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**A REPORT TO**
**ZANCOR OAKVILE LTD.**

# PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

## PROPOSED 8-STOREY RESIDENTIAL/RETAIL BUILDING WITH 2-TO 3-LEVEL UNDERGROUND PARKING

## 2444 TO 2468 OLD BRONTE ROAD

## TOWN OF OAKVILLE

**Reference No. 1803-E058**

**March 15, 2019**

**DISTRIBUTION**

3 Copies - Zancor Oakville Ltd.

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It should be noted that the information supplied in this report may not be sufficient to obtain approval for disposal of excess soil or materials generated during construction.

## TABLE OF CONTENTS

**TABLE OF CONTENTS (Cont'd)**

## TABLES



## DRAWINGS



## APPENDICES

## 1.0 EXECUTIVE SUMMARY

Soil Engineers Ltd. (SEL) was retained by Zancor Oakville Ltd. to carry out a Phase Two Environmental Site Assessment (Phase Two ESA), as defined by Ontario Regulation (O. Reg.) 153/04, as amended. The subject property is located at 2444 to 2468 Old Bronte Road, in the Town of Oakville (hereinafter referred to as "the subject site").

The purpose of the Phase Two ESA was to determine the soil quality at the subject site, as related to the environmental concerns identified in our Phase One Environmental Site Assessement (Phase One ESA).

The field work was performed at selected locations on the subject site. Soil samples were collected and submitted for chemical analysis in accordance with the Table 2, Full Depth Generic Site Condition Standards in a Potable Groundwater Condition for Residential/Parkland/Institutional property use and for coarse textured soils (Table 2 Standards), as published in the "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" (EPA), April 15, 2011.

A review of the analytical test results of soil samples indicates the tested parameters at the test locations meet the Table 2 Standards. Consequently, there are no contaminants identified at the subject site at a concentration above the applicable site condition standards (Table 2 Standards) during the Phase Two ESA.

Based on the findings of the Phase Two ESA, it is our opinion that the property is suitable for the proposed development. No further environmental investigation is recommended at this time.

## 2.0 INTRODUCTION

Soil Engineers Ltd. (SEL) was retained by Zancor Oakville Ltd. to carry out a Phase Two Environmental Site Assessment (Phase Two ESA), as defined by Ontario Regulation (O. Reg.) 153/04, as amended by O. Regs. 366/05, 66/08, 511/09, 245/10, 179/11, 269/11 and 333/13, herein referred to as O. Reg. 153/04. The subject property is located on the west side of Old Bronte Road and north of Pine Glen Road in the Town of Oakville (hereinafter referred to as "the subject site").

The purpose of the Phase Two ESA is to determine the soil quality at the subject site, as related to the environmental concerns identified in our Phase One Environmental Site Assessement (Phase One ESA).

### 2.1 Site Description

The subject site, irregular in shape and approximately 0.697 hectares (1.72 acres) in area, is located on the west side of Old Bronte Road and north of Pine Glen Road. The municipal addresses are 2444, 2454, 2460 and 2468 Old Bronte Road, in the Town of Oakville. The subject site comprised of four (4) Property Identification Numbers (PINs). The municipal addresses, PINs, and legal descriptions associated with the subject site are summarized in the Table below:

| PIN | Municipal Address | Property Description in Parcel Register |
|---|---|---|
| 24926-2916 (LT) | 2444 Old Bronte Road | PT LT 31, CON 1 TRAF SDS PT 1 20R20816; TOWN OF OAKVILLE |
| 24926-2917 (LT) | 2454 Old Bronte Road | PT LT 31, CON 1 TRAF SDS PART 2 20R20816; TOWN OF OAKVILLE |
| 24926-2918 (LT) | 2460 Old Bronte Road | PT LT 31, CON 1 TRAF SDS PT 320R20816; TOWN OF OAKVILLE |
| 24926-0045 (LT) | 2468 Old Bronte Road | PT LT 31, CON 1 TRAFALGAR, SOUTH OF DUNDAS STREET, AS IN 520646; OAKVILLE/TRAFALGAR |

At the time of the assessment, subject site comprises four (4) parcels of land. With the exception of the building at 2460 Old Bronte Road, the former buildings were demolished at the time of the assessment.

The subject site is located in a residential area within the Town of Oakville. The neighbouring properties consist of residential properties to the northwest and southeast, a church to the northeast, and a paramedic service station and vacant lands to the southwest.

No watercourses or areas of natural significance were located on the subject site or within the Phase One Study Area. The ground surface at the subject site appears releatively flat with minor undulations, and the grade generally descends towards the south.

## 2.2 Property Ownership

This Phase Two ESA was commissioned to address the environmental concerns in accordance with our proposal dated December 12, 2018. The investigation was approved on January 10, 2019 by Ms. Stephanie Ceccanese, Project Coordinator of Zancor Oakville Ltd. Our client can be contacted at:

Zancor Oakville Ltd.
137 Bowes Road
Concord, Ontario
L4K 1H3

Attention: Mr. Anthony Pignetti

## 2.3 Current and Proposed Future Uses

The subject site is currently vacant lands with the exception of a building structure at 2460 Old Bronte Road. An 8-storey residential/commercial development with 2- to 3-levels of underground parking is being proposed for the subject site. It is anticipated that the new development will be provided with municipal services meeting urban standards.

## 2.4 Applicable Site Condition Standards

SEL has selected the applicable regulatory criteria from O. Reg. 153/04, as amended under the EPA, to assess the analytical data from the submitted soil samples. The following information was used to select the appropriate criteria:

- The subject site is not considered to be sensitive based on the definition set forth in O.Reg. 153/04 as amended, as the property is not within/adjacent/part of an area of natural significance.
- The property is not a shallow soil property, as the bedrock was not encountered within 2.0 metres below ground surface (mbgs) during the investigation.
- The subject site is located in a residential area within the Town of Oakville. Based on the information obtained from the Phase One ESA, there are two (2) domestic water wells located at the subject site which have since been decommissioned. There are eighty-one (81) water well records for neighbouring properties within 250 m from the subject site boundaries.
- Full depth generic criteria is to be used in this assessment.
- The intended property use of the subject site is residential/commercial.
- No grain size analysis has been performed for this Phase Two ESA and, therefore, coarse textured soils are automatically applied.

Based on the above evaluation, the Ministry of the Environment, Conservation and Parks (MECP) Table 2, Full Depth Generic Site Condition Standards in a Potable Groundwater Condition, for Residential/Parkland/Institutional property use and for coarse textured soils as published in the "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011 (Table 2 Standards) has been selected for evaluating the environmental conditions at the subject site.

# 3.0 BACKGROUND

## 3.1 Physical Setting

Based on the information obtained from our Phase One ESA, the general physical setting of the subject site is summarized below:

The subject site is located within a residential area in the Town of Oakville. The neighbouring properties consisted mainly of residential properties to the northwest and southeast, a church to the northeast, and a paramedic service station and vacant land to the southwest.

The subject site is situated within the physiographical region known as the Iroquois Plain. A review of a Geological Map of the area, located at the Geological Survey of Canada website indicates that the site is underlain predominantly by the Halton Till, which consists of a silt to silty clay matrix, high in matrix carbonate content and clast poor. The subject site is underlain by bedrock of the Queenston Formation (shale, limestone, dolostone, and siltstone).

The subject site is located on the west side of Old Bronte Road and north of Pine Glen Road, in the Town of Oakville. The ground surface of the subject site is relatively flat with minor undulations, and the grade generally descends towards the south. The subject site is located in the larger hydrogeological region known as Southern Ontario Lowlands. A watershed map of the area was located at the Land Information Office website (Watershed and Sub-Watershed Map) and shows the subject site is situated within the Fourteen Mile Creek Watershed.

Based on the review of the Ontario Ministry of Natural Resources and Forestry (OMNR) Natural Heritage Information Centre (NHIC) database files for listings of the various classes of natural areas located within the vicinity of the subject site, there are no watercourses or areas of natural significance located at the subject site or neighbouring properties within the Phase One Study Area.

## 3.2 Past Investigations

The following previous investigation report for the subject site was reviewed as part of this Phase Two ESA:

- Phase One Environmental Site Assessment, Proposed Residential/Commercial Development, 2444 to 2468 Old Bronte Road, Town of Oakville, Reference No. 1803-E058, dated June 15, 2018.

The Phase One ESA identified there were two (2) heating oil aboveground storage tanks (ASTs) located in the basement of 2444 Old Bronte Road. A Phase Two ESA was recommended to assess this concern.

# 4.0 SCOPE OF THE INVESTIGATION

## 4.1 Overview of Site Investigation

The purpose of this investigation (Phase Two ESA) is to assess the soil quality at the subject site, as related to the environmental concern raised in the findings of our Phase One ESA. This Phase Two ESA was conducted in general conformance with the CSA Standard Z769-00 and O. Reg. 153/04 as amended.

The scope of work for this investigation includes:

- Locate the underground and overhead utilities.
- Drill four (4) boreholes (designated as BH101 to BH104) to depths of 3.0 mbgs.
- Collect representative soil samples from the boreholes.
- Undertake field examination of the retrieved soil samples for visual and olfactory evidence of potential contamination.
- Undertake soil vapour measurements for the retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 $ppm_v$ (parts per million by volume).
- Carry out analytical testing program on selected soil samples including quality assurance/quality control (QA/QC samples) for the following parameters: Petroleum Hydrocarbons (PHCs) and Metals.
- Review analytical testing results of submitted soil samples using applicable Site Condition Standards.
- Prepare a Phase Two ESA report containing the findings of the investigation.

The rationale for the selection of borehole locations is presented in the Sampling and Analysis Plan, Appendix A.

## 4.2 Media Investigated

Based on the findings of the Phase One ESA, soil media was investigated during the Phase Two ESA in accordance with the Sampling and Analysis Plan provided in Appendix 'A'. Groundwater and sediment were not identified as potentially contaminated media in our Phase One ESA. Consequently, no groundwater or sediment investigation was conducted as part of this Phase Two ESA.

Boreholes were advanced using a track-mounted direct push drilling machine (Powerprobe 9700 VTR PRO) equipped with Shelby tube samplers: Soil samples were logged in the field and head space vapour screening was conducted for all retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 $ppm_v$.

No groundwater monitoring wells were installed in the boreholes.

## 4.3 Phase One Conceptual Site Model

A plan, illustrating the features of the subject site and surrounding areas within 250 m from the subject site boundaries including the locations of potentially contaminating activities (PCAs), is presented in Drawing No. 1.

## 4.4 Deviations from Sampling and Analysis Plan

No deviations from the sampling and analysis plan were encountered.

## 4.5 Impediments

No impediments were encountered during the investigation for the Phase Two ESA.

## 5.0 INVESTIGATION METHOD

### 5.1 General

The Phase Two ESA was carried out in accordance with the Sampling and Analysis Plan provided in Appendix 'A' and in accordance with the SEL Standard Operating Procedures.

The Phase Two ESA consisted of drilling four (4) boreholes, field measurements, and collection of soil samples from two of four drilled boreholes for chemical analysis. The soil samples were assessed for the potential contamination with respect to the Areas of Potential Environmental Concern (APEC) identified by our Phase One ESA.

The sampling and decontamination procedures were conducted in accordance with the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures were carried out in accordance with the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", dated March 9, 2004, amended as of July 1, 2011, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

### 5.2 Drilling and Excavating

Prior to the field work, the underground utilities were located and marked out in the field by representatives of the major utility companies and a private locator (C.L. Locates Inc.).

The field work for this investigation was conducted on February 11, 2019, and consisted of drilling four (4) boreholes (designated as BH101 to BH104) to depths of 3.0 metres below ground surface (mbgs) for sampling and testing. The locations of the boreholes are shown on Drawing No. 2.

The boreholes were advanced using a direct push drilling machine (i.e. Powerprobe), equipped with sampling rods, supplied by a drilling contractor, Profile Drilling Inc. Soil samples from the boreholes were recovered at regular intervals using Shelby tube samplers for soil vapour measurement, soil classification and visual and olfactory observations.

Drilling equipment such as drill rigs, augers, drill pipes, drilling rods and split-spoons are decontaminated prior to initial use, between borehole locations and at the completion of drilling activities. The drilling equipment is manually scrubbed with a brush using a phosphate-free solution and power washed to remove any adhered soils, foreign material and potential contaminants. In addition, any of the sampling equipment is decontaminated prior to each usage.

The field work was supervised by a SEL environmental technician who recorded the findings and observations.

### 5.3 Soil: Sampling

Soil samples from the boreholes were retrieved at regular intervals, using a stainless Shelby tube sampler. Prior to recovering a sample, the sampling equipment was brushed clean using a solution of phosphate-free detergent and distilled water, and each discrete sample was handled by the sampler with new disposable gloves in order to avoid the risk of cross-contamination between the samples. Each soil sample was split with part of the sample sealed in a laboratory-prepared glass jar and stored in a cooler with ice, and the remainder of the sample sealed in a double sealable bag for vapour measurement and soil classification. A small amount of the soil sample was retrieved by a disposable 'T' shaped Terracore sampler and the soil samples from the Terracore sampler were stored in methanol vials for F1 analyses.

The subsoil conditions at the borehole locations indicate a layer of topsoil, asphalt and/or gravel followed by silty clay till at the borehole locations. Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs provided in Appendix 'B'.

Based on the soil vapour measurements and visual and olfactory observations, representative worst case soil samples from each borehole were selected and sent to the laboratory for chemical analyses.

## 5.4 Field Screening Measurements

The headspace vapour concentrations were measured using a portable RKI Eagle gas detector, TYPE 101 (Serial Number: E091015) set to include flammable gases with the exception of methane (methane elimination mode), and having a minimum detection level of 2 $ppm_v$. Prior to taking the measurements, the instrument was calibrated to hexane standards for both ppm and LEL according to the instruction manual for the instrument. Our technician was trained by the supplier for the proper calibration procedure. The instrument is calibrated or tuned up by the supplier (Pine Environmental Service Inc.) seasonally.
The results of the soil vapour measurement are presented in Borehole Logs, Appendix 'B'.

The representative worst case soil samples based on the soil vapour measurements and visual and olfactory observations were selected from each borehole and submitted to the laboratory for chemical analyses.

## 5.5 Groundwater: Sampling

Groundwater was not assessed as part of this investigation.

## 5.6 Sediment: Sampling

Sediment was not assessed as part of this investigation.

## 5.7 Analytical Testing

The soil samples were analysed by Maxxam Analytics Inc (Maxxam) in Mississauga, Ontario. Maxxam is accredited by Canadian Association for Laboratory Accreditation (CALA) in

accordance with ISO/IEC 17025:2005 – "General Requirements for the Competence of Testing and Calibration Laboratories" for all the parameters analysed during this investigation.

## 5.8 Residue Management Procedures

There was no significant volume of excess soil generated from the field investigation. Consequently, there was no residue management procedure required as part of this Phase Two ESA.

## 5.9 Elevation Surveying

The elevation at each of the borehole locations was surveyed using a hand-held (Trimble Geoexplorer 6000 Series) Global Navigation Satellite System measurement equipment. The equipment is capable of having vertical and horizontal accuracy of 0.1± m.

The elevations at the borehole locations are presented in the borehole logs in Appendix 'B'.

## 5.10 Quality Assurance and Quality Control Measures

The soil sampling and analysis plan provided in Appendix 'A' was prepared and executed based on the findings of our Phase One ESA.

The Phase Two ESA was carried out in accordance with the Sampling and Analysis Plan and in accordance with the SEL Standard Operating Procedures.

The sampling and decontamination procedures were conducted in accordance with the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures were carried out in accordance with the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1

of the Environmental Protection Act", dated March 9, 2004, amended as of July 1, 2011, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

Field observations were made and documented in a field book in accordance with generally accepted practices and with the procedures developed and utilized by SEL.

SEL field sampling QA/QC protocols, applied to the investigation, are as follows:

- The collection of at least one field duplicate sample per site for every sampling media (where three or more such samples are collected).
- Where volatile organic chemical analysis is required, the collection of discrete samples directly into laboratory-prepared sample vials and immediate placement into a cooler with ice to maintain the temperature at less than 10 °C for transport to the laboratory.
- If trace organics in the collected samples are anticipated (organic chemicals with a concentration of less than 1 µg/g), precautions are made to avoid any possible cross-contamination (eliminating bare hand or latex glove contacts with the soil or water; soil sampling equipment used for the collection of trace organics are cleaned using a phosphate-free detergent and water, followed by a distilled water rinse and a methanol rinse between sampling sites.

The result of the field duplicate sample is discussed later in Section 6 of this report.

## 6.0 REVIEW AND EVALUATION

### 6.1 Geology

Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs provided in Appendix 'B'. The field investigation has disclosed that beneath the surface course of granular fill, a silty clay till deposits at the borehole locations. No bedrock was encountered during the Phase Two ESA.

The descriptions of the strata encountered at the borehole locations are briefly discussed below.

**Granular Fill**

Granular Fill, approximately 0.15m to 0.3m in thickness, is contacted at the at the ground surface of the borehole locations.

**Silty Clay Till**

Underlying the granular fill, a silty clay till deposit was encountered at the borehole locations, at depths of 0.15m to 0.3m below ground surface (mbgs). The silty clay till deposit at BH 101 and BH 102 locations were disturbed to the depths of approximately 2.4mbgs due to backfilling process of the building basement using the on-site material. The boreholes were terminated in the silty clay till at depths of 3.0 mbgs.

**Hydrogeology**

Groundwater was not encountered at the borehole locations during the field investigation. Groundwater was not investigated as part of the Phase Two ESA.

## 6.2 Fine-Medium Soil Texture

No grain size analysis was performed as part of the Phase Two ESA. Therefore, site condition standards for coarse textured soils were used in the assessment.

## 6.3 Soil: Field Screening

Head space vapour screening was conducted for all retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 $ppm_v$.

Soil vapour readings of 0 $ppm_v$ were recorded for all collected soil samples, indicating non-detectable combustible gases in the soil samples retrieved from the boreholes.

## 6.4 Soil Quality

Representative "worst case" soil sample from each borehole was selected based on the soil vapour measurements and visual and olfactory observations. The selected soil samples were submitted to the laboratory for chemical analyses of PHCs and Metals.

The soil test results were reviewed using the Table 2, Full Depth Generic Site Condition Standards in a Potable Groundwater Condition for Residential/Parkland/Institutional property use and for coarse textured soils as published in the "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011 (Table 2 Standards).

Soil quality data containing results of the chemical analyses for the tested soil samples are presented in Table I. Maximum concentrations of the tested parameters in soil are presented in Table II.

The Certificates of Analysis for the soil samples is presented in Appendix 'C'.

The findings of the soil test results are summarized below:

**Petroleum Hydrocarbons (PHCs)**

Two (2) original soil samples were submitted for analysis of PHCs. The test results indicate the tested soil samples were below the laboratory reported detection limits and meet the Table 2 Standards.

**Metals**

Two (2) original soil samples and one duplicate sample were submitted for analysis of Metals. The concentrations of metals in the tested soil samples meet the Table 2 Standards.

## 6.5 Groundwater Quality

Groundwater was not assessed as part of this investigation.

## 6.6 Sediment Quality

Sediment was not assessed as part of this investigation.

## 6.7 Quality Assurance and Quality Control Results

The Phase Two ESA was carried out in accordance with the Sampling and Analysis Plan and in accordance with the SEL Standard Operating Procedures.

The sampling and decontamination procedures were conducted in accordance with the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures were carried out in accordance with the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", dated March 9, 2004, amended as of July 1, 2011, in accordance with O. Reg. 511/09 and O. Reg. 269/11 (herein referred to as Analytical Protocol).

### 6.7.1 Field Quality Assurance/Quality Control Samples

As part of the QA/QC program for the Phase Two ESA, QC samples in the form of a field duplicate were analysed. The field duplicate sample was collected in the field for Metals in soil. Details of QC samples including their analysis results are presented below:

**Field Duplicate**

A total of one (1) field duplicate soil sample was collected and submitted for chemical analysis. Details of duplicate sampling and analysis are presented in the Table below:

| Duplicate Sample ID | Original Sample ID | Media | Test Conducted |
|---|---|---|---|
| DUP1 | BH102/2A | Soil | Metals |

The result of the analysis of the field duplicate sample is similar to the results for the original sample and relative percent differences for the detectable tested parameters are within the acceptable range. However, the relative percent differences could not be calculated between the original and duplicate samples in the situation where the original and/or duplicate samples were below the reported laboratory detection limits.

The Certificates of Analysis for the QA/QC samples are included in Appendix 'C'.

### 6.7.2 Sample Handling in Accordance with the Analytical Protocol

The samples analyzed as part of the Phase Two ESA were handled in accordance with the analytical protocol with respect to holding time, preservation method, storage requirement and sample container type.

### 6.7.3 Certification of Results

Based on the review of the QA/QC sample results for the soil samples of this investigation, the Chain of Custody forms and the laboratory Certificate of Analysis, it is certified that:

- All Certificates of Analysis or Analytical Reports received pursuant to Section 47(2) of O. Reg. 153/04, as amended, comply with Section 47(3) of O. Reg. 153/04, as amended.
- A Certificate of Analysis or Analytical Report was received for each sample submitted for analysis.
- Copies of all Certificates of Analysis are included in Appendix 'C'.

### 6.7.4 Data Validation

The Analytical Protocol establishes Acceptance Limits for use when assessing the reliability of data reported by analytical laboratories including maximum holding times for the storage of samples/sample extracts between collection and analysis, analytical methods, field and/or laboratory quality assurance samples, recovery ranges for spiked samples and surrogates, Reporting Detection Limits (RDLs, mandatory maximum method detection limits) and precision required when analyzing laboratory replicate and spiked samples.

The review of the data in the Certificate of Analysis indicates:

- All samples/sample extracts were analyzed within their applicable holding times using approved analytical methods.
- No tested parameters were detected in any laboratory blank samples.

- The Reported Detection Limits were met for the tested parameters.
- The result of the laboratory duplicate samples is similar to the results for the original sample and relative percent differences for the detectable tested parameters are within the acceptable range.

### 6.7.5 Data Quality Objectives

In conclusion, the overall quality of field data did not affect decision making and the overall objectives of the investigation were met.

## 6.8 Phase Two Conceptual Site Model

The Phase Two Conceptual Site Model is prepared based on the findings of the Phase One ESA and this Phase Two ESA.

### 6.8.1 Description and Assessment

The subject site, irregular in shape and approximately 0.697 hectares (1.72 acres) in area, is located at 2444, 2454, 2460, and 2468 Old Bronte Road in the Town of Oakville. The subject site comprised of four (4) Property Identification Numbers (PINs). The municipal addresses and PINs along with their legal descriptions included in the subject site are summarized in the Table below:

| PIN | Municipal Address | Property Description in Parcel Register |
|---|---|---|
| 24926-2916 (LT) | 2444 Old Bronte Road | PT LT 31, CON 1 TRAF SDS PT 1 20R20816; TOWN OF OAKVILLE |
| 24926-2917 (LT) | 2454 Old Bronte Road | PT LT 31, CON 1 TRAF SDS PART 2 20R20816; TOWN OF OAKVILLE |
| 24926-2918 (LT) | 2460 Old Bronte Road | PT LT 31, CON 1 TRAF SDS PT 320R20816; TOWN OF OAKVILLE |
| 24926-0045 (LT) | 2468 Old Bronte Road | PT LT 31, CON 1 TRAFALGAR, SOUTH OF DUNDAS STREET, AS IN 520646; OAKVILLE/TRAFALGAR |

6.8.1.1 Areas where Potentially Contaminating Activity Has Occurred

The Phase One ESA determined the Potentially Contaminating Activities (PCAs) at the subject that may contribute to APECs for the soil condition at the subject site, based on records review, interviews and site reconnaissance. The areas of PCAs along with the corresponding list in Table 2 Schedule D of O. Reg. 153/04 are summarized below:

- Presence of two heating oil ASTs in the basement of the residential building on the southeast portion of the subject site which has since been demolished. #28 – Gasoline and Associated Products Storage in Fixed Tanks

The location of the PCA is shown on Drawing No. 1.

6.8.1.2 Areas of Potential Environmental Concern

The following Areas of Potential Environmental Concern (APEC) was identified at the subject site:

APEC 1 and APEC 2: Potential soil impacts due to the two heating oil ASTs located at the southeastern portion of the subject site.

The location of the APEC is shown on Drawing No. 2.

6.8.1.3 Subsurface Structures and Utilities

The subject site is currently vacant lands with the exception of a building structure at 2460 Old Bronte Road.

Since no contaminants are found at the subject site at a concentration above the applicable site condition standard, no subsurface structures or utilities with the potential to affect contaminants distribution or transport are identified at the subject site.

### 6.8.2 Physical Setting

#### 6.8.2.1 Stratigraphy

The subject site is situated within the physiographical region known as the Iroquois Plain. A review of a Geological Map of the area, located at the Geological Survey of Canada website indicates that the site is underlain predominantly by the Halton Till, which consists of a silt to silty clay matrix, high in matrix carbonate content and clast poor. The subject site is underlain by bedrock of the Queenston Formation (shale, limestone, dolostone, and siltstone).

The field investigation for this Phase Two ESA consisted of drilling four (4) boreholes to depths of 3.0 mbgs. The subsoil conditions at the borehole locations indicate that beneath the surface comprise of granular fill, a silty clay till contacted at the borehole locations. No bedrock was encountered during this Phase Two ESA.

The borehole location plan is shown on Drawing No. 2. The locations for the geologic cross-section of the soil stratigraphy at the subject site are presented on Drawing Nos. 3 and 4. Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs provided in Appendix 'B'.

#### 6.8.2.2 Hydrogeological Characteristics

The subject site is located in the larger hydrogeological region known as Southern Ontario Lowlands. A watershed map of the area was located at the Land Information Office website (Watershed and Sub-watershed Map) and shows the subject site is situated within the Fourteen Mile Creek Watershed. The ground surface of the subject site is relatively flat with minor undulations, and the grade generally descends towards the south. Groundwater at the subject site is expected to flow in a southerly direction.

Groundwater was not investigated as part of this assessment.

6.8.2.3 Approximate Depth to Bedrock

Bedrock was not encountered at the subject site during the field investigation within the maximum drilling depth of 3.0 mbgs. According to the Ontario Geological Survey Bedrock Cross Section Viewer, the bedrock at the subject site is approximately 5 to 6m below ground surface.

6.8.2.4 Approximate Depth to Water Table

Groundwater was not investigated as part of the Phase Two ESA. Based on the information obtained from the MECP well records, the approximate depth to the water table in the area of the subject site is 3.47 mbgs.

6.8.2.5 Section 41 or 43.1 of the Regulation

The subject site is not within/adjacent/part of an area of natural significance. Therefore, Section 41 of the regulation (Site Condition Standards, Environmental Sensitive Areas) does not apply to the subject site.

The property is not a shallow soil property, as the bedrock was not encountered within 2.0 mbgs during the investigation. There is no water body in the vicinity of the subject site. Therefore, Section 43.1 of the Regulation (Site Condition Standards, Shallow Soil Property or Water Body) does not apply to the subject site.

6.8.2.6 Soils Placed On, In or Under the Phase Two Property

The findings of our Phase One ESA and the drilling investigation of the Phase Two ESA do not indicate any fill material being brought onto the subject site.

6.8.2.7 Proposed Building and Other Structures

A residential and commercial development is being proposed for the subject site. It is anticipated that the new development will be provided with municipal services meeting urban standards.

The final location of proposed buildings or any other structures was not known at the time of the preparation of this report.

### 6.8.3 Contamination In or Under the Phase Two Property

Based on the findings of the Phase One ESA, contaminants of potential concern in the soil with respect to the identified APECs at the subject site were assessed during the Phase Two ESA.

Based on the information obtained from the Phase One ESA and Phase Two ESA, the Ministry of the Environment, Conservation and Parks (MECP) Table 2, Full Depth Generic Site Condition Standards in a Potable Groundwater Condition, for Residential/Parkland/ Institutional property use and for coarse textured soils under Part XV.1 of EPA (Table 2 Standards) has been selected for assessing the soil condition at the subject site.

6.8.3.1 Area Where Contaminants are Present

Soil samples were collected during the Phase Two ESA and submitted for chemical analysis of one or more of the following parameters: PHCs and Metals.

A review of the analytical test results of soil samples indicates the tested samples for the tested parameters meet the Table 2 Standards.

Consequently, there are no contaminants identified at the subject site at a concentration above the applicable site condition standards (Table 2 Standards) during the Phase Two ESA.

6.8.3.2 Distribution of Contaminants

No contaminants are identified at the test locations at a concentration above the applicable site condition standards.

6.8.3.3 Contaminant Medium

No contaminants are identified at the test locations at a concentration above applicable site condition standards.

6.8.3.4 Reasons for Discharge

No contaminants are identified at the test locations at a concentration above applicable site condition standards.

6.8.3.5 Migration of Contaminants

No contaminants are identified at the test locations at a concentration above applicable site condition standards.

6.8.4 **Potential Exposure Pathways and Receptors**

Since no contaminants are found at the subject site at a concentration above the applicable site condition standard (Table 2 Standards), no potential exposure pathways and receptors are identified.

## 7.0 CONCLUSIONS

The purpose of the Phase Two ESA was to determine the soil quality at the subject site, as related to the following APECs identified in our Phase One ESA:

APEC 1 and APEC 2: Potential soil impacts due to the two heating oil ASTs located at the southeastern portion of the subject site.

The findings of the field investigation and analytical results of the Phase Two ESA are summarized below:

- The field investigation for this Phase Two ESA consisted of drilling four (4) boreholes (designated as BH101 to BH104) to depths of 3.0 mbgs.
- The subsoil conditions at the borehole locations indicate that beneath the surface course of granular fill, a silty clay till deposits at the borehole locations.
- The soil samples retrieved from the boreholes were examined for visual and olfactory evidence of potential contamination. No evidence of potential contamination was documented in any of the retrieved soil samples.
- Head space vapour screening was conducted for all retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 $ppm_v$. Soil vapour measurements of 0 $ppm_v$ were recorded for all collected soil samples, indicating non-detactable combustible gases in the soil samples retrieved from the boreholes.
- Based on the soil vapour measurements and visual and olfactory observations, representative "worst case" soil samples were selected from each borehole for chemical analyses of one or more of the following parameters: PHCs and Metals.
- As part of the QA/QC program for the investigation, QC samples in the form of field duplicate were analysed. A field duplicate sample was collected in the field for Metal parameters in soil.
- The analytical test results were reviewed using the Table 2, Full Depth Generic Site Condition Standards in a Potable Groundwater Condition, for Residential/

Parkland/Institutional property use and for coarse textured soils (Table 2 Standards), as published in the "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA", April 15, 2011.

- The result of the analysis of the duplicate sample is similar to the results for the original sample and relative percent differences for the detectable tested parameters are within acceptable range. However, the relative percent differences could not be calculated between the original and duplicate samples in the situation where the original and/or duplicate samples were below the reported laboratory detection limit.

A review of the analytical test results of soil samples indicates the tested parameters at the borehole locations meet the Table 2 Standards. Consequently, there are no contaminants identified at the subject site at a concentration above the applicable site condition standards (Table 2 Standards) during the Phase Two ESA.

Based on the findings of the Phase Two ESA, it is our opinion that the property is suitable for the proposed development. No further environmental investigation is recommended at this time.

**SOIL ENGINEERS LTD.**

as per Kimberly Dubarry, M.Env.Sc., EIT

Eleni Girma Beyene, P.Eng., $QP_{ESA}$

LICENSED PROFESSIONAL ENGINEER
E. GIRMA BEYENE
100068382
Mar. 15/2019
PROVINCE OF ONTARIO

## 8.0 REFERENCES

MECP. "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

MECP. "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", dated March 9, 2004, amended as of July 1, 2011, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

MECP. "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" (EPA), April 15, 2011.

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# TABLES

## REFERENCE NO. 1803-E058

Soil Engineers Ltd.

# SOIL CHEMICAL ANALYSIS - Metal Parameters

Table I

Project No. 1803-E058
Maxxam Job No. B948010



| Sample ID | RDL** | BH101-2A | BH102-2A | DUP1 | Ontario Regulation 153/04 Table 2 RPI Standards*** |
|---|---|---|---|---|---|
| Sample Date | | 11-Feb-2019 | 11-Feb-2019 | 11-Feb-2019 | |
| Laboratory ID | | JAW713 | JAW714 | JAW715 | |
| Bore Hole No. | | BH101 | BH102 | BH102 | |
| Depth (mbgs*) | | 1.2 - 1.8 | 1.2 - 1.8 | 1.2 - 1.8 | |
| Antimony | 0.2 | <0.20 | <0.20 | <0.20 | 7.5 |
| Arsenic | 1 | 3.7 | 4 | 3.9 | 18 |
| Barium | 0.5 | 98 | 94 | 94 | 390 |
| Beryllium | 0.2 | 0.68 | 0.69 | 0.71 | 4 |
| Boron (Hot Water Soluble) | - | - | - | - | 1.5 |
| Cadmium | 0.1 | 0.11 | <0.10 | 0.1 | 1.2 |
| Chromium | 1 | 20 | 20 | 20 | 160 |
| Chromium VI | - | - | - | - | 8 |
| Cobalt | 0.1 | 11 | 12 | 12 | 22 |
| Copper | 0.5 | 22 | 23 | 23 | 140 |
| Lead | 1 | 10 | 10 | 9.9 | 120 |
| Mercury | 0.05 | <0.050 | <0.050 | <0.050 | 0.27 |
| Molybdenum | 0.5 | 0.58 | 0.56 | 0.52 | 6.9 |
| Nickel | 0.5 | 25 | 25 | 25 | 100 |
| Selenium | 0.5 | <0.50 | <0.50 | <0.50 | 2.4 |
| Silver | 0.2 | <0.20 | <0.20 | <0.20 | 20 |
| Thallium | 0.05 | 0.15 | 0.14 | 0.15 | 1 |
| Vanadium | 5 | 27 | 27 | 29 | 86 |
| Zinc | 5 | 61 | 57 | 58 | 340 |
| pH | - | - | - | - | - |
| Electrical Conductivity (ms/cm) | - | - | - | - | 0.7 |
| Sodium Adsorption Ratio | - | - | - | - | 5 |
| Cyanide | - | - | - | - | 0.051 |
| Chloride | - | - | - | - | - |
| Boron (Total) | 5 | 12 | 12 | 12 | 120 |
| Uranium | 0.05 | 0.59 | 0.6 | 0.59 | 23 |

Analysis by Maxxam Analytics, all results in ppm (µg/g) unless otherwise stated.
* mbgs - metres below ground surface.
** RDL - Analytical Reportable Detection Limits (RDLs).
*** Standards shown are for Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for residential/parkland/institutional property use (coarse textured soils).

Soil Engineers Ltd.

# SOIL CHEMICAL ANALYSIS - Petroleum Hydrocarbon (PHC) Parameters

Table I

Project No. 1803-E058

Maxxam Job No. B948010



| Sample ID | RDL** | BH101-3A | BH102-3B | Ontario Regulation 153/04 Table 2 RPI Standards*** |
|---|---|---|---|---|
| Sample Date | | 11-Feb-2019 | 11-Feb-2019 | |
| Laboratory ID | | JAW716 | JAW717 | |
| Bore Hole No. | | BH101 | BH102 | |
| Depth (mbgs*) | | 2.4 - 2.7 | 2.4 - 3.0 | |
| Benzene | 0.02 | <0.020 | <0.020 | 0.21 |
| Toluene | 0.02 | <0.020 | <0.020 | 2.3 |
| Ethylbenzene | 0.02 | <0.020 | <0.020 | 1.1 |
| o-Xylene | 0.02 | <0.020 | <0.020 | - |
| p+m-Xylene | 0.04 | <0.040 | <0.040 | - |
| Xylene Mixture | 0.04 | <0.040 | <0.040 | 3.1 |
| F1 (C6 to C10) | 10 | <10 | <10 | 55 |
| F1 (C6 to C10) minus BTEX | 10 | <10 | <10 | 55 |
| F2 (C10 to C16) | 10 | <10 | <10 | 98 |
| F3 (C16 to C34) | 50 | <50 | <50 | 300 |
| F4 (C34 to C50) | 50 | <50 | <50 | 2800 |
| Gravimetric Heavy Hydrocarbons | - | - | - | 2800 |
| Moisture Content (%) | 1 | 11 | 11 | - |

Analysis by Maxxam Analytics, all results in ppm (µg/g) unless otherwise stated.

* mbgs - metres below ground surface.

** RDL - Analytical Reportable Detection Limits (RDLs).

*** Standards shown are for Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for residential/parkland/institutional property use (coarse textured soils).

Reference No. 1803-E058
**Table II** – Maximum Concentration (Soil)



**Summary of Metals**

| Parameter | Unit | Maximum Concentration | Sample ID | Sampling Depth (m) |
|---|---|---|---|---|
| Antimony | ug/g | <0.20 | - | - |
| Arsenic | ug/g | 4 | BH102-2A | 1.2 – 1.8 |
| Barium | ug/g | 98 | BH101-2A | 1.2 – 1.8 |
| Beryllium | ug/g | 0.71 | DUP1 | 1.2 – 1.8 |
| Boron (Hot Water Soluble) | ug/g | - | - | - |
| Cadmium | ug/g | 0.11 | BH101-2A | 1.2 – 1.8 |
| Chromium | ug/g | 20 | BH101-2A, BH102-2A, DUP1 | 1.2 – 1.8 |
| Chromium VI | ug/g | - | - | - |
| Cobalt | ug/g | 12 | BH102-2A, DUP1 | 1.2 – 1.8 |
| Copper | ug/g | 23 | BH102-2A, DUP1 | 1.2 – 1.8 |
| Lead | ug/g | 10 | BH101-2A, BH102-2A | 1.2 – 1.8 |
| Mercury | ug/g | <0.050 | - | - |
| Molybdenum | ug/g | 0.58 | BH101-2A | 1.2 – 1.8 |
| Nickel | ug/g | 25 | BH101-2A, BH102-2A, DUP1 | 1.2 – 1.8 |
| Selenium | ug/g | <0.50 | - | - |
| Silver | ug/g | <0.20 | - | - |
| Thallium | ug/g | 0.15 | BH101-2A, DUP1 | 1.2 – 1.8 |
| Vanadium | ug/g | 29 | DUP1 | 1.2 – 1.8 |
| Zinc | ug/g | 61 | BH101-2A | 1.2 – 1.8 |
| Cyanide | ug/g | - | - | - |
| Boron (Total) | ug/g | 12 | BH101-2A, BH102-2A, DUP1 | 1.2 – 1.8 |
| Uranium | ug/g | 0.6 | BH102-2A | 1.2 – 1.8 |

**Summary of Petroleum Hydrocarbons (PHCs)**

| Parameter | Unit | Maximum Concentration | Sample ID | Sampling Depth (m) |
|---|---|---|---|---|
| Benzene | µg/g | <0.020 | - | - |
| Toluene | µg/g | <0.020 | - | - |
| Ethylbenzene | µg/g | <0.020 | - | - |
| o-Xylene | µg/g | <0.020 | - | - |
| m/p-Xylenes | µg/g | <0.040 | - | - |
| Xylene Mixture | µg/g | <0.040 | - | - |
| F1 (C6-C10) | µg/g | <10 | - | - |
| F1 (C6-C10) minus BTEX | µg/g | <10 | - | - |
| F2 (C10-C16) | µg/g | <10 | - | - |
| F3 (C16-C34) | µg/g | <50 | - | - |
| F4 (C34-C50) | µg/g | <50 | - | - |

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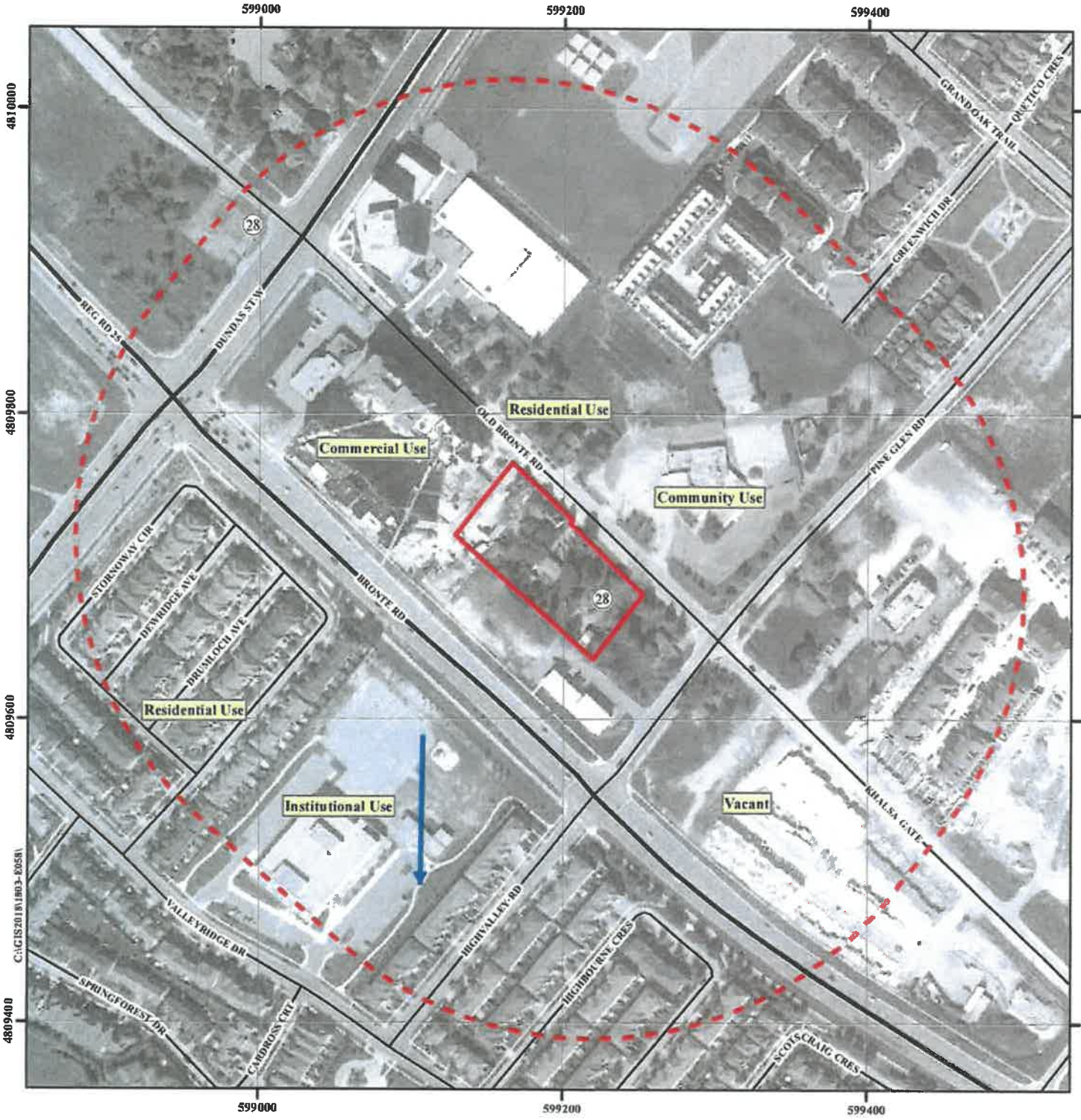
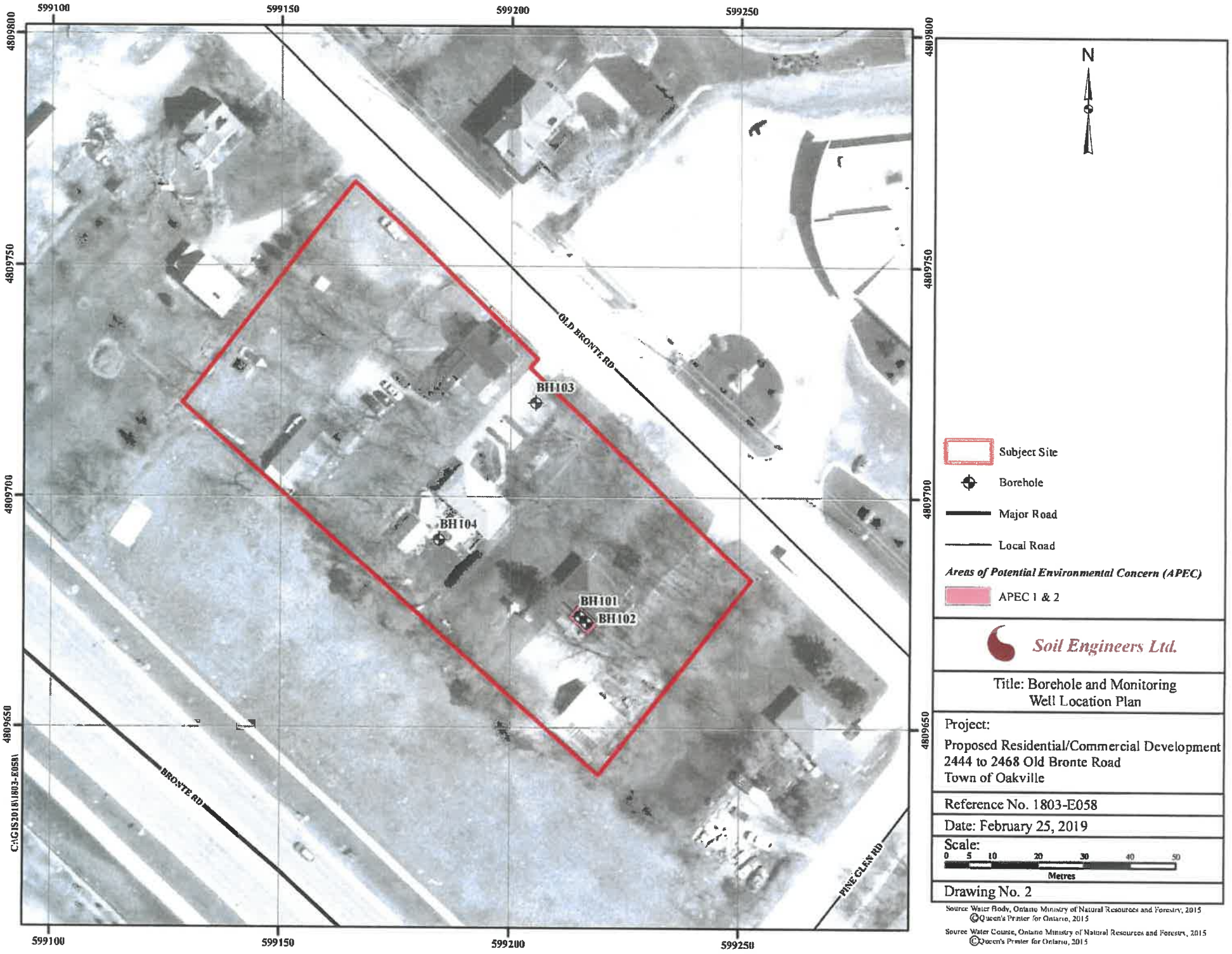
# DRAWINGS

## REFERENCE NO. 1803-E058


599000
599200
599400
4810000
4809800
4809600
4809400
N
28
Residential Use
Commercial Use
Community Use
Residential Use
Institutional Use
Vacant
DUNDAS ST W
REG RD 25
OLD BRONTE RD
BRONTE RD
PINE GLEN RD
KHALSA GATE
GRANDOAK TRAIL
QUETICO CRES
GREENWICH DR
STORNOWAY CIR
DENRIDGE AVE
DRUMLOCH AVE
VALLEYRIDGE DR
SPRINGFOREST DR
CAMDROSS CRT
HIGHVALLEY RD
HIGHBOURNE CRES
SCOTSCRAIG CRES
Subject Site
Phase One Study Area
Inferred Groundwater Flow Direction
Major Road
Local Road
Potentially Contaminating Activities
28 Gasoline and Associated Products Storage in Fixed Tanks
Soil Engineers Ltd.
Title: Site Location Plan
Project:
Proposed Residential/Commercial Development
2444 to 2468 Old Bronte Road
Town of Oakville
Reference No. 1803-E058
Date: February 25, 2019
Scale:
0 15 30 60 90 120 150
Metres
Drawing No. 1
Source Water Body, Ontario Ministry of Natural Resources and Forestry, 2015
©Queen's Printer for Ontario, 2015
Source Water Course, Ontario Ministry of Natural Resources and Forestry, 2015
©Queen's Printer for Ontario, 2015


599100
599150
599200
599250
4809800
4809750
4809700
4809650
OLD BRONTE RD
BRONTE RD
PINE GLEN RD
BH103
BH104
BH101
BH102
C:\GIS\2018\1803-E058\
N
Subject Site
Borehole
Major Road
Local Road
Areas of Potential Environmental Concern (APEC)
APEC 1 & 2
Soil Engineers Ltd.
Title: Borehole and Monitoring Well Location Plan
Project:
Proposed Residential/Commercial Development
2444 to 2468 Old Bronte Road
Town of Oakville
Reference No. 1803-E058
Date: February 25, 2019
Scale:
0 5 10 20 30 40 50
Metres
Drawing No. 2
Source Water Body, Ontario Ministry of Natural Resources and Forestry, 2015
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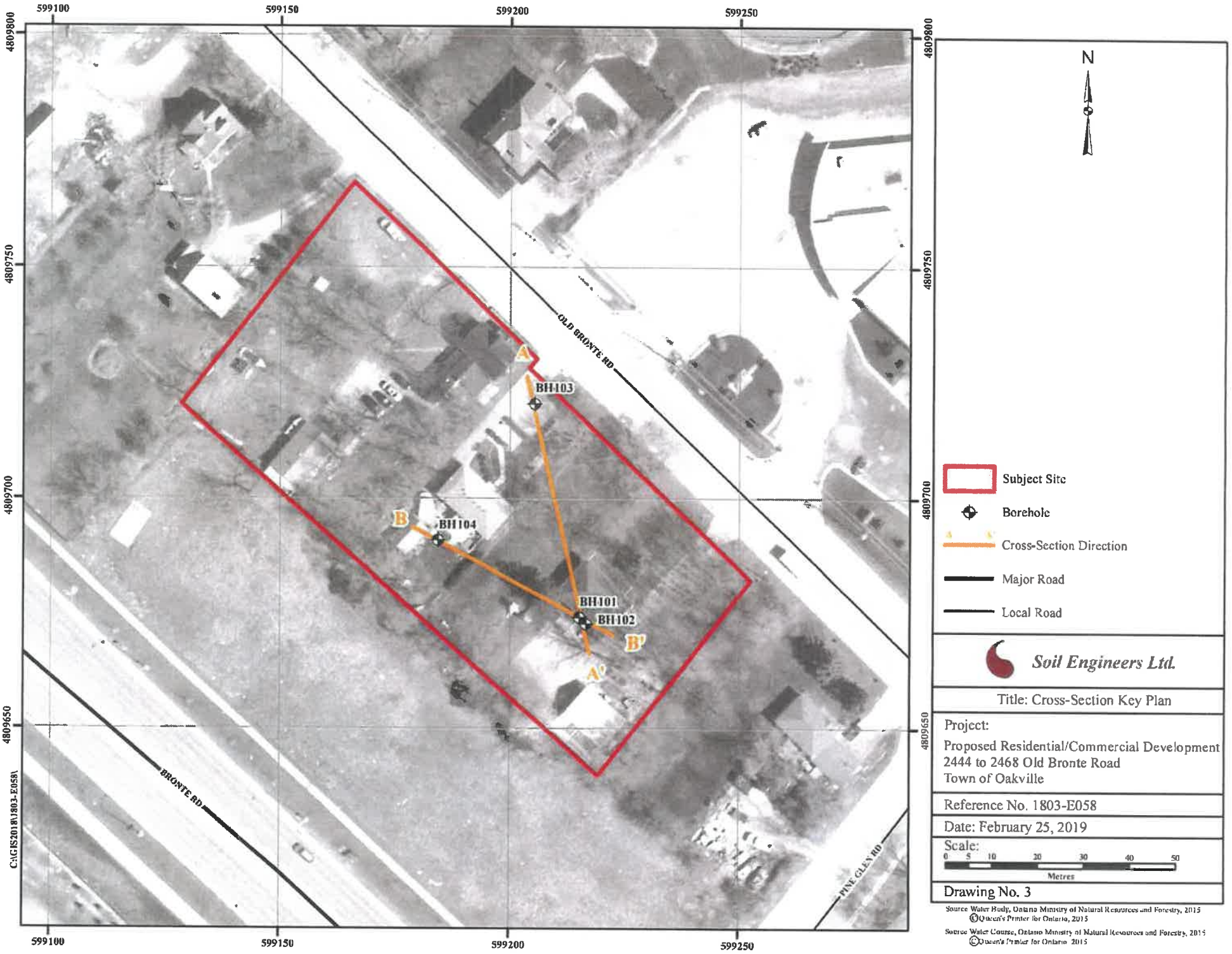
Source Water Course, Ontario Ministry of Natural Resources and Forestry, 2015
©Queen's Printer for Ontario, 2015


599100
599150
599200
599250
4809800
4809750
4809700
4809650
OLD BRONTE RD
BRONTE RD
PINE GLEN RD
A
A'
B
B'
BH103
BH104
BH101
BH102
N
Subject Site
Borehole
Cross-Section Direction
Major Road
Local Road
Soil Engineers Ltd.
Title: Cross-Section Key Plan
Project:
Proposed Residential/Commercial Development
2444 to 2468 Old Bronte Road
Town of Oakville
Reference No. 1803-E058
Date: February 25, 2019
Scale:
0 5 10 20 30 40 50
Metres
Drawing No. 3
C:\GIS\2018\1803-E058\
Source Water Body, Ontario Ministry of Natural Resources and Forestry, 2015
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Source Water Course, Ontario Ministry of Natural Resources and Forestry, 2015
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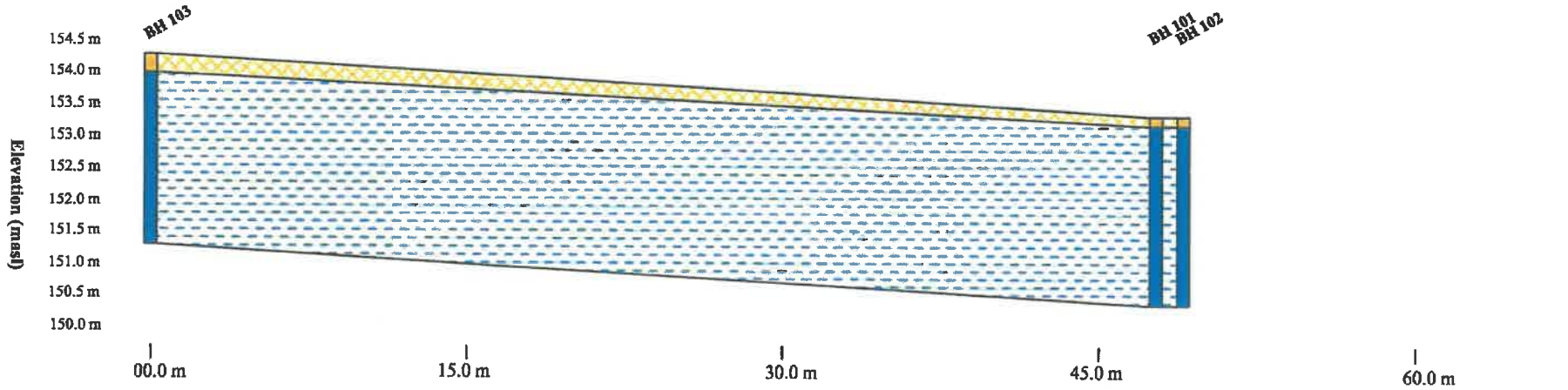
North-northwest
A

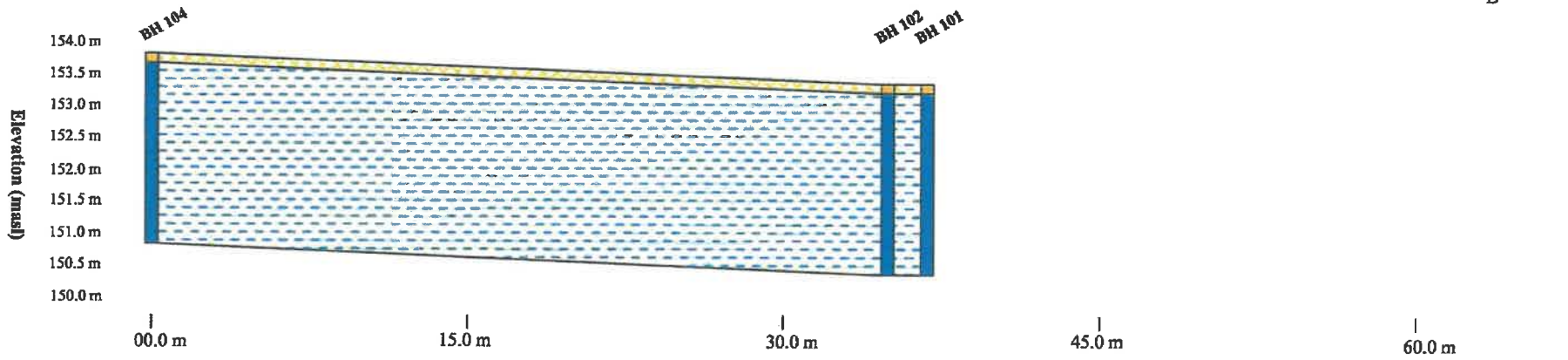
South-southeast
A'




**SECTION A-A'**

Northwest
B

Southeast
B'




**SECTION B-B'**

**Granular, Fill**

**Silty Clay, Till**

G: Projects/2018/Jobs/1803-E058

Soil Engineers Ltd.
CONSULTING SOIL, FOUNDATION & ENVIRONMENTAL ENGINEERS

Title: Geological Cross-Sections A-A' and B-B'

Project: Proposed Residential/Commercial Development
2444 to 2468 Old Bronte Road
Town of Oakville

| Reference No: | Date: | Scale: V | Scale: H | Drawing No. |
|---|---|---|---|---|
| 1803-E058 | February 26, 2018 | 1:100 | 1:300 | 4 |

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# APPENDIX 'A'

## SAMPLING AND ANALYSIS PLAN

**REFERENCE NO. 1803-E058**

This Sampling and Analysis Plan is prepared for the Phase Two Environmental Site Assessment (ESA) as defined by Ontario Regulation (O. Reg.) 153/04, as amended. The subject property is located on the west side of Old Bronte Road and north of Pine Glen Road, in the Town of Oakville (hereinafter referred to as "subject site").

The Sampling and Analysis Plan is prepared based on the findings our Phase One Environmental Site Assessment (Phase One ESA, Ref. No. 1803-E058 dated June 15, 2018).

## 1) OBJECTIVE

The objective of the Phase Two ESA was to determine the soil quality at the subject site, as related to the following Areas of Potential Environmental Concerns (APECs) identified in the Phase One ESA by Soil Engineers Ltd. (SEL):

- APEC 1 and APEC 2: Potential soil impacts due to the two (2) aboveground heating oil storage tanks on the southeastern portion of the subject site.

## 2) SCOPE OF WORK

The scope of work for the Phase Two ESA includes:

- Locate the underground and overhead utilities.
- Conduct a total of four (4) boreholes to depths of 3.0 mbgs.
- Collect representative soil samples from the boreholes.
- Undertake field examination of the retrieved soil samples for visual and olfactory evidence of potential contamination.
- Undertake soil vapour measurements for the retrieved soil samples using a combustible gas detector (RKI Eagle) in methane elimination mode, calibrated with hexane and having a minimum detection level of 2 $ppm_v$ (parts per million by volume).
- Carry out analytical testing program on selected soil samples including quality assurance/quality control (QA/QC samples) for the following parameters: Petroleum Hydrocarbons (PHCs) and Metals.

- Review analytical testing results of submitted soil samples using applicable Site Condition Standards.
- Prepare a Phase Two ESA report containing the findings of the investigation.

## 3) RATIONALE OF BOREHOLE LOCATIONS

The rationale for the selection of the borehole locations is presented in the Table below:

| Areas of Potential Environmental Concerns (APECs) | Borehole ID |
|---|---|
| APEC 1 and 2: Potential soil impacts due to two (2) former aboveground heating oil storage tanks on the southeastern portion of the subject site. | BH101, BH102 |

The locations of proposed boreholes for the Phase Two ESA are shown in Drawing No. 2.

## 4) SOIL AND GROUNDWATER SAMPLES (INCLUDING QA/QC SAMPLES) ANALYTICAL SCHEDULE

A summary of soil samples (including QA/QC samples) to be submitted is presented in the table below:

| Borehole | Metals | PHC |
|---|---|---|
| BH101 | 1 | 1 |
| BH102 | 1 | 1 |
| Duplicate Soil Sample | 1 | 0 |

## 5) SOIL SAMPLING PROCEDURES

SEL's Standard Operation Procedures (SOPs) will be followed throughout the field investigation (sampling, decontamination of equipment, observation and documentation) including field QA/QC program. SEL SOPs are presented in Section 7 of this sampling and analysis plan.

## 6) DATA QUALITY OBJECTIVES

Sampling and decontamination procedures including the QA/QC program should be carried out in accordance with:

- SEL SOPs, as presented in the Section 7.
- The "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario", May 1996, revised December 1996, as amended by O. Reg. 511/09.

Laboratory analytical methods, protocols and procedures should be carried out in accordance with the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", dated March 9, 2004, amended as of July 1, 2011, in accordance with O. Reg. 511/09 and O. Reg. 269/11.

## 7) STANDARD OPERATING PROCEDURES (SOPs)

### 7.1) Borehole Drilling

The purpose of borehole drilling is to provide access to subsurface soils at specified locations and depths. Soil borings also allow for installation of groundwater monitoring wells.

#### 7.1.1) Underground Utilities

Prior to drilling, the public utility service (Ontario One Call) and private utility services are contacted. The underground utility services are located and marked out in the field.

#### 7.1.2) Drilling Methods

Direct Push Drilling (i.e. Geoprobe, Powerprobe, Pionjar, etc.)

The direct push drilling machine is a hydraulically powered hammer/ram sampling device. The unit is designed so that the weight of the vehicle provides the majority of downward force. The

hydraulics, with the aid of a percussion hammer, push lengths of specially modified 54 mm (2.125 inch) outside diameter (OD), hardened steel rod into the ground. The rod is advanced to target sampling depth is reached. The steel rod has been specially modified for specific types of sample collection.

Flight-Auger Drilling

The flight-auger drilling machine is a hydraulically powered feed and retract system that provides 28,275 pounds (12,826 kg) of retract force and 18,650 pounds (8,460 kg) of down pressure. The 183 cm (72 inch) stroke, hydraulic vertical drive system has no chains or cables which can stretch. It is equipped with hollow-stem augers. It is extended to pre-determined sampling intervals using conventional drilling methods, at which time a decontaminated 51 mm split-spoon sampler is extended ahead of the lead auger to collect a soil sample. The split-spoon sampler is then brought to surface and opened, exposing the soil core sample.

Hand Dug Test Pit

The hand-dug test pits were hand-dug using shovel. Prior to digging and sampling at each test pit location, the shovel was brushed clean using a solution of phosphate-free detergent and distilled water.

7.1.3) Occupational Health and Safety

Prior to drilling, the site is inspected to ensure that no potentially hazardous material is present near/around the drilling area. Safety procedures are reviewed and a safety check of the equipment is conducted including locating the emergency stop button on the drill rig, checking personal protective equipment (hard hats, safety shoes, eye/ear protection), locating the first aid kit and confirming the location of the nearest hospital, and verifying the standard procedure in case of injury.

7.1.4) Drilling Spoils

Excess soil generated during sampling and drilling procedure is stored at the site in metal drums. If the analytical results indicate the soil is contaminated, a licensed disposal company is notified to collect the drums of soil for proper disposal.

7.1.5) Borehole Abandonment

After drilling, logging and/or sampling, boreholes will be backfilled by the method described below:

- Bentonite is thoroughly mixed into the grout within the specified percentage range. The tremie grout is usually placed into the hole; however, for selected boreholes (e.g., shallow borings well above the water table) at certain sites, the grout may be allowed to free fall, taking care to ensure the grout does not bridge and form gaps or voids in the grout column.
- The volume of the borehole is calculated and compared to the grout volume used during grouting to aid in verifying that bridging did not occur.
- When using a tremie to place grout in the borehole, the bottom of the tremie is submerged into the grout column and withdrawn slowly as the hole fills with grout. If allowing the grout to free fall (and not using a tremie), the grout is poured slowly into the boring. The rise of the grout column is visually monitored or sounded with a weighted tape.
- If the method used to drill the boring utilized a drive casing, the casing is slowly extracted during grouting such that the bottom of the casing does not come above the top of the grout column.
- During the grouting process, no contaminating material (oil, grease, or fuels from gloves, pumps, hoses, et. al) is permitted to enter the grout mix and personnel wear personal protective equipment as specified in the Project Health and Safety Plan.

- Following grouting, barriers are placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes typically require at least a second visit to 'top off' the hole.
- The surface hole condition should match the pre-drilling condition (asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.

7.1.6) Subsurface Obstruction

Where refusal to drilling occurs due to rock, foundation or underground services, the borehole is relocated within 2.0 m downstream from the original borehole location.

## 7.2) Soil Sampling

### 7.2.1) Introduction

Soil sampling is conducted in accordance with the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, May 1996" as revised December 1996 (MOE Guidance Manual) and as amended by O. Reg. 366/05, 66/08, 511/09, 245/10, 179/11, 269/11 and 333/13. The sampling procedures are described herein.

### 7.2.2) Drilling Rig Decontamination

Geoprobe

One-time use Shelby tube (thin-walled) samples are recovered from the boreholes in clear disposable PVC liners to prevent cross-contamination.

CME 55

Drilling equipment such as drill rigs, augers, drill pipes, drilling rods and split-spoons are decontaminated prior to initial use, between borehole locations and at the completion of drilling activities. The drilling equipment is manually scrubbed with a brush using a phosphate-free solution and thoroughly steam cleaned and/or power washed to remove any foreign material and potential contaminants.

In addition, the Shelby tube sampler and any sub-sampling equipment are decontaminated prior to each usage. Various solutions are used for sampling equipment decontamination as described below:

- Phosphate-free soap solution (i.e., Alconox), tap water and distilled water are used for suspected petroleum hydrocarbon soil sampling.
- A reagent-grade methanol solution and distilled water are used for suspected VOCs soil sampling. The reinstate waste is collected.
- Reagent-grade 10% nitric acid solution and distilled water are used for suspected metals soil sampling. The reinstate waste will be collected.

7.2.3) Sample Logging and Field Screening

Samples are typically collected at 1.5 m intervals in the overburden. Tactile examination of the samples is made to classify the soil, and a log is recorded for each borehole detailing the physical characteristics of the soil including colour, soil type, structure, and any observed staining or odour. The organic vapour readings, the moisture content of the samples as determined in the laboratory, the groundwater and cave-in levels measured at the time of investigation, and the groundwater monitoring well construction details are given on the borehole logs.

7.2.4) Field Screening and Calibration Procedures

The soil samples are classified based on physical characteristics including colour, soil type, moisture, and visible observation of staining and/or odour. In addition, the organic vapour reading for each soil sample is determined using a gas detector. Based on the overall soil physical characteristics, representative soil sample are selected for chemical analysis.

The organic vapour readings are measured using a portable RKI Eagle gas detector, TYPE 101 (Serial Number: E091015) set to include all gases, and having a minimum detection of 2 ppm. Prior to measurement, the detector is calibrated using a Hexane 40% LEL gas. The allowable range of calibration is 38% to 42%.

7.2.5) Soil Sampling

The soil from the disposable sampler liner is handled using new disposable gloves in order to avoid the risk of cross-contamination between the samples. Sufficient amounts of the soil samples are placed into clean glass jars with Teflon lined lids for analyses for Polychlorinated Biphenyls, Polyaromatic Hydrocarbons, moisture content, medium to heavy PHCs, and Metals and Inorganics.

Small amounts of the soil samples are collected using a disposable 'T'-shaped Terracore sampler and stored in methanol or sodium bisulfate vials for light PHCs (CCME F1) and VOCs analysis, respectively; the remainder of the samples is placed into a sealable bag for vapour measurement and soil classification. The samples are stored in an insulated container with ice after sampling and during shipment to the laboratory.

The minimum requirements for the number, type and frequency of field quality control are given below:

Field Duplicates: At least 1 field duplicate sample is collected and submitted for laboratory analysis for every 10 soil samples that are collected to ensure the soil sampling technique is accurate.

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# APPENDIX 'B'

## BOREHOLE LOGS

## REFERENCE NO. 1803-E058

**JOB NO.:** 1803-E058

# LOG OF BOREHOLE NO.: 101

**FIGURE NO.:** 1

**PROJECT DESCRIPTION:** Proposed Residential/ Commercial Development

**METHOD OF BORING:** Direct Push

**PROJECT LOCATION:** 2444 to 2468 Old Bronte Road
Town of Oakville

**DRILLING DATE:** February 11, 2019

| El. (masl) / Depth (mbgs) | SOIL DESCRIPTION | SAMPLES Number | Type | Gas Reading | Depth Scale (mbgs) | ● Gas Reading (ppm) 20 60 100 140 180 | REMARKS | WATER LEVEL |
|---|---|---|---|---|---|---|---|---|
| 153.40 | Ground Surface | | | | | | | |
| 0.0 | **15 cm GRANULAR FILL** | 1A | TO | 0 | 0 | 0 | | |
| | **SILT CLAY, Till**<br>(disturbed)<br>a trace of sand to sandy<br>a trace to some gravel<br>occ. sand seams and layers,<br>cobbles and boulders | 1B | TO | 0 | | 0 | | |
| | | | | | 1 | | | |
| | | 2A | TO | 0 | | 0 | BH101/2A: Metals | |
| | | 2B | TO | 0 | 2 | 0 | | |
| 151.0 | | | | | | | | |
| 2.4 | **SILTY CLAY, Fill**<br>(undisturbed)<br>a trace of sand to sandy<br>a trace to some gravel<br>occ. sand seams and layers,<br>cobbles and boulders | 3A | TO | 0 | | 0 | BH101/3A: PHCs | |
| 150.4 | | 3B | TO | 0 | 3 | 0 | | |
| 3.0 | END OF BOREHOLE | | | | | | | |
| | | | | | 4 | | | |
| | | | | | 5 | | | |
| | | | | | 6 | | | |

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**JOB NO.:** 1803-E058

# LOG OF BOREHOLE NO.: 102

**FIGURE NO.:** 2

**PROJECT DESCRIPTION:** Proposed Residential/ Commercial Development

**METHOD OF BORING:** Direct Push

**PROJECT LOCATION:** 2444 to 2468 Old Bronte Road
Town of Oakville

**DRILLING DATE:** February 11, 2019

| El. (masl) / Depth (mbgs) | SOIL DESCRIPTION | SAMPLES Number | Type | Gas Reading | Depth Scale (mbgs) | Gas Reading (ppm) 20 60 100 140 180 | REMARKS | WATER LEVEL |
|---|---|---|---|---|---|---|---|---|
| 153.40 | Ground Surface | | | | | | | |
| 0.0 | **15 cm GRANULAR FILL** | 1A | TO | 0 | 0 | 0 | | |
| | **SILT CLAY, Till**<br>(disturbed)<br>a trace of sand to sandy<br>a trace to some gravel<br>occ. sand seams and layers,<br>cobbles and boulders | 1B | TO | 0 | | 0 | | |
| | | | | | 1 | | | |
| | | 2A | TO | 0 | | 0 | BH102/2A and Dup: Metals | |
| | | 2B | TO | 0 | | 0 | | |
| | | 3A | TO | 0 | 2 | 0 | | |
| 151.0<br>2.4 | **SILTY CLAY, Fill**<br>(undisturbed)<br>a trace of sand to sandy<br>a trace to some gravel<br>occ. sand seams and layers,<br>cobbles and boulders | 3B | TO | 0 | | 0 | BH102/3B: PHCs | |
| 150.4<br>3.0 | END OF BOREHOLE | | | | 3 | | | |
| | | | | | 4 | | | |
| | | | | | 5 | | | |
| | | | | | 6 | | | |

**Soil Engineers Ltd.**

**JOB NO.:** 1803-E058

# LOG OF BOREHOLE NO.: 103

**FIGURE NO.:** 3

**PROJECT DESCRIPTION:** Proposed Residential/ Commercial Development

**METHOD OF BORING:** Direct Push

**PROJECT LOCATION:** 2444 to 2468 Old Bronte Road
Town of Oakville

**DRILLING DATE:** February 11, 2019

| El. (masl) / Depth (mbgs) | SOIL DESCRIPTION | SAMPLES Number | Type | Gas Reading | Depth Scale (mbgs) | ● Gas Reading (ppm) 20 60 100 140 180 | REMARKS | WATER LEVEL |
|---|---|---|---|---|---|---|---|---|
| 154.34 | Asphalt Surface | | | | | | | |
| 0.0 | **30 cm GRANULAR FILL** | | | | 0 | | | |
| | **SILT CLAY, Till**<br>a trace of sand to sandy<br>a trace to some gravel<br>occ. sand seams and layers,<br>cobbles and boulders | 1A | TO | 0 | | ● 0 | | |
| | | 1B | TO | 0 | 1 | ● 0 | | |
| | | 2A | TO | 0 | | ● 0 | | |
| | | 2B | TO | 0 | 2 | ● 0 | | |
| | | 3A | TO | 0 | | ● 0 | | |
| 151.3 | | 3B | TO | 0 | 3 | ● 0 | | |
| 3.0 | END OF BOREHOLE | | | | | | | |
| | | | | | 4 | | | |
| | | | | | 5 | | | |
| | | | | | 6 | | | |

**Soil Engineers Ltd.**

**JOB NO.:** 1803-E058

# LOG OF BOREHOLE NO.: 104

**FIGURE NO.:** 4

**PROJECT DESCRIPTION:** Proposed Residential/ Commercial Development

**METHOD OF BORING:** Direct Push

**PROJECT LOCATION:** 2444 to 2468 Old Bronte Road
Town of Oakville

**DRILLING DATE:** February 11, 2019

| El. (masl) / Depth (mbgs) | SOIL DESCRIPTION | SAMPLES: Number | SAMPLES: Type | SAMPLES: Gas Reading | Depth Scale (mbgs) | ● Gas Reading (ppm) 20 60 100 140 180 | REMARKS | WATER LEVEL |
|---|---|---|---|---|---|---|---|---|
| 153.87 | Ground Surface | | | | | | | |
| 0.0 | **15 cm GRANULAR FILL** | | | | 0 | | | |
| | **SILT CLAY, Till**<br>a trace of sand to sandy<br>a trace to some gravel<br>occ. sand seams and layers,<br>cobbles and boulders | 1A | TO | 0 | | ● 0 | | |
| | | 1B | TO | 0 | 1 | ● 0 | | |
| | | 2A | TO | 0 | | ● 0 | | |
| | | 2B | TO | 0 | 2 | ● 0 | | |
| | | 3A | TO | 0 | | ● 0 | | |
| | | 3B | TO | 0 | | ● 0 | | |
| 150.8 | | 4 | TO | 0 | 3 | ● 0 | | |
| 3.0 | END OF BOREHOLE | | | | | | | |
| | | | | | 4 | | | |
| | | | | | 5 | | | |
| | | | | | 6 | | | |

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# APPENDIX 'C'

## CERTIFICATE OF ANALYSIS
## (SOIL SAMPLES)

## REFERENCE NO. 1803-E058

Maxxam
A Bureau Veritas Group Company

Your Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Your C.O.C. #: 701791-01-01

**Attention: Kimberly Dubarry**

Soil Engineers Ltd
90 West Beaver Creek Road
Unit 100
Richmond Hill, ON
CANADA L4B 1E7

**Report Date: 2019/02/26**
Report #: R5608164
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B948010**
**Received: 2019/02/22, 15:20**

Sample Matrix: Soil
# Samples Received: 5

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Reference |
|---|---|---|---|---|---|
| Petroleum Hydro. CCME F1 & BTEX in Soil (1) | 2 | N/A | 2019/02/24 | CAM SOP-00315 | CCME PHC-CWS m |
| Petroleum Hydrocarbons F2-F4 in Soil (2) | 2 | 2019/02/23 | 2019/02/23 | CAM SOP-00316 | CCME CWS m |
| Strong Acid Leachable Metals by ICPMS | 3 | 2019/02/26 | 2019/02/26 | CAM SOP-00447 | EPA 6020B m |
| Moisture | 2 | N/A | 2019/02/23 | CAM SOP-00445 | Carter 2nd ed 51.2 m |

**Remarks:**

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.


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Maxxam
A Bureau Veritas Group Company

Your Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Your C.O.C. #: 701791-01-01

**Attention: Kimberly Dubarry**

Soil Engineers Ltd
90 West Beaver Creek Road
Unit 100
Richmond Hill, ON
CANADA L4B 1E7

**Report Date: 2019/02/26**
Report #: R5608164
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B948010**
**Received: 2019/02/22, 15:20**

Encryption Key

Maxxam
26 Feb 2019 17:21:45

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B948010
Report Date: 2019/02/26

Soil Engineers Ltd
Client Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Sampler Initials: OAK

## O.REG 153 ICPMS METALS (SOIL)

| Maxxam ID | | JAW713 | JAW714 | JAW715 | | |
|---|---|---|---|---|---|---|
| Sampling Date | | 2019/02/11 10:00 | 2019/02/11 10:00 | 2019/02/11 10:00 | | |
| COC Number | | 701791-01-01 | 701791-01-01 | 701791-01-01 | | |
| | UNITS | BH101-2A | BH102-2A | DUP1 | RDL | QC Batch |
| **Metals** | | | | | | |
| Acid Extractable Antimony (Sb) | ug/g | <0.20 | <0.20 | <0.20 | 0.20 | 5990890 |
| Acid Extractable Arsenic (As) | ug/g | 3.7 | 4.0 | 3.9 | 1.0 | 5990890 |
| Acid Extractable Barium (Ba) | ug/g | 98 | 94 | 94 | 0.50 | 5990890 |
| Acid Extractable Beryllium (Be) | ug/g | 0.68 | 0.69 | 0.71 | 0.20 | 5990890 |
| Acid Extractable Boron (B) | ug/g | 12 | 12 | 12 | 5.0 | 5990890 |
| Acid Extractable Cadmium (Cd) | ug/g | 0.11 | <0.10 | 0.10 | 0.10 | 5990890 |
| Acid Extractable Chromium (Cr) | ug/g | 20 | 20 | 20 | 1.0 | 5990890 |
| Acid Extractable Cobalt (Co) | ug/g | 11 | 12 | 12 | 0.10 | 5990890 |
| Acid Extractable Copper (Cu) | ug/g | 22 | 23 | 23 | 0.50 | 5990890 |
| Acid Extractable Lead (Pb) | ug/g | 10 | 10 | 9.9 | 1.0 | 5990890 |
| Acid Extractable Molybdenum (Mo) | ug/g | 0.58 | 0.56 | 0.52 | 0.50 | 5990890 |
| Acid Extractable Nickel (Ni) | ug/g | 25 | 25 | 25 | 0.50 | 5990890 |
| Acid Extractable Selenium (Se) | ug/g | <0.50 | <0.50 | <0.50 | 0.50 | 5990890 |
| Acid Extractable Silver (Ag) | ug/g | <0.20 | <0.20 | <0.20 | 0.20 | 5990890 |
| Acid Extractable Thallium (Tl) | ug/g | 0.15 | 0.14 | 0.15 | 0.050 | 5990890 |
| Acid Extractable Uranium (U) | ug/g | 0.59 | 0.60 | 0.59 | 0.050 | 5990890 |
| Acid Extractable Vanadium (V) | ug/g | 27 | 27 | 29 | 5.0 | 5990890 |
| Acid Extractable Zinc (Zn) | ug/g | 61 | 57 | 58 | 5.0 | 5990890 |
| Acid Extractable Mercury (Hg) | ug/g | <0.050 | <0.050 | <0.050 | 0.050 | 5990890 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B948010
Report Date: 2019/02/26

Soil Engineers Ltd
Client Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Sampler Initials: OAK

## O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

| Maxxam ID | | JAW716 | JAW717 | | |
|---|---|---|---|---|---|
| Sampling Date | | 2019/02/11 10:00 | 2019/02/11 10:00 | | |
| COC Number | | 701791-01-01 | 701791-01-01 | | |
| | UNITS | BH101-3A | BH102-3B | RDL | QC Batch |
| **Inorganics** | | | | | |
| Moisture | % | 11 | 11 | 1.0 | 5988452 |
| **BTEX & F1 Hydrocarbons** | | | | | |
| Benzene | ug/g | <0.020 | <0.020 | 0.020 | 5988471 |
| Toluene | ug/g | <0.020 | <0.020 | 0.020 | 5988471 |
| Ethylbenzene | ug/g | <0.020 | <0.020 | 0.020 | 5988471 |
| o-Xylene | ug/g | <0.020 | <0.020 | 0.020 | 5988471 |
| p+m-Xylene | ug/g | <0.040 | <0.040 | 0.040 | 5988471 |
| Total Xylenes | ug/g | <0.040 | <0.040 | 0.040 | 5988471 |
| F1 (C6-C10) | ug/g | <10 | <10 | 10 | 5988471 |
| F1 (C6-C10) - BTEX | ug/g | <10 | <10 | 10 | 5988471 |
| **F2-F4 Hydrocarbons** | | | | | |
| F2 (C10-C16 Hydrocarbons) | ug/g | <10 | <10 | 10 | 5988465 |
| F3 (C16-C34 Hydrocarbons) | ug/g | <50 | <50 | 50 | 5988465 |
| F4 (C34-C50 Hydrocarbons) | ug/g | <50 | <50 | 50 | 5988465 |
| Reached Baseline at C50 | ug/g | Yes | Yes | | 5988465 |
| **Surrogate Recovery (%)** | | | | | |
| 1,4-Difluorobenzene | % | 102 | 104 | | 5988471 |
| 4-Bromofluorobenzene | % | 99 | 98 | | 5988471 |
| D10-Ethylbenzene | % | 93 | 93 | | 5988471 |
| D4-1,2-Dichloroethane | % | 96 | 100 | | 5988471 |
| o-Terphenyl | % | 102 | 106 | | 5988465 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B948010
Report Date: 2019/02/26

Soil Engineers Ltd
Client Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Sampler Initials: OAK

## TEST SUMMARY

**Maxxam ID:** JAW713
**Sample ID:** BH101-2A
**Matrix:** Soil

**Collected:** 2019/02/11
**Shipped:**
**Received:** 2019/02/22

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Strong Acid Leachable Metals by ICPMS | ICP/MS | 5990890 | 2019/02/26 | 2019/02/26 | Daniel Teclu |

**Maxxam ID:** JAW714
**Sample ID:** BH102-2A
**Matrix:** Soil

**Collected:** 2019/02/11
**Shipped:**
**Received:** 2019/02/22

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Strong Acid Leachable Metals by ICPMS | ICP/MS | 5990890 | 2019/02/26 | 2019/02/26 | Daniel Teclu |

**Maxxam ID:** JAW715
**Sample ID:** DUP1
**Matrix:** Soil

**Collected:** 2019/02/11
**Shipped:**
**Received:** 2019/02/22

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Strong Acid Leachable Metals by ICPMS | ICP/MS | 5990890 | 2019/02/26 | 2019/02/26 | Daniel Teclu |

**Maxxam ID:** JAW716
**Sample ID:** BH101-3A
**Matrix:** Soil

**Collected:** 2019/02/11
**Shipped:**
**Received:** 2019/02/22

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Petroleum Hydro. CCME F1 & BTEX in Soil | HSGC/MSFD | 5988471 | N/A | 2019/02/24 | Abdikarim Ali |
| Petroleum Hydrocarbons F2-F4 in Soil | GC/FID | 5988465 | 2019/02/23 | 2019/02/23 | Prabhjot Gulati |
| Moisture | BAL | 5988452 | N/A | 2019/02/23 | Min Yang |

**Maxxam ID:** JAW717
**Sample ID:** BH102-3B
**Matrix:** Soil

**Collected:** 2019/02/11
**Shipped:**
**Received:** 2019/02/22

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Petroleum Hydro. CCME F1 & BTEX in Soil | HSGC/MSFD | 5988471 | N/A | 2019/02/24 | Abdikarim Ali |
| Petroleum Hydrocarbons F2-F4 in Soil | GC/FID | 5988465 | 2019/02/23 | 2019/02/23 | Prabhjot Gulati |
| Moisture | BAL | 5988452 | N/A | 2019/02/23 | Min Yang |



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Maxxam Job #: B948010
Report Date: 2019/02/26

Soil Engineers Ltd
Client Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Sampler Initials: OAK

## GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

| | |
|---|---|
| Package 1 | 0.0°C |

**Results relate only to the items tested.**



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A Bureau Veritas Group Company

Maxxam Job #: B948010
Report Date: 2019/02/26

## QUALITY ASSURANCE REPORT

Soil Engineers Ltd
Client Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Sampler Initials: OAK

| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits |
| 5988465 | o-Terphenyl | 2019/02/25 | 114 | 60 - 130 | 108 | 60 - 130 | 103 | % | | |
| 5988471 | 1,4-Difluorobenzene | 2019/02/24 | 103 | 60 - 140 | 105 | 60 - 140 | 103 | % | | |
| 5988471 | 4-Bromofluorobenzene | 2019/02/24 | 98 | 60 - 140 | 99 | 60 - 140 | 97 | % | | |
| 5988471 | D10-Ethylbenzene | 2019/02/24 | 98 | 60 - 140 | 89 | 60 - 140 | 76 | % | | |
| 5988471 | D4-1,2-Dichloroethane | 2019/02/24 | 103 | 60 - 140 | 102 | 60 - 140 | 101 | % | | |
| 5988452 | Moisture | 2019/02/23 | | | | | | | 4.5 | 20 |
| 5988465 | F2 (C10-C16 Hydrocarbons) | 2019/02/23 | 112 | 50 - 130 | 105 | 80 - 120 | <10 | ug/g | NC | 30 |
| 5988465 | F3 (C16-C34 Hydrocarbons) | 2019/02/23 | 111 | 50 - 130 | 103 | 80 - 120 | <50 | ug/g | NC | 30 |
| 5988465 | F4 (C34-C50 Hydrocarbons) | 2019/02/23 | 110 | 50 - 130 | 104 | 80 - 120 | <50 | ug/g | NC | 30 |
| 5988471 | Benzene | 2019/02/24 | 86 | 60 - 140 | 87 | 60 - 140 | <0.020 | ug/g | NC | 50 |
| 5988471 | Ethylbenzene | 2019/02/24 | 90 | 60 - 140 | 87 | 60 - 140 | <0.020 | ug/g | NC | 50 |
| 5988471 | F1 (C6-C10) - BTEX | 2019/02/24 | | | | | <10 | ug/g | NC | 30 |
| 5988471 | F1 (C6-C10) | 2019/02/24 | 90 | 60 - 140 | 94 | 80 - 120 | <10 | ug/g | NC | 30 |
| 5988471 | o-Xylene | 2019/02/24 | 87 | 60 - 140 | 85 | 60 - 140 | <0.020 | ug/g | NC | 50 |
| 5988471 | p+m-Xylene | 2019/02/24 | 91 | 60 - 140 | 89 | 60 - 140 | <0.040 | ug/g | NC | 50 |
| 5988471 | Toluene | 2019/02/24 | 91 | 60 - 140 | 89 | 60 - 140 | <0.020 | ug/g | NC | 50 |
| 5988471 | Total Xylenes | 2019/02/24 | | | | | <0.040 | ug/g | NC | 50 |
| 5990890 | Acid Extractable Antimony (Sb) | 2019/02/26 | 93 | 75 - 125 | 101 | 80 - 120 | <0.20 | ug/g | 7.0 | 30 |
| 5990890 | Acid Extractable Arsenic (As) | 2019/02/26 | 94 | 75 - 125 | 97 | 80 - 120 | <1.0 | ug/g | 10 | 30 |
| 5990890 | Acid Extractable Barium (Ba) | 2019/02/26 | NC | 75 - 125 | 102 | 80 - 120 | <0.50 | ug/g | 3.8 | 30 |
| 5990890 | Acid Extractable Beryllium (Be) | 2019/02/26 | 111 | 75 - 125 | 105 | 80 - 120 | <0.20 | ug/g | 5.1 | 30 |
| 5990890 | Acid Extractable Boron (B) | 2019/02/26 | 112 | 75 - 125 | 105 | 80 - 120 | <5.0 | ug/g | 4.2 | 30 |
| 5990890 | Acid Extractable Cadmium (Cd) | 2019/02/26 | 101 | 75 - 125 | 99 | 80 - 120 | <0.10 | ug/g | NC | 30 |
| 5990890 | Acid Extractable Chromium (Cr) | 2019/02/26 | 112 | 75 - 125 | 101 | 80 - 120 | <1.0 | ug/g | 1.1 | 30 |
| 5990890 | Acid Extractable Cobalt (Co) | 2019/02/26 | 104 | 75 - 125 | 100 | 80 - 120 | <0.10 | ug/g | 0.58 | 30 |
| 5990890 | Acid Extractable Copper (Cu) | 2019/02/26 | NC | 75 - 125 | 98 | 80 - 120 | <0.50 | ug/g | 2.2 | 30 |
| 5990890 | Acid Extractable Lead (Pb) | 2019/02/26 | NC | 75 - 125 | 98 | 80 - 120 | <1.0 | ug/g | 4.2 | 30 |
| 5990890 | Acid Extractable Mercury (Hg) | 2019/02/26 | 95 | 75 - 125 | 92 | 80 - 120 | <0.050 | ug/g | 0.95 | 30 |
| 5990890 | Acid Extractable Molybdenum (Mo) | 2019/02/26 | 104 | 75 - 125 | 98 | 80 - 120 | <0.50 | ug/g | 1.1 | 30 |
| 5990890 | Acid Extractable Nickel (Ni) | 2019/02/26 | NC | 75 - 125 | 96 | 80 - 120 | <0.50 | ug/g | 0.23 | 30 |
| 5990890 | Acid Extractable Selenium (Se) | 2019/02/26 | 103 | 75 - 125 | 101 | 80 - 120 | <0.50 | ug/g | 9.1 | 30 |
| 5990890 | Acid Extractable Silver (Ag) | 2019/02/26 | 103 | 75 - 125 | 103 | 80 - 120 | <0.20 | ug/g | NC | 30 |



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Maxxam Job #: B948010
Report Date: 2019/02/26

## QUALITY ASSURANCE REPORT(CONT'D)

Soil Engineers Ltd
Client Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Sampler Initials: OAK

| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits |
| 5990890 | Acid Extractable Thallium (Tl) | 2019/02/26 | 101 | 75 - 125 | 98 | 80 - 120 | <0.050 | ug/g | 1.1 | 30 |
| 5990890 | Acid Extractable Uranium (U) | 2019/02/26 | 101 | 75 - 125 | 96 | 80 - 120 | <0.050 | ug/g | 1.2 | 30 |
| 5990890 | Acid Extractable Vanadium (V) | 2019/02/26 | NC | 75 - 125 | 100 | 80 - 120 | <5.0 | ug/g | 0.93 | 30 |
| 5990890 | Acid Extractable Zinc (Zn) | 2019/02/26 | NC | 75 - 125 | 100 | 80 - 120 | <5.0 | ug/g | 0.50 | 30 |

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



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Maxxam Job #: B948010
Report Date: 2019/02/26

Soil Engineers Ltd
Client Project #: 1803-E058
Site Location: 2444 to 2468 Old Bronte Road, Oakville
Sampler Initials: OAK

## VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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# CHAIN OF CUSTODY RECORD

Page 1 of 1

**INVOICE TO:**
Company Name: #00497 Soil Engineers Ltd
Attention: Kimberly Dubarry
Address: 90 West Beaver Creek Road Unit 100, Richmond Hill ON L4B 1E7
Tel: (416) 754-8515 Fax: (416) 754-8516
Email: kimberly.dubarry@soilengineersltd.com

**REPORT TO:**
Company Name: Same as invoice to
Attention:
Address:
Tel: Fax:
Email:

**PROJECT INFORMATION:**
Quotation #: B40922
P.O. #:
Project: 1803-E058
Project Name:
Site #: 2444 to 2466 Old Bronte Road,
Sampled By: Priscilla

**Laboratory Use Only:**
Maxxam Job #:
Bottle Order #: 701791
COC #: C#701791-01-01
Project Manager: Antonella Brasil

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

**Regulation 153 (2011)**
☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ For RSC
☐ Table ___

**Other Regulations**
☐ CCME ☐ Sanitary Sewer By-law
☐ Reg 558 ☐ Storm Sewer By-law
☐ MISA Municipality ___
☐ PWQO
☐ Other ___

**Special Instructions**

Include Criteria on Certificate of Analysis (Y/N)? ___

**Turnaround Time (TAT) Required**
Please provide advance notice for rush projects

**Regular (Standard) TAT:** X
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

**Job Specific Rush TAT** (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___
(Call lab for #)

| | Sample Barcode Label | Sample (Location) Identification | Date Sampled | Time Sampled | Matrix | Field Filtered (please circle): Metals / Hg / CrVI | PHC F1 - F4 + BTEX Petroleum Hydrocarbons | ICPMS Metals | # of Bottles | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | BH101-2A | Feb 11, 2019 | 10 AM | Soil | | | ✓ | 1 | |
| 2 | | BH102-2A | " | " | " | | | ✓ | 1 | |
| 3 | | DUP1 | " | " | " | | | ✓ | 1 | |
| 4 | | BH101-3A | " | " | " | | ✓ | | 3 | |
| 5 | | BH102-3B | " | " | " | | ✓ | | 3 | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |

22-Feb-19 15:20
Antonella Brasil
B948010
GK1 ENV-573

| * RELINQUISHED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | RECEIVED BY: (Signature/Print) | Date: (YY/MM/DD) | Time | # jars used and not submitted |
|---|---|---|---|---|---|---|
| [illegible] | 19/02/18 | [illegible] | [illegible] | 19/02/19 | 15:20 | |

**Laboratory Use Only**
Time Sensitive: ___
Temperature (°C) on Rece: 10 | 1
Custody Seal Present: Yes ✓ No
Intact: ✓

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxam Yellow: Client

MW 10/4 to