



GOLDER

Phase Two Environmental Site Assessment

*Part of 1910 St. Laurent Boulevard, Ottawa
Elmvale Acres Shopping Centre*

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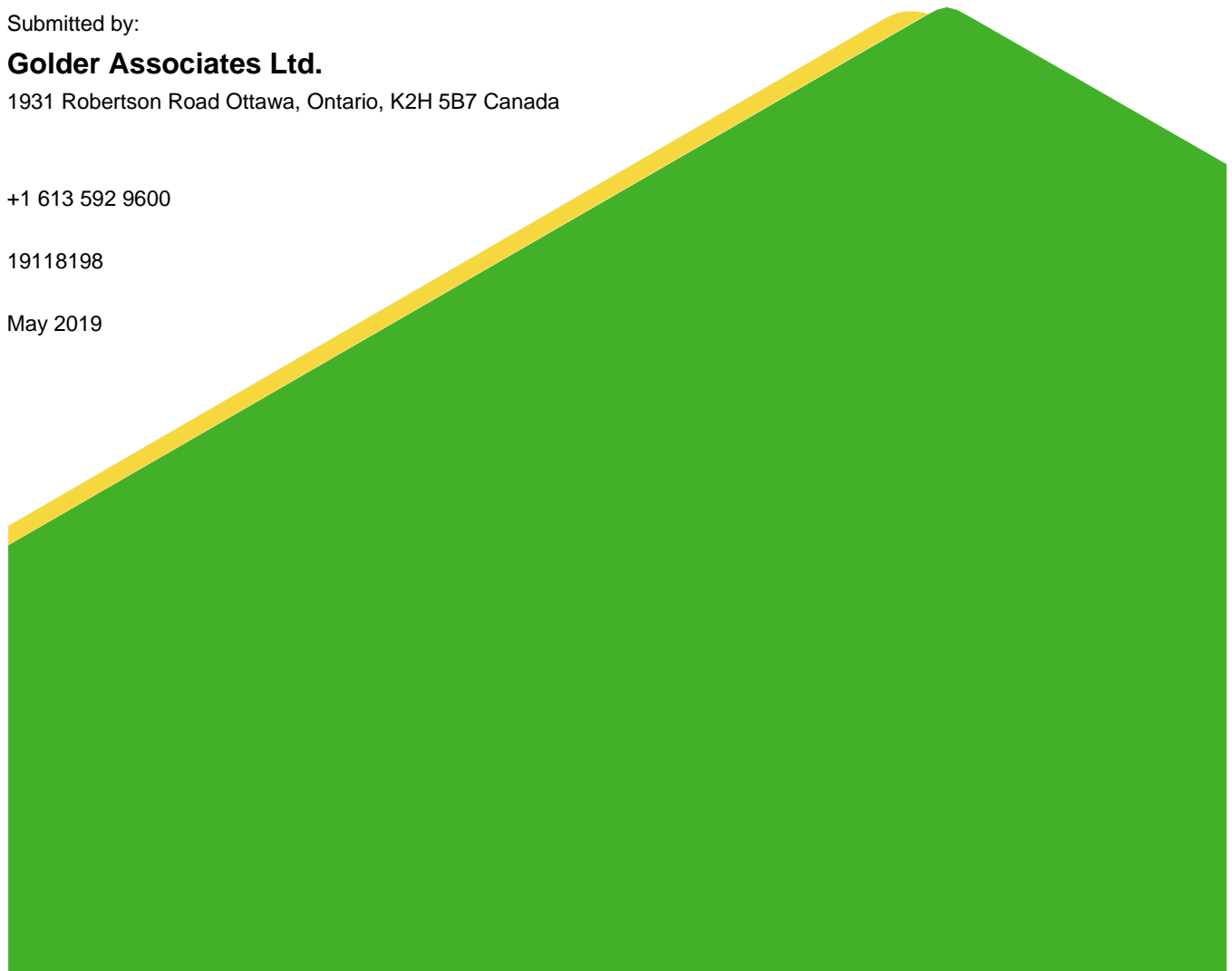
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1.0 INTRODUCTION

The following Phase Two Environmental Site Assessment (ESA) report has been prepared for a part of the property located at 1910 St. Laurent Boulevard in Ottawa (the “Subject Property”). The part of the Subject property covered by this Phase Two ESA includes a 2.0055-acre “L” shaped parcel of land located on the northern portion of the Subject Property, hereafter referred to as the “Site”, “Phase Two Property” or “RSC Property”, as shown on Figure 1.

1.1 Site Ownership and Description

The RSC Property information is as follows:

Municipal Address	Part of 1910 St. Laurent Boulevard, Ottawa
Property Identification Number	Part 1 of PIN 041720204
Legal Description	Part 1 Part of Block E of Registered Plan 643, City of Ottawa

The contact information for the Site is:

Site Owner/Client	Address	Contact Information
2058280 Ontario Limited (RioCan Real Estate Inv Trust)	RioCan Yonge Eglinton Centre 2300 Yonge Street, Suite 500 Toronto, Ontario M4P 1EP	Clayton Reynolds, Director Environmental Compliance Office: (416) 866-7324 Email: C Reynolds@riocan.com

1.2 Overview

The Phase Two Property, which includes of the RSC Property, consists of a 2.0055-acre “L” shaped parcel of land located 30 m southwest of the intersection between Smyth Road and St. Laurent Boulevard. The RSC Property is located on the northern portion of the Subject Property (occupied by Elmvale Acres Shopping Centre with municipal address 1910 St. Laurent Boulevard) with a single-storey commercial building occupied by Kelsey’s Original Roadhouse restaurant (the “Site Building”) and associated asphalt paved parking areas. In addition, asphalt paved driveways off Smyth Road and Othello Avenue provide access to the Site, from the north and west portions respectively. Another asphalt paved driveway, off St. Laurent Boulevard, provides access to the RSC Property from east side of the Site. The surrounding properties to the Site include primarily of residential and commercial activities with some community land uses.

Given that the Site will be redeveloped for residential purposes with two multi-tenant residential buildings, a change in land use from less sensitive (commercial) to more sensitive (residential) entails a mandatory requirement for filing of a Record of Site Condition (RSC) for this property pursuant to Ontario Regulation 153/04 – Records of Site Condition – Part XV.1 of the Act, made under the Environmental Protection Act. Golder understands that this Phase Two ESA, completed in accordance with the requirements of Schedule E of O.Reg. 153/04 (as amended), will be used for filing of an RSC application in response to address comments from Ontario Ministry of Environment, Conservation and Parks (MECP) on the initial Phase One ESA based RSC filing in 2018 (RSC File# 19-350). As such, the boundaries of the property for which the RSC will be filed, and the Phase Two Property are the same.

1.1 Physical Settings

The RSC Property, addressed 1910 St. Laurent Boulevard and located southwest of the intersection between Smyth Road and St. Laurent Boulevard, is located on the northern portion of the Subject Property. The RSC Property, with approximately 2-acre area, consists primarily of asphalt paved parking and driveways as well as a single storied commercial restaurant building on the northeast portion of the Site as shown on Figure 1. The surrounding properties include residential and commercial buildings with some community land uses, as illustrated on Figure 2.

- **North:** Bounded by Smyth Road followed by commercial properties including health services and Smyth Medical Centre at 1929 Russell Road as well as Bank of Montreal at 945 Smyth Road. Further away from the Site, land uses include residential homes/buildings, Alda Burt Park and other commercial land uses. A vacant land located immediately north of the Site (across Smyth Road) was previously a gas station.
- **East:** A multi-tenant commercial building followed by St. Laurent Boulevard. High density residential development (cooperative housing and high-rise apartment buildings) east of St. Laurent Boulevard with Russell Road and other commercial land uses further away from the RSC Property.
- **South:** Adjacent land uses include commercial properties occupied by Elmvale Acres Shopping Centre and a strip mall with associated parking areas (on the Subject Property). Commercial activities include banks, clinics and retail stores along with associated parking lots.
- **West:** Bounded by Othello Avenue followed by primarily residential homes in the Elmvale Acres neighbourhood; however, few community and commercial activities include St. Aidan's Church and Kiwanis Music Festival.

1.3 Phase One ESA Conceptual Site Model

A Phase One ESA in accordance with Ontario Regulation 153/04 (O.Reg. 153/04) (as amended) was completed for the Subject Property by Golder titled "*Phase One Environmental Site Assessment Part of 1910 St. Laurent Boulevard, Ottawa, ON*" in November 2018 (the "2018 Phase One ESA"). The Phase One ESA included a review of previous historical reports, including previous Phase Two ESA programs associated with larger Subject Property but which included relevant information for the Phase One Property. Golder has incorporated additional discussion based on the MECP review comments on the Phase One ESA RSC submission.

The following describes the Phase One ESA Conception Site Model (CSM) for the RSC Property based on the information obtained and reviewed as part of the 2018 Phase One ESA and from the MECP comments on the Phase One ESA submission:

- At the time of the Site visit on August 20, 2018, the RSC Property was occupied primarily by asphalt paved areas (driveway and parking lots) and a single storey commercial building occupied by Kelsey's Original Roadhouse restaurant on the northeast portion of the Site. As per the MECP comments, the historical and current use as a parking lot, may have included the application of de-icing agents.
- No water bodies were identified on the Phase One Property. The Ramsay Creek is located approximately 1.8 km east of the Site. No areas of natural significance were identified on or within the Phase One Study Area.
- According to ERIS report, only one WWIS record existed for the Site which indicated a test hole was drilled to 3.66 mbgs into overburden that consisted of sand, gravel pavement structure underlain by grey clay.

However, ERIS report also mentioned a combination of observation wells and historical potable wells records in the surrounding area which indicate that the stratigraphy in the vicinity of Phase One Property is generally brown sand and gravel underlain by silty clay and limestone or shale bedrock. The static water level is between 3 and 10.4 mbgs.

- Historically, the RSC Property was developed prior to 1945 (earliest available photograph) as agricultural land with farm buildings on the northern portion whereas the southern portion was undeveloped and likely used as agricultural fields. The RSC Property was redeveloped for commercial purposes with the construction of Elmvale Acres Shopping Centre sometime between 1958 and 1965. The RSC Property only consisted of parking areas and driveways associated with shopping mall from 1965 till 1996, when the current Site Building was constructed on the northeast corner. There is no indication that the Phase One Property was consisted of an on-site storage or use of chemicals. There are no indications that the Phase One Property was used for an industrial use or any of the following commercial uses: vehicle garage, dry cleaning facility and/or or bulk liquid dispensing facility. As per the MECP comments on the Phase One ESA, although not known, the past agricultural use may have included the application of pesticides (PCA #40) prior the redevelopment of the Site in 1958.
- No piles of fill were observed on the Site at the time of the Site visit and previous boreholes on the Subject Property, including the Site, did not indicate the presence of fill deposits beyond engineered pavement structure. As a conservative approach the pavement structure was considered as imported fill of unknown quality and origin (i.e. PCA #30), although likely was sourced from licensed pit or quarry.
- The surrounding properties to the Site consisted of generally mixed land uses including commercial properties to the north and south, and primarily residential with some community land uses to the west and east. There are indications that surrounding properties to the north and south historically consisted of commercial uses including vehicle garage, bulk liquid dispensing facility, or dry-cleaning facility, these activities were off-Site PCAs and are considered as not having resulted in an APEC to the Site. The dry cleaner (PCA#37) 150 metres to the south of the Phase One Property was located on the larger Subject Property (i.e. the Elmvale Shopping Centre). Although this was not considered as a PCA that has resulted in an APEC in the Phase One ESA as the impacts are well defined and off-Site, it was carried as a PCA that has resulted in an APEC based on the MECP review comments on the Phase One ESA RSC submission.
- The following roads were located within the Phase One Study Area at the time of the Site visit:
 - Lancaster Road, Russell Road, St. Laurent Boulevard, Othello Avenue, Gladwin Crescent, Hamlet Road, Wingate Drive, Olympia Crescent, and Chapman Boulevard.
- Local groundwater is anticipated to flow east (with localized variations caused by underground utilities in the vicinity of the Site) towards the nearest waterbody, Ramsay Creek, which is located 1.8 km east of the Site.

The following table summarizes all the PCAs considered to have resulted in an APEC on the RSC Property as identified in the Phase One ESA as wells as those identified by the MECP following review of the initial Phase One ESA based RSC filing in 2018. Figure 1 shows the locations of the identified APECs and their associated PCAs.

Phase Two ESA Findings with respect to the PCAs resulting in APECs to the Site.

Areas of Potential Environmental Concern (APECs)	Location of APEC at the Site	Potentially Contaminating Activity (PCA)	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or Sediment)
1. Presence of engineered fill materials used to grade the Site for parking areas at the time of construction (APEC 1)	Site-wide	#30. Importation of Fill Material of Unknown Quality	On-Site	PHCs F1-F4, BTEX, PAHs and metals	Soil
2. Use of pesticides associated with historical agricultural activities. (APEC 2)	Site-wide	#40. Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Pesticides (organochlorine)	Soil
3. Salt application, for de-icing purposes, to parking areas on RSC Property (APEC 3)	Site-wide	No PCA# assigned	On-Site	Electrical Conductivity (EC) and SAR (Sodium Adsorption Ratio)	Soil and groundwater
4. Known off-Site VOC plume in groundwater associated with former dry-cleaning operations located off-Site in the main Elmvale Acres Shopping Centre building, located south of the RSC Property (APEC 4)	Site-wide	#37. Operation of Dry-Cleaning Equipment (where chemicals are used)	Off-Site	VOCs	Soil and groundwater

1.2 Applicable Site Condition Standards

The analytical results of the samples collected for this Phase Two ESA were compared to the Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (Residential/Parkland/Institutional Property Use, coarse textured soil) presented in the Ministry of Environment, Conservation and Parks (“MECP”) *“Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”*, dated April 15, 2011. The applicable site condition standards were selected based on the following rationale:

- The Site and all other properties located, in whole or in part, within 250 metres of the Site are supplied by the City of Ottawa municipal drinking water system and there are no water supply wells which are in use;
- The Site is not located in an area designated in a municipal official plan as a well-head protection area or other designation identified by the municipality for the protection of ground water;
- Coarse soil texture was considered applicable for the Site (conservative approach) and as such, no grain size analysis was performed as part of the Phase Two ESA.
- There are no water bodies on the Site. The closest water body is located approximately 1.8 km east of the Site;
- There are no features on the Phase Two Property that would meet the conditions of an environmentally sensitive site, as described in Section 41 of O.Reg.153/04 as amended. Based on the data obtained from previous reports, soil pH ranged from 7.26 to 8.63, which is within MOECC's acceptable pH range of 5 to 9.
- The intended land use for the Phase Two Property is mixed residential and commercial, as such the more sensitive land use (residential) is considered to be applicable for the Site; and,
- The overburden thickness is greater than 2 metres over more than one-third of the Phase Two Property.

2.0 SCOPE OF THE PHASE TWO ESA INVESTIGATION

The primary objectives of this Phase Two ESA were to assess the absence or presence of the contaminants of concern in relation to the potential environmental concerns identified in the Phase One ESA completed by Golder and further expanded by the MECP following their review of the RSC submission based on the Phase One ESA. The Phase Two ESA was also used to characterize the subsurface conditions at the Phase Two Property and to determine if soil and groundwater quality at the Site meet the applicable site condition standards. In addition, to delineate the horizontal and vertical extent of the subsurface impacts in soil and groundwater (if present) at the Site during the Phase Two ESA. To achieve the objectives of the Phase Two ESA, the location of the boreholes and monitoring wells and the parameters for chemical analysis of soil and groundwater samples were selected to assess the quality of soil and groundwater at the Site in relation to the APECs and PCAs identified in the Phase One ESA completed by Golder.

2.1 Overview of Site Investigation

The Phase Two ESA included completion of three boreholes in 2019 (19-01, 19-02 and 19-03) installed with monitoring wells, to evaluate soil and groundwater quality at the Site. Monitoring well 19-03 was not sampled as it was adjacent to existing monitoring well 15-03 and not required.

In addition, existing monitoring wells (15-01A (deep), 15-01B (shallow), 15-02 and 15-03) on-Site, completed as part of previous environmental investigation at the Subject Property, were resampled for groundwater quality. Furthermore, soil samples from a geotechnical investigation in 2018 (BH18-1, BH18-2 and BH18-3) were used to supplement the Phase Two ESA to further evaluate the vertical distribution of salt related impacts into the glacial till at the Site.

2.2 Media Investigated

To address the APECs identified in the Phase One ESA, the Phase Two ESA field program included sampling of subsurface and surface soil from the three boreholes completed in 2019 and sampling of groundwater from the five shallow monitoring wells installed in the silty clay (included three existing 2015 wells and two new 2019 wells) and one deep existing well screened within the glacial till. No sediment was present at the Site and therefore no sediment sampling was completed. A summary of the samples collected from each media investigated (soil and groundwater) and submitted for laboratory analysis of the COCs is provided in Tables 3 and 4 following the text of this report.

The locations of the boreholes and monitoring wells are shown on Figure 1.

2.3 Deviations from Sampling and Analysis Plan

A sampling and analysis plan which outlines the rationale for the field investigation activities carried out at the Site and the associated methodologies used to meet the objectives of this Phase Two ESA was prepared at the initiation of the Phase Two ESA. The procedures described in the Sampling and Analysis Plan were followed and there were no deviations from the SAP with the exception the addition of additional soil samples from geotechnical boreholes previously drilled after completion of the Phase Two ESA analysis to add vertical delineation of salt related impacts at greater depth than the samples available in the Phase Two ESA boreholes.

2.4 Impediments

No impediments to the Phase Two ESA investigation were encountered.

3.0 PHASE TWO INVESTIGATION METHOD

3.1 General

The following sections describe the pre-field work activities and field investigation methodology employed during the Phase Two ESA conducted at the Phase Two Property. The field investigation methods were carried out in accordance with Golder's Quality Assurance Program and the SOPs. The current Phase Two ESA fieldwork was completed in April 2019.

Prior to initiating the field work, Golder developed and implemented Site-specific protocols to protect the health and safety of its employees and subcontractors through the preparation of a Site-specific Health and Safety Plan. An assessment of potential health and safety hazards at the Phase Two Property and those associated with the proposed work was completed each day of the field program. A health and safety tail gate meeting was held with Golder's subcontractors each day prior to completion of the field work. The document was reviewed and signed on-Site by field personnel prior to commencing work. Additionally, prior to any intrusive investigations, including drilling, Golder retained USL-1 Inc. of Ottawa, Ontario to coordinate utility clearances with the local utility companies and to clear boreholes locations.

The previous 2015 groundwater sampling results presented in this Phase Two ESA were collected completed in November of 2015 and the geotechnical boreholes used to supplement the EC soil analytical results were completed in September 2018. Both of these field programs are discussed in separate reports, the information from these reports has been incorporated into the Phase Two ESA, where applicable.

3.2 Drilling

Three boreholes (BH19-01m BH19-02 and BH19-03) were advanced at the Site. Borehole locations are provided in Figure 1. All boreholes were advanced using a geoprobe drilling rig. The borehole drilling and monitoring well installation activities were monitored in the field by an experienced Golder technician. During borehole drilling, overburden soil samples were collected continuously at using a push tube sampler with dedicated plastic sampling sleeves for each sampling run.

3.3 Soil: Sampling

Soil samples were split in the field into two components. One component of each sample was placed into laboratory supplied sample jars and stored in a cooler with ice for possible subsequent chemical analysis. The second component of the sample was placed inside a labelled plastic bag for subsequent field headspace screening. When handling all soil samples, a clean gloved hand was used and all equipment in contact with soils was decontaminated between sampling locations to minimize the potential for cross-contamination.

The subsurface soil conditions within the boreholes were described in terms of their texture, presence of staining, odour and debris, if any. Geologic descriptions of soil samples are presented in the Record of Borehole sheets (Appendix A).

All soil samples collected and submitted for chemical analysis were obtained from undisturbed soils, including fill materials (if present) and native overburden, from the Site by borehole drilling methods. Nitrile gloves were worn when handling soil samples and all equipment in contact with soils was washed between sample locations to prevent the potential of cross contamination.

Soil samples submitted for chemical analysis were based on visual or olfactory observations (e.g., staining, discolouration, free product, and/or odour, if any), from representative soil layers, and/or from depth horizons at which potential impact would most likely have occurred, such as near the water table. Otherwise, if no visual or olfactory observations were noted, the highest recorded field screening reading and/or depth horizons at which potential contamination was considered most likely to have occurred was used to determine which soil sample to submit for analysis from each test location.

3.4 Field Screening Measurements

Field measurements of sample headspace concentration were made using the following equipment:

Equipment	Make and Model	Parameters Detected	Detection Limits	Precision	Accuracy	Calibration Standard	Calibration Procedure
Photo-ionization detector (PID) MiniRae 3000 10.6 EV bulb	MiniRae 3000, Serial No. 592-909267	Organic vapours	0 - 15,000 ppm	N/A	+/- 3%	100 ppm Isobutylene	By supplier prior to fieldwork & by Golder Associates field staff during work

The PIDs were used to provide an estimate of the relative concentrations of organic vapours in the headspace of each soil sample and was used to support selection of soil samples for submission for laboratory analysis. The selection of “worst case” soil samples submitted for laboratory analysis of the COCs is based on professional judgement which included a consideration of the highest organic vapour readings, visual and olfactory evidence of potential contamination and the depths of the soil sample collection (depth horizons at which potential impact would most likely have occurred, such as from the upper fill layer or near the water table).

In this instance, there were no measurable organic vapours in the soil samples.

3.5 Groundwater: Monitoring Well Installation

Following the completion of drilling and soil sampling at the three (3) borehole locations (19-01, 19-02 and 19-03) were completed with monitoring wells. As previously indicated the previous monitoring well 15-03, adjacent to 19-03 was sampled in place of 19-03 which was therefore not included in the Phase Two ESA groundwater program. Each new monitoring well was screened in the upper soils near the groundwater table.

Previous monitoring wells used in the Phase Two ESA included three monitoring wells in the upper silty clay (15-01B, 15-02 and 15-03) and one deeper well 15-01A installed in the glacial till.

All monitoring wells were installed by using threaded 32 mm diameter, schedule 40, polyvinyl chloride (“PVC”) well screens and riser pipe, which were brought to the Site in sealed plastic bags. The annulus surrounding the screened portion of the well and an approximately 0.2 to 0.7 m portion of the riser pipe above the slotted pipe was filled with silica filter sand. A bentonite seal was placed above the sand filter pack with a minimum thickness of 0.3 m. The monitoring wells were completed with a flush mount protective well casing set in concrete and the riser pipes were sealed with a protective cap.

The monitoring wells were developed following the drilling by removing up to ten well volumes or by removing groundwater until the well was purged three times dry, using dedicated Waterra® inertial pumps (polyethylene tubing with foot valves). During monitoring well development, qualitative observations were made of water colour, clarity, and the presence or absence of any hydrocarbon sheen or odours.

Monitoring well construction details are summarized in Table 1 and presented in the Record of Borehole sheets (Appendix A).

3.6 Groundwater: Water Level Measurement and Sampling

Prior to the groundwater sampling, the water levels were recorded on November 12, 2015 (Previous Results) and on April 12 and 24th, 2019 (Existing 2015 wells and 2019 Phase Two ESA wells). The water level measurements and the groundwater sampling were completed more than 24 hours after the well development was completed. The water level measurements were taken from the top of the PVC riser and are summarized in Table 2 following the text of this report. Groundwater was measured between 0.9 and 2.3 metres depth.

Following the water level measurement and prior to the groundwater sampling the wells were purged and sampled using the dedicated tubing and gravity samplers. Following purging, groundwater samples were collected into the laboratory provided sample bottles, placed in a cooler on ice and delivered under chain-of-custody procedures to AGAT. The groundwater samples were analyzed for one or more of the following parameters: VOCs, sodium and chloride following chain-of-custody procedures. Details of the parameters analyzed at each monitoring well are presented in Table 4.

3.7 Sediment: Sampling

There is no sediment on the Site and as such, no sediment samples were collected as part of this investigation.

3.8 Analytical Testing

Soil and groundwater analyses were conducted by AGAT. The contact information for the analytical laboratory is included below.

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario, L4Z 1Y2
Laboratory Contact: Sandra Consulta
905-712-5106

The analytical laboratory is accredited in accordance with the International Standard ISO/IEC 17025 (CALA) (General Requirement for the Competence of Testing and Calibration Laboratories, May 5, 2005, as amended) and the standards for proficiency testing developed by the Standards Council of Canada, the Canadian Association for Laboratory Accreditation or another accreditation body accepted by the MECP.

3.9 Quality Assurance and Quality Control Measures

Golder's quality assurance program for environmental investigations was implemented to ensure that analytical data obtained by the investigation were valid and representative. The quality assurance program included the following measures:

- The use of standard operating procedures for all field investigation activities;
- All monitoring wells were developed following installation to remove fine particles from the filter pack and any fluids introduced during drilling;
- Monitoring wells were appropriately purged prior to groundwater sample collection to remove stagnant water from the well bore and improve sample representativeness, minimizing sample agitation and aeration to the extent practicable;
- The collection of field duplicate samples at a minimum frequency of one duplicate for every ten samples;
- Submission of one trip blank for laboratory analysis of VOCs during each of the groundwater sampling events. The trip blanks were supplied and sealed by the laboratory, were brought to the Site and then shipped back to the laboratory unopened for analysis of VOCs.
- Initial calibration of field equipment was performed at the start of each field day, with daily checks of calibration, as needed, using a standard of known concentration;
- Soil and groundwater samples were handled and stored in accordance with the sample collection and preservation requirement of the Ministry of the Environment (MOE) *Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act*, July 1, 2011. Samples were collected directly into pre-cleaned, laboratory-supplied sample containers with the appropriate preservative for the analyte group. Upon collection, samples were placed in insulated coolers with ice for storage and transport to the analytical laboratory under chain-of-custody;

- Dedicated sampling equipment (tubing and foot valves) and clean disposable Nitrile™ gloves were used at each sampling location to prevent cross-contamination. All non-dedicated sampling equipment (e.g., water level meters, split spoons) was decontaminated between sampling locations. Sampling equipment in contact with soil, groundwater, or sediment was: cleaned by mechanical means; washed with a laboratory-grade detergent (e.g., phosphate-free LiquiNox or AlcoNox) and, if necessary, an appropriate desorbing wash solution; and thoroughly rinsed with analyte-free water;
- Detailed field records documenting the methods and circumstances of collection for each field sample were prepared at the time of sample collection. Each sample was assigned a unique sample identification number recorded in the field notes, along with the date and time of sample collection, the sample matrix, and the requested analyses; and,
- The submission of samples to the analytical laboratory in accordance with standard chain of custody procedures.

4.0 REVIEW AND EVALUATION

4.1 Geological Conditions

The soil conditions encountered during drilling program are presented in the Record of Borehole sheets (included in the Phase Two ESA Report), as well as in the cross sections presented in Figure 5 with the cross-section location and orientation shown on Figure 2.

The subsurface stratigraphy within the area of the investigation consists of pavement structure comprised of gravelly sand (associated with the parking lot pavement structure) overlying silty clay which is underlain by glacial till and shale bedrock. The silty clay layer extends up to 11 mbgs and is underlain by glacial till extending to between 14.6 and 23.7 mbgs where shale bedrock surface was encountered. The silty clay layer is inferred to represent an aquitard that limits the potential for downward migration of potential groundwater impacts at the Site. The underlying glacial till between 14.6 and 23.7 mbgs is inferred to represent the deeper confined hydro-stratigraphy unit.

4.2 Physical Hydrogeology

Groundwater Levels and Flow Directions

As part of a previous environmental investigation at the Site, static groundwater levels were measured from three monitoring wells at the Site in 2015. Recent groundwater sampling event from April 2019, measured static groundwater levels for BH15-01A, BH15-02, BH19-01 and BH19-02 on April 12, 2019, and, for BH15-01B and BH19-03 on April 24, 2019. The water levels on April 12, 2019 were measured between 1.48 and 2.29 mbgs, whereas the water levels on April 24, 2019 was measured between 0.58 and 1.38 mbgs. Water levels measured on November 12, 2015 from BH15-01A, BH15-01B, BH15-03, and BH15-03 were between 1.81 and 2.15 mbgs. The interpreted shallow groundwater flow direction based on groundwater level events in 2015 and on April 12, 2019 was calculated to be to the southeast (as shown on Figures 2). Seasonal fluctuations in water levels on the Site are anticipated.

Horizontal and Vertical Hydraulic Gradients

The average horizontal hydraulic gradient was calculated based on the water level contours presented in Figure 2. The horizontal hydraulic gradient for shallow groundwater conditions was calculated to be approximately 0.01 m/m. Variability in hydraulic gradients may be present at the Phase Two property related to the presence of foundations/buried structure, bedding materials, and buried services at the Site.

The vertical hydraulic gradient was estimated based on the water level elevations measured in the monitoring well pairs (shallow and deeper) located within the silty clay (shallow) and the glacial till (deeper) on April 12, 2019 at MW15-01A and B. The vertical hydraulic gradients at all monitoring well pairs were determined to be downward (or recharging).

Groundwater Hydraulic Conductivity

Groundwater flow velocity was determined based on the hydraulic conductivity of 1.0×10^{-9} m/s for silty clay, a porosity of 50%, and the horizontal gradient. The groundwater flow velocity within silty clay was calculated to be 6.3×10^{-4} m/year. Note that actual groundwater velocity may vary significantly not only because of variability of the hydraulic gradient, but also because of variability of the hydraulic conductivity within the silty clay.

4.3 Findings of the Phase Two ESA with respect to the APECs

To address the APECs and PCAs identified at the Site, soil and groundwater sampling and analysis for potential COCs were completed as part of this Phase Two ESA. MECP Table 3 Standards (April 15, 2011) in a non-potable groundwater condition for residential/parkland/institutional property use for coarse-textured soil were used to compare the soil and groundwater analytical results. A summary of the findings from the Phase Two ESA with respect to the APECs and associated PCAs with respect to the Site is provided in the table below.

Phase Two ESA Investigation Results for each APEC

APEC	PCA	Summary of Phase Two ESA Program	Summary of Exceedances
#1	#30 Importation of Fill Material of Unknown Quality (Soil only)	Fill quality analysis in boreholes BH19-01, BH19-02 and BH19-03 included analysis of three samples as well as a field duplicate of BH19-01 SA3 for each of these parameters- PHCs F1-F4, BTEX, PAHs and metals. All of the fill is located above the groundwater table.	No exceedances

APEC	PCA	Summary of Phase Two ESA Program	Summary of Exceedances
#2	#40. Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications (Soil only)	<p>A total of three soil samples near the interface between the imported fill and native soil (BH19-01 SA3, BH19-02 SA2 and BH19-03 SA2) and a field duplicate of BH19-01 SA3 were analyzed for Pesticides (organochlorine).</p> <p>The fill native interface is located above the groundwater table.</p>	No exceedances
#3	Salt application, for de-icing purposes, to parking areas on RSC Property (Soil and groundwater)	<p>A total of 12 soil samples including three from fill layer, six from silty clay (native) layer, and three from glacial till layer at the Site were analyzed for EC and SAR.</p> <p>Three fill samples were from boreholes completed in 2019 (BH19-01 SA1, BH19-02 SA1, BH19-03 SA1). Six native soil samples as well as a field duplicate of BH19-01 SA3 were analyzed for salt impacts. Three glacial till samples, collected as part of a geotechnical investigation in September 2018, were also analyzed for vertical delineation purposes.</p> <p>A total of seven groundwater samples in 2019 were analyzed for sodium and chloride including a field duplicate of BH15-03.</p>	<p>EC exceedance in all soil samples except for one silty clay and two glacial till samples.</p> <p>SAR exceedance in two fill samples (BH19-01 SA1 and BH19-03 SA1).</p> <p>Chloride exceedance in three well locations (15-01B, 15-03 and 1-01).</p>
#4	#37. Operation of Dry-Cleaning Equipment (where chemicals are used) (Soil and groundwater)	<p>Three clay (soil) samples (BH19-01 SA3, BH19-02 SA4 and BH19-03 SA5) and a field duplicate of BH19-01 SA3 were analyzed for VOCs.</p> <p>A total of five groundwater samples in 2019 (BH19-01, BH19-02, BH15-01B, BH15-02, BH15-03) were analyzed for VOCs. In addition, four samples (BH15-01A, BH15-01B, BH15-02, BH15-03) were analyzed in 2015 for VOCs and did not identify any exceedances.</p>	No exceedances

4.4 Summary of Current Site Condition

The summary of the soil and groundwater conditions at the Site based on the results of this Phase Two ESA, by stratigraphic layer and media, is presented below:

- **Fill (pavement structure)** – The fill layer at the Site, extending to depths ranging between 0.56 mbgs and 1.04 mbgs, consisted of parking lot pavement structure. A total of three fill samples were analyzed for PHCs F1-F4, BTEX, PAHs, and, metals and inorganics. All fill samples exceeded EC concentrations and two of the three fill samples exceeded SAR concentrations, above applicable MECP Table 3 standards. No other fill related exceedances over the applicable site condition standards were identified.
- **Silty Clay (soil)**- The clay at the Site extended up to 11 mbgs. Five silty clay samples (BH19-01 SA3, BH19-02 SA2, BH19-02 SA4, BH19-03 SA2 and BH19-03 SA5) as well as a field duplicate of BH19-01 SA3 were analyzed for VOCs, pesticides, and/or inorganics. In addition, three silty clay samples (BH18-01 SA7, BH18-02 SA7, BH18-03 SA7- collected from previous geotechnical investigations in 2018) were analyzed for EC and SAR.
 - All silty clay samples analyzed for VOCs and pesticides satisfied the applicable MECP Table 3 standards for residential use.
 - All silty clay samples, except sample BH18-02 SA7, exceeded EC concentrations compared to applicable MECP Table 3 standards; however, no silty clay samples analyzed exceeded applicable SAR concentrations.
 - Three samples (BH18-1 SA7, BH18-2 SA7 and BH18-3 SA7), collected during previous geotechnical samples at depths between 4.57 and 5.18 mbgs, were analysed for EC and SAR with no exceedances identified for SAR. However, two of these samples exceeded applicable concentrations for EC.
- **Glacial Till (soil)**- The glacial till at the Site consisted of sandy silt to clayey silt starting at depths of about 11 mbgs. Three glacial till soil samples (BH18-1 SA10, BH18-2 SA10 and BH18-3 SA11) from the Site, collected at depths between 8.38 and 9.75 mbgs, were analyzed for EC and SAR for delineation purposes due to identified exceedances in the overlying fill and clay samples for these parameters. Only one sample (BH18-2 SA10) had EC concentrations above MECP Table 3 standards for residential uses.
- **Groundwater**- Groundwater quality assessment at the Site consisted of groundwater sampling events in 2015 and 2019. All groundwater samples in 2015 and 2019 were analyzed for VOCs whereas sodium and chloride was included in the 2019 program in response to MECP comments. There were no exceedances of the applicable site condition standards identified for VOCs or sodium in any of the groundwater samples. Chloride exceedances were observed in three of the six groundwater samples and a field duplicate (collected from 15-03) sample.
 - One of the samples, from monitoring well (15-01A) screened in glacial till layer, was analyzed for sodium and chloride for delineation purposes related to salt impacts in the overlying shallow clay wells. This deeper well in the glacial till did not exceed the site condition standards for either chloride or sodium.

Based on the identified exceedances of EC and SAR in soil and of chloride in groundwater at the Site, a remediation and/or risk assessment will be required to obtain an RSC. EC exceedances which extend through the clay into the glacial till without a correspondingly elevated SAR are inferred to be the result of naturally elevated EC in the soils resulting from marine clay deposits in the Ottawa area. The impacts associated with the

application of de-icing agents (i.e. where both EC and SAR) are considered limited to the fill. Salt impacts (i.e. chloride) has impacted the upper groundwater table and is not present in the deeper glacial till. Naturally elevated EC in soil is delineated to the bedrock surface as a conservative approach.

4.5 Meteorological and Climatic Considerations

Seasonal fluctuations in groundwater levels are expected at the Site. Based on the information obtained from the Phase Two ESA, the depth to the water table is between 0.58 and 2.29 mbgs, and, was located primarily in the silty clay layer (0.5 to 11 mbgs). Seasonal fluctuation in water levels on the Site should be expected; however, given the limited number of monitoring events seasonal trends could not be identified. Majority of the RSC Property is paved and serviced by storm sewer catchments connected to the City storm sewer. As such, temporal fluctuations in the groundwater levels due to variable effects of climatic or meteorological conditions would likely not influence the distribution and migration of contaminants on the Site and as such there is limited interaction with respect to meteorological conditions and the presence salt related exceedance at the Site, beyond the continued seasonal addition of de-icing agents on the Site and adjacent roadways.

4.6 Potential Exposure Pathways and Receptor

The only exceedances at the Site are elevated EC and SAR in soil and chloride in groundwater resulting from the application of de-icing agents on the Site and adjacent roadways. The Site does not use the groundwater as a potable resource and the EC and SAR in soil are only a risk to ecological receptors including terrestrial plants via root/direct uptake and chloride impacts to aquatic receptors through the pathway of groundwater to surface water. The closest waterbody is more than a kilometre from the Site and therefore not considered a viable receptor.

Given that the current use as a paved parking area and the future use of the Site will be building or paved parking, there are no complete pathways or applicable receptors at the Site.

4.7 Contaminant Release and Migration Mechanism

Based on the information obtained during the Phase Two ESA, the fill and upper clay at the Site has been impacted by historical and on-going salt-application, on-Site and from adjacent roadways north and west of the RSC Property. In addition, there may also be some additive impacts with respect to naturally elevated EC associated with the salt in the native soil present at the Site. The upper lower permeable clay has limited the downward migration of salt impacts to the upper soil and hydrogeological unit with no chloride exceedances present in the deeper glacial till monitoring well. On-going contribution from the Site activities and surrounding roadways will continue to add salt to the Site soils and regional groundwater.

Potential for migration of VOC-plume in groundwater, from the historical dry cleaning operations south of the RSC Property, towards the RSC Property is not considered a potential as it has been delineated off-Site on the Subject Property and is not in an upgradient location. This has been confirmed by the lack of detectable VOCs on the RSC Property.

4.8 Soil Vapour Intrusion

EC and SAR in soil and chloride in groundwater were identified in exceedance of application MECP site condition standards; however, these parameters do not present a vapour intrusion concern for current and future buildings at the Site.

5.0 CONCLUSIONS

Following the completion of the Phase Two ESA described herein the soil and groundwater satisfied the applicable site condition standard, certified as of April 24, 2019 with the only exception being EC and SAR in soils and chloride exceedances in shallow groundwater as a result of the application of de-icing agents (salt) to the Site and from surrounding roadways. There are no exceedances associated with any of the other APECs investigated.

Remediation or risk assessment will be required to obtain a RSC due to the presence of salt related impacts. It is noted that most of the soil impacts will be removed during redevelopment due to the excavation of basement parking and pavement subgrade.

6.0 SIGNATURE

The undersigned Qualified Person confirms that he was responsible for conducting and/or supervising this Phase Two ESA and the associated findings and conclusions.

We trust that you will find the contents of this report satisfactory for your current needs. Should you require clarification of the information provided, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.



Shihan Chowdhury, MEnvSc, EIT
Environmental Consultant



Keith Holmes, MSc, PGeo., QP_{ESA}
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TABLES

Table 1: Groundwater Monitoring Well Construction Details

Monitoring Well ID	Ground Surface Elevation (mASL)	Top of Pipe Elevation (mASL)	Borehole Depth (mbgs)	Borehole Depth (masl)	Screen Interval (masl)	Screened Media	Date of well Completion
15-01A	78.61	78.51	26.72	51.89	69.64 - 66.59	Sandy clayey silt (glacial till)	04-Nov-15
15-01B	78.61	78.54	26.72	51.89	77.09 - 74.04	Silty clay to clay	02-Nov-15
15-02	78.34	78.14	18.37	59.97	76.13 - 73.08	Silty clay to clay	03-Nov-15
15-03	77.70	77.69	6.71	70.99	75.57 - 72.52	Silty clay to clay	03-Nov-15
19-01	78.35	78.27	3.0	75.35	76.95 - 75.45	Silty clay to clay	15-Mar-15
19-02	78.57	78.49	3.0	75.357	77.17 - 75.67	Silty clay to clay	15-Mar-15

Notes:

mASL- metres above sea level

mbgs-metres below ground surface

No evidence of free product was observed during elevation or sampling events.

Table 2: Groundwater Elevations

Monitoring Well	Top of Pipe Elevation (mASL)	Depth to Groundwater in 2015 (mbgs)	Groundwater Elevation in 2019 (mASL)	Date of Measurement	Depth to Groundwater (mbgs)	Groundwater Elevation in 2019 (mASL)	Date of Measurement
15-01A	78.51	2.150	76.36	12-Nov-15	1.810	76.70	12-Apr-19
15-01B	78.54	1.850	76.69	12-Nov-15	0.584	77.96	24-Apr-19
15-02	78.14	1.810	76.33	12-Nov-15	2.030	76.11	12-Apr-19
15-03	77.69	2.040	75.65	12-Nov-15	1.385	76.31	24-Apr-19
19-01	78.27	n/a	n/a	n/a	2.290	75.98	12-Apr-19
19-02	78.49	n/a	n/a	n/a	1.480	77.01	12-Apr-19

mbgs- metres below ground surface

mASL- metres above sea level

n/a - water levels not measured

Elevations are metres above sea level based on the geodetic datum CGVD 1928

No evidence of free product was observed during any elevation or sampling events.

Table 3: Summary of Soil Samples Submitted for Laboratory Analysis

Location	Soil Samples Collected	Soil Samples Analyzed	Parameters Analyzed	MECP Table 3 Exceedances ⁽¹⁾
BH 18-01	BH18-01 SA7 and \ BH18-01 SA10	BH18-01 SA7 (4.57 - 5.18) and BH18-01 SA10 (8.38 - 8.99)	EC and SAR	EC
BH 18-02	BH18-02 SA7 and BH18-02 SA10	BH18-02 SA7 (4.42 - 5.03) and BH18-02 SA10 (8.99 - 9.60)	EC and SAR	EC
BH 18-03	BH18-03 SA7 and BH18-03 SA11	BH18-03 SA7 (4.57 - 5.18) and BH18-03 SA11 9.14 - 9.75)	EC and SAR	EC
BH19-01	BH19-01 SA1, BH19-01 SA2, BH19-01 SA3, BH19-01 SA4, BH19-01 SA5	BH19-01 SA1 (0.43 - 1.04), BH19-01 SA3 (1.22 - 1.83)	PHCs, PAHs, VOCs, Metals and Inorganics, EC, SAR, and/or Pesticides (organochlorine)	EC and SAR
BH19-02	BH19-02 SA1, BH19-02 SA2, BH19-02 SA3, BH19-02 SA4, BH19-02 SA5	BH19-02 SA1 (0.15 - 0.59), BH19-02 SA2 (0.59 - 1.22), BH19-02 SA4 (1.82 - 2.44)	PHCs, PAHs, VOCs, Metals and Inorganics, EC, SAR, and/or Pesticides (organochlorine)	EC
BH 19-03	BH19-03 SA1, BH19-03 SA2, BH19-03 SA3, BH19-03 SA4, BH19-03 SA5	BH19-03 SA1 (0.18 - 0.56), BH19-03 SA2 (0.56 - 1.22), BH19-03 SA5 (2.44 - 3.3)	PHCs, PAHs, VOCs, Metals and Inorganics, EC, SAR, and/or Pesticides (organochlorine)	EC and SAR

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Residential/Parkland/Institutional Property Use, coarse-textured soil, April 15, 2011 (MECP Table 3 Standards).

PHCs: Petroleum Hydrocarbons (F1-F4)

BTEX: Benzene, Toluene, Ethylbenzene and Xylenes

VOCs: Volatile Organic Compounds

PAHs: Polycyclic Aromatic Hydrocarbons

EC: Electrical Conductivity

SAR: Sodium Adsorption Ratio

Table 4: Summary of Groundwater Samples Submitted for Laboratory Analysis

Monitoring Well ID	Screened Interval (mbgs); Stratigraphy	Groundwater Samples Submitted for Analysis	Analytical Parameters	MECP Table 3 Exceedances ⁽¹⁾
BH15-01A	8.97 - 12.02; sandy clayey silt (glacial till)	15-01A	Sodium, Chloride	None
BH15-01B	1.52 - 4.57; silty clay to clay	15-01B	VOCs, Sodium, Chloride	Chloride
BH15-02	2.21 - 5.26; silty clay to clay	15-02	VOCs, Sodium, Chloride	None
BH15-03	2.13 - 5.18; silty clay to clay	15-03	VOCs, Sodium, Chloride	Chloride
BH19-01	2.21 - 5.26; silty clay to clay	19-01	VOCs, Sodium, Chloride	Chloride
BH19-02	2.13 - 5.18; silty clay to clay	19-02	VOCs, Sodium, Chloride	None

(1) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition, Residential/Parkland/Institutional Property Use, coarse-textured soil, April 15, 2011 (MECP Table 3 Standards).

VOCs- Volatile Organic Compounds

Borehole Location	Unit	MECP Table 3 Standard (R/P/I) ⁽¹⁾	19-01	19-02	19-03
Sample Date			15-Mar-2019	15-Mar-2019	15-Mar-2019
Sample ID			BH19-01 SA1	BH19-02 SA1	BH19-03 SA1
Sample Depth (mbgs)			0.43 - 1.04	0.15 - 0.59	0.18 - 0.56
Petroleum Hydrocarbons					
Benzene	µg/g	0.21	<0.02	<0.02	<0.02
Toluene	µg/g	2.3	<0.05	<0.05	0.1
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05
Xylenes, Total	µg/g	3.1	<0.05	<0.05	0.1
Petroleum Hydrocarbons - F1 (C6-C10)	µg/g	55	<5	<5	12
Petroleum Hydrocarbons - F2 (C10-C16)	µg/g	98	<10	<10	<10
Petroleum Hydrocarbons - F3 (C16-C34)	µg/g	300	<50	100	<50
Petroleum Hydrocarbons - F4 (C34-C50)	µg/g	2800	<50	250	<50

Footnotes:

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n/a = Chemical not analyzed or criteria not defined.

Grey background and **bold font** indicates exceedances above MECP Table 3 standards.

(1) MECP Table 3 Standards: Table 3- Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residential/Parkland/Institutional Property Use, Coarse Grained Soils; as per Ontario Regulation 153/04 (2011) under the Environmental Protection Act of the Ministry of the Environment, Conservation and Parks (MECP)

Borehole Location	Unit	MECP Table 3 Standard (R/P/I) ⁽¹⁾	19-01		19-02	19-03
Sample Date			15-Mar-2019	15-Mar-2019	15-Mar-2019	15-Mar-2019
Sample ID			BH19-01 SA3	DUP-1	BH19-02 SA4	BH19-03 SA5
Sample Depth (mbgs)			1.22 - 1.83	1.22 - 1.83	1.82 - 2.44	2.44 - 3.3
Volatile Organic Compounds						
Dichlorodifluoromethane	µg/g	16	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	µg/g	0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	µg/g	4	<0.05	<0.05	<0.05	<0.05
Acetone	µg/g	16	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	µg/g	0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	µg/g	0.1	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	µg/g	0.084	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	µg/g	0.75	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	µg/g	3.5	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	µg/g	16	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	µg/g	3.4	<0.02	<0.02	<0.02	<0.02
Chloroform	µg/g	0.05	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	µg/g	0.05	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	µg/g	0.38	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	µg/g	0.05	<0.05	<0.05	<0.05	<0.05
Benzene	µg/g	0.21	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	µg/g	0.05	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	µg/g	0.061	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	µg/g	13	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	µg/g	1.7	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	µg/g	0.05	<0.04	<0.04	<0.04	<0.04
Toluene	µg/g	2.3	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	µg/g	9.4	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	µg/g	0.05	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	µg/g	0.28	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	µg/g	0.058	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	µg/g	2.4	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	2	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	µg/g	n/a	<0.05	<0.05	<0.05	<0.05
Bromoform	µg/g	0.27	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g	0.7	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	µg/g	0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g	n/a	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	µg/g	4.8	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	µg/g	0.083	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	µg/g	3.4	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	3.1	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene	µg/g	0.05	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	2.8	<0.05	<0.05	<0.05	<0.05

Footnotes:

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Grey background and **bold font** indicates exceedances above MECP Table 3 standards.

(1) MECP Table 3 Standards: Table 3- Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residential/Parkland/Institutional Property Use, Coarse Grained Soils; as per Ontario Regulation 153/04 (2011) under the Environmental Protection Act of the Ministry of the Environment, Conservation and Parks (MECP)

Borehole Location	Unit	MECP Table 3 Standard (R/P/I) ⁽¹⁾	19-01	19-02	19-03
Sample Date			15-Mar-2019	15-Mar-2019	15-Mar-2019
Sample ID			BH19-01 SA1	BH19-02 SA1	BH19-03 SA1
Sample Depth (mbgs)			0.43 - 1.04	0.15 - 0.59	0.18 - 0.56
PAHs					
Naphthalene	µg/g	0.6	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.15	<0.05	<0.05	<0.05
Acenaphthene	µg/g	7.9	<0.05	<0.05	<0.05
Fluorene	µg/g	62	<0.05	<0.05	<0.05
Phenanthrene	µg/g	6.2	<0.05	<0.05	<0.05
Anthracene	µg/g	0.67	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	<0.05	<0.05	<0.05
Pyrene	µg/g	78	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.5	<0.05	<0.05	<0.05
Chrysene	µg/g	7	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.78	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.78	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.38	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	6.6	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene ⁽²⁾	µg/g	0.99	<0.05	<0.05	<0.05

Footnotes:

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(2) 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

Borehole Location	Unit	MECP Table 3 Standard (R/P/I) ⁽¹⁾	19-01	19-02	19-03
Sample Date			15-Mar-2019	15-Mar-2019	15-Mar-2019
Sample ID			BH19-01 SA1	BH19-02 SA1	BH19-03 SA1
Sample Depth (mbgs)			0.43 - 1.04	0.15 - 0.59	0.18 - 0.56
Metals					
Antimony	µg/g	7.5	<0.8	<0.8	<0.8
Arsenic	µg/g	18	3	4	3
Barium	µg/g	390	328	157	176
Beryllium	µg/g	4	0.8	<0.5	<0.5
Boron	µg/g	120	<5	8	7
Boron (Hot Water Soluble)	µg/g	1.5	0.15	0.3	0.43
Cadmium	µg/g	1.2	<0.5	<0.5	<0.5
Chromium	µg/g	160	87	13	50
Cobalt	µg/g	22	18.3	5.3	10.3
Copper	µg/g	140	43	7	22
Lead	µg/g	120	12	9	5
Molybdenum	µg/g	6.9	2.4	2.4	<0.5
Nickel	µg/g	100	50	16	32
Selenium	µg/g	2.4	<0.4	<0.4	<0.4
Silver	µg/g	20	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4
Uranium	µg/g	23	0.9	<0.5	<0.5
Vanadium	µg/g	86	78	16	43
Zinc	µg/g	340	97	18	51
Chromium VI	µg/g	8	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	<0.10	<0.10	<0.10

Footnotes:

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Grey background and **bold font** indicates exceedances above MECP Table 3 standards.

(1) MECP Table 3 Standards: Table 3- Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residential/Parkland/Institutional Property Use, Coarse Grained Soils; as per Ontario Regulation 153/04 (2011) under the Environmental Protection Act of the Ministry of the Environment, Conservation and Parks (MECP)

Borehole Location	Unit	MECP Table 3 Standard (R/P/I) ⁽¹⁾	19-01			19-02		19-03		18-01 ⁽³⁾		18-02 ⁽²⁾		18-03 ⁽²⁾	
Sample Date			15-Mar-2019	15-Mar-2019	15-Mar-2019	15-Mar-2019	15-Mar-2019	15-Mar-2019	15-Mar-2019	12-Sep-2018	12-Sep-2018	17-Sep-2018	17-Sep-2018	10-Sep-2018	10-Sep-2018
Sample ID			BH19-01 SA1	BH19-01 SA3	DUP-1	BH19-02 SA1	BH19-02 SA4	BH19-03 SA1	BH19-03 SA5	BH18-01 SA7	BH18-01 SA10	BH18-02 SA7	BH18-02 SA10	BH18-03 SA7	BH18-03 SA11
Sample Depth (mbgs)			0.43 - 1.04	1.22 - 1.83	1.22 - 1.83	0.15 - 0.59	1.82 - 2.44	0.18 - 0.56	2.44 - 3.3	4.57 - 5.18	8.38 - 8.99	4.42 - 5.03	8.99 - 9.60	4.57 - 5.18	9.14 - 9.75
Inorganics															
Electrical Conductivity	mS/cm	0.7	3.55	1.41	1.32	0.769	1.21	4.01	2.81	1.17	0.301	0.499	0.885	1.19	0.351
Sodium Adsorption Ratio	NA	5	7.59	0.808	0.986	2.14	4.2	5.11	1.72	1.59	1.35	1.36	0.386	0.901	2.67
pH	pH units	n/a	7.27	n/a	n/a	7.53	n/a	7.71	7.12	n/a	n/a	n/a	n/a	n/a	n/a
Moisture Content	%	n/a	25.1	n/a	n/a	4.5	n/a	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Footnotes:

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(1) MECP Table 3 Standards: Table 3- Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residential/Parkland/Institutional Property Use, Coarse Grained Soils; as per Ontario Regulation 153/04 (2011) under the Environmental Protection Act of the Ministry of the Environment, Conservation and Parks (MECP)

(2) Soil samples, collected from geotechnical boreholes completed in September 2018, analyzed for EC and SAR delineation purposes.

Borehole Location	Unit	MECP Table 3 Standard (R/P/I) ⁽¹⁾	19-01		19-02	19-03
Sample Date			15-Mar-2019	15-Mar-2019	15-Mar-2019	15-Mar-2019
Sample ID			BH19-01 SA3	DUP-1	BH19-02 SA2	BH19-03 SA2
Sample Depth (mbgs)			1.22 - 1.83	1.22 - 1.83	0.59 - 1.22	0.56 - 1.22
Organichlorine Pesticides						
Hexachloroethane	µg/g	0.089	<0.01	<0.01	<0.01	<0.01
Gamma-Hexachlorocyclohexane	µg/g	0.056	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.15	<0.005	<0.005	<0.005	<0.005
Aldrin	µg/g	0.05	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	<0.005	<0.005	<0.005	<0.005
Chlordane	µg/g	0.05	<0.007	<0.007	<0.007	<0.007
DDE	µg/g	0.26	<0.007	<0.007	<0.007	<0.007
DDD	µg/g	3.3	<0.007	<0.007	<0.007	<0.007
DDT	µg/g	1.4	<0.007	<0.007	<0.007	<0.007
Dieldrin	µg/g	0.05	<0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.04	<0.005	<0.005	<0.005	<0.005
Methoxychlor	µg/g	0.13	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.52	<0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.012	<0.01	<0.01	<0.01	<0.01

Footnotes:

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n/a = Chemical not analyzed or criteria not defined.

Grey background and **bold font** indicates exceedances above MECP Table 3 standards.

(1) MECP Table 3 Standards: Table 3- Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residential/Parkland/Institutional Property Use, Coarse Grained Soils; as per Ontario Regulation 153/04 (2011) under the Environmental Protection Act of the Ministry of the Environment, Conservation and Parks (MECP)

Table 6A: Groundwater Analytical Results- Volatile Organic Compounds

Sample ID			15-01A	15-01B		15-02			15-03	
Sample Date		MECP Table 3	12-Nov-2015	12-Nov-2015	20-Mar-2019	12-Nov-2015	12-Apr-2019	12-Nov-2015	28-Feb-2019	28-Feb-2019*
Water Levels (mbgs)	Unit	Standard ⁽¹⁾	2.2	1.9	2.2	1.8	2.03	2.0	2.0	2.0
Dichlorodifluoromethane	µg/l	4400	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/l	0.5	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/l	5.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/l	2500	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/l	130000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/l	1.6	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/l	610	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/l	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/l	190	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/l	320	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/l	470000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/l	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/l	2.4	0.73	0.57	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/l	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/l	640	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/l	0.79	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/l	44	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/l	16	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/l	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/l	85000	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/l	140000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/l	4.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/l	18000	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/l	82000	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/l	0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/l	1.6	0.43	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/l	3.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/l	630	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/l	2300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/l	n/a	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromoform	µg/l	380	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/l	1300	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/l	3.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/l	n/a	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/l	9600	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/l	8	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/l	4600	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/l	5.2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/l	4200	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/l	51	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Footnotes:

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na = Chemical not analyzed or criteria not defined.

Grey background and bold font indicates exceedances above MECP Table 3 standards.

*Field duplicate (DUP-1) of 15-03 collected on February 28, 2019

(1) MECP Table 3 Standards: Table 3- Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residential/Parkland/Institutional Property Use, Coarse Grained Soils; as per Ontario Regulation 153/04 (2011) under the Environmental Protection Act of the Ministry of the Environment, Conservation and Parks (MECP)

Sample ID	Unit	MECP Table 3 Standard ⁽¹⁾	15-01A	15-01B		15-02	15-03**	19-01	19-02
Sample Date			12-Apr-2019	20-Mar-2019*	24-Apr-2019	12-Apr-2019	24-Apr-2019	12-Apr-2019	12-Apr-2019
Water Levels (mbgs)			1.81	2.20	1.85	2.03	1.39	2.29	1.48
Sodium	µg/l	2,300,000	1,690	2,000,000	1,340,000	40,200	1,750,000	416,000	388,000
Chloride	µg/l	2,300,000	6,980	6,400,000	4,100,000	60,200	3,230,000	2,860,000	1,230,000
pH	pH units	--	n/a	7.70	n/a	n/a	n/a	n/a	n/a

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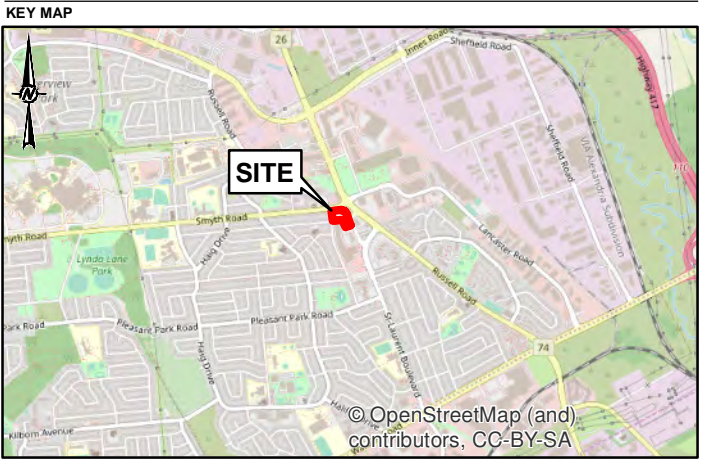
Grey background and bold font indicates exceedances above MECP Table 3 standards.

* Groundwater sample for Sodium was not filtered

**Field duplicate (DUP-1) of 15-03 collected on February 28, 2019 was not field filtered for sodium and hence not included in this table.

(1) MECP Table 3 Standards: Table 3- Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residential/Parkland/Institutional Property Use, Coarse Grained Soils; as per Ontario Regulation 153/04 (2011) under the Environmental Protection Act of the Ministry of the Environment, Conservation and Parks (MECP)

FIGURES



- LEGEND**
- BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
 - BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
 - EXISTING MONITORING WELL LOCATION
 - PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

Areas of Potential Environmental Concern ("APEC")		
APEC#	Detail	PCA#
1	Importation of Fill Material of Unknown Quality- Presence of fill materials across the entire RSC Property.	30
2	Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications – Use of pesticides across entire RSC Property.	40
3	Salt application, for de-icing purposes, to driveways and parking areas on the RSC Property.	n/a
4	Operation of Dry-Cleaning Equipment (where chemicals are used)– Former dry cleaning operations approxiamtely 150 m south of the RSC Property.	37



Potentially Contaminating Activities ("PCA")		
Location	Detail	PCA#
1	Importation of Fill Material of Unknown Quality- Fill was expected to have been brought to the Site during development and likely present across the entire RSC Property (not indicated on Figure 1).	30
2	Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications – Use of pesticides, associated with historical agricultural activities, across entire RSC Property (not indicated on Figure 1).	40
3	Salt application, for de-icing purposes, to driveways and parking areas on the RSC Property (not indicated on Figure 1).	n/a
4	Operation of Dry-Cleaning Equipment (where chemicals are used)– Former dry cleaners on Subject Property located 150 m south of the RSC Property (not indicated on Figure 1).	37

CLIENT
RIOCAN MANAGEMENT INC.

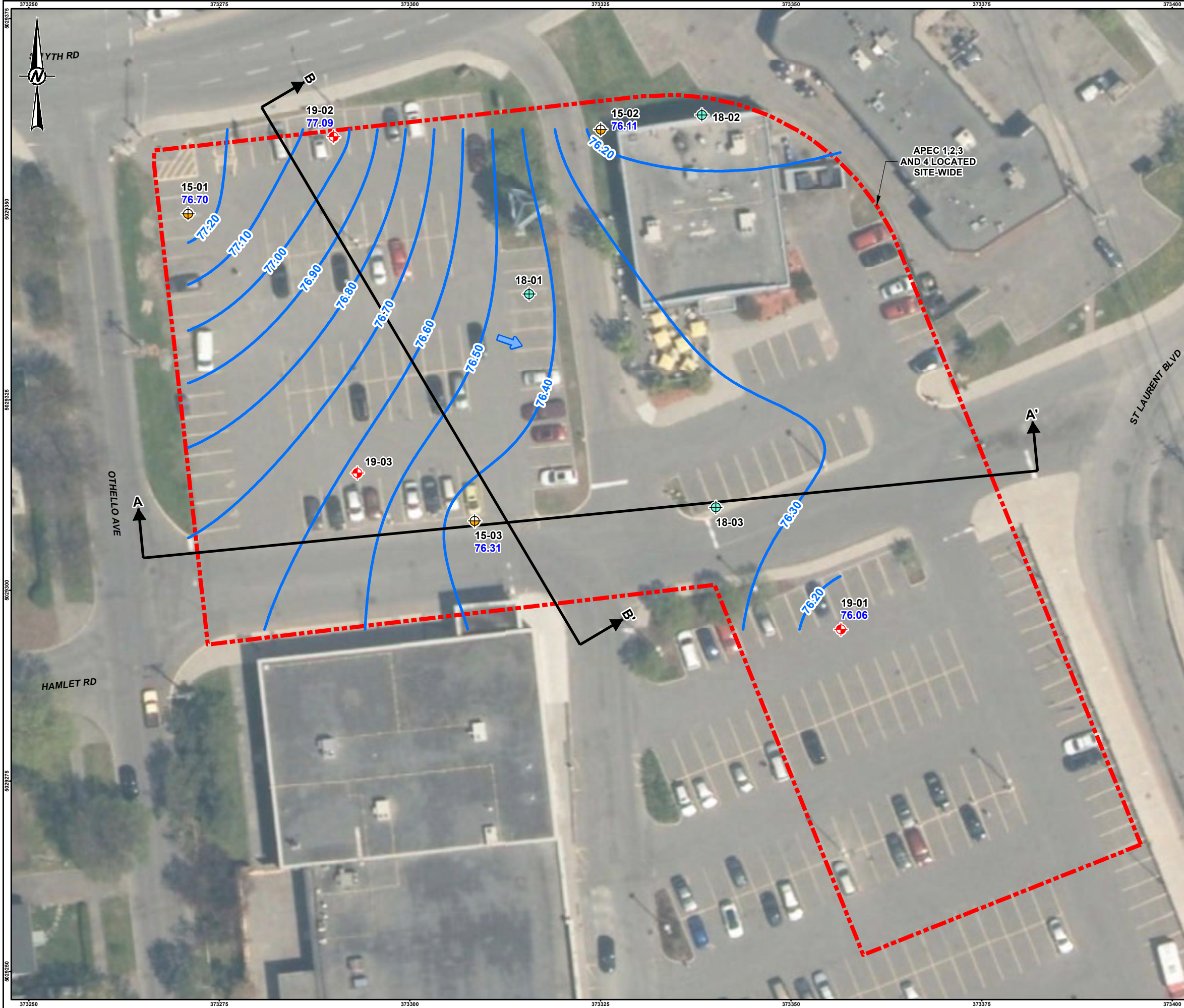
PROJECT
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE
SITE PLAN AND AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

CONSULTANT	YYYY-MM-DD	2019-05-17
	DESIGNED	---
	PREPARED	JEM/BR
	REVIEWED	SAC
	APPROVED	KPH

PROJECT NO. 19118198 CONTROL 0001 REV. 0

FIGURE 1



KEY MAP

SCALE 1:50,000

LEGEND

- 76.70 GROUNDWATER ELEVATION, mASL
- INTERPRETED GROUNDWATER FLOW
- INTERPRETED GROUNDWATER CONTOUR, mASL
- CROSS-SECTION LOCATION
- BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
- BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
- EXISTING MONITORING WELL LOCATION
- PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)

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REFERENCE(S)

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2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

0 5 10 20
1:500 METRES

CLIENT

RIOCAN MANAGEMENT INC.

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE

GROUNDWATER ELEVATION, INTERPRETED GROUNDWATER FLOW AND CROSS-SECTION LOCATIONS

CONSULTANT	YYYY-MM-DD	2019-05-17
DESIGNED	---	
PREPARED	JEM/BR	
REVIEWED	SAC	
APPROVED	KPH	

GOLDER

PROJECT NO.	CONTROL	REV.	FIGURE
19118198	0001	0	2



KEY MAP

LEGEND

- BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
- BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
- EXISTING MONITORING WELL LOCATION
- PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)

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REFERENCE(S)

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2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

CLIENT

RIOCAN MANAGEMENT INC.

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE

PHCs AND BTEX ANALYSIS AND EXCEEDANCE IN SOIL

CONSULTANT	YYYY-MM-DD	2019-05-17
	DESIGNED	---
	PREPARED	JEM/BR
	REVIEWED	SAC
	APPROVED	KPH

PROJECT NO.	CONTROL	REV.	FIGURE
19118198	0001	0	3A

Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-02 SA4	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		1.82 - 2.44	
Sample complies with MECP Table 3 for VOCs			VOCs, EC and SAR

Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-03 SA5	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		2.44 - 3.3	
Sample complies with MECP Table 3 for VOCs		VOCs, EC, SAR and pH	

Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-01 SA3	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		1.22 - 1.83	
Sample complies with MECP Table 3 for VOCs		VOCs, EC, SAR and Pesticides (organochlorine)	

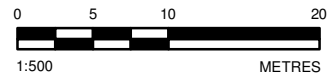


LEGEND

	BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
	BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
	EXISTING MONITORING WELL LOCATION
	PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)
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REFERENCE(S)
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2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28



CLIENT RIOCAN MANAGEMENT INC.		
PROJECT PHASE II ENVIRONMENTAL SITE ASSESSMENT PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON		
TITLE VOCs ANALYSIS AND EXCEEDANCE IN SOIL		
CONSULTANT 	YYYY-MM-DD	2019-05-17
	DESIGNED	---
	PREPARED	JEM/BR
	REVIEWED	SAC
APPROVED	KPH	
PROJECT NO. 19118198	CONTROL 0001	REV. 0
FIGURE 3B		

Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-02 SA1	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		0.15 - 0.59	
Sample complies with MECP Table 3 for PAHs			PHCs, BTEX, PAHs, Metals & Inorganics,

Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-03 SA1	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		0.18 - 0.56	
Sample complies with MECP Table 3 for PAHs			PHCs, BTEX, PAHs, Metals & Inorganics,

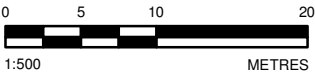
Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-01 SA1	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		0.43 - 1.04	
Sample complies with MECP Table 3 for PAHs			PHCs, BTEX, PAHs, Metals & Inorganics,



- LEGEND
- BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
 - BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
 - EXISTING MONITORING WELL LOCATION
 - PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)
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REFERENCE(S)
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2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28



CLIENT RIOCAN MANAGEMENT INC.		
PROJECT PHASE II ENVIRONMENTAL SITE ASSESSMENT PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON		
TITLE PAHs ANALYSIS AND EXCEEDANCE IN SOIL		
CONSULTANT 	YYYY-MM-DD	2019-05-17
	DESIGNED	---
	PREPARED	JEM/BR
	REVIEWED	SAC
	APPROVED	KPH
PROJECT NO. 19118198	CONTROL 0001	REV. 0



Sample ID	MECP Table 3	BH 19-02 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.15 - 0.59	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,

Sample ID	MECP Table 3	BH 19-03 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.18 - 0.56	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,

Sample ID	MECP Table 3	BH 19-01 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.43 - 1.04	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,

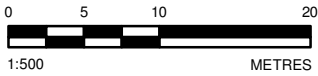


SCALE 1:50,000

LEGEND	
	BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
	BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
	EXISTING MONITORING WELL LOCATION
	PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28



CLIENT RIOCAN MANAGEMENT INC.		
PROJECT PHASE II ENVIRONMENTAL SITE ASSESSMENT PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON		
TITLE METALS ANALYSIS AND EXCEEDANCE IN SOIL		
CONSULTANT	YYYY-MM-DD	2019-05-17
	DESIGNED	---
	PREPARED	JEM/BR
	REVIEWED	SAC
	APPROVED	KPH
PROJECT NO. 19118198	CONTROL 0001	REV. 0
		FIGURE 3D



KEY MAP

SCALE 1:50,000

LEGEND

- BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
- BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
- EXISTING MONITORING WELL LOCATION
- PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY
- LATERAL EXTENT OF EC/SAR EXCEEDANCES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

CLIENT

RIOCAN MANAGEMENT INC.

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE

INORGANICS ANALYSIS AND EXCEEDANCE IN SOIL

CONSULTANT	YYYY-MM-DD	2019-05-17
GOLDER	DESIGNED	---
	PREPARED	JEM/BR
	REVIEWED	SAC
	APPROVED	KPH

PROJECT NO.	CONTROL	REV.	FIGURE
19118198	0001	0	3E

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm



LEGEND

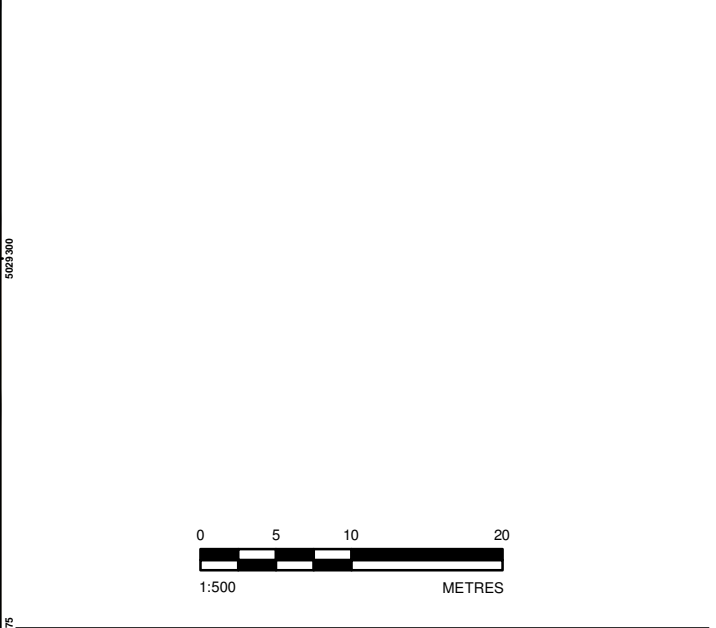
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- BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
- EXISTING MONITORING WELL LOCATION
- PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)

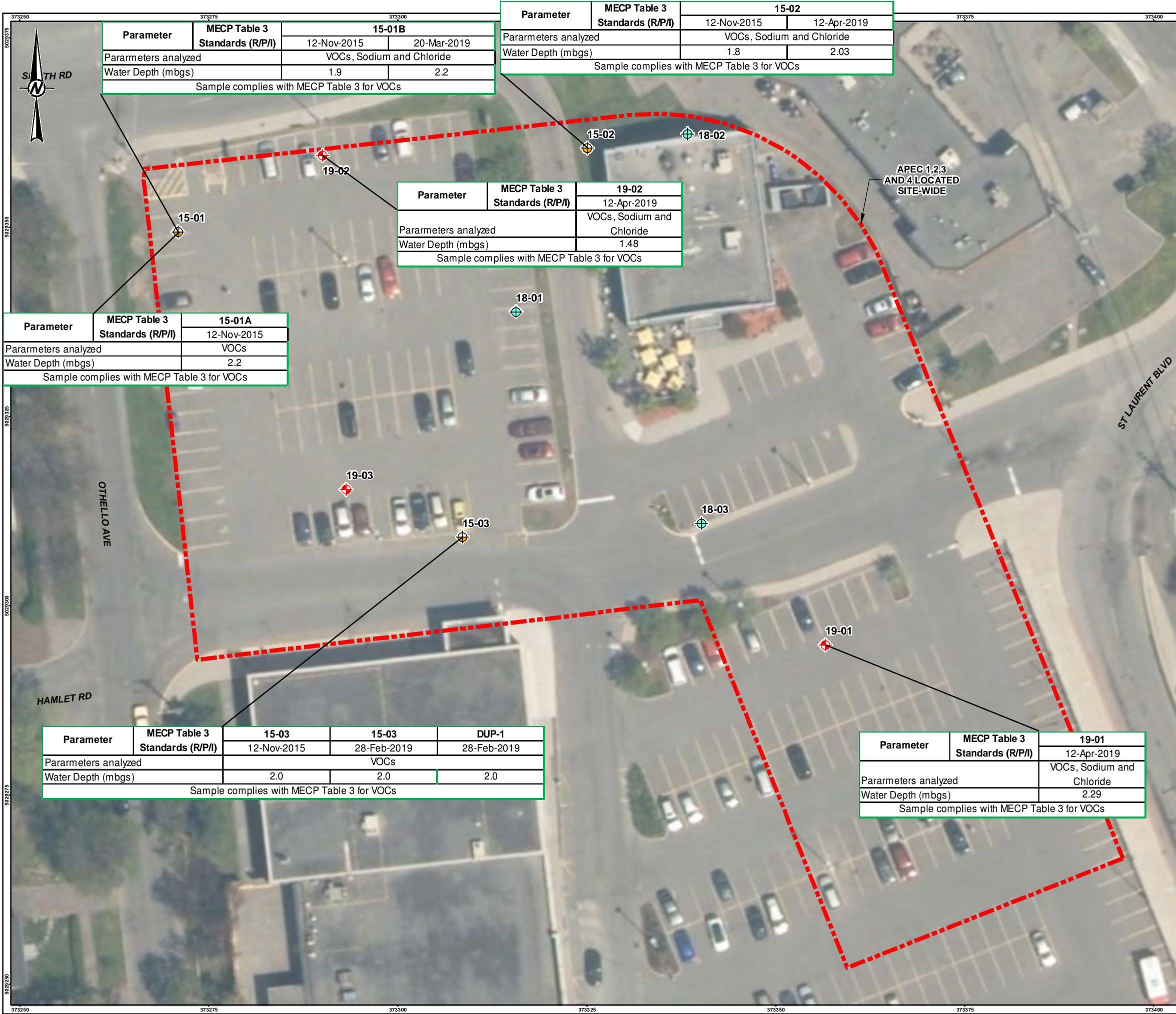
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28



CLIENT			RIOCAN MANAGEMENT INC.
PROJECT			PHASE II ENVIRONMENTAL SITE ASSESSMENT PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON
TITLE			PESTICIDE ANALYSIS AND EXCEEDANCE IN SOIL
CONSULTANT		YYYY-MM-DD	2019-05-17
		DESIGNED	---
		PREPARED	JEM/BR
		REVIEWED	SAC
		APPROVED	KPH
PROJECT NO.	CONTROL	REV.	FIGURE
19118198	0001	0	3F

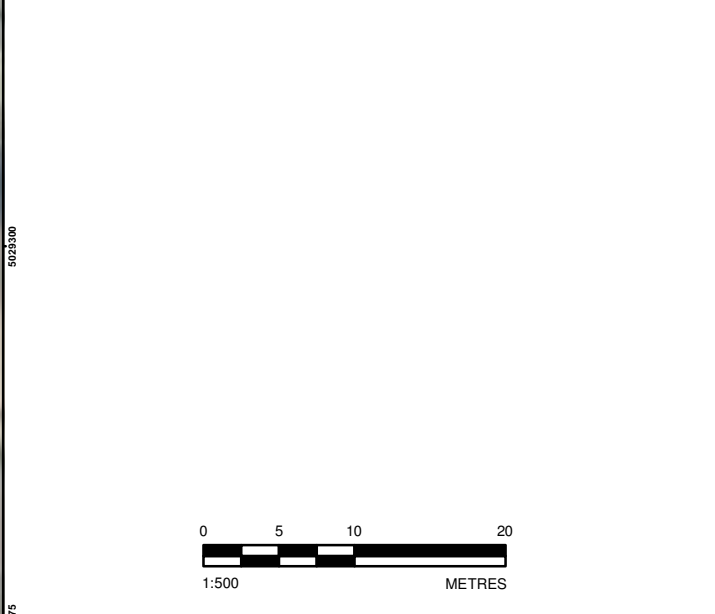


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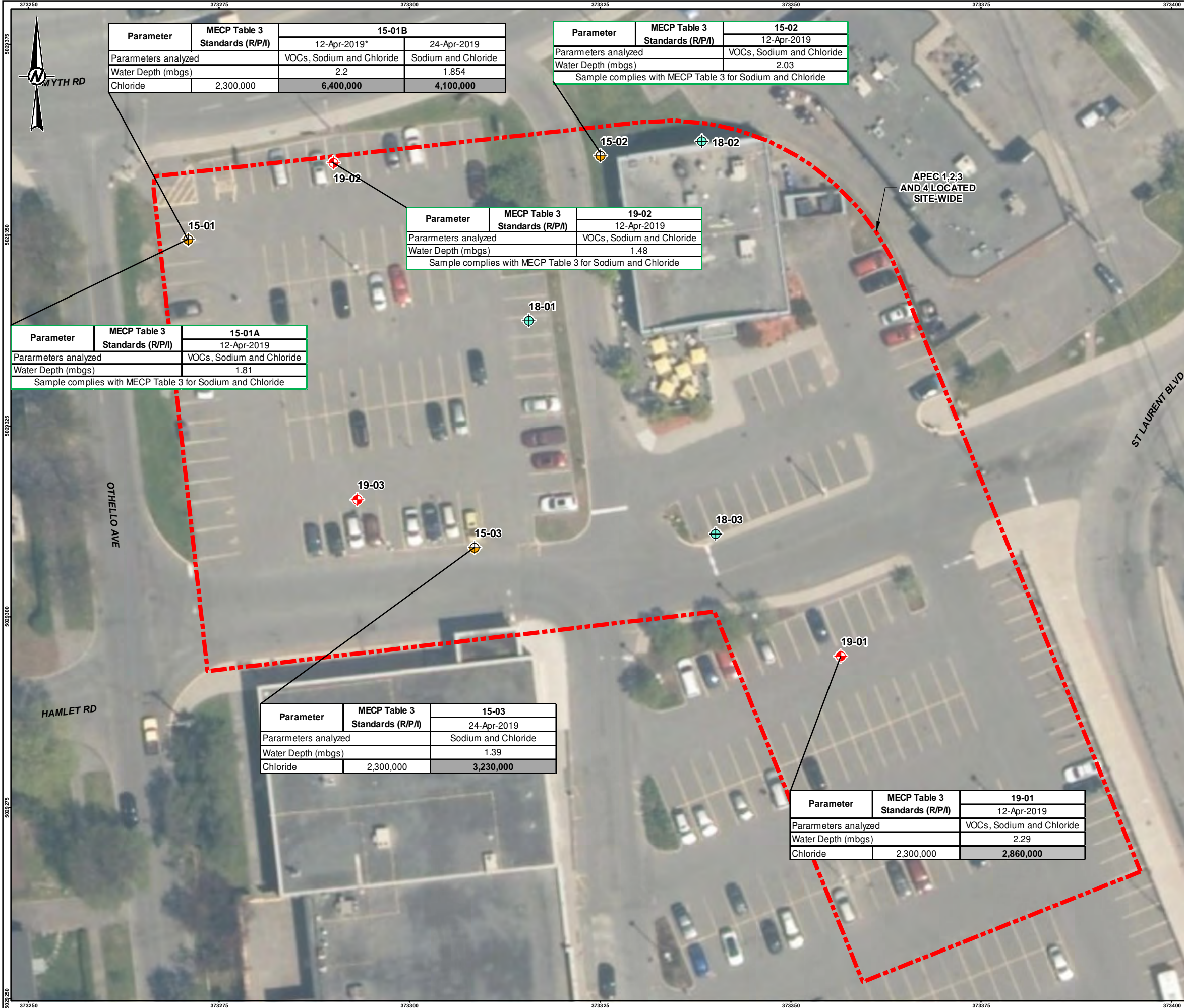
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	BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
	EXISTING MONITORING WELL LOCATION
	PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28



CLIENT		RIOCAN MANAGEMENT INC.	
PROJECT		PHASE II ENVIRONMENTAL SITE ASSESSMENT PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON	
TITLE		VOCs ANALYSIS AND EXCEEDANCE IN GROUNDWATER	
CONSULTANT		YYYY-MM-DD	2019-05-17
		DESIGNED	---
		PREPARED	JEM/BR
		REVIEWED	SAC
		APPROVED	KPH
PROJECT NO.	CONTROL	REV.	FIGURE
19118198	0001	0	4A



KEY MAP

SCALE 1:50,000

LEGEND

- BOREHOLE LOCATION, 2019 PHASE II ESA, (19118198)
- BOREHOLE LOCATION, 2018 GEOTECH INVESTIGATION, (18106596)
- EXISTING MONITORING WELL LOCATION
- PHASE ONE/ PHASE TWO/ RSC SITE BOUNDARY

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

0 5 10 20
1:500 METRES

CLIENT
RIOCAN MANAGEMENT INC.

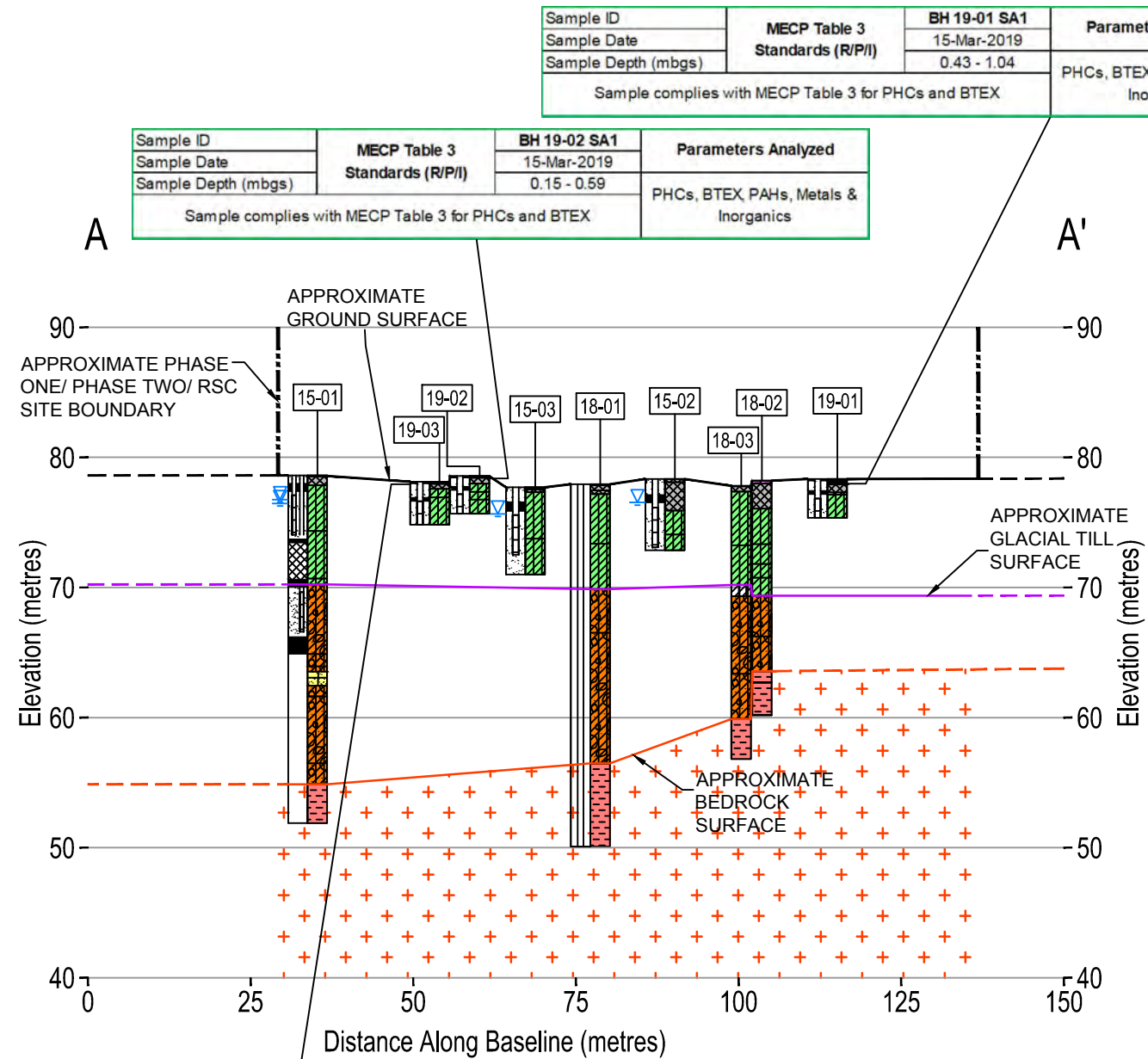
PROJECT
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE
INORGANICS ANALYSIS AND EXCEEDANCE IN GROUNDWATER

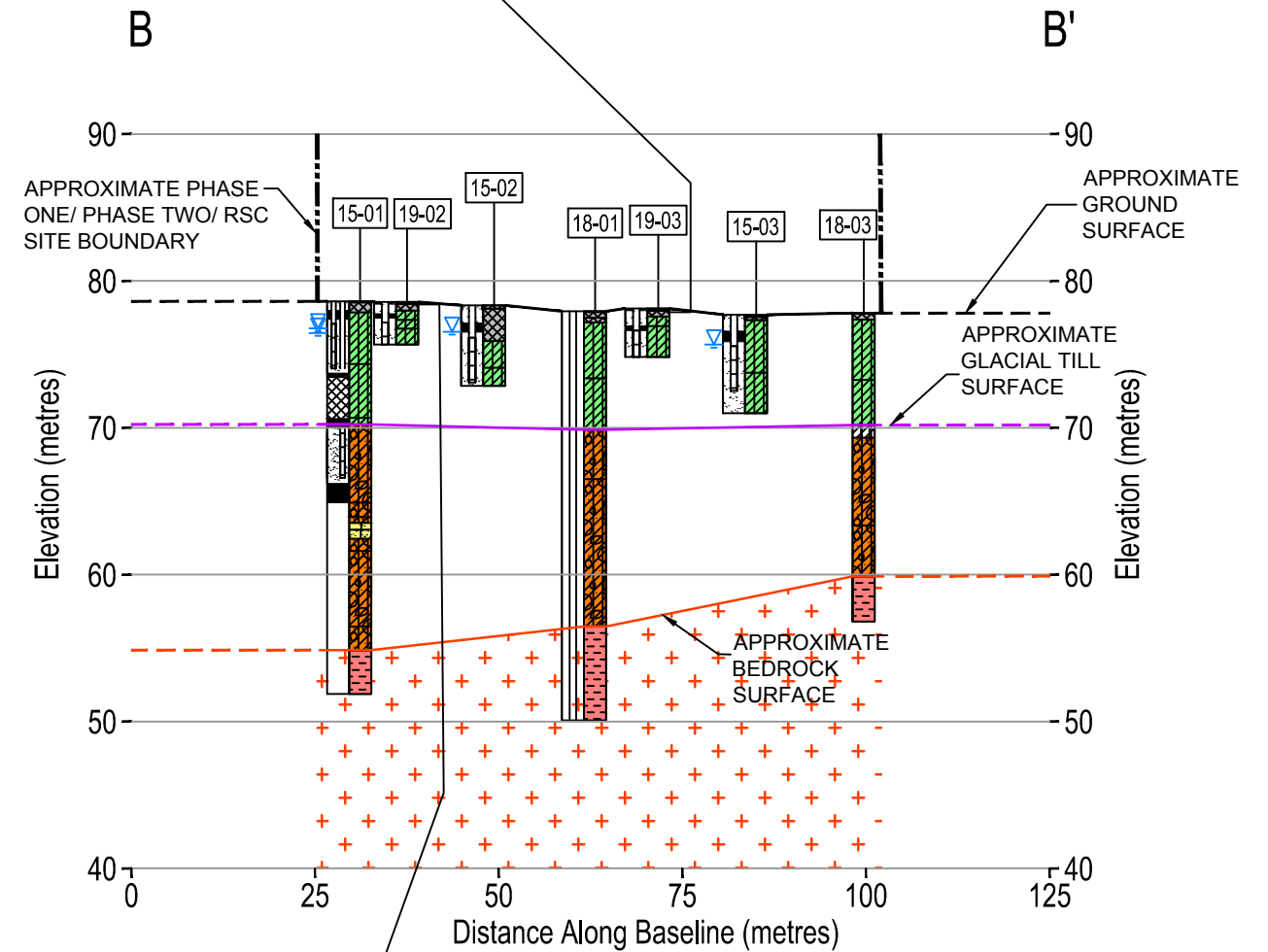
CONSULTANT	YYYY-MM-DD	2019-05-17
	DESIGNED	---
	PREPARED	JEM/BR
	REVIEWED	SAC
	APPROVED	KPH

PROJECT NO.	CONTROL	REV.	FIGURE
19118198	0001	0	4B

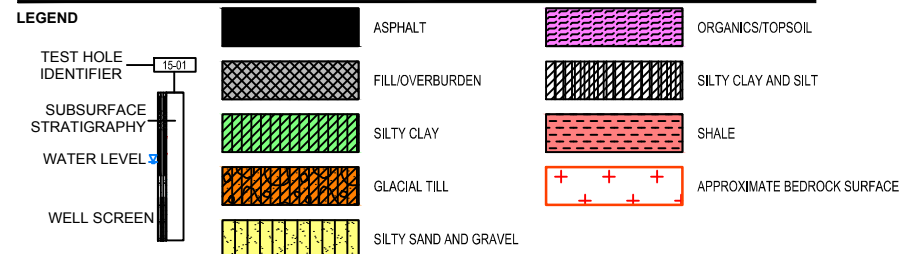
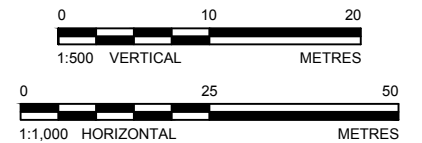
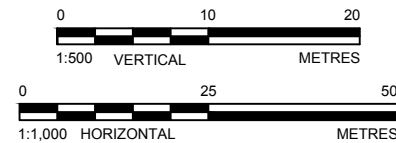
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Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-03 SA1	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		0.18 - 0.56	
Sample complies with MECP Table 3 for PHCs and BTEX			PHCs, BTEX, PAHs, Metals & Inorganics



Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-02 SA1	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		0.15 - 0.59	
Sample complies with MECP Table 3 for PHCs and BTEX			PHCs, BTEX, PAHs, Metals & Inorganics



NOTE(S)

- FOR DETAILED SUBSURFACE DESCRIPTIONS AT TEST HOLE LOCATIONS REFER TO RECORD OF TEST HOLE SHEETS.
- FOR CROSS SECTION LOCATION SEE FIGURE 2

CLIENT
RIOCAN MANAGEMENT INC.

CONSULTANT



YYYY-MM-DD	2019-05-17
DESIGNED	----
PREPARED	JEM/BR
REVIEWED	SAC
APPROVED	KPH

PROJECT
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

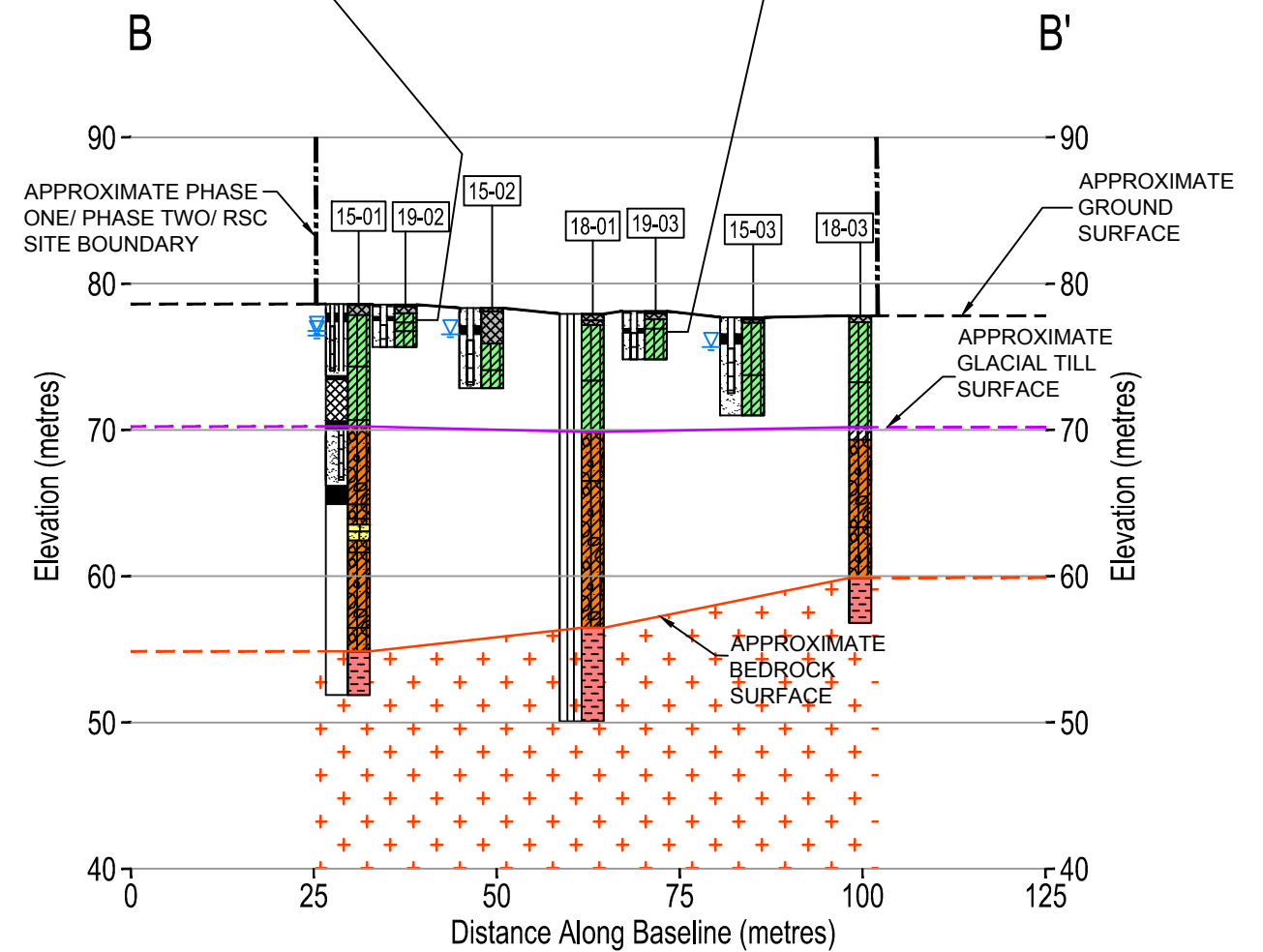
TITLE
CROSS-SECTION WITH PHCs AND BTEX ANALYSIS AND EXCEEDANCE IN SOIL

PROJECT NO.	CONTROL	REV.	FIGURE
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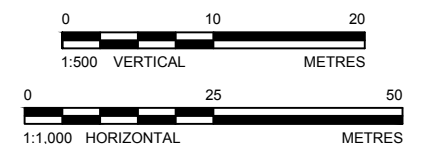
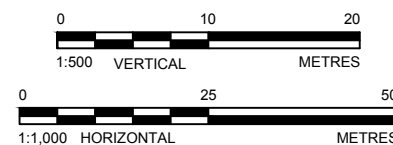
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm

Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-02 SA4	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		1.82 - 2.44	
Sample complies with MECP Table 3 for VOCs			VOCs, EC and SAR



Sample ID	MECP Table 3 Standards (R/P/I)	BH 19-03 SA5	Parameters Analyzed
Sample Date		15-Mar-2019	
Sample Depth (mbgs)		2.44 - 3.3	
Sample complies with MECP Table 3 for VOCs			VOCs, EC, SAR and pH



LEGEND

TEST HOLE 15-01

SUBSURFACE STRATIGRAPHY

WATER LEVEL 

WELL SCREEN

ASPHALT

FILL/OVERBURDEN

SILTY CLAY

GLACIAL TILL

SILTY SAND AND GRAVEL

ASPHALT

FILL/OVERBURDEN

SILTY CLAY

GLACIAL TILL

SILTY SAND AND GRAVEL

ORGANICS

SILTY CLAY AND SIL

SHALE

APPROXIMATE

NOTE(S)

- NOTE(S)
1. FOR DETAILED SUBSURFACE DESCRIPTIONS AT TEST HOLE LOCATIONS REFER TO RECORD OF TEST HOLE SHEETS.
 2. FOR CROSS SECTION LOCATION SEE FIGURE 2

CLIENT
RIOCAN MANAGEMENT INC.

CONSULTANT

YYYY-MM-DD 2019-05-17

PREPARED JEM/BR

REVIEWED SAC

APPROVED KPH

PROJECT
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE
CROSS-SECTION WITH VOCs ANALYSIS AND EXCEEDANCE IN
SOIL

PROJECT NO.	CONTROL	REV.	FIGURE
19118198	0001	A	5B

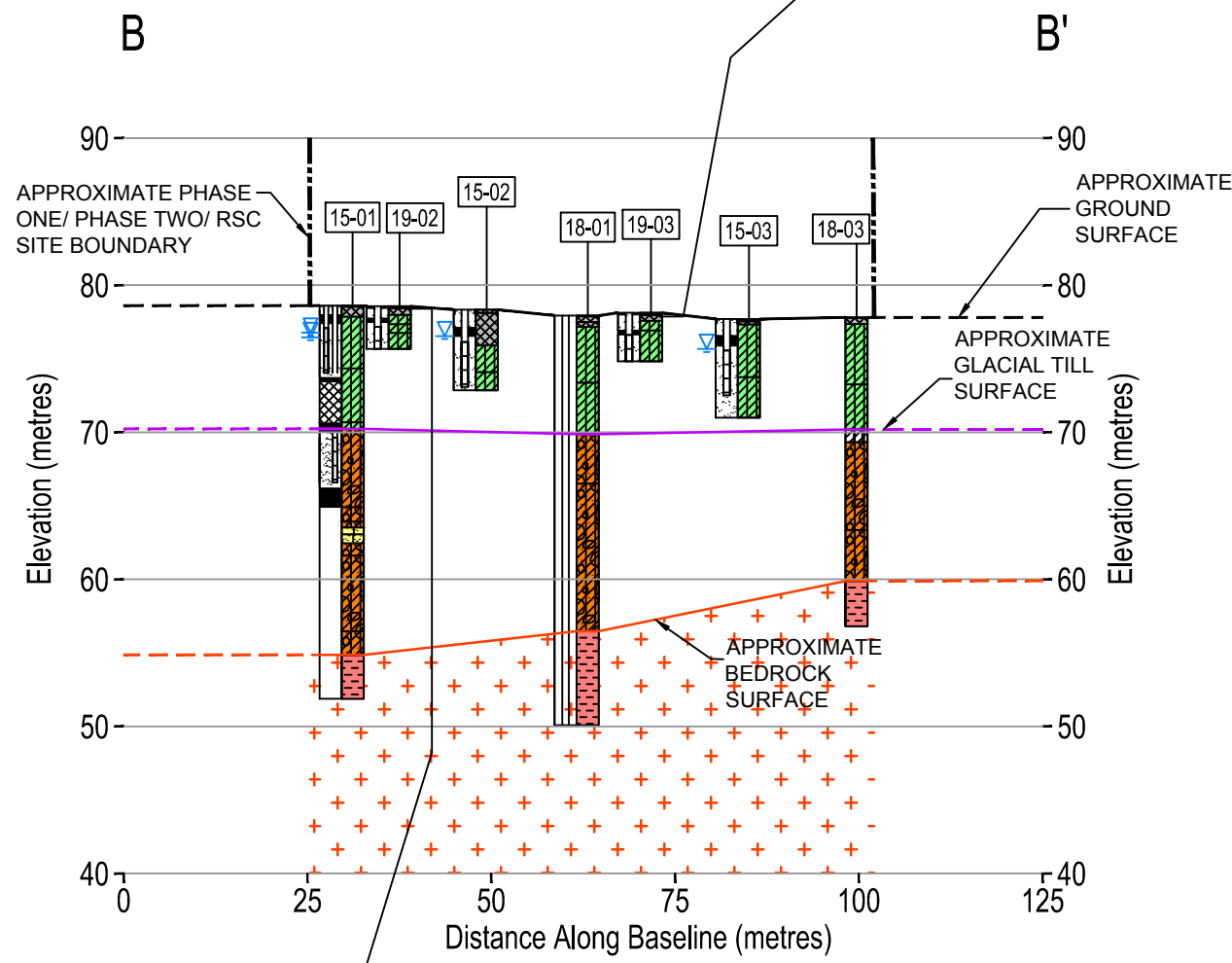
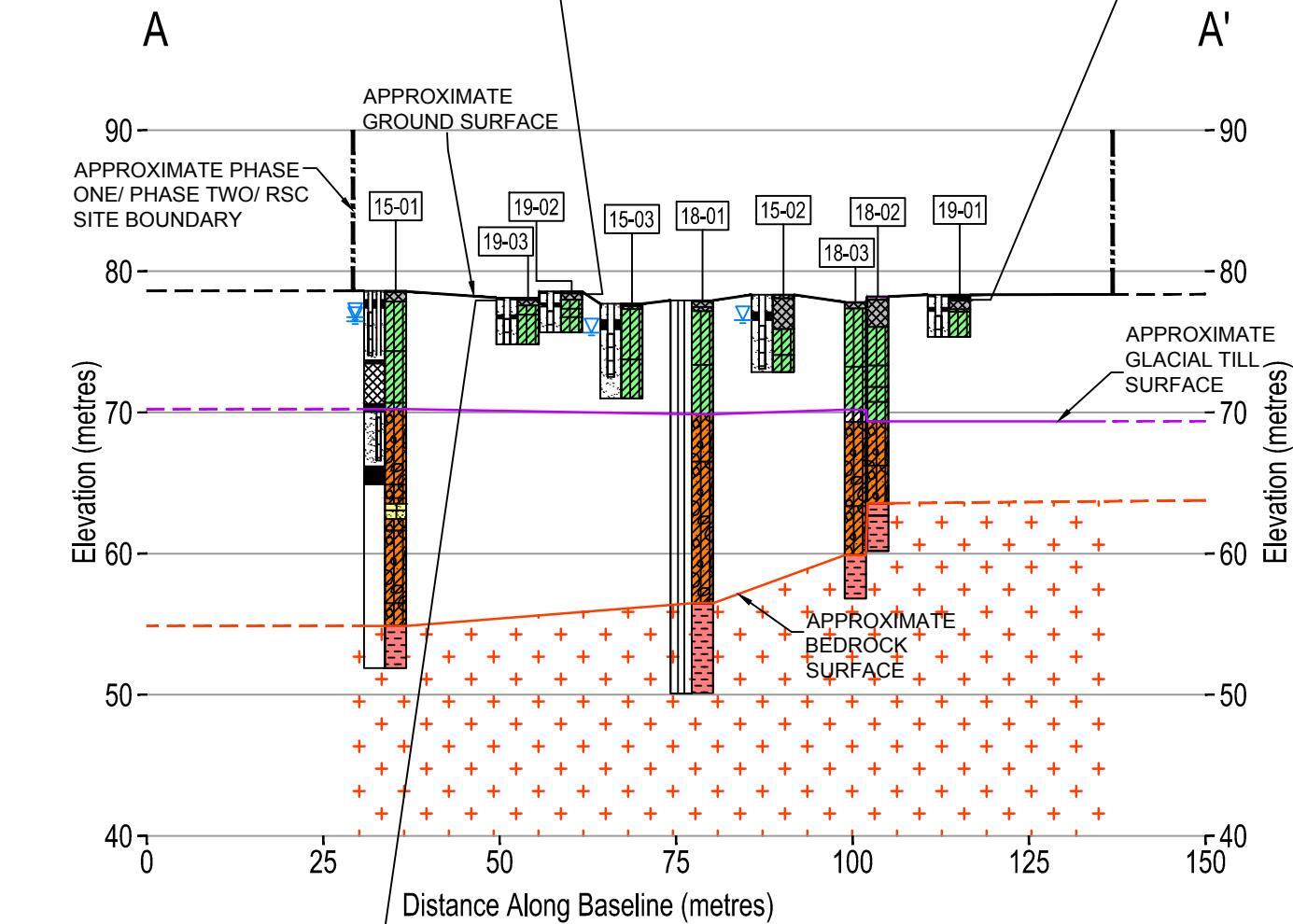
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Sample ID	MECP Table 3	BH 19-01 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.43 - 1.04	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,

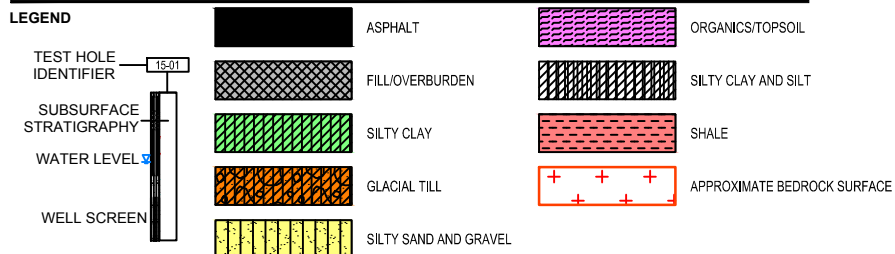
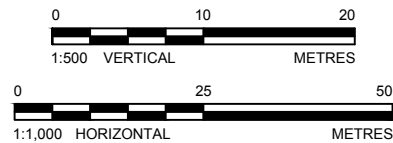
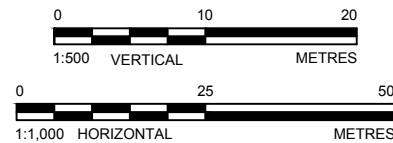
Sample ID	MECP Table 3	BH 19-03 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.18 - 0.56	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,

Sample ID	MECP Table 3	BH 19-02 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.15 - 0.59	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,

Sample ID	MECP Table 3	BH 19-02 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.15 - 0.59	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,



Sample ID	MECP Table 3	BH 19-03 SA1	Parameters Analyzed
Sample Date	Standards (R/P/I)	15-Mar-2019	
Sample Depth (mbgs)		0.18 - 0.56	
Sample complies with MECP Table 3 for Metals			PHCs, BTEX, PAHs, Metals & Inorganics,



NOTE(S)

1. FOR DETAILED SUBSURFACE DESCRIPTIONS AT TEST HOLE LOCATIONS REFER TO RECORD OF TEST HOLE SHEETS.

2. FOR CROSS SECTION LOCATION SEE FIGURE 2

CLIENT

RIOCAN MANAGEMENT INC.

CONSULTANT



YYYY-MM-DD 2019-05-17

DESIGNED ---

PREPARED JEM/BR

REVIEWED SAC

APPROVED KPH

PROJECT

PHASE II ENVIRONMENTAL SITE ASSESSMENT

PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE

CROSS-SECTION WITH METALS ANALYSIS AND EXCEEDANCE IN SOIL

PROJECT NO. 19118198

CONTROL 0001

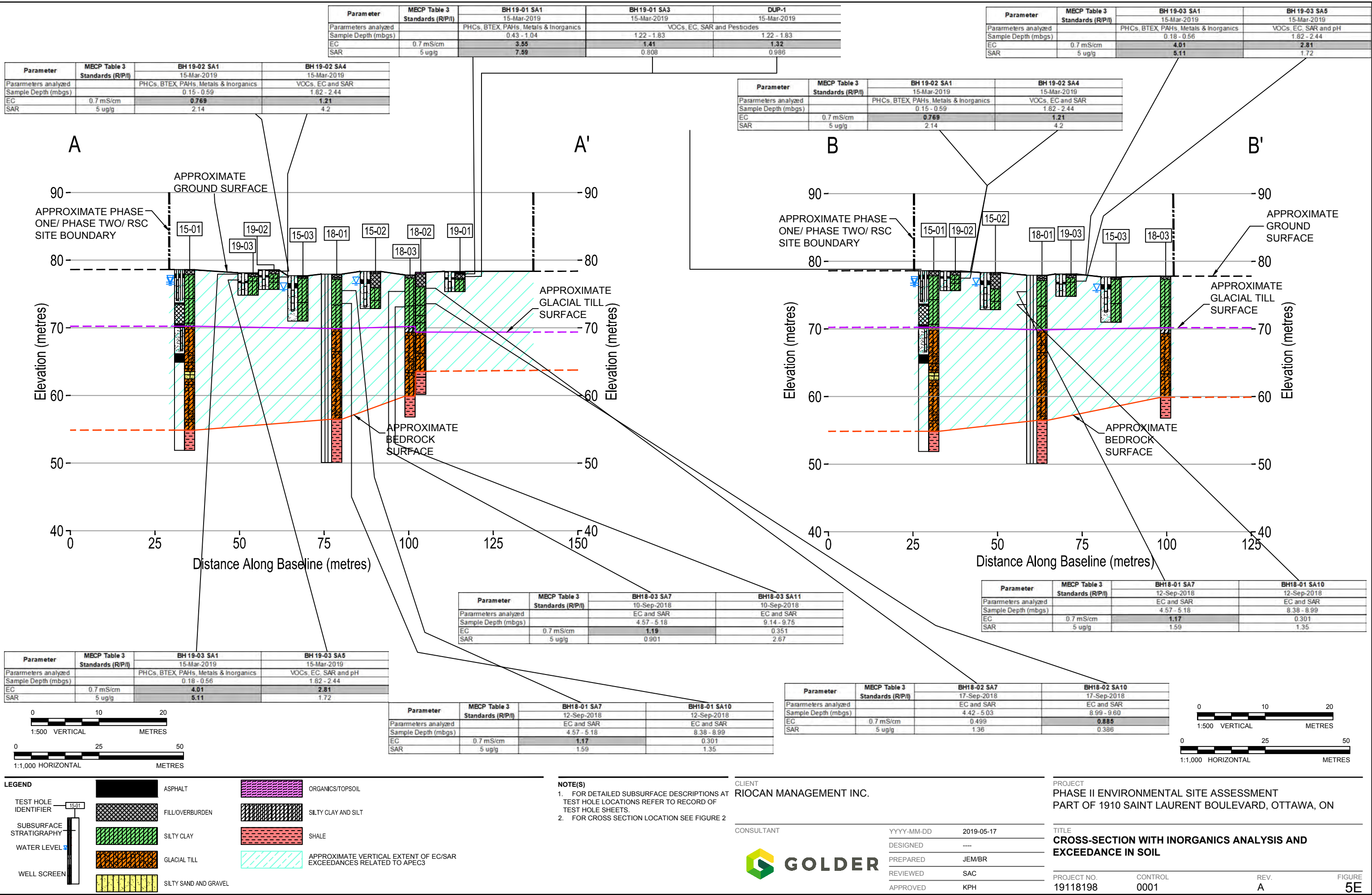
REV. A

FIGURE 5D

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm

Path: \\golder-gdpc-gatfettawa\active\spatial_in\Bocan_Management_in\Enviro0001_PhaseII_ESA | File Name: 191119-001-HS-0005.dwg



IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm

Path: \\golder-gdpcat\atlanta\active\19118198_RIOCAN_Enviro0001_PhaseII_ESA | File Name: 19118198-0001-HS-0005.dwg

Parameter	MECP Table 3 Standards (R/P/I)	15-01A
		12-Apr-2019
Parameters analyzed		VOCs, Sodium and Chloride
Water Depth (m bgs)		1.81
Sample complies with MECP Table 3 for Sodium and Chloride		

Parameter	MECP Table 3 Standards (R/P/I)	15-02
		12-Apr-2019
Parameters analyzed		VOCs, Sodium and Chloride
Water Depth (m bgs)		2.03
Sample complies with MECP Table 3 for Sodium and Chloride		

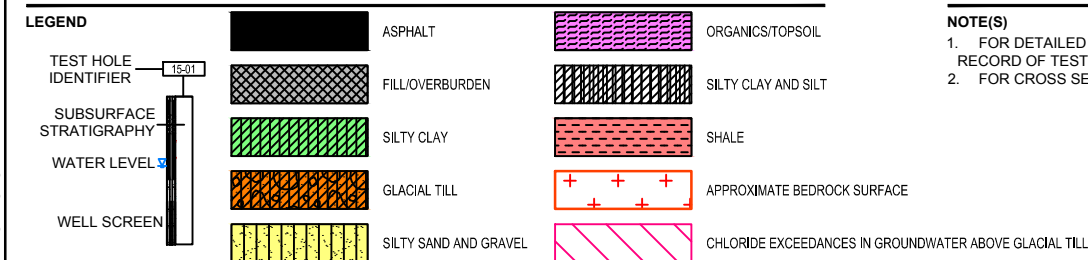
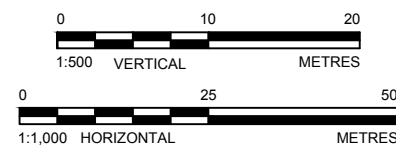
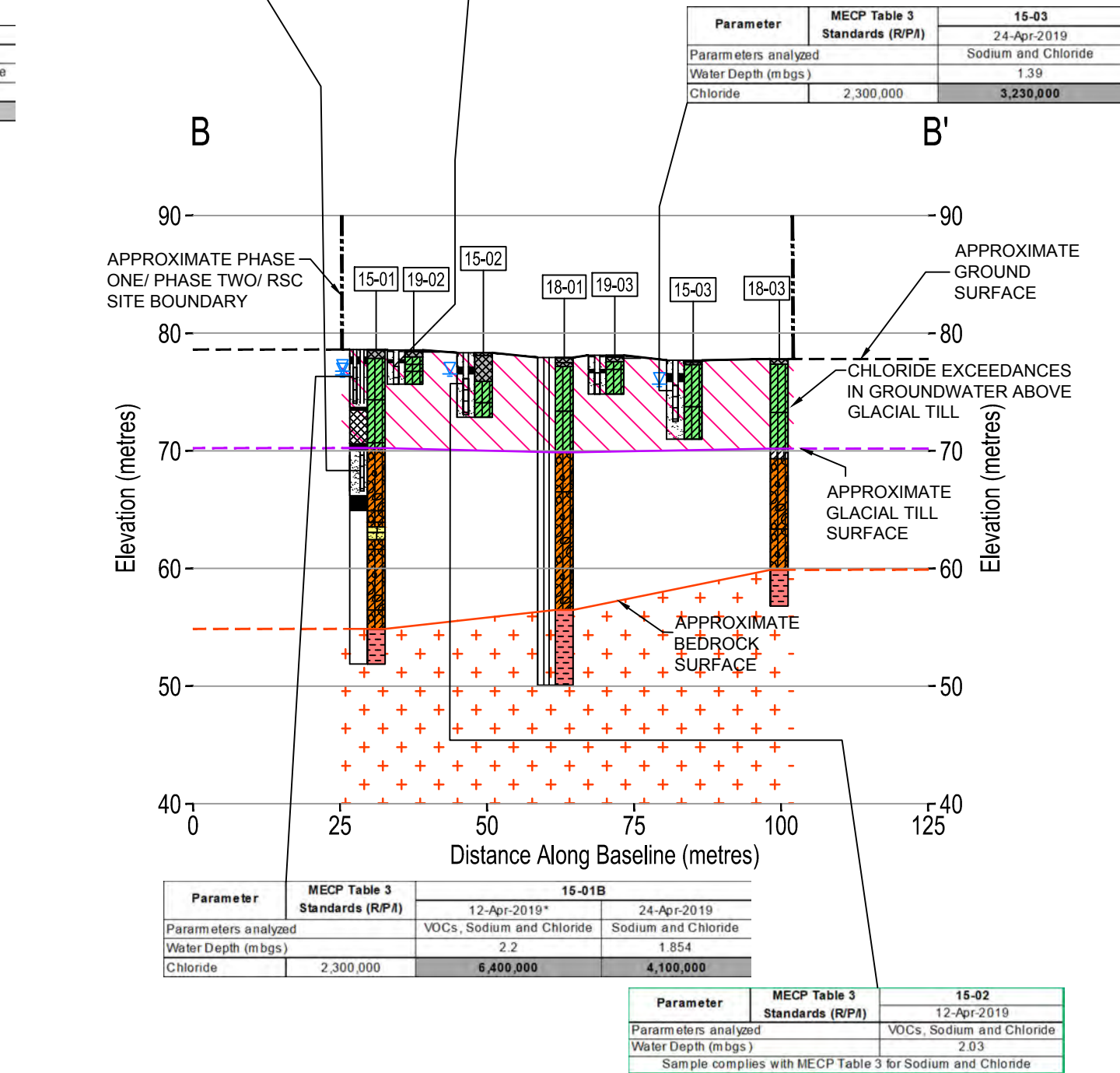
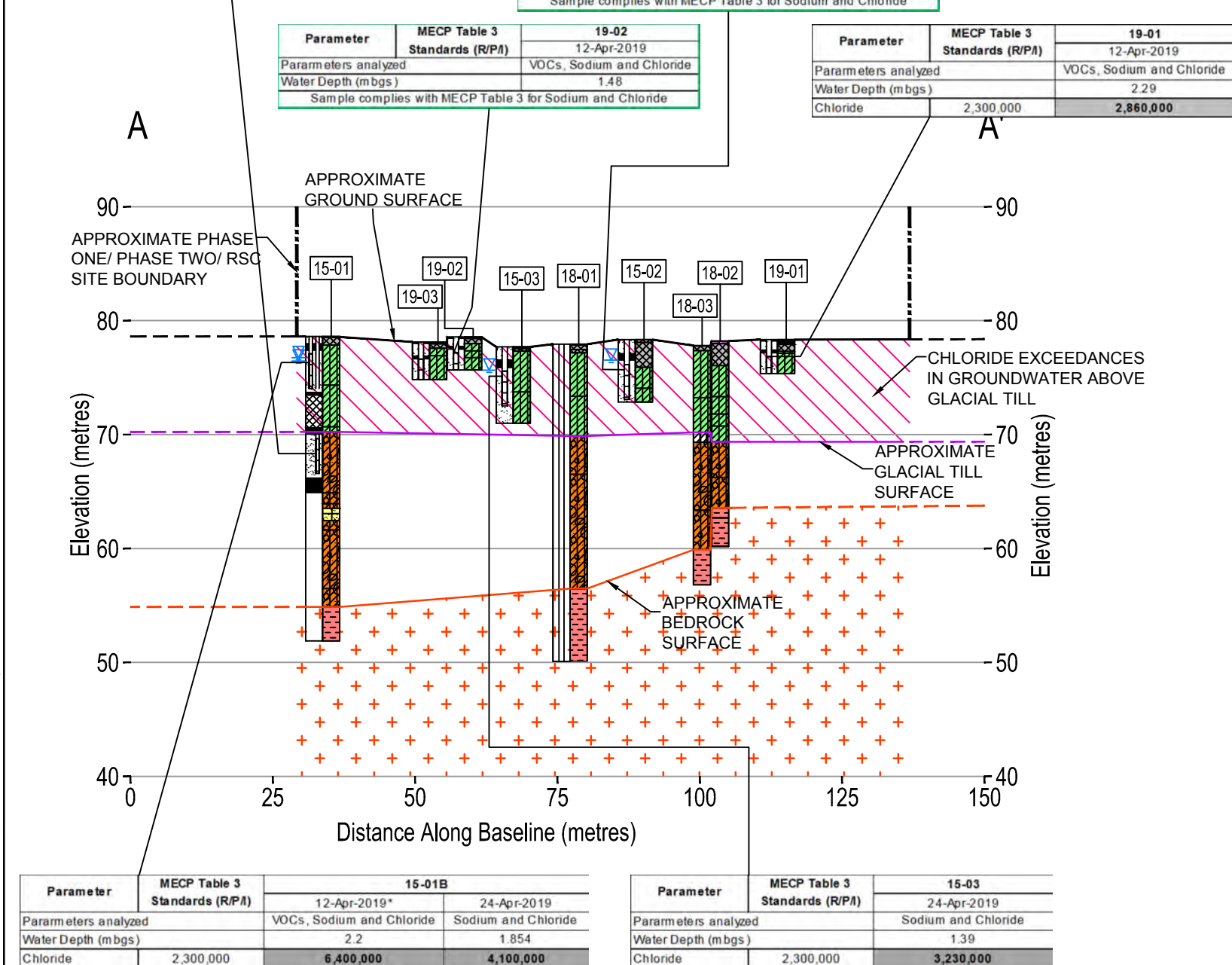
Parameter	MECP Table 3 Standards (R/P/I)	19-02
		12-Apr-2019
Parameters analyzed		VOCs, Sodium and Chloride
Water Depth (m bgs)		1.48
Sample complies with MECP Table 3 for Sodium and Chloride		

Parameter	MECP Table 3 Standards (R/P/I)	19-01
		12-Apr-2019
Parameters analyzed		VOCs, Sodium and Chloride
Water Depth (m bgs)		2.29
Chloride	2,300,000	2,860,000

Parameter	MECP Table 3 Standards (R/P/I)	15-01A
		12-Apr-2019
Parameters analyzed		VOCs, Sodium and Chloride
Water Depth (m bgs)		1.81
Sample complies with MECP Table 3 for Sodium and Chloride		

Parameter	MECP Table 3 Standards (R/P/I)	19-02
		12-Apr-2019
Parameters analyzed		VOCs, Sodium and Chloride
Water Depth (m bgs)		1.48
Sample complies with MECP Table 3 for Sodium and Chloride		

Parameter	MECP Table 3 Standards (R/P/I)	15-03
		24-Apr-2019
Parameters analyzed		Sodium and Chloride
Water Depth (m bgs)		1.39
Chloride	2,300,000	3,230,000



NOTE(S)

1. FOR DETAILED SUBSURFACE DESCRIPTIONS AT TEST HOLE LOCATIONS REFER TO RECORD OF TEST HOLE SHEETS.

2. FOR CROSS SECTION LOCATION SEE FIGURE 2

CLIENT
RIOCAN MANAGEMENT INC.

CONSULTANT



YYYY-MM-DD 2019-05-17

DESIGNED ---

PREPARED JEM/BR

REVIEWED SAC

APPROVED KPH

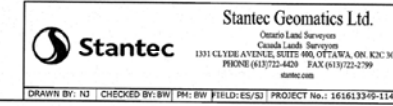
PROJECT
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PART OF 1910 SAINT LAURENT BOULEVARD, OTTAWA, ON

TITLE
CROSS-SECTION WITH INORGANICS ANALYSIS AND EXCEEDANCE IN GROUNDWATER

PROJECT NO. 19118198 CONTROL 0001 REV. A FIGURE 5H

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25 mm



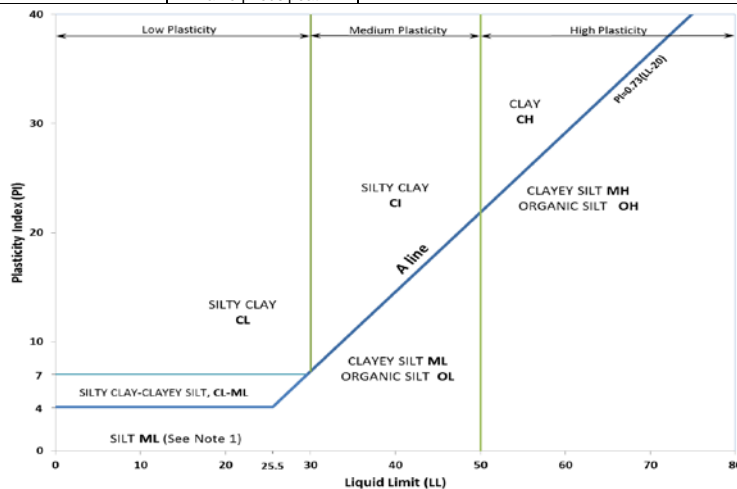
APPENDIX A

Record of Boreholes

METHOD OF SOIL CLASSIFICATION

The Golder Associates Ltd. Soil Classification System is based on the Unified Soil Classification System (USCS)

Organic or Inorganic	Soil Group	Type of Soil		Gradation or Plasticity	$Cu = \frac{D_{60}}{D_{10}}$		$Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$			Organic Content	USCS Group Symbol	Group Name		
INORGANIC (Organic Content ≤30% by mass)	COARSE-GRAINED SOILS (>50% by mass is larger than 0.075 mm)	GRAVELS (>50% by mass of coarse fraction is larger than 4.75 mm)	Gravels with ≤12% fines (by mass)	Poorly Graded	<4		≤1 or ≥3			≤30%	GP	GRAVEL		
				Well Graded	≥4		1 to 3				GW	GRAVEL		
			Gravels with >12% fines (by mass)	Below A Line	n/a						GM	SILTY GRAVEL		
				Above A Line	n/a						GC	CLAYEY GRAVEL		
		SANDS (≥50% by mass of coarse fraction is smaller than 4.75 mm)	Sands with ≤12% fines (by mass)	Poorly Graded	<6		≤1 or ≥3				SP	SAND		
				Well Graded	≥6		1 to 3				SW	SAND		
			Sands with >12% fines (by mass)	Below A Line	n/a						SM	SILTY SAND		
				Above A Line	n/a						SC	CLAYEY SAND		
		Organic or Inorganic	Soil Group	Type of Soil	Laboratory Tests	Field Indicators					Organic Content	USCS Group Symbol	Primary Name	
		INORGANIC (Organic Content ≤30% by mass)	FINE-GRAINED SOILS (≥50% by mass is smaller than 0.075 mm)	SILTS (Non-Plastic or Pl and LL plot below A-Line on Plasticity Chart below)	Liquid Limit <50	Dilatancy	Dry Strength	Shine Test	Thread Diameter		Toughness (of 3 mm thread)	Organic Content	USCS Group Symbol	Primary Name
Rapid	None					None	>6 mm	N/A (can't roll 3 mm thread)	<5%	ML	SILT			
Slow	None to Low					Dull	3mm to 6 mm	None to low	<5%	ML	CLAYEY SILT			
Liquid Limit ≥50	Slow to very slow				Low to medium	Dull to slight	3mm to 6 mm	Low	5% to 30%	OL	ORGANIC SILT			
	Slow to very slow			Low to medium	Slight	3mm to 6 mm	Low to medium	<5%	MH	CLAYEY SILT				
	None			Medium to high	Dull to slight	1 mm to 3 mm	Medium to high	5% to 30%	OH	ORGANIC SILT				
CLAYS (Pl and LL plot above A-Line on Plasticity Chart below)	Liquid Limit <30			None	Low to medium	Slight to shiny	~ 3 mm	Low to medium	0% to 30%	CL	SILTY CLAY			
	Liquid Limit 30 to 50			None	Medium to high	Slight to shiny	1 mm to 3 mm	Medium	(see Note 2)	CI	SILTY CLAY			
	Liquid Limit ≥50			None	High	Shiny	<1 mm	High		CH	CLAY			
HIGHLY ORGANIC SOILS (Organic Content >30% by mass)				Peat and mineral soil mixtures							30% to 75%	PT	SILTY PEAT, SANDY PEAT	
		Predominantly peat, may contain some mineral soil, fibrous or amorphous peat							75% to 100%	PEAT				



Note 1 – Fine grained materials with PI and LL that plot in this area are named (ML) SILT with slight plasticity. Fine-grained materials which are non-plastic (i.e. a PL cannot be measured) are named SILT.

Note 2 – For soils with <5% organic content, include the descriptor “trace organics” for soils with between 5% and 30% organic content include the prefix “organic” before the Primary name.

Dual Symbol — A dual symbol is two symbols separated by a hyphen, for example, GP-GM, SW-SC and CL-ML.

For non-cohesive soils, the dual symbols must be used when the soil has between 5% and 12% fines (i.e. to identify transitional material between “clean” and “dirty” sand or gravel.

For cohesive soils, the dual symbol must be used when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart (see Plasticity Chart at left).

Borderline Symbol — A borderline symbol is two symbols separated by a slash, for example, CL/CI, GM/SM, CL/ML.

A borderline symbol should be used to indicate that the soil has been identified as having properties that are on the transition between similar materials. In addition, a borderline symbol may be used to indicate a range of similar soil types within a stratum.

ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by plasticity	<0.075	< (200)

MODIFIERS FOR SECONDARY AND MINOR CONSTITUENTS

Percentage by Mass	Modifier
>35	Use 'and' to combine major constituents (i.e., SAND and GRAVEL)
> 12 to 35	Primary soil name prefixed with "gravelly, sandy, SILTY, CLAYEY" as applicable
> 5 to 12	some
≤ 5	trace

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split-spoon sampler for a distance of 300 mm (12 in.). Values reported are as recorded in the field and are uncorrected.

Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm² pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and sleeve frictions are recorded electronically at 25 mm penetration intervals.

Dynamic Cone Penetration Resistance (DCPT); N_d:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

PH: Sampler advanced by hydraulic pressure

PM: Sampler advanced by manual pressure

WH: Sampler advanced by static weight of hammer

WR: Sampler advanced by weight of sampler and rod

SAMPLES

AS	Auger sample
BS	Block sample
CS	Chunk sample
DD	Diamond Drilling
DO or DP	Seamless open ended, driven or pushed tube sampler – note size
DS	Denison type sample
GS	Grab Sample
MC	Modified California Samples
MS	Modified Shelby (for frozen soil)
RC	Rock core
SC	Soil core
SS	Split spoon sampler – note size
ST	Slotted tube
TO	Thin-walled, open – note size (Shelby tube)
TP	Thin-walled, piston – note size (Shelby tube)
WS	Wash sample

SOIL TESTS

w	water content
PL , w _p	plastic limit
LL , w _L	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test ¹
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement ¹
D _R	relative density (specific gravity, G _s)
DS	direct shear test
GS	specific gravity
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO ₄	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V (FV)	field vane (LV-laboratory vane test)
γ	unit weight

1. Tests anisotropically consolidated prior to shear are shown as CAD, CAU.

NON-COHESIVE (COHESIONLESS) SOILS

Compactness²

Term	SPT 'N' (blows/0.3m) ¹
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

1. SPT 'N' in accordance with ASTM D1586, uncorrected for the effects of overburden pressure.

2. Definition of compactness terms are based on SPT 'N' ranges as provided in Terzaghi, Peck and Mesri (1996). Many factors affect the recorded SPT 'N' value, including hammer efficiency (which may be greater than 60% in automatic trip hammers), overburden pressure, groundwater conditions, and grain size. As such, the recorded SPT 'N' value(s) should be considered only an approximate guide to the soil compactness. These factors need to be considered when evaluating the results, and the stated compactness terms should not be relied upon for design or construction.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

COHESIVE SOILS

Consistency

Term	Undrained Shear Strength (kPa)	SPT 'N' ^{1,2} (blows/0.3m)
Very Soft	<12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	>200	>30

1. SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.

2. SPT 'N' values should be considered ONLY an approximate guide to consistency; for sensitive clays (e.g., Champlain Sea clays), the N-value approximation for consistency terms does NOT apply. Rely on direct measurement of undrained shear strength or other manual observations.

Water Content

Term	Description
w < PL	Material is estimated to be drier than the Plastic Limit.
w ~ PL	Material is estimated to be close to the Plastic Limit.
w > PL	Material is estimated to be wetter than the Plastic Limit.

LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

I. GENERAL

π	3.1416
$\ln x$	natural logarithm of x
\log_{10}	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time

II. STRESS AND STRAIN

γ	shear strain
Δ	change in, e.g. in stress: $\Delta \sigma$
ε	linear strain
ε_v	volumetric strain
η	coefficient of viscosity
ν	Poisson's ratio
σ	total stress
σ'	effective stress ($\sigma' = \sigma - u$)
σ'_{vo}	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
σ_{oct}	mean stress or octahedral stress $= (\sigma_1 + \sigma_2 + \sigma_3)/3$
τ	shear stress
u	porewater pressure
E	modulus of deformation
G	shear modulus of deformation
K	bulk modulus of compressibility

III. SOIL PROPERTIES

(a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight)*
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
γ'	unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$)
D_R	relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly G_s)
e	void ratio
n	porosity
S	degree of saturation

(a) Index Properties (continued)

w	water content
w_l or LL	liquid limit
w_p or PL	plastic limit
I_p or PI	plasticity index = $(w_l - w_p)$
NP	non-plastic
w_s	shrinkage limit
I_L	liquidity index = $(w - w_p) / I_p$
I_C	consistency index = $(w_l - w) / I_p$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
I_D	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

(b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

(c) Consolidation (one-dimensional)

C_c	compression index (normally consolidated range)
C_r	recompression index (over-consolidated range)
C_s	swelling index
C_α	secondary compression index
m_v	coefficient of volume change
C_v	coefficient of consolidation (vertical direction)
C_h	coefficient of consolidation (horizontal direction)
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation stress
OCR	over-consolidation ratio = σ'_p / σ'_{vo}

(d) Shear Strength

τ_p, τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = $\tan \delta$
c'	effective cohesion
c_u, s_u	undrained shear strength ($\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
p'	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$
q_u	compressive strength $(\sigma_1 - \sigma_3)$
S_t	sensitivity

* Density symbol is ρ . Unit weight symbol is γ where $\gamma = \rho g$ (i.e. mass density multiplied by acceleration due to gravity)

Notes: 1
2

$$\tau = c' + \sigma' \tan \phi'$$

$$\text{shear strength} = (\text{compressive strength})/2$$

SHEET 1 OF 2

DATUM: Geodetic

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa		nat V. + rem V. ⊕		Q - ● U - ○		WATER CONTENT PERCENT				
								20	40	60	80	10 ⁻⁵	10 ⁻⁵	10 ⁻⁴				10 ⁻³
								Wp		W		WI						
								20	40	60	80							
0		GROUND SURFACE		78.61														
	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALTIC CONCRETE		0.08												Flush Mount Protective Casing		
		FILL - (SW) gravelly SAND, angular; grey, (PAVEMENT STRUCTURE)														Silica Sand		
1		(CI/CH) SILTY CLAY to CLAY; grey brown, highly fissured, (WEATHERED CRUST); cohesive, w>PL, very stiff		77.85	1	SS	9									Bentonite Seal		
				0.76	2	SS	13					○				Silica Sand		
2					3	SS	9					○						
					4	SS	8					○						
3					5	SS	7					○				32 mm Diam. PVC #10 Slot Screen 'B'		
					6	SS	5					○						
4			(CI/CH) SILTY CLAY to CLAY; grey, contains shells; cohesive, w>PL, stiff	74.34	7 & 8	SS	3									CHEM		
				4.27	9	SS	-	⊕		+			○			Silica Sand		
5					10	SS	1		⊕		+					Bentonite Seal		
					11	SS	-	⊕		+			○					
6					12	SS	PM		⊕		+					Native Backfill and Bentonite		
					13	SS	-	⊕		+			○					
8			(CI/CH-ML) SILTY CLAY to CLAYEY SILT, trace to some sand and gravel; grey; cohesive, w>PL, very stiff (ML) sandy CLAYEY SILT, some gravel; dark brown, presence of cobbles inferred from auger refusal (GLACIAL TILL); non-cohesive, w>PL, very stiff	70.68				⊕		+								
				7.93	14	SS	2					○				Bentonite Seal		
		70.23																
9		8.38		15	SS	13					○				Silica Sand			
				16	SS	>50												
10																		
11															32 mm Diam. PVC #10 Slot Screen 'A'			
12	Rotary Drill NW Casing											○				MH		
															Silica Sand			
13															Bentonite Seal			
14			(SM) SILTY SAND, trace gravel; dark brown, (GLACIAL TILL); non-cohesive, wet, dense to compact	64.89														
				13.72	23	SS	41									Bentonite and Cement Grout		
				63.93														
15				14.68	24	SS	28					○						
		CONTINUED NEXT PAGE																

DEPTH SCALE

1 : 75



LOGGED: RI

CHECKED: WAM

PROJECT: 1522569-16000

RECORD OF BOREHOLE: 15-01

SHEET 2 OF 2

LOCATION: N 5027658.3 ;E 451048.9

BORING DATE: October 30 & November 2, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m											
								SHEAR STRENGTH Cu, kPa		nat V. + Q - rem V. ⊕ U - ●		WATER CONTENT PERCENT						
								20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³			
								20	40	60	80	20	40	60	80			
15	Rotary Drill NW Casing	--- CONTINUED FROM PREVIOUS PAGE ---																
		<div>(ML) sandy CLAYEY SILT, some gravel; dark brown, (GLACIAL TILL); non-cohesive, wet, compact (SM) SILTY SAND, fine; dark brown; non-cohesive, wet, very dense (SM/GP) gravelly SILTY SAND, medium to coarse, to sandy GRAVEL, fine; dark brown; non-cohesive, wet, very dense (ML) sandy CLAYEY SILT, some gravel; dark brown, (GLACIAL TILL); cohesive, w>PL, hard (ML) gravelly CLAYEY SAND; dark brown, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, moist, dense to very dense</div>	63.52 15.09	25	SS	50												
			63.06 15.55	26	SS	78												
16			62.45 16.16	27	SS	28												
			61.61 17.00	28	SS	>50												
17				29	NQ RC	DD												
				30	SS	>50												
18				31	SS	>50												
				32	NQ RC	DD												
19				33	SS	>50												
20				34	NQ RC	DD												
21				35	NQ RC	DD												
22				56.48 22.13	36	NQ RC	DD											
23				37	NQ RC	DD												
24	BOREHOLE CONTINUED ON RECORD OF DRILLHOLE 15-01																	
25																		
26																		
27																		
28																		
29																		
30																		

DEPTH SCALE

1 : 75



LOGGED: RI

CHECKED: WAM

MIS-BHS 001 1522569-16000.GPJ GAL-MIS.GDT 03/10/16 JEW/JM

PROJECT: 1522569-16000

RECORD OF DRILLHOLE: 15-01

SHEET 1 OF 1

LOCATION: N 5027658.3 ;E 451048.9

DRILLING DATE: October 30 & November 2, 2015

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-55

DRILLING CONTRACTOR: Downing Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH	COLOUR % RETURN	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate										BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage										PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular										PO - Polished K - Slickensided SM - Smooth Ro - Rough MB - Mechanical Break										BR - Broken Rock										NOTE: For additional abbreviations refer to list of abbreviations & symbols.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
								RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25 m	DISCONTINUITY DATA										HYDRAULIC CONDUCTIVITY K, cm/sec		Diametral Point Load Index (MPa)	RMC -Q' AVG.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
								TOTAL CORE %	SOLID CORE %			B Angle	DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Joon	Jr	Ja	Jc	Jd	Je	Jf	Jg	Jh			Ji	Jj	Jk	Jl	Jm	Jn	Jo	Jp	Jq	Jr	Js	Jt	Ju	Jv	Jw	Jx	Jy	Jz																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
24	Rotary Drill NQ Core	BEDROCK SURFACE		54.87																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

Bentonite and
Cement GroutWL in Screen 'A' at
Elev. 76.46 m on
Nov. 12, 2015WL in Screen 'B' at
Elev. 76.76 m on
Nov. 12, 2015

DEPTH SCALE

1 : 75



LOGGED: RI

CHECKED: WAM

MIS-RCK 004 1522569-16000.GPJ GAL-MISS.GDT 03/10/16 JEM/JM

PROJECT: 1522569-16000

RECORD OF BOREHOLE: 15-02

SHEET 1 OF 1

LOCATION: N 5027677.8 ; E 451107.8

BORING DATE: November 3, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
								SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
								20	40	60	80	nat V. rem V. + ⊕ - ●	Q - U - ○			10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³	Wp	W	Wi																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

Flush Mount
Protective Casing

Silica Sand

Bentonite Seal

Silica Sand

32 mm Diam. PVC
#10 Slot Screen

Silica Sand

WL in Screen at
Elev. 76.53 m on
Nov. 12, 2015

DEPTH SCALE

1 : 75



LOGGED: RI

CHECKED: WAM

MIS-BHS 001 1522569-16000.GPJ GAL-MIS.GDT 03/10/16 JEW/JM

PROJECT: 1522569-16000

RECORD OF BOREHOLE: 15-02A

SHEET 1 OF 2

LOCATION: N 5027677.8 ;E 451107.8

BORING DATE: November 4 & 5, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m												
								SHEAR STRENGTH Cu, kPa		nat V. + rem V. ⊕		Q - ● U - ○		WATER CONTENT PERCENT					
								20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³			Wp	W
								20	40	60	80	20	40	60	80				
0		GROUND SURFACE		78.34															
	Power Auger 200 mm Diam. (Hollow Stem)	TOPSOIL/FILL - (ML) sandy SILT, trace gravel; dark brown to black; non-cohesive		0.00															
				0.25	1	SS	9												
1		FILL - (CL) SILTY CLAY, some sand, trace gravel; grey brown, contains silty sand seams, organic matter, and glass; cohesive, w>PL			2	SS	9												
					3	SS	6												
2					4	SS	11												
				75.90															
				2.44	5	SS	8												
3		(CI/CH) SILTY CLAY to CLAY; grey brown, highly fissured, (WEATHERED CRUST); cohesive, w>PL, very stiff			6	SS	6												
					7	SS	5												
4				74.07															
			(CI/CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, very stiff		4.27	8	SS	3											
5						9	TP	PH	⊕			+		○					
												>96 +							
6						10	TP	PH	⊕		+			○					
						11	SS	-	⊕		+								
7									⊕		+								
								⊕		+									
8					12	SS	2												
								⊕		+									
9				69.19				⊕		+									
		(ML) sandy CLAYEY SILT, some gravel; dark brown (GLACIAL TILL); cohesive, w>PL, firm to stiff		9.15	13	SS	7												
10																			
11				67.06	14	SS	10												
		(ML) sandy CLAYEY SILT, some gravel; dark brown, contains silty sand seams, (GLACIAL TILL); cohesive, w>PL, very stiff		11.28															
12					15	SS	28												
13																			
14		(ML/SM) gravelly sandy SILT; dark brown, (GLACIAL TILL); non-cohesive, moist, very dense		64.62	16	SS	18												
				13.72															
15																			
		CONTINUED NEXT PAGE																	

DEPTH SCALE

1 : 75



LOGGED: RI

CHECKED: WAM

MIS-BHS 001 1522569-16000.GPJ GAL-MIS.GDT 03/10/16 JEM/JM

PROJECT: 1522569-16000

RECORD OF BOREHOLE: 15-02A

SHEET 2 OF 2

LOCATION: N 5027677.8 ; E 451107.8

BORING DATE: November 4 & 5, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION				
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³						
								SHEAR STRENGTH Cu, kPa				nat V. + Q - ● rem V. ⊕ U - ○						WATER CONTENT PERCENT			
								20	40	60	80	20	40	60	80			Wp	W	Wi	
15	Power Auger 200 mm Diam. (Hollow Stem)	--- CONTINUED FROM PREVIOUS PAGE --- (ML/SM) gravelly sandy SILT; dark brown, (GLACIAL TILL); non-cohesive, moist, very dense - presence of cobbles inferred from auger resistance from 15.24 m to 18.37 m																			
		17		SS	>50																
16																					
17		18		SS	>50																
18		End of Borehole		59.97 18.37	19	SS	>50														
19																					
20																					
21																					
22																					
23																					
24																					
25																					
26																					
27																					
28																					
29																					
30																					

DEPTH SCALE

1 : 75



LOGGED: RI

CHECKED: WAM

MIS-BHS 001 1522569-16000.GPJ GAL-MIS.GDT 03/10/16 JEW/JM

PROJECT: 1522569-16000

RECORD OF BOREHOLE: 15-03

SHEET 1 OF 1

LOCATION: N 5027617.7 ; E 451091.3

BORING DATE: November 3, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION								
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT													
								20		40		60		80				10 ⁻⁶		10 ⁻⁵		10 ⁻⁴		10 ⁻³	
								20		40		60		80				Wp		W		Wi			
0		GROUND SURFACE		77.70																					
	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALTIC CONCRETE		0.00																					
		FILL - (SW) gravelly SAND, angular; grey, (PAVEMENT STRUCTURE)		0.16	A	GRAB	-										Flush Mount Protective Casing								
				0.38																					
1		(CI/CH) SILTY CLAY to CLAY; grey brown, highly fissured, (WEATHERED CRUST); cohesive, w>PL, stiff to very stiff			1	SS	7										Silica Sand								
					2	SS	10										Bentonite Seal								
2					3	SS	7										Silica Sand								
					4	SS	5																		
3					5	SS	3																		
					6	SS	-																		
4			(CI/CH) SILTY CLAY to CLAY; grey, with black organic mottling; cohesive, w>PL, firm to stiff		73.74 3.96	7 & 8	SS	2									32 mm Diam. PVC #10 Slot Screen								
					9	SS	-	⊕		+															
5								⊕																	
					10	SS	1	⊕		+															
6																									
7		End of Borehole		70.99 6.71				⊕		+															
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									

DEPTH SCALE

1 : 75



LOGGED: RI

CHECKED: WAM

MIS-BHS 001 1522569-16000.GPJ GAL-MIS.GDT 03/10/16 JEM/JM

PROJECT: 18106596

RECORD OF BOREHOLE: 18-01

SHEET 3 OF 4


LOCATION: N 5029338.9 ;E 373315.6

BORING DATE: September 12-14, 2018

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20 40 60 80				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³							
								SHEAR STRENGTH Cu, kPa		nat V. + rem V. ⊕		Q - ● U - ○		WATER CONTENT PERCENT					
								20 40 60 80						Wp -----○ W----- WI					
20	Power Auger 200 mm Diam. (Hollow Stem)	--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel to gravelly; dark grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to very dense		56.48 21.46	25	RC	DD												
21																			
22		Borehole continued on RECORD OF DRILLHOLE 18-01																	
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: DJG

CHECKED: KM

MIS-BHS 001 18106596.GPJ GAL-MIS.GDT 11/08/18 ZS

PROJECT: 18106596

RECORD OF DRILLHOLE: 18-01

SHEET 4 OF 4

LOCATION: N 5029338.9 ;E 373315.6

DRILLING DATE: September 12-14, 2018

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: D-50

DRILLING CONTRACTOR: Forage Grenville

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	COLOUR % RETURN	JN - Joint FLT - Fault SHR- Shear VN - Vein CJ - Conjugate										BD- Bedding FO- Foliation CO- Contact OR- Orthogonal CL - Cleavage										PL - Planar CU- Curved UN- Undulating ST - Stepped IR - Irregular										PO- Polished K - Slickensided SM- Smooth Ro - Rough MB- Mechanical Break										BR - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25 m	DIP w.r.t CORE AXIS	DISCONTINUITY DATA					HYDRAULIC CONDUCTIVITY K, cm/sec					Diametral Point Load Index (MPa)	RMC -Q AVG.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
							TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION					Joon	Jr	Ja	10 cm	10 cm			10 cm	10 cm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
							FLUSH	80-90				80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90			80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90	80-90

63.5 mm Diam.
VSP Pipe

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: DJG

CHECKED: KM

MIS-RCK 004 18106596.GPJ GAL-MISS.GDT 11/08/18 ZS

PROJECT: 18106596

RECORD OF BOREHOLE: 18-02

SHEET 1 OF 3

LOCATION: N 5029362.4 ;E 373338.3

BORING DATE: September 17, 2018

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	SHEAR STRENGTH Cu, kPa		nat V. + Q - ● rem V. ⊕ U - ○		WATER CONTENT PERCENT Wp — W — Wi					
								20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³		
0		GROUND SURFACE		78.20													
	Power Auger 200 mm Diam. (Hollow Stem)	TOPSOIL - (SM) SILTY SAND; dark brown; moist		0.00													
		FILL - (CL) sandy SILTY CLAY, some gravel; grey brown, contains organic matter; cohesive, moist		77.97	1	SS	11										
				0.23													
1					2	SS	6										
					3	SS	11										
2																	
			(CI/CH) SILTY CLAY to CLAY; grey brown, highly fissured (WEATHERED CRUST); cohesive, w~PL, very stiff		76.06	4	SS	10									
					2.14												
3																	
						5	SS	10									
4																	
					6	SS	5										
5		(CI/CH) SILTY CLAY to CLAY; grey, with black mottling; cohesive, w > PL, very stiff		73.32	7	SS	3										
				4.88													
6																	
					8	SS	2										
		(CI/CH) SILTY CLAY to CLAY; grey, with black mottling; cohesive, w > PL, stiff		71.80													
				6.40													
7																	
8		(CI/CL) SILTY CLAY to CLAY; grey, contains clayey silt seams/layers; cohesive, w > PL, very stiff		70.73	9	SS	1										
				7.47													
9		(ML) sandy SILT, low plasticity fines, some gravel; dark grey to black, shaley (GLACIAL TILL); wet, compact		69.36													
				8.84	10	SS	12										
					11	SS	10										
10		CONTINUED NEXT PAGE															

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: PAH

CHECKED: KM

MIS-BHS 001 18106596.GPJ GAL-MIS.GDT 11/08/18 ZS

PROJECT: 18106596

RECORD OF BOREHOLE: 18-02

SHEET 2 OF 3

LOCATION: N 5029362.4 ;E 373338.3

BORING DATE: September 17, 2018

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION				
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³						
								SHEAR STRENGTH Cu, kPa				nat V. + Q - ● rem V. ⊕ U - ○						WATER CONTENT PERCENT			
																		Wp — W — WI			
								20	40	60	80	20	40	60	80						
10	Power Auger 200 mm Diam. (Hollow Stem)	--- CONTINUED FROM PREVIOUS PAGE --- (ML) sandy SILT, low plasticity fines, some gravel; dark grey to black, shaley (GLACIAL TILL); wet, compact																			
				11	SS	10															
11				12	SS	12															
				13	SS	10															
12		(SM) gravelly SILTY SAND to SILTY SAND, some gravel; grey, contains cobbles and sandy seams/layers (GLACIAL TILL); non-cohesive, wet, compact to very dense		66.24 11.96																	
13																					
14																					

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: PAH

CHECKED: KM

MIS-BHS 001 18106596.GPJ GAL-MIS.GDT 11/08/18 ZS

PROJECT: 18106596

RECORD OF DRILLHOLE: 18-02

SHEET 3 OF 3

LOCATION: N 5029362.4 ;E 373338.3

DRILLING DATE: September 17, 2018

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: D-50

DRILLING CONTRACTOR: Forage Grenville

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	COLOUR % RETURN	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate				BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage				PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular				PO - Polished K - Slickensided SM - Smooth Ro - Rough MB - Mechanical Break				BR - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
				DEPTH (m)	RECOVERY			R.Q.D. %	FRACT. INDEX PER 0.25 m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA			HYDRAULIC CONDUCTIVITY K, cm/sec			Diameter Point Load Index (MPa)	RMC -Q AVG.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
					TOTAL CORE %						SOLID CORE %	TYPE AND SURFACE DESCRIPTION	Joon	Jr	Ja	10 ⁻⁶			10 ⁻⁵	10 ⁻⁴	10 ⁻³																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
15	Rotary Drill NQ Core	BEDROCK SURFACE		63.56																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: PAH

CHECKED: KM

MIS-RCK 004 18106596.GPJ GAL-MISS.GDT 11/08/18 ZS

PROJECT: 18106596

RECORD OF BOREHOLE: 18-03

SHEET 2 OF 3

LOCATION: N 5029310.9 ;E 373340.2

BORING DATE: September 10-11, 2018

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m											
								SHEAR STRENGTH Cu, kPa		nat V. + Q - rem V. ⊕ U - ●		WATER CONTENT PERCENT						
								20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴			10 ⁻³	Wp
								20	40	60	80	20	40	60	80			
10	Power Auger 200 mm Diam. (Hollow Stem)	--- CONTINUED FROM PREVIOUS PAGE --- (SM/ML) SAND and SILT, gravelly to some gravel; dark grey brown (GLACIAL TILL); non-cohesive, wet, loose to compact																
				12	SS	10												
11					13	SS	8											
12					14	SS	10											
					15	SS	15											
13																		
					16	SS	11											
14																		
					17	SS	23											
15		(SM) gravelly SILTY SAND; dark grey brown, contains sandy silt seams, cobbles and weathered shale fragments (GLACIAL TILL); non-cohesive, wet, very dense	63.35 14.47	18	SS	59												
16				19	SS	85												
17				20	SS	>50												
				21	SS	>50												
				22	SS	>50												
18	Borehole continued on RECORD OF DRILLHOLE 18-03		59.89 17.93															
19																		
20																		

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: DJG

CHECKED: KM

MIS-BHS 001 18106596.GPJ GAL-MIS.GDT 11/08/18 ZS

PROJECT: 18106596

RECORD OF DRILLHOLE: 18-03

SHEET 3 OF 3

LOCATION: N 5029310.9 ;E 373340.2

DRILLING DATE: September 10-11, 2018

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: D-50

DRILLING CONTRACTOR: Forage Grenville

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.		RUN No.	COLOUR % RETURN	JN - Joint FLT - Fault SHR - Shear VN - Vein CJ - Conjugate				BD - Bedding FO - Foliation CO - Contact OR - Orthogonal CL - Cleavage				PL - Planar CU - Curved UN - Undulating ST - Stepped IR - Irregular				PO - Polished K - Slickensided SM - Smooth Ro - Rough MB - Mechanical Break				BR - Broken Rock NOTE: For additional abbreviations refer to list of abbreviations & symbols.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
				DEPTH (m)	RECOVERY			R.Q.D. %	FRACT. INDEX PER 0.25 m	DISCONTINUITY DATA				HYDRAULIC CONDUCTIVITY				Diametral Point Load Index (MPa)	RMC -Q AVG.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
					TOTAL CORE %					SOLID CORE %	TYPE AND SURFACE DESCRIPTION	Joon	Jr	Ja	K, cm/sec	10 ⁻⁶	10 ⁻⁵			10 ⁻⁴	10 ⁻³																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
18	Rotary Drill NO Core	BEDROCK SURFACE		59.89																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: DJG

CHECKED: KM

MIS-RCK 004 18106596.GPJ GAL-MISS.GDT 11/08/18 ZS

PROJECT: 19118198

RECORD OF BOREHOLE: 19-01

SHEET 1 OF 1





LOCATION: See Site Plan

BORING DATE: March 15, 2019

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	ND = <i>Not Detected</i> 20 40 60 80				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³					
								HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square ND = <i>Not Detected</i>				WATER CONTENT PERCENT					
								20 40 60 80				Wp — \bigcirc W — Wl 20 40 60 80					
0	GeoProbe Direct Push	GROUND SURFACE		78.35													
		ASPHALTIC CONCRETE		0.00													
				77.92													
		FILL - (SW) gravelly SAND; brown		0.43	1	SS	- \oplus								Silica Sand		
1				77.31													
		(CI/CH) SILTY CLAY to CLAY; brown grey; cohesive, w~PL, stiff		1.04 77.13	2	SS	- \oplus								Bentonite Seal		
		(CI/CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, very stiff		1.22	3	SS	- \oplus							Silica Sand			
2					4	SS	- \oplus										
					5	SS	- \oplus							Well Screen			
3		End of Borehole		75.35 3.00													
4																	
5																	
6																	
7																	
8																	
9																	
10																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: RM

CHECKED: SC

MIS-BHS 001 19118198.GPJ GAL-MIS.GDT 05/17/19 JEM

PROJECT: 19118198

RECORD OF BOREHOLE: 19-02

SHEET 1 OF 1






LOCATION: See Site Plan

BORING DATE: March 15, 2019

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s					
								ND = Not Detected				10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³					
								HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square				WATER CONTENT PERCENT					
								ND = Not Detected				Wp \bigcirc W WI					
								20	40	60	80	20	40	60	80		
0		GROUND SURFACE		78.57													
	GeoProbe Direct Push	ASPHALTIC CONCRETE		0.00													
		FILL - (SW) gravelly SAND; brown		0.15	1	SS	- \oplus										
				77.98													
		(CI-CH) SILTY CLAY to CLAY; brown grey; cohesive, w~PL, stiff		0.59	2	SS	- \oplus										
1				77.35													
		(CI-CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, very stiff		1.22	3	SS	- \oplus										
2			76.75														
		(CI-CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, stiff		1.82	4	SS	- \oplus										
					5	SS	- \oplus										
3		End of Borehole		75.67 2.90													
4																	
5																	
6																	
7																	
8																	
9																	
10																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: RM

CHECKED: SC

MIS-BHS 001 19118198.GPJ GAL-MIS.GDT 05/17/19 JEM

PROJECT: 19118198

RECORD OF BOREHOLE: 19-03

SHEET 1 OF 1





LOCATION: See Site Plan

BORING DATE: March 15, 2019

DATUM: CGVD28

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \oplus				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \square				WATER CONTENT PERCENT					
								ND = Not Detected				Wp \mid \bigcirc W \mid WI					
								ND = Not Detected				20 40 60 80					
0	GeoProbe Direct Push	GROUND SURFACE		78.13													
		ASPHALTIC CONCRETE		77.95													
		FILL - (SW) gravelly SAND; brown		0.18	1	SS	- \oplus										
		(CI-CH) SILTY CLAY to CLAY; trace sand; brown grey; cohesive, w~PL, stiff		77.57 0.56	2	SS	- \oplus										
1		(CI-CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, stiff		76.91 1.22	3	SS	- \oplus										
2					4	SS	- \oplus										
3					5	SS	- \oplus										
		End of Borehole		74.83 3.30													
4																	
5																	
6																	
7																	
8																	
9																	
10																	

DEPTH SCALE

1 : 50

**GOLDER**

LOGGED: RM

CHECKED: SC

MIS-BHS 001 19118198.GPJ GAL-MIS.GDT 05/17/19 JEM

APPENDIX B

Laboratory Reports of Analysis

**CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600**

ATTENTION TO: Shihan Chowdhury; Keith Holmes

PROJECT: Elmvale Acres (Riocan) Phase II ESA

AGAT WORK ORDER: 19Z442376

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Mar 11, 2019

PAGES (INCLUDING COVER): 12

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

***NOTES**

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-03-01

DATE REPORTED: 2019-03-11

		SAMPLE DESCRIPTION:		Trip Spike	
		SAMPLE TYPE:		Water	
		DATE SAMPLED:		2019-02-28	
Parameter	Unit	G / S	RDL	9934705	
Dichlorodifluoromethane	%			111	
Vinyl Chloride	%			107	
Bromomethane	%			86	
Trichlorofluoromethane	%			103	
Acetone	%			94	
1,1-Dichloroethylene	%			83	
Methylene Chloride	%			103	
trans- 1,2-Dichloroethylene	%			79	
Methyl tert-butyl ether	%			105	
1,1-Dichloroethane	%			94	
Methyl Ethyl Ketone	%			102	
cis- 1,2-Dichloroethylene	%			83	
Chloroform	%			81	
1,2-Dichloroethane	%			87	
1,1,1-Trichloroethane	%			80	
Carbon Tetrachloride	%			80	
Benzene	%			87	
1,2-Dichloropropane	%			78	
Trichloroethylene	%			89	
Bromodichloromethane	%			85	
Methyl Isobutyl Ketone	%			94	
1,1,2-Trichloroethane	%			103	
Toluene	%			107	
Dibromochloromethane	%			85	
Ethylene Dibromide	%			95	
Tetrachloroethylene	%			104	
1,1,1,2-Tetrachloroethane	%			81	
Chlorobenzene	%			106	
Ethylbenzene	%			105	
m & p-Xylene	%			106	

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
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TEL (905)712-5100
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CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-03-01

DATE REPORTED: 2019-03-11

		SAMPLE DESCRIPTION:		Trip Spike
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-02-28
Parameter	Unit	G / S	RDL	9934705
Bromoform	%			76
Styrene	%			101
1,1,2,2-Tetrachloroethane	%			101
o-Xylene	%			107
1,3-Dichlorobenzene	%			102
1,4-Dichlorobenzene	%			118
1,2-Dichlorobenzene	%			118
1,3-Dichloropropene	%			84
Xylene Mixture	%			107
n-Hexane	%			110
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140		101
4-Bromofluorobenzene	% Recovery	50-140		108

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9934705 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
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CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-03-01

DATE REPORTED: 2019-03-11

Parameter	Unit	SAMPLE DESCRIPTION:		BH15-3	DUP-1	Trip Blank
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2019-02-28	2019-02-28	2019-02-28
		G / S	RDL	9934690	9934703	9934704
Dichlorodifluoromethane	µg/L	4400	0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.5	0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	5.6	0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	<0.40	<0.40	<0.40
Acetone	µg/L	130000	1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	1.6	0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	610	0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	190	0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	320	0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	470000	1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	2.4	0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	1.6	0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	640	0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.79	0.20	<0.20	<0.20	<0.20
Benzene	µg/L	44	0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	16	0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	140000	1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L	82000	0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.25	0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	3.3	0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20	<0.20	<0.20

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-03-01

DATE REPORTED: 2019-03-11

		SAMPLE DESCRIPTION:		BH15-3	DUP-1	Trip Blank
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2019-02-28	2019-02-28	2019-02-28
Parameter	Unit	G / S	RDL	9934690	9934703	9934704
Bromoform	µg/L	380	0.10	<0.10	<0.10	<0.10
Styrene	µg/L	1300	0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	3.2	0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	8	0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	4600	0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	5.2	0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/L	4200	0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L	51	0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	50-140		100	103	103
4-Bromofluorobenzene	% Recovery	50-140		94	93	92

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9934690-9934704 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLED BY:

O. Reg. 153(511) - ORPs (Water)

DATE RECEIVED: 2019-03-01

DATE REPORTED: 2019-03-11

		SAMPLE DESCRIPTION:		BH15-3	DUP-1
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-02-28	2019-02-28
Parameter	Unit	G / S	RDL	9934690	9934703
Sodium	µg/L	2300000	25000	2900000	2850000
Chloride	µg/L	2300000	20000	6210000	6390000
pH	pH Units		NA	7.86	7.86

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9934690-9934703 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily



AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9934690	BH15-3	ON T3 NPGW CT	O. Reg. 153(511) - ORPs (Water)	Chloride	µg/L	2300000	6210000
9934690	BH15-3	ON T3 NPGW CT	O. Reg. 153(511) - ORPs (Water)	Sodium	µg/L	2300000	2900000
9934703	DUP-1	ON T3 NPGW CT	O. Reg. 153(511) - ORPs (Water)	Chloride	µg/L	2300000	6390000
9934703	DUP-1	ON T3 NPGW CT	O. Reg. 153(511) - ORPs (Water)	Sodium	µg/L	2300000	2850000

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 19Z442376
PROJECT: Elmvale Acres (Riocan) Phase II ESA
ATTENTION TO: Shihan Chowdhury; Keith Holmes
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Mar 11, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - VOCs (Water)

Dichlorodifluoromethane	9940053		< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	106%	50%	140%	103%	50%	140%
Vinyl Chloride	9940053		< 0.17	< 0.17	NA	< 0.17	102%	50%	140%	111%	50%	140%	100%	50%	140%
Bromomethane	9940053		< 0.20	< 0.20	NA	< 0.20	84%	50%	140%	93%	50%	140%	83%	50%	140%
Trichlorofluoromethane	9940053		< 0.40	< 0.40	NA	< 0.40	102%	50%	140%	104%	50%	140%	93%	50%	140%
Acetone	9940053		< 1.0	< 1.0	NA	< 1.0	112%	50%	140%	90%	50%	140%	94%	50%	140%
1,1-Dichloroethylene	9940053		< 0.30	< 0.30	NA	< 0.30	109%	50%	140%	76%	60%	130%	78%	50%	140%
Methylene Chloride	9940053		< 0.30	< 0.30	NA	< 0.30	112%	50%	140%	107%	60%	130%	105%	50%	140%
trans- 1,2-Dichloroethylene	9940053		< 0.20	< 0.20	NA	< 0.20	108%	50%	140%	80%	60%	130%	80%	50%	140%
Methyl tert-butyl ether	9940053		< 0.20	< 0.20	NA	< 0.20	101%	50%	140%	112%	60%	130%	107%	50%	140%
1,1-Dichloroethane	9940053		< 0.30	< 0.30	NA	< 0.30	84%	50%	140%	76%	60%	130%	76%	50%	140%
Methyl Ethyl Ketone	9940053		< 1.0	< 1.0	NA	< 1.0	108%	50%	140%	110%	50%	140%	94%	50%	140%
cis- 1,2-Dichloroethylene	9940053		< 0.20	< 0.20	NA	< 0.20	85%	50%	140%	81%	60%	130%	88%	50%	140%
Chloroform	9940053		< 0.20	< 0.20	NA	< 0.20	73%	50%	140%	77%	60%	130%	84%	50%	140%
1,2-Dichloroethane	9940053		< 0.20	< 0.20	NA	< 0.20	86%	50%	140%	80%	60%	130%	93%	50%	140%
1,1,1-Trichloroethane	9940053		< 0.30	< 0.30	NA	< 0.30	77%	50%	140%	76%	60%	130%	75%	50%	140%
Carbon Tetrachloride	9940053		< 0.20	< 0.20	NA	< 0.20	73%	50%	140%	76%	60%	130%	79%	50%	140%
Benzene	9940053		< 0.20	< 0.20	NA	< 0.20	93%	50%	140%	85%	60%	130%	90%	50%	140%
1,2-Dichloropropane	9940053		< 0.20	< 0.20	NA	< 0.20	78%	50%	140%	88%	60%	130%	80%	50%	140%
Trichloroethylene	9940053		< 0.20	< 0.20	NA	< 0.20	84%	50%	140%	82%	60%	130%	93%	50%	140%
Bromodichloromethane	9940053		< 0.20	< 0.20	NA	< 0.20	81%	50%	140%	91%	60%	130%	78%	50%	140%
Methyl Isobutyl Ketone	9940053		< 1.0	< 1.0	NA	< 1.0	91%	50%	140%	98%	50%	140%	96%	50%	140%
1,1,2-Trichloroethane	9940053		< 0.20	< 0.20	NA	< 0.20	92%	50%	140%	99%	60%	130%	106%	50%	140%
Toluene	9940053		< 0.20	< 0.20	NA	< 0.20	103%	50%	140%	109%	60%	130%	113%	50%	140%
Dibromochloromethane	9940053		< 0.10	< 0.10	NA	< 0.10	77%	50%	140%	80%	60%	130%	84%	50%	140%
Ethylene Dibromide	9940053		< 0.10	< 0.10	NA	< 0.10	89%	50%	140%	92%	60%	130%	100%	50%	140%
Tetrachloroethylene	9940053		< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	108%	60%	130%	111%	50%	140%
1,1,1,2-Tetrachloroethane	9940053		< 0.10	< 0.10	NA	< 0.10	97%	50%	140%	84%	60%	130%	85%	50%	140%
Chlorobenzene	9940053		< 0.10	< 0.10	NA	< 0.10	95%	50%	140%	106%	60%	130%	113%	50%	140%
Ethylbenzene	9940053		< 0.10	< 0.10	NA	< 0.10	93%	50%	140%	110%	60%	130%	111%	50%	140%
m & p-Xylene	9940053		< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	102%	60%	130%	113%	50%	140%
Bromoform	9940053		< 0.10	< 0.10	NA	< 0.10	78%	50%	140%	82%	60%	130%	83%	50%	140%
Styrene	9940053		< 0.10	< 0.10	NA	< 0.10	83%	50%	140%	102%	60%	130%	107%	50%	140%
1,1,2,2-Tetrachloroethane	9940053		< 0.10	< 0.10	NA	< 0.10	84%	50%	140%	107%	60%	130%	102%	50%	140%
o-Xylene	9940053		< 0.10	< 0.10	NA	< 0.10	96%	50%	140%	108%	60%	130%	114%	50%	140%
1,3-Dichlorobenzene	9940053		< 0.10	< 0.10	NA	< 0.10	89%	50%	140%	107%	60%	130%	111%	50%	140%
1,4-Dichlorobenzene	9940053		< 0.10	< 0.10	NA	< 0.10	103%	50%	140%	82%	60%	130%	83%	50%	140%
1,2-Dichlorobenzene	9940053		< 0.10	< 0.10	NA	< 0.10	103%	50%	140%	100%	60%	130%	111%	50%	140%
1,3-Dichloropropene	9940053		< 0.30	< 0.30	NA	< 0.30	88%	50%	140%	87%	60%	130%	80%	50%	140%
n-Hexane	9940053		< 0.20	< 0.20	NA	< 0.20	104%	50%	140%	97%	60%	130%	116%	50%	140%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 8 of 12

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Mar 11, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:



Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 19Z442376

PROJECT: Elmvale Acres (Riocan) Phase II ESA

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Mar 11, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - ORPs (Water)

Sodium	9940871		730000	705000	3.5%	< 500	98%	70%	130%	98%	80%	120%	84%	70%	130%
Chloride	9939844		11900	11900	0.0%	< 100	94%	70%	130%	100%	70%	130%	105%	70%	130%
pH	9934690	9934690	7.86	7.85	0.1%	NA	99%	90%	110%						

Comments: NA signifies Not Applicable.

Certified By:



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 19Z442376
PROJECT: Elmvale Acres (Riocan) Phase II ESA
ATTENTION TO: Shihan Chowdhury; Keith Holmes
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Water Analysis			
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Shihan Chowdhury

PROJECT: 19118198

AGAT WORK ORDER: 19Z447875

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Mar 26, 2019

PAGES (INCLUDING COVER): 19

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

***NOTES**

VERSION 2: Revised report with EC and SAR results, issued on March 28, 2019.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z447875

PROJECT: 19118198

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - EC/SAR (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		DUP-1	19-02 SA4	19-03 SA5
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2019-03-15	2019-03-15	2019-03-15
Parameter	Unit	G / S	RDL	9977624	9977627	9977630
Electrical Conductivity	mS/cm		0.005	1.32	1.21	2.81
Sodium Adsorption Ratio	NA		NA	0.986	4.20	1.72

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9977624-9977630 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil).

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 19Z447875

PROJECT: 19118198

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

Parameter	Unit	SAMPLE DESCRIPTION:		19-01 SA1	19-02 SA1	19-03 SA1
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2019-03-15	2019-03-15	2019-03-15
		G / S	RDL	9977621	9977625	9977628
Antimony	µg/g	7.5	0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	3	4	3
Barium	µg/g	390	2	328	157	176
Beryllium	µg/g	4	0.5	0.8	<0.5	<0.5
Boron	µg/g	120	5	<5	8	7
Boron (Hot Water Soluble)	µg/g	1.5	0.10	0.15	0.30	0.43
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5
Chromium	µg/g	160	2	87	13	50
Cobalt	µg/g	22	0.5	18.3	5.3	10.3
Copper	µg/g	140	1	43	7	22
Lead	µg/g	120	1	12	9	5
Molybdenum	µg/g	6.9	0.5	2.4	2.4	<0.5
Nickel	µg/g	100	1	50	16	32
Selenium	µg/g	2.4	0.4	<0.4	<0.4	<0.4
Silver	µg/g	20	0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	0.4	<0.4	<0.4
Uranium	µg/g	23	0.5	0.9	<0.5	<0.5
Vanadium	µg/g	86	1	78	16	43
Zinc	µg/g	340	5	97	18	51
Chromium VI	µg/g	8	0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	0.7	0.005	3.55	0.769	4.01
Sodium Adsorption Ratio	NA	5	NA	7.59	2.14	5.11
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.27	7.53	7.71

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Coarse Textured Soils

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9977621-9977628 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Analysis performed at AGAT Toronto (unless marked by *)

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AGAT WORK ORDER: 19Z447875

PROJECT: 19118198

5835 COOPERS AVENUE
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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - ORPs (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

SAMPLE DESCRIPTION: 19-03 SA5

SAMPLE TYPE: Soil

DATE SAMPLED: 2019-03-15

Parameter	Unit	G / S	RDL	9977630
pH, 2:1 CaCl ₂ Extraction	pH Units	NA	7.12	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9977630 pH was determined on the 0.01M CaCl₂ extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil).

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - OC Pesticides (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		19-01 SA3	DUP-1	19-02 SA2	19-03 SA2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2019-03-15	2019-03-15	2019-03-15	2019-03-15
Parameter	Unit	G / S	RDL	9977623	9977624	9977626	9977629
Hexachloroethane	µg/g	0.089	0.01	<0.01	<0.01	<0.01	<0.01
Gamma-Hexachlorocyclohexane	µg/g	0.056	0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.15	0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005
Chlordane	µg/g	0.05	0.007	<0.007	<0.007	<0.007	<0.007
DDE	µg/g	0.26	0.007	<0.007	<0.007	<0.007	<0.007
DDD	µg/g	3.3	0.007	<0.007	<0.007	<0.007	<0.007
DDT	µg/g	1.4	0.007	<0.007	<0.007	<0.007	<0.007
Dieldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	µg/g	0.13	0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.52	0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.012	0.01	<0.01	<0.01	<0.01	<0.01
Moisture Content	%		0.1	17.8	27.3	27.9	26.6
Surrogate	Unit	Acceptable Limits					
TCMX	%	50-140		93	67	92	64
Decachlorobiphenyl	%	60-130		102	89	112	95

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9977623-9977629 Results are based on the dry weight of the soil.

DDT total is a calculated parameter. The calculated value is the sum of op/DDT and pp/DDT.

DDD total is a calculated parameter. The calculated value is the sum of op/DDD and pp/DDD.

DDE total is a calculated parameter. The calculated value is the sum of op/DDE and pp/DDE.

Endosulfan total is a calculated parameter. The calculated value is the sum of Endosulfan I and Endosulfan II.

Chlordane total is a calculated parameter. The calculated value is the sum of Alpha-Chlordane and Gamma-Chlordane.

Analysis performed at AGAT Toronto (unless marked by *)

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N Popmukolof



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AGAT WORK ORDER: 19Z447875

PROJECT: 19118198

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		19-01 SA1	19-02 SA1	19-03 SA1
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2019-03-15	2019-03-15	2019-03-15
Parameter	Unit	G / S	RDL	9977621	9977625	9977628
Naphthalene	µg/g	0.6	0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.15	0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	7.9	0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	62	0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	6.2	0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.67	0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	78	0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.5	0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	7	0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.78	0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.78	0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.38	0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	6.6	0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.99	0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits				
Chrysene-d12	%	50-140		100	80	85

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9977621-9977628 Results are based on the dry weight of the soil.

Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

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AGAT WORK ORDER: 19Z447875

PROJECT: 19118198

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		19-01 SA1	19-02 SA1	19-03 SA1
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2019-03-15	2019-03-15	2019-03-15
Parameter	Unit	G / S	RDL	9977621	9977625	9977628
Benzene	µg/g	0.21	0.02	<0.02	<0.02	<0.02
Toluene	µg/g	2.3	0.05	<0.05	<0.05	0.10
Ethylbenzene	µg/g	2	0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	3.1	0.05	<0.05	<0.05	0.10
F1 (C6 to C10)	µg/g	55	5	<5	<5	12
F1 (C6 to C10) minus BTEX	µg/g	55	5	<5	<5	12
F2 (C10 to C16)	µg/g	98	10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10
F3 (C16 to C34)	µg/g	300	50	<50	100	<50
F3 (C16 to C34) minus PAHs	µg/g		50	<50	100	<50
F4 (C34 to C50)	µg/g	2800	50	<50	250	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA	NA
Moisture Content	%		0.1	25.1	4.5	5.0
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140		84	82	86

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9977621-9977628 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

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PROJECT: 19118198

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		19-01 SA3	DUP-1	19-02 SA4	19-03 SA5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2019-03-15	2019-03-15	2019-03-15	2019-03-15
Parameter	Unit	G / S	RDL	9977623	9977624	9977627	9977630
Dichlorodifluoromethane	µg/g	16	0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	4	0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	16	0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.084	0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.75	0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	3.5	0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	16	0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	3.4	0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.38	0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.21	0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.061	0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	13	0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	1.7	0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	2.3	0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	9.4	0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.28	0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.058	0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	2.4	0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	2	0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

N Popmukolof



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PROJECT: 19118198

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE: 1910 St. Laurent Blvd.

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

O. Reg. 153(511) - VOCs (Soil)

DATE RECEIVED: 2019-03-18

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		19-01 SA3	DUP-1	19-02 SA4	19-03 SA5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2019-03-15	2019-03-15	2019-03-15	2019-03-15
Parameter	Unit	G / S	RDL	9977623	9977624	9977627	9977630
Bromoform	ug/g	0.27	0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.7	0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	4.8	0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.083	0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	3.4	0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	ug/g	3.1	0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	ug/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	17.8	27.3	17.7	18.0
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	50-140		98	100	103	99
4-Bromofluorobenzene	% Recovery	50-140		90	92	90	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Coarse Textured Soils

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9977623-9977630 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.

1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

N Popmukolof



Guideline Violation

AGAT WORK ORDER: 19Z447875

PROJECT: 19118198

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ATTENTION TO: Shihan Chowdhury

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9977621	19-01 SA1	ON T3 S RPI CT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.7	3.55
9977621	19-01 SA1	ON T3 S RPI CT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	5	7.59
9977625	19-02 SA1	ON T3 S RPI CT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.7	0.769
9977628	19-03 SA1	ON T3 S RPI CT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	mS/cm	0.7	4.01
9977628	19-03 SA1	ON T3 S RPI CT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	NA	5	5.11

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE: 1910 St. Laurent Blvd.

AGAT WORK ORDER: 19Z447875

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

Soil Analysis

RPT Date: Mar 26, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	9977055		2.2	1.9	NA	< 0.8	106%	70%	130%	99%	80%	120%	73%	70%	130%
Arsenic	9977055		4	4	NA	< 1	97%	70%	130%	93%	80%	120%	95%	70%	130%
Barium	9977055		95	89	6.5%	< 2	105%	70%	130%	100%	80%	120%	104%	70%	130%
Beryllium	9977055		<0.5	<0.5	NA	< 0.5	107%	70%	130%	99%	80%	120%	101%	70%	130%
Boron	9977055		15	15	NA	< 5	75%	70%	130%	103%	80%	120%	94%	70%	130%
Boron (Hot Water Soluble)	9977281		0.43	0.40	NA	< 0.10	111%	60%	140%	101%	70%	130%	100%	60%	140%
Cadmium	9977055		0.5	0.5	NA	< 0.5	100%	70%	130%	100%	80%	120%	102%	70%	130%
Chromium	9977055		30	29	3.4%	< 2	81%	70%	130%	96%	80%	120%	96%	70%	130%
Cobalt	9977055		4.9	4.3	13.0%	< 0.5	95%	70%	130%	93%	80%	120%	90%	70%	130%
Copper	9977055		47	48	2.1%	< 1	98%	70%	130%	99%	80%	120%	86%	70%	130%
Lead	9977055		68	64	6.1%	< 1	102%	70%	130%	101%	80%	120%	101%	70%	130%
Molybdenum	9977055		4.4	3.4	25.6%	< 0.5	99%	70%	130%	99%	80%	120%	98%	70%	130%
Nickel	9977055		45	39	14.3%	< 1	98%	70%	130%	92%	80%	120%	86%	70%	130%
Selenium	9977055		0.8	2.1	NA	< 0.4	101%	70%	130%	98%	80%	120%	103%	70%	130%
Silver	9977055		<0.2	<0.2	NA	< 0.2	94%	70%	130%	86%	80%	120%	92%	70%	130%
Thallium	9977055		<0.4	<0.4	NA	< 0.4	98%	70%	130%	98%	80%	120%	93%	70%	130%
Uranium	9977055		0.5	<0.5	NA	< 0.5	98%	70%	130%	98%	80%	120%	101%	70%	130%
Vanadium	9977055		16	15	6.5%	< 1	98%	70%	130%	94%	80%	120%	96%	70%	130%
Zinc	9977055		570	505	12.1%	< 5	96%	70%	130%	100%	80%	120%	109%	70%	130%
Chromium VI	9984236		<0.2	<0.2	NA	< 0.2	106%	70%	130%	95%	80%	120%	100%	70%	130%
Cyanide	9984236		<0.040	<0.040	NA	< 0.040	90%	70%	130%	101%	80%	120%	92%	70%	130%
Mercury	9977055		0.13	0.11	NA	< 0.10	108%	70%	130%	98%	80%	120%	89%	70%	130%
Electrical Conductivity	9979536		0.431	0.447	3.6%	< 0.005	107%	90%	110%						
Sodium Adsorption Ratio	9979536		0.353	0.354	0.3%	NA									
pH, 2:1 CaCl2 Extraction	9977621	9977621	7.27	7.31	0.5%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

O. Reg. 153(511) - EC/SAR (Soil)

Electrical Conductivity	9986875	3.38	3.51	3.8%	< 0.005	103%	90%	110%	NA	NA
Sodium Adsorption Ratio	9986875	64.3	67.8	5.3%	NA	NA			NA	NA

Comments: NA signifies Not Applicable.

Certified By:




Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE: 1910 St. Laurent Blvd.

AGAT WORK ORDER: 19Z447875

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

Trace Organics Analysis

RPT Date: Mar 26, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Benzene	9964028		< 0.02	< 0.02	NA	< 0.02	85%	60%	130%	97%	60%	130%	83%	60%	130%
Toluene	9964028		< 0.05	< 0.05	NA	< 0.05	107%	60%	130%	103%	60%	130%	84%	60%	130%
Ethylbenzene	9964028		< 0.05	< 0.05	NA	< 0.05	112%	60%	130%	102%	60%	130%	83%	60%	130%
Xylene Mixture	9964028		< 0.05	< 0.05	NA	< 0.05	113%	60%	130%	101%	60%	130%	89%	60%	130%
F1 (C6 to C10)	9964028		< 5	< 5	NA	< 5	105%	60%	130%	94%	85%	115%	83%	70%	130%
F2 (C10 to C16)	9968898		< 10	< 10	NA	< 10	95%	60%	130%	90%	80%	120%	81%	70%	130%
F3 (C16 to C34)	9968898		< 50	< 50	NA	< 50	98%	60%	130%	91%	80%	120%	83%	70%	130%
F4 (C34 to C50)	9968898		< 50	< 50	NA	< 50	92%	60%	130%	101%	80%	120%	93%	70%	130%

O. Reg. 153(511) - PAHs (Soil)

Naphthalene	9968985		< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	90%	50%	140%	79%	50%	140%
Acenaphthylene	9968985		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	99%	50%	140%	89%	50%	140%
Acenaphthene	9968985		< 0.05	< 0.05	NA	< 0.05	97%	50%	140%	92%	50%	140%	82%	50%	140%
Fluorene	9968985		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	98%	50%	140%	94%	50%	140%
Phenanthrene	9968985		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	97%	50%	140%	93%	50%	140%
Anthracene	9968985		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	97%	50%	140%	94%	50%	140%
Fluoranthene	9968985		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	99%	50%	140%	89%	50%	140%
Pyrene	9968985		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	94%	50%	140%	94%	50%	140%
Benz(a)anthracene	9968985		< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	96%	50%	140%	95%	50%	140%
Chrysene	9968985		< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	94%	50%	140%	93%	50%	140%
Benzo(b)fluoranthene	9968985		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	101%	50%	140%	80%	50%	140%
Benzo(k)fluoranthene	9968985		< 0.05	< 0.05	NA	< 0.05	81%	50%	140%	85%	50%	140%	75%	50%	140%
Benzo(a)pyrene	9968985		< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	79%	50%	140%	81%	50%	140%
Indeno(1,2,3-cd)pyrene	9968985		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	81%	50%	140%	76%	50%	140%
Dibenz(a,h)anthracene	9968985		< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	72%	50%	140%	79%	50%	140%
Benzo(g,h,i)perylene	9968985		< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	99%	50%	140%	89%	50%	140%
2-and 1-methyl Naphthalene	9968985		< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	97%	50%	140%	87%	50%	140%

O. Reg. 153(511) - VOCs (Soil)

Dichlorodifluoromethane	9981863		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	96%	50%	140%	83%	50%	140%
Vinyl Chloride	9981863		< 0.02	< 0.02	NA	< 0.02	87%	50%	140%	82%	50%	140%	81%	50%	140%
Bromomethane	9981863		< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	107%	50%	140%	111%	50%	140%
Trichlorofluoromethane	9981863		< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	119%	50%	140%	91%	50%	140%
Acetone	9981863		< 0.50	< 0.50	NA	< 0.50	113%	50%	140%	113%	50%	140%	87%	50%	140%
1,1-Dichloroethylene	9981863		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	95%	60%	130%	77%	50%	140%
Methylene Chloride	9981863		< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	111%	60%	130%	78%	50%	140%
Trans- 1,2-Dichloroethylene	9981863		< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	109%	60%	130%	79%	50%	140%
Methyl tert-butyl Ether	9981863		< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	103%	60%	130%	113%	50%	140%
1,1-Dichloroethane	9981863		< 0.02	< 0.02	NA	< 0.02	119%	50%	140%	109%	60%	130%	80%	50%	140%
Methyl Ethyl Ketone	9981863		< 0.50	< 0.50	NA	< 0.50	115%	50%	140%	118%	50%	140%	88%	50%	140%

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE: 1910 St. Laurent Blvd.

AGAT WORK ORDER: 19Z447875

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

Trace Organics Analysis (Continued)

RPT Date: Mar 26, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Cis- 1,2-Dichloroethylene	9981863		< 0.02	< 0.02	NA	< 0.02	103%	50%	140%	96%	60%	130%	78%	50%	140%
Chloroform	9981863		< 0.04	< 0.04	NA	< 0.04	107%	50%	140%	105%	60%	130%	77%	50%	140%
1,2-Dichloroethane	9981863		< 0.03	< 0.03	NA	< 0.03	90%	50%	140%	98%	60%	130%	80%	50%	140%
1,1,1-Trichloroethane	9981863		< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	111%	60%	130%	79%	50%	140%
Carbon Tetrachloride	9981863		< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	100%	60%	130%	79%	50%	140%
Benzene	9981863		< 0.02	< 0.02	NA	< 0.02	103%	50%	140%	89%	60%	130%	80%	50%	140%
1,2-Dichloropropane	9981863		< 0.03	< 0.03	NA	< 0.03	110%	50%	140%	111%	60%	130%	77%	50%	140%
Trichloroethylene	9981863		< 0.03	< 0.03	NA	< 0.03	107%	50%	140%	107%	60%	130%	93%	50%	140%
Bromodichloromethane	9981863		< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	111%	60%	130%	95%	50%	140%
Methyl Isobutyl Ketone	9981863		< 0.50	< 0.50	NA	< 0.50	101%	50%	140%	111%	50%	140%	100%	50%	140%
1,1,2-Trichloroethane	9981863		< 0.04	< 0.04	NA	< 0.04	104%	50%	140%	112%	60%	130%	98%	50%	140%
Toluene	9981863		< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	110%	60%	130%	90%	50%	140%
Dibromochloromethane	9981863		< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	112%	60%	130%	107%	50%	140%
Ethylene Dibromide	9981863		< 0.04	< 0.04	NA	< 0.04	110%	50%	140%	107%	60%	130%	114%	50%	140%
Tetrachloroethylene	9981863		< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	107%	60%	130%	85%	50%	140%
1,1,1,2-Tetrachloroethane	9981863		< 0.04	< 0.04	NA	< 0.04	106%	50%	140%	106%	60%	130%	112%	50%	140%
Chlorobenzene	9981863		< 0.05	< 0.05	NA	< 0.05	110%	50%	140%	116%	60%	130%	96%	50%	140%
Ethylbenzene	9981863		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	110%	60%	130%	90%	50%	140%
m & p-Xylene	9981863		< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	104%	60%	130%	90%	50%	140%
Bromoform	9981863		< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	105%	60%	130%	102%	50%	140%
Styrene	9981863		< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	110%	60%	130%	113%	50%	140%
1,1,2,2-Tetrachloroethane	9981863		< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	102%	60%	130%	109%	50%	140%
o-Xylene	9981863		< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	113%	60%	130%	94%	50%	140%
1,3-Dichlorobenzene	9981863		< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	106%	60%	130%	94%	50%	140%
1,4-Dichlorobenzene	9981863		< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	112%	60%	130%	91%	50%	140%
1,2-Dichlorobenzene	9981863		< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	109%	60%	130%	93%	50%	140%
1,3-Dichloropropene	9981863		< 0.04	< 0.04	NA	< 0.04	81%	50%	140%	112%	60%	130%	86%	50%	140%
n-Hexane	9981863		< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	95%	60%	130%	86%	50%	140%
O. Reg. 153(511) - OC Pesticides (Soil)															
Hexachloroethane	9965242		< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	100%	50%	140%	96%	50%	140%
Gamma-Hexachlorocyclohexane	9965242		< 0.005	< 0.005	NA	< 0.005	91%	50%	140%	92%	50%	140%	89%	50%	140%
Heptachlor	9965242		< 0.005	< 0.005	NA	< 0.005	90%	50%	140%	87%	50%	140%	86%	50%	140%
Aldrin	9965242		< 0.005	< 0.005	NA	< 0.005	98%	50%	140%	100%	50%	140%	94%	50%	140%
Heptachlor Epoxide	9965242		< 0.005	< 0.005	NA	< 0.005	103%	50%	140%	100%	50%	140%	100%	50%	140%
Endosulfan	9965242		< 0.005	< 0.005	NA	< 0.005	102%	50%	140%	106%	50%	140%	83%	50%	140%
Chlordane	9965242		< 0.007	< 0.007	NA	< 0.007	97%	50%	140%	104%	50%	140%	102%	50%	140%
DDE	9965242		< 0.007	< 0.007	NA	< 0.007	103%	50%	140%	105%	50%	140%	108%	50%	140%
DDD	9965242		< 0.007	< 0.007	NA	< 0.007	98%	50%	140%	101%	50%	140%	100%	50%	140%
DDT	9965242		< 0.007	< 0.007	NA	< 0.007	83%	50%	140%	88%	50%	140%	92%	50%	140%



Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE: 1910 St. Laurent Blvd.

AGAT WORK ORDER: 19Z447875

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

Trace Organics Analysis (Continued)

RPT Date: Mar 26, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dieldrin	9965242		< 0.005	< 0.005	NA	< 0.005	91%	50%	140%	103%	50%	140%	96%	50%	140%
Endrin	9965242		< 0.005	< 0.005	NA	< 0.005	87%	50%	140%	89%	50%	140%	80%	50%	140%
Methoxychlor	9965242		< 0.005	< 0.005	NA	< 0.005	80%	50%	140%	80%	50%	140%	97%	50%	140%
Hexachlorobenzene	9965242		< 0.005	< 0.005	NA	< 0.005	102%	50%	140%	104%	50%	140%	94%	50%	140%
Hexachlorobutadiene	9965242		< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	91%	50%	140%	96%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE: 1910 St. Laurent Blvd.

AGAT WORK ORDER: 19Z447875

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	ICP/OES
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A; SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	pH METER

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE: 1910 St. Laurent Blvd.

AGAT WORK ORDER: 19Z447875

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Hexachloroethane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Gamma-Hexachlorocyclohexane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Aldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor Epoxide	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endosulfan	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Chlordane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDE	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDD	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDT	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Dieldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Methoxychlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobenzene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobutadiene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
TCMX	ORG-91-5112	EPA SW-846 3541,3620 & 8081	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Moisture Content		MOE E3139	BALANCE
Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Acenaphthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluorene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Phenanthrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P&T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P&T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P&T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P&T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE: 1910 St. Laurent Blvd.

AGAT WORK ORDER: 19Z447875

ATTENTION TO: Shihan Chowdhury

SAMPLED BY: Rochelle Mathew

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl	VOL-91-5009		GC/FID
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Moisture Content	VOL-91-5002	MOE E3139	BALANCE



AGAT

Laboratories

129

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: GOLDER ASSOCIATES
Contact: SHIHAN CHOWDHURY
Address: 1931 ROBERTSON ROAD, OTTAWA
ON K2H 5B7
Phone: _____ Fax: _____
Reports to be sent to: _____
1. Email: shihan-chowdhury@golder.com
2. Email: _____

Project Information:

Project: 19118198
Site Location: 1310 ST. LAURENT BLVD.
Sampled By: RECHELLE MATHIAS
AGAT Quote #: 50 Rates PO: 19118198
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Company: _____
Contact: _____
Address: _____
Email: _____
Bill To Same: Yes ☒ No ☐

Regulatory Requirements:

(Please check all applicable boxes)

☒ Regulation 153/04

Table 3

☐ Indicate One

☐ Ind./Com

☒ Res./Park

☐ Agriculture

Soil Texture (Check One)

☒ Coarse

☐ Fine

☐ Sewer Use

☐ Sanitary

☐ Storm

Region _____

Indicate One

☐ MISA

☐ Regulation 558

☐ CCME

☐ Prov. Water Quality
Objectives (PWQO)

☐ Other

Indicate One

Is this submission for a
Record of Site Condition?

☒ Yes ☐ No

Report Guideline on
Certificate of Analysis

☒ Yes ☐ No

Sample Matrix Legend

B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Field Filtered - Metals, Hg, CrVI

O. Reg 153

Metals and Inorganics

☐ All Metals

☐ 153 Metals (excl. Hydrides)

☐ Hydride Metals

☐ 153 Metals (incl. Hydrides)

ORPs: ☐ B-HWS

☐ Cl ☐ CN

☐ Cr⁶⁺ ☐ EC

☐ FOC ☐ Hg

☐ pH ☐ SAR

Full Metals Scan

Regulatory/Custom Metals

Nutrients: ☐ TP

☐ NH₃

☐ TKN

☐ NO₃

☐ NO₂

☐ NO₂+NO₃

Volatiles: ☐ VOC

☐ THM

☒ BTEX

PHCs F1 - F4

ABNS

PAHS

PCBs: ☐ Total

☐ Aroclors

Organochlorine Pesticides

TCLP: ☐ M&I

☐ VOCs

☐ ABNS

☐ Bta/P

☐ PCBs

Sewer Use

PH

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N
19-01 SA 1	15/3/19	0915		3		
19-01 SA 3		0920			HOLD EC/SAR	
DUP - 1		0920			HOLD EC/SAR	
19-02 SA 1		0955				
19-02 SA 2		1000				
19-02 SA 4		1004			HOLD EC/SAR	
19-03 SA 1		1050				
19-03 SA 2		1052				
19-03 SA 5		1057			HOLD EC/SAR	

Samples Relinquished By (Print Name and Sign):

SHIHAN CHOWDHURY

Samples Relinquished By (Print Name and Sign):

CP to FedEx

Samples Relinquished By (Print Name and Sign):

Date

Time

Date

Time

Date

Time

Date

Time

Date

Time

Date

Time

Samples Received By (Print Name and Sign):

Jeff Jorei

Samples Received By (Print Name and Sign):

Simon

Samples Received By (Print Name and Sign):

Date

Time

Date

Time

Date

Time

Date

Time

Date

Time

Date

Time

Page 1 of 1

Nº: **T 082609**

Laboratory Use Only

Work Order #: 192447875

Cooler Quantity: 1

Arrival Temperatures: 8.4 | 8.1 | 18.0

76 | 68 | 67

Custody Seal Intact: ☐ Yes ☐ No ☒ N/A

Notes: on ice

Turnaround Time (TAT) Required:

Regular TAT

☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days

☐ 2 Business Days

☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Shihan Chowdhury

PROJECT: Elmvale Acres (Riocan) Phase II ESA

AGAT WORK ORDER: 19Z449116

TRACE ORGANICS REVIEWED BY: Pinkal Patel, Report Reviewer

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Mar 27, 2019

PAGES (INCLUDING COVER): 11

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 19Z449116

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-03-21

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		MW15-01B
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-03-20
Parameter	Unit	G / S	RDL	9985526
Dichlorodifluoromethane	µg/L	4400	0.20	<0.20
Vinyl Chloride	µg/L	0.5	0.17	<0.17
Bromomethane	µg/L	5.6	0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	<0.40
Acetone	µg/L	130000	1.0	<1.0
1,1-Dichloroethylene	µg/L	1.6	0.30	<0.30
Methylene Chloride	µg/L	610	0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20
Methyl tert-butyl ether	µg/L	190	0.20	<0.20
1,1-Dichloroethane	µg/L	320	0.30	<0.30
Methyl Ethyl Ketone	µg/L	470000	1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20
Chloroform	µg/L	2.4	0.20	<0.20
1,2-Dichloroethane	µg/L	1.6	0.20	<0.20
1,1,1-Trichloroethane	µg/L	640	0.30	<0.30
Carbon Tetrachloride	µg/L	0.79	0.20	<0.20
Benzene	µg/L	44	0.20	<0.20
1,2-Dichloropropane	µg/L	16	0.20	<0.20
Trichloroethylene	µg/L	1.6	0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	<0.20
Methyl Isobutyl Ketone	µg/L	140000	1.0	<1.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20
Dibromochloromethane	µg/L	82000	0.10	<0.10
Ethylene Dibromide	µg/L	0.25	0.10	<0.10
Tetrachloroethylene	µg/L	1.6	0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	3.3	0.10	<0.10
Chlorobenzene	µg/L	630	0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20

Certified By:

Shihan Chowdhury



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z449116

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-03-21

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		MW15-01B
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-03-20
Parameter	Unit	G / S	RDL	9985526
Bromoform	µg/L	380	0.10	<0.10
Styrene	µg/L	1300	0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	3.2	0.10	<0.10
o-Xylene	µg/L		0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	<0.10
1,4-Dichlorobenzene	µg/L	8	0.10	<0.10
1,2-Dichlorobenzene	µg/L	4600	0.10	<0.10
1,3-Dichloropropene	µg/L	5.2	0.30	<0.30
Xylene Mixture	µg/L	4200	0.20	<0.20
n-Hexane	µg/L	51	0.20	<0.20
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140		100
4-Bromofluorobenzene	% Recovery	50-140		98

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9985526 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Shihan Chowdhury



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z449116

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
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TEL (905)712-5100
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - ORPs (Water)

DATE RECEIVED: 2019-03-21

DATE REPORTED: 2019-03-25

		SAMPLE DESCRIPTION:		MW15-01B
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-03-20
Parameter	Unit	G / S	RDL	9985526
Chloride	µg/L	2300000	20000	6400000
pH	pH Units		NA	7.70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

9985526 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraistegui



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z449116

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Shihan Chowdhury

SAMPLED BY:

O. Reg. 153(511) - Sodium (Water)

DATE RECEIVED: 2019-03-21

DATE REPORTED: 2019-03-26

		SAMPLE DESCRIPTION:		MW15-01B
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-03-20
Parameter	Unit	G / S	RDL	9985526
Sodium	µg/L	2300000	50000	2000000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.
9985526 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.
Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraístequi



AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19Z449116

PROJECT: Elmvale Acres (Riocan) Phase II ESA

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9985526	MW15-01B	ON T3 NPGW CT	O. Reg. 153(511) - ORPs (Water)	Chloride	µg/L	2300000	6400000

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: Elmvale Acres (Riocan) Phase II ESA
SAMPLING SITE:

AGAT WORK ORDER: 19Z449116
ATTENTION TO: Shihan Chowdhury
SAMPLED BY:

Trace Organics Analysis

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - VOCs (Water)

Dichlorodifluoromethane	9975904		< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	109%	50%	140%	102%	50%	140%
Vinyl Chloride	9975904		< 0.17	< 0.17	NA	< 0.17	95%	50%	140%	108%	50%	140%	115%	50%	140%
Bromomethane	9975904		< 0.20	< 0.20	NA	< 0.20	113%	50%	140%	119%	50%	140%	117%	50%	140%
Trichlorofluoromethane	9975904		< 0.40	< 0.40	NA	< 0.40	117%	50%	140%	109%	50%	140%	109%	50%	140%
Acetone	9975904		< 1.0	< 1.0	NA	< 1.0	96%	50%	140%	106%	50%	140%	104%	50%	140%
1,1-Dichloroethylene	9975904		< 0.30	< 0.30	NA	< 0.30	110%	50%	140%	103%	60%	130%	107%	50%	140%
Methylene Chloride	9975904		< 0.30	< 0.30	NA	< 0.30	99%	50%	140%	95%	60%	130%	90%	50%	140%
trans- 1,2-Dichloroethylene	9975904		< 0.20	< 0.20	NA	< 0.20	96%	50%	140%	94%	60%	130%	95%	50%	140%
Methyl tert-butyl ether	9975904		< 0.20	< 0.20	NA	< 0.20	81%	50%	140%	102%	60%	130%	86%	50%	140%
1,1-Dichloroethane	9975904		< 0.30	< 0.30	NA	< 0.30	85%	50%	140%	97%	60%	130%	87%	50%	140%
Methyl Ethyl Ketone	9975904		< 1.0	< 1.0	NA	< 1.0	80%	50%	140%	88%	50%	140%	84%	50%	140%
cis- 1,2-Dichloroethylene	9975904		< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	92%	60%	130%	94%	50%	140%
Chloroform	9975904		< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	92%	60%	130%	94%	50%	140%
1,2-Dichloroethane	9975904		< 0.20	< 0.20	NA	< 0.20	103%	50%	140%	82%	60%	130%	97%	50%	140%
1,1,1-Trichloroethane	9975904		< 0.30	< 0.30	NA	< 0.30	94%	50%	140%	109%	60%	130%	88%	50%	140%
Carbon Tetrachloride	9975904		< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	95%	60%	130%	93%	50%	140%
Benzene	9975904		< 0.20	< 0.20	NA	< 0.20	91%	50%	140%	97%	60%	130%	98%	50%	140%
1,2-Dichloropropane	9975904		< 0.20	< 0.20	NA	< 0.20	84%	50%	140%	90%	60%	130%	83%	50%	140%
Trichloroethylene	9975904		< 0.20	< 0.20	NA	< 0.20	86%	50%	140%	89%	60%	130%	92%	50%	140%
Bromodichloromethane	9975904		< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	78%	60%	130%	77%	50%	140%
Methyl Isobutyl Ketone	9975904		< 1.0	< 1.0	NA	< 1.0	101%	50%	140%	88%	50%	140%	83%	50%	140%
1,1,2-Trichloroethane	9975904		< 0.20	< 0.20	NA	< 0.20	112%	50%	140%	109%	60%	130%	107%	50%	140%
Toluene	9975904		< 0.20	< 0.20	NA	< 0.20	116%	50%	140%	102%	60%	130%	116%	50%	140%
Dibromochloromethane	9975904		< 0.10	< 0.10	NA	< 0.10	78%	50%	140%	85%	60%	130%	77%	50%	140%
Ethylene Dibromide	9975904		< 0.10	< 0.10	NA	< 0.10	103%	50%	140%	104%	60%	130%	95%	50%	140%
Tetrachloroethylene	9975904		< 0.20	< 0.20	NA	< 0.20	108%	50%	140%	115%	60%	130%	111%	50%	140%
1,1,1,2-Tetrachloroethane	9975904		< 0.10	< 0.10	NA	< 0.10	98%	50%	140%	100%	60%	130%	88%	50%	140%
Chlorobenzene	9975904		< 0.10	< 0.10	NA	< 0.10	89%	50%	140%	115%	60%	130%	111%	50%	140%
Ethylbenzene	9975904		< 0.10	< 0.10	NA	< 0.10	97%	50%	140%	115%	60%	130%	111%	50%	140%
m & p-Xylene	9975904		< 0.20	< 0.20	NA	< 0.20	112%	50%	140%	116%	60%	130%	112%	50%	140%
Bromoform	9975904		< 0.10	< 0.10	NA	< 0.10	81%	50%	140%	84%	60%	130%	75%	50%	140%
Styrene	9975904		< 0.10	< 0.10	NA	< 0.10	77%	50%	140%	102%	60%	130%	97%	50%	140%
1,1,2,2-Tetrachloroethane	9975904		< 0.10	< 0.10	NA	< 0.10	103%	50%	140%	107%	60%	130%	104%	50%	140%
o-Xylene	9975904		< 0.10	< 0.10	NA	< 0.10	96%	50%	140%	118%	60%	130%	115%	50%	140%
1,3-Dichlorobenzene	9975904		< 0.10	< 0.10	NA	< 0.10	94%	50%	140%	105%	60%	130%	100%	50%	140%
1,4-Dichlorobenzene	9975904		< 0.10	< 0.10	NA	< 0.10	101%	50%	140%	109%	60%	130%	103%	50%	140%
1,2-Dichlorobenzene	9975904		< 0.10	< 0.10	NA	< 0.10	93%	50%	140%	103%	60%	130%	99%	50%	140%
1,3-Dichloropropene	9975904		< 0.30	< 0.30	NA	< 0.30	82%	50%	140%	85%	60%	130%	81%	50%	140%
n-Hexane	9975904		< 0.20	< 0.20	NA	< 0.20	105%	50%	140%	91%	60%	130%	100%	50%	140%

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: Elmvale Acres (Riocan) Phase II ESA
SAMPLING SITE:

AGAT WORK ORDER: 19Z449116
ATTENTION TO: Shihan Chowdhury
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits	Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower		Upper	Lower		Upper	Lower

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: _____





Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: Elmvale Acres (Riocan) Phase II ESA
SAMPLING SITE:

AGAT WORK ORDER: 19Z449116
ATTENTION TO: Shihan Chowdhury
SAMPLED BY:

Water Analysis

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - ORPs (Water)															
Chloride	9984315		68200	67800	0.6%	< 100	98%	70%	130%	107%	70%	130%	113%	70%	130%
pH	9985484		7.97	7.90	0.9%	NA	100%	90%	110%						
O. Reg. 153(511) - Sodium (Water)															
Sodium	9985227		7730	7770	0.6%	< 500	98%	70%	130%	100%	80%	120%	106%	70%	130%

Certified By:

Iris Veraestegui

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: Elmvale Acres (Riocan) Phase II ESA
SAMPLING SITE:

AGAT WORK ORDER: 19Z449116
ATTENTION TO: Shihan Chowdhury
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Water Analysis			
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Sodium	MET-93-6105	EPA SW 846-6010C & 200.7	ICP/OES

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Shihan Chowdhury

PROJECT: 19118198

AGAT WORK ORDER: 19Z453968

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor

DATE REPORTED: Apr 09, 2019

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z453968

PROJECT: 19118198

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Shihan Chowdhury

SAMPLED BY:

O. Reg. 153(511) - ORPs (Soil)									
DATE RECEIVED: 2019-04-05					DATE REPORTED: 2019-04-09				
SAMPLE DESCRIPTION:		18-01 SA7		18-01 SA10		18-02 SA7		18-02 SA10	
SAMPLE TYPE:		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2018-09-12		2018-09-12		2018-09-17		2018-09-17	
G / S		114698		114705		114706		114707	
RDL		114698		114705		114706		114707	
Parameter	Unit	G / S	RDL	114698	114705	114706	114707	114708	114709
Electrical Conductivity	mS/cm	0.005	1.17	0.301	0.499	0.885	1.19	0.351	
Sodium Adsorption Ratio	NA	NA	1.59	1.35	1.36	0.386	0.901	2.67	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

114698-114709 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil).

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198

SAMPLING SITE:

AGAT WORK ORDER: 19Z453968

ATTENTION TO: Shihan Chowdhury

SAMPLED BY:

Soil Analysis

RPT Date: Apr 09, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - ORPs (Soil)

Electrical Conductivity	118827		0.146	0.142	2.8%	< 0.005	103%	90%	110%	NA			NA		
Sodium Adsorption Ratio	118827		0.558	0.565	1.2%	NA	NA			NA			NA		

Comments: NA signifies Not Applicable.

Certified By:

Amanjot Bhella

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 19Z453968

PROJECT: 19118198

ATTENTION TO: Shihan Chowdhury

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	ICP/OES



AGAT

Laboratories

5835 Coopers Avenue
Mississauga, ON
L4Z 1Y2

www.agatlabs.com • webeearth.agatlabs.com

P: 905.712.5100 • F: 905.712.5122

Laboratory Use Only

Arrival Temperature: 8.618318.3
AGAT WO #: 192463968
Lab Temperature: 768 512
Notes: onice

Chain of Custody Record

Client Information

Company: GOWDER ASSOCIATES
Contact: SHIHAN CHOWDHURY
Address: 1931 ROBERTSON ROAD
Phone: _____ Fax: _____
Project: 19118198 PO: _____
AGAT Quotation #: _____

Please note, if quotation number is not provided,
client will be billed full price for analysis.

Regulatory Requirements

☒ Regulation 153/04
(reg. 511 Amend.)

Table 3
Indicate one

- ☐ Ind/Com
☒ Res/Park
☐ Agriculture

Soil Texture (check one)

☒ Coarse ☐ Fine

☐ Sewer Use

Region _____
Indicate one

- ☐ Sanitary
☐ Storm

☐ Regulation 558

☐ CCME

☐ Other (specify) _____

☐ Prov. Water Quality
Objectives (PWQO)
☐ None

Turnaround Time Required (TAT) Required*

Regular TAT

☐ 5 to 7 Working Days

Rush TAT (please provide prior notification)

Rush Surcharges Apply

☐ 3 Working Days

☒ 2 Working Days

☐ 1 Working Day

OR

Date Required (Rush surcharges may apply): _____

*TAT is exclusive of weekends and statutory holidays

Invoice To

Same: Yes ☒ No ☐

Company: _____
Contact: _____
Address: _____

Is this a drinking water sample?

(potable water intended for human consumption)

☐ Yes ☐ No

If "Yes", please use the
Drinking Water Chain of Custody Form

Is this submission for a Record of Site Condition?

☒ Yes ☐ No

Legend Matrix

GW Ground Water O Oil
SW Surface Water P Paint
SD Sediment S Soil

Report Information - reports to be sent to:

1. Name: SHIHAN CHOWDHURY
Email: shihan-chowdhury@agat.com
2. Name: _____
Email: _____

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/Sample Information	Metals	Metal S	Hydride	Client C	ORPs: <input type="checkbox"/> FOC <input type="checkbox"/> NO ₃	Nutrient <input type="checkbox"/> NO ₃	VOC: <input type="checkbox"/>	CCME F	ABNs	PAHs	Chloroph	PCBs	Organoch	TCLP M	Sewer U																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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Samples Relinquished By (Print Name and Sign):

SHIHAN CHOWDHURY / [Signature]

Date/Time:

APR 5, 2019

Samples Received By (Print Name and Sign):

UBerthelet / [Signature]

Date/Time:

19-04-05 11:15

Samples Relinquished By (Print Name and Sign):

UBerthelet to FedEx

Date/Time:

19-04-05 16:00

Samples Received By (Print Name and Sign):

Sima Z

Date/Time:

19/4/6 1/13

Pink Copy - Client

Yellow Copy - AGAT

White Copy - AGAT

Page 1 of 1

Nº: **31329**

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Keith Holmes

PROJECT: 1918198 - Elmvale

AGAT WORK ORDER: 19Z456865

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Apr 22, 2019

PAGES (INCLUDING COVER): 10

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z456865

PROJECT: 1918198 - Elmvale

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Keith Holmes

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-04-15

DATE REPORTED: 2019-04-22

Parameter	Unit	SAMPLE DESCRIPTION:		MW15-2	MW19-1	MW19-2
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2019-04-12	2019-04-12	2019-04-12
		G / S	RDL	132381	132382	132383
Dichlorodifluoromethane	µg/L	4400	0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L	1.7	0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	56	0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	<0.40	<0.40	<0.40
Acetone	µg/L	130000	1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	17	0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	5500	0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	1400	0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	3100	0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1500000	1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	22	0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	12	0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	6700	0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	8.4	0.20	<0.20	<0.20	<0.20
Benzene	µg/L	430	0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	140	0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	580000	1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	30	0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L	82000	0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.83	0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	17	0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	28	0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20	<0.20	<0.20

Certified By:

N Popiwko



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z456865

PROJECT: 1918198 - Elmvale

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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Keith Holmes

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2019-04-15

DATE REPORTED: 2019-04-22

		SAMPLE DESCRIPTION:		MW15-2	MW19-1	MW19-2
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2019-04-12	2019-04-12	2019-04-12
Parameter	Unit	G / S	RDL	132381	132382	132383
Bromoform	µg/L	770	0.10	<0.10	<0.10	<0.10
Styrene	µg/L	9100	0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	15	0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	67	0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	9600	0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	45	0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/L	4200	0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L	520	0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	50-140		94	95	95
4-Bromofluorobenzene	% Recovery	50-140		86	87	87

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

132381-132383 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z456865

PROJECT: 1918198 - Elmvale

5835 COOPERS AVENUE
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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Keith Holmes

SAMPLED BY:

O. Reg. 153(511) - ORPs (Water)

DATE RECEIVED: 2019-04-15

DATE REPORTED: 2019-04-22

		SAMPLE DESCRIPTION: MW15-2				MW19-1		MW19-2	
		SAMPLE TYPE: Water				Water		Water	
		DATE SAMPLED: 2019-04-12				2019-04-12		2019-04-12	
Parameter	Unit	G / S	RDL	132381	RDL	132382	RDL	132383	
Sodium	µg/L	2300000	500	40200	5000	416000	500	388000	
Chloride	µg/L	2300000	500	60200	5000	2860000	2000	1230000	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Medium and Fine Textured Soils

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

132381-132383 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraástegui



AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19Z456865

PROJECT: 1918198 - Elmvale

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CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Keith Holmes

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
132382	MW19-1	ON T3 NPGW MFT	O. Reg. 153(511) - ORPs (Water)	Chloride	µg/L	2300000	2860000

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 19Z456865

PROJECT: 1918198 - Elmvale

ATTENTION TO: Keith Holmes

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - VOCs (Water)

Dichlorodifluoromethane	135151		< 0.20	< 0.20	NA	< 0.20	75%	50%	140%	112%	50%	140%	108%	50%	140%
Vinyl Chloride	135151		< 0.17	< 0.17	NA	< 0.17	107%	50%	140%	101%	50%	140%	98%	50%	140%
Bromomethane	135151		< 0.20	< 0.20	NA	< 0.20	81%	50%	140%	94%	50%	140%	104%	50%	140%
Trichlorofluoromethane	135151		< 0.40	< 0.40	NA	< 0.40	84%	50%	140%	109%	50%	140%	111%	50%	140%
Acetone	135151		< 1.0	< 1.0	NA	< 1.0	98%	50%	140%	111%	50%	140%	91%	50%	140%
1,1-Dichloroethylene	135151		< 0.30	< 0.30	NA	< 0.30	103%	50%	140%	105%	60%	130%	91%	50%	140%
Methylene Chloride	135151		< 0.30	< 0.30	NA	< 0.30	113%	50%	140%	95%	60%	130%	100%	50%	140%
trans- 1,2-Dichloroethylene	135151		< 0.20	< 0.20	NA	< 0.20	95%	50%	140%	103%	60%	130%	80%	50%	140%
Methyl tert-butyl ether	135151		< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	92%	60%	130%	100%	50%	140%
1,1-Dichloroethane	135151		< 0.30	< 0.30	NA	< 0.30	102%	50%	140%	90%	60%	130%	117%	50%	140%
Methyl Ethyl Ketone	135151		< 1.0	< 1.0	NA	< 1.0	112%	50%	140%	87%	50%	140%	90%	50%	140%
cis- 1,2-Dichloroethylene	135151		< 0.20	< 0.20	NA	< 0.20	118%	50%	140%	98%	60%	130%	97%	50%	140%
Chloroform	135151		< 0.20	< 0.20	NA	< 0.20	96%	50%	140%	96%	60%	130%	115%	50%	140%
1,2-Dichloroethane	135151		< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	94%	60%	130%	97%	50%	140%
1,1,1-Trichloroethane	135151		< 0.30	< 0.30	NA	< 0.30	114%	50%	140%	91%	60%	130%	95%	50%	140%
Carbon Tetrachloride	135151		< 0.20	< 0.20	NA	< 0.20	113%	50%	140%	94%	60%	130%	105%	50%	140%
Benzene	135151		< 0.20	< 0.20	NA	< 0.20	95%	50%	140%	103%	60%	130%	114%	50%	140%
1,2-Dichloropropane	135151		< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	90%	60%	130%	97%	50%	140%
Trichloroethylene	135151		< 0.20	< 0.20	NA	< 0.20	86%	50%	140%	100%	60%	130%	103%	50%	140%
Bromodichloromethane	135151		< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	91%	60%	130%	110%	50%	140%
Methyl Isobutyl Ketone	135151		< 1.0	< 1.0	NA	< 1.0	107%	50%	140%	89%	50%	140%	108%	50%	140%
1,1,2-Trichloroethane	135151		< 0.20	< 0.20	NA	< 0.20	110%	50%	140%	116%	60%	130%	94%	50%	140%
Toluene	135151		< 0.20	< 0.20	NA	< 0.20	100%	50%	140%	113%	60%	130%	85%	50%	140%
Dibromochloromethane	135151		< 0.10	< 0.10	NA	< 0.10	107%	50%	140%	80%	60%	130%	88%	50%	140%
Ethylene Dibromide	135151		< 0.10	< 0.10	NA	< 0.10	119%	50%	140%	102%	60%	130%	115%	50%	140%
Tetrachloroethylene	135151		< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	102%	60%	130%	97%	50%	140%
1,1,1,2-Tetrachloroethane	135151		< 0.10	< 0.10	NA	< 0.10	95%	50%	140%	95%	60%	130%	94%	50%	140%
Chlorobenzene	135151		< 0.10	< 0.10	NA	< 0.10	112%	50%	140%	102%	60%	130%	93%	50%	140%
Ethylbenzene	135151		< 0.10	< 0.10	NA	< 0.10	114%	50%	140%	107%	60%	130%	99%	50%	140%
m & p-Xylene	135151		< 0.20	< 0.20	NA	< 0.20	111%	50%	140%	108%	60%	130%	108%	50%	140%
Bromoform	135151		< 0.10	< 0.10	NA	< 0.10	99%	50%	140%	73%	60%	130%	80%	50%	140%
Styrene	135151		< 0.10	< 0.10	NA	< 0.10	95%	50%	140%	108%	60%	130%	118%	50%	140%
1,1,2,2-Tetrachloroethane	135151		< 0.10	< 0.10	NA	< 0.10	96%	50%	140%	115%	60%	130%	107%	50%	140%
o-Xylene	135151		< 0.10	< 0.10	NA	< 0.10	114%	50%	140%	100%	60%	130%	87%	50%	140%
1,3-Dichlorobenzene	135151		< 0.10	< 0.10	NA	< 0.10	98%	50%	140%	106%	60%	130%	102%	50%	140%
1,4-Dichlorobenzene	135151		< 0.10	< 0.10	NA	< 0.10	85%	50%	140%	112%	60%	130%	111%	50%	140%
1,2-Dichlorobenzene	135151		< 0.10	< 0.10	NA	< 0.10	107%	50%	140%	114%	60%	130%	88%	50%	140%
1,3-Dichloropropene	135151		< 0.30	< 0.30	NA	< 0.30	87%	50%	140%	81%	60%	130%	83%	50%	140%
n-Hexane	135151		< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	84%	60%	130%	102%	50%	140%

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 1918198 - Elmvale

SAMPLING SITE:

AGAT WORK ORDER: 19Z456865

ATTENTION TO: Keith Holmes

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:





Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 1918198 - Elmvale

SAMPLING SITE:

AGAT WORK ORDER: 19Z456865

ATTENTION TO: Keith Holmes

SAMPLED BY:

Water Analysis

RPT Date:			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - ORPs (Water)

Sodium	133790	15900	15900	0.1%	< 500	97%	70%	130%	97%	80%	120%	100%	70%	130%
Chloride	137172	977	784	NA	< 100	101%	70%	130%	106%	70%	130%	105%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Iris Veraestegui

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 19Z456865

PROJECT: 1918198 - Elmvale

ATTENTION TO: Keith Holmes

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Water Analysis			
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Shihan Chowdhury; Keith Holmes

PROJECT: 19118198 - Elmvale

AGAT WORK ORDER: 19Z459700

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Apr 25, 2019

PAGES (INCLUDING COVER): 6

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z459700

PROJECT: 19118198 - Elmvale

5835 COOPERS AVENUE
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CANADA L4Z 1Y2
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLED BY: Robyn Chatwin-Davies

O. Reg. 153(511) - ORPs (Water)

DATE RECEIVED: 2019-04-24

DATE REPORTED: 2019-04-25

		SAMPLE DESCRIPTION:		15-1B	15-03
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-04-24	2019-04-24
Parameter	Unit	G / S	RDL	151167	151168
Sodium	µg/L	2300000	10000	1340000	1750000
Chloride	µg/L	2300000	10000	4100000	3230000

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

151167-151168 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraástegui



AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19Z459700

PROJECT: 19118198 - Elmvale

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CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
151167	15-1B	ON T3 NPGW CT	O. Reg. 153(511) - ORPs (Water)	Chloride	µg/L	2300000	4100000
151168	15-03	ON T3 NPGW CT	O. Reg. 153(511) - ORPs (Water)	Chloride	µg/L	2300000	3230000



Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 19118198 - Elmvale

SAMPLING SITE:

AGAT WORK ORDER: 19Z459700

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLED BY: Robyn Chatwin-Davies

Water Analysis

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - ORPs (Water)

Sodium	144614	721	681	NA	< 500	100%	70%	130%	100%	80%	120%	98%	70%	130%
Chloride	147671	229000	226000	1.3%	< 100	93%	70%	130%	105%	70%	130%	102%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Iris Veraestegui

Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 19Z459700

PROJECT: 19118198 - Elmvale

ATTENTION TO: Shihan Chowdhury; Keith Holmes

SAMPLING SITE:

SAMPLED BY: Robyn Chatwin-Davies

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Alyssa Troke

PROJECT: 1522569/16000

AGAT WORK ORDER: 15T042566

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Nov 20, 2015

PAGES (INCLUDING COVER): 12

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15T042566

PROJECT: 1522569/16000

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

DATE RECEIVED: 2015-11-13

DATE REPORTED: 2015-11-20

		SAMPLE DESCRIPTION:		15-01A	15-01B	15-02	15-03	DUP1	Field Blank
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015
Parameter	Unit	G / S	RDL	7196528	7196533	7196538	7196543	7196548	7196553
F1 (C6 to C10)	µg/L		25	<25	<25	<25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	750	25	<25	<25	<25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA	NA	NA	NA	NA
Surrogate	Unit	Acceptable Limits							
Terphenyl	%	60-140		103	125	100	114	124	128

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils

7196528-7196553 The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 15T042566

PROJECT: 1522569/16000

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2015-11-13

DATE REPORTED: 2015-11-20

		SAMPLE DESCRIPTION:		15-01A	15-01B	15-02	15-03	DUP1	Field Blank	Trip Blank
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015
Parameter	Unit	G / S	RDL	7196528	7196533	7196538	7196543	7196548	7196553	7196558
Dichlorodifluoromethane	µg/L	4400	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.5	0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	5.6	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L	130000	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	1.6	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	610	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	190	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	320	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	470000	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	2.4	0.20	0.73	0.57	<0.20	<0.20	0.54	<0.20	<0.20
1,2-Dichloroethane	µg/L	1.6	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	640	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.79	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L	44	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	16	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	140000	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibromochloromethane	µg/L	82000	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.25	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	1.6	0.20	0.43	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	3.3	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Certified By:

N Popiwko



Certificate of Analysis

AGAT WORK ORDER: 15T042566

PROJECT: 1522569/16000

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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2015-11-13

DATE REPORTED: 2015-11-20

		SAMPLE DESCRIPTION:		15-01A	15-01B	15-02	15-03	DUP1	Field Blank	Trip Blank
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015
Parameter	Unit	G / S	RDL	7196528	7196533	7196538	7196543	7196548	7196553	7196558
Bromoform	µg/L	380	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L	1300	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	3.2	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	8	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	4600	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	5.2	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/L	4200	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L	51	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits								
Toluene-d8	% Recovery	50-140		85	84	85	85	88	86	81
4-Bromofluorobenzene	% Recovery	50-140		91	92	94	98	95	92	87

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils

Certified By:

N Popmukolof



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15T042566

PROJECT: 1522569/16000

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

PHCs BTEX (Water)(TS)

DATE RECEIVED: 2015-11-13

DATE REPORTED: 2015-11-20

		SAMPLE DESCRIPTION:		Trip Spike	
		SAMPLE TYPE:		Water	
		DATE SAMPLED:		11/12/2015	
Parameter	Unit	G / S	RDL	7196561	
Benzene	%			85	
Toluene	%			81	
Ethylbenzene	%			76	
m & p - Xylene	%			73	
o - Xylene	%			83	
Xylene Mixture	%			76	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
7196561 The C6-C10 fraction is calculated using Toluene response factor.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
Extraction and holding times were met for this sample.
NA = Not Applicable

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 15T042566

PROJECT: 1522569/16000

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TEL (905)712-5100
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CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

O. Reg. 153(511) - Metals (Comprehensive) (Water)

DATE RECEIVED: 2015-11-13

DATE REPORTED: 2015-11-20

		SAMPLE DESCRIPTION:		15-01A	15-01B	15-02	15-03	DUP1	Field Blank
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015
Parameter	Unit	G / S	RDL	7196528	7196533	7196538	7196543	7196548	7196553
Antimony	µg/L	20000	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	µg/L	1900	1.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0
Barium	µg/L	29000	2.0	349	343	136	216	352	<2.0
Beryllium	µg/L	67	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/L	45000	10.0	97.3	75.5	75.3	97.4	63.4	<10.0
Cadmium	µg/L	2.7	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	µg/L	810	2.0	5.3	3.6	4.8	7.1	7.6	<2.0
Cobalt	µg/L	66	0.5	2.3	2.6	1.8	4.7	2.9	<0.5
Copper	µg/L	87	1.0	3.8	3.6	2.5	6.1	4.2	<1.0
Lead	µg/L	25	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	µg/L	9200	0.5	14.6	2.9	13.6	7.2	2.7	<0.5
Nickel	µg/L	490	1.0	10.8	7.1	5.7	17.9	16.0	<1.0
Selenium	µg/L	63	1.0	3.6	3.7	1.9	4.6	3.0	<1.0
Silver	µg/L	1.5	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/L	510	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Uranium	µg/L	420	0.5	1.3	3.0	3.4	4.7	3.0	<0.5
Vanadium	µg/L	250	0.4	<0.4	<0.4	3.0	<0.4	<0.4	<0.4
Zinc	µg/L	1100	5.0	12.5	11.6	8.8	10.3	9.3	<5.0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Non-Potable Ground Water - All Types of Property Uses - Coarse Textured Soils

Certified By:

Amanjot Bhela

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 1522569/16000

SAMPLING SITE:

AGAT WORK ORDER: 15T042566

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

Trace Organics Analysis

RPT Date: Nov 20, 2015			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	7193330		< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	86%	50%	140%	98%	50%	140%
Vinyl Chloride	7193330		< 0.17	< 0.17	NA	< 0.17	110%	50%	140%	85%	50%	140%	91%	50%	140%
Bromomethane	7193330		< 0.20	< 0.20	NA	< 0.20	93%	50%	140%	82%	50%	140%	84%	50%	140%
Trichlorofluoromethane	7193330		< 0.40	< 0.40	NA	< 0.40	106%	50%	140%	99%	50%	140%	108%	50%	140%
Acetone	7193330		< 1.0	< 1.0	NA	< 1.0	117%	50%	140%	109%	50%	140%	115%	50%	140%
1,1-Dichloroethylene	7193330		< 0.30	< 0.30	NA	< 0.30	74%	50%	140%	80%	60%	130%	81%	50%	140%
Methylene Chloride	7193330		< 0.30	< 0.30	NA	< 0.30	89%	50%	140%	94%	60%	130%	81%	50%	140%
trans- 1,2-Dichloroethylene	7193330		< 0.20	< 0.20	NA	< 0.20	75%	50%	140%	85%	60%	130%	76%	50%	140%
Methyl tert-butyl ether	7193330		< 0.20	< 0.20	NA	< 0.20	79%	50%	140%	75%	60%	130%	79%	50%	140%
1,1-Dichloroethane	7193330		< 0.30	< 0.30	NA	< 0.30	78%	50%	140%	85%	60%	130%	97%	50%	140%
Methyl Ethyl Ketone	7193330		< 1.0	< 1.0	NA	< 1.0	99%	50%	140%	94%	50%	140%	92%	50%	140%
cis- 1,2-Dichloroethylene	7193330		< 0.20	< 0.20	NA	< 0.20	84%	50%	140%	95%	60%	130%	106%	50%	140%
Chloroform	7193330		< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	112%	60%	130%	112%	50%	140%
1,2-Dichloroethane	7193330		< 0.20	< 0.20	NA	< 0.20	116%	50%	140%	113%	60%	130%	121%	50%	140%
1,1,1-Trichloroethane	7193330		< 0.30	< 0.30	NA	< 0.30	90%	50%	140%	102%	60%	130%	88%	50%	140%
Carbon Tetrachloride	7193330		< 0.20	< 0.20	NA	< 0.20	94%	50%	140%	100%	60%	130%	95%	50%	140%
Benzene	7193330		< 0.20	< 0.20	NA	< 0.20	97%	50%	140%	94%	60%	130%	96%	50%	140%
1,2-Dichloropropane	7193330		< 0.20	< 0.20	NA	< 0.20	105%	50%	140%	106%	60%	130%	114%	50%	140%
Trichloroethylene	7193330		< 0.20	< 0.20	NA	< 0.20	104%	50%	140%	105%	60%	130%	104%	50%	140%
Bromodichloromethane	7193330		< 0.20	< 0.20	NA	< 0.20	119%	50%	140%	118%	60%	130%	119%	50%	140%
Methyl Isobutyl Ketone	7193330		< 1.0	< 1.0	NA	< 1.0	103%	50%	140%	85%	50%	140%	89%	50%	140%
1,1,2-Trichloroethane	7193330		< 0.20	< 0.20	NA	< 0.20	117%	50%	140%	111%	60%	130%	104%	50%	140%
Toluene	7193330		< 0.20	< 0.20	NA	< 0.20	94%	50%	140%	92%	60%	130%	82%	50%	140%
Dibromochloromethane	7193330		< 0.10	< 0.10	NA	< 0.10	104%	50%	140%	102%	60%	130%	102%	50%	140%
Ethylene Dibromide	7193330		< 0.10	< 0.10	NA	< 0.10	112%	50%	140%	109%	60%	130%	103%	50%	140%
Tetrachloroethylene	7193330		< 0.20	< 0.20	NA	< 0.20	93%	50%	140%	95%	60%	130%	85%	50%	140%
1,1,1,2-Tetrachloroethane	7193330		< 0.10	< 0.10	NA	< 0.10	124%	50%	140%	105%	60%	130%	101%	50%	140%
Chlorobenzene	7193330		< 0.10	< 0.10	NA	< 0.10	105%	50%	140%	102%	60%	130%	98%	50%	140%
Ethylbenzene	7193330		< 0.10	< 0.10	NA	< 0.10	92%	50%	140%	93%	60%	130%	88%	50%	140%
m & p-Xylene	7193330		< 0.20	< 0.20	NA	< 0.20	94%	50%	140%	94%	60%	130%	87%	50%	140%
Bromoform	7193330		< 0.10	< 0.10	NA	< 0.10	124%	50%	140%	102%	60%	130%	113%	50%	140%
Styrene	7193330		< 0.10	< 0.10	NA	< 0.10	90%	50%	140%	87%	60%	130%	88%	50%	140%
1,1,2,2-Tetrachloroethane	7193330		< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	118%	60%	130%	126%	50%	140%
o-Xylene	7193330		< 0.10	< 0.10	NA	< 0.10	104%	50%	140%	97%	60%	130%	97%	50%	140%
1,3-Dichlorobenzene	7193330		< 0.10	< 0.10	NA	< 0.10	102%	50%	140%	99%	60%	130%	101%	50%	140%
1,4-Dichlorobenzene	7193330		< 0.10	< 0.10	NA	< 0.10	107%	50%	140%	105%	60%	130%	106%	50%	140%
1,2-Dichlorobenzene	7193330		< 0.10	< 0.10	NA	< 0.10	109%	50%	140%	103%	60%	130%	105%	50%	140%
1,3-Dichloropropene	7193330		< 0.30	< 0.30	NA	< 0.30	96%	50%	140%	85%	60%	130%	102%	50%	140%
n-Hexane	7193330		< 0.20	< 0.20	NA	< 0.20	77%	50%	140%	90%	60%	130%	73%	50%	140%



Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 1522569/16000

SAMPLING SITE:

AGAT WORK ORDER: 15T042566

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

Trace Organics Analysis (Continued)

RPT Date: Nov 20, 2015			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

F1 (C6 to C10)	7193310		< 25	< 25	NA	< 25	79%	60%	140%	85%	60%	140%	82%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	95%	60%	140%	69%	60%	140%	65%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	92%	60%	140%	95%	60%	140%	89%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	84%	60%	140%	91%	60%	140%	90%	60%	140%

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.

When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

N Popmukohol



Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 1522569/16000

SAMPLING SITE:

AGAT WORK ORDER: 15T042566

ATTENTION TO: Alyssa Troke

SAMPLED BY: Alyssa Troke

Water Analysis															
RPT Date: Nov 20, 2015			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals (Comprehensive) (Water)															
Antimony	7196528	7196528	0.6	0.6	NA	< 0.5	102%	70%	130%	101%	80%	120%	103%	70%	130%
Arsenic	7196528	7196528	< 1.0	< 1.0	0.0%	< 1.0	107%	70%	130%	105%	80%	120%	114%	70%	130%
Barium	7196528	7196528	349	350	0.3%	< 2.0	102%	70%	130%	97%	80%	120%	99%	70%	130%
Beryllium	7196528	7196528	< 0.5	< 0.5	0.0%	< 0.5	108%	70%	130%	102%	80%	120%	102%	70%	130%
Boron	7196528	7196528	97.3	87.5	10.6%	< 10.0	96%	70%	130%	93%	80%	120%	84%	70%	130%
Cadmium	7196528	7196528	< 0.2	< 0.2	0.0%	< 0.2	101%	70%	130%	106%	80%	120%	111%	70%	130%
Chromium	7196528	7196528	5.3	6.7	NA	< 2.0	106%	70%	130%	110%	80%	120%	113%	70%	130%
Cobalt	7196528	7196528	2.3	2.2	NA	< 0.5	106%	70%	130%	109%	80%	120%	105%	70%	130%
Copper	7196528	7196528	3.8	4.2	NA	< 1.0	99%	70%	130%	106%	80%	120%	92%	70%	130%
Lead	7196528	7196528	< 0.5	< 0.5	0.0%	< 0.5	100%	70%	130%	97%	80%	120%	86%	70%	130%
Molybdenum	7196528	7196528	14.6	14.5	0.7%	< 0.5	101%	70%	130%	99%	80%	120%	113%	70%	130%
Nickel	7196528	7196528	10.8	11.9	9.7%	< 1.0	108%	70%	130%	107%	80%	120%	100%	70%	130%
Selenium	7196528	7196528	3.6	2.8	NA	< 1.0	100%	70%	130%	108%	80%	120%	118%	70%	130%
Silver	7196528	7196528	< 0.2	< 0.2	0.0%	< 0.2	104%	70%	130%	109%	80%	120%	113%	70%	130%
Thallium	7196528	7196528	< 0.3	< 0.3	0.0%	< 0.3	104%	70%	130%	107%	80%	120%	96%	70%	130%
Uranium	7196528	7196528	1.3	1.2	NA	< 0.5	99%	70%	130%	91%	80%	120%	88%	70%	130%
Vanadium	7196528	7196528	< 0.4	< 0.4	0.0%	< 0.4	106%	70%	130%	109%	80%	120%	118%	70%	130%
Zinc	7196528	7196528	12.5	12.1	NA	< 5.0	97%	70%	130%	99%	80%	120%	91%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Amanjot Bhela



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15T042566

PROJECT: 1522569/16000

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY: Alyssa Troke

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 to C10)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC E3421	GC / FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC E3421	GC / FID
F4 (C34 to C50)	VOL-91-5010	MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
Terphenyl	VOL-91-5010		GC/FID
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15T042566

PROJECT: 1522569/16000

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY: Alyssa Troke

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Benzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Toluene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Ethylbenzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
m & p - Xylene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
o - Xylene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Xylene Mixture	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Water Analysis			
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS



AGAT

Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Golder Associates
Contact: Alyssa Troke / Keith Holmes
Address: 1931 Robertson Road, Ottawa
Phone: 613-592-9600 Fax: _____
Reports to be sent to:
1. Email: atroke@golder.com
2. Email: khalmes@golder.com

Project Information:

Project: 1525569/116000
Site Location: Elmvale
Sampled By: Alyssa Troke
AGAT Quote #: See previous submission
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company: Golder Associates
Contact: Alyssa Troke
Address: 1931 ~~153~~ Robertson Road
Email: atroke@golder.com

Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☒ Regulation 153/04

Table 3
Indicate One

☐ Ind/Com

☒ Res/Park

☐ Agriculture

Soil Texture (Check One)

☐ Coarse

☐ Fine

☐ Sewer Use

☐ Sanitary

☐ Storm

Region _____

Indicate One

☐ Regulation 558

☐ CCME

☐ Prov. Water Quality Objectives (PWQO)

☐ Other _____

Indicate One

Is this submission for a
Record of Site Condition?

☒ Yes

☐ No

Report Guideline on
Certificate of Analysis

☒ Yes

☐ No

Sample Matrix Legend

B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

(Check Applicable)

ORPs: ☐ B-HWS ☐ Cl ☐ CN
☐ C⁶⁺ ☐ EC ☐ FOC ☐ NO₃/NO₂
☐ Total N ☐ Hg ☐ pH ☐ SAR
Nutrients: ☐ TP ☐ NH₃ ☐ TKN
☐ NO₃ ☐ NO₂ ☐ NO₃/NO₂
Volatiles: ☒ VOC ☐ BTEX ☐ THM
CCME Fractions 1 to 4: incl. BTE

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: <input type="checkbox"/> B-HWS <input type="checkbox"/> Cl <input type="checkbox"/> CN <input type="checkbox"/> C ⁶⁺ <input type="checkbox"/> EC <input type="checkbox"/> FOC <input type="checkbox"/> NO ₃ /NO ₂ <input type="checkbox"/> Total N <input type="checkbox"/> Hg <input type="checkbox"/> pH <input type="checkbox"/> SAR	Nutrients: <input type="checkbox"/> TP <input type="checkbox"/> NH ₃ <input type="checkbox"/> TKN <input type="checkbox"/> NO ₃ <input type="checkbox"/> NO ₂ <input type="checkbox"/> NO ₃ /NO ₂	Volatiles: <input checked="" type="checkbox"/> VOC <input type="checkbox"/> BTEX <input type="checkbox"/> THM	CCME Fractions 1 to 4: <u>incl. BTE</u>	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
15-01A	Nov 12/15	—	5	GW			X						X	X						
15-01B		—	5				X						X	X						
15-02		—	5				X						X	X						
15-03		—	5				X						X	X						
DUP1		—	5				X						X	X						
Field Blank		—	5				X						X	X						
Trip Blank		—	3										X	X						
Trip Spike		—	3										X	X						

Samples Relinquished By (Print Name and Sign):

Alyssa Troke

Samples Relinquished By (Print Name and Sign):

Date

Nov 13/15

Time

11:00

Samples Received By (Print Name and Sign):

M. B...

Samples Received By (Print Name and Sign):

Date

Nov 14

Time

10:00

Page 1 of 1

N^o: **T000654**

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Alyssa Troke

PROJECT: 18106596 - Elmvale

AGAT WORK ORDER: 19Z456867

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Apr 22, 2019

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z456867

PROJECT: 18106596 - Elmvale

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

Ottawa Sanitary and Combined Sewer Use By-law - BNAEs/Total PAHs

DATE RECEIVED: 2019-04-15

DATE REPORTED: 2019-04-18

SAMPLE DESCRIPTION: MW15-1A					
SAMPLE TYPE: Water					
DATE SAMPLED: 2019-04-12					
Parameter	Unit	G / S: A	G / S: B	RDL	132415
Bis(2-Chloroethoxy)methane	mg/L	0.036		0.0005	<0.0005
2,4-Dichlorophenol	mg/L	0.044		0.0005	<0.0005
Naphthalene	mg/L	0.059	0.0064	0.0003	<0.0003
2-Methylnaphthalene	mg/L	0.022		0.0002	<0.0002
1-Methylnaphthalene	mg/L	0.032		0.0002	<0.0002
Fluorene	mg/L	0.059		0.0002	<0.0002
Diethyl phthalate	mg/L	0.2		0.0005	<0.0005
Bis(2-Ethylhexyl)phthalate	mg/L	0.28		0.0005	0.0029[<A]
Di-n-butyl phthalate	mg/L	0.057		0.0005	<0.0005
Butyl benzyl phthalate	mg/L	0.017		0.0005	<0.0005
Di-n-octyl phthalate	mg/L	0.03		0.0005	<0.0005
Indole	mg/L	0.05		0.0005	<0.0005
Total PAHs	mg/L	0.015	0.006	0.0003	<0.0003

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to Limits for Sanitary and Combined Sewer Discharge - City of Ottawa - By-Law No. 2003-514, B Refers to Limits for Storm Sewer Discharge - City of Ottawa - By-Law No. 2003-514
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z456867

PROJECT: 18106596 - Elmvale

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Alyssa Troke

SAMPLED BY:

Total PCBs (water)

DATE RECEIVED: 2019-04-15

DATE REPORTED: 2019-04-18

SAMPLE DESCRIPTION: MW15-1A

SAMPLE TYPE: Water

DATE SAMPLED: 2019-04-12

Parameter	Unit	G / S	RDL	132415
-----------	------	-------	-----	--------

PCBs	µg/L		0.1	<0.1
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Surrogate	Unit	Acceptable Limits
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Decachlorobiphenyl	%	60-130 95
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Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 19Z456867

PROJECT: 18106596 - Elmvale

5835 COOPERS AVENUE
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FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

Ottawa Sanitary and Combined Sewer Use By-law - Inorganics

DATE RECEIVED: 2019-04-15

DATE REPORTED: 2019-04-22

SAMPLE DESCRIPTION: MW15-1A					
SAMPLE TYPE: Water					
DATE SAMPLED: 2019-04-12					
Parameter	Unit	G / S: A	G / S: B	RDL	132415
Total Suspended Solids	mg/L	350	15	10	94[B-A]
Total Kjeldahl Nitrogen	mg/L	100		0.10	<0.10
Chloride	mg/L			10	6980
Sodium	mg/L			2.5	1690
Total Aluminum	mg/L	50		0.020	4.20[<A]
Total Antimony	mg/L	5		0.020	<0.020
Total Arsenic	mg/L	1	0.02	0.015	0.027[B-A]
Total Bismuth	mg/L	5		0.010	<0.010
Total Boron	mg/L	25		0.050	0.051[<A]
Total Cadmium	mg/L	0.02	0.008	0.010	<0.010
Total Chromium	mg/L	5	0.08	0.020	<0.020
Total Cobalt	mg/L	5		0.020	<0.020
Total Copper	mg/L	3	0.04	0.020	<0.020
Total Lead	mg/L	5	0.12	0.020	<0.020
Total Manganese	mg/L	5	0.05	0.020	2.57[B-A]
Total Molybdenum	mg/L	5		0.020	<0.020
Total Nickel	mg/L	3	0.08	0.030	<0.030
Total Selenium	mg/L	5	0.02	0.020	<0.020
Total Silver	mg/L	5	0.12	0.020	<0.020
Total Tin	mg/L	5		0.020	<0.020
Total Titanium	mg/L	5		0.020	0.295[<A]
Total Vanadium	mg/L	5		0.020	<0.020
Total Zinc	mg/L	3	0.04	0.020	0.029[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to Limits for Sanitary and Combined Sewer Discharge - City of Ottawa - By-Law No. 2003-514, B Refers to Limits for Storm Sewer Discharge - City of Ottawa - By-Law No. 2003-514

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

132415 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraistegui



AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19Z456867

PROJECT: 18106596 - Elmvale

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
132415	MW15-1A	ON Ottawa Storm	Ottawa Sanitary and Combined Sewer Use By-law - Inorganics	Total Arsenic	mg/L	0.02	0.027
132415	MW15-1A	ON Ottawa Storm	Ottawa Sanitary and Combined Sewer Use By-law - Inorganics	Total Manganese	mg/L	0.05	2.57
132415	MW15-1A	ON Ottawa Storm	Ottawa Sanitary and Combined Sewer Use By-law - Inorganics	Total Suspended Solids	mg/L	15	94



Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 18106596 - Elmvale

SAMPLING SITE:

AGAT WORK ORDER: 19Z456867

ATTENTION TO: Alyssa Troke

SAMPLED BY:

Trace Organics Analysis

RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Ottawa Sanitary and Combined Sewer Use By-law - BNAEs/Total PAHs

Bis(2-Chloroethoxy)methane	TW	< 0.0005	< 0.0005	NA	< 0.0005	79%	60%	140%	96%	60%	140%	97%	60%	140%
2,4-Dichlorophenol	TW	< 0.0005	< 0.0005	NA	< 0.0005	105%	60%	140%	111%	60%	140%	114%	60%	140%
Naphthalene	TW	< 0.0003	< 0.0003	NA	< 0.0003	99%	60%	140%	105%	60%	140%	106%	60%	140%
2-Methylnaphthalene	TW	< 0.0002	< 0.0002	NA	< 0.0002	100%	60%	130%	94%	60%	130%	103%	60%	130%
1-Methylnaphthalene	TW	< 0.0002	< 0.0002	NA	< 0.0002	104%	60%	130%	107%	60%	130%	99%	60%	130%
Fluorene	TW	< 0.0002	< 0.0002	NA	< 0.0002	96%	60%	140%	90%	60%	140%	99%	60%	140%
Diethyl phthalate	TW	< 0.0005	< 0.0005	NA	< 0.0005	98%	60%	130%	97%	60%	130%	90%	60%	130%
Bis(2-Ethylhexyl)phthalate	TW	< 0.0005	< 0.0005	NA	< 0.0005	104%	60%	130%	95%	60%	130%	85%	60%	130%
Di-n-butyl phthalate	TW	< 0.0005	< 0.0005	NA	< 0.0005	101%	60%	130%	100%	60%	130%	97%	60%	130%
Butyl benzyl phthalate	TW	< 0.0005	< 0.0005	NA	< 0.0005	106%	60%	130%	87%	60%	130%	89%	60%	130%
Di-n-octyl phthalate	TW	< 0.0005	< 0.0005	NA	< 0.0005	105%	60%	130%	89%	60%	130%	87%	60%	130%
Indole	TW	< 0.0005	< 0.0005	NA	< 0.0005	103%	60%	130%	97%	60%	130%	94%	60%	130%
Total PAHs	TW	< 0.0003	< 0.0003	NA	< 0.0003	101%	60%	130%	85%	60%	130%	101%	60%	130%

Total PCBs (water)

PCBs	TW	< 0.1	< 0.1	NA	< 0.1	105%	60%	140%	104%	60%	140%	94%	60%	140%
------	----	-------	-------	----	-------	------	-----	------	------	-----	------	-----	-----	------

Comments: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.
When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 18106596 - Elmvale

SAMPLING SITE:

AGAT WORK ORDER: 19Z456867

ATTENTION TO: Alyssa Troke

SAMPLED BY:

Water Analysis															
RPT Date:			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Ottawa Sanitary and Combined Sewer Use By-law - Inorganics															
Total Suspended Solids	134772		<10	<10	NA	< 10	98%	80%	120%						
Total Kjeldahl Nitrogen	141048		149	152	2.0%	< 0.10	105%	80%	120%	107%	80%	120%	107%	70%	130%
Chloride	141640		36.5	36.9	1.1%	< 0.10	104%	90%	110%	101%	90%	110%	106%	80%	120%
Sodium	129152		4.00	3.98	0.5%	< 0.05	97%	90%	110%	97%	90%	110%	103%	70%	130%
Total Aluminum	135077		<0.020	0.026	NA	< 0.020	106%	90%	110%	99%	80%	120%	100%	70%	130%
Total Antimony	135077		<0.020	<0.020	NA	< 0.020	104%	90%	110%	101%	80%	120%	103%	70%	130%
Total Arsenic	135077		<0.015	<0.015	NA	< 0.015	103%	90%	110%	103%	80%	120%	105%	70%	130%
Total Bismuth	135077		<0.010	<0.010	NA	< 0.010	103%	90%	110%	106%	80%	120%	107%	70%	130%
Total Boron	135077		<0.050	<0.050	NA	< 0.050	101%	90%	110%	99%	80%	120%	102%	70%	130%
Total Cadmium	135077		<0.010	<0.010	NA	< 0.010	95%	90%	110%	93%	80%	120%	120%	70%	130%
Total Chromium	135077		<0.020	<0.020	NA	< 0.020	103%	90%	110%	104%	80%	120%	107%	70%	130%
Total Cobalt	135077		<0.020	<0.020	NA	< 0.020	100%	90%	110%	101%	80%	120%	101%	70%	130%
Total Copper	135077		<0.020	<0.020	NA	< 0.020	101%	90%	110%	104%	80%	120%	105%	70%	130%
Total Lead	135077		<0.020	<0.020	NA	< 0.020	101%	90%	110%	103%	80%	120%	103%	70%	130%
Total Manganese	135077		0.125	0.128	2.4%	< 0.020	103%	90%	110%	105%	80%	120%	106%	70%	130%
Total Molybdenum	135077		<0.020	<0.020	NA	< 0.020	96%	90%	110%	94%	80%	120%	101%	70%	130%
Total Nickel	135077		<0.030	<0.030	NA	< 0.030	104%	90%	110%	105%	80%	120%	106%	70%	130%
Total Selenium	135077		<0.020	<0.020	NA	< 0.020	102%	90%	110%	96%	80%	120%	97%	70%	130%
Total Silver	135077		<0.020	<0.020	NA	< 0.020	97%	90%	110%	105%	80%	120%	111%	70%	130%
Total Tin	135077		<0.020	<0.020	NA	< 0.020	93%	90%	110%	91%	80%	120%	99%	70%	130%
Total Titanium	135077		<0.020	<0.020	NA	< 0.020	96%	90%	110%	94%	80%	120%	101%	70%	130%
Total Vanadium	135077		<0.020	<0.020	NA	< 0.020	96%	90%	110%	95%	80%	120%	100%	70%	130%
Total Zinc	135077		<0.020	<0.020	NA	< 0.020	102%	90%	110%	100%	80%	120%	103%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

PROJECT: 18106596 - Elmvale

SAMPLING SITE:

AGAT WORK ORDER: 19Z456867

ATTENTION TO: Alyssa Troke

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Bis(2-Chloroethoxy)methane	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2,4-Dichlorophenol	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Naphthalene	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2-Methylnaphthalene	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
1-Methylnaphthalene	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Fluorene	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Diethyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Bis(2-Ethylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Di-n-butyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Butyl benzyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Di-n-octyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Indole	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Total PAHs	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Water Analysis			
Total Suspended Solids	INOR-93-6028	SM 2540 D	BALANCE
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Aluminum	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Antimony	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Arsenic	MET-93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Bismuth	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Boron	MET-93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Cadmium	MET -93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Chromium	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Cobalt	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Copper	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Lead	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Manganese	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Molybdenum	MET-93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Nickel	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Selenium	MET-93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Silver	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS
Total Tin	MET-93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Titanium	MET-93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Vanadium	MET-93-6103	EPA SW-846 3010A & 6020A	ICP-MS
Total Zinc	MET-93-6003	EPA SW-846 3010A & 6020A	ICP-MS



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