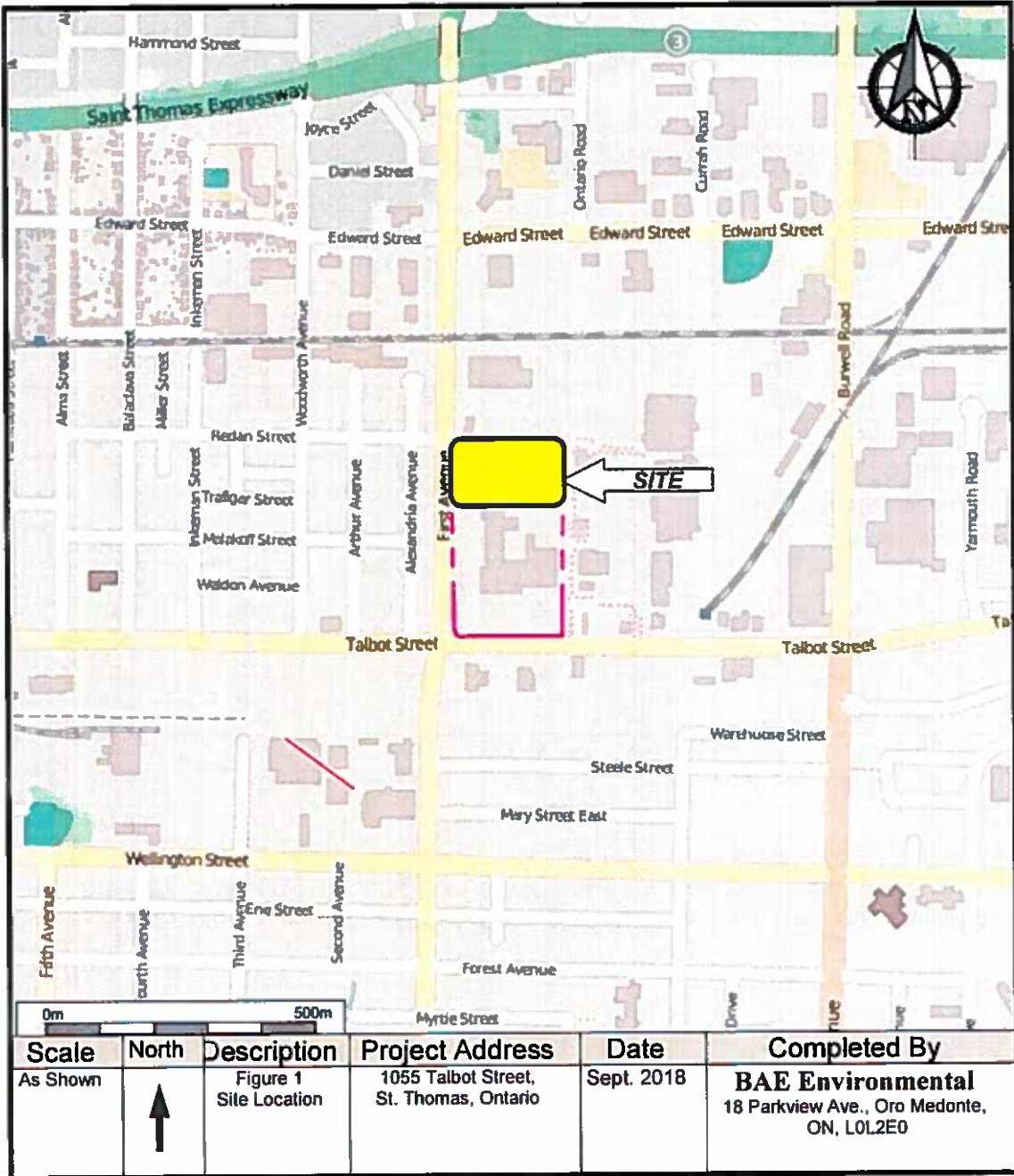
PARAMETER	CRITERIA	MDL	TP18-2	TP18-3	TP18-4	TP18-7
Acenaphthene	7.9	0.050	<0.050	<0.050	0.139	<0.050
Acenaphthylene	0.15	0.050	<0.050	<0.050	0.418	<0.050
Anthracene	0.67	0.050	<0.050	<0.050	0.368	<0.050
Benzo(a)anthracene	0.5	0.050	<0.050	<0.050	0.514	<0.050
Benzo(a)pyrene	0.3	0.050	<0.050	<0.050	0.209	<0.050
Benzo(b)fluoranthene	0.78	0.050	<0.050	<0.050	0.177	<0.050
Benzo(g,h,i)perylene	6.6	0.050	<0.050	<0.050	0.462	<0.050
Benzo(k)fluoranthene	0.78	0.050	<0.050	<0.050	0.058	<0.050
Chrysene	7	0.050	<0.050	<0.050	1.22	<0.050
Dibenzo(ah)anthracene	0.1	0.050	<0.050	<0.050	0.059	<0.050
Fluoranthene	0.69	0.050	<0.050	<0.050	0.216	<0.050
Fluorene	62	0.050	<0.050	<0.050	<0.042	<0.050
Indeno(1,2,3-cd)pyrene	0.38	0.050	<0.050	<0.050	<0.030	<0.050
1+2Methylnaphthalene	0.99	0.042	<0.042	<0.042	<0.030	<0.042
1-Methylnaphthalene	0.99	0.030	<0.030	<0.030	0.016	<0.030
2-Methylnaphthalene	0.99	0.030	<0.030	<0.030	0.931	<0.030
Naphthalene	0.6	0.050	<0.050	<0.050	0.966	<0.050
Phenanthrene	6.2	0.050	<0.050	<0.050	0.139	<0.050
Pyrene	7	0.050	<0.050	<0.050	0.418	<0.050

All values in ug/l - ppm - parts per million MDL- Method Detection Limit,  
 \*Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011).



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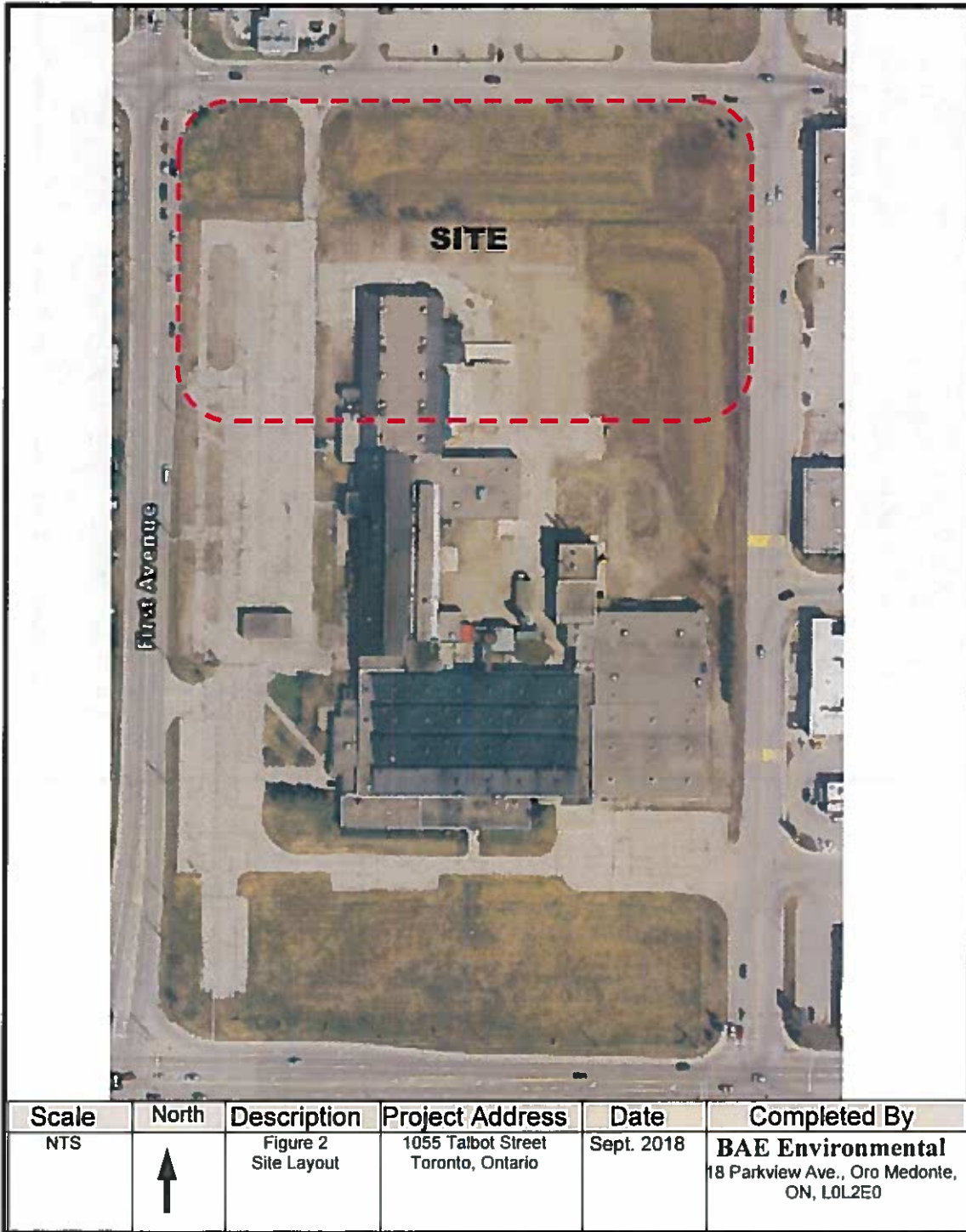
Figure 1: Site Location





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Figure 2: Site Layout

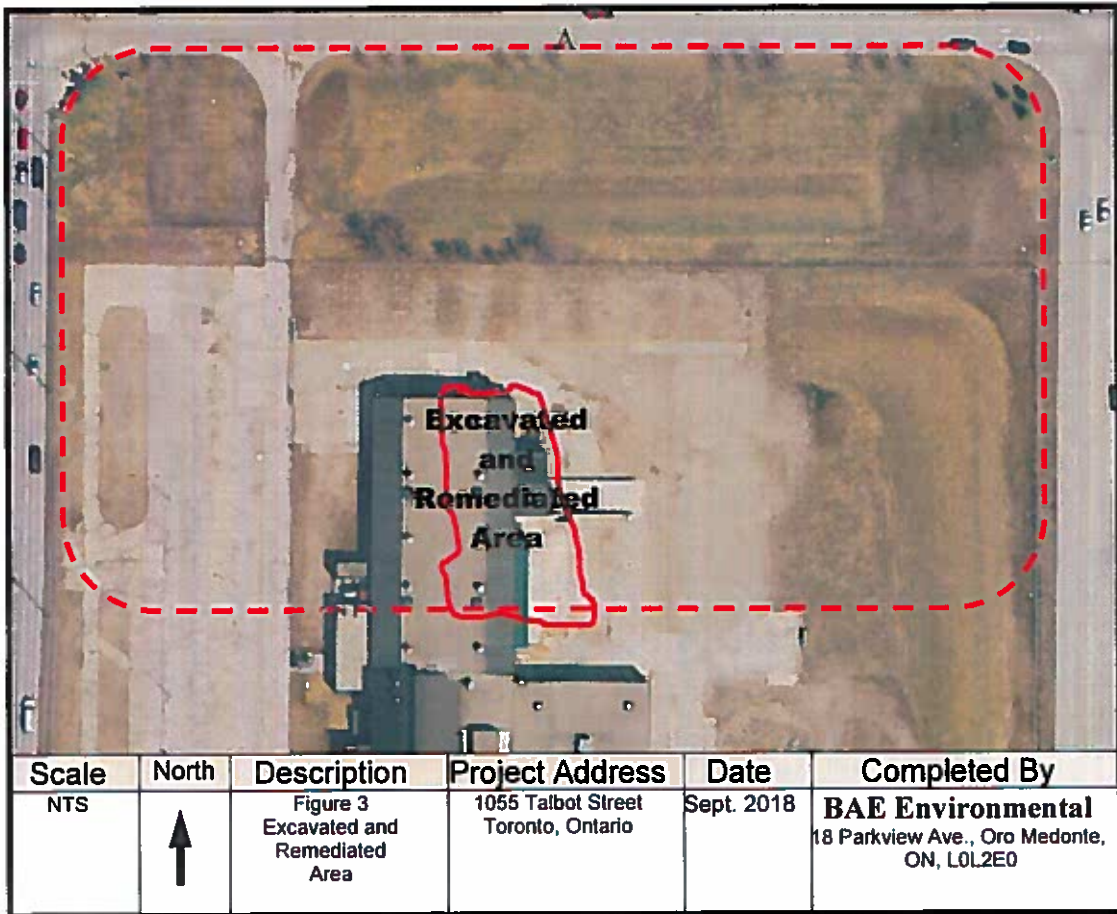






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Figure 3: Excavated and Remediated Area (approximate)





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Figure 4: Groundwater Monitoring and Sample Locations





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Figure 5: Soil Sample Locations

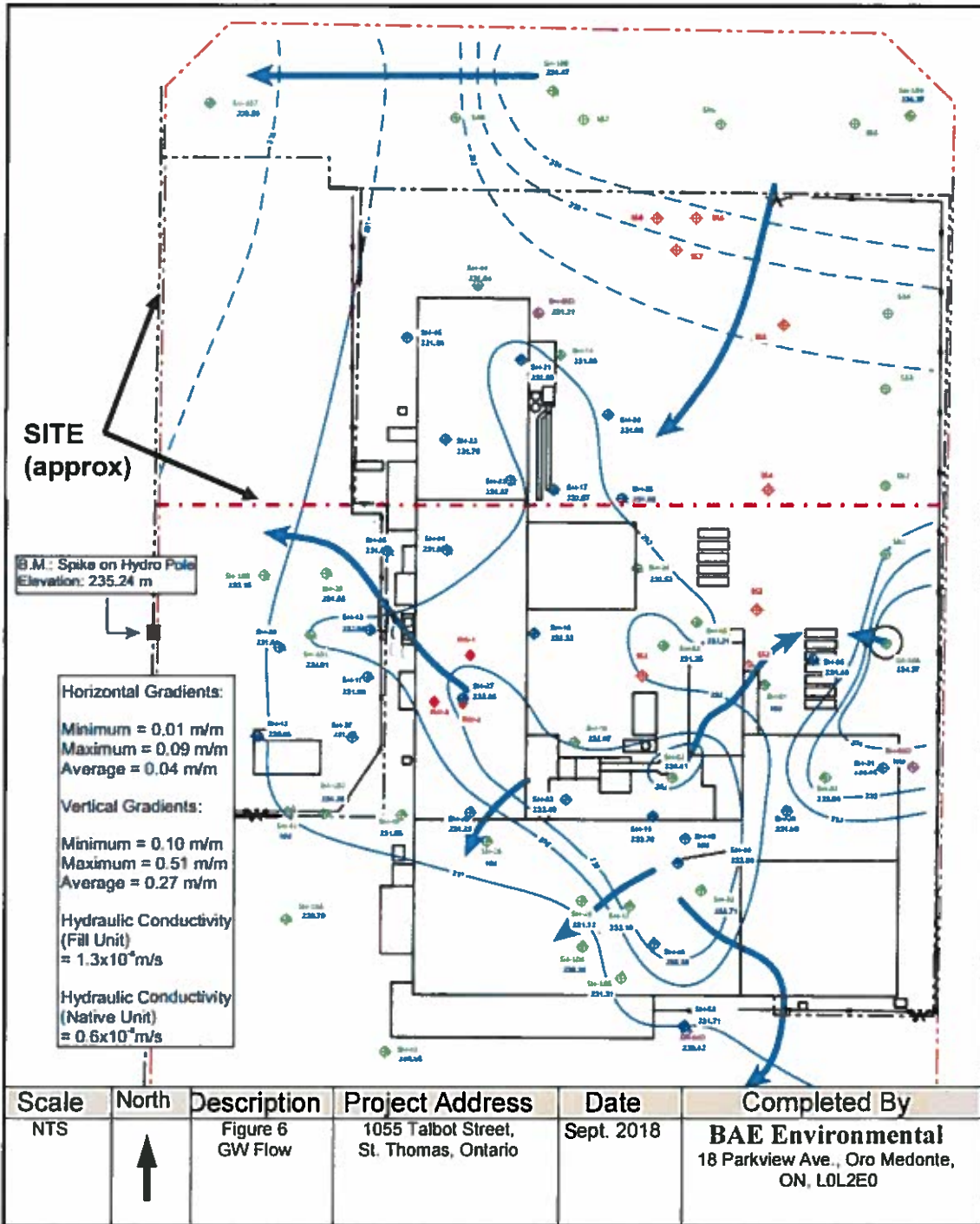






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Figure 6: Groundwater Flow Directions





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## Appendix A Sampling and Analysis Plan



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Sampling and Analysis Plan  
1055 Talbot Street, St. Thomas, Ontario

The Phase Two ESA was undertaken to further assess areas of actual and/or potential environmental concern and to provide a Phase Two ESA report generally compliant with the requirements of Ontario Regulation 153/04 as amended by Ontario Regulations 511/09 and 179/11 ("O.Reg. 153/04, as amended").

The proposed Phase 2 ESA Sampling and Analysis Plan are presented below:  
The program will assess the soil conditions and depth to the groundwater table across the site utilizing eight (8) boreholes that will be advanced up to the groundwater interface (or bedrock refusal).

Combustible vapour readings will be conducted on all soil samples retrieved from the boreholes.

The field program will be completed in accordance with BAE Standard Operating Procedures.

#### QA/QC and Standard Operating Procedures

A strict Quality Assurance/Quality Control (QA/QC) program will be implemented and maintained throughout the project to ensure the Site data are representative of the actual Site conditions. The QA/QC program provides a method of documented checks to assess the precision and accuracy of collected data. The QA/QC program includes a set of standard procedures or protocols to be followed throughout the investigations. To this end, BAE field and QA/QC protocols have been developed to meet or exceed those defined in the MOE documents entitled "Guideline for Phase II Environmental Site Assessments in Ontario" (Draft, March 2006) and "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" (1996) and Canadian Council of Ministers of the Environment (CCME) "Guidance Manual Sampling, Analysis, and Data Management for Contaminated Sites" (1993). The field QA/QC program will include the following components:

- 1) The use of personnel protective equipment including hard hats, safety glasses, safety work boots, and chemically resistant latex/nitrile gloves for sample handling;
- 2) Thorough documentation of all field activities and sample handling practices including field notes, chain of custody forms, memos to file, etc;
- 3) Thorough decontamination of all non-dedicated sampling equipment employed in all investigation phases;
- 4) The use of laboratory analytical protocols and method detection limits that have been established in accordance with regulatory requirements of the Province of

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Ontario;

- 5) The RKI Eagle was re-calibrated to Hexane during the planning process;
- 6) The Petroflag Turbidimetric Screening Method For Total Recoverable Petroleum Hydrocarbons in Soil - Official Method US EPA SW-846 Method 9074 was re-calibrated with the appropriate blanks and standards (each 10 samples) prior to and during usage in the field;
- 7) The MiniRae 3000 Portable Handheld VOC Monitor was calibrated using isobutylene calibration gas prior to use; and,
- 8) The ALS Quality Control Report was provided by ALS at the request of BAE. ALS includes comprehensive QC checks with every analysis to ensure high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

The primary sample fractions will be placed in 200 ml sample jars with Teflon-lined lids and methanol reserved (samples for BTEX and PHC F1 only) and subsequently stored in coolers on ice for future potential laboratory analysis. The duplicate sample fractions will be placed in "Ziploc" sample bags and stored at ambient temperature for subsequent field vapour screening purposes. All soil samples will be collected in accordance with strict environmental sampling protocols to minimize loss of volatile organics and to ensure reliable and representative results. Disposable nitrile gloves will be used and replaced between the handling of successive samples. All soil sampling equipment (augers, stainless steel trowels, spatulas, etc.) will be thoroughly decontaminated between soil sample locations to prevent potential cross-contamination.

Decontamination activities will include:

- Physical removal of any adhered debris;
- Wash/scrub in a soap solution;
- Distilled water rinse;
- Methanol rinse; and
- Air dry.

Ground water samples will be collected directly into laboratory supplied sample containers preinoculated with any necessary preservatives. Dedicated (one pair per sample), disposable nitrile gloves will be used throughout the proceedings. Vials that contain samples to be analyzed for volatile compounds will be inverted after filling and inspected to ensure that no head space was present in any vial.



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Samples will be placed in a cooler and stored on ice until delivered to the analytical laboratory. All sample containers and preservatives, where applicable, will be supplied by the laboratory and will be consistent with the specifications provided in Tables A (soil/ sediment) and B (ground water) of the Analytical Protocol (MOE, 2011e). Similarly, all samples will be placed on ice in coolers after collection to meet the storage requirements of the Analytical Protocol (MOE, 2011e). All samples will be labelled with unique identifiers indicating the borehole/monitoring well of origin and depth interval (soil samples). All samples will be transported by BAE staff directly to the laboratory under continuous Chain of Custody documentation. Each Chain of Custody form will have a unique serial number. Any deviations from the sampling and analysis plan will be documented.

Sampling and Analysis Parameters - Environmental analysis will be conducted on upper fill and lower fill soil as determined based on field observations and combustible vapour readings. Additional soil analysis will be completed for the following parameters: Representative soil samples will be submitted to ALS Environmental Laboratory for independent chemical analysis of the Metals, PHC and VOC and BTEX Parameters. The BTEX parameters consist of Benzene, Toluene, Ethylbenzene and Xylenes which are the main components of fuel - gasoline, diesel and furnace oil. This analysis would have detected gasoline, diesel and/or heating oil. The PHC Parameters including F1, F2, F3 and F4 detect all petroleum parameters. As PCBs are mobile through oils this would have been detected in the analysis. The Metals and VOCs analysis will address potential concerns from previous onsite and offsite activities.

Groundwater analysis will be completed on samples from representative areas for the following parameters: Representative soil samples will be submitted to ALS Environmental Laboratory for independent chemical analysis of the Metals, PHC and VOC and BTEX Parameters. The BTEX parameters consist of Benzene, Toluene, Ethylbenzene and Xylenes which are the main components of fuel - gasoline, diesel and furnace oil. The PHC Parameters including F1, F2, F3 and F4 detect all petroleum parameters. As PCBs are mobile through oils this would have been detected in the analysis. The Metals and VOCs analysis will address potential concerns from previous onsite and offsite activities.

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Appendix B  
Part XV.1 of the *Environmental Protection Act* – Table 3: Generic Site  
Condition Standards for Use in a Non-Potable Groundwater  
Condition (July 2011)





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Table 3 Contaminant	Soil Standards (other than sediment) µg/g		Non- Potable Ground Water µg/L
	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Acenaphthene	(58) 7.9	96	(1700) 600
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	1.8
Acetone	(28) 16	(28) 16	130000
Aldrin	0.05	(0.11) 0.088	8.5
Anthracene	(0.74) 0.67	(0.74) 0.67	2.4
Antimony	7.5	(50) 40	20000
Arsenic	18	18	1900
Barium	390	670	29000
Benzene	(0.17) 0.21	(0.4) 0.32	(430) 44
Benz[a]anthracene	(0.63) 0.5	0.96	4.7
Benzo[a]pyrene	0.3	0.3	0.81
Benzo[b]fluoranthene <sup>2</sup>	0.78	0.96	0.75
Benzo[ghi]perylene	(7.8) 6.6	9.6	0.2
Benzo[k]fluoranthene	0.78	0.96	0.4
Beryllium	(5) 4	(10) 8	67
Biphenyl 1,1'-	(1.1) 0.31	(210) 52	(2200) 1000
Bis(2-chloroethyl)ether	0.5	0.5	300000
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(14) 11	20000
Bis(2-ethylhexyl)phthalate	5	(35) 28	140
Boron (Hot Water Soluble)*	1.5	2	NA
Boron (total)	120	120	45000
Bromodichloromethane	13	18	85000
Bromoform	(0.26) 0.27	(1.7) 0.61	(770) 380
Bromomethane	0.05	0.05	(56) 5.6
Cadmium	1.2	1.9	2.7
Carbon Tetrachloride	(0.12) 0.05	(1.5) 0.21	(8.4) 0.79
Chlordane	0.05	0.05	28
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	400
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	630
Chloroform	(0.18) 0.05	(0.18) 0.47	(22) 2.4
Chlorophenol, 2-	(2) 1.6	(3.9) 3.1	3300
Chromium Total	160	160	810
Chromium VI	(10) 8	(10) 8	140
Chrysene	(7.8) 7	9.6	1
Cobalt	22	(100) 80	66
Copper	(180) 140	(300) 230	87
Cyanide (CN-)	0.051	0.051	66
Dibenz[a,h]anthracene	0.1	0.1	0.52
Dibromochloromethane	9.4	13	82000
Dichlorobenzene, 1,2-	(4.3) 3.4	(8.5) 6.8	(9600) 4600
Dichlorobenzene, 1,3-	(6) 4.8	(12) 9.6	9600
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.84) 0.2	(67) 8
Dichlorobenzidine, 3,3'-	1	1	640
Dichlorodifluoromethane	(25) 16	(25) 16	4400
DDD	3.3	4.6	45
DDE	(0.33) 0.26	(0.65) 0.52	20
DDT	1.4	1.4	2.8
Dichloroethane, 1,1-	(11) 3.5	(21) 17	(3100) 320
Dichloroethane, 1,2-	0.05	0.05	(12) 1.6
Dichloroethylene, 1,1-	0.05	(0.48) 0.064	(17) 1.6
Dichloroethylene, 1,2-cis-	(30) 3.4	(37) 55	(17) 1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(9.3) 1.3	(17) 1.6
Dichlorophenol, 2,4-	(2.1) 1.7	(4.2) 3.4	4600
Dichloropropane, 1,2-	(0.085) 0.05	(0.68) 0.16	(140) 16
Dichloropropene, 1,3-	(0.083) 0.05	(0.21) 0.18	(45) 5.2
Dieldrin	0.05	(0.11) 0.088	0.75

St. Thomas, Ontario



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Table 3 Contaminant	Soil Standards (other than sediment) µg/g		Non-Potable Ground Water µg/L
	Residential/ Parkland Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Diethyl Phthalate	0.5	0.5	38
Dimethylphthalate	0.5	0.5	38
Dimethylphenol, 2,4-	(420) 390	(440) 390	39000
Dinitrophenol, 2,4-	38	(66) 59	11000
Dinitrotoluene, 2,4 & 2,6-	0.92	1.2	2900
Dioxane, 1,4	1.8	1.8	(7300000) 1900000
Dioxin/Furan (TEQ)	0.000013	0.000099	(0.023) 0.014
Endosulfan	0.04	(0.38) 0.3	1.5
Endrin	0.04	0.04	0.48
Ethylbenzene	(15) 2	(19) 9.5	2300
Ethylene dibromide	0.05	0.05	(0.83) 0.25
Fluoranthene	0.69	9.6	130
Fluorene	(69) 62	(69) 62	400
Heptachlor	0.15	0.19	2.5
Heptachlor Epoxide	0.05	0.05	0.048
Hexachlorobenzene	0.52	0.66	3.1
Hexachlorobutadiene	(0.014) 0.012	(0.095) 0.031	(4.5) 0.44
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	1.2
Hexachloroethane	(0.071) 0.089	(0.43) 0.21	(200) 94
Hexane (n)	(34) 2.8	(88) 46	(520) 51
Indeno[1,2,3-cd]pyrene	(0.48) 0.38	(0.95) 0.76	0.2
Lead	120	120	25
Mercury	(1.8) 0.27	(20) 3.9	(2.8) 0.29
Methoxychlor	0.13	1.6	6.5
Methyl Ethyl Ketone	(44) 16	(88) 70	(1500000) 470000
Methyl Isobutyl Ketone	(4.3) 1.7	(210) 31	(580000) 140000
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	0.15
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(3.2) 11	(1400) 190
Methylene Chloride	(0.96) 0.1	(2) 1.6	(5500) 610
Methylnaphthalene, 2-(1-) ***	(3.4) 0.99	(85) 76	1800
Molybdenum	6.9	40	9200
Naphthalene	(0.75) 0.6	(28) 9.6	(6400) 1400
Nickel	(130) 100	(340) 270	490
Pentachlorophenol	0.1	(3.3) 2.9	62
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	750
Petroleum Hydrocarbons F2	(150) 98	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(2500) 1700	500
Petroleum Hydrocarbons F4	(5600) 2800	(6600) 3300	500
Phenanthrene	(7.8) 6.2	(16) 12	580
Phenol	9.4	9.4	12000
Polychlorinated Biphenyls	0.35	1.1	(15) 7.8
Pyrene	78	96	68
Selenium	2.4	5.5	63
Silver	(25) 20	(50) 40	1.5
Styrene	(2.2) 0.7	(43) 34	(9100) 1300
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.11) 0.087	(28) 3.3
Tetrachloroethane, 1,1,2,2-	0.05	(0.094) 0.05	(15) 3.2
Tetrachloroethylene	(2.3) 0.28	(21) 4.5	(17) 1.6
Thallium	1	3.3	510
Toluene	(6) 2.3	(78) 68	18000
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(16) 3.2	(850) 180
Trichloroethane, 1,1,1-	(3.4) 0.38	(12) 6.1	(6700) 640
Trichloroethane, 1,1,2-	0.05	(0.11) 0.05	(30) 4.7
Trichloroethylene	(0.52) 0.061	(0.61) 0.91	(17) 1.6
Trichlorofluoromethane	(5.8) 4	(5.8) 4	2500
Trichlorophenol, 2,4,5-	(5.5) 4.4	10	1600
Trichlorophenol, 2,4,6-	(4.2) 3.8	(4.2) 3.8	230
Uranium	23	33	420
Vanadium	86	86	250
Vinyl Chloride	(0.022) 0.02	(0.25) 0.032	(1.7) 0.5



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Table 3 Contaminant	Soil Standards (other than sediment) µg/g		Non-Potable Ground Water µg/L
	Residential/ Parkland Institutional Property Use	Industrial/ Commercial Community Property Use	All Types of Property Use
Xylene Mixture	(25) 31	(30) 26	4200
Zinc	340	340	1100
Electrical Conductivity (mS/cm)	0.7	1.4	#N/A
Chloride	NA	NA	2300000
Sodium Adsorption Ratio	5	12	NA
Sodium	NA	NA	2300000

Notes

( ) Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

\* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

\*\* Analysis for methyl mercury only applies when mercury (total) standard is exceeded

\*\*\* The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2-methyl naphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

\*\*\*\* FI fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.



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## Appendix C Field Screening Apparatus



September 2018

Environmental Protection Development September 2001  
Agency Washington, DC 20460

**Innovative Technology  
Verification Report  
Field Measurement  
Technologies for Total  
Petroleum Hydrocarbons in Soil  
Dexsil® Corporation  
PetroFLAG™ System**

EPA/600/R-01/092  
September 2001

**Innovative Technology  
Verification Report  
Dexsil® Corporation  
PetroFLAG™ System**

Prepared by  
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Office of Research and Development  
U.S. Environmental Protection Agency  
**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
Office of Research and Development  
Washington, DC 20460

**ENVIRONMENTAL TECHNOLOGY VERIFICATION PROGRAM  
VERIFICATION STATEMENT  
TECHNOLOGY TYPE: FIELD MEASUREMENT DEVICE**



September 2018

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**APPLICATION: MEASUREMENT OF TOTAL PETROLEUM HYDROCARBONS**

**TECHNOLOGY NAME: PetroFLAG™ SYSTEM**

**COMPANY: DEXSIL® CORPORATION**

**ADDRESS: ONE HAMDEN PARK DRIVE**

**HAMDEN, CT 06517**

**WEB SITE: <http://www.dexsil.com>**

**TELEPHONE: (203) 288-3509**

**VERIFICATION PROGRAM DESCRIPTION**

The U.S. Environmental Protection Agency (EPA) created the Superfund Innovative Technology Evaluation (SITE) and Environmental Technology Verification (ETV) Programs to facilitate deployment of innovative technologies through performance verification and information dissemination. The goal of these programs is to further environmental protection by substantially accelerating the acceptance and use of improved and cost-effective technologies. These programs assist and inform those involved in design, distribution, permitting, and purchase of environmental technologies. This document summarizes results of a demonstration of the PetroFLAG™ System developed by Dexsil® Corporation (Dexsil).

**PROGRAM OPERATION**

Under the SITE and ETV Programs, with the full participation of the technology developers, the EPA evaluates and documents the performance of innovative technologies by developing demonstration plans, conducting field tests, collecting and analyzing demonstration data, and preparing reports. The technologies are evaluated under rigorous quality assurance (QA) protocols to produce well-documented data of known quality. The EPA National Exposure Research Laboratory, which demonstrates field sampling, monitoring, and measurement technologies, selected Tetra Tech EM Inc. as the verification organization to assist in field testing seven field measurement devices for total petroleum hydrocarbons (TPH) in soil. This demonstration was funded by the SITE Program.

**DEMONSTRATION DESCRIPTION**

In June 2000, the EPA conducted a field demonstration of the PetroFLAG™ System and six other field measurement devices for TPH in soil. This verification statement focuses on the PetroFLAG™ System; a similar statement has been prepared for each of the other six devices. The performance and cost of the PetroFLAG™ System were compared to those of an off-site laboratory reference method, "Test Methods for Evaluating Solid Waste" (SW-846) Method 8015B (modified). To verify a wide range of performance attributes, the demonstration had both primary and secondary objectives. The primary objectives included (1) determining the method detection limit, (2) evaluating the accuracy and precision of TPH measurement, (3) evaluating the effect of interferences, and (4) evaluating the effect of moisture content on TPH measurement for each device. Additional primary objectives were to measure sample throughput and estimate TPH measurement costs. Secondary objectives included (1) documenting the skills and training required to properly operate the device, (2) documenting the portability of the device, (3) evaluating the device's durability, and (4) documenting the availability of the device and associated spare parts.

The PetroFLAG™ System was demonstrated by using it to analyze 66 soil environmental samples, 79 soil performance evaluation (PE) samples, and 36 liquid PE samples. In addition to these 181 samples, 10 extract duplicates prepared using the environmental samples were analyzed. The environmental samples were collected in four areas contaminated with gasoline,





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diesel, or other petroleum products, and the PE samples were obtained from a commercial provider. Dexsil chose not to analyze soil samples collected in a fifth area because Dexsil believed that the natural organic material in the area would adversely impact the PetroFLAG™ System's ability to accurately measure TPH. In addition, Dexsil chose not to analyze low- and medium-concentration-range weathered gasoline soil PE samples because according to Dexsil, the PetroFLAG™ System was not sensitive to weathered gasoline concentrations of less than 1,000 milligrams per kilogram. Collectively, the environmental and PE samples provided the different matrix types and the different levels and types of petroleum hydrocarbon contamination needed to perform a comprehensive evaluation of the PetroFLAG™ System. A complete description of the demonstration and a summary of its results are available in the "Innovative Technology Verification Report: Field Measurement Devices for Total Petroleum Hydrocarbons in Soil—Dexsil® Corporation.

#### TECHNOLOGY DESCRIPTION

The PetroFLAG™ System manufactured by Dexsil is based on emulsion turbidimetry, which involves measurement of the light scattered by an emulsion. With the PetroFLAG™ System, a proprietary, nonpolar, organic solvent mixture composed of alcohols, primarily methanol, is used to extract petroleum hydrocarbons from soil samples. A proprietary developer solution that is polar in nature and that acts as an emulsifier is added to a sample extract in order to precipitate the aromatic and aliphatic hydrocarbons and form uniformly sized micelles. Light at a wavelength of 585 nanometers is passed through the emulsion, and the amount of light scattered by the emulsion at a 90-degree angle is measured using a turbidimeter. The TPH concentration in the emulsion is then determined by comparing the turbidity reading for the emulsion to that for a reference standard or to a standard calibration curve. According to Dexsil, the TPH concentration thus measured is a function of the mean molecular weight of the hydrocarbons present in the sample. During the demonstration, extraction of petroleum hydrocarbons in a given soil sample was typically completed by adding 10 milliliters (mL) of proprietary methanol mixture extraction solvent to 10 grams of the sample. To form an emulsion, 2 mL of sample extract was then decanted into a vial containing 4 mL of developer solution. The emulsion was analyzed using the PetroFLAG™ Analyzer (turbidimeter) to obtain a direct measurement of the TPH concentration in the soil sample.

#### VERIFICATION OF PERFORMANCE

To ensure data usability, data quality indicators for accuracy, precision, representativeness, completeness, and comparability were assessed for the reference method based on project-specific QA objectives. Although the reference method results generally exhibited a negative bias, based on the results for the data quality indicators, the reference method results were considered to be of adequate quality. The bias was considered to be significant primarily for low- and medium concentration- range soil samples containing diesel, which made up only 13 percent of the total number of samples analyzed during the demonstration. The reference method recoveries observed during the demonstration were typical of the recoveries obtained by most organic analytical methods for environmental samples. In general, the user should exercise caution when evaluating the accuracy of a field measurement device by comparing it to reference methods because the reference methods themselves may have limitations. Key demonstration findings are summarized below for the primary objectives.

**Method Detection Limit:** Based on the TPH results for seven low-concentration-range diesel soil PE samples, the method detection limits were determined to be 20 and 6.32 milligrams per kilogram for the PetroFLAG™ System and reference method, respectively.



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**Accuracy and Precision:** Seventy-one of 97 PetroFLAG™ System results (73 percent) used to draw conclusions regarding whether the TPH concentration in a given sampling area or sample type exceeded a specified action level agreed with those of the reference method; 26 PetroFLAG™ System conclusions were false positives. There were no false negatives. Of 91 PetroFLAG™ System results used to assess measurement bias, 11 were within 30 percent, 9 were within 30 to 50 percent, and 71 were not within 50 percent of the reference method results; 82 PetroFLAG™ System results were biased high, and 9 were biased low. For soil environmental samples, the PetroFLAG™ System results were statistically (1) the same as the reference method results for one of the four sampling areas and (2) different from the reference method results for three of the sampling areas. For soil PE samples, the PetroFLAG™ System results were statistically (1) the same as the reference method results for high concentration- range diesel samples and (2) different from the reference method results for blank samples, high-concentration range weathered gasoline samples, and low- and medium-concentration-range diesel samples. For liquid PE samples, the PetroFLAG™ System results were statistically different from the reference method results for both weathered gasoline and diesel samples. The PetroFLAG™ System results correlated highly with the reference method results for one of the four sampling areas and diesel soil PE samples (the square of the correlation coefficient [R<sup>2</sup>] values were greater than 0.90, and F-test probability values were less than 5 percent). The PetroFLAG™ System results correlated moderately with the reference method results for two of the four sampling areas (R<sup>2</sup> values were 0.84 and 0.86, and F-test probability values were less than 5 percent). The PetroFLAG™ System results correlated weakly with the reference method results for one of the four sampling areas and weathered gasoline soil PE samples (R<sup>2</sup> values were 0.42 and 0.10, respectively, and F-test probability values were greater than 5 percent). Comparison of the PetroFLAG™ System and reference method median relative standard deviations (RSD) showed that the PetroFLAG™ System and the reference method exhibited similar overall precision. Specifically, the median RSD ranges were 6 to 19 percent and 5.5 to 16 percent for the PetroFLAG™ System and reference method, respectively. The analytical precision was about the same for the PetroFLAG™ System (a median relative percent difference of 5) and reference method (a median relative percent difference of 4).

**Effect of Interferents:** The PetroFLAG™ System showed a mean response of less than 5 percent for neat methyl-tert-butyl ether (MTBE) and tetrachloroethene (PCE) and for soil spiked with humic acid. The device's mean responses for neat Stoddard solvent; turpentine; and 1,2,4-trichlorobenzene were 42.5, 103, and 16 percent, respectively. The reference method showed varying mean responses for MTBE (39 percent); PCE (17.5 percent); Stoddard solvent (85 percent); turpentine (52 percent); 1,2,4-trichlorobenzene (50 percent); and humic acid (0 percent). For the demonstration, MTBE and Stoddard solvent were included in the definition of TPH.

**Effect of Moisture Content:** The PetroFLAG™ System showed a statistically significant decrease (17 percent) in TPH results when the soil moisture content was increased from 9 to 16 percent for weathered gasoline soil PE samples; the reference method TPH results were unaffected. Both PetroFLAG™ System and reference method TPH results were unaffected when the soil moisture content was increased from less than 1 to 9 percent for diesel soil PE samples.

**Measurement Time:** From the time of sample receipt, Dexsil required 50 hours, 40 minutes, to prepare a draft data package containing TPH results for 181 samples and 10 extract duplicates compared to 30 days for the reference method, which was used to analyze 199 samples and 13 extract duplicates.



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Key demonstration findings are summarized below for the secondary objectives.

***Skill and Training Requirements:*** The PetroFLAG™ System can be operated by one person with basic wet chemistry skills. The sample analysis procedure for the device can be learned in the field with a few practice attempts.

***Portability:*** The PetroFLAG™ System is battery-operated and requires no alternating current power source. The device can be easily moved between sampling areas in the field, if necessary.

***Durability and Availability of the Device:*** All items in the PetroFLAG™ System are available from Dexsil. During a 6-month warranty period, Dexsil will supply replacement parts for the device by overnight courier service at no cost. During the demonstration, none of the device's reusable items malfunctioned or was damaged.

In summary, during the demonstration, the PetroFLAG™ System exhibited the following desirable characteristics of a field TPH measurement device: (1) good precision, (2) lack of sensitivity to interferents that are not petroleum hydrocarbons (PCE and humic acid), (3) low measurement costs, and (4) ease of use. In addition, the PetroFLAG™ System exhibited moderate sample throughput. Based on action level conclusions and statistical correlations, the PetroFLAG™ System TPH results compared well with those of the reference method; however, the device exhibited a high bias, and its TPH results were determined to be statistically different from those of the reference method. In addition, turpentine and 1,2,4-trichlorobenzene biased the device's TPH results high. Moreover, an increase in soil moisture content biased the device's TPH results low for weathered gasoline soil PE samples. Collectively, the demonstration findings indicated that the user should exercise caution when considering the device for a specific field TPH measurement application.

Original signed by

Gary J. Foley, Ph.D.  
Director

National Exposure Research Laboratory  
Office of Research and Development



September 2018

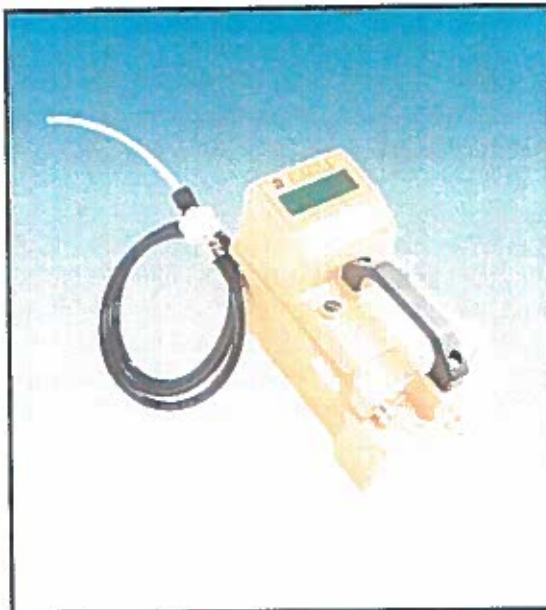
P001-G102



## ONE TO SIX GAS PORTABLE MONITOR

Gas Detection For Life

EAGLE™ Model



### Features

- Simultaneous detection of up to 6 different gases
- Over 250 gas monitoring configurations
- Widest range of gas sensors available
- PPM / LEL hydrocarbon detection
- Powerful long-life pump with 125' range
- Low flow pump shut off and alarm
- Methane elimination switch for environmental use
- Security "Adjustment Lockout Switch"
- Up to 30 hours of continuous operation
- IR Sensors available for CO<sub>2</sub>, % LEL CH<sub>4</sub>, and 0-100% volume CH<sub>4</sub>
- Transformer testing version available
- Alkaline or Ni-Cad capability
- Ergonomic RFI/EMI/Chemical resistant case
- Datalogging option
- Autocalibration
- Intrinsically safe design, CSA/NRTL & UL Classified (most versions)

RKI is proud to produce the most versatile portable gas detector on the market. The EAGLE is a powerful instrument that does more than offer standard confined space protection. The EAGLE also provides detection combinations never before offered in a portable gas monitor featuring the industry's widest selection of high quality, long life and field proven sensors.

The EAGLE's ergonomic design offers easy access to controls such as autocalibration, alarm silence, demand zero, peak hold and a wide variety of other features. Each channel has 2 alarm levels plus TWA and STEL alarms for toxic channels. Alarm levels are adjustable and can be latching or self resetting.

Standard features on the EAGLE are not available on other competitive units. These features include PPM/LEL hydrocarbon detection and a methane elimination switch for environmental applications. For quick response and recovery, the EAGLE has a strong internal pump which can draw samples from over 125 feet. The EAGLE will continuously operate for over 30 hours on alkaline batteries or 18 hours on Ni-Cads. Many accessories such as long hoses, special probes, datalogging, continuous operation adapters, remote alarms and strobes, dilution fittings, internal hydrophobic filter, etc. are available to help satisfy almost any application. Rugged, weatherproof, easy to operate and maintain, the EAGLE is the industry's answer to portable gas detection.

RKI Instruments, Inc. • 1855 Whipple Rd. Hayward, CA 94544 • Phone (800) 754-5165 • (510) 441-5656 • Fax (510) 441-5650

World Leader In Gas Detection & Sensor Technology  
[www.rkiinstruments.com](http://www.rkiinstruments.com)



September 2018

## EAGLE™ Model

<b>Enclosure</b>	Weatherproof, chemical resistant, RFI/EMI coated high impact polycarbonate-polyester blend. Can be set in rain or into 2.5' of water without damage. Ergonomically balanced with rugged top mounted handle.
<b>Dimensions</b>	10.5" L x 5.9" W 7" H
<b>Weight</b>	5 lbs
<b>Detection Principle</b>	Catalytic combustion, electrochemical cell, galvanic cell, and infrared.
<b>Sensor Life</b>	2 years under normal conditions.
<b>Sampling Method</b>	Powerful, long-life pump (over 6,000 hours) can draw samples over 125 feet. Flow rate approximately 2.0 SCFH.
<b>Display</b>	4 x 20 LCD readout with backlighting. Viewed through window in case top. Displays readings & status of all channels simultaneously.
<b>Alarms</b>	2 alarms per channel plus TWA and STEL alarms. Fully adjustable for levels, latching or self reset and silenceable.
<b>Alarm Method</b>	Buzzer 85dB at 30 cm, dual high intensity LED's, and flashing display.
<b>Controls</b>	6 external push buttons for operation, demand zero, and autocalibration. Buttons also access LEL/ppm, alarm silence, peak hold, TWA / STEL values, battery status and many other features.
<b>Continuous Operating Hours</b>	30 hours minimum using alkaline batteries, or 18 hours using Ni-Cads.
<b>Power Source</b>	Size D batteries, 4 alkaline or Ni-Cad. Charger has alkaline recognition to prevent battery damage if charging is attempted with alkalines.
<b>Operating Temp. &amp; Humidity</b>	-10°C to 40°C (14°F to 104°F), 0 to 85% RH, non-condensing.
<b>Indication Accuracy</b>	Maximum variance +/- 5% of full scale.
<b>Response Time</b>	30 seconds to 80% (for most gases).
<b>Safety Design</b>	Intrinsically Safe, Class 1, Division 1, Groups A, B, C and D, CSA / NRTL & UL Classified (most versions).
<b>Standard Accessories</b>	Shoulder strap, alkaline batteries, hydrophobic probe and 5 foot hose (for special toxic gas versions, shorter teflon hose used without probe)
<b>Optional Accessories</b>	<ul style="list-style-type: none"> <li>Datalogging of up to 4 gases (No datalogging possible on 5 or 8 gas versions or versions with more than 2 toxic sensors).</li> <li>Remote alarm</li> <li>Dilution fitting (50/50)</li> <li>Ni-Cad batteries</li> <li>Battery charger, 115 VAC, 220 VAC, or 12 VDC</li> <li>Continuous Operation Adapter, 115 VAC or 12 VDC</li> <li>Extra loud buzzer</li> <li>Extension Probes</li> <li>Internal Hydrophobic Filter (strongly recommended)</li> </ul>
<b>Warranty</b>	One year material and workmanship.

### Gases & Detectable Ranges

Standard Confined Space Gases	
Hydrocarbons (CH <sub>4</sub> , std)	0 - 100% LEL 0 - 50,000 ppm
Oxygen (O <sub>2</sub> )	0 - 40% Vol.
Carbon Monoxide (CO)	0 - 500 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0 - 100 ppm
Super Toxics and Other Gases	
Ammonia (NH <sub>3</sub> )	0 - 75 ppm
Arsine (AsH <sub>3</sub> )	0 - 1 ppm 0 - 200 ppb
Carbon Dioxide (CO <sub>2</sub> ) (IR Sensor)	0 - 5,000 ppm 0 - 10,000 ppm 0 - 5% Vol. 0 - 20% Vol. 0 - 50% Vol.
Chlorine (Cl <sub>2</sub> )	0 - 3 ppm
Fluorine (F <sub>2</sub> )	0 - 5 ppm
Hydrogen Fluoride (HF)	0 - 8 ppm
Hydrogen Chloride (HCl)	0 - 5 ppm
Hydrogen Cyanide (HCN)	0 - 30 ppm
Methane (CH <sub>4</sub> ) (IR Sensor)	0 - 100% LEL 0 - 100% Vol.
Nitrogen Dioxide (NO <sub>2</sub> )	0 - 15 ppm
Nitric Oxide (NO)	0 - 100 ppm
Ozone (O <sub>3</sub> )	0 - 1 ppm
Phosphine (PH <sub>3</sub> )	0 - 1 ppm
Silane (SiH <sub>4</sub> )	0 - 15 ppm
Sulfur Dioxide (SO <sub>2</sub> )	0 - 30 ppm

The EAGLE can be provided with up to 6 gas sensors (2 Toxics maximum from "super toxics" list). Please specify gas combination when ordering.

#### Special Features

- Low Flow alarm shuts pump off to avoid damage to instrument.
- Hydrophobic filter disc in probe.
- Internal dust filter (or optional internal hydrophobic filter)
- Quick autocalibration using 4 in 1 calibration gas standard.
- Single gas calibration capability.
- Methane elimination switch for environmental applications.
- "Adjustment Lockout Switch" for added security.
- Confirmation beep (silenceable).
- Backlight, automatic for alarms and by demand with adjustable time.
- Meets EPA Method 21 protocol for fugitive emissions testing.

## RKI Instruments, Inc.



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www.rklinstruments.com

### Authorized Distributor:





September 2018



# MiniRAE 3000

## Portable Handheld VOC Monitor

The MiniRAE 3000 is the most advanced handheld volatile organic compound (VOC) monitor on the market. Its photoionization detector's (PID) extended range of 0 to 15,000 ppm makes it an ideal instrument for applications from industrial hygiene to leak detection and HazMat.

The RF modem allows real-time data transmissions with a base controller located up to 500 feet away from the MiniRAE 3000 (or two miles with optional RAELink3 portable modem). A personal computer can be used as the base station for a MiniRAE 3000 system. The standard ProRAE Remote software is capable of monitoring the input of up to 64 remotely located monitors, including MiniRAE 3000, AreaRAE, etc.



### Key Features

- Proven PID technology  
The patented sensor provides the following unique features:
  - 3-second response time
  - Extended range up to 15,000 ppm with improved linearity
  - Humidity compensation with integral humidity and temperature sensors
- Real-time wireless data transmission with built-in RF modem or Bluetooth
- Designed for simple service Easy access to lamp and sensor in seconds without tools
- Big graphic display for easy overview of gas type, Correction Factor and concentration
- Field-interchangeable battery pack replaced in seconds without tools
- Integrated flashlight for better view in dark conditions
- User-friendly screens, including dataplot chart view
- Integrated RAE Systems Correction Factors list for more than 200 compounds to measure more chemicals than any other PID
- Multi-language support with 12 languages encoded
- Rugged housing withstands use in harsh environments
  - IP67 waterproof design for easy cleaning and decontamination in water
  - Strong protective removable rubber boot

### Additional Advantages

- View real-time sensor data and alarm status at headquarters or command center
- Automatic lamp type recognition
- Duty-cycling™ lamp and sensor auto-cleaning technology
- Tough, flexible inlet Flex-Probe™
- 3 large keys operable with 3 layers of gloves
- Strong, built-in sample pump draws up to 100 feet (30m) horizontally or vertically
- Loud, 95dB audible alarm
- Bright red flashing visual alarm
- Interchangeable drop-in Lithium-Ion and alkaline battery packs
- Charging cradle doubles as an external battery charger
- Compatible with AutoRAE™ calibration station
- ProRAE Remote software simultaneously controls and displays readings for up to 64 remote detectors
- License-free, ISM band RF transmission with communication range up to 500 feet (2 miles with optional RAELink3 modem)
- Optional RAELink3 modem provides GPS capability to track and display readings from remote detectors and provide up to 2 miles' long-distance transmission
- Datalogging with up to 6 months of data at one-minute intervals
- 3-year 10.6 eV lamp warranty



[www.raesystems.com](http://www.raesystems.com)



ATEX







September 2018

## MiniRAE 3000

### Specifications\*

#### Detector Specifications

<b>Size</b>	10" L x 3.0" W x 2.5" H (25.5 cm x 7.6 cm x 6.4 cm)
<b>Weight</b>	26 oz (738 g)
<b>Sensors</b>	Photoionization sensor with standard 10.6 eV or optional 9.8 eV or 11.7 eV lamps
<b>Battery</b>	<ul style="list-style-type: none"> <li>• Rechargeable, as internal field-replaceable Lithium-Ion battery pack</li> <li>• Alkaline battery adapter</li> </ul>
<b>Operating Hours</b>	16 hours of operation (12 hours with alkaline battery)
<b>Display Graphic</b>	4 lines, 28 x 43 mm, with LED backlight for enhanced display readability
<b>Keypad</b>	1 operation and 2 programming keys, 1 flashlight on/off
<b>Direct Readout</b>	<ul style="list-style-type: none"> <li>• Instantaneous reading</li> <li>• VOCs as ppm by volume</li> <li>• High values</li> <li>• STEL and TWA</li> <li>• Battery and shutdown voltage</li> <li>• Date, time, temperature</li> </ul>
<b>Alarms</b>	<ul style="list-style-type: none"> <li>• 95dB at 12" (30 cm) buzzer and flashing red LED to indicate exceeded preset limits</li> <li>• High: 3 beeps and flashes per second</li> <li>• Low: 2 beeps and flashes per second</li> <li>• STEL and TWA: 1 beep and flash per second</li> <li>• Alarms latching with manual override or automatic reset</li> <li>• Additional diagnostic alarm and display message for low battery and pump stall</li> </ul>
<b>EM/RFI</b>	Highly resistant to EM/RFI. Compliant with EMC directive (2004/10/EC), R & TTE directive (1999/5/EC)
<b>IP Rating</b>	<ul style="list-style-type: none"> <li>• IP67 unit off and without flexible probe</li> <li>• IP65 unit running</li> </ul>
<b>Datalogging</b>	Standard 6 months at one-minute intervals
<b>Calibration</b>	Two-point or three-point calibration for zero and span. Calibration memory for 8 calibration gases, alarm limits, span values and calibration dates
<b>Sampling Pump</b>	<ul style="list-style-type: none"> <li>• Internal, integrated flow rate at 500 cc/min</li> <li>• Sample from 100' (30m) horizontally and vertically</li> </ul>
<b>Low Flow Alarm</b>	• Auto pump shutoff at low-flow condition
<b>Communication</b>	<ul style="list-style-type: none"> <li>• Download data and upload instrument set-up from PC through charging cradle or optional Bluetooth™</li> <li>• Wireless data transmission through built-in RF modem</li> </ul>
<b>Frequency</b>	902 to 928 MHz (license-free), 2.400 to 2.4835 GHz (license-free), 433 MHz, 869 MHz
<b>RF Range</b>	Up to 500' (152m; 900 MHz, 433 MHz, 869 MHz), extendable with RAELink3 Repeater to 2 miles (3.2km)
<b>Hazard Area Approval</b>	<ul style="list-style-type: none"> <li>• US and Canada: cULcs, Classified as Intrinsically Safe for use in Class I, Division 1 Groups A, B, C, D</li> <li>• Europe: ATEX II 2G EEx ia IIC T4</li> </ul>
<b>Temperature</b>	-4° to 122° F (-20° to 50° C)
<b>Humidity</b>	0% to 95% relative humidity (non-condensing)
<b>Attachments</b>	Durable bright yellow rubber boot
<b>Warranty</b>	3 years for 10.6 eV lamp, 1 year for pump, battery, sensor and instrument

\*Specifications are subject to change

#### Sensor Specifications

Gas Monitor	Range	Resolution	Response Time T90
VOCs	0 to 999.9 ppm	0.1 ppm	< 3 s
	1000 to 15,000 ppm	1 ppm	< 3 s

#### Monitor only includes:

- MiniRAE 3000 Monitor, Model PGM-7320
- Wireless communication module built in, as specified
- Datalogging with ProRAE Studio Package for Windows™ 98, 2000, NT, ME & XP
- Charging/download adapter
- RAE UV lamp, as specified
- Flex-i-Probe™
- External filter
- Rubber boot
- Alkaline battery adapter
- Lamp-cleaning kit
- Tool kit
- Operation CD-ROM
- Operation & Maintenance manual
- Soft leather case

#### Monitor with accessories kit adds:

- Hard transport case with pre-cut foam padding
- Charging/download cradle
- 5 Porous metal filters and O-rings
- Organic vapor zeroing kit
- Gas outlet port adapter and tubing

#### Optional calibration kit adds:

- 100 ppm isobutylene calibration gas, 34L
- Calibration regulator and flow controller

#### Optional Guaranteed Cost of Ownership Program:

- 4-year repair and replacement guarantee
- Annual maintenance service

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[www.raesystems.com](http://www.raesystems.com)

DS-1018-02





September 2018

## Solinst

## Interface Meter

Model 122 Data Sheet

### Interface Meter Model 122

Solinst Oil/Water Interface Meters give clear and accurate measurements of product level and thickness in wells and tanks.

Determination of both light (floating) non-aqueous phase liquids (LNAPL) and dense (sinking) non-aqueous phase liquids (DNAPL) is quick and easy. The factory-sealed probes are pressure proof and tapes are available in a range of lengths from 65 - 1000 ft (20 - 300 m).

The 5/8" (16 mm) diameter P1 Probe allows easy access through tight spaces and into narrow wells. The Probe is designed for use in various monitoring applications.

### Hazardous Locations Use

The Model 122 Interface Meter has been approved by the Canadian Standards Association (CSA) for use in explosive environments. It is suitable for use in hazardous locations Class I, Groups C&D.

The grounding strap is a safety essential when the meter is used in potentially explosive environments. It also ensures that the electronics are properly protected.

### Operating Principles

**Product** (Non-conductive liquid) = Steady light and tone

**Water** (Conductive liquid) = Intermittent light and tone

To detect liquids, Solinst Interface Meters use an infra-red beam and detector. When the probe enters a liquid the beam is refracted away from the detector which activates an audible tone and light. If the liquid is a non-conductive



oil/product the signals are steady. If the liquid is water (conductive liquid greater than 50  $\mu\text{S}/\text{cm}$ ), the conductivity of the water completes a conductivity circuit. This overrides the infra-red circuit, and the tone and light are intermittent.

Both sensors use exactly the same zero point, giving accuracy as good as 1/200 ft or 1.0 mm. The high accuracy enables the sensors to detect the slightest sheen of oil on the surface of the water; this is indicated by a rapid intermittent tone.



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### Accurate, Reliable, Robust

- Designed for rugged field use
- Stable electronics with automatic circuitry testing
- Tape uses stranded stainless steel conductors:
  - non-stretch; does not corrode
  - resists kinking and breaks
  - easy to repair and splice
- Sturdy free-standing reel with carrying handle

### High Quality Design

The state-of-the-art electronics include automatic circuitry testing when the 'On' button is used; 120 hours of on-time battery life; clear signals; and high accuracy.

Infra-red refraction is used to detect liquids and conductivity to distinguish water. Both optical and electronic sensors are precisely aligned at the same zero point. A steady light and tone indicate product. Water is indicated by intermittent signals.

The factory sealed probe does not need to be accessed by the user. An integral stainless steel shield protects the sensors. It is set permanently into place, yet allows for easy cleaning.

The circuits are powered by 2 standard 9V batteries which are housed in easy-access drawers in the faceplate of the reel.

### Features

- Sensor accuracy to 1/200 ft or 1.0 mm
- Certified intrinsically safe
- 5/8" (16 mm) diameter probe
- Easy access batteries: minimum 120 hours of life
- Automatic shut off after 10 minutes
- Inexpensive, simple repairs
- 3 year warranty

\* Solinst is a registered trademark of Solinst Canada Ltd.

Model 122 & 122M are CSA approved for use in hazardous locations Class I, Groups C&D

High Quality Groundwater and Surface Water Monitoring Instrumentation

Solinst



September 2018

## Solinst

## Interface Meter

**Mini Interface Meter**  
Model 122M



The 122 Mini is a convenient small version of the Solinst Interface Meter, small enough to fit in a backpack. A custom carrying bag is also an option. The Mini is available in 65 ft or 20 m lengths.

The 5/8" (16 mm) diameter probe is attached to narrow 1/4" (6 mm) tape, which is accurately marked each 1/100 ft or millimeter. Enhanced electronics allow operation for up to 300 hours of on-time, using one 9V battery.



Model 122 P1 and 122M Probes

### Probes

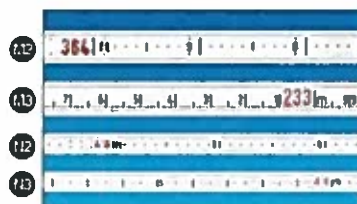
**122 P1:** 5/8" diameter (16 mm) stainless steel. The beam is emitted from within a cone-shaped tip made from rigid polyurethane. The tip is protected by an integral stainless steel shield. This probe is excellent for the vast majority of product monitoring situations.

**122M Probe:** 5/8" diameter (16 mm) stainless steel. Similar to the P1 but shorter.

### Tape

The easy-to-read markings on the tape are permanently heat-stamped into the tape. The dog bone shaped tape avoids adherence to wet surfaces in wells. It is resistant to most chemicals, and the smooth surface of the tape is easy to decontaminate, and easy to handle.

- M2** Feet and tenths: with markings every 1/100 ft.
- M3** Meters and centimeters: with markings every mm.
- N2 and N3** As above, but on the narrow 1/4" (6 mm) tape for the 122 Mini Interface Meter.



### Obtaining Product Measurements

To measure the thickness of a product layer, lower the probe into the well until the signals activate. If there is an oil/product layer on the top of the water (LNAPL), the light and tone will be steady, indicating an air/product interface.

Read the depth off the permanently marked tape. Lower the probe further into the water, where the signals become intermittent, then pull back up and take a reading at the product/water interface. The thickness of the product layer is then determined by subtracting the first reading from the second.

If there is only water in the well and no product, there will only be intermittent (water) signals.

The presence or absence of dense (sinking) non-aqueous layers (DNAPL) is determined by continuing to lower the probe to the bottom of the well.

If the steady tone and light return, this indicates a non-conductive liquid.

Measure the depth and continue lowering the probe until it touches bottom and the tape goes slack.

To determine the thickness of the DNAPL layer, subtract the first reading from the bottom depth.



### Standard Equipment

Each standard meter is provided with a grounding clip, cleaning brush, a convenient carrying bag with shoulder strap, and a tape guide/datum.

The tape guide may be used to provide support for the reel on the well casing. It acts as a datum allowing repeatably accurate measurements; ensures that the probe hangs in the centre of the well; and protects the tape from damage.

It is essential to use the grounding clip to ensure safety and proper function of the electronics in all applications.

Printed in Canada  
September 2, 2009

For further information contact: Solinst Canada Ltd.  
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Web Site: www.solinst.com E-mail: instruments@solinst.com

Solinst

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September 2018

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## Appendix D Certificates of Analysis

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September 2018

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8577382 Canada Inc. - BAE Environmental  
ATTN: BRIAN EMMS  
18 Parkview Avenue  
Oro Medonte ON L0L 2E0

Date Received: 13-SEP-18  
Report Date: 21-SEP-18 15:19 (MT)  
Version: FINAL

Client Phone: 705-715-1881

## Certificate of Analysis

Lab Work Order #: L2164170  
Project P.O. #: NOT SUBMITTED  
Job Reference: BAE1815  
C of C Numbers: 17-615757, 17-615758  
Legal Site Desc:

Melanie Moshl  
Account Manager

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ADDRESS: 95 West Beaver Creek Road, Unit 1, Richmond Hill, ON L4B 1H2 Canada | Phone: +1 905 881 9887 | Fax: +1 905 881 8062  
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RIGHT SOLUTIONS RIGHT PARTNER



-64-



September 2018



**ANALYTICAL GUIDELINE REPORT**

L2164170 CONTD...  
Page 2 of 22  
21-SEP-18 15:19 (MT)

BAE1815

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164170-1	F18-1							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	15.6		0.10	%	18-SEP-18		
<b>Volatile Organic Compounds</b>								
	Acetone	<0.50		0.50	ug/g	18-SEP-18	16	28
	Benzene	<0.0068		0.0068	ug/g	18-SEP-18	0.32	0.4
	Bromodichloromethane	<0.050		0.050	ug/g	18-SEP-18	18	18
	Bromoforn	<0.050		0.050	ug/g	18-SEP-18	0.81	1.7
	Bromomethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	18-SEP-18	0.21	1.5
	Chlorobenzene	<0.050		0.050	ug/g	18-SEP-18	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	18-SEP-18	13	13
	Chloroforn	<0.050		0.050	ug/g	18-SEP-18	0.47	0.18
	1,2-Dibromoethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-SEP-18	6.8	8.5
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-SEP-18	9.6	12
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-SEP-18	0.2	0.84
	Dichlorodifluoromethane	<0.050		0.050	ug/g	18-SEP-18	18	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	18-SEP-18	17	21
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.05
	1,1-Dichloromethylene	<0.050		0.050	ug/g	18-SEP-18	0.064	0.48
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-SEP-18	55	37
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-SEP-18	1.3	9.3
	Methylene Chloride	<0.050		0.050	ug/g	18-SEP-18	1.6	2
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-SEP-18	0.16	0.68
	ca-1,3-Dichloropropane	<0.030		0.030	ug/g	18-SEP-18		
	trans-1,3-Dichloropropane	<0.030		0.030	ug/g	18-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-SEP-18	0.18	0.21
	Ethylbenzene	<0.018		0.018	ug/g	18-SEP-18	9.5	19
	n-Hexane	<0.050		0.050	ug/g	18-SEP-18	46	88
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-SEP-18	70	88
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-SEP-18	31	210
	MTBE	<0.050		0.050	ug/g	18-SEP-18	11	3.2
	Styrene	<0.050		0.050	ug/g	18-SEP-18	34	43
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-SEP-18	0.087	0.11
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.094
	Tetrachloroethylene	<0.050		0.050	ug/g	18-SEP-18	4.5	21
	Toluene	<0.080		0.080	ug/g	18-SEP-18	68	78
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-SEP-18	6.1	12
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.11
	Trichloroethylene	<0.010		0.010	ug/g	18-SEP-18	0.91	0.81
	Trichlorofluoromethane	<0.050		0.050	ug/g	18-SEP-18	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	18-SEP-18	0.032	0.25
	o-Xylene	<0.020		0.020	ug/g	18-SEP-18		
	m+p-Xylenes	<0.030		0.030	ug/g	18-SEP-18		
	Xylenes (Total)	<0.050		0.050	ug/g	18-SEP-18	26	30
	Surrogate: 4-Bromofluorobenzene	118.6		50-140	%	18-SEP-18		
	Surrogate: 1,4-Difluorobenzene	119.3		50-140	%	18-SEP-18		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied.

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2184170-1	F18-1						#1	#2		
Sampled By:	CLIENT on 13-SEP-18 @ 08:00									
Matrix:	SOIL									
<b>Hydrocarbons</b>										
F1 (C6-C10)		<5.0		5.0	ug/g	18-SEP-18	55	65		
F1-BTEX		<5.0		5.0	ug/g	18-SEP-18	55	65		
F2 (C10-C16)		<10		10	ug/g	17-SEP-18	230	250		
F3 (C18-C34)		<50		50	ug/g	17-SEP-18	1700	2500		
F4 (C34-C50)		<50		50	ug/g	17-SEP-18	3300	6600		
Total Hydrocarbons (C6-C50)		<72		72	ug/g	18-SEP-18				
Chrom. to baseline at nC50		YES			No Unit	17-SEP-18				
Surrogate: 2-Bromobenzotrifluoride		97.6		60-140	%	17-SEP-18				
Surrogate: 3,4-Dichloroluene		85.0		60-140	%	18-SEP-18				
L2184170-2	F18-2						#1	#2		
Sampled By:	CLIENT on 13-SEP-18 @ 08:00									
Matrix:	SOIL									
<b>Physical Tests</b>										
% Moisture		15.4		0.10	%	18-SEP-18				
<b>Volatile Organic Compounds</b>										
Acetone		<0.50		0.50	ug/g	18-SEP-18	16	28		
Benzene		<0.0068		0.0068	ug/g	18-SEP-18	0.32	0.4		
Bromodichloromethane		<0.050		0.050	ug/g	18-SEP-18	18	18		
Bromoforn		<0.050		0.050	ug/g	18-SEP-18	0.61	1.7		
Bromomethane		<0.050		0.050	ug/g	18-SEP-18	0.05	0.05		
Carbon tetrachloride		<0.050		0.050	ug/g	18-SEP-18	0.21	1.5		
Chlorobenzene		<0.050		0.050	ug/g	18-SEP-18	2.4	2.7		
Dibromochloromethane		<0.050		0.050	ug/g	18-SEP-18	13	13		
Chloroforn		<0.050		0.050	ug/g	18-SEP-18	0.47	0.18		
1,2-Dibromoethane		<0.050		0.050	ug/g	18-SEP-18	0.05	0.05		
1,2-Dichlorobenzene		<0.050		0.050	ug/g	18-SEP-18	6.8	8.5		
1,3-Dichlorobenzene		<0.050		0.050	ug/g	18-SEP-18	9.6	12		
1,4-Dichlorobenzene		<0.050		0.050	ug/g	18-SEP-18	0.2	0.84		
Dichlorodifluoromethane		<0.050		0.050	ug/g	18-SEP-18	16	25		
1,1-Dichloroethane		<0.050		0.050	ug/g	18-SEP-18	17	21		
1,2-Dichloroethane		<0.050		0.050	ug/g	18-SEP-18	0.05	0.05		
1,1-Dichloroethylene		<0.050		0.050	ug/g	18-SEP-18	0.064	0.48		
cis-1,2-Dichloroethylene		<0.050		0.050	ug/g	18-SEP-18	55	37		
trans-1,2-Dichloroethylene		<0.050		0.050	ug/g	18-SEP-18	1.3	9.3		
Methylene Chloride		<0.050		0.050	ug/g	18-SEP-18	1.6	2		
1,2-Dichloropropane		<0.050		0.050	ug/g	18-SEP-18	0.16	0.68		
cis-1,3-Dichloropropene		<0.030		0.030	ug/g	18-SEP-18				
trans-1,3-Dichloropropene		<0.030		0.030	ug/g	18-SEP-18				
1,3-Dichloropropene (cis & trans)		<0.042		0.042	ug/g	18-SEP-18	0.18	0.21		
Ethylbenzene		<0.018		0.018	ug/g	18-SEP-18	9.5	19		
n-Hexane		<0.050		0.050	ug/g	18-SEP-18	46	88		
Methyl Ethyl Ketone		<0.50		0.50	ug/g	18-SEP-18	70	88		
Methyl Isobutyl Ketone		<0.50		0.50	ug/g	18-SEP-18	31	210		
MTBE		<0.050		0.050	ug/g	18-SEP-18	11	3.2		
Styrene		<0.050		0.050	ug/g	18-SEP-18	34	43		

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

Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:  
Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-HCC (C/F)

#1: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Commu. Property Use (Fine)

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164170-2	F18-2							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Volatile Organic Compounds</b>								
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-SEP-18	0.087	0.11
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.094
	Tetrachloroethylene	<0.050		0.050	ug/g	18-SEP-18	4.5	21
	Toluene	<0.080		0.080	ug/g	18-SEP-18	68	78
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-SEP-18	6.1	12
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.11
	Trichloroethylene	<0.010		0.010	ug/g	18-SEP-18	0.91	0.61
	Trichlorofluoromethane	<0.050		0.050	ug/g	18-SEP-18	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	18-SEP-18	0.032	0.25
	o-Xylene	<0.020		0.020	ug/g	18-SEP-18		
	m+p-Xylenes	<0.030		0.030	ug/g	18-SEP-18		
	Xylenes (Total)	<0.050		0.050	ug/g	18-SEP-18	26	30
	Surrogate: 4-Bromofluorobenzene	106.4		50-140	%	18-SEP-18		
	Surrogate: 1,4-Difluorobenzene	107.5		50-140	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<5.0		5.0	ug/g	18-SEP-18	55	65
	F1-BTEX	<5.0		5.0	ug/g	18-SEP-18	55	65
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	18-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	101.9		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	82.9		60-140	%	18-SEP-18		
L2164170-3	F18-3							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	15.2		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	97.9		60-140	%	17-SEP-18		
L2164170-4	F18-4							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	16.6		0.10	%	18-SEP-18		
<b>Volatile Organic Compounds</b>								
	Acetone	<0.50		0.50	ug/g	18-SEP-18	16	28
	Benzene	<0.0068		0.0068	ug/g	18-SEP-18	0.32	0.4
	Bromodichloromethane	<0.050		0.050	ug/g	18-SEP-18	18	18

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

⚠ Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICG (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
Grouping	Analyte						#1	#2
L2184170-4 F18-4								
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Volatile Organic Compounds</b>								
	Bromotom	<0.050		0.050	ug/g	18-SEP-18	0.61	1.7
	Bromomethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	18-SEP-18	0.21	1.5
	Chlorobenzene	<0.050		0.050	ug/g	18-SEP-18	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	18-SEP-18	13	13
	Chloroform	<0.050		0.050	ug/g	18-SEP-18	0.47	0.18
	1,2-Dibromoethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-SEP-18	6.8	8.5
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-SEP-18	9.6	12
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-SEP-18	0.2	0.84
	Dichlorodifluoromethane	<0.050		0.050	ug/g	18-SEP-18	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	18-SEP-18	17	21
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-SEP-18	0.064	0.48
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-SEP-18	55	37
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-SEP-18	1.3	9.3
	Methylene Chloride	<0.050		0.050	ug/g	18-SEP-18	1.6	2
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-SEP-18	0.16	0.68
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-SEP-18		
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-SEP-18	0.18	0.21
	Ethylbenzene	<0.018		0.018	ug/g	18-SEP-18	9.5	19
	n-Hexane	<0.050		0.050	ug/g	18-SEP-18	46	88
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-SEP-18	70	88
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-SEP-18	31	210
	MTBE	<0.050		0.050	ug/g	18-SEP-18	11	3.2
	Styrene	<0.050		0.050	ug/g	18-SEP-18	34	43
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-SEP-18	0.087	0.11
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.094
	Tetrachloroethylene	<0.050		0.050	ug/g	18-SEP-18	4.5	21
	Toluene	<0.080		0.080	ug/g	18-SEP-18	88	78
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-SEP-18	6.1	12
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-SEP-18	0.05	0.11
	Trichloroethylene	<0.010		0.010	ug/g	18-SEP-18	0.91	0.61
	Trichlorofluoromethane	<0.050		0.050	ug/g	18-SEP-18	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	18-SEP-18	0.032	0.25
	o-Xylene	<0.020		0.020	ug/g	18-SEP-18		
	m+p-Xylenes	<0.030		0.030	ug/g	18-SEP-18		
	Xylenes (Total)	<0.050		0.050	ug/g	18-SEP-18	26	30
	Surrogate: 4-Bromofluorobenzene	110.9		50-140	%	18-SEP-18		
	Surrogate: 1,4-Difluorobenzene	113.4		50-140	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<5.0		5.0	ug/g	18-SEP-18	55	65
	F1-BTEX	<5.0		5.0	ug/g	18-SEP-18	55	65
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2164170-4	F18-4 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2		
	<b>Hydrocarbons</b>									
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600		
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	18-SEP-18				
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18				
	Surrogate: 2-Bromobenzotrifluoride	100.7		60-140	%	17-SEP-18				
	Surrogate: 3,4-Dichlorotoluene	88.8		60-140	%	18-SEP-18				
L2164170-5	F18-5 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2		
	<b>Physical Tests</b>									
	% Moisture	15.2		0.10	%	18-SEP-18				
	<b>Hydrocarbons</b>									
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250		
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500		
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18				
	Surrogate: 2-Bromobenzotrifluoride	95.1		60-140	%	17-SEP-18				
L2164170-6	EW18-1 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2		
	<b>Physical Tests</b>									
	% Moisture	16.1		0.10	%	18-SEP-18				
	<b>Hydrocarbons</b>									
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250		
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500		
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18				
	Surrogate: 2-Bromobenzotrifluoride	92.4		60-140	%	17-SEP-18				
L2164170-7	EW18-2 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2		
	<b>Physical Tests</b>									
	% Moisture	14.0		0.10	%	18-SEP-18				
	<b>Hydrocarbons</b>									
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250		
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500		
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18				
	Surrogate: 2-Bromobenzotrifluoride	90.9		60-140	%	17-SEP-18				
L2164170-8	EW18-3 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2		

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

█ Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
Grouping	Analyte						#1	#2
L2164170-8	EW18-3							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	15.0		0.10	%	18-SEP-18		
<b>Volatile Organic Compounds</b>								
	Acetone	<0.50		0.50	ug/g	19-SEP-18	16	28
	Benzene	<0.0068		0.0068	ug/g	19-SEP-18	0.32	0.4
	Bromodichloromethane	<0.050		0.050	ug/g	19-SEP-18	18	18
	Bromoforn	<0.050		0.050	ug/g	19-SEP-18	0.61	1.7
	Bromomethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	19-SEP-18	0.21	1.5
	Chlorobenzene	<0.050		0.050	ug/g	19-SEP-18	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	19-SEP-18	13	13
	Chloroforn	<0.050		0.050	ug/g	19-SEP-18	0.47	0.18
	1,2-Dibromoethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	6.8	8.5
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	9.6	12
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	0.2	0.84
	Dichlorodifluoromethane	<0.050		0.050	ug/g	19-SEP-18	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	17	21
	1,2-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	0.064	0.48
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	55	37
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	1.3	9.3
	Methylene Chloride	<0.050		0.050	ug/g	19-SEP-18	1.8	2
	1,2-Dichloropropane	<0.050		0.050	ug/g	19-SEP-18	0.16	0.68
	cis-1,3-Dichloropropane	<0.030		0.030	ug/g	19-SEP-18		
	trans-1,3-Dichloropropane	<0.030		0.030	ug/g	19-SEP-18		
	1,3-Dichloropropane (cis & trans)	<0.042		0.042	ug/g	19-SEP-18	0.18	0.21
	Ethylbenzene	<0.018		0.018	ug/g	19-SEP-18	9.5	19
	n-Hexane	<0.050		0.050	ug/g	19-SEP-18	46	88
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	19-SEP-18	70	88
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	19-SEP-18	31	210
	MTBE	<0.050		0.050	ug/g	19-SEP-18	11	3.2
	Styrene	<0.050		0.050	ug/g	19-SEP-18	34	43
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.087	0.11
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.094
	Tetrachloroethylene	<0.050		0.050	ug/g	19-SEP-18	4.5	21
	Toluene	<0.080		0.080	ug/g	19-SEP-18	88	78
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	6.1	12
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.11
	Trichloroethylene	<0.010		0.010	ug/g	19-SEP-18	0.91	0.61
	Trichlorofluoromethane	<0.050		0.050	ug/g	19-SEP-18	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	19-SEP-18	0.032	0.25
	o-Xylene	<0.020		0.020	ug/g	19-SEP-18		
	m+p-Xylenes	<0.030		0.030	ug/g	19-SEP-18		
	Xylenes (Total)	<0.050		0.050	ug/g	19-SEP-18	26	30
	Surrogate: 4-Bromofluorobenzene	101.2		50-140	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	112.2		50-140	%	19-SEP-18		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied.

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Commu. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Commu. Property Use (Fine)



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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
L2164170-8	EW18-3 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<5.0		5.0	ug/g	19-SEP-18	55	65
	F1-BTEX	<5.0		5.0	ug/g	19-SEP-18	55	65
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	92.1		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichloroluene	75.9		60-140	%	19-SEP-18		
L2164170-9	SW18-1 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2
<b>Physical Tests</b>								
	% Moisture	15.4		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Chrom. to baseline at nC50	YES			No Limit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	93.5		60-140	%	17-SEP-18		
L2164170-10	SW18-2 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2
<b>Physical Tests</b>								
	% Moisture	14.4		0.10	%	18-SEP-18		
<b>Volatile Organic Compounds</b>								
	Acetone	<0.50		0.50	ug/g	19-SEP-18	16	28
	Benzene	<0.0068		0.0068	ug/g	19-SEP-18	0.32	0.4
	Bromodichloromethane	<0.050		0.050	ug/g	19-SEP-18	18	18
	Bromoforn	<0.050		0.050	ug/g	19-SEP-18	0.61	1.7
	Bromomethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	19-SEP-18	0.21	1.5
	Chlorobenzene	<0.050		0.050	ug/g	19-SEP-18	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	19-SEP-18	13	13
	Chloroforn	<0.050		0.050	ug/g	19-SEP-18	0.47	0.18
	1,2-Dibromoethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	6.8	8.5
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	9.6	12
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	0.2	0.84
	Dichlorodifluoromethane	<0.050		0.050	ug/g	19-SEP-18	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	17	21
	1,2-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	0.064	0.48

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
Grouping	Analyte						#1	#2
L2164170-10 SW18-2								
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Metric: SOIL								
<b>Volatile Organic Compounds</b>								
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	55	37
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	1.3	9.3
	Methylene Chloride	<0.050		0.050	ug/g	18-SEP-18	1.6	2
	1,2-Dichloropropane	<0.050		0.050	ug/g	19-SEP-18	0.18	0.68
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	19-SEP-18		
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	19-SEP-18	0.18	0.21
	Ethylbenzene	<0.018		0.018	ug/g	19-SEP-18	9.5	19
	n-Hexane	<0.050		0.050	ug/g	19-SEP-18	46	88
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	19-SEP-18	70	88
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	19-SEP-18	31	210
	MTBE	<0.050		0.050	ug/g	19-SEP-18	11	3.2
	Styrene	<0.050		0.050	ug/g	19-SEP-18	34	43
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.087	0.11
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.094
	Tetrachloroethylene	<0.050		0.050	ug/g	19-SEP-18	4.5	21
	Toluene	<0.080		0.080	ug/g	19-SEP-18	68	78
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	6.1	12
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.11
	Trichloroethylene	<0.010		0.010	ug/g	19-SEP-18	0.91	0.61
	Trichlorofluoromethane	<0.050		0.050	ug/g	19-SEP-18	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	19-SEP-18	0.032	0.25
	o-Xylene	<0.020		0.020	ug/g	19-SEP-18		
	m+p-Xylenes	<0.030		0.030	ug/g	19-SEP-18		
	Xylenes (Total)	<0.050		0.050	ug/g	19-SEP-18	28	30
	Surrogate: 4-Bromofluorobenzene	98.7		50-140	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	108.6		50-140	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C8-C10)	<5.0		5.0	ug/g	19-SEP-18	55	85
	F1-BTEX	<5.0		5.0	ug/g	19-SEP-18	55	85
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Total Hydrocarbons (C8-C50)	<72		72	ug/g	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Limit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	82.2		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	76.2		60-140	%	19-SEP-18		
L2164170-11 SW18-3								
Sampled By: CLIENT on 13-SEP-18 @ 11:00								
Metric: SOIL								
<b>Physical Tests</b>								
	% Moisture	13.5		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits				
L2164170-11	SW18-3							#1	#2		
Sampled By: CLIENT on 13-SEP-18 @ 11:00											
Matrix: SOIL											
<b>Hydrocarbons</b>											
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18		3300	6600		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18					
	Surrogate: 2-Bromobenzotrifluoride	94.2		60-140	%	17-SEP-18					
L2164170-12	TP18-7-2							#1	#2		
Sampled By: CLIENT on 12-SEP-18 @ 16:00											
Matrix: SOIL											
<b>Physical Tests</b>											
	% Moisture	14.0		0.10	%	18-SEP-18					
<b>Metals</b>											
	Antimony (Sb)	<1.0		1.0	ug/g	18-SEP-18		40	50		
	Arsenic (As)	4.0		1.0	ug/g	18-SEP-18		18	18		
	Barium (Ba)	109		1.0	ug/g	18-SEP-18		670	670		
	Beryllium (Be)	0.68		0.50	ug/g	18-SEP-18		8	10		
	Boron (B)	11.8		5.0	ug/g	18-SEP-18		120	120		
	Cadmium (Cd)	<0.50		0.50	ug/g	18-SEP-18		1.9	1.9		
	Chromium (Cr)	20.8		1.0	ug/g	18-SEP-18		160	160		
	Cobalt (Co)	9.6		1.0	ug/g	18-SEP-18		80	100		
	Copper (Cu)	19.3		1.0	ug/g	18-SEP-18		230	300		
	Lead (Pb)	8.2		1.0	ug/g	18-SEP-18		120	120		
	Molybdenum (Mo)	<1.0		1.0	ug/g	18-SEP-18		40	40		
	Nickel (Ni)	21.8		1.0	ug/g	18-SEP-18		270	340		
	Selenium (Se)	<1.0		1.0	ug/g	18-SEP-18		5.5	5.5		
	Silver (Ag)	<0.20		0.20	ug/g	18-SEP-18		40	50		
	Thallium (Tl)	<0.50		0.50	ug/g	18-SEP-18		3.3	3.3		
	Uranium (U)	<1.0		1.0	ug/g	18-SEP-18		33	33		
	Vanadium (V)	31.8		1.0	ug/g	18-SEP-18		86	86		
	Zinc (Zn)	50.3		5.0	ug/g	18-SEP-18		340	340		
<b>Polycyclic Aromatic Hydrocarbons</b>											
	Acenaphthene	<0.050		0.050	ug/g	19-SEP-18		96	96		
	Acenaphthylene	<0.050		0.050	ug/g	19-SEP-18		0.15	0.17		
	Anthracene	<0.050		0.050	ug/g	19-SEP-18		0.67	0.74		
	Benzo(a)anthracene	<0.050		0.050	ug/g	19-SEP-18		0.96	0.96		
	Benzo(a)pyrene	<0.050		0.050	ug/g	19-SEP-18		0.3	0.3		
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	19-SEP-18		0.96	0.96		
	Benzo(g,h,i)perylene	<0.050		0.050	ug/g	19-SEP-18		9.6	9.6		
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	19-SEP-18		0.96	0.96		
	Chrysene	<0.050		0.050	ug/g	19-SEP-18		9.6	9.6		
	Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	19-SEP-18		0.1	0.1		
	Fluoranthene	<0.050		0.050	ug/g	19-SEP-18		9.6	9.6		
	Fluorene	<0.050		0.050	ug/g	19-SEP-18		62	69		
	Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	19-SEP-18		0.76	0.85		
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	19-SEP-18		76	85		
	1-Methylnaphthalene	<0.030		0.030	ug/g	19-SEP-18		76	85		
	2-Methylnaphthalene	<0.030		0.030	ug/g	19-SEP-18		76	85		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164170-12	TP18-7-2 Sampled By: CLIENT on 12-SEP-18 @ 16:00 Matrix: SOIL							
<b>Polycyclic Aromatic Hydrocarbons</b>								
	Naphthalene	<0.013		0.013	ug/g	19-SEP-18	9.6	28
	Phenanthrene	<0.046		0.046	ug/g	19-SEP-18	12	16
	Pyrene	<0.050		0.050	ug/g	19-SEP-18	96	96
	Surrogate: 2-Fluorobiphenyl	95.3		50-140	%	19-SEP-18		
	Surrogate: p-Terphenyl d14	102.7		50-140	%	19-SEP-18		
L2164170-13	NW18-1 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2
<b>Physical Tests</b>								
	% Moisture	8.15		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	146		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	265		50	ug/g	17-SEP-18	3300	6600
	F4G-SG (GHH-Silica)	850		250	ug/g	17-SEP-18	3300	6600
	Chrom. to baseline at nC50	NO			No Limit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	94.3		60-140	%	17-SEP-18		
L2164170-14	NW18-2 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2
<b>Physical Tests</b>								
	% Moisture	10.0		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Chrom. to baseline at nC50	YES			No Limit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	92.8		60-140	%	17-SEP-18		
L2164170-15	NW18-1 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2
<b>Physical Tests</b>								
	% Moisture	16.4		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Chrom. to baseline at nC50	YES			No Limit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	95.7		60-140	%	17-SEP-18		
L2164170-16	NW18-2 Sampled By: CLIENT on 13-SEP-18 @ 08:00 Matrix: SOIL						#1	#2

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164170-16	WW18-2							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
% Moisture		18.3		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
F2 (C10-C16)		<10		10	ug/g	17-SEP-18	230	250
F3 (C16-C34)		<50		50	ug/g	17-SEP-18	1700	2500
F4 (C34-C50)		<50		50	ug/g	17-SEP-18	3300	6600
Chrom. to baseline at nC50		YES			No Unit	17-SEP-18		
Surrogate: 2-Bromobenzotrifluoride		90.1		60-140	%	17-SEP-18		
L2164170-17	WW18-3							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
% Moisture		6.77		0.10	%	18-SEP-18		
<b>Volatile Organic Compounds</b>								
Acetone		<0.50		0.50	ug/g	19-SEP-18	16	28
Benzene		<0.0068		0.0068	ug/g	19-SEP-18	0.32	0.4
Bromodichloromethane		<0.050		0.050	ug/g	19-SEP-18	18	18
Bromoforn		<0.050		0.050	ug/g	19-SEP-18	0.61	1.7
Bromomethane		<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
Carbon tetrachloride		<0.050		0.050	ug/g	19-SEP-18	0.21	1.5
Chlorobenzene		<0.050		0.050	ug/g	19-SEP-18	2.4	2.7
Dibromochloromethane		<0.050		0.050	ug/g	19-SEP-18	13	13
Chloroform		<0.050		0.050	ug/g	19-SEP-18	0.47	0.18
1,2-Dibromoethane		<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
1,2-Dichloroethane		<0.050		0.050	ug/g	19-SEP-18	6.8	8.5
1,3-Dichlorobenzene		<0.050		0.050	ug/g	19-SEP-18	9.6	12
1,4-Dichlorobenzene		<0.050		0.050	ug/g	19-SEP-18	0.2	0.84
Dichlorodifluoromethane		<0.050		0.050	ug/g	19-SEP-18	16	25
1,1-Dichloroethane		<0.050		0.050	ug/g	19-SEP-18	17	21
1,2-Dichloroethane		<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
1,1-Dichloroethylene		<0.050		0.050	ug/g	19-SEP-18	0.064	0.48
cs-1,2-Dichloroethylene		<0.050		0.050	ug/g	19-SEP-18	55	37
trans-1,2-Dichloroethylene		<0.050		0.050	ug/g	19-SEP-18	1.3	9.3
Methylene Chloride		<0.050		0.050	ug/g	19-SEP-18	1.6	2
1,2-Dichloropropane		<0.050		0.050	ug/g	19-SEP-18	0.15	0.68
cis-1,3-Dichloropropene		<0.030		0.030	ug/g	19-SEP-18		
trans-1,3-Dichloropropene		<0.030		0.030	ug/g	19-SEP-18		
1,3-Dichloropropene (cis & trans)		<0.042		0.042	ug/g	19-SEP-18	0.18	0.21
Ethylbenzene		<0.018		0.018	ug/g	19-SEP-18	9.5	19
n-Hexane		<0.050		0.050	ug/g	19-SEP-18	46	88
Methyl Ethyl Ketone		<0.50		0.50	ug/g	19-SEP-18	70	88
Methyl Isobutyl Ketone		<0.50		0.50	ug/g	19-SEP-18	31	210
MTBE		<0.050		0.050	ug/g	19-SEP-18	11	3.2
Styrene		<0.050		0.050	ug/g	19-SEP-18	34	43
1,1,1,2-Tetrachloroethane		<0.050		0.050	ug/g	19-SEP-18	0.087	0.11
1,1,2,2-Tetrachloroethane		<0.050		0.050	ug/g	19-SEP-18		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2184170-17	WW18-3							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Volatile Organic Compounds</b>								
	Tetrachloroethylene	<0.050		0.050	ug/g	19-SEP-18	0.05	0.094
	Toluene	<0.080		0.080	ug/g	19-SEP-18	4.5	21
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	68	78
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	6.1	12
	Trichloroethylene	<0.010		0.010	ug/g	19-SEP-18	0.05	0.11
	Trichlorofluoromethane	<0.050		0.050	ug/g	19-SEP-18	0.91	0.61
	Vinyl chloride	<0.020		0.020	ug/g	19-SEP-18	4	5.8
	o-Xylene	<0.020		0.020	ug/g	19-SEP-18	0.032	0.25
	m+p-Xylenes	<0.030		0.030	ug/g	19-SEP-18		
	Xylenes (Total)	<0.050		0.050	ug/g	19-SEP-18	26	30
	Surrogate: 4-Bromofluorobenzene	111.3		50-140	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	124.5		50-140	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C8-C10)	<5.0		5.0	ug/g	19-SEP-18	55	65
	F1-BTEX	<5.0		5.0	ug/g	19-SEP-18	55	65
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C18-C34)	130		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	143		50	ug/g	17-SEP-18	3300	6600
	F4G-SG (GHH-Silica)	440		250	ug/g	17-SEP-18	3300	6600
	Total Hydrocarbons (C8-C50)	273		72	ug/g	19-SEP-18		
	Chrom. to baseline at nC50	NO			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	98.6		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	85.4		60-140	%	19-SEP-18		
L2184170-18	WW18-4							
Sampled By: CLIENT on 13-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	18.1		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C18-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	93.0		60-140	%	17-SEP-18		
L2184170-19	TP18-1-2							
Sampled By: CLIENT on 12-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	17.8		0.10	%	18-SEP-18		
<b>Volatile Organic Compounds</b>								
	Acetone	<0.50		0.50	ug/g	19-SEP-18	16	28
	Benzene	<0.0088		0.0088	ug/g	19-SEP-18	0.32	0.4
	Bromodichloromethane	<0.050		0.050	ug/g	19-SEP-18	18	18

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2184170-19 TP18-1-2								
Sampled By: CLIENT on 12-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Volatile Organic Compounds</b>								
	Bromoform	<0.050		0.050	ug/g	19-SEP-18	0.61	1.7
	Bromomethane	<0.050		0.050	ug/g	19-SEP-18	0.06	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	19-SEP-18	0.21	1.5
	Chlorobenzene	<0.050		0.050	ug/g	19-SEP-18	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	19-SEP-18	13	13
	Chloroform	<0.050		0.050	ug/g	19-SEP-18	0.47	0.18
	1,2-Dibromoethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	6.8	8.5
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	9.6	12
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	0.2	0.84
	Dichlorodifluoromethane	<0.050		0.050	ug/g	19-SEP-18	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	17	21
	1,2-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	0.064	0.48
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	55	37
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	1.3	9.3
	Methylene Chloride	<0.050		0.050	ug/g	19-SEP-18	1.6	2
	1,2-Dichloropropane	<0.050		0.050	ug/g	19-SEP-18	0.16	0.68
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	19-SEP-18		
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	19-SEP-18	0.18	0.21
	Ethylbenzene	<0.018		0.018	ug/g	19-SEP-18	9.5	19
	n-Hexane	<0.050		0.050	ug/g	19-SEP-18	46	88
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	19-SEP-18	70	88
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	19-SEP-18	31	210
	MTBE	<0.050		0.050	ug/g	19-SEP-18	11	3.2
	Styrene	<0.050		0.050	ug/g	19-SEP-18	34	43
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.087	0.11
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.094
	Tetrachloroethylene	<0.050		0.050	ug/g	19-SEP-18	4.5	21
	Toluene	<0.080		0.080	ug/g	19-SEP-18	68	78
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	6.1	12
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.11
	Trichloroethylene	<0.010		0.010	ug/g	19-SEP-18	0.91	0.61
	Trichlorofluoromethane	<0.050		0.050	ug/g	19-SEP-18	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	19-SEP-18	0.032	0.25
	o-Xylene	<0.020		0.020	ug/g	19-SEP-18		
	m+p-Xylenes	<0.030		0.030	ug/g	19-SEP-18		
	Xylenes (Total)	<0.050		0.050	ug/g	19-SEP-18	26	30
	Surrogate: 4-Bromofluorobenzene	104.6		50-140	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	118.6		50-140	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<5.0		5.0	ug/g	19-SEP-18	55	65
	F1-BTEX	<5.0		5.0	ug/g	19-SEP-18	55	65
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500

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

█ Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied.

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits						
L2184170-19	TP18-1-2							#1	#2				
Sampled By: CLIENT on 12-SEP-18 @ 08:00													
Matrix: SOIL													
<b>Hydrocarbons</b>													
F4 (C34-C50)		<50		50	ug/g	17-SEP-18		3300	6600				
Total Hydrocarbons (C8-C50)		<72		72	ug/g	19-SEP-18							
Chrom. to baseline at nC50		YES			No Unit	17-SEP-18							
Surrogate: 2-Bromobenzotrifluoride		93.6		60-140	%	17-SEP-18							
Surrogate: 3,4-Dichlorotoluene		80.4		60-140	%	19-SEP-18							
L2184170-20	TP18-2-2							#1	#2				
Sampled By: CLIENT on 12-SEP-18 @ 08:00													
Matrix: SOIL													
<b>Physical Tests</b>													
% Moisture		19.1		0.10	%	18-SEP-18							
<b>Metals</b>													
Antimony (Sb)		<1.0		1.0	ug/g	18-SEP-18		40	50				
Arsenic (As)		4.3		1.0	ug/g	18-SEP-18		18	18				
Barium (Ba)		59.8		1.0	ug/g	18-SEP-18		670	670				
Beryllium (Be)		<0.50		0.50	ug/g	18-SEP-18		8	10				
Boron (B)		7.9		5.0	ug/g	18-SEP-18		120	120				
Cadmium (Cd)		<0.50		0.50	ug/g	18-SEP-18		1.9	1.9				
Chromium (Cr)		16.4		1.0	ug/g	18-SEP-18		160	160				
Cobalt (Co)		7.8		1.0	ug/g	18-SEP-18		80	100				
Copper (Cu)		22.8		1.0	ug/g	18-SEP-18		230	300				
Lead (Pb)		8.1		1.0	ug/g	18-SEP-18		120	120				
Molybdenum (Mo)		<1.0		1.0	ug/g	18-SEP-18		40	40				
Nickel (Ni)		18.3		1.0	ug/g	18-SEP-18		270	340				
Selenium (Se)		<1.0		1.0	ug/g	18-SEP-18		5.5	5.5				
Silver (Ag)		<0.20		0.20	ug/g	18-SEP-18		40	50				
Thallium (Tl)		<0.50		0.50	ug/g	18-SEP-18		3.3	3.3				
Uranium (U)		<1.0		1.0	ug/g	18-SEP-18		33	33				
Vanadium (V)		28.5		1.0	ug/g	18-SEP-18		88	88				
Zinc (Zn)		45.2		5.0	ug/g	18-SEP-18		340	340				
<b>Polycyclic Aromatic Hydrocarbons</b>													
Acenaphthene		<0.050		0.050	ug/g	19-SEP-18		96	96				
Acenaphthylene		<0.050		0.050	ug/g	19-SEP-18		0.15	0.17				
Anthracene		<0.050		0.050	ug/g	19-SEP-18		0.67	0.74				
Benzo(a)anthracene		<0.050		0.050	ug/g	19-SEP-18		0.96	0.96				
Benzo(a)pyrene		<0.050		0.050	ug/g	19-SEP-18		0.3	0.3				
Benzo(b)fluoranthene		<0.050		0.050	ug/g	19-SEP-18		0.96	0.96				
Benzo(g,h,i)perylene		<0.050		0.050	ug/g	19-SEP-18		9.6	9.6				
Benzo(k)fluoranthene		<0.050		0.050	ug/g	19-SEP-18		0.96	0.96				
Chrysene		<0.050		0.050	ug/g	19-SEP-18		9.6	9.6				
Dibenzo(ah)anthracene		<0.050		0.050	ug/g	19-SEP-18		0.1	0.1				
Fluoranthene		<0.050		0.050	ug/g	19-SEP-18		9.6	9.6				
Fluorene		<0.050		0.050	ug/g	19-SEP-18		62	69				
Indeno(1,2,3-cd)pyrene		<0.050		0.050	ug/g	19-SEP-18		0.76	0.95				
1+2-Methylnaphthalenes		<0.042		0.042	ug/g	19-SEP-18		76	85				

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:  
Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits							
L2164170-20	TP18-2-2													
Sampled By: CLIENT on 12-SEP-18 @ 08:00														
Matrix: SOIL														
<b>Polycyclic Aromatic Hydrocarbons</b>														
	1-Methylnaphthalene	<0.030		0.030	ug/g	19-SEP-18	76	85						
	2-Methylnaphthalene	<0.030		0.030	ug/g	19-SEP-18	76	85						
	Naphthalene	<0.013		0.013	ug/g	19-SEP-18	96	28						
	Phenanthrene	<0.046		0.046	ug/g	19-SEP-18	12	16						
	Pyrene	<0.050		0.050	ug/g	19-SEP-18	96	96						
	Surrogate: 2-Fluorobiphenyl	91.9		50-140	%	19-SEP-18								
	Surrogate: p-Terphenyl d14	78.8		50-140	%	19-SEP-18								
L2164170-21	TP-18-3-2													
Sampled By: CLIENT on 12-SEP-18 @ 08:00														
Matrix: SOIL														
<b>Physical Tests</b>														
	% Moisture	18.4		0.10	%	18-SEP-18								
<b>Metals</b>														
	Antimony (Sb)	<1.0		1.0	ug/g	18-SEP-18	40	50						
	Arsenic (As)	4.9		1.0	ug/g	18-SEP-18	18	18						
	Barium (Ba)	170		1.0	ug/g	18-SEP-18	670	670						
	Beryllium (Be)	0.93		0.50	ug/g	18-SEP-18	8	10						
	Boron (B)	17.1		5.0	ug/g	18-SEP-18	120	120						
	Cadmium (Cd)	<0.50		0.50	ug/g	18-SEP-18	1.9	1.9						
	Chromium (Cr)	31.2		1.0	ug/g	18-SEP-18	160	160						
	Cobalt (Co)	14.1		1.0	ug/g	18-SEP-18	80	100						
	Copper (Cu)	25.1		1.0	ug/g	18-SEP-18	230	300						
	Lead (Pb)	11.2		1.0	ug/g	18-SEP-18	120	120						
	Molybdenum (Mo)	<1.0		1.0	ug/g	18-SEP-18	40	40						
	Nickel (Ni)	33.0		1.0	ug/g	18-SEP-18	270	340						
	Selenium (Se)	<1.0		1.0	ug/g	18-SEP-18	5.5	5.5						
	Silver (Ag)	<0.20		0.20	ug/g	18-SEP-18	40	50						
	Thallium (Tl)	<0.50		0.50	ug/g	18-SEP-18	3.3	3.3						
	Uranium (U)	<1.0		1.0	ug/g	18-SEP-18	33	33						
	Vanadium (V)	42.5		1.0	ug/g	18-SEP-18	86	86						
	Zinc (Zn)	73.8		5.0	ug/g	18-SEP-18	340	340						
<b>Polycyclic Aromatic Hydrocarbons</b>														
	Acenaphthene	<0.050		0.050	ug/g	19-SEP-18	96	96						
	Acenaphthylene	<0.050		0.050	ug/g	19-SEP-18	0.15	0.17						
	Anthracene	<0.050		0.050	ug/g	19-SEP-18	0.67	0.74						
	Benzo(a)anthracene	<0.050		0.050	ug/g	19-SEP-18	0.96	0.86						
	Benzo(a)pyrene	<0.050		0.050	ug/g	19-SEP-18	0.3	0.3						
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	19-SEP-18	0.86	0.86						
	Benzo(g,h,i)perylene	<0.050		0.050	ug/g	19-SEP-18	9.6	9.6						
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	19-SEP-18	0.96	0.86						
	Chrysene	<0.050		0.050	ug/g	19-SEP-18	9.6	9.6						
	Dibenzo(ah)anthracene	<0.050		0.050	ug/g	19-SEP-18	0.1	0.1						
	Fluoranthene	<0.050		0.050	ug/g	19-SEP-18	9.6	9.6						
	Fluorene	<0.050		0.050	ug/g	19-SEP-18	62	69						

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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Sample Details Grouping		Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
								#1	#2
L2184170-21		TP-18-3-2							
Sampled By:		CLIENT on 12-SEP-18 @ 08:00							
Matrix:		SOIL							
Polycyclic Aromatic Hydrocarbons									
	Indeno(1,2,3-cd)pyrene		<0.050		0.050	ug/g	19-SEP-18	0.76	0.95
	1+2-Methylnaphthalenes		<0.042		0.042	ug/g	19-SEP-18	76	85
	1-Methylnaphthalene		<0.030		0.030	ug/g	19-SEP-18	76	85
	2-Methylnaphthalene		<0.030		0.030	ug/g	19-SEP-18	76	85
	Naphthalene		<0.013		0.013	ug/g	19-SEP-18	9.6	28
	Phenanthrene		<0.046		0.046	ug/g	19-SEP-18	12	16
	Pyrene		<0.050		0.050	ug/g	19-SEP-18	96	96
	Surrogate: 2-Fluorobiphenyl		88.1		50-140	%	19-SEP-18		
	Surrogate: p-Terphenyl d14		100.4		50-140	%	19-SEP-18		
L2184170-22		TP18-4-4							
Sampled By:		CLIENT on 12-SEP-18 @ 08:00							
Matrix:		SOIL							
Physical Tests									
	% Moisture		12.6		0.10	%	18-SEP-18		
Metals									
	Antimony (Sb)		<1.0		1.0	ug/g	18-SEP-18	40	50
	Arsenic (As)		5.0		1.0	ug/g	18-SEP-18	18	18
	Barium (Ba)		62.9		1.0	ug/g	18-SEP-18	670	670
	Beryllium (Be)		<0.50		0.50	ug/g	18-SEP-18	8	10
	Boron (B)		8.2		5.0	ug/g	18-SEP-18	120	120
	Cadmium (Cd)		<0.50		0.50	ug/g	18-SEP-18	1.9	1.9
	Chromium (Cr)		17.7		1.0	ug/g	18-SEP-18	160	160
	Cobalt (Co)		8.2		1.0	ug/g	18-SEP-18	80	100
	Copper (Cu)		26.9		1.0	ug/g	18-SEP-18	230	300
	Lead (Pb)		7.8		1.0	ug/g	18-SEP-18	120	120
	Molybdenum (Mo)		<1.0		1.0	ug/g	18-SEP-18	40	40
	Nickel (Ni)		18.3		1.0	ug/g	18-SEP-18	270	340
	Selenium (Se)		<1.0		1.0	ug/g	18-SEP-18	5.5	5.5
	Silver (Ag)		<0.20		0.20	ug/g	18-SEP-18	40	50
	Thallium (Tl)		<0.50		0.50	ug/g	18-SEP-18	3.3	3.3
	Uranium (U)		<1.0		1.0	ug/g	18-SEP-18	33	33
	Vanadium (V)		29.5		1.0	ug/g	18-SEP-18	66	66
	Zinc (Zn)		46.2		5.0	ug/g	18-SEP-18	340	340
Hydrocarbons									
	F2 (C10-C16)		<10		10	ug/g	17-SEP-18	230	250
	F2-Naphth		<10		10	ug/g	18-SEP-18		
	F3 (C16-C34)		<50		50	ug/g	17-SEP-18	1700	2500
	F3-PAH		<50		50	ug/g	19-SEP-18		
	F4 (C34-C50)		<50		50	ug/g	17-SEP-18	3000	6600
	Chrom. to baseline at nC50		YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride		89.4		60-140	%	17-SEP-18		
Polycyclic Aromatic Hydrocarbons									
	Acenaphthene		0.064		0.050	ug/g	19-SEP-18	96	96
	Acenaphthylene		<0.050		0.050	ug/g	19-SEP-18	0.15	0.17

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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**ANALYTICAL GUIDELINE REPORT**

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164170-22	TP18-4-4							
Sampled By:	CLIENT on 12-SEP-18 @ 08:00							
Matrix:	SOIL							
<b>Polycyclic Aromatic Hydrocarbons</b>								
	Anthracene	0.139		0.050	ug/g	19-SEP-18	0.67	0.74
	Benzo(a)anthracene	0.418		0.050	ug/g	19-SEP-18	0.96	0.96
	Benzo(a)pyrene	0.368		0.050	ug/g	19-SEP-18	*0.3	*0.3
	Benzo(b)fluoranthene	0.514		0.050	ug/g	19-SEP-18	0.96	0.96
	Benzo(g,h,i)perylene	0.209		0.050	ug/g	19-SEP-18	9.6	9.6
	Benzo(k)fluoranthene	0.177		0.050	ug/g	19-SEP-18	0.96	0.96
	Chrysene	0.462		0.050	ug/g	19-SEP-18	9.6	9.6
	Dibenzo(a,h)anthracene	0.058		0.050	ug/g	19-SEP-18	0.1	0.1
	Fluoranthene	1.22		0.050	ug/g	19-SEP-18	9.6	9.6
	Fluorene	0.059		0.050	ug/g	19-SEP-18	62	69
	Indeno(1,2,3-cd)pyrene	0.216		0.050	ug/g	19-SEP-18	0.76	0.95
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	19-SEP-18	76	85
	1-Methylnaphthalene	<0.030		0.030	ug/g	19-SEP-18	76	85
	2-Methylnaphthalene	<0.030		0.030	ug/g	19-SEP-18	76	85
	Naphthalene	0.016		0.013	ug/g	19-SEP-18	9.6	28
	Phenanthrene	0.931		0.046	ug/g	19-SEP-18	12	16
	Pyrene	0.966		0.050	ug/g	19-SEP-18	96	96
	Surrogate: 2-Fluorobiphenyl	90.6		50-140	%	19-SEP-18		
	Surrogate: p-Terphenyl d14	102.8		50-140	%	19-SEP-18		
L2164170-23	TP18-5-2							
Sampled By:	CLIENT on 12-SEP-18 @ 08:00							
Matrix:	SOIL							
<b>Physical Tests</b>								
	% Moisture	8.11		0.10	%	18-SEP-18		
<b>Volatile Organic Compounds</b>								
	Acetone	<0.50		0.50	ug/g	19-SEP-18	16	28
	Benzene	<0.0068		0.0068	ug/g	19-SEP-18	0.32	0.4
	Bromodichloromethane	<0.050		0.050	ug/g	19-SEP-18	16	16
	Bromoform	<0.050		0.050	ug/g	19-SEP-18	0.61	1.7
	Bromomethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	19-SEP-18	0.21	1.5
	Chlorobenzene	<0.050		0.050	ug/g	19-SEP-18	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	19-SEP-18	13	13
	Chloroform	<0.050		0.050	ug/g	19-SEP-18	0.47	0.18
	1,2-Dibromoethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	6.8	8.5
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	9.6	12
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	19-SEP-18	0.2	0.84
	Dichlorodifluoromethane	<0.050		0.050	ug/g	19-SEP-18	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	17	21
	1,2-Dichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	0.064	0.48
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	55	37
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	19-SEP-18	1.3	9.3

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2184170-23	TP18-5-2							
Sampled By: CLIENT on 12-SEP-18 @ 08:00								
Matrix: SOIL								
<b>Volatile Organic Compounds</b>								
	Methylene Chloride	<0.050		0.050	ug/g	19-SEP-18	1.6	2
	1,2-Dichloropropane	<0.050		0.050	ug/g	19-SEP-18	0.16	0.68
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	19-SEP-18		
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	19-SEP-18	0.18	0.21
	Ethylbenzene	0.019		0.018	ug/g	19-SEP-18	9.5	19
	n-Hexane	<0.050		0.050	ug/g	19-SEP-18	48	88
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	19-SEP-18	70	88
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	19-SEP-18	31	210
	MTBE	<0.050		0.050	ug/g	19-SEP-18	11	3.2
	Styrene	<0.050		0.050	ug/g	19-SEP-18	34	43
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.087	0.11
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.094
	Tetrachloroethylene	<0.050		0.050	ug/g	19-SEP-18	4.5	21
	Toluene	<0.080		0.080	ug/g	19-SEP-18	88	78
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	6.1	12
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	19-SEP-18	0.05	0.11
	Trichloroethylene	<0.010		0.010	ug/g	19-SEP-18	0.91	0.61
	Trichlorofluoromethane	<0.050		0.050	ug/g	19-SEP-18	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	19-SEP-18	0.032	0.25
	o-Xylene	0.099		0.020	ug/g	19-SEP-18		
	m+p-Xylenes	0.111		0.030	ug/g	19-SEP-18		
	Xylenes (Total)	0.210		0.050	ug/g	19-SEP-18	26	30
	Surrogate: 4-Bromofluorobenzene	107.0		50-140	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	120.6		50-140	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<5.0		5.0	ug/g	19-SEP-18	55	65
	F1-BTEX	<5.0		5.0	ug/g	20-SEP-18	55	65
	F2 (C10-C16)	<10		10	ug/g	19-SEP-18	230	250
	F3 (C16-C34)	140		50	ug/g	19-SEP-18	1700	2500
	F4 (C34-C50)	182		50	ug/g	19-SEP-18	3300	6600
	F4G-SG (GHH-Silica)	610		250	ug/g	19-SEP-18	3300	6600
	Total Hydrocarbons (C6-C50)	332		72	ug/g	20-SEP-18		
	Chrom. to baseline at nC50	NO		No Limit		19-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	96.2		60-140	%	19-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	78.5		60-140	%	19-SEP-18		
L2184170-24	TP18-6-2							
Sampled By: CLIENT on 12-SEP-18 @ 11:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	16.8		0.10	%	18-SEP-18		
<b>Hydrocarbons</b>								
	F2 (C10-C16)	<10		10	ug/g	17-SEP-18	230	250
	F3 (C16-C34)	<50		50	ug/g	17-SEP-18	1700	2500
	F4 (C34-C50)	<50		50	ug/g	17-SEP-18	3300	6600

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied: Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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**ANALYTICAL GUIDELINE REPORT**

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164170-24	TP18-6-2							
Sampled By: CLIENT on 12-SEP-18 @ 11:00								
Matrix: SOIL								
<b>Hydrocarbons</b>								
Chrom. to baseline at nC50		YES			No Unit	17-SEP-18		
Surrogate: 2-Bromobenzotrifluoride		93 g		60-140	%	17-SEP-18		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON\_R511-T3-SOIL-ICC (C/F)

#1: T3-Soil-Ind/Com/Comm. Property Use (Coarse)

#2: T3-Soil-Ind/Com/Comm. Property Use (Fine)



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### Reference Information

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 technique is used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j) fluoranthene, if also present in 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), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCa	SW82608/SW8270C
VOC-511-HS-WT	Soil	VOC-O Reg 153/04 (July 2011)	SW846 8280 (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:

17-615757	17-615758
-----------	-----------

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	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 wet - milligrams per kilogram based on wet weight of sample  
 mg/kg lw - 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 OC 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. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.





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### Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference***
F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-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.
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)	CCME Tier 1
--------------	------	--------------------------------	-------------

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-eg is analyzed gravimetrically.

**Notes:**

1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-eg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-eg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-eg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

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).

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1
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F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

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-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
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This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

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
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September 2018

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8577382 Canada Inc. - BAE Environmental  
ATTN: BRIAN EMMS  
18 Parkview Avenue  
Oro Medonte ON L0L 2E0

Date Received: 24-SEP-18  
Report Date: 26-SEP-18 15:41 (MT)  
Version: FINAL

Client Phone: 705-715-1881

## Certificate of Analysis

**Lab Work Order #:** L2169656  
**Project P.O. #:** NOT SUBMITTED  
**Job Reference:** BAE1815  
**C of C Numbers:** 17-639118  
**Legal Site Desc:**

Melanie Moshi  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 95 West Beaver Creek Road, Unit 1, Richmond Hill, ON L4B 1H2 Canada | Phone: +1 905 881 9887 | Fax: +1 905 881 8062  
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September 2018



**ANALYTICAL GUIDELINE REPORT**

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2169656-1	TP16-2-2							
Sampled By: B EMMS on 24-SEP-18 @ 16:00								
Matrix: SOIL								
<b>Saturated Paste Extractables</b>								
	SAR	0.77		0.10	SAR	26-SEP-18	12	
	Calcium (Ca)	3.3		1.0	mg/L	26-SEP-18		
	Magnesium (Mg)	1.9		1.0	mg/L	26-SEP-18		
	Sodium (Na)	7.1		1.0	mg/L	26-SEP-18		2300
L2169656-2	TP16-4-4							
Sampled By: B EMMS on 24-SEP-18 @ 16:00								
Matrix: SOIL								
<b>Physical Tests</b>								
	% Moisture	3.27		0.10	%	26-SEP-18		
<b>Saturated Paste Extractables</b>								
	SAR	0.79		0.10	SAR	26-SEP-18	12	
	Calcium (Ca)	3.0		1.0	mg/L	26-SEP-18		
	Magnesium (Mg)	1.9		1.0	mg/L	26-SEP-18		
	Sodium (Na)	7.1		1.0	mg/L	26-SEP-18		2300
<b>Polycyclic Aromatic Hydrocarbons</b>								
	Benzo(a)pyrene	<0.020		0.020	mg/kg	26-SEP-18	0.3	
	Surrogate: 2-Fluorobiphenyl	86.6		50-140	%	26-SEP-18		
	Surrogate: p-Terphenyl d14	99.5		50-140	%	26-SEP-18		
L2169656-3	SH-35							
Sampled By: B EMMS on 24-SEP-18 @ 16:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	Chloroform	4.9		1.0	ug/L	26-SEP-18		22

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

▲ Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T3-ICC-FINE-SOIL-WATER

#1: T3-Soil-Ind/Com/Commu. Property Use (Fine)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



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Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BAP-WT	Soil	Benzo(a)pyrene	SW486 8270
The procedure uses a mechanical shaking technique to extract a representative sub-sample with a mixture of methanol and toluene. The extract is analyzed by GC/MSD.			
MOISTURE-WT	Soil	% Moisture	Gravimetric Oven Dried
SAR-R511-WT	Soil	SAR-O Reg 15304 (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. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

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-CHLOROFORM-WT	Water	Chloroform	SW846 8260
Liquid samples are analyzed by headspace GC/MSD.			

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

Chain of Custody numbers

17-639118

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	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 ww - milligrams per kilogram based on wet weight of sample  
mg/kg lw - 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. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.



September 2018

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8577382 Canada Inc. - BAE Environmental  
ATTN: BRIAN EMMS  
18 Parkview Avenue  
Oro Medonte ON L0L 2E0

Date Received: 13-SEP-18  
Report Date: 19-SEP-18 11:54 (MT)  
Version: FINAL

Client Phone: 705-715-1881

## Certificate of Analysis

Lab Work Order #: L2164144  
Project P.O. #: NOT SUBMITTED  
Job Reference: BAE1815  
C of C Numbers: 17-615759  
Legal Site Desc:

Melanie Moshi  
Account Manager

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
Grouping	Analyte						#1	#2
L2164144-1	SH-05							
Sampled By: CLIENT on 13-SEP-18 @ 10:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	Acetone	<30		30	ug/L	19-SEP-18	130000	130000
	Benzene	<0.50		0.50	ug/L	19-SEP-18	44	430
	Bromodichloromethane	<2.0		2.0	ug/L	19-SEP-18	85000	85000
	Bromoform	<5.0		5.0	ug/L	19-SEP-18	380	770
	Bromomethane	<0.50		0.50	ug/L	19-SEP-18	5.6	56
	Carbon tetrachloride	<0.20		0.20	ug/L	19-SEP-18	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	19-SEP-18	630	630
	Dibromochloromethane	<2.0		2.0	ug/L	19-SEP-18	82000	82000
	Chloroform	10.8		1.0	ug/L	19-SEP-18	*2.4	22
	1,2-Dibromoethane	<0.20		0.20	ug/L	19-SEP-18	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	4600	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	19-SEP-18	4400	4400
	1,1-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	320	3100
	1,2-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	19-SEP-18	610	5500
	1,2-Dichloropropane	<0.50		0.50	ug/L	19-SEP-18	18	140
	cis-1,3-Dichloropropane	<0.30		0.30	ug/L	19-SEP-18		
	trans-1,3-Dichloropropane	<0.30		0.30	ug/L	19-SEP-18		
	1,3-Dichloropropane (cis & trans)	<0.50		0.50	ug/L	19-SEP-18	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	19-SEP-18	2300	2300
	n-Hexane	<0.50		0.50	ug/L	19-SEP-18	51	520
	Methyl Ethyl Ketone	<20		20	ug/L	19-SEP-18	470000	1500000
	Methyl Isobutyl Ketone	<20		20	ug/L	19-SEP-18	140000	580000
	MTBE	<2.0		2.0	ug/L	19-SEP-18	190	1400
	Styrene	<0.50		0.50	ug/L	19-SEP-18	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Toluene	<0.50		0.50	ug/L	19-SEP-18	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	640	6700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	19-SEP-18	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	19-SEP-18	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	19-SEP-18		
	m+p-Xylenes	<0.40		0.40	ug/L	19-SEP-18		
	Xylenes (Total)	<0.50		0.50	ug/L	19-SEP-18	4200	4200
	Surrogate 4-Bromofluorobenzene	99.6		70-130	%	19-SEP-18		
	Surrogate 1,4-Difluorobenzene	100.4		70-130	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<25		25	ug/L	19-SEP-18	750	750

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



September 2018



**ANALYTICAL GUIDELINE REPORT**

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164144-1	SH-05							
Sampled By: CLIENT on 13-SEP-18 @ 10:00								
Matrix: WATER								
<b>Hydrocarbons</b>								
	F1-BTEX	<25		25	ug/L	19-SEP-18	750	750
	F2 (C10-C16)	150		100	ug/L	17-SEP-18	150	150
	F3 (C16-C34)	<250		250	ug/L	17-SEP-18	500	500
	F4 (C34-C50)	<250		250	ug/L	17-SEP-18	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	100.0		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	65.0		60-140	%	19-SEP-18		
L2164144-2	SH-44							
Sampled By: CLIENT on 13-SEP-18 @ 10:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	Acetone	<30		30	ug/L	19-SEP-18	130000	130000
	Benzene	<0.50		0.50	ug/L	19-SEP-18	44	430
	Bromodichloromethane	<2.0		2.0	ug/L	19-SEP-18	85000	85000
	Bromoform	<5.0		5.0	ug/L	19-SEP-18	380	770
	Bromomethane	<0.50		0.50	ug/L	19-SEP-18	5.6	56
	Carbon tetrachloride	<0.20		0.20	ug/L	19-SEP-18	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	19-SEP-18	630	630
	Dibromochloromethane	<2.0		2.0	ug/L	19-SEP-18	82000	82000
	Chloroform	<1.0		1.0	ug/L	19-SEP-18	2.4	22
	1,2-Dibromoethane	<0.20		0.20	ug/L	19-SEP-18	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	4600	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	19-SEP-18	4400	4400
	1,1-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	320	3100
	1,2-Dichloroethane	0.96		0.50	ug/L	19-SEP-18	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	19-SEP-18	610	5500
	1,2-Dichloropropane	<0.50		0.50	ug/L	19-SEP-18	16	140
	cis-1,3-Dichloropropane	<0.30		0.30	ug/L	19-SEP-18		
	trans-1,3-Dichloropropane	<0.30		0.30	ug/L	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	19-SEP-18	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	19-SEP-18	2300	2300
	n-Hexane	<0.50		0.50	ug/L	19-SEP-18	51	520
	Methyl Ethyl Ketone	<20		20	ug/L	19-SEP-18	470000	1500000
	Methyl Isobutyl Ketone	<20		20	ug/L	19-SEP-18	140000	580000
	MTBE	<2.0		2.0	ug/L	19-SEP-18	190	1400
	Styrene	<0.50		0.50	ug/L	19-SEP-18	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

**Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)**

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

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**ANALYTICAL GUIDELINE REPORT**

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164144-2	SH-44							
Sampled By:	CLIENT on 13-SEP-18 @ 10:00							
Matrix:	WATER							
<b>Volatile Organic Compounds</b>								
	Toluene	<0.50		0.50	ug/L	19-SEP-18	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	640	8700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	19-SEP-18	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	19-SEP-18	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	19-SEP-18		
	m+p-Xylenes	<0.40		0.40	ug/L	19-SEP-18		
	Xylenes (Total)	<0.50		0.50	ug/L	19-SEP-18	4200	4200
	Surrogate: 4-Bromofluorobenzene	99.5		70-130	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C8-C10)	<25		25	ug/L	19-SEP-18	750	750
	F1-BTEX	<25		25	ug/L	19-SEP-18	750	750
	F2 (C10-C16)	<100		100	ug/L	17-SEP-18	150	150
	F3 (C16-C34)	<250		250	ug/L	17-SEP-18	500	500
	F4 (C34-C50)	<250		250	ug/L	17-SEP-18	500	500
	Total Hydrocarbons (C8-C50)	<370		370	ug/L	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	89.3		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	77.1		60-140	%	19-SEP-18		
L2164144-3	MW17-3							
Sampled By:	CLIENT on 13-SEP-18 @ 10:00							
Matrix:	WATER							
<b>Volatile Organic Compounds</b>								
	Acetone	82		30	ug/L	19-SEP-18	130000	130000
	Benzene	<0.50		0.50	ug/L	19-SEP-18	44	430
	Bromodichloromethane	6.9		2.0	ug/L	19-SEP-18	85000	85000
	Bromoforn	<5.0		5.0	ug/L	19-SEP-18	380	770
	Bromomethane	<0.50		0.50	ug/L	19-SEP-18	5.6	56
	Carbon tetrachloride	<0.20		0.20	ug/L	19-SEP-18	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	19-SEP-18	630	630
	Dibromochloromethane	3.0		2.0	ug/L	19-SEP-18	82000	82000
	Chloroforn	17.8		1.0	ug/L	19-SEP-18	2.4	22
	1,2-Dibromoethane	<0.20		0.20	ug/L	19-SEP-18	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	4800	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	18-SEP-18	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	19-SEP-18	4400	4400
	1,1-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	320	3100
	1,2-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	19-SEP-18	610	5500

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied.

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



September 2018



**ANALYTICAL GUIDELINE REPORT**

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
Grouping	Analyte						#1	#2
L2164144-3 MW17-3								
Sampled By: CLIENT on 13-SEP-18 @ 10:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	1,2-Dichloropropane	<0.50		0.50	ug/L	19-SEP-18	16	140
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	19-SEP-18	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	19-SEP-18	2300	2300
	n-Hexane	<0.50		0.50	ug/L	19-SEP-18	51	520
	Methyl Ethyl Ketone	114		20	ug/L	19-SEP-18	470000	1500000
	Methyl Isobutyl Ketone	<20		20	ug/L	19-SEP-18	140000	580000
	MTBE	<2.0		2.0	ug/L	19-SEP-18	190	1400
	Styrene	<0.50		0.50	ug/L	19-SEP-18	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Toluene	<0.50		0.50	ug/L	19-SEP-18	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	640	6700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	19-SEP-18	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	19-SEP-18	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	19-SEP-18		
	m+p-Xylenes	<0.40		0.40	ug/L	19-SEP-18		
	Xylenes (Total)	<0.50		0.50	ug/L	19-SEP-18	4200	4200
	Surrogate: 4-Bromofluorobenzene	99.7		70-130	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<25		25	ug/L	19-SEP-18	750	750
	F1-BTEX	<25		25	ug/L	19-SEP-18	750	750
	F2 (C10-C18)	<100		100	ug/L	18-SEP-18	150	150
	F3 (C18-C34)	<250		250	ug/L	18-SEP-18	500	500
	F4 (C34-C50)	<250		250	ug/L	18-SEP-18	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	18-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	96.7		60-140	%	18-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	83.0		60-140	%	18-SEP-18		
L2164144-4 MW17-4								
Sampled By: CLIENT on 13-SEP-18 @ 12:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	Acetone	<30		30	ug/L	19-SEP-18	130000	130000
	Benzene	<0.50		0.50	ug/L	19-SEP-18	44	430
	Bromodichloromethane	<2.0		2.0	ug/L	19-SEP-18	85000	85000
	Bromoform	<5.0		5.0	ug/L	19-SEP-18	380	770
	Bromomethane	<0.50		0.50	ug/L	19-SEP-18	5.6	56
	Carbon tetrachloride	<0.20		0.20	ug/L	19-SEP-18	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	19-SEP-18	630	630

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
Grouping	Analyte						#1	#2
L2164144-4 MW17-4								
Sampled By: CLIENT on 13-SEP-18 @ 12:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	Dibromochloromethane	<2.0		2.0	ug/L	19-SEP-18	82000	82000
	Chloroform	<1.0		1.0	ug/L	19-SEP-18	2.4	22
	1,2-Dibromoethane	<0.20		0.20	ug/L	19-SEP-18	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	4600	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	19-SEP-18	4400	4400
	1,1-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	320	3100
	1,2-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	19-SEP-18	610	5500
	1,2-Dichloropropane	<0.50		0.50	ug/L	19-SEP-18	16	140
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	19-SEP-18	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	19-SEP-18	2300	2300
	n-Hexane	<0.50		0.50	ug/L	19-SEP-18	51	520
	Methyl Ethyl Ketone	<20		20	ug/L	19-SEP-18	470000	1500000
	Methyl Isobutyl Ketone	<20		20	ug/L	19-SEP-18	140000	580000
	MTBE	<2.0		2.0	ug/L	19-SEP-18	180	1400
	Styrene	<0.50		0.50	ug/L	19-SEP-18	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Toluene	<0.50		0.50	ug/L	19-SEP-18	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	840	6700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	19-SEP-18	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	19-SEP-18	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	19-SEP-18		
	m+p-Xylenes	<0.40		0.40	ug/L	19-SEP-18		
	Xylenes (Total)	<0.50		0.50	ug/L	19-SEP-18	4200	4200
	Surrogate: 4-Bromofluorobenzene	98.9		70-130	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	100.3		70-130	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<25		25	ug/L	19-SEP-18	750	750
	F1-BTEX	<25		25	ug/L	19-SEP-18	750	750
	F2 (C10-C16)	<100		100	ug/L	17-SEP-18	150	150
	F3 (C16-C34)	<250		250	ug/L	17-SEP-18	500	500
	F4 (C34-C50)	<250		250	ug/L	17-SEP-18	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	88.2		60-140	%	17-SEP-18		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)





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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164144-4	MW17-4							
Sampled By: CLIENT on 13-SEP-18 @ 12:00								
Matrix: WATER								
<b>Hydrocarbons</b>								
Surrogate: 3,4-Dichlorotoluene		81.3		60-140	%	19-SEP-18		
L2164144-5	SH-22							
Sampled By: CLIENT on 13-SEP-18 @ 12:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
Acetone		<30		30	ug/L	19-SEP-18	130000	130000
Benzene		<0.50		0.50	ug/L	19-SEP-18	44	430
Bromochloromethane		<2.0		2.0	ug/L	19-SEP-18	85000	85000
Bromoforn		<5.0		5.0	ug/L	19-SEP-18	380	770
Bromomethane		<0.50		0.50	ug/L	19-SEP-18	5.6	56
Carbon tetrachloride		<0.20		0.20	ug/L	19-SEP-18	0.79	8.4
Chlorobenzene		<0.50		0.50	ug/L	19-SEP-18	630	630
Dibromochloromethane		<2.0		2.0	ug/L	19-SEP-18	82000	82000
Chloroforn		<1.0		1.0	ug/L	19-SEP-18	2.4	22
1,2-Dibromoethane		<0.20		0.20	ug/L	19-SEP-18	0.25	0.83
1,2-Dichlorobenzene		<0.50		0.50	ug/L	19-SEP-18	4600	9600
1,3-Dichlorobenzene		<0.50		0.50	ug/L	19-SEP-18	9600	9600
1,4-Dichlorobenzene		<0.50		0.50	ug/L	19-SEP-18	8	87
Dichlorodifluoromethane		<2.0		2.0	ug/L	19-SEP-18	4400	4400
1,1-Dichloroethane		<0.50		0.50	ug/L	19-SEP-18	320	3100
1,2-Dichloroethane		<0.50		0.50	ug/L	19-SEP-18	1.6	12
1,1-Dichloroethylene		<0.50		0.50	ug/L	19-SEP-18	1.6	17
cis-1,2-Dichloroethylene		<0.50		0.50	ug/L	19-SEP-18	1.6	17
trans-1,2-Dichloroethylene		<0.50		0.50	ug/L	19-SEP-18	1.6	17
Methylene Chloride		<5.0		5.0	ug/L	19-SEP-18	610	5500
1,2-Dichloropropane		<0.50		0.50	ug/L	19-SEP-18	16	140
cis-1,3-Dichloropropene		<0.30		0.30	ug/L	19-SEP-18		
trans-1,3-Dichloropropene		<0.30		0.30	ug/L	19-SEP-18		
1,3-Dichloropropene (cis & trans)		<0.50		0.50	ug/L	19-SEP-18	5.2	45
Ethylbenzene		<0.50		0.50	ug/L	19-SEP-18	2300	2300
n-Hexane		<0.50		0.50	ug/L	19-SEP-18	51	520
Methyl Ethyl Ketone		<20		20	ug/L	19-SEP-18	470000	1500000
Methyl Isobutyl Ketone		<20		20	ug/L	19-SEP-18	140000	580000
MTBE		<2.0		2.0	ug/L	19-SEP-18	190	1400
Styrene		<0.50		0.50	ug/L	19-SEP-18	1300	9100
1,1,1,2-Tetrachloroethane		<0.50		0.50	ug/L	19-SEP-18	3.3	28
1,1,2,2-Tetrachloroethane		<0.50		0.50	ug/L	19-SEP-18	3.2	15
Tetrachloroethylene		<0.50		0.50	ug/L	19-SEP-18	1.6	17
Toluene		<0.50		0.50	ug/L	19-SEP-18	18000	18000
1,1,1-Trichloroethane		<0.50		0.50	ug/L	19-SEP-18	640	6700
1,1,2-Trichloroethane		<0.50		0.50	ug/L	19-SEP-18	4.7	30
Trichloroethylene		<0.50		0.50	ug/L	19-SEP-18	1.6	17
Trichlorofluoromethane		<5.0		5.0	ug/L	19-SEP-18	2500	2500
Vinyl chloride		<0.50		0.50	ug/L	19-SEP-18	0.5	1.7
o-Xylene		<0.30		0.30	ug/L	19-SEP-18		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

**Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)**

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2184144-5	SH-22							
Sampled By: CLIENT on 13-SEP-18 @ 12:00								
Matrix: WATER								
<b>Volatiles Organic Compounds</b>								
	m+p-Xylenes	<0.40		0.40	ug/L	19-SEP-18		
	Xylenes (Total)	<0.50		0.50	ug/L	19-SEP-18	4200	4200
	Surrogate: 4-Bromofluorobenzene	99.4		70-130	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<25		25	ug/L	19-SEP-18	750	750
	F1-BTEX	<25		25	ug/L	19-SEP-18	750	750
	F2 (C10-C18)	<100		100	ug/L	17-SEP-18	150	150
	F3 (C18-C34)	<250		250	ug/L	17-SEP-18	500	500
	F4 (C34-C50)	<250		250	ug/L	17-SEP-18	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Limit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	95.7		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	78.7		60-140	%	19-SEP-18		
L2184144-6	SH-35							
Sampled By: CLIENT on 13-SEP-18 @ 12:00								
Matrix: WATER								
<b>Volatiles Organic Compounds</b>								
	Acetone	<30		30	ug/L	19-SEP-18	130000	130000
	Benzene	<0.50		0.50	ug/L	19-SEP-18	44	430
	Bromodichloromethane	7.3		2.0	ug/L	19-SEP-18	85000	85000
	Bromoforn	<5.0		5.0	ug/L	19-SEP-18	380	770
	Bromomethane	<0.50		0.50	ug/L	19-SEP-18	5.6	58
	Carbon tetrachloride	<0.20		0.20	ug/L	19-SEP-18	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	19-SEP-18	630	630
	Dibromochloromethane	2.8		2.0	ug/L	19-SEP-18	82000	82000
	Chloroforn	23.5		1.0	ug/L	19-SEP-18	724	722
	1,2-Dibromoethane	<0.20		0.20	ug/L	19-SEP-18	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	4600	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	19-SEP-18	4400	4400
	1,1-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	320	3100
	1,2-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	19-SEP-18	610	5500
	1,2-Dichloropropane	<0.50		0.50	ug/L	19-SEP-18	16	140
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	19-SEP-18	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	19-SEP-18	2300	2300
	n-Hexane	<0.50		0.50	ug/L	19-SEP-18	51	520
	Methyl Ethyl Ketone	<20		20	ug/L	19-SEP-18	470000	1500000

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

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Sample Details		Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
Grouping	Analyte						#1	#2
L2164144-6 SH-35								
Sampled By: CLIENT on 13-SEP-18 @ 12:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	Methyl Isobutyl Ketone	<20		20	ug/L	19-SEP-18	140000	580000
	MTBE	<2.0		2.0	ug/L	19-SEP-18	190	1400
	Styrene	<0.50		0.50	ug/L	19-SEP-18	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Toluene	<0.50		0.50	ug/L	19-SEP-18	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	640	6700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	19-SEP-18	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	19-SEP-18	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	19-SEP-18		
	m+p-Xylenes	<0.40		0.40	ug/L	19-SEP-18		
	Xylenes (Total)	<0.50		0.50	ug/L	19-SEP-18	4200	4200
	Surrogate: 4-Bromofluorobenzene	99.2		70-130	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C6-C10)	<25		25	ug/L	19-SEP-18	750	750
	F1-BTEX	<25		25	ug/L	19-SEP-18	750	750
	F2 (C10-C16)	<100		100	ug/L	17-SEP-18	150	150
	F3 (C16-C34)	<250		250	ug/L	17-SEP-18	500	500
	F4 (C34-C50)	<250		250	ug/L	17-SEP-18	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	93.1		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	85.5		60-140	%	19-SEP-18		
L2164144-7 SH-45								
Sampled By: CLIENT on 13-SEP-18 @ 13:00								
Matrix: WATER								
<b>Volatile Organic Compounds</b>								
	Acetone	<30		30	ug/L	19-SEP-18	130000	130000
	Benzene	<0.50		0.50	ug/L	19-SEP-18	44	430
	Bromodichloromethane	<2.0		2.0	ug/L	19-SEP-18	85000	85000
	Bromoforn	<5.0		5.0	ug/L	19-SEP-18	380	770
	Bromomethane	<0.50		0.50	ug/L	19-SEP-18	5.6	56
	Carbon tetrachloride	<0.20		0.20	ug/L	19-SEP-18	0.79	8.4
	Chlorobenzene	<0.50		0.50	ug/L	19-SEP-18	630	630
	Dibromochloromethane	<2.0		2.0	ug/L	19-SEP-18	82000	82000
	Chloroforn	<1.0		1.0	ug/L	19-SEP-18	2.4	22
	1,2-Dibromoethane	<0.20		0.20	ug/L	19-SEP-18	0.25	0.83
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	4800	9600
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	9600	9600
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-SEP-18	8	67
	Dichlorodifluoromethane	<2.0		2.0	ug/L	19-SEP-18	4400	4400

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

Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Sulfa] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits	
							#1	#2
L2164144-7	SH-45							
Sampled By: CLIENT on 13-SEP-18 @ 13:00								
Matrix: WATER								
<b>Volatiles Organic Compounds</b>								
	1,1-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	320	3100
	1,2-Dichloroethane	<0.50		0.50	ug/L	19-SEP-18	1.6	12
	1,1-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Methylene Chloride	<5.0		5.0	ug/L	19-SEP-18	610	5500
	1,2-Dichloropropane	<0.50		0.50	ug/L	19-SEP-18	16	140
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	19-SEP-18		
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	19-SEP-18	5.2	45
	Ethylbenzene	<0.50		0.50	ug/L	19-SEP-18	2300	2300
	n-Hexane	<0.50		0.50	ug/L	19-SEP-18	51	520
	Methyl Ethyl Ketone	<20		20	ug/L	19-SEP-18	470000	1500000
	Methyl Isobutyl Ketone	<20		20	ug/L	19-SEP-18	140000	580000
	MTBE	<2.0		2.0	ug/L	19-SEP-18	190	1400
	Styrene	<0.50		0.50	ug/L	19-SEP-18	1300	9100
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.3	28
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	19-SEP-18	3.2	15
	Tetrachloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Toluene	<0.50		0.50	ug/L	19-SEP-18	18000	18000
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	640	6700
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	19-SEP-18	4.7	30
	Trichloroethylene	<0.50		0.50	ug/L	19-SEP-18	1.6	17
	Trichlorofluoromethane	<5.0		5.0	ug/L	19-SEP-18	2500	2500
	Vinyl chloride	<0.50		0.50	ug/L	19-SEP-18	0.5	1.7
	o-Xylene	<0.30		0.30	ug/L	19-SEP-18		
	m+p-Xylenes	<0.40		0.40	ug/L	19-SEP-18		
	Xylenes (Total)	<0.50		0.50	ug/L	19-SEP-18	4200	4200
	Surrogate: 4-Bromofluorobenzene	97.3		70-130	%	19-SEP-18		
	Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	19-SEP-18		
<b>Hydrocarbons</b>								
	F1 (C8-C10)	<25		25	ug/L	19-SEP-18	750	750
	F1-BTEX	<25		25	ug/L	19-SEP-18	750	750
	F2 (C10-C16)	<100		100	ug/L	17-SEP-18	150	150
	F3 (C16-C34)	<250		250	ug/L	17-SEP-18	500	500
	F4 (C34-C50)	<250		250	ug/L	17-SEP-18	500	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	19-SEP-18		
	Chrom. to baseline at nC50	YES			No Unit	17-SEP-18		
	Surrogate: 2-Bromobenzotrifluoride	91.4		60-140	%	17-SEP-18		
	Surrogate: 3,4-Dichlorotoluene	79.0		60-140	%	19-SEP-18		

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

\* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)



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### Reference Information

**Methods Listed (if applicable):**

ALS Test Code	Matrix	Test Description	Method Reference***
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-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 C8 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.
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)	E3368/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)	EPA 3511/CCME Tier 1
--------------	-------	--------------------------------	----------------------

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

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).

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 2011)	SW846 8260

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
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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:**

17-615759

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

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## Reference Information

### 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 ww1 - milligrams per kilogram based on wet weight of sample  
mg/kg lw1 - 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. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.*



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8577382 Canada Inc. - BAE Environmental  
ATTN: BRIAN EMMS  
18 Parkview Avenue  
Oro Medonte ON L0L 2E0

Date Received: 19-SEP-18  
Report Date: 20-SEP-18 10:35 (MT)  
Version: FINAL

Client Phone: 705-715-1881

## Certificate of Analysis

Lab Work Order #: L2166549  
Project P.O. #: NOT SUBMITTED  
Job Reference: BAE1815  
C of C Numbers: 17-63138  
Legal Site Desc:

Melanie Mosh  
Account Manager

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Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	Batch
L2166549-1 SH17							
Sampled By: CLIENT on 18-SEP-18 @ 17:00							
Matrix: WATER							
<b>Volatile Organic Compounds</b>							
Acetone	<30		30	ug/L		20-SEP-18	R4223528
Benzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Bromodichloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Bromoforn	<5.0		5.0	ug/L		20-SEP-18	R4223528
Bromomethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Carbon tetrachloride	<0.20		0.20	ug/L		20-SEP-18	R4223528
Chlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dibromochloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Chloroforn	<1.0		1.0	ug/L		20-SEP-18	R4223528
1,2-Dibromoethane	<0.20		0.20	ug/L		20-SEP-18	R4223528
1,2-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,3-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,4-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dichlorodifluoromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
1,1-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,2-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methylene Chloride	<5.0		5.0	ug/L		20-SEP-18	R4223528
1,2-Dichloropropane	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		20-SEP-18	
Ethylbenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
n-Hexane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methyl Ethyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
Methyl Isobutyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
MTBE	<2.0		2.0	ug/L		20-SEP-18	R4223528
Styrene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Tetrachloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Toluene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichlorofluoromethane	<5.0		5.0	ug/L		20-SEP-18	R4223528
Vinyl chloride	<0.50		0.50	ug/L		20-SEP-18	R4223528
o-Xylene	<0.30		0.30	ug/L		20-SEP-18	R4223528
m+p-Xylenes	<0.40		0.40	ug/L		20-SEP-18	R4223528

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.



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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166549-1 SH17 Sampled By: CLIENT on 18-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
Xylenes (Total)	<0.50		0.50	ug/L		20-SEP-18	
Surrogate: 4-Bromofluorobenzene	97.3		70-130	%		20-SEP-18	R4223528
Surrogate: 1,4-Difluorobenzene	99.5		70-130	%		20-SEP-18	R4223528
<b>Hydrocarbons</b>							
F1 (C6-C10)	<25		25	ug/L		20-SEP-18	R4223528
F1-BTEX	<25		25	ug/L		20-SEP-18	
F2 (C10-C16)	<100		100	ug/L	19-SEP-18	20-SEP-18	R4223770
F3 (C16-C34)	<250		250	ug/L	18-SEP-18	20-SEP-18	R4223770
F4 (C34-C50)	<250		250	ug/L	18-SEP-18	20-SEP-18	R4223770
Total Hydrocarbons (C6-C50)	<370		370	ug/L		20-SEP-18	
Chrom. to baseline at nC50	YES				19-SEP-18	20-SEP-18	R4223770
Surrogate: 2-Bromobenzotrifluoride	84.1		60-140	%	19-SEP-18	20-SEP-18	R4223770
Surrogate: 3,4-Dichlorotoluene	79.5		60-140	%		20-SEP-18	R4223528
L2166549-2 SH23 Sampled By: CLIENT on 18-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
Acetone	<30		30	ug/L		20-SEP-18	R4223528
Benzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Bromodichloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Bromoforn	<5.0		5.0	ug/L		20-SEP-18	R4223528
Bromomethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Carbon tetrachloride	<0.20		0.20	ug/L		20-SEP-18	R4223528
Chlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dibromochloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Chloroforn	<1.0		1.0	ug/L		20-SEP-18	R4223528
1,2-Dibromoethane	<0.20		0.20	ug/L		20-SEP-18	R4223528
1,2-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,3-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,4-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dichlorodifluoromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
1,1-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,2-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methylene Chloride	<5.0		5.0	ug/L		20-SEP-18	R4223528
1,2-Dichloropropane	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		20-SEP-18	
Ethylbenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	Batch
L2166549-2 SH23 Sampled By: CLIENT on 16-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
n-Hexane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methyl Ethyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
Methyl Isobutyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
MTBE	<2.0		2.0	ug/L		20-SEP-18	R4223528
Styrene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Tetrachloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Toluene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichlorofluoromethane	<5.0		5.0	ug/L		20-SEP-18	R4223528
Vinyl chloride	<0.50		0.50	ug/L		20-SEP-18	R4223528
o-Xylene	<0.30		0.30	ug/L		20-SEP-18	R4223528
m+p-Xylenes	<0.40		0.40	ug/L		20-SEP-18	R4223528
Xylenes (Total)	<0.50		0.50	ug/L		20-SEP-18	R4223528
Surrogate: 4-Bromofluorobenzene	97.2		70-130	%		20-SEP-18	R4223528
Surrogate: 1,4-Difluorobenzene	98.2		70-130	%		20-SEP-18	R4223528
<b>Hydrocarbons</b>							
F1 (C6-C10)	<25		25	ug/L		20-SEP-18	R4223528
F1-BTEX	<25		25	ug/L		20-SEP-18	R4223528
F2 (C10-C18)	<100		100	ug/L	19-SEP-18	20-SEP-18	R4223770
F3 (C18-C34)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770
F4 (C34-C50)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770
Total Hydrocarbons (C6-C50)	<370		370	ug/L		20-SEP-18	R4223528
Chrom. to baseline at nC50	YES				19-SEP-18	20-SEP-18	R4223770
Surrogate: 2-Bromobenzotrifluoride	84.2		60-140	%	19-SEP-18	20-SEP-18	R4223770
Surrogate: 3,4-Dichlorobenzene	71.7		60-140	%		20-SEP-18	R4223528
L2166549-3 SH21 Sampled By: CLIENT on 16-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
Acetone	<30		30	ug/L		20-SEP-18	R4223528
Benzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Bromodichloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Bromoforn	<5.0		5.0	ug/L		20-SEP-18	R4223528
Bromomethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Carbon tetrachloride	<0.20		0.20	ug/L		20-SEP-18	R4223528
Chlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dibromochloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Chloroform	<1.0		1.0	ug/L		20-SEP-18	R4223528

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166549-3 SH21							
Sampled By: CUENT on 18-SEP-18 @ 17:00							
Matrix: WATER							
<b>Volatile Organic Compounds</b>							
1,2-Dibromoethane	<0.20		0.20	ug/L		20-SEP-18	R4223528
1,2-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,3-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,4-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dichlorodifluoromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
1,1-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,2-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methylene Chloride	<5.0		5.0	ug/L		20-SEP-18	R4223528
1,2-Dichloropropane	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		20-SEP-18	
Ethylbenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
n-Hexane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methyl Ethyl Ketone	<2.0		2.0	ug/L		20-SEP-18	R4223528
Methyl Isobutyl Ketone	<2.0		2.0	ug/L		20-SEP-18	R4223528
MTBE	<2.0		2.0	ug/L		20-SEP-18	R4223528
Styrene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Tetrachloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Toluene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichlorofluoromethane	<5.0		5.0	ug/L		20-SEP-18	R4223528
Vinyl chloride	<0.50		0.50	ug/L		20-SEP-18	R4223528
o-Xylene	<0.30		0.30	ug/L		20-SEP-18	R4223528
m+p-Xylenes	<0.40		0.40	ug/L		20-SEP-18	R4223528
Xylenes (Total)	<0.50		0.50	ug/L		20-SEP-18	
Surrogate: 4-Bromofluorobenzene	97.8		70-130	%		20-SEP-18	R4223528
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%		20-SEP-18	R4223528
<b>Hydrocarbons</b>							
F1 (C6-C10)	<25		25	ug/L		20-SEP-18	R4223528
F1-BTEX	<25		25	ug/L		20-SEP-18	
F2 (C10-C16)	<100		100	ug/L	19-SEP-18	20-SEP-18	R4223770
F3 (C16-C34)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770
F4 (C34-C50)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.



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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166549-3 SH21 Sampled By: CLIENT on 18-SEP-18 @ 17:00 Matrix: WATER							
<b>Hydrocarbons</b>							
Total Hydrocarbons (C8-C50)	<370		370	ug/L		20-SEP-18	
Chrom. to baseline at nC50	YES				18-SEP-18	20-SEP-18	R4223770
Surrogate: 2-Bromobenzotrifluoride	87.5		60-140	%	18-SEP-18	20-SEP-18	R4223770
Surrogate: 3,4-Dichlorotoluene	81.5		60-140	%		20-SEP-18	R4223528
L2166549-4 SH38 Sampled By: CLIENT on 18-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
Acetone	<30		30	ug/L		20-SEP-18	R4223528
Benzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Bromodichloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Bromoforn	<5.0		5.0	ug/L		20-SEP-18	R4223528
Bromomethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Carbon tetrachloride	<0.20		0.20	ug/L		20-SEP-18	R4223528
Chlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dibromochloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Chloroforn	<1.0		1.0	ug/L		20-SEP-18	R4223528
1,2-Dibromoethane	<0.20		0.20	ug/L		20-SEP-18	R4223528
1,2-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,3-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,4-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dichlorodifluoromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
1,1-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,2-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methylene Chloride	<5.0		5.0	ug/L		20-SEP-18	R4223528
1,2-Dichloropropane	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		20-SEP-18	R4223528
Ethylbenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
n-Hexane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methyl Ethyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
Methyl Isobutyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
MTBE	<2.0		2.0	ug/L		20-SEP-18	R4223528
Styrene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Tetrachloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Toluene	<0.50		0.50	ug/L		20-SEP-18	R4223528

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.



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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2166549-4 SH36 Sampled By: CLIENT on 18-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
1,1,1-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichlorofluoromethane	<5.0		5.0	ug/L		20-SEP-18	R4223528
Vinyl chloride	<0.50		0.50	ug/L		20-SEP-18	R4223528
o-Xylene	<0.30		0.30	ug/L		20-SEP-18	R4223528
m+p-Xylenes	<0.40		0.40	ug/L		20-SEP-18	R4223528
Xylenes (Total)	<0.50		0.50	ug/L		20-SEP-18	
Surrogate: 4-Bromofluorobenzene	97.5		70-130	%		20-SEP-18	R4223528
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%		20-SEP-18	R4223528
<b>Hydrocarbons</b>							
F1 (C6-C10)	<25		25	ug/L		20-SEP-18	R4223528
F1-BTEX	<25		25	ug/L		20-SEP-18	
F2 (C10-C16)	<100		100	ug/L	19-SEP-18	20-SEP-18	R4223770
F3 (C16-C34)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770
F4 (C34-C50)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770
Total Hydrocarbons (C6-C50)	<370		370	ug/L		20-SEP-18	
Chrom. to baseline at nC50	YES				19-SEP-18	20-SEP-18	R4223770
Surrogate: 2-Bromobenzotrifluoride	85.9		60-140	%	19-SEP-18	20-SEP-18	R4223770
Surrogate: 3,4-Dichlorotoluene	84.1		60-140	%		20-SEP-18	R4223528
L2166549-5 MW17-3 Sampled By: CLIENT on 18-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
Acetone	<30		30	ug/L		20-SEP-18	R4223528
Benzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Bromodichloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Bromoforn	<5.0		5.0	ug/L		20-SEP-18	R4223528
Bromomethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Carbon tetrachloride	<0.20		0.20	ug/L		20-SEP-18	R4223528
Chlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dibromochloromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
Chloroforn	<1.0		1.0	ug/L		20-SEP-18	R4223528
1,2-Dibromoethane	<0.20		0.20	ug/L		20-SEP-18	R4223528
1,2-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,3-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,4-Dichlorobenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Dichlorodifluoromethane	<2.0		2.0	ug/L		20-SEP-18	R4223528
1,1-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,2-Dichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2168549-5 MW17-3 Sampled By: CLIENT on 18-SEP-18 @ 17:00 Matrix: WATER							
<b>Volatile Organic Compounds</b>							
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methylene Chloride	<5.0		5.0	ug/L		20-SEP-18	R4223528
1,2-Dichloropropane	<0.50		0.50	ug/L		20-SEP-18	R4223528
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		20-SEP-18	R4223528
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		20-SEP-18	
Ethylbenzene	<0.50		0.50	ug/L		20-SEP-18	R4223528
n-Hexane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Methyl Ethyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
Methyl Isobutyl Ketone	<20		20	ug/L		20-SEP-18	R4223528
MTBE	<2.0		2.0	ug/L		20-SEP-18	R4223528
Styrene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Tetrachloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Toluene	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,1-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
1,1,2-Trichloroethane	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichloroethylene	<0.50		0.50	ug/L		20-SEP-18	R4223528
Trichlorofluoromethane	<5.0		5.0	ug/L		20-SEP-18	R4223528
Vinyl chloride	<0.50		0.50	ug/L		20-SEP-18	R4223528
o-Xylene	<0.30		0.30	ug/L		20-SEP-18	R4223528
m+p-Xylenes	<0.40		0.40	ug/L		20-SEP-18	R4223528
Xylenes (Total)	<0.50		0.50	ug/L		20-SEP-18	
Surrogate: 4-Bromofluorobenzene	98.1		70-130	%		20-SEP-18	R4223528
Surrogate: 1,4-Difluorobenzene	99.8		70-130	%		20-SEP-18	R4223528
<b>Hydrocarbons</b>							
F1 (C8-C10)	<25		25	ug/L		20-SEP-18	R4223528
F1-BTEX	<25		25	ug/L		20-SEP-18	
F2 (C10-C18)	<100		100	ug/L	19-SEP-18	20-SEP-18	R4223770
F3 (C16-C34)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770
F4 (C34-C50)	<250		250	ug/L	19-SEP-18	20-SEP-18	R4223770
Total Hydrocarbons (C6-C50)	<370		370	ug/L		20-SEP-18	
Chrom. to baseline at nC50	YES				19-SEP-18	20-SEP-18	R4223770
Surrogate: 2-Bromobenzotrifluoride	88.0		60-140	%	19-SEP-18	20-SEP-18	R4223770
Surrogate: 3,4-Dichlorotoluene	79.6		60-140	%		20-SEP-18	R4223528

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.



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### Reference Information

#### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L
<p>Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:</p> <ol style="list-style-type: none"> <li>All extraction and analysis holding times were met.</li> <li>Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.</li> <li>Linearity of gasoline response within 15% throughout the calibration range.</li> </ol> <p>Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:</p> <ol style="list-style-type: none"> <li>All extraction and analysis holding times were met.</li> <li>Instrument performance showing C10, C16 and C34 response factors within 10% of their average.</li> <li>Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.</li> <li>Linearity of diesel or motor oil response within 15% throughout the calibration range.</li> </ol>			
F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS
<p>Fraction F1 is determined by analyzing by headspace-GC/FID.</p> <p>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).</p>			
F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1
<p>Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.</p> <p>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).</p>			
VOC-1,3-OCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260
<p>Liquid samples are analyzed by headspace GC/MSD.</p> <p>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).</p>			
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
<p>Total xylenes represents the sum of o-xylene and m&amp;p-xylene</p>			

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

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

#### Chain of Custody Numbers:

17-63138

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## Reference Information

### 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 weight of sample  
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.



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## Appendix E Borehole Records



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## EXPLANATION OF BOREHOLE LOG GRAPHICS, SYMBOLS AND ABBREVIATIONS

1. **Depth:** This column records the depth of geologic contacts in metres below grade.
2. **Water table:** This column records the depth of the interpreted water table based upon field observations in metres below grade.
3. **Stratigraphic Symbols and Descriptions:**

Symbol	Particle	Size (mm)
	Asphalt/Concrete	
	Fill Material (crushed stone, waste)	
	Organic Rich Topsoil	
	Boulders	>200 mm
	Cobbles	60 -200 mm
	Gravel	Coarse 20-60 Medium 4-20 Fine 2-6
	Sand	Coarse 0.6-2.0 Medium 0.2-0.6 Fine 0.08-0.2
	Silt	0.002-0.06 mm
	Clay	<0.002 mm
	Limestone	
	Shale	
	Igneous Rock	
	Metamorphic Rock	

### Textural Descriptions

trace	1-10%
some	10-20%
adjective	20-35%
"and"	35-50%
noun	50-100%

### Moisture Conditions

#### Cohesionless Soils

Dry  
Moist  
Wet  
Saturated

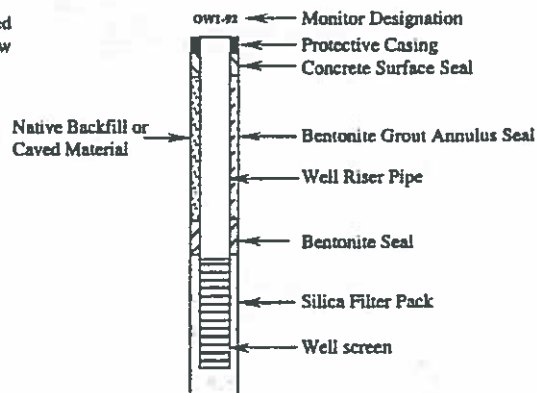
#### Cohesive Soils

DTPL - Drier Than Plastic Limit  
APL - About Plastic Limit  
WTPL - Wetter Than Plastic Limit

### Standard Penetration Resistance

Cohesionless Soils		Cohesive Soils	
Compactness	Blows / 0.3 m (N)	Consistency	Blows / 0.3 m (N)
Very loose	< 4	Very Soft	< 2
Loose	4 to 10	Soft	2 to 4
Compact	10 to 30	Firm	4 to 8
Dense	30 to 50	Stiff	8 to 15
Very Dense	> 50	Very Stiff	15 to 30
		Hard	> 30

### 4. Borehole Completion Details:



5. **Number:** designation given to sample for identification.
6. **Interval:** describes interval over which the sample was collected in metres below grade.
7. **Sample Type:**  
GS = Grab Sample  
WS = Wash Sample  
RC = Rock Core  
SS = Split Spoon Sample  
ST = Shelby Tube Sample  
AS = Auger Flight Sample  
CC = Continuous Core Sample
8. **% Recovery** =  $\frac{\text{length of core recovered}}{\text{length of run}} \times 100$
9. **'N' Value** = Standard Penetration Resistance defined as:  
  
The number of blows by a 63.6 kg (140 lb) hammer dropped 760 mm (30 in.) to drive a 50 mm (2 in.) diameter open sampler attached to "A" size drill rods for a distance of 300 mm (12 in.)

10. **Headspace Vapour Concentration:** Soil gas vapour concentration, results in units indicated.

11. **Comments:** This column is used to describe field observations, drilling details, extra laboratory tests performed or soil sub-sample intervals.





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<b>Log of Borehole: MW17-3D</b> Project #: 118205.002 <span style="float: right;">Logged By: MC</span> Project: Soil and Groundwater Assessment Client: 2153791 Ontario Ltd. Location: 1055 Talbot Street, St. Thomas, Ontario Drill Date: August 3, 2017 <span style="float: right;">Project Manager: SI</span>									
SUBSURFACE PROFILE					SAMPLE				
Depth	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Sample #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm)(RK)/(PD)	Laboratory Analysis
0		Ground Surface	0.00						
1		<b>Sand and Gravel Fill</b> Brown, moist, some silt			1	50	BH17-3 S1	0/0	
2		Wet			2	20	BH17-3 S2	0/0	
3		<b>Silty Clay Till</b> Brown, moist	3.35		3	50	BH17-3 S3	10/0	PHCs/VOCs
4		Grey, wet			4	50	BH17-3 S4	10/0	
5				5	50	BH17-3 S5	10/0		
7.62		End of Borehole	7.62	Screen					
				Silica Sand					
				Water Level ≈ 2.74 m bgs Aug. 11, 2017					

Contractor: Strata Drilling Group

Pinchin Ltd.

Grade Elevation: NM

Drilling Method: 7822 DT

73 Meg Drive

Top of Casing Elevation: NM

Well Casing Size: 5.1 cm (2")

London, ON N6E 2V2

Sheet: 1 of 1

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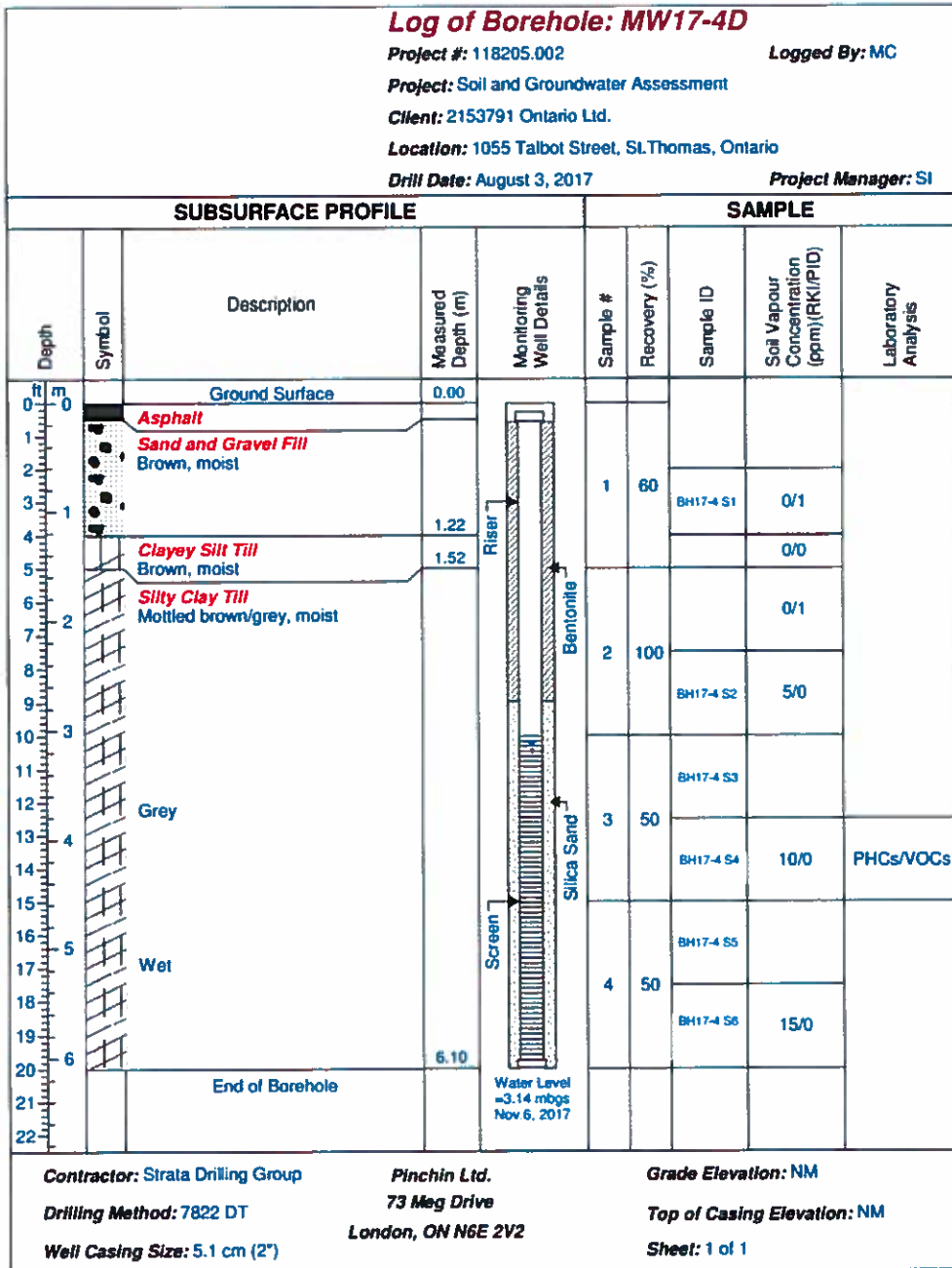


September 2018

<p style="text-align: center;"><b>Log of Borehole: MW17-3S</b>                      Project #: 118205.002 <span style="float: right;">Logged By: MC</span>                      Project: Soil and Groundwater Assessment                      Client: 2153791 Ontario Ltd.                      Location: 1055 Talbot Street, St. Thomas, Ontario                      Drill Date: August 3, 2017 <span style="float: right;">Project Manager: SI</span></p>								
SUBSURFACE PROFILE					SAMPLE			
Depth	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Sample #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm)(FKI/PID)
ft m								
-1		Ground Surface	0.00	<p style="text-align: center;">Riser Screen Silica Sand - Bentonite</p>				No soil samples collected from this well location. Soil representation similar to MW17-4D
0		<b>Sand and Gravel Fill</b> Brown, moist						
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12			3.81					
13								
14		<b>Silty Clay Till</b> Brown, moist Grey, wet		Water Level ≈2.75 mbgs Aug. 11, 2017				
15			4.57					
16		End of Borehole						
17								
18								
19								
20								
21								
22								
Contractor: Strata Drilling Group <span style="margin-left: 100px;">Pinchin Ltd.</span> <span style="float: right;">Grade Elevation: NM</span> Drilling Method: 7822 DT <span style="margin-left: 100px;">73 Meg Drive</span> <span style="float: right;">Top of Casing Elevation: NM</span> Well Casing Size: 5.1 cm (2") <span style="margin-left: 100px;">London, ON N6E 2V2</span> <span style="float: right;">Sheet: 1 of 1</span>								



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<b>Log of Borehole: MW17-4S</b> Project #: 118205.002      Logged By: MC Project: Soil and Groundwater Assessment Client: 2153791 Ontario Ltd. Location: 1055 Talbot Street, St. Thomas, Ontario Drill Date: August 3, 2017      Project Manager: SI									
SUBSURFACE PROFILE					SAMPLE				
Depth	Symbol	Description	Measured Depth (m)	Monitoring Well Details	Sample #	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm)(PKI/PID)	Laboratory Analysts
0		Ground Surface	0.00						
0		Asphalt	0.15						
1		Sand and Gravel Fill Brown, moist							No soil samples collected from this well location. Soil representation similar to MW17-4D
2									
3									
4		Clayey Silt Till Brown, moist	1.22						
5		Silty Clay Till Mottled brown/grey, moist	1.52						
6									
7									
8									
9									
10		End of Borehole	3.05						
11									

Contractor: Strata Drilling Group  
 Drilling Method: 7822 DT  
 Well Casing Size: 5.1 cm (2")

Pinchin Ltd.  
 73 Meg Drive  
 London, ON N6E 2V2

Grade Elevation: NM  
 Top of Casing Elevation: NM  
 Sheet: 1 of 1

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**Appendix F  
Qualifications of Assessors**



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**BRIAN A. EMMS, C.E.T.**

Certified Environmental Engineering Technologist

EDUCATION:

Jan 1995 – Dec 1997 Georgian College of Applied Arts and Technology  
Environmental Engineering Technology

Auto-Cad, G.I.S. mapping, organic/environmental chemistry, geology, aquatic biology, project management, land division, surveying, aerial photograph interpretation, environmental/soil sciences, soil properties, environmental assessments, engineering principles, environmental law, air pollution control, solid waste management, water and wastewater treatment

1994 - 1996 International Correspondence Schools  
Wildlife and Forestry Conservation

Reforestation, logging, private nursery practices, wildlife management, waterfowl, upland game birds, wildlife law enforcement

1978 - 1980 St. Clair College, Ontario Management Development Program

ADDITIONAL ENVIRONMENTAL COURSES:

- Waste Auditing / Reduction Planning Certificate
- Bill 143 Compliance Program Workshop
- Environmental Landscaping
- ISO 14001 Environmental Management Systems Workshop
- Phase I and Phase II Environmental Site Assessments-Lexus
- Remediation By Natural Attenuation
- MOE-RSC& SSRA Guideline Best Practices and Pitfalls
- Erosion Control and Soil Stabilisation
- Remediation Technologies For Groundwater
- Environmental Field Screening Technologies 2002
- Brownfield Remediation
- Environmental Regulation & Compliance 2002
- Contaminated & Hazardous Waste Site Management Course-2004
- Dealing With Industrial Contaminated Land Regulation & Compliance -2005
- Dealing With Industrial Contaminated Land Regulation & Compliance - 2006
- New Environmental Technologies in Canada – 2007
- Mould Identification, Analysis and Remediation – 2008
- Dealing With Industrial Contaminated Land Regulation & Compliance - 2009, 2010, 2011
- US EPA Practical Models to Support Remediation Strategy Decision-Making -2012
- US EPA Understanding of LNAPL Behavior in the Subsurface- State of Science vs. State of Practice, Parts 1, 2 & 3 – 2015
- Texas Commission on Environmental Quality - Corrective Action at Leaking Petroleum Storage Tank Sites - 2016





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**RELATED EXPERIENCE:**

February 2001- Present BAE & Associates previously Environmental Solutions

Principal / Senior Environmental Technologist

- Marketing, contract negotiations, project administration / management, Phase I, II and III Environmental Site Assessments / remediation, Emergency Spill Response, geotechnical investigations, Brownfield Rehabilitation, Mould Recognition and Removal.

May 1997-January 2001 Prominent Environmental Firm.

Branch / Project Manager  
Barrie, ON

- marketing, contract negotiations, project administration / management, Phase I, II and III Environmental Site Assessments \ remediation, report writing, RSC
- geotechnical investigations, asbestos abatement, demolition
- liaison between clients and government agencies.

**Memberships:** Ontario Association of Certified Engineering Technicians and Technologists  
Certified Member (OACETT)  
Canadian Environmental Certification Approvals Board (CECAB)

**Accomplishments:** Royal Victoria Hospital Volunteer  
United Nations Peacekeeper in Cyprus  
Participant in the Development of Ministry of Municipal Affairs and Housing – Brownfields Showcase

**G . Jan Van Iterson, P. Eng.<sup>QP</sup>**

Professional Engineer

Mr. Van Iterson has 45 years' experience as a Professional Engineer and has been associated with and involved with environmental projects and the environmental assessment process for over 10 years. Mr. Van Iterson is licensed with the Professional Engineers of Ontario, Alberta, Manitoba, New Brunswick and P.E.I.

Mr. Van Iterson has worked closely with Environmental Solutions, Canadian Soil Remediation Services, Vickers Environmental Technologies and later with Gowen Environmental in conjunction with the Ministry of Environment (MOE) on a major brownfields project in central Ontario. In that same year (2004) Mr. Van Iterson was registered with the Ministry of Environment as a Qualified Person as per Ontario Regulation 153/04. Since that time he has been associated with many ESAs and environmental site remediation for various financial institutions, municipal governments, insurance companies, law firms and the private sector. He has submitted and had acknowledged by the MOE more than 20 Record of Site Conditions as per Part XV.1 of the Environmental Protection Act and Ontario Regulation 153/04 (O. Reg. 153/04) as well as complying with several MOE Audit processes. Mr. Van Iterson keeps abreast with the latest of environmental technologies as well up to date and in accordance with Part XV.1 of the Environmental Protection Act and Ontario Regulation 153/04 - as amended by O. Reg. 511 (July, 2011).

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Appendix G  
North Parcel Survey



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