December 2015

REPORT ON

Phase Two Environmental Site Assessment
Westgate Shopping Centre
Ottawa, Ontario

Submitted to:
RioCan Management Inc.
RioCan Yonge Eglinton Centre
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Toronto, Ontario
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REPORT

Report Number: 1522569-17000

Distribution:

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Golder Associates

Executive Summary

The Executive Summary highlights key points from the report only; for complete information and findings, as well as the limitations, the reader should examine the complete report.

Golder Associates Ltd. ("Golder") was retained by RioCan Management Inc. ("RioCan") to carry out a Phase Two Environmental Site Assessment ("ESA") of the Westgate Shopping Centre (mall address is 1309 Carling Avenue) in Ottawa, Ontario (hereinafter referred to as the "Site" and the "Phase Two Property"), as shown on Figure 1. There are 11 municipal addresses associated with the property. The legal description of the Site is: Part of Lot 33, Concession 10F of Part 1, 5, 7, 5R14579, T/W CR340247; S/T CR334034, Ottawa/Nepean.

It is understood that the Phase Two Property is to be redeveloped with residential and commercial properties and that this redevelopment is to occur in three separate stages. The first stage of redevelopment consists of a single residential building to be located in the southeast corner of the Site (as shown on Figure 2) (hereinafter referred to as the "area of first development").

Golder previously completed a Phase One ESA for the Site, the results of which were documented in Golder Report No. 1522569(17000) entitled, "*Phase One Environmental Site Assessment, Westgate Shopping Centre, Ottawa, Ontario*", dated September 2015. Based on the findings of the Phase One ESA, Golder completed this Phase Two ESA investigation for the property. This report provides the findings of the Phase Two ESA for the Site.

The analytical results from samples collected and submitted as part of this investigation indicate that volatile organic compounds in groundwater sample collected from the monitoring well at 15-03 do not meet the applicable Ministry of Environment Table 3 Standards under O. Reg. 153/04. All other parameters tested in soil and groundwater meet the Table 3 Standards.

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1.0 INTRODUCTION

1.1 Site Description

Golder was retained by RioCan to conduct a Phase Two ESA of the following property:

Municipal Addresses	The Site is comprised of eleven municipal addresses in Ottawa, Ontario: ■ 1265 Carling Avenue ■ 1271 Carling Avenue ■ 1277 Carling Avenue ■ 1277A Carling Avenue ■ 1285 Carling Avenue ■ 1309 Carling Avenue ■ 1287 Carling Avenue ■ 1295 Carling Avenue ■ 1297 Carling Avenue ■ 1299 Carling Avenue ■ 1315 Carling Avenue
Property Identification Number	040250172
Legal Description	Part of Lot 33, Concession 10F of Part 1, 5, 7, 5R14579, T/W CR340247; S/T CR334034, Ottawa/Nepean.
Size of the Phase Two Property	3.96 hectares (ha)

The Site location is provided on Figure 1. A Site plan is provided on Figure 2. A plan of survey for the Site was not available at the time this report was prepared. The boundaries of the Phase Two Property are provided in Figure 2.

It is understood that the Phase Two Property is to be redeveloped with residential and commercial properties and that this redevelopment is to occur in three separate stages. The first stage of redevelopment consists of a single residential building to be located in the southeast corner of the Site (as shown on Figure 2) (hereinafter referred to as the “area of first development”).

1.2 Property Ownership

The contact information for the Phase Two Property owner is as follows:

Site Owner / Client	Address	Contact Information
RioCan Management Inc.	RioCan Yonge Eglinton Centre 2300 Yonge Street, Suite 500 Toronto, Ontario M4P 1EP	Melissa Cristofoli Office: (416) 643-6678 Email: mcristofoli@riocan.com

Authorization to proceed with this investigation was received from Stuart Craig of RioCan on October 2, 2015.

1.3 Current and Proposed Future Uses

The Phase Two Property is currently developed with two commercial buildings including the Westgate Shopping Centre and the Monkey Joe's Restaurant. The Phase Two Property was reportedly first developed around 1948 with an oil warehouse on the west side of the Site and was redeveloped as the Westgate Shopping Centre in 1955 with the addition of the Monkey Joe's building in the 1970's. The proposed future use of the Phase Two Property is mixed commercial and residential.

1.4 Applicable Site Condition Standard

The analytical results of the samples collected for this Phase Two ESA were compared to the Table 3 Generic Site Condition Standards (residential property use, coarse textured soil) presented in the Ministry of Environment ("MOE") "*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 have no wells installed;
- 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;
- Based on field observations and the results of grain size analyses presented in Appendix A (iii), the glacial till encountered at the Site is considered to be coarse textured and more than one third of the soil materials at the Site are considered to be coarse textured;
- The closest water body is the Ottawa River, located 2.2 kilometres ("km") north and northwest of the Phase Two Property;
- There are no features on the Phase Two Property that would meet the conditions of an environmentally sensitive site, as described in Section 41;
- The intended land use for the Phase Two Property is mixed residential and commercial; and,
- The overburden thickness is greater than 2 metres over more than one-third of the Phase Two Property.

2.0 BACKGROUND INFORMATION

This section presents the background conditions of the Phase Two Property including a description of the physical setting and a summary of past investigations conducted.

The objectives of the Phase Two ESA were to obtain information about environmental conditions in the soil and groundwater on, in or under the Site, and to develop the information necessary to complete a Record of Site Condition ("RSC") for the property. The objectives of this Phase Two ESA were achieved by:

- Developing an understanding of the geological and hydrogeological conditions at the Site; and,
- Conducting field sampling for all contaminants of concern ("COC") associated with all areas of potential environmental concern identified at the Site.

2.1 Physical Setting

The nearest surface water body is the Ottawa River, located 2.2 km north and northwest of the Phase Two Property. There are no identified areas of natural significance within the Phase One Study area. Land uses surrounding the Phase Two Property include parkland, residential, institutional and commercial and uses, as shown in Figure 2. The Phase Two Property is bordered by roadways on the north, south and east sides.

The topography of the Phase Two Property and surrounding areas is generally flat, with some sloping to the south, away from Highway 417, which is at a higher elevation than the Site. Highway 417 is elevated relative to the Site by means of fill. The Site is sloped to allow for drainage of surface water to on-Site stormwater catch basins.

2.2 Past Investigations

2.2.1 Phase One ESA

Golder recently conducted a Phase One ESA for the Site, the results of which were documented in Golder Report No. 1522569(17000) entitled, "*Phase One Environmental Site Assessment, Westgate Shopping Centre, Ottawa, Ontario*", dated September 2015, to assess the likelihood of soil and/or groundwater contamination resulting from historic or present activities at the Site and surrounding area. This included a review of available historical information on the Site and surrounding area, interviews with persons familiar with the Site and a Site reconnaissance. The APECs identified in the 2015 Phase One ESA are summarized in the following table:

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or Sediment)
1. Fill (Site-wide)	Fill is reportedly present across the Site.	**#30.** Importation of Fill Material of Unknown Quality	On-Site	Metals, PAHs	Soil and Groundwater

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or Sediment)
2. On-Site and Off-Site Soil and Groundwater	It was reported by the Site Representative that there was previously oil storage USTs at the rear of the mall. It was reported that the clean-up and removal was completed by Pinchin, but no report was provided to Golder for review. Also, it was noted that there were hydrocarbon products stored on the Site in the 1925 (revised 1948) FIP in a defined area along the extreme southwestern part of the site. In addition there are off-Site PCAs that may contribute to APECs on-Site. ASTs were located at service stations/garages/industrial properties at six locations hydraulically down- and-cross gradient of the Site. Approximate addresses are: 1. 1376 Carling Avenue 2. 1354 Carling Avenue 3. 1330 Carling Avenue 4. 1331 Carling Avenue 5. 1316 Carling Avenue 6. 872 Merivale Road	**#28.** Gasoline and Associated Products in Fixed Tanks **#10.** Commercial Autobody Shops	On-Site and off-Site	PHCs F1-F4 (including BTEX), VOCs, PAHs	Soil and Groundwater
3. Transformer Room (on-Site, west end)	Basement of the Shopper's Drug Mart has a Hydro Ottawa transformer room.	**#18.** Electricity Generator, Transformation and Power Stations	On-Site	PHCs F1-F4, PCBs	Soil and Groundwater

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or Sediment)
4. On-Site and Off-Site Soil and Groundwater (south of the Site)	A dry cleaning facility was formerly located in the on-Site shopping centre. Another dry cleaning facility was identified within the Study Area; approximately 100 m south of the Site at 1317 Carling Avenue.	**#37.** Operation of Dry Cleaning Equipment (where chemicals are used)	On-Site and Off-Site	VOCs	Soil and Groundwater
5. Off-Site Soil and Groundwater (east of the Site)	Eastern part of the Site. APEC is located at the northeast corner of the intersection of Carling Avenue and Merivale Road. The address is 1275 Carling Avenue.	**#18.** Electricity Generator, Transformation and Power Stations	Off-Site	PHCs F1-F4 (including BTEX), PCBs	Soil and Groundwater
6. Off-Site Soil and Groundwater (north, east and south of the Site)	There were rail lines along two sides of the Site, along the Highway 417 corridor and along Merivale Road.	**#46.** Rail Yards, Tracks and Spurs	Off-Site	Metals, PHCs F1-F4 (including BTEX), PAHs, VOCs	Soil and Groundwater

Notes:
PCA # potentially contaminating activity as listed O.Reg. 153/04, Schedule D, Table 2
PHC petroleum hydrocarbon compound fractions
BTEX benzene, toluene, ethylbenzene, xylenes
VOC volatile organic compounds
PAH polycyclic aromatic hydrocarbons
PCB polychlorinated biphenyls
PCA potentially contaminating activity

This report was prepared by the Qualified Person and will be relied upon for the Phase Two investigation.

3.0 SCOPE OF THE INVESTIGATION

3.1 Overview of Site Investigation

The Phase Two ESA investigation activities were completed between November 24, 2014 and December 2, 2014 and included the following tasks:

- **Health and Safety Plan**: Preparation of a Health and Safety Plan for internal and subcontractor use prior to initiating any field work at the Site.
- **Utility Clearances**: Coordination of utility clearances with local utility companies along with retaining the services of a private locator to assess for possible services in the areas of the proposed test locations.
- **Borehole Advancement and Monitoring Well Installation**: The borehole drilling and monitoring well installation program included drilling of ten boreholes. Eight (8) of the ten (10) boreholes were completed as groundwater monitoring wells, all of which were used for groundwater sampling at the Site. The rationale for the selected location of the boreholes is provided in the Sampling and Analysis Plan provided in Appendix A(i). The location of the boreholes and monitoring wells are shown on Figures 2 and 3. The monitoring well construction details are presented in Table 1.
- **Soil Sampling**: Selected soil samples were collected on October 7, 8, 9 and 13, 2015 from the boreholes. Soil samples were submitted for chemical analysis of one or more of the following; petroleum hydrocarbons fraction 1 to fraction 4 ("PHCs F1-F4"), volatile organic compounds ("VOCs"), polycyclic aromatic hydrocarbons ("PAHs"), polychlorinated biphenyls ("PCBs") and/or metals (including mercury and chromium VI).
- **Groundwater Monitoring and Sampling**: Groundwater samples were collected on October 14, 2015. Groundwater samples were submitted for analysis of one or more of the following; PHCs F1-F4, VOCs, PAHs, PCBs and/or metals (including mercury and hexavalent chromium). Static groundwater levels were measured in the monitoring wells located across the Site on October 14, 2015 and November 9, 2015. However, the monitoring wells at 15-03, 15-04 and 15-06 could not accessed on November 9, 2015 and as such, the groundwater levels in these locations were not measured on this date.
- **Surveying**: An elevation survey for the boreholes and monitoring wells advanced as part of the Phase Two ESA investigation was completed on October 14, 2015.
- **Reporting**: Golder compiled and assessed the field and laboratory results from the above noted activities into this report.

The Phase Two investigation was carried out in general accordance with Golder's standard operating procedures, which conform to the requirements of O. Reg. 153/04. The data from the Phase Two ESA investigation completed by Golder at the Site were incorporated into a single Phase Two ESA report following the Phase Two ESA report format required under O. Reg. 153/04 (as amended).

There were no impediments or access limitations that would affect the conclusions of this Phase Two ESA report.

3.2 Media Investigated

To address the potential environmental issues identified in the Phase One ESA, the Phase Two ESA field program included sampling of subsurface soil and of groundwater from wells screened within the overburden at the Site. No sediment was present at the Site and therefore no sediment sampling was completed. A summary of media investigated and the applicable contaminants of potential concern are provided in Tables 3 and 4. The sampling and analysis plan 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.

3.3 Phase One Conceptual Site Model

The Phase One ESA Conceptual Site Model ("CSM"), described below, is based on the results of the September 2015 Phase One ESA investigation.

- The Site consisted of a 3.96 hectare irregularly shaped parcel of land developed with a two commercial buildings including the Westgate Shopping Centre and the Monkey Joe's Restaurant. The Westgate Shopping Centre is one to two-storey building that occupies approximately half of the footprint of the Site and the Money Joe's Restaurant is a one-storey building that occupies approximately two percent of the footprint of the Site;
- No water bodies or areas of natural significance were identified on or within the Phase One Study Area;
- Potable water in the vicinity of the Site is supplied by the City of Ottawa and is obtained from the Ottawa River. No potable water wells were identified within the Phase One Study Area;
- At the time of the Phase One ESA, the Phase One Property was developed with two commercial buildings including the Westgate Shopping Centre and the Monkey Joe's Restaurant. The Site has been developed as the Westgate Shopping Centre and associated parking areas since 1955, with the addition of the Monkey Joe's building in the 1970's. Historically, the Phase One Property was first developed as an oil storage facility between around 1951;
- The following PCAs (resulting in APECs on-Site) were identified within the Phase One Study Area:

Location	Potentially Contaminating Activity	Information Source	Rationale for Potential Contribution of the PCA to an APEC
Phase One Property	***Importation of Fill Material of Unknown Quality –*** Fill was noted in a borehole record for the Site, as well as expected to have been brought to the Site during the construction of the Westgate Shopping Centre.	Previous EcoLog ERIS Report and Site Observations	The PCA is located on the Phase One Property and must be identified as an APEC.
	Gasoline and Associated Products Storage in Fixed Tanks It was reported by the Site Representative that there used to be heating oil storage USTs at the rear of the mall. The USTs were located at the north and northwest corner of the mall, near to the locations of the former boiler rooms. It was reported that the UST	Site Representative	The PCA is located on the Phase One Property and must be identified as an APEC.

Location	Potentially Contaminating Activity	Information Source	Rationale for Potential Contribution of the PCA to an APEC
	clean-up and removal was completed by Pinchin in 2010, but no report was provided to Golder for review. Also, it was noted that there were hydrocarbon products stored on the Site in the 1925 (revised 1948) FIP in a defined area along the extreme southwestern part of the Site.		
	Electricity Generator, Transformation and Power Stations – There is a Hydro-Ottawa electrical vault in the basement of the Shopper's Drug Mart, which was not accessed during the Site visit due to accessibility restriction (Hydro Ottawa only). The Hydro vault has been in the building since approximately the construction of the mall. There is also a suspected additional decommissioned transformer room at the west side of the mall.	Site Observations	The PCA is located on the Phase One Property and is therefore identified as an APEC.
	Operation of Dry Cleaning Equipment – There has been a dry cleaner facility in the Westgate Shopping Centre. Based on a historic mall Site Plan and the extended construction of the Shopper's Drug Mart, the dry cleaners would have been in the area that is now adjacent to the Shopper's Drug Mart.	1965 FIP, aerial images, city directories	The PCA is located on the Phase One Property and is therefore identified as an APEC.
Phase One Study Area (excluding the Phase One Property)	***Railyards, Tracks and Spurs*** – A railway corridor was located in the path of the current Highway 417 (adjacent to the Site), as well as there was additional railway lines running along what is currently Merivale Road, east of the Site (adjacent).	Aerial photographs (1945)	Based on the up and cross gradient location of this PCA to the Site, as well as the close down-gradient proximity, and the nature of impacts associated with this PCA (which may migrate through groundwater) the presence of this PCA may impact the Phase One Property.
	Railyards, Tracks and Spurs – A rail yard was located approximately 150 to 200 m southeast of the Site.	Aerial photographs (1945)	Given that this facility was separated from the Site by 150 m including Merivale Road and Carling Avenue and their underlying services, it is not considered to be a PCA that will result in an APEC on the Site.

Location	Potentially Contaminating Activity	Information Source	Rationale for Potential Contribution of the PCA to an APEC
	Operation of Dry Cleaning Equipment – A former dry cleaner facility was located south of the Site along Carling Avenue. It was located within 00 m of the Site.	City directories	Based on the up-gradient location of this PCA to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.
	Electricity Generator, Transformation and Power Stations – A Hydro Ottawa Sub-Station is located east of the Site, at the intersection of Merivale Road and Carling Avenue. The sub-station has been in operation since prior to 1945 and known to have contained PCBs and transformers. The power station is approximately 30 m east of the Site.	1965 FIP, Trow (1994), aerial images, Site Observations, Site Representative, city directories	Based on the cross gradient location of this PCA to the Site, as well as the close proximity, and the nature of impacts associated with this PCA (which may migrate through groundwater) the presence of this PCA may impact the Phase One Property.
	Gasoline and Associated Products Storage in Fixed Tanks – Review of historical documentation indicates that there were approximately six locations cross-to-down gradient of the Site, within 250 m, that had gasoline and/or associated products in fixed tanks (primarily USTs, some ASTs).	1965 FIP, Trow (1994), aerial images, Site Representative, city directories	Based on the down and cross-gradient location of these PCAs to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.
	Commercial Autobody Shops – There is a *Second Chance Auto Sales* building approximately 40 m southwest of the Site that has a garage at the rear of the building. There are also historical references to auto repair shops in the Study Area, including the former Department of Highways and the garage and service station at the intersection of Thames and Merivale.	1965 FIP, aerial images, Site Observations, city directories	Based on the up and cross-gradient location of these PCAs to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.

Location	Potentially Contaminating Activity	Information Source	Rationale for Potential Contribution of the PCA to an APEC
	Industrial Land Use – The Seven-Up Bottling Co. was located south of the Site and had a UST on the property. In addition, west of the Site the former Barrington Petroleum Products and Ontario Department of Highways facilities may have been considered industrial.	1965 FIP, aerial images, city directories	Based on the up and cross-gradient location of these PCAs to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.

- No formal utility drawings are available for the Site, however, utility locates undertaken at the Site have identified the location of all underground utilities. Given Golder's understanding of the Site, the absence of formal drawings does not represent a significant limitation to the Phase One ESA;
- The surficial soil at the Site consists primarily of glaciomarine and marine deposits of silt and clay (basin and quiet water deposits). The EcoLog ERIS Report indicated that the Site and Study Area are predominately silty clay and till. Bedrock in the Phase One Study Area is Middle Ordovician: limestone, dolostone, shale, arkose and sandstone. Records from the EcoLog ERIS report indicated that the Site and Phase One Study Area have limestone and shale bedrock. The borehole record identified nearest to the Site indicated that there is grey limestone bedrock at a depth of 13.7 metres below ground surface (mbgs); and,
- Local and regional groundwater flow is anticipated to flow in a northern direction toward the Ottawa River located approximately 2.2 km north and northwest of the Site. The Rideau Canal is also located approximately 2.3 km east of the Site. There are many subsurface utilities in the vicinity of the Site and groundwater flow direction may be affected.

3.4 Deviations from Sampling and Analysis Plan

A sampling and analysis plan is provided in Appendix A(i) which incorporates the 2015 investigation program. The sampling and analysis plan 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. This plan was prepared prior to the October 2015 field investigation covers the activities undertaken during the Phase Two ESA. The procedures described in the Sampling and Analysis Plan were generally followed with the following exceptions:

- The borehole and monitoring well at 15-05 was could not be completed at its proposed location due to underlying utilities and as such it was completed to the west of its proposed location. The actual location of the borehole and monitoring well was not at an optimal location;
- The borehole and monitoring well at BH15-07 could not be drilled as access to this location was restricted to overhead utilities;

- During the field activities, it was difficult to determine the true water table in the clay and therefore, the monitoring wells were installed to straddle the inferred water table. However, the groundwater level measurements taken after well installation indicated that the water level monitoring wells those at 15-01, 15-04 and 15-05 rose to above the screen or sand pack. Given that PHCs were either non-detect or detected at low concentrations, the deviation of the sampling analysis plan with respect to well screen position is not considered to have caused an impediment to the Phase Two ESA; and,
- The soil sample submitted from BH15-02 was not analyzed for PCBs as outlined in the sampling and analysis plan. Given that no PCBs were detected in the groundwater sample collected from this location, the soil at this location is not inferred to have PCB impacts. As such, the absence of the PCB analysis from this soil sample is not considered to have caused an impediment to the Phase Two ESA.

No further material deviations from the sampling and analysis plan were identified in the course of the investigation.

3.5 Impediments

Overhead utilities restricted access to the location of BH15-07 and as such, the proposed borehole and monitoring well at this location could not be completed. Supplemental investigation is planned to drill at this location with equipment that does not restrict drilling access. No other physical impediments to the Phase Two ESA investigation were encountered.

4.0 INVESTIGATION METHOD

4.1 General

The following sections describe the pre-field work activities and field investigation methodology employed during the Phase Two ESA conducted at the Site. The field work was conducted between October 7, 2015 and October 14, 2015.

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 completed public and private utility clearances.

4.2 Drilling

Ten boreholes (identified as BH15-01 to BH15-06 and BH15-08 to BH15-11) were advanced at the Site. Borehole locations are provided in Figure 3. All boreholes were advanced by George Downing Estate Drilling Ltd. ("Downing") using a CME-75 truck-mounted drilling rig with the exception of BH15-04 and BH15-09. The overburden at BH15-04 was drilled using a GeoProbe 7822DT and the bedrock was cored at this location using a CME-75 truck-mounted drilling rig. BH15-09 was advanced into bedrock using a CME-75 truck-mounted drilling rig.

During borehole drilling activities with the GeoProbe 7822DT, overburden soil samples were recovered at regular depth intervals (0.75 m) using a 51 mm diameter PVC sleeve macro sampler.

During borehole drilling activities with the CME-75 truck-mounted drilling rig, overburden soil samples were collected using split spoon soil sampling equipment and augered using 200 mm outside diameter ("OD") solid stem augers. Continuous soil samples were collected using the following method:

- Split-spoon: 0.61 m (2 foot) long, 5.08 cm (2 inch) diameter stainless steel split spoon sampling system at 0.76 m long intervals. Split-spoons were decontaminated between sample locations.

The boreholes (excluding BH15-04 and BH15-09 which were advanced into bedrock) were advanced to depths of 6.10 mbgs. Upon reaching bedrock at BH15-04 and BH15-09, diamond drilling using NQ sized core was used to reach the maximum drilling depths of 16.13 and 20.34 mbgs, respectively. Bedrock was encountered at a depth of 13.46 mbgs at BH15-04 and at a depth of 16.28 mbgs at BH15-09.

4.3 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(ii)).

All soil samples collected and submitted for chemical analysis were obtained from undisturbed soils, including fill materials 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. Two soil samples were submitted as part of this investigation for grain size analysis to support the use of the coarse textured soil site condition standard for use at the Site.

As per the sampling and analysis plan, provided in Appendix A(i), one soil sample was submitted from each test location with the exception of BH15-08 from which two soil samples were submitted.

Soil samples submitted for chemical analysis were based on visual (e.g., staining, discolouration and/or free product, if any) and/or olfactory (if any) observations obtained from borehole drilling activities. 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.

Visual and olfactory observations and results of soil headspace measurements are presented on the Record of Borehole sheets provided in Appendix A(ii).

4.4 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. 592903395	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 PID was 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 was based on professional judgement which included a consideration of the highest organic vapour readings, visual and olfactory evidence of potential contamination (PHC odour, presence of debris) 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).

The results of soil headspace screening measurements are provided in the Record of Boreholes in Appendix A(ii).

4.5 Groundwater: Monitoring Well Installation

Groundwater monitoring wells were installed into eight of the ten boreholes (BH15-1 to BH15-6, BH15-8 and BH15-10) by Downing 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 0.3 m portion of the riser pipe above the slotted pipe was filled with silica filter sand. The monitoring well was completed with a flush mount style protective well casing set in concrete and sealed by bentonite from the top of the sand pack up to the base of the concrete around the protective well casing. The riser pipes were sealed with a protective cap.

Following drilling, the monitoring wells were developed on October 9 and 13, 2015 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(ii)).

4.6 Groundwater: Field Measurements for Water Quality Parameters

Groundwater indicator parameters including temperature, pH, conductivity, oxidation-reduction potential ("ORP") and dissolved oxygen were measured prior to sampling to ensure adequate well development and purging. A Horiba U-52 water quality meter was used to measure groundwater quality during monitoring well development and groundwater sampling. The instrument was calibrated using factory supplied solutions for electrical conductivity (0.718 milliSiemens per centimetre (mS/cm). 5.0 mS/cm and 80.0 mS/cm), pH (4.01 pH and 7.01 pH), turbidity (0 nephelometric turbidity units (NTU) and 800 NTU), dissolved oxygen (0 milligram per litre (mg/L)), temperature (19.0 degrees Celsius (ºC)) and ORP (240 millivolts (mV)) parameters. Specifications of the Hoiba U-52 for each parameter are outlined in the following table:

Parameter	Range	Resolution	Accuracy
pH	0.00 to 14.00 pH	0.01 pH	±0.1 pH
Conductivity	0.00 to 100 mS/cm	0.01 mS/cm	± 0.1%
Temperature	-5 to 55 ºC	0.01 ºC	± (0.3 + 0.005*absolute value of temperature) ºC
Dissolved Oxygen	0 to 50 mg/L	0.01 mg/L	± 0.1%
Oxidation-Reduction Potential	-2000 to +2000 ORP	0.1 mV	± 15 mV

4.7 Groundwater: Sampling

Prior to the groundwater sampling the wells were purged by using a peristaltic pump. During the well purging, qualitative observations were made of water colour, clarity, the presence or absence of any hydrocarbon sheen and any odours present. Free phase product, odour or sheen were not observed or detected with the oil/water interface probe in any the monitoring wells during the groundwater purging or sampling. Groundwater sampling was carried at the Site out using a peristaltic pump with dedicated Waterra™ polyethylene tubing on October 14, 2015.

Samples were placed in laboratory-prepared containers and stored on ice, in a cooler until delivery to AGAT Laboratories ("AGAT"). Samples were analyzed for PHC F1, PHCs F2-F4, VOCs, PAHs, PCBs, and/or metals (including mercury and hexavalent chromium) following chain-of-custody procedures. Details of the parameters analyzed at each monitoring well are presented in Table 4.

4.8 Sediment: Sampling

No sediment samples were collected as part of this investigation.

4.9 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 MOECC.

4.10 Residue Management Procedures

All residues produced during the investigation (soil cuttings from drilling, groundwater from well development purging, wash water from equipment decontamination) were placed in sealed drums and temporarily stored on-Site. Upon receipt of analytical results, all residues were disposed of off-site.

4.11 Elevation Surveying

All boreholes and monitoring wells were surveyed on October 14, 2015 using a Trimble R8 to a geodetic benchmark. Borehole elevations are indicated on the Field Logs in Appendix A(ii).

Groundwater levels were monitored in all eight monitoring wells to determine groundwater flow direction and were measured relative to the elevation of the top of the PVC riser. An oil/water interface probe was used to investigate the potential presence of product in the monitoring wells.

A summary of recorded groundwater elevations is provided in Table 2.

4.12 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;
- The collection of at least one trip blank and one trip spike for sampling events that include the analysis of volatile organic compounds in groundwater;
- The collection of one field blank;
- Initial calibration of field equipment was performed at the start of each field day, with a 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.I 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 footvalves) 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.

Below is a summary of the primary and duplicate samples collected between November and December 2014.

Date	Soil Samples Collected	Duplicates	Trip Blanks
October 7 - 13, 2015	BH15-01 SA1, BH15-01 SA2, BH15-01 SA3, BH15-01 SA4, BH15-01 SA5, BH15-01 SA6, BH15-01 SA7, BH15-02 SA1, BH15-02 SA2, BH15-02 SA3, BH15-02 SA4, BH15-02 SA5, BH15-02 SA6, BH15-02 SA7, BH15-02 SA8, BH15-02 SA9, BH15-03 SA1, BH15-03 SA2, BH15-03 SA3, BH15-03 SA4, BH15-03 SA5, BH15-03 SA6, BH15-03 SA7, BH15-03 SA8, BH15-03 SA9, BH15-03 SA10, BH15-04 SA1, BH15-04 SA2, BH15-04 SA3, BH15-04 SA4, BH15-04 SA5, BH15-04 SA6, BH15-04 SA7, BH15-04 SA8, BH15-04 SA9, BH15-04 SA10, BH15-05 SA1, BH15-05 SA2, BH15-05 SA3, BH15-05 SA4, BH15-05 SA5, BH15-05 SA6, BH15-05 SA7, BH15-06 SA1, BH15-06 SA2, BH15-06 SA3, BH15-06 SA4, BH15-06 SA5, BH15-06 SA6, BH15-06 SA7, BH15-08 SA1, BH15-08 SA2, BH15-08 SA3, BH15-08 SA4, BH15-08 SA5, BH15-08 SA6, BH15-08 SA7, BH15-08 SA8, BH15-09 SA1, BH15-09 SA2, BH15-09 SA3, BH15-09 SA4, BH15-09 SA5, BH15-09 SA6, BH15-09 SA7, BH15-09 SA8, BH15-09 SA9, BH15-09 SA10, BH15-09 SA11, BH15-09 SA12, BH15-09 SA13, BH15-09 SA14, BH15-10 SA1, BH15-10 SA2, BH15-10 SA3, BH15-10 SA4, BH15-10 SA5, BH15-11 SA1, BH15-11 SA2, BH15-11 SA3, BH15-11 SA4, BH15-11 SA5, BH15-11 SA6, BH15-11 SA7 **(84)**	DUP1 (duplicate of BH15-01 SA6), DUP2 (duplicate of BH15-02 SA3), DUP3 (duplicate of BH15-03 SA5), DUP4 (duplicate of BH15-05 SA10), DUP5 (duplicate of BH15-04 SA6), DUP6 (duplicate of BH15-06 SA6), DUP8 (duplicate of BH15-08 SA6), DUP10 (duplicate of BH15-10 SA6) **(8)**	NA
Date	**Groundwater Samples Collected**	**Duplicates**	**Trip Blanks**
October 14, 2015	15-01, 15-02, 15-03, 15-04, 15-05, 15-06, 15-08, 15-10, **(7)**	DUP3 (duplicate of 15-03), DUP8 (duplicate of 15-08) **(2)**	Trip blank

5.0 REVIEW AND EVALUATION

This section of the report presents a review and evaluation of the results of the drilling, monitoring and sampling activities conducted as part of the Phase Two ESA.

5.1 Geology

The soil conditions encountered during the borehole drilling are presented in the Record of Borehole sheets and provided in Appendix A(ii), as well as in the cross sections presented in Figure 5 and 6, with the cross section location shown on Figure 3. The following presents a summary of the subsurface soil conditions encountered during the investigation.

In general, the subsurface stratigraphy within the area of the investigation consists of surficial fill materials (including fill associated with the parking lot pavement structure) overlying silty clay which is generally underlain by glacial till at depths of 3.7 to 6.1 mbgs. The two boreholes, BH15-04 and BH15-09, that penetrated through the till encountered limestone bedrock at depths ranging from 13.5 and 16.3 mbgs, respectively.

Based on the soil conditions encountered in the boreholes, the native silty clay and glacial till is not considered a significant water bearing formation at the Phase Two Property.

5.2 Groundwater: Elevations and Flow Direction

All monitoring wells were used in the interpretation of shallow groundwater contours and shallow groundwater flow direction. Any temporary fluctuation in water levels on the Phase Two Property is not anticipated to effect the conclusions of the Phase Two ESA.

The base of shallow groundwater monitoring well screen intervals were installed at elevations ranging from approximately 61.33 masl (12.75 mbgs) to 69.39 masl (6.1 mbgs). The location and depth of the screens were selected based on the issues being investigated, and were installed in an attempt to straddle the water table. A summary of the monitoring well construction details are presented in Table 1. Monitoring for free phase product using an interface probe was conducted on October 14, 2015. No evidence of petroleum hydrocarbon free product or sheen in groundwater was observed.

Static groundwater levels were measured in the monitoring wells located across the Site on October 14, 2015 and November 9, 2015. However, the monitoring wells at 15-03, 15-04 and 15-06 could not accessed on November 9, 2015 and as such, the groundwater levels in these locations were not measured on this date. Groundwater elevations at the Site ranged from 69.70 masl (BH15-08) to 73.64 masl (BH15-01) and were encountered at depths of 1.26 to 5.46 mbgs. Based on the interpreted groundwater elevation contours presented in Figure 4, the inferred direction of groundwater flow is to the northwest, towards Merivale Road. It is interpreted that the services in Merivale Road and Carling Avenue as well as the basements located on the northeast and southwest corner of the Westgate Shopping Centre are influencing the groundwater flow.

Based on the soil conditions encountered in the boreholes and the water level measurements, the native silty clay unit was inferred to act as an aquitard.

Seasonal fluctuation in water levels on the Site should be expected. Given the limited number of monitoring events seasonal trends could not be identified, however shallow groundwater water levels are typically highest following the spring recharge and decline throughout the summer and fall months into the winter.

Underground utility information available for the Phase Two Property indicate that the Site is utility lines including telecommunication, municipal water, storm sewers, sanitary sewers and hydro connect the Site below ground from multiple locations. A sanitary sewer runs parallel to the western edge of the shopping centre and it located to the west of the monitoring well at 15-03. The only basements located on Site are two in the Westgate Shopping Centre; one which is located below the Shopper's Drug Mart unit and the other that is located at the rear of the east end of the mall. Given the close proximity of the westernmost sanitary sewer and basement on the western half to Site to the monitoring well at 15-03 and that the groundwater elevation in this monitoring well was measured to be 2.75 mbgs, the VOC contaminants present in groundwater in this location have migrated into the sanitary sewer trench and below the basement of the shopping centre. However, given that the depths to groundwater on the eastern half of the Site were 4.74 mbgs (at BH15-08) and 4.80 mbgs (at BH15-10), the subsurface utilities and structures on the eastern half of the Phase Two Property are not expected to act as preferential pathways promoting the migration of COCs as the water table is not inferred to intercept buried utilities and subsurface structures in this portion of the Phase Two Property. In addition, no COCs are present in groundwater on this portion of the Phase Two Property in exceedances of the applicable site condition standards.

5.3 Groundwater: Hydraulic Conductivity, Hydraulic Gradients and Velocity

5.3.1 Hydraulic Conductivity

Rising head test was completed in the monitoring wells at 15-05, 15-06 and 15-08 on October 14, 2015. Based on the results on the three rising head test, the average hydraulic conductivity was calculated to be approximately 2.37×10^{-7} m/s.

5.3.2 Hydraulic Gradients

The average horizontal hydraulic gradient was estimated for shallow groundwater conditions based on water levels collected on October 14, 2015 and November 9, 2015, and the inferred groundwater contours are presented on Figure 4. The horizontal hydraulic gradient for shallow groundwater conditions was calculated to be between 0.01 and 0.03 m/m. Variability in hydraulic gradients calculated at the Phase Two property may be related to the presence of foundations/buried structure, bedding materials, and buried services at the Site.

Vertical hydraulic gradients need to be confirmed at the Site as no nested pairs were available for evaluation.

5.3.3 Groundwater Velocity

Groundwater flow velocity was determined based on the average hydraulic conductivity and the horizontal gradients. The minimum groundwater flow velocity was calculated to be 2.37×10^{-9} m/s and the maximum groundwater flow velocity was calculated to be 7.10×10^{-9} m/s.

5.4 Coarse Soil Texture

Two representative soil samples (BH15-09 SA7 and BH15-09 SA12) were collected from native overburden materials and submitted to Golder's geotechnical laboratory for a 75 µm sieve wash test. The test results are provided in Appendix A(iii). The two samples were considered to be sufficient, given that native soil encountered during the Phase Two ESA was homogeneous across the Site.

Based on fieldwork observations, borehole stratigraphy and the sieve analysis results, more than 50% of particles (by mass) in the soil were greater than 75 µm in mean diameter. Accordingly, the Site soil is considered to be coarse-textured.

5.5 Soil: Field Screening

Headspace vapour measurements were conducted on the soil samples collected from each borehole. Organic vapour measurements from non-detect to 4.5 ppm (highest reading measured at BH15-03 between 4.88 to 5.38 mbgs).

The results of headspace vapour measurements are presented on the Record of Borehole sheets in Appendix A(ii).

5.6 Soil: Quality

Table 3 provides a summary of the soil samples submitted for analysis and the associated test parameters. The analytical results of soil samples are presented in Tables 5A to 5E. Laboratory Certificates of Analysis for the soil samples are included in Appendix A(iii).

Golder completed soil sampling at the Site during borehole advancement between November 7 and 13, 2015. The soil samples were submitted to AGAT for analysis of one or more of the following parameters; PHCs, PAHs, VOCs, PCBs and/or metals.

A summary of the number of soil samples analyzed and the number of soil samples exceeding the MOE Table 3 Standards is provided below:

Parameter	Number of soil samples analysed	Number of soil samples exceeding the Table 3 Standards
VOCs	4 (including one duplicate soil sample)	0
PCBs	4 (including one duplicate soil sample)	0
PAHs	5 (including one duplicate soil sample)	0
Metals	5 (including one duplicate soil sample)	0
PHC F1/BTEX	12 (including one duplicate soil sample)	0
PHC F2-F4	12 (including one duplicate soil sample)	0

All soil samples submitted for analysis met the applicable Site condition standards for the parameters tested, including those submitted from the area of first development.

5.7 Groundwater: Quality

Monitoring well construction details are summarized in Table 1 and a list of groundwater samples submitted for laboratory analysis is provided in Table 4. The analytical results for groundwater samples are summarized in Tables 6A through 6E, along with the applicable MOE Table 3 Standards. Laboratory Certificates of Analysis for groundwater are provided in Appendix A(iii).

Golder completed sampling of monitoring wells at the Site on October 14, 2015. Groundwater samples were submitted to AGAT for analysis for one or more of the following parameters; PHCs, PAHs, VOCs, PCBs and/or metals.

A summary of the number of groundwater samples analysed and number of samples exceeding the MOE Table 3 Standards is provided below:

Parameter	Number of groundwater samples analysed	Number of groundwater samples exceeding the 2011 Table 3 Standards
VOCs	4 (including 1 duplicate groundwater sample)	2 (including 1 duplicate groundwater sample)
PCBs	6 (including 2 duplicate groundwater samples)	0
PAHs	2 (including 1 duplicate groundwater sample)	0
Metals	2 (including 1 duplicate groundwater sample)	0
PHC F1/BTEX	9 (including 2 duplicate groundwater samples)	0
PHC F2-F4	9 (including 2 duplicate groundwater samples)	0

The VOC groundwater exceedances compared to be MOE Table 3 Standards are shown in Figure 3 and the details of these exceedances are as follows:

- The reported concentrations of cis-1,2-dichloroethene in the original and duplicate groundwater samples collected from the monitoring well at 15-03 (samples 15-03 and DUP3) were 590 and 670 ug/l, respectively, compared to MOE Table 3 Standard of 1.6 ug/l;
- The reported concentrations of tetrachloroethylene in the original and duplicate groundwater samples collected from the monitoring well at 15-03 (samples 15-03 and DUP3) were 2700 and 2800 ug/l, respectively, compared to MOE Table 3 Standard of 1.6 ug/l;
- The reported concentrations of trans-1,2-dichloroethene in the original and duplicate groundwater samples collected from the monitoring well at 15-03 (samples 15-03 and DUP3) were 7.5 and 8.8 ug/l, respectively, compared to MOE Table 3 Standard of 1.6 ug/l; and,
- The reported concentrations of trans-1,2-dichloroethene in the original and duplicate groundwater samples collected from the monitoring well at 15-03 (samples 15-03 and DUP3) were both 52 ug/l compared to MOE Table 3 Standard of 0.5 ug/l.

The VOCs are inferred to be associated with the former dry cleaning facility that was located on the Site, likely from spillage of dry cleaning solvent . The monitoring well at 15-04 is the closest well to the north of the 15-03 and the monitoring well 15-02 is the closest well to the south of 15-03. The concentrations of VOCs in the groundwater samples collected these monitoring wells were either non-detect or below the applicable site standard. The closest monitoring wells to the west and east of the 15-03 are those located at 15-01 and 15-06, both of which are located greater than 50 m from 15-03. The groundwater samples from these two monitoring wells were not analyzed for VOCs. As such, further delineation is required to confirm the lateral extent of the VOC impacts and whether or not the VOC impacts extend into the groundwater in bedrock.

It is noted that the only monitoring well located on the area of first was the monitoring well location at 15-10. The groundwater sample collected from this monitoring well did not have any exceedances of the MOE Table 3 Standards.

In addition to numerical standards, the MOE Table 3 Standard sets out non-numerical (aesthetic) standards relating to the presence of free phase product and hydrocarbon sheen. Specifically, a property does not meet the site condition standards if there is evidence of free product, including but not limited to, visible petroleum hydrocarbon film or sheen present on groundwater, surface water or in any groundwater or surface water samples. Monitoring for free phase product using an interface probe was conducted on October 14, 2015. No evidence of free product or sheen in groundwater was observed.

5.8 Sediment: Quality

No sediment samples were collected as part of this investigation.

5.9 Quality Assurance and Quality Control Results

The quality assurance assessment of the field duplicate sample results was conducted according to the document entitled Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004 (amended in July 2009 and effective as of July 1, 2011) (“Analytical Protocol”).

To determine the precision of the analytical methods and field sampling procedures, blind duplicate samples were collected during soil and groundwater sampling. Precision is determined by the relative percent difference (“RPD”) between the duplicate and original samples and was calculated as follows:

$$RPD = \frac{|x_1 - x_2|}{x_m}$$

Where
x_1 initial sample results
x_2 duplicate sample results
x_m mean of x_1, x_2

RPDs are calculated only if the concentrations of a parameter are greater than the laboratory reported detection limit (“RDL”) in both the duplicate and original samples. In addition, lower precision in the RPD calculation is expected when concentrations of the analytes are less than ten (10) times the RDL. Therefore, RPDs were calculated for the original and duplicate groundwater and soil samples only in cases where the measured concentrations of analytes in both samples were ten (10) times greater than the RDL.

The following RPD limits were considered reasonable and are based on Analytical Protocol: RPDs in soil, 30% for metals, 50% for VOCs, 30% for PHCs, 40% for PCBs and 40% for PAHs and in groundwater/surface water, 20% for metals, 30% for VOCs, 30% for PHCs, 30% for PCBs and 30% for PAHs.

The calculated RPDs for metals in the original and duplicate soil sample were less than 10% and considered within acceptable limits. RPDs could not be calculated for PHCs, PBCs, VOCs and PAHs in the original and duplicate sample, as these results were below the laboratory RDL or less that ten times greater than the RDL. The calculated RPDs for the original and duplicate groundwater sample were less than 8% for metals, 0% for PHCs and less than 21% for VOCs; all of which are considered to be within acceptable limits. RPDs could not be calculated for PCBs and PAHs in the original and duplicate sample, as these results were all below the laboratory RDL or less that ten times greater than the RDL.

One trip spike was submitted for analysis of VOCs, as part of the groundwater monitoring conducted at the Site. The trip spike was spiked with a known concentration of VOCs and then analyzed at the lab. The percent recovery (%R) for each parameter analyzed was calculated according the following equations:

$$\%\,R = \frac{x_2}{x_1} \times 100$$

Where, x_1 and x_2 are the spiked VOC concentration and the analyzed concentrations. The acceptable range for %R is between 50% and 140%. All parameters analyzed for the trip blank had the return %Rs within the acceptable range.

It is noted that the trip blank sample was found to have no detectable concentrations and that the field blank sample also had no detectable concentrations with the exception of chloroform which was detected at 1.7 ug/L, bromodichloromethane which was detected 0.51 ug/L and dibromochloromethane which was detected 0.51 ug/L. Although these parameters were detected in the field blank samples, they were non-detect in all groundwater samples analyzed for VOCs with the exception of chloroform that was detected at 0.35 ug/L in the groundwater sample from the monitoring well at 15-04. However, the detectable concentration of chloroform in the groundwater is considered to be a result of municipally treated water used for bedrock coring of BH15-04. As such, it is considered that the field QA/QC measures are acceptable and that the data obtained during investigation are reliable. The quality of the analytical results is further supported by AGAT's internal quality assurance program that includes laboratory blanks, spikes, surrogates and duplicate samples.

All certificates of analysis or analytical reports received pursuant to clause 47 (2) (b) of the regulation comply with subsection 47(3). A certificate of analysis or analytical report has been received for each sample submitted for analysis and is provided in Appendix A(iii). The analytical laboratory did not qualify any of the analytical results.

Accordingly, the analytical data generated during the investigation are valid and representative and may be used in this Phase Two ESA without further qualification.

5.10 Phase Two Conceptual Site Model

The Phase Two conceptual site model is presented in the following sections.

POTENTIAL SOURCES OF CONTAMINATION

Potentially Contaminating Activities

Based on the information obtained as part of the Phase One ESA, the following potentially contaminating activities ("PCAs") were identified. The location of each PCA is provided on Figure 2:

Location	Potentially Contaminating Activity	Information Source	Rationale for Potential Contribution of the PCA to an APEC
Phase One Property	***Importation of Fill Material of Unknown Quality –*** Fill was noted in a borehole record for the Site, as well as expected to have been brought to the Site during the construction of the Westgate Shopping Centre.	Previous EcoLog ERIS Report and Site Observations	The PCA is located on the Phase One Property and must be identified as an APEC.
	Gasoline and Associated Products Storage in Fixed Tanks It was reported by the Site Representative that there used to be heating oil storage USTs at the rear of the mall. The USTs were located at the north and northwest corner of the mall, near to the locations of the former boiler rooms. It was reported that the UST clean-up and removal was completed by Pinchin in 2010, but no report was provided to Golder for review. Also, it was noted that there were hydrocarbon products stored on the Site in the 1925 (revised 1948) FIP in a defined area along the extreme southwestern part of the Site.	Site Representative	The PCA is located on the Phase One Property and must be identified as an APEC.
	Electricity Generator, Transformation and Power Stations – There is a Hydro-Ottawa electrical vault in the basement of the Shopper's Drug Mart, which was not accessed during the Site visit due to accessibility restriction (Hydro Ottawa only). The Hydro vault has been in the building since approximately the construction of the mall. There is also a suspected additional decommissioned transformer room at the west side of the mall.	Site Observations	The PCA is located on the Phase One Property and is therefore identified as an APEC.

Location	Potentially Contaminating Activity	Information Source	Rationale for Potential Contribution of the PCA to an APEC
	Operation of Dry Cleaning Equipment – There has been a dry cleaner facility in the Westgate Shopping Centre. Based on a historic mall Site Plan and the extended construction of the Shopper's Drug Mart, the dry cleaners would have been in the area that is now adjacent to the Shopper's Drug Mart.	1965 FIP, aerial images, city directories	The PCA is located on the Phase One Property and is therefore identified as an APEC.
Phase One Study Area (excluding the Phase One Property)	***Railyards, Tracks and Spurs*** – A railway corridor was located in the path of the current Highway 417 (adjacent to the Site), as well as there was additional railway lines running along what is currently Merivale Road, east of the Site (adjacent).	Aerial photographs (1945)	Based on the up and cross gradient location of this PCA to the Site, as well as the close down-gradient proximity, and the nature of impacts associated with this PCA (which may migrate through groundwater) the presence of this PCA may impact the Phase One Property.
	Railyards, Tracks and Spurs – A and a rail yard was located approximately 150 to 200 m southeast of the Site.	Aerial photographs (1945)	Given that this facility was separated from the Site by 150 m including Merivale Road and Carling Avenue and their underlying services, it is not considered to be a PCA that will result in an APEC on the Site.
	Operation of Dry Cleaning Equipment – A former dry cleaner facility was located south of the Site along Carling Avenue. It was located within 00 m of the Site.	City directories	Based on the up-gradient location of this PCA to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.
	Electricity Generator, Transformation and Power Stations – A Hydro Ottawa Sub-Station is located east of the Site, at the intersection of Merivale Road and Carling Avenue. The sub-station has been in operation since prior to 1945 and known to have contained PCBs and transformers. The power station is approximately 30 m east of the Site.	1965 FIP, Trow (1994), aerial images, Site Observations, Site Representative, city directories	Based on the cross gradient location of this PCA to the Site, as well as the close proximity, and the nature of impacts associated with this PCA (which may migrate through groundwater) the presence of this PCA may impact the Phase One Property.

Location	Potentially Contaminating Activity	Information Source	Rationale for Potential Contribution of the PCA to an APEC
	Gasoline and Associated Products Storage in Fixed Tanks – Review of historical documentation indicates that there were approximately six locations cross-to-down gradient of the Site, within 250 m, that had gasoline and/or associated products in fixed tanks (primarily USTs, some ASTs).	1965 FIP, Trow (1994), aerial images, Site Representative, city directories	Based on the down and cross-gradient location of these PCAs to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.
	Commercial Autobody Shops – There is a *Second Chance Auto Sales* building approximately 40 m southwest of the Site that has a garage at the rear of the building. There are also historical references to auto repair shops in the Study Area, including the former Department of Highways and the garage and service station at the intersection of Thames and Merivale.	1965 FIP, aerial images, Site Observations, city directories	Based on the up and cross-gradient location of these PCAs to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.
	Industrial Land Use – The Seven-Up Bottling Co. was located south of the Site and had a UST on the property. In addition, west of the Site the former Barrington Petroleum Products and Ontario Department of Highways facilities may have been considered industrial.	1965 FIP, aerial images, city directories	Based on the up and cross-gradient location of these PCAs to the Site, and the nature of impacts associated with this PCA, which may migrate through groundwater, the presence of this PCA may impact the Phase One Property.

Areas of Potential Environmental Concern

The following APECs were identified on the Site:

- APEC 1 – Fill is reportedly present across the Site.
- APEC 2 – It was reported by the Site Representative that there was previously oil storage USTs at the rear of the mall. The USTs were located at the north and northwest corner of the mall, near to the locations of the former boiler rooms. It was reported that the clean-up and removal was completed by Pinchin, but no report was provided to Golder for review. Also, it was noted that there was hydrocarbon products stored on the Site in the 1925 (revised 1948) FIP in a defined area along the extreme southwestern part of the site. In addition, there are off-Site PCAs that may contribute to APECs on-Site. ASTs were located at service stations/garages/industrial properties at six locations hydraulically down-and-cross gradient of the Site. Approximate addresses are:
  - 1376 Carling Avenue
  - 1354 Carling Avenue
  - 1330 Carling Avenue
  - 1331 Carling Avenue
  - 1316 Carling Avenue
  - 872 Merivale Road
- APEC 3 – Basement of the Shopper's Drug Mart has a Hydro Ottawa transformer room.
- APEC 4 – A dry cleaning facility was formerly located in the on-Site shopping centre. Another dry cleaning facility was formerly located within the Study Area; approximately 100 m south of the Site at 1317 Carling Avenue.
- APEC 5 – A Hydro Ottawa Sub-Station is located approximately 30 m east of the Site at the northeast corner of Merivale Road and Carling Avenue; and,
- APEC 6 – There were rail lines along two sides of the Site, along the Highway 417 corridor and Merivale Road.

It is noted that only APECs 1, 2, 5 and 6 are located on the area of first development.

Subsurface Structures and Utilities

The Site and surrounding area are serviced with storm sewers, sanitary sewers, municipal water, natural gas and telecommunication. Utility lines including telecommunication, municipal water, storm sewers, sanitary sewers and hydro connect the Site below ground from multiple locations. It was noted that a sanitary sewer runs parallel to the western edge of the shopping centre and it located to the west of the monitoring well at 15-03. Given its close proximity to this monitoring well, the VOC contaminants present in the groundwater at this location may have entered into the sanitary sewer trench.

Building structures located on the Site are shown on Figures 2 and 3. The on-Site Monkey Joe's restaurant is constructed with slab-on grade floors, with no basement. The on-Site shopping centre is also constructed with slab-on grade floors; however, it has a basement located below the Shopper's Drug Mart unit and at the rear of the east end of the mall. The depth and location of building foundations and footings are unknown; however is

likely at frost depth of approximately 1.5 mbgs. In addition, the depths of the shopping centre basements are unknown; however, are likely at depths of approximately 3 to 4 mbgs. The monitoring well at 15-03 is located just east of the Shopper's Drug Mart unit and given that the groundwater level in this monitoring well was measured at 2.75 mbgs, it is likely that the basement below the Shopper's Drug Mart unit intercepts the groundwater table and is potentially receiving VOC groundwater contaminants found in the monitoring well at 15-03.

PHYSICAL SETTING

Stratigraphy

Representative geologic cross-sections of the Site are presented in Figures 5 and 6. Concrete (5 to 10 cm in thickness) was present at surface at all borehole locations. In general, the subsurface soil conditions beneath the concrete consisted of fill material overlying native silty clay which is generally underlain by glacial till. The upper portion of the fill material generally consisted of grey, granular pavement structure comprised predominantly of sand with varying amounts of gravel. In some boreholes, the lower portion of the fill consisted of grey brown to black silty clay. The presence of organic matter, wood pieces and glass fragments was occasionally observed in the silty clay fill. The fill extended to depths between 0.43 to 2.44 mbgs. With the exception of BH15-02, the pavement structure and fill were underlain silty clay that extended to depths ranging from about 3.66 to 6.10 mbgs. Glacial till was encountered below the silt clay unit. Where it was fully penetrated in BH15-04 and BH15-09, the glacial till had a thickness of 7.4 and 11.7 m, respectively, and extended to depths of about 13.46 to 16.28 mbgs. The two boreholes that were penetrated through the till (BH15-04 and BH15-09) encountered limestone bedrock beneath the glacial till.

Given that the average thickness of overburden at the Site is greater than 2 m, the Site is not considered to be a shallow soil property as defined by O. Reg 153/04 (as amended).

Hydrogeological Characteristics

The regional groundwater flow direction is expected to be towards the Ottawa River, located approximately 2.2 km to the north. The groundwater flow may be controlled locally by the sewers in Carling Avenue and Merivale Road and underlying utilities on the Site.

Static groundwater levels were measured in the monitoring wells located across the Site on October 14, 2015 and November 9, 2015. However, the monitoring wells at 15-03, 15-04 and 15-06 could not accessed on November 9, 2015 and as such, the groundwater levels in these locations were not measured on this date. Figure 4 shows the groundwater elevations measured on October 14, 2015 (for wells with no November 9th measurement) and November 9, 2015 (the remainder of wells). The interpreted groundwater flow direction is also shown on Figure 4. Groundwater elevations at the Site ranged from 69.70 (BH15-08) to 73.64 masl (BH15-01) and were encountered at depths of 1.26 to 5.46 mbgs. Shallow groundwater flow direction was inferred to be to the northwest, towards Merivale Road.

The average horizontal hydraulic gradient was estimated for shallow groundwater conditions based on water levels collected on October 14, 2015 and November 29, 2015, and the inferred groundwater contours as plotted on Figure 4. The horizontal hydraulic gradient for shallow groundwater conditions was calculated to be between 0.01 and 0.03 m/m.

Vertical hydraulic gradients need to be confirmed at the Site as no nested pairs were available for evaluation.

The following additional observations are provided:

- The groundwater table at the Site was encountered in the native silty clay and glacial till layers;
- The QP is not aware of any respect in which section 41 or 43.1 of the regulation applies to the property;
- Soil has not been brought from another property and placed on, in or under the Site as part of this Phase Two ESA;
- Underlying utilities and structure may intercept the groundwater at the Site; however, it needs to be confirmed whether they intercept groundwater originating from location BH15-03, which is the only location of groundwater contamination; and,
- Groundwater flow appears to be controlled by the services in Merivale Road, Carline Avenue and/or basements on the southwest and northeast portions of the Site.

DELINEATION OF CONTAMINANT IMPACTS

APECs Where Contaminants are Present at a Concentration Above the Applicable Site Condition Standard

APEC locations are provided in Figure 2. The APECs where a contaminant is present on, in or under the Phase Two Property at a concentration greater than the applicable site condition standard, along with the contaminants present in each environmental medium, are identified in the following table.

APEC Description	Contaminants of Concern
APEC 4 - A dry cleaning facility was formerly located in the on-Site shopping centre. Another dry cleaning facility was formerly located within the Study Area; approximately 100 m south of the Site at 1317 Carling Avenue.	Soil – None Groundwater – VOCs Sediment – NA

APEC 4 was not identified as an APEC for the area of first development. As such, no contaminants associated with the APECs on the area of first developed had concentrations greater the applicable site conditions standard. Further definition of this APEC 4 is required.

Contaminant Distribution

No contaminants were present in soil at a concentration greater than the applicable site condition standard and no sediment is present at the Phase Two Property. However, the groundwater in the monitoring well at 15-03 contained concentrations of VOCs (namely cis-1,2-dichloroethene, tetrachloroethylene, trans-1,2-dichloroethene, trichloroethene and vinyl chloride) greater than the applicable site condition standard which is indicative of a VOC plume in this area of the Site. These contaminant concentrations were not in exceedance of the applicable site condition standard in the groundwater from the adjacent wells; however, vertical and horizontal delineation of the VOC plume has not been completed at the time of preparation of this report. A summary of the reported concentrations in groundwater is presented in Tables 6A to 6E.

Potential Reason for Discharge into the Environment at the Site

The reason for the discharge of contaminants present on, in or under the Phase Two property at a concentration greater than the applicable site condition standard is not known; however, given that a dry cleaning facility was historically located on the Site, it is likely that the groundwater impacts are associated with dry cleaning solvent spillage from the former dry cleaning facility.

Contaminant Migration

VOCs, more specifically cis-1,2-dichloroethene, tetrachloroethylene, trans-1,2-dichloroethene, trichloroethene and vinyl chloride, were detected in the original and duplicate groundwater samples collected from the monitoring well at 15-03 at concentrations exceeding the applicable site condition standards. However, at the time of preparation of this report, the VOC plume in this area had not been delineated. Several underground utilities exist at the Phase Two Property including a sanitary sewer that runs parallel to the western edge of the shopping centre, just west of 15-03. In addition, the shopping centre has a basement below the Shopper's Drug Mart unit (located to the east of 15-03) and at the rear of the east end of the mall which may locally influence groundwater flow at the Site. Given the close proximity of the sanitary sewer and the basement to the monitoring well at 15-03, the VOC contaminants present in groundwater in this monitoring well have migrated into the sanitary sewer trench and below the basement of the shopping centre.

Meteorological and Climatic Considerations

Seasonal fluctuation in water levels on the Site should be expected. Given the limited number of monitoring events seasonal trends could not be identified, however shallow groundwater water levels are typically highest following the spring recharge and decline throughout the summer and fall months into the winter. The entire site is paved and serviced by storm sewer catchments connected to the City storm sewer. As such, not much local recharge is anticipated.

Soil Vapour Intrusion Pathways

Although no volatile compounds in the soil were above the applicable site standards, concentrations of VOCs in the groundwater collected from the monitoring well at 15-03 exceeded the applicable site standard. The on-Site shopping centre is constructed with slab-on-grade floor, with a basement located on the east end of the mall and below the Shopper's Drug Mart unit which is located just east of the monitoring well at 15-03. As it is uncertain if the VOC contamination extends beneath the shopping centre, there is a potential for vapour intrusion to the on-Site shopping centre. Confirmation of vapour intrusion risks is required via delineation of the VOC plume and/or soil vapour testing.

CROSS-SECTIONS

Lateral and Vertical Distribution of Contaminants

Representative cross-sections of the Site are presented in Figures 5 and 6.

POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS

Potential human receptors at the Site might include outdoor and indoor workers, construction workers, and visitors to the Site. Potential ecological receptors might include soil invertebrates. The exposure pathways for potential ecological receptors include direct/dermal contact and/or ingestion. Exposure pathways for potential human receptors include inhalation of indoor and outdoor air.

The above identified potential exposure pathways and receptors are based only on a preliminary evaluation and, as such, the release mechanisms, potential exposure pathways, and receptors may change upon a completion of a risk assessment for the Site. Evaluation of potential exposure pathways and receptors is beyond the scope of the Phase Two ESA work and, as such, it was not performed as part of this Phase Two ESA report.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The Phase Two ESA investigated all APECs identified in the 2015 Phase One ESA with the exception of APEC 2 which was not completely investigated. The 2015 Phase One ESA indicated that an oil storage UST was formerly located at the rear of the eastern portion of the mall and was identified as an on-Site PCA that resulted in an APEC (part of APEC 2) on Site. As part of the Phase Two sampling and analysis plan, BH15-07 was to be completed with a monitoring well to access the soil and groundwater quality associated with the former oil UST. However, access to the borehole's proposed location was restricted due to overhead utilities and as such the borehole at monitoring well at 15-07 could not be completed. In addition, BH15-05 was completed with a monitoring well to assess potential contamination associated with the oil UST that was reportedly to have been formerly located on the northwest corner of the mall. The proposed location of BH15-05 was restricted due to underlying utilities and as such, it was not positioned in an optimal location.

The reported concentrations of the contaminants of potential concern in all analyzed soil and groundwater samples were below the applicable site condition standards as of the certification date (October 14, 2015), with the exception of VOCs, namely cis-1,2-dichloroethene, tetrachloroethylene, trans-1,2-dichloroethene, trichloroethene and vinyl chloride, in both the original and duplicate groundwater samples collected form the monitoring well at 15-03.

Based on the finding of the Phase Two ESA, it is recommended investigations be undertaken at 15-07 and an optimal location of 15-05 in order to assess the soil and groundwater quality associated with the oil USTs that was formerly located, or reportedly to be formerly located, in the mall. In addition, it is recommended that the VOC in groundwater that was identified at 15-03 be laterally and vertically delineated. The completion of a risk assessment or remediation will then be required prior to the submission of a RSC.

It should be noted that the Phase Two ESA investigated all APECs identified on the area of first development and that the reported concentrations of potential concern in all soil and groundwater samples analyzed from this area were below the applicable site condition standard as of the certification date (October 14, 2015).

7.0 REFERENCES

MOE. 2004. *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act,* March 9, 2004 (amended in July 2009 and effective as of July 1, 2011).

MOE. 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, dated April 15, 2011

MOE. 2011. Ontario Regulation 153/04, as amended, *Record of Site Condition - Part XV.1 of the Environmental Protection Act*, amended October 31, 2011

8.0 LIMITATIONS

This report was prepared for the exclusive use of RioCan Management Inc. The report, which specifically includes all tables, figures and appendices, is based on data and information, collected during conducting the Phase Two ESA, and is based solely on the conditions of the property at the time of conducting investigations, supplemented by historical information and data obtained by Golder Associates Ltd. as described in this report.

The assessment of environmental conditions at this Site has been made using the results of field screening techniques and chemical analysis of soil and groundwater samples at a limited number of locations. The Site conditions between sampling locations have been inferred based on conditions observed at the sampling locations. Conditions may vary from these sample locations. Additional study, including further investigation, can reduce the inherent uncertainties associated with this type of study. However, it is never possible, even with exhaustive sampling and testing, to dismiss the possibility that part of a Site may be contaminated and remain undetected. It is noted that the borehole and monitoring well 15-07 could not been completed and that the borehole and monitoring well at 15-05 was not positioned in an optimal location. As such, it was recommended that further investigations be undertaken to assess the soil and groundwater quality at 15-07 and an optimal location of 15-05.

The services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party (other than as noted above) as a result of decisions made or actions based on this report.

The content of this report is based on information collected during the drilling, soil and groundwater sampling activities, our present understanding of the Site conditions, and our professional judgement in light of such information at the time of this report. This report provides a professional opinion and therefore no warranty is expressed, implied, or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, including excavations, borings or other studies, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

The monitoring wells installed as part of this project have been constructed using licensed drilling/well contractors employing licensed well technicians. It is owner's responsibility to have a licensed well technician properly abandon all monitoring wells, if required.

9.0 SIGNATURES

The undersigned Qualified Person confirms that he/she 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.

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Environmental Consultant

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Principal

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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 Completion
BH15-01	74.90	74.81	6.10	68.80	71.85 - 68.80	Silty clay and silty sand	09-Oct-15
BH15-02	74.07	73.95	6.10	67.97	71.02 - 67.97	Clayey sand and silty sand	08-Oct-15
BH15-03	73.99	73.92	6.10	67.89	70.94 - 67.89	Silty clay and clayey sand	07-Oct-15
BH15-04	74.08	73.99	16.13	57.95	64.38 - 61.33	Clayey sand and silty sand	13-Oct-15
BH15-05	73.93	73.81	6.10	67.83	70.88 - 67.83	Silty clay and clayey sand	07-Oct-15
BH15-06	73.96	73.87	6.10	67.86	72.44 - 69.39	Silty clay	07-Oct-15
BH15-08	74.33	74.25	6.10	68.23	71.28 - 68.23	Silty clay, clayey sand and silty sand	08-Oct-15
BH15-10	74.86	74.77	6.10	68.76	72.04 - 68.76	Silty clay and silty sand	08-Oct-15

Monitoring Well	Ground Surface Elevation (m)	Top of Pipe Elevation (m)	Depth to Groundwater (mbgs) (October 14, 2015)	Depth to Groundwater (mbgs) (November 9, 2015)	Groundwater Elevation (m)	Groundwater Elevation Date	Product Measurement (mm) (October 14, 2015)
BH15-01	74.90	74.81	1.32	1.26	73.63	09/11/2015	0.00
BH15-02	74.07	73.95	5.46	2.77	71.30	09/11/2015	0.00
BH15-03	73.99	73.92	2.75	NA	71.24	14/10/2015	0.00
BH15-04	74.08	73.99	2.79	NA	71.28	14/10/2015	0.00
BH15-05	73.93	73.81	2.09	2.76	71.17	09/11/2015	0.00
BH15-06	73.96	73.87	2.48	NA	71.48	14/10/2015	0.00
BH15-08	74.33	74.25	4.74	4.63	69.70	09/11/2015	0.00
BH15-10	74.86	74.77	4.80	4.78	70.08	09/11/2015	0.00

Borehole Location	Soil Samples Submitted for Analysis	Analytical Paramaters
BH15-01	SA7 (5.89 - 6.10 m)	Petroleum Hydrocabons (F1-F4)
BH15-02	SA8 (5.56 - 6.10 m)	Petroleum Hydrocabons (F1-F4) and Volatile Organic Compounds
BH15-03	SA5 (1.88 - 2.44 m) and DUP3 (duplicate of SA5)	Petroleum Hydrocabons (F1-F4), Volatile Organic Compounds, Polycyclic Aromatic Hydrocarbons, Polychlorinated Biphenyls and Metals
BH15-04	SA9 (4.88 - 6.10 m)	Petroleum Hydrocabons (F1-F4) and Volatile Organic Compounds
BH15-05	SA7 (5.94 - 6.10 m)	Petroleum Hydrocabons (F1-F4)
BH15-06	SA5 (3.66 - 4.88 m)	Petroleum Hydrocabons (F1-F4)
BH15-08	SA1 (0.10 - 0.43 m)	Petroleum Hydrocabons (F1-F4), Polycyclic Aromatic Hydrocarbons and Metals
BH15-08	SA6 (3.66 - 4.88 m)	Petroleum Hydrocabons (F1-F4) and Polychlorinated Biphenyls
BH15-09	SA2 (0.76 - 1.37 m)	Petroleum Hydrocabons (F1-F4), Polycyclic Aromatic Hydrocarbons and Metals
BH15-10	SA4 (3.66 - 4.88 m)	Petroleum Hydrocabons (F1-F4) and Polychlorinated Biphenyls
BH15-11	SA1 (0.10 - 0.25 m)	Petroleum Hydrocabons (F1-F4), Polycyclic Aromatic Hydrocarbons and Metals

Monitoring Well Location	Groundwater Samples Submitted for Analysis	Analytical Paramaters
15-01	15-01	Petroleum Hydrocabons (F1-F4)
15-02	15-02	Petroleum Hydrocabons (F1-F4), Polychlorinated Biphenyls and Volatile Organic Compounds
15-03	15-03 and DUP3 (duplicate of 15-03)	Petroleum Hydrocabons (F1-F4), Polychlorinated Biphenyls and Volatile Organic Compounds
15-04	15-04	Petroleum Hydrocabons (F1-F4) and Volatile Organic Compounds
15-05	15-05	Petroleum Hydrocabons (F1-F4)
15-06	15-06	Petroleum Hydrocabons (F1-F4)
15-08	15-08 and DUP8 (duplicate of 15-08)	Petroleum Hydrocabons (F1-F4), Polycyclic Aromatic Hydrocarbons, Polychlorinated Biphenyls and Metals
15-10	15-10	Polychlorinated Biphenyls

Parameter	Unit	MOE Table 3 Standard (R/P/I) (1) (2)	15-01 09-Oct-2015 BH15-01 SA7	15-02 08-Oct-2015 BH15-02 SA8	15-03 07-Oct-2015 BH15-03 SA5	15-03 07-Oct-2015 DUP3 (Field Duplicate)	15-04 09-Oct-2015 BH15-04 SA9	15-05 07-Oct-2015 BH15-05 SA7	15-06 07-Oct-2015 BH15-06 SA5	15-08 08-Oct-2015 BH15-08 SA1	15-08 08-Oct-2015 BH15-08 SA6	15-09 13-Oct-2015 BH15-09 SA2	15-10 08-Oct-2015 BH15-10 SA4	15-11 07-Oct-2015 BH15-11 SA1
Sample Depth	m		5.89 - 6.10	5.56 - 6.10	1.88 - 2.44	1.88 - 2.44	4.88 - 6.10	5.94 - 6.10	3.66 - 4.88	0.10 - 0.43	3.66 - 4.88	0.76 - 1.37	3.66 - 4.88	0.10 - 0.25
Petroleum Hydrocarbons														
Benzene	ug/g	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	ug/g	2.3	<0.08	<0.05	<0.05	<0.05	<0.05	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	ug/g	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	ug/g	--	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
o-Xylene	ug/g	--	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Xylenes, Total	ug/g	3.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Petroleum Hydrocarbons - F1 (C6-C10)	ug/g	55	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Petroleum Hydrocarbons - F2 (C10-C16)	ug/g	98	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons - F3 (C16-C34)	ug/g	300	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Petroleum Hydrocarbons - F4 (C34-C50)	ug/g	2800	<50	<50	<50	<50	<50	<50	<50	<50	<50	120	<50	<50

Footnotes:

Tables should be read in conjunction with the accompanying document.

< value = Indicates parameter not detected above laboratory method detection limit.

> value = Indicates parameter detected above equipment analytical range.

-- Chemical not analyzed or criteria not defined.

Grey background indicates exceedances.

(1) Ontario Regulation 153/04 (2011) Table 3: Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residenitial/Parkland/Institutional Property Use, Coarse Grained Soils

(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard (R/P/I)

Parameter	Unit	MOE Table 3 Standard (R/P/I) [1] [2]	15-01 09-Oct-2015 BH15-01 SA7	15-02 08-Oct-2015 BH15-02 SA8	15-03 07-Oct-2015 BH15-03 SA5	15-03 07-Oct-2015 DUP3 (Field Duplicate)	15-04 09-Oct-2015 BH15-04 SA9	15-05 07-Oct-2015 BH15-05 SA7	15-06 07-Oct-2015 BH15-06 SA5	15-08 08-Oct-2015 BH15-08 SA1	15-08 08-Oct-2015 BH15-08 SA6	15-09 13-Oct-2015 BH15-09 SA2	15-10 08-Oct-2015 BH15-10 SA4	15-11 07-Oct-2015 BH15-11 SA1
Sample Depth	m		5.89 - 6.10	5.56 - 6.10	1.88 - 2.44	1.88 - 2.44	4.88 - 6.10	5.94 - 6.10	3.66 - 4.88	0.10 - 0.43	3.66 - 4.88	0.76 - 1.37	3.66 - 4.88	0.10 - 0.25
VOCs														
1,1,1,2-Tetrachloroethane	ug/g	0.058	--	<0.04	<0.04	<0.04	<0.04	--	--	--	--	--	--	--
1,1,1-Trichloroethane	ug/g	0.38	--	<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	--	--	--	--	--	--	--
1,1,2-Trichloroethane	ug/g	0.05	--	<0.04	<0.04	<0.04	<0.04	--	--	--	--	--	--	--
1,1-Dichloroethane	ug/g	3.5	--	<0.02	<0.02	<0.02	<0.02	--	--	--	--	--	--	--
1,1-Dichloroethylene	ug/g	0.05	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
1,2-Dibromoethane	ug/g	0.05	--	<0.04	<0.04	<0.04	<0.04	--	--	--	--	--	--	--
1,2-Dichlorobenzene	ug/g	3.4	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
1,2-Dichloroethane	ug/g	0.05	--	<0.03	<0.03	<0.03	<0.03	--	--	--	--	--	--	--
1,2-Dichloropropane	ug/g	0.05	--	<0.03	<0.03	<0.03	<0.03	--	--	--	--	--	--	--
1,3-Dichlorobenzene	ug/g	4.8	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
1,3-Dichloropropene, Total	ug/g	0.05	--	<0.04	<0.04	<0.04	<0.04	--	--	--	--	--	--	--
1,4-Dichlorobenzene	ug/g	0.083	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Methyl Ethyl Ketone	ug/g	16	--	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--
4-Methyl-2-pentanone	ug/g	1.7	--	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--
Acetone	ug/g	16	--	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--
Bromodichloromethane	ug/g	13	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Bromoform	ug/g	0.27	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Bromomethane	ug/g	0.05	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Carbon Tetrachloride	ug/g	0.05	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Chlorobenzene	ug/g	2.4	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Chloroform	ug/g	0.05	--	<0.04	<0.04	<0.04	<0.04	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	ug/g	3.4	--	<0.02	<0.02	<0.02	<0.02	--	--	--	--	--	--	--
Dibromochloromethane	ug/g	9.4	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Dichlorodifluoromethane	ug/g	16	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Methyl tert-Butyl Ether	ug/g	0.75	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Methylene Chloride	ug/g	0.1	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
n-Hexane	ug/g	2.8	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Styrene	ug/g	0.7	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Tetrachloroethylene	ug/g	0.28	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	ug/g	0.084	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Trichloroethene	ug/g	0.061	--	<0.03	<0.03	<0.03	<0.03	--	--	--	--	--	--	--
Trichlorofluoromethane	ug/g	4	--	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--
Vinyl Chloride	ug/g	0.02	--	<0.02	<0.02	<0.02	<0.02	--	--	--	--	--	--	--

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(1) Ontario Regulation 153/04 (2011) Table 3: Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residenitial/Parkland/Institutional Property Use, Coarse Grained Soils

(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard (R/P/I)

Parameter	Unit	MOE Table 3 Standard (R/P/I) (1) (2)	15-01 09-Oct-2015 BH15-01 SA7	15-02 08-Oct-2015 BH15-02 SA8	15-03 07-Oct-2015 BH15-03 SA5	15-03 07-Oct-2015 DUP3 (Field Duplicate)	15-04 09-Oct-2015 BH15-04 SA9	15-05 07-Oct-2015 BH15-05 SA7	15-06 07-Oct-2015 BH15-06 SA5	15-08 08-Oct-2015 BH15-08 SA1	15-08 08-Oct-2015 BH15-08 SA6	15-09 13-Oct-2015 BH15-09 SA2	15-10 08-Oct-2015 BH15-10 SA4	15-11 07-Oct-2015 BH15-11 SA1
Sample Depth	m		5.89 - 6.10	5.56 - 6.10	1.88 - 2.44	1.88 - 2.44	4.88 - 6.10	5.94 - 6.10	3.66 - 4.88	0.10 - 0.43	3.66 - 4.88	0.76 - 1.37	3.66 - 4.88	0.10 - 0.25
PAHs														
1-and 2-methyl Naphthalene	ug/g	0.99 (3)	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Acenaphthene	ug/g	7.9	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Acenaphthylene	ug/g	0.15	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Anthracene	ug/g	0.67	--	--	<0.05	<0.05	--	--	--	0.06	--	<0.05	--	<0.05
Benzo[a]anthracene	ug/g	0.5	--	--	<0.05	<0.05	--	--	--	0.12	--	<0.05	--	<0.05
Benzo[a]pyrene	ug/g	0.3	--	--	<0.05	<0.05	--	--	--	0.10	--	<0.05	--	<0.05
Benzo[b]fluoranthene	ug/g	0.78	--	--	<0.05	<0.05	--	--	--	0.14	--	<0.05	--	<0.05
Benzo[g,h,i]perylene	ug/g	6.6	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Benzo[k]fluoranthene	ug/g	0.78	--	--	<0.05	<0.05	--	--	--	0.06	--	<0.05	--	<0.05
Chrysene	ug/g	7	--	--	<0.05	<0.05	--	--	--	0.12	--	<0.05	--	<0.05
Dibenzo[a,h]anthracene	ug/g	0.1	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Fluoranthene	ug/g	0.69	--	--	0.06	0.09	--	--	--	0.31	--	<0.05	--	<0.05
Fluorene	ug/g	62	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Indeno[1,2,3-cd]pyrene	ug/g	0.38	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Naphthalene	ug/g	0.6	--	--	<0.05	<0.05	--	--	--	<0.05	--	<0.05	--	<0.05
Phenanthrene	ug/g	6.2	--	--	<0.05	<0.05	--	--	--	0.21	--	<0.05	--	<0.05
Pyrene	ug/g	78	--	--	0.05	0.07	--	--	--	0.24	--	<0.05	--	<0.05

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(1) Ontario Regulation 153/04 (2011) Table 3: Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, Residenitial/Parkland/Institutional Property Use, Coarse Grained Soils
(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard (R/P/I)
(3) The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2-methyl naphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

Parameter	Unit	MOE Table 3 Standard (R/P/I) [1] [2]	15-01 09-Oct-2015 BH15-01 SA7	15-02 08-Oct-2015 BH15-02 SA8	15-03 07-Oct-2015 BH15-03 SA5	15-03 07-Oct-2015 DUP3 (Field Duplicate)	15-04 09-Oct-2015 BH15-04 SA9	15-05 07-Oct-2015 BH15-05 SA7	15-06 07-Oct-2015 BH15-06 SA5	15-08 08-Oct-2015 BH15-08 SA1	15-08 08-Oct-2015 BH15-08 SA6	15-09 13-Oct-2015 BH15-09 SA2	15-10 08-Oct-2015 BH15-10 SA4	15-11 07-Oct-2015 BH15-11 SA1
Sample Depth	m		5.89 - 6.10	5.56 - 6.10	1.88 - 2.44	1.88 - 2.44	4.88 - 6.10	5.94 - 6.10	3.66 - 4.88	0.10 - 0.43	3.66 - 4.88	0.76 - 1.37	3.66 - 4.88	0.10 - 0.25
PCBs														
Aroclor 1242	ug/g	--	--	--	<0.1	<0.1	--	--	--	--	<0.1	--	<0.1	--
Aroclor 1248	ug/g	--	--	--	<0.1	<0.1	--	--	--	--	<0.1	--	<0.1	--
Aroclor 1254	ug/g	--	--	--	<0.1	<0.1	--	--	--	--	<0.1	--	<0.1	--
Aroclor 1260	ug/g	--	--	--	<0.1	<0.1	--	--	--	--	<0.1	--	<0.1	--
Polychlorinated Biphenyls	ug/g	0.35	--	--	<0.1	<0.1	--	--	--	--	<0.1	--	<0.1	--

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(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard (R/P/I)

Parameter	Unit	MOE Table 3 Standard (R/P/I) [1] [2]	15-01 09-Oct-2015 BH15-01 SA7	15-02 08-Oct-2015 BH15-02 SA8	15-03 07-Oct-2015 BH15-03 SA5	15-03 07-Oct-2015 DUP3 (Field Duplicate)	15-04 09-Oct-2015 BH15-04 SA9	15-05 07-Oct-2015 BH15-05 SA7	15-06 07-Oct-2015 BH15-06 SA5	15-08 08-Oct-2015 BH15-08 SA1	15-08 08-Oct-2015 BH15-08 SA6	15-09 13-Oct-2015 BH15-09 SA2	15-10 08-Oct-2015 BH15-10 SA4	15-11 07-Oct-2015 BH15-11 SA1
Sample Depth	m		5.89 - 6.10	5.56 - 6.10	1.88 - 2.44	1.88 - 2.44	4.88 - 6.10	5.94 - 6.10	3.66 - 4.88	0.10 - 0.43	3.66 - 4.88	0.76 - 1.37	3.66 - 4.88	0.10 - 0.25
Metals														
Antimony	ug/g	7.5	--	--	<0.8	<0.8	--	--	--	<0.8	--	<0.8	--	<0.8
Arsenic	ug/g	18	--	--	2	2	--	--	--	3	--	2	--	4
Barium	ug/g	390	--	--	115	120	--	--	--	365	--	262	--	142
Beryllium	ug/g	4	--	--	0.5	<0.5	--	--	--	<0.5	--	0.7	--	0.5
Boron	ug/g	120	--	--	6	6	--	--	--	6	--	5	--	10
Cadmium	ug/g	1.2	--	--	<0.5	<0.5	--	--	--	<0.5	--	<0.5	--	<0.5
Chromium	ug/g	160	--	--	33	36	--	--	--	20	--	79	--	40
Cobalt	ug/g	22	--	--	8.2	8.7	--	--	--	7.0	--	18.1	--	12.8
Copper	ug/g	140	--	--	20	22	--	--	--	16	--	32	--	27
Lead	ug/g	120	--	--	19	26	--	--	--	9	--	9	--	10
Molybdenum	ug/g	6.9	--	--	0.6	0.7	--	--	--	1.1	--	1.2	--	2.2
Nickel	ug/g	100	--	--	22	23	--	--	--	16	--	45	--	34
Selenium	ug/g	2.4	--	--	<0.4	<0.4	--	--	--	<0.4	--	<0.4	--	<0.4
Silver	ug/g	20	--	--	<0.2	<0.2	--	--	--	<0.2	--	<0.2	--	<0.2
Thallium	ug/g	1	--	--	<0.4	<0.4	--	--	--	<0.4	--	<0.4	--	<0.4
Uranium	ug/g	23	--	--	0.5	0.5	--	--	--	0.5	--	0.9	--	1.0
Vanadium	ug/g	86	--	--	32	33	--	--	--	23	--	80	--	44
Zinc	ug/g	340	--	--	71	72	--	--	--	29	--	98	--	52

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(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard (R/P/I)

Parameter	Unit	MOE Table 3 Standard (1) (2)	15-01	15-02	15-03	15-03	15-04	15-05	15-06	15-08	15-08	15-10
			14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015
			15-01	15-02	15-03	DUP 3 (Field Duplicate)	15-04	15-05	15-06	15-08	DUP 8 (Field Duplicate)	15-10
Petroleum Hydrocarbons												
Benzene	ug/l	44	<0.20	<0.20	<2.00	<2.00	<0.20	<0.20	<0.20	<0.20	<0.20	--
Toluene	ug/l	18000	<0.20	0.41	<2.00	<2.00	0.33	<0.20	<0.20	<0.20	<0.20	--
Ethylbenzene	ug/l	2300	<0.10	<0.10	<1.00	<1.00	<0.10	<0.10	<0.10	<0.10	<0.10	--
m,p-Xylenes	ug/l	--	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
o-Xylene	ug/l	--	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
Xylenes, Total	ug/l	4200	<0.20	<0.20	<2.00	<2.00	<0.20	<0.20	<0.20	<0.20	<0.20	--
Petroleum Hydrocarbons - F1 (C6-C10)	ug/l	750	<25	<25	470	470	<25	<25	<25	<25	<25	--
Petroleum Hydrocarbons - F2 (C10-C16)	ug/l	150	<100	<100	<100	<100	<100	<100	<100	<100	<100	--
Petroleum Hydrocarbons - F3 (C16-C34)	ug/l	500	<100	<100	<100	<100	<100	<100	<100	<100	<100	--
Petroleum Hydrocarbons - F4 (C34-C50)	ug/l	500	<100	<100	<100	<100	<100	<100	<100	<100	<100	--

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(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard

Parameter	Unit	MOE Table 3 Standard (1) (2)	15-01 14-Oct-2015 15-01	15-02 14-Oct-2015 15-02	15-03 14-Oct-2015 15-03	15-03 14-Oct-2015 DUP 3 (Field Duplicate)	15-04 14-Oct-2015 15-04	15-05 14-Oct-2015 15-05	15-06 14-Oct-2015 15-06	15-08 14-Oct-2015 15-08	15-08 14-Oct-2015 DUP 8 (Field Duplicate)	15-10 14-Oct-2015 15-10
VOCs												
1,1,1,2-Tetrachloroethane	ug/l	3.3	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
1,1,1-Trichloroethane	ug/l	640	--	<0.30	<3.00	<3.00	<0.30	--	--	--	--	--
1,1,2,2-Tetrachloroethane	ug/l	3.2	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
1,1,2-Trichloroethane	ug/l	4.7	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
1,1-Dichloroethane	ug/l	320	--	<0.30	<3.00	<3.00	<0.30	--	--	--	--	--
1,1-Dichloroethylene	ug/l	1.6	--	<0.30	<3.00	<3.00	<0.30	--	--	--	--	--
1,2-Dibromoethane	ug/l	0.25	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
1,2-Dichlorobenzene	ug/l	4600	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
1,2-Dichloroethane	ug/l	1.6	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
1,2-Dichloropropane	ug/l	16	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
1,3-Dichlorobenzene	ug/l	9600	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
1,3-Dichloropropene, Total	ug/l	5.2	--	<0.30	<3.00	<3.00	<0.30	--	--	--	--	--
1,4-Dichlorobenzene	ug/l	8	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
Methyl Ethyl Ketone	ug/l	470000	--	<1.0	<10.0	<10.0	<1.0	--	--	--	--	--
4-Methyl-2-pentanone	ug/l	140000	--	<1.0	<10.0	<10.0	<1.0	--	--	--	--	--
Acetone	ug/l	130000	--	<1.0	<10.0	<10.0	<1.0	--	--	--	--	--
Bromodichloromethane	ug/l	85000	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
Bromoform	ug/l	380	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
Bromomethane	ug/l	5.6	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
Carbon Tetrachloride	ug/l	0.79	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
Chlorobenzene	ug/l	630	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
Chloroform	ug/l	2.4	--	<0.20	<2.00	<2.00	0.35	--	--	--	--	--
cis-1,2-Dichloroethene	ug/l	1.6	--	<0.20	**590**	**670**	<0.20	--	--	--	--	--
Dibromochloromethane	ug/l	82000	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
Dichlorodifluoromethane	ug/l	4400	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
Methyl tert-Butyl Ether	ug/l	190	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
Methylene Chloride	ug/l	610	--	<0.30	<3.00	<3.00	<0.30	--	--	--	--	--
n-Hexane	ug/l	51	--	<0.20	<2.00	<2.00	<0.20	--	--	--	--	--
Styrene	ug/l	1300	--	<0.10	<1.00	<1.00	<0.10	--	--	--	--	--
Tetrachloroethylene	ug/l	1.6	--	<0.20	**2700**	**2800**	<0.20	--	--	--	--	--
trans-1,2-Dichloroethene	ug/l	1.6	--	<0.20	**7.5**	**8.8**	<0.20	--	--	--	--	--
Trichloroethene	ug/l	1.6	--	<0.20	**440**	**540**	<0.20	--	--	--	--	--
Trichlorofluoromethane	ug/l	2500	--	<0.40	<4.00	<4.00	<0.40	--	--	--	--	--
Vinyl Chloride	ug/l	0.5	--	<0.17	**52**	**52**	<0.17	--	--	--	--	--

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(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard

Parameter	Unit	MOE Table 3 Standard (1) (2)	15-01	15-02	15-03	15-03	15-04	15-05	15-06	15-08	15-08	15-10
			14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015
			15-01	15-02	15-03	DUP 3 (Field Duplicate)	15-04	15-05	15-06	15-08	DUP 8 (Field Duplicate)	15-10
PAHs												
2-and 1-methyl Naphthalene	ug/l	1800 (3)	--	--	--	--	--	--	--	<0.20	<0.20	--
Acenaphthene	ug/l	600	--	--	--	--	--	--	--	<0.20	<0.20	--
Acenaphthylene	ug/l	1.8	--	--	--	--	--	--	--	<0.20	<0.20	--
Anthracene	ug/l	2.4	--	--	--	--	--	--	--	<0.10	<0.10	--
Benzo[a]anthracene	ug/l	4.7	--	--	--	--	--	--	--	<0.20	<0.20	--
Benzo[a]pyrene	ug/l	0.81	--	--	--	--	--	--	--	<0.01	<0.01	--
Benzo[b]fluoranthene	ug/l	0.75	--	--	--	--	--	--	--	<0.10	<0.10	--
Benzo[g,h,i]perylene	ug/l	0.2	--	--	--	--	--	--	--	<0.20	<0.20	--
Benzo[k]fluoranthene	ug/l	0.4	--	--	--	--	--	--	--	<0.10	<0.10	--
Chrysene	ug/l	1	--	--	--	--	--	--	--	<0.10	<0.10	--
Dibenzo[a,h]anthracene	ug/l	0.52	--	--	--	--	--	--	--	<0.20	<0.20	--
Fluoranthene	ug/l	130	--	--	--	--	--	--	--	<0.20	<0.20	--
Fluorene	ug/l	400	--	--	--	--	--	--	--	<0.20	<0.20	--
Indeno[1,2,3-cd]pyrene	ug/l	0.2	--	--	--	--	--	--	--	<0.20	<0.20	--
Naphthalene	ug/l	1400	--	--	--	--	--	--	--	<0.20	<0.20	--
Phenanthrene	ug/l	580	--	--	--	--	--	--	--	<0.10	<0.10	--
Pyrene	ug/l	68	--	--	--	--	--	--	--	<0.20	<0.20	--

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(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard

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

Parameter	Unit	MOE Table 3 Standard (1) (2)	15-01	15-02	15-03	15-03	15-04	15-05	15-06	15-08	15-08	15-10
			14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015
			15-01	15-02	15-03	DUP 3 (Field Duplicate)	15-04	15-05	15-06	15-08	DUP 8 (Field Duplicate)	15-10
PCBs												
Aroclor 1242	ug/l	--	--	<0.1	<0.1	<0.1	--	--	--	<0.1	<0.1	<0.1
Aroclor 1248	ug/l	--	--	<0.1	<0.1	<0.1	--	--	--	<0.1	<0.1	<0.1
Aroclor 1254	ug/l	--	--	<0.1	<0.1	<0.1	--	--	--	<0.1	<0.1	<0.1
Aroclor 1260	ug/l	--	--	<0.1	<0.1	<0.1	--	--	--	<0.1	<0.1	<0.1
Polychlorinated Biphenyls	ug/l	7.8	--	<0.1	<0.1	<0.1	--	--	--	<0.1	<0.1	<0.1

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(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard

Parameter	Unit	MOE Table 3 Standard (1) (2)	15-01	15-02	15-03	15-03	15-04	15-05	15-06	15-08	15-08	15-10
			14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015	14-Oct-2015
			15-01	15-02	15-03	DUP 3 (Field Duplicate)	15-04	15-05	15-06	15-08	DUP 8 (Field Duplicate)	15-10
Metals												
Antimony	ug/l	20000	--	--	--	--	--	--	--	<0.5	<0.5	--
Arsenic	ug/l	1900	--	--	--	--	--	--	--	6.5	6.7	--
Barium	ug/l	29000	--	--	--	--	--	--	--	502	479	--
Beryllium	ug/l	67	--	--	--	--	--	--	--	<0.5	<0.5	--
Boron	ug/l	45000	--	--	--	--	--	--	--	75.8	71.2	--
Cadmium	ug/l	2.7	--	--	--	--	--	--	--	<0.2	<0.2	--
Chromium	ug/l	810	--	--	--	--	--	--	--	3.1	5.8	--
Cobalt	ug/l	66	--	--	--	--	--	--	--	3.3	3.2	--
Copper	ug/l	87	--	--	--	--	--	--	--	1.0	<1.0	--
Hexavalent Chromium	ug/l	140	--	--	--	--	--	--	--	<5	<5	--
Lead	ug/l	25	--	--	--	--	--	--	--	<0.5	<0.5	--
Mercury	ug/l	0.29	--	--	--	--	--	--	--	<0.02	<0.02	--
Molybdenum	ug/l	9200	--	--	--	--	--	--	--	5.6	5.3	--
Nickel	ug/l	490	--	--	--	--	--	--	--	7.1	7.4	--
Selenium	ug/l	63	--	--	--	--	--	--	--	1.4	2.8	--
Silver	ug/l	1.5	--	--	--	--	--	--	--	<0.2	<0.2	--
Thallium	ug/l	510	--	--	--	--	--	--	--	<0.3	<0.3	--
Uranium	ug/l	420	--	--	--	--	--	--	--	3.9	3.9	--
Vanadium	ug/l	250	--	--	--	--	--	--	--	6.4	6.2	--
Zinc	ug/l	1100	--	--	--	--	--	--	--	5.4	<5.0	--

Footnotes:

Tables should be read in conjunction with the accompanying document.

< value = Indicates parameter not detected above laboratory method detection limit.

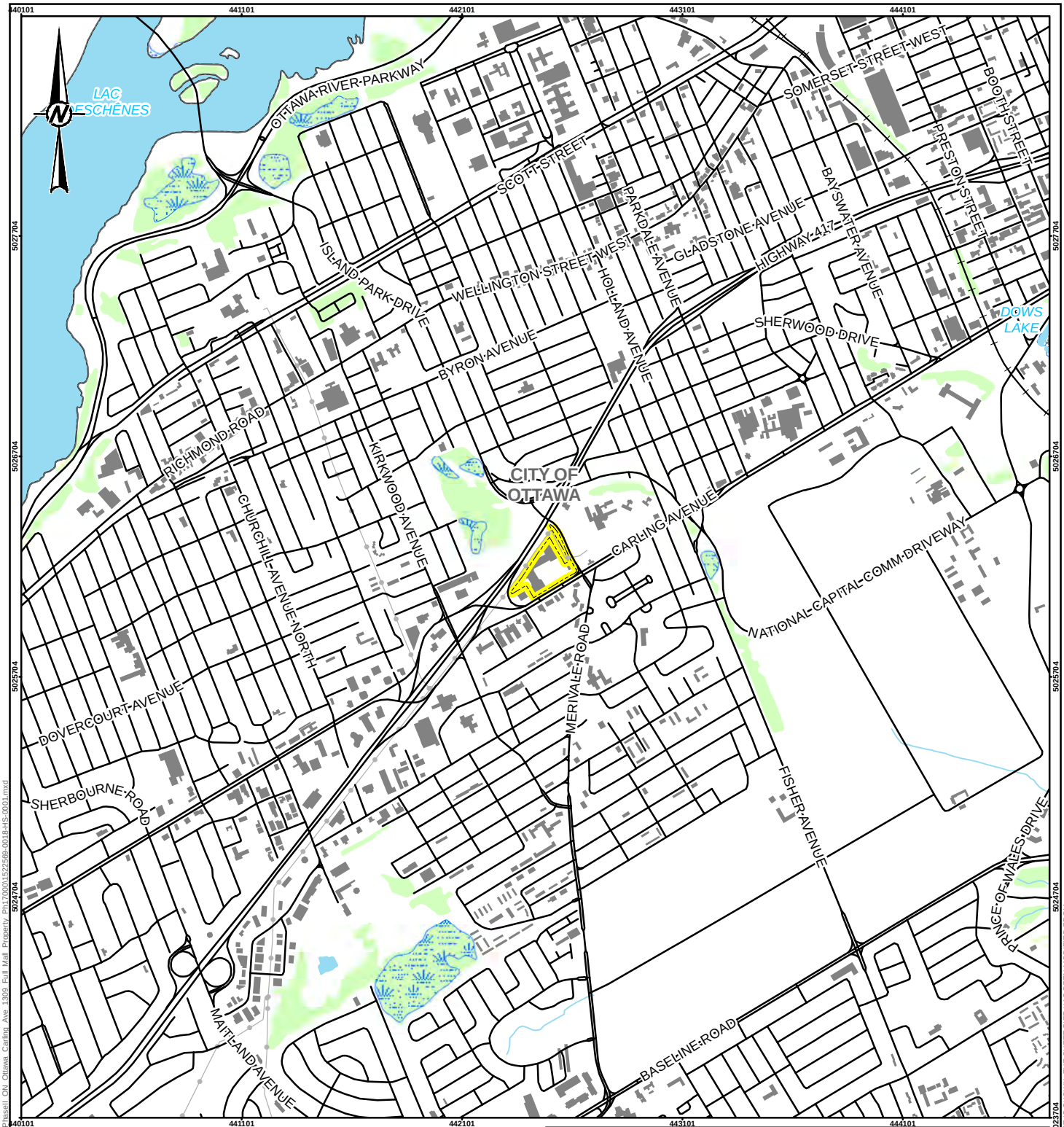
> value = Indicates parameter detected above equipment analytical range.

-- Chemical not analyzed or criteria not defined.

Grey background indicates exceedances.

(1) Ontario Regulation 153/04 (2011) Table 3: Full Depth Generic Site Conditions in a Non-Potable Groundwater Condition, All Types of Property Use, Non-Potable Groundwater

(2) Bold Font = Parameter concentration greater than MOE Table 3 Standard



LEGEND

- RAILWAY
- ROAD
- UTILITY LINE
- WATERCOURSE
- APPROXIMATE PHASE TWO PROPERTY
- BUILDING
- MUNICIPAL BOUNDARY
- WATERBODY
- WETLAND
- WOODED AREA

0 500 1,000

1:25,000 METRES

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2015
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2015
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18N

CLIENT
RIOCAN MANAGEMENT INC.

PROJECT
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1309 CARLING AVENUE, OTTAWA, ONTARIO

TITLE
KEY PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-11-24
DESIGNED	JT
PREPARED	JT
REVIEWED	AT
APPROVED	BJV

PROJECT NO.	PHASE	REV.	FIGURE
1522569	17000	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
0

Path: O:\Mississauga\SIM\Client\RIOCAN\Canada\69 PROJ\1522569 ESA\40 PROD\008 Blasell ON Ottawa Carling Ave 1309 Full Mall Property Ph1\70001522569-008-HS-0001.mxd

Potentially Contaminating Activities ("PCA")		
Location	Detail	PCA #
A	Importation of Fill Materials of Unknown Quality or Origin	30
B	Electricity Generatorion, Transformation and Power Stations: Basement of the Shopper's Drug Mart has a Hydro Ottawa transformer room	18
C	Electricity Generatorion, Transformation and Power Stations: Hydro Ottawa Sub-Station	18
D	Rail Yards, Tracks and Spurs: Former C.P.R. right-of-way and rail yard	46
E	Gasoline and Associated Products in Fixed Tanks: Former Barrington's Petroleum Products Limited	28
F	Gasoline and Associated Products in Fixed Tanks: Industrial land use as the Seven-Up Bottling Co. with one UST on the property	28, 52
G	Gasoline and Associated Products in Fixed Tanks and Commercial Autobody Shops: Former gasoline and service station with two USTs	28, 10
H	Gasoline and Associated Products in Fixed Tanks: Former gasoline service station with three USTs	28
I	Gasoline and Associated Products in Fixed Tanks and Commercial Autobody Shops: Former gasoline and service station with two USTs and a 'greasing' area	28, 10
J	Gasoline and Associated Products in Fixed Tanks and Commercial Autobody Shops: Former gasoline and service station with two USTs and a 'greasing' area	28, 10
K	Operation of Dry Cleaning Equipment (where chemicals are used): Former dry cleaner's in the Westgate Shopping Centre. Could not confirm whether historically cleaning was done on the property	37
L	Operation of Dry Cleaning Equipment (where chemicals are used): Off-Site, south side of Carling Avenue	37
M	Gasoline and Associated Products in Fixed Tanks: Industrial land use as the Seven-Up Bottling Co. with one UST on the property	28
N	Gasoline and Associated Products in Fixed Tanks	28
O	Gasoline and Associated Products in Fixed Tanks: Former Sun Oil Ltd.	28

LEGEND

- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE BOREHOLE LOCATION NOT COMPLETED. (PLANNED AS PART OF FUTURE SUPPLEMENTAL PHASE II ESA)
- POTENTIALLY CONTAMINATING ACTIVITY
- AREA OF FIRST DEVELOPMENT
- APPROXIMATE PHASE TWO PROPERTY

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

- APEC 1 (SITE WIDE)
- APEC 2
- APEC 3
- APEC 4
- APEC 5
- APEC 6

Areas of Potential Environmental Concern ("APEC")		
APEC #	Detail	PCA#
1	Importation of Fill Material of Unknown Quality	30
2	Gasoline and Associated Products in Fixed Tanks, Storage, Maintenance, Fuelling and Repair of Equipment, Vehicles and Material Used to Maintain Transportation Systems, and Commercial Autobody Shops	28, 52, 10
3	Electricity Generator, Transformation and Power Stations (Transformer Room)	18
4	Operation of Dry Cleaning Equipment (where chemicals are used)	37
5	Electricity Generator, Transformation and Power Stations (Hydro Ottawa Sub-Station)	18
6	Rail Yards, Tracks and Spurs	46

0 100 200

1:3,500 METRES

REFERENCE(S)

BASE DATA - ATLAS OF CANADA, NATURAL RESOURCES CANADA, 2011. MNR LIO, OBTAINED 2015.
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BASE IMAGERY - MICROSOFT BING ©2015 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18N

CLIENT
RIOCAN MANAGEMENT INC.

PROJECT
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1309 CARLING AVENUE, OTTAWA, ONTARIO

TITLE
SITE PLAN

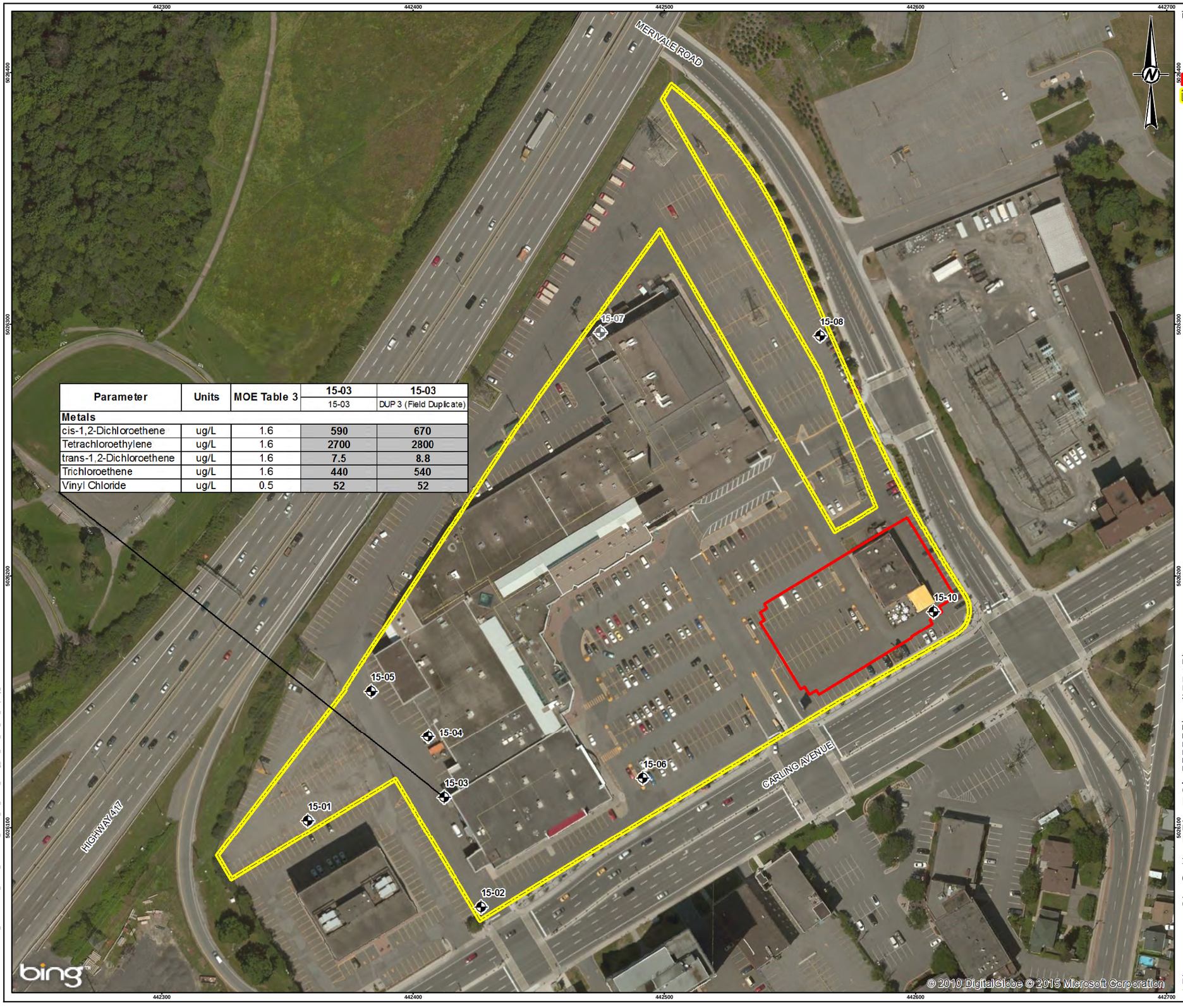
CONSULTANT
Golder Associates

YYYY-MM-DD	2015-10-28
DESIGNED	JT
PREPARED	JT
REVIEWED	AT
APPROVED	BJV

PROJECT NO.	PHASE	REV.	FIGURE
1522569	17000	0	2

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

S:\Clients\RIOCAN\Canada\99_PROJ\1522569_ESA\40_PROD\0018_Phase\I_ON_Ottawa_Carling_Ave_1309_Full_Mall_Property_Ph17000\1522569-0018-HS-0001.mxd



Parameter	Units	MOE Table 3	15-03	15-03
			15-03	DUP 3 (Field Duplicate)
Metals				
cis-1,2-Dichloroethene	ug/L	1.6	**590**	**670**
Tetrachloroethylene	ug/L	1.6	**2700**	**2800**
trans-1,2-Dichloroethene	ug/L	1.6	**7.5**	**8.8**
Trichloroethene	ug/L	1.6	**440**	**540**
Vinyl Chloride	ug/L	0.5	**52**	**52**

LEGEND

- APPROXIMATE BOREHOLE LOCATION COMPLETED AS MONITORING WELLS
- APPROXIMATE BOREHOLE LOCATION NOT COMPLETED. (PLANNED AS PART OF FUTURE SUPPLEMENTAL PHASE II ESA)
- AREA OF FIRST DEVELOPMENT
- APPROXIMATE PHASE TWO PROPERTY

0 10 20 40 60 80

1:1,500 METRES

NOTE(S)

1. MOE TABLE 3: ONTARIO REG 153/04 (2011) TABLE 3: FULL DEPTH GENERIC SITE CONDITIONS IN A NON-POTABLE GROUNDWATER CONDITION, ALL TYPES OF PROPERTY USE, NON-POTABLE GROUNDWATER
2. SHADED AND BOLD VALUES ARE EXCEEDANCES OF MOE TABLE 3

REFERENCE(S)

BASE DATA - ATLAS OF CANADA, NATURAL RESOURCES CANADA, 2011. MNR LIO, OBTAINED 2015. PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2015
BASE IMAGERY - MICROSOFT BING ©2015 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18N

CLIENT
RIOCAN MANAGEMENT INC.

PROJECT
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1309 CARLING AVENUE, OTTAWA, ONTARIO

TITLE
GROUNDWATER EXCEEDANCES

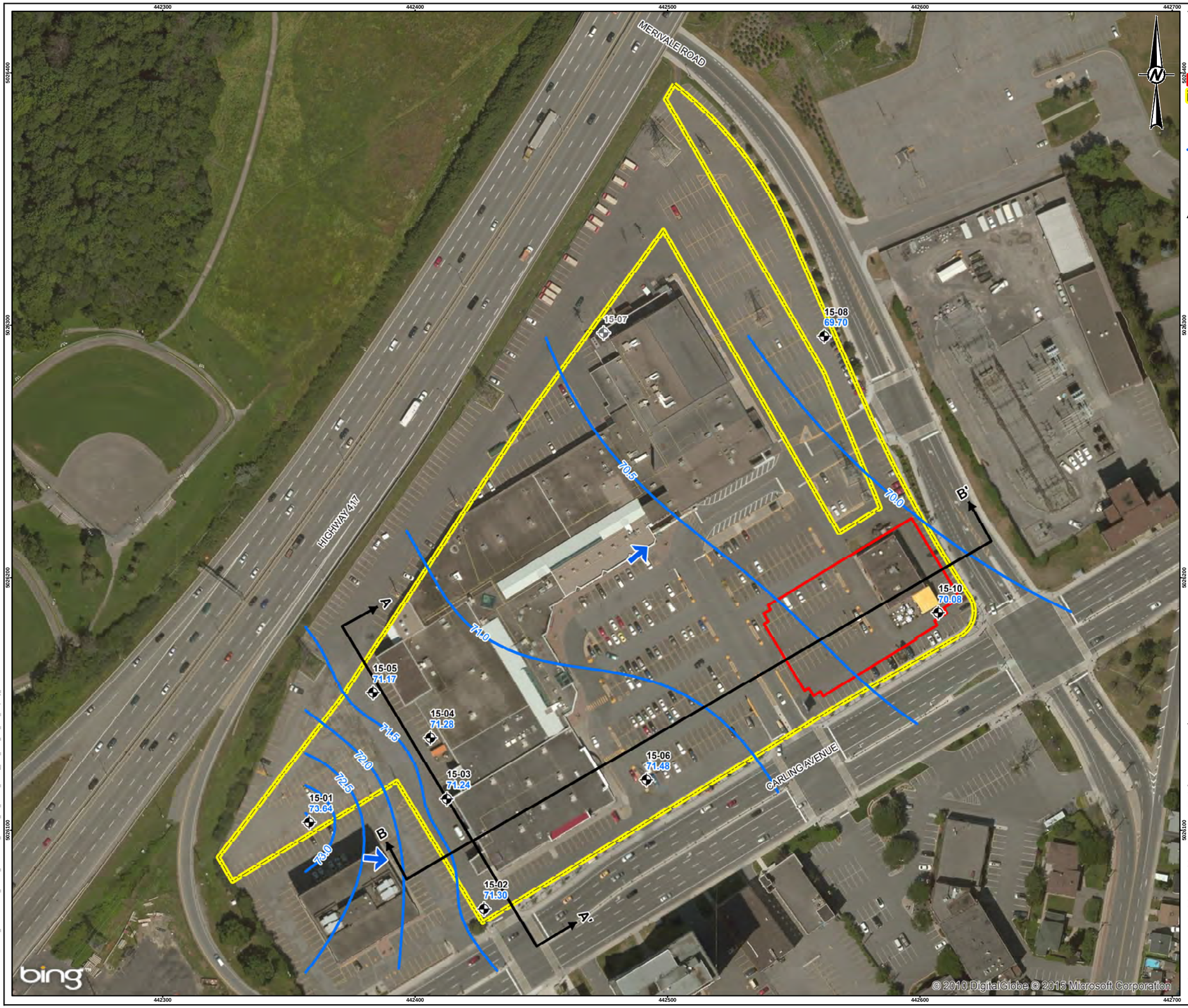
CONSULTANT
Golder Associates

YYYY-MM-DD	2015-10-28
DESIGNED	JT
PREPARED	JT
REVIEWED	AT
APPROVED	BJV

PROJECT NO.	PHASE	REV.	FIGURE
1522569	17000	0	3

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

S:\Clients\RIOCAN\Canada\99_PROJ\1522569_ESA\40_PROD\0018_Phase\I_ON_Ottawa_Carling_Ave_1309_Full_Mall_Property_Ph1\7000\1522569-0018-HS-0001.mxd



LEGEND

- APPROXIMATE BOREHOLE LOCATION COMPLETED AS MONITORING WELLS
- APPROXIMATE BOREHOLE LOCATION NOT COMPLETED. (PLANNED AS PART OF FUTURE SUPPLEMENTAL PHASE II ESA)
- AREA OF FIRST DEVELOPMENT
- APPROXIMATE PHASE TWO PROPERTY
- INTERPRETED GROUNDWATER FLOW DIRECTION
- INTERPRETED GROUNDWATER ELEVATION CONTOUR, mASL
- 73.57 GROUNDWATER ELEVATION, mASL (OCTOBER 14 and NOVEMBER 9, 2015)
- A A' CROSS-SECTION LOCATION

0 10 20 40 60 80

1:1,500 METRES

REFERENCE(S)

BASE DATA - ATLAS OF CANADA, NATURAL RESOURCES CANADA, 2011. MNR LIO, OBTAINED 2015. PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2015
BASE IMAGERY - MICROSOFT BING ©2015 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18N

CLIENT
RIOCAN MANAGEMENT INC.

PROJECT
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1309 CARLING AVENUE, OTTAWA, ONTARIO

TITLE
GROUNDWATER ELEVATIONS AND INTERPRETED GROUNDWATER FLOW DIRECTION

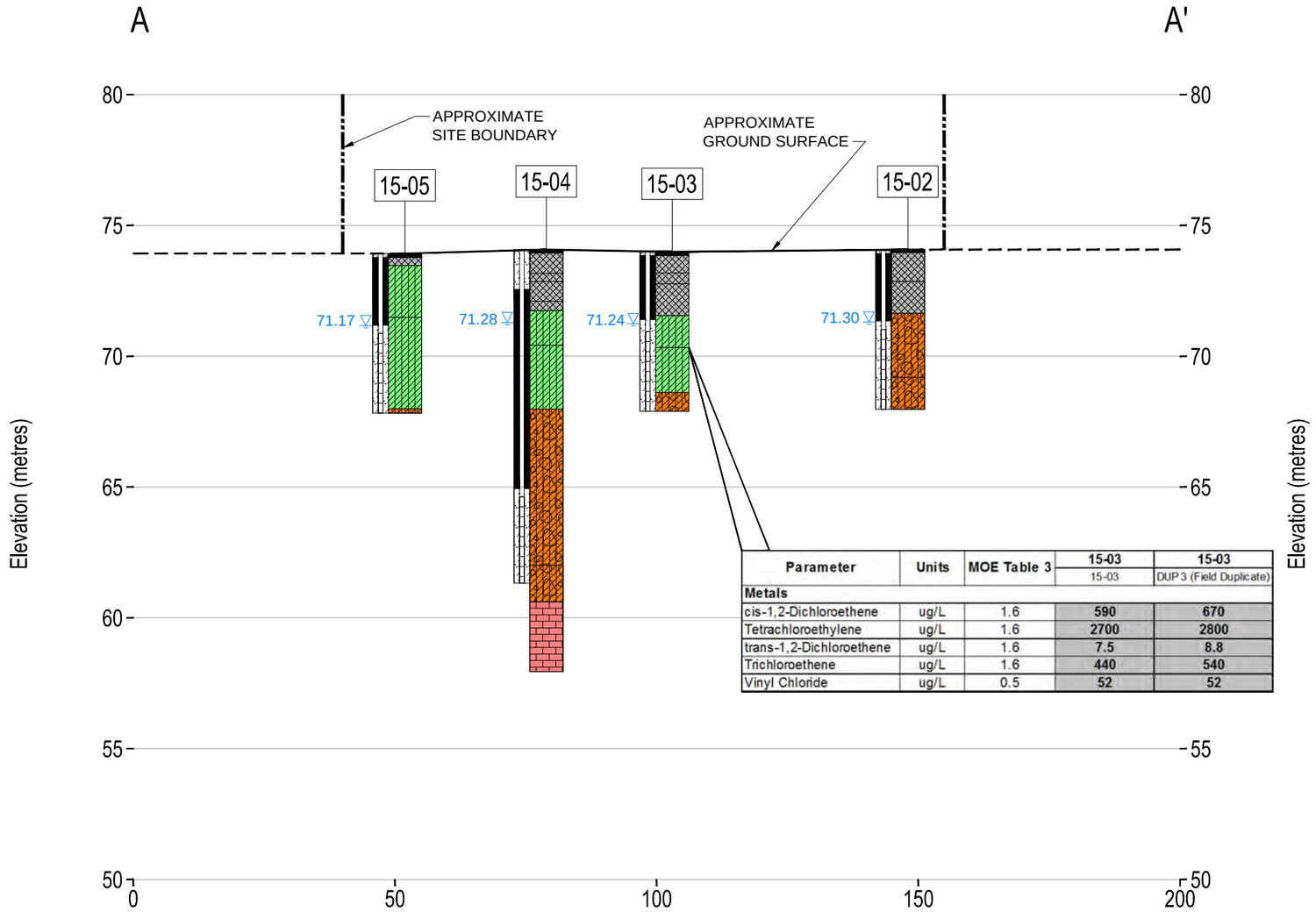
CONSULTANT
Golder Associates

YYYY-MM-DD	2015-10-28
DESIGNED	JT
PREPARED	JT
REVIEWED	AT
APPROVED	BJV

PROJECT NO.	PHASE	REV.	FIGURE
1522569	17000	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

S:\Clients\RIOCAN\Canada\99_PROJ\1522569_ESA40_PROD\0018_Phase\I_ON_Ottawa_Carling_Ave_1309_Full_Mall_Property_Ph1\700\1522569-0018-HS-0001.mxd



Parameter	Units	MOE Table 3	15-03	15-03
			15-03	DUP 3 (Field Duplicate)
Metals				
cis-1,2-Dichloroethene	ug/L	1.6	**590**	**670**
Tetrachloroethylene	ug/L	1.6	**2700**	**2800**
trans-1,2-Dichloroethene	ug/L	1.6	**7.5**	**8.8**
Trichloroethene	ug/L	1.6	**440**	**540**
Vinyl Chloride	ug/L	0.5	**52**	**52**

0 5 10
1:200 VERTICAL METRES

0 25 50
1:1,000 HORIZONTAL METRES

LEGEND

TEST HOLE IDENTIFIER — 15-01
SUBSURFACE STRATIGRAPHY
WATER LEVEL Oct.14 or Nov.9, 2015
WELL SCREEN

ASPHALTIC CONCRETE
FILL
SILTY CLAY
GLACIAL TILL
LIMESTONE BEDROCK

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 4.
3. MOE TABLE 3: ONTARIO REG 153/04 (2011) TABLE 3: FULL DEPTH GENERIC SITE CONDITIONS IN A NON-POTABLE GROUNDWATER CONDITION, ALL TYPES OF PROPERTY USE, NON-POTABLE GROUNDWATER
4. SHADED AND BOLD VALUES ARE EXCEEDANCES OF MOE TABLE 3

CLIENT
RIOCAN MANAGEMENT INC.

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-11-25
DESIGNED	----
PREPARED	JEM
REVIEWED	AT
APPROVED	BJV

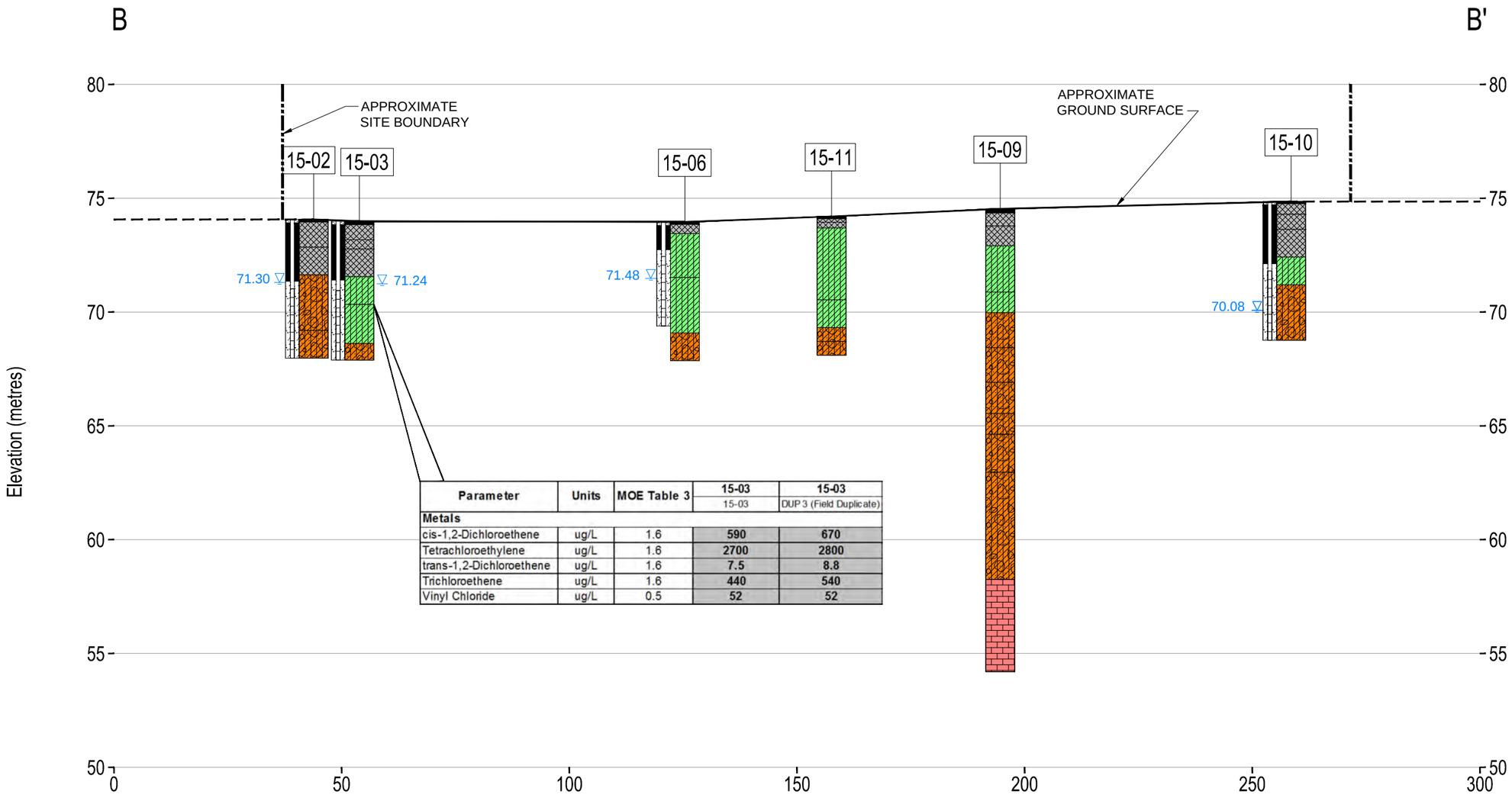
PROJECT
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1309 CARLING AVENUE, OTTAWA, ONTARIO

TITLE
GEOLOGICAL CROSS-SECTION A-A'

PROJECT NO.	PHASE	REV.	FIGURE
1522569	17000	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B
25 mm
0

Path: \\golder.gds\gaMississauga\SIM\Clients\RIOCAN\Canada\09_PRO\1522569_ESAv40_PRO\0018_Phase II_ON_Ottawa_Carling_Ave_1309_Full_Mall_Property_Ph17000\ | File Name: 1522569-0018-HS-0005.dwg



Parameter	Units	MOE Table 3	15-03	15-03
			15-03	DUP 3 (Field Duplicate)
Metals				
cis-1,2-Dichloroethene	ug/L	1.6	**590**	**670**
Tetrachloroethylene	ug/L	1.6	**2700**	**2800**
trans-1,2-Dichloroethene	ug/L	1.6	**7.5**	**8.8**
Trichloroethene	ug/L	1.6	**440**	**540**
Vinyl Chloride	ug/L	0.5	**52**	**52**

1:200 VERTICAL 0 5 10 METRES

1:1,000 HORIZONTAL 0 25 50 METRES

LEGEND

TEST HOLE IDENTIFIER (15-01)

SUBSURFACE STRATIGRAPHY

WATER LEVEL Oct.14 or Nov.9, 2015

WELL SCREEN

ASPHALTIC CONCRETE

FILL

SILTY CLAY

GLACIAL TILL

LIMESTONE BEDROCK

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 4.
3. MOE TABLE 3: ONTARIO REG 153/04 (2011) TABLE 3: FULL DEPTH GENERIC SITE CONDITIONS IN A NON-POTABLE GROUNDWATER CONDITION, ALL TYPES OF PROPERTY USE, NON-POTABLE GROUNDWATER
4. SHADED AND BOLD VALUES ARE EXCEEDANCES OF MOE TABLE 3

CLIENT
RIOCAN MANAGEMENT INC.

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-11-25
DESIGNED	----
PREPARED	JEM
REVIEWED	AT
APPROVED	BJV

PROJECT
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
1309 CARLING AVENUE, OTTAWA, ONTARIO

TITLE
GEOLOGICAL CROSS-SECTION B-B'

PROJECT NO.	PHASE	REV.	FIGURE
1522569	17000	0	6

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

25 mm

0

Path: \\golder.gds\gal\Mississauga\Shared\Clients\RIOCAN\Canada\99_PROJ\1522569_ESAv40_PROD\0018_PhaseII_ON_Ottawa_Carling_Ave_1309_Full_Mall_Property_Ph17000\ | File Name: 1522569-0018-HS-0005.dwg

APPENDIX A (i)

Sampling and Analysis Plan

Table A1: Sampling and Analysis Plan, Westgate Shopping Centre

Area of Potential Environmental Concern	Borehole Location ID	Location	Rationale	Borehole Depth (mbgs)	Well to be Installed (Y/N)	Depth of Well	Soil Samples	Groundwater Samples	QA/QC Soil Samples	QA/QC Groundwater Samples
APEC 1 - Fill is reportedly present across the Site	BH15-09	To be located in the parking lot near the middle of the Site	Borehole to assess the quality of fill on Site and for geotechnical investigation	20.34	N	NA	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX, PAHs and metals	NA	One duplicate soil sample will be submitted for analysis of PHCs F1-F4/BTEX, VOCs, PAHs, PCBs and metals	One duplicate groundwate sample will be submitted for analysis of PHCs F1-F4/BTEX, VOCs and PCBs and another duplicate groundwater sample will be submitted for analysis of PHCs F1-F4/BTEX, PCBs , PAHs and metals. In addition, one trip blank and one trip spike will be submitted for analysis of VOCs and one field blank will be submitted for analysis of PHCs F1-F4/BTEX, VOCs, PCBs , PAHs and metals
	BH15-11	To be located near the northeast corner of the area of first development	Borehole to assess the quality of fill on Site	6.1	N	NA	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX, PAHs and metals	NA		
	BH15-03	To the located on the west side of the shopping centre near the Shopper's Drug Mart and the former dry cleaning facility	Borehole to assess the quality of fill on Site. Borehole to be completed with a monitoring well to assess groundwater impacts associated with other APECs	6.1	Y	Bottom of screen (3 m screen) in all monitoring wells will be located such that the screen straddles the water table	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX, PAHs and metals	NA		
	BH15-08	To be located on the northeast portion of the Site to the west of Merivale Road	Borehole to assess the quality of fill on Site. Borehole to be completed with a monitoring well to assess groundwater impacts associated with other APECs	6.1	Y	Bottom of screen (3 m screen) in all monitoring wells will be located such that the screen straddles the water table	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX, PAHs and metals	NA		
APEC 2 - It was reported by the Site Representative that there was previously oil storage USTs at the rear of the mall. The USTs were located at the north and northwest corner of the mall, near to the locations of the former boiler rooms. It was reported that the clean-up and removal was completed by Pinchin, but no report was provided to Golder for review. Also, it was noted that there was hydrocarbon products stored on the Site in the 1925 (revised 1948) FIP. In addition, there are off-Site PCAs that may contribute to APECs on-Site. ASTs were located at service stations/garages/industrial properties at six locations hydraulically down-and-cross gradient of the Site.	BH15-01	To be located on the southwesternmost portion of the Site	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to a former off-Site gas station	6.1	Y	Bottom of screen (3 m screen) in all monitoring wells will be located such that the screen straddles the water table	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX		
	BH15-02	To be located on the south corner of the Site, just north of Carling Avenue	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to a former off-Site gas station	6.1	Y		One soil sample will be submitted for analysis of PHCs F1-F4/BTEX	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX		
	BH15-03	To the located on the west side of the shopping centre near the Shopper's Drug Mart and the former dry cleaning facility	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to a former off-Site gas station	6.1	Y		One soil sample will be submitted for analysis of PHCs F1-F4/BTEX	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX		

Area of Potential Environmental Concern	Borehole Location ID	Location	Rationale	Borehole Depth (mbgs)	Well to be Installed (Y/N)	Depth of Well	Soil Samples	Groundwater Samples	QA/QC Soil Samples	QA/QC Groundwater Samples
	BH15-05	To be located on the western portion of the Site near the oil UST that was reportedly to have been formerly located on the northwest corner of the mall	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to a former oil UST that was reported to have been located on the northwest corner of the mall	6.1	Y		One soil sample will be submitted for analysis of PHCs F1-F4/BTEX	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX		
	BH15-06	To be located on the southern portion of the Site, north of Carling Avenue and east of the Shopper's Drug Mart	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to a former Seven-Up Bottling Co. with one UST on the property	6.1	Y		One soil sample will be submitted for analysis of PHCs F1-F4/BTEX	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX		
	BH15-07	To be located on the northern portion of the Site near the former oil UST that was located at the rear of the east end of the mall	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to an oil UST that was formerly present on at the rear of the east end of the mall	6.1	Y		One soil sample will be submitted for analysis of PHCs F1-F4/BTEX	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX		
APEC 3 - Basement of the Shopper's Drug Mart has a Hydro Ottawa transformer room	BH15-02	To be located on the south corner of the Site, just north of Carling Avenue	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to the transformer room in the basement of the Shopper's Drug Mart	6.1	Y		One soil sample will be submitted for analysis of PHCs F1-F4/BTEX and PCBs	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX and PCBs		
	BH15-03	To the located on the west side of the shopping centre near the Shopper's Drug Mart and the former dry cleaning facility	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to the transformer room in the basement of the Shopper's Drug Mart	6.1	Y		One soil sample will be submitted for analysis of PHCs F1-F4/BTEX and PCBs	One soil sample will be submitted for analysis of PHCs F1-F4/BTEX and PCBs		
APEC 4 - A dry cleaning facility was formerly located in the on-Site shopping centre. Another dry cleaning facility was formerly located within the Study Area; approximately 100 m south of the Site at 1317 Carling Avenue	BH15-02	To be located on the south corner of the Site, just north of Carling Avenue	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to the former dry cleaning facility that located to the south of the Site	6.1	Y		One soil sample will be submitted for analysis of VOCs	One soil sample will be submitted for analysis of VOCs		
	BH15-03	To the located on the west side of the shopping centre near the Shopper's Drug Mart and the former dry cleaning facility	Borehole completed with a monitoring well to assess potential soil and groundwater impacts related to the dry cleaning facility that was formerly located in the shopping centre	6.1	Y		One soil sample will be submitted for analysis of VOCs	One soil sample will be submitted for analysis of VOCs		

APPENDIX A (ii)

Field Logs

LIST OF ABBREVIATIONS

The abbreviations commonly employed on Records of Boreholes, on figures, and in the text of the report are as follows:

I. SAMPLE TYPE

AS	Auger sample
BS	Block sample
CS	Chunk sample
DO or DP	Seamless open-ended, driven or pushed tube samplers
DS	Denison type sample
FS	Foil sample
RC	Rock core
SC	Soil core
SS	Split spoon sampler
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample
DT	Dual tube sample
DD	Diamond drilling

II. 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.).

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 an uncased 50 mm (2 in.) diameter, 60^0 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

Cone Penetration Test (CPT):

An electronic cone penetrometer with a 60^0 conical tip and a projected end area of 10 cm^2 pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and friction along a sleeve are recorded electronically at 25 mm penetration intervals.

III. SOIL DESCRIPTION

(a) Cohesionless Soils

Density Index (Relative Density)	**N** Blows/300 mm Or Blows/ft.
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	over 50

(b) Cohesive Soils

C_u or S_u

Consistency	kPa	Psf
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1,000
Stiff	50 to 100	1,000 to 2,000
Very stiff	100 to 200	2,000 to 4,000
Hard	Over 200	Over 4,000

IV. SOIL TESTS

w	Water content
w_p or PL	Plastic limited
w_l or LL	Liquid limit
C	Consolidaiton (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
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	Field vane test (LV-laboratory vane test)
γ	Unit weight

Note: [1] Tests which are anisotropically consolidated prior shear are shown as CAD, CAU.

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
FOS	factor of safety
V	volume
W	weight

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 vertical effective overburden stress
$\sigma_1\sigma_2\sigma_3$	principal stresses (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

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

(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 = $(w_l - w_p)$
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 (overconsolidated range)
C_s	swelling index
C_α	coefficient of secondary consolidation
m_v	coefficient of volume change
c_v	coefficient of consolidation (vertical direction)
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation stress
OCR	overconsolidation ratio = σ'_p / σ'_{vo}

(d) Shear Strength

τ_p or τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = tan δ
c'	effective cohesion
c_u or 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

Notes:
[1] $\tau = c' + \sigma' \tan \phi'$
[2] shear strength = (compressive strength) / 2

LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

WEATHERING STATE

Fresh: no visible sign of rock material weathering
Faintly Weathered: weathering limited to the surface of major discontinuities.
Slightly weathered: penetrative weathering developed on open discontinuity surfaces but only slight weathering of rock material.
Moderately weathered: weathering extends throughout the rock mass but the rock material is not friable
Highly weathered: weathering extends throughout rock mass and the rock material is partly friable.
Completely weathered: rock is wholly decomposed and in a friable condition but the rock texture and structure are preserved.

BEDDING THICKNESS

Description	Bedding Plane Spacing
Very Thickly Bedded	> 2 m
Thickly Bedded	0.6 m to 2m
Medium Bedded	0.2 m to 0.6 m
Thinly Bedded	60 mm to 0.2 m
Very Thinly Bedded	20 mm to 60 mm
Laminated	6 mm to 20 mm
Thinly Laminated	< 6 mm

JOINT OR FOLIATION SPACING

Description	Spacing
Very Wide	> 3 m
Wide	1 – 3 m
Moderately Close	0.3 – 1 m
Close	50 – 300 mm
Very Close	< 50 mm

GRAIN SIZE

Term	Size*
Very Coarse Grained	> 60 mm
Coarse Grained	2 – 60 mm
Medium Grained	60 microns – 2mm
Fine Grained	2 – 60 microns
Very Fine Grained	< 2 microns

Note: *Grains > 60 microns diameter are visible to the naked eye.

CORE CONDITION

Total Core Recovery
The percentage of solid drill core recovered regardless of quality or length, measured relative to the length of the total core run.

Solid Core Recovery (SCR)
The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

Rock Quality Designation (RQD)
The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run. RQD varies from 0% for completely broken core 100% for core in solid sticks.

DISCONTINUITY DATA

Fracture Index
A count of the number of discontinuities (physical separations) in the rock core, including naturally occurring fractures but not including mechanically induced breaks caused by drilling.

Dip with Respect to (W.R.T.) Core Axis
The angle of the discontinuity relative to the axis (length) of the core. In a vertical borehole a discontinuity with a 90^0 angle is horizontal.

Description and Notes
An abbreviated description of the discontinuities, whether naturally occurring separations such as fractures, bedding planes and foliation ground or shattered core and mechanically separated bedding or foliation surfaces. Additional information concerning the nature information concerning the nature of fracture surfaces and infillings are also noted.

Abbreviations

BD -	Bedding	PY -	Pyrite
FO -	Foliation/Schistosity	Ca -	Calcite
CL -	Clean	PO -	Polished
SH -	Shear Plane/Zone	K -	Slickensided
VN -	Vein	SM -	Smooth
FLT -	Fault	RO -	Ridged/Rough
CO -	Contact	ST -	Stepped
JN -	Joint	PL -	Planar
FR -	Fracture	IR -	Irregular
MB -	Mechanical Break	UN -	Undulating
BR -	Broken Rock	CU -	Curved
BL -	Blast Induced	TCA -	To Core Axis
ll -	Parallel To	STR -	Stress Induced
OR -	Orthogonal		

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-01

SHEET 1 OF 1

LOCATION: N 5026103.1 ;E 442358.0

BORING DATE: October 9, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		74.90									
0	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.05									Flush Mount Protective Casing
		FILL - (SW) gravelly SAND; grey, (PAVEMENT STRUCTURE)		74.14	1	50 DT	PH						
1		FILL - (CL) SILTY CLAY; grey brown to black, contains organic matter; cohesive, w>PL		0.76 73.68	2	50 DT	PH						Bentonite Seal
		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL		1.22	3	50 DT	PH						
2													
3					4	50 DT	PH						Silica Sand
				71.24									
4		(CI/CH) SILTY CLAY; grey; cohesive, w>PL		3.66	5	50 DT	PH						32 mm Diam. PVC #10 Slot Screen
5					6	50 DT	PH						
				69.01									
6		(SM) SILTY SAND, some gravel; grey, (GLACIAL TILL); non-cohesive, wet		5.89	7	50 DT	PH						W.L. in Screen at Elev. 73.57 m on October 14, 2015
		End of Borehole		6.10									W.L. in Screen at Elev. 73.64 m on November 9, 2015
7													
8													
9													
10													
11													
12													
13													
14													
15													

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

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PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-02

SHEET 1 OF 1

LOCATION: N 5026068.8 ;E 442427.2

BORING DATE: October 8, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		74.07							
	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.11							Flush Mount Protective Casing
		FILL - (SW) gravelly SAND; grey, (PAVEMENT STRUCTURE)			1	50 DT	PH				
1				72.85							
		FILL - (CL) SILTY CLAY; grey brown to black; cohesive, w>PL		1.22	2	50 DT	PH				Bentonite Seal
2				71.63							
		(SC) CLAYEY SAND, some gravel; brown to grey, contains cobbles and boulders, (GLACIAL TILL); cohesive, w>PL		2.44	3	50 DT	PH				Silica Sand
					4	50 DT	PH				
4					5	50 DT	PH				32 mm Diam. PVC #10 Slot Screen
				69.19							
5		(SM) SILTY SAND, some gravel; grey, (GLACIAL TILL); non-cohesive, moist		4.88	6	50 DT	PH				
					7	50 DT	PH				
					8	50 DT	PH				
					9	50 DT	PH				
6				67.97							
		End of Borehole		6.10							W.L. in Screen at Elev. 68.61 m on October 14, 2015
											W.L. in Screen at Elev. 71.30 m on November 9, 2015
7											
8											
9											
10											
11											
12											
13											
14											
15											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-03

SHEET 1 OF 1

LOCATION: N 5026112.4 ;E 442412.5

BORING DATE: October 7, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		73.99							
	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.00							Flush Mount Protective Casing
		FILL - (SW) gravelly SAND; brown, (PAVEMENT STRUCTURE)		0.15	1	50 DT	PH				
1				73.18							
		FILL - (SW) SAND, trace gravel; dark brown, contains organic matter; non-cohesive		0.81	2	50 DT	PH				
				72.77							
				1.22	3	50 DT	PH				Bentonite Seal
		FILL - (CL) SILTY CLAY; grey brown, contains wood and glass fragments; cohesive, w>PL			4	50 DT	PH				
2					5	50 DT	PH				
				71.55							
		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL		2.44	6	50 DT	PH				
3					7	50 DT	PH				Silica Sand
				70.33							
		(CI/CH) SILTY CLAY; grey; cohesive, w>PL		3.66							
4					8	50 DT	PH				
											32 mm Diam. PVC #10 Slot Screen
5					9	50 DT	PH				
				68.61							
		(SC) CLAYEY SAND, some gravel; grey, (GLACIAL TILL); cohesive, w>PL		5.38	10	50 DT	PH				
6				67.89							
		End of Borehole		6.10							W.L. in Screen at Elev. 71.24 m on October 14, 2015
7											
8											
9											
10											
11											
12											
13											
14											
15											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

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PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-04

SHEET 1 OF 3

LOCATION: N 5026136.5 ;E 442406.0

BORING DATE: October 9, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		74.08							
0	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.00							Flush Mount Protective Casing
		FILL - (SW) gravelly SAND; grey, (PAVEMENT STRUCTURE)		0.13	1	50 DT	PH				
				73.17							Silica Sand
1		FILL - (CL) SILTY CLAY; grey brown; cohesive, w>PL		0.91 72.86	2	50 DT	PH				
		FILL - (SP) SAND, fine, some silt; grey; non-cohesive, dry		1.22	3	50 DT	PH				
				72.10							
2		FILL - (SW) gravelly SAND to SAND; grey; non-cohesive		1.98	4	50 DT	PH				
				71.74	5	50	PH				
					6	DT	PH				
		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL		2.34		50 DT					
3					7	50 DT	PH				
				70.42							
		(CI/CH) SILTY CLAY; grey; cohesive, w>PL		3.66							
4					8	50 DT	PH				
5					9	50 DT	PH				Bentonite Seal
6				67.98							
		(SC) CLAYEY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); cohesive, w>PL		6.10							
7					10	50 DT	PH				
8	Power Auger 200 mm Diam. (Hollow Stem)										
9											Silica Sand
10											
11											32 mm Diam. PVC #10 Slot Screen
12				62.01							
		(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive		12.07	C1	NQ RC	DD				
13	Rotary Drill NQ Core										W.L. in Screen at Elev. 71.28 m on October 14, 2015
				60.62							
		Fresh, thinly to medium bedded, dark grey to black, strong to very strong, fine grained LIMESTONE BEDROCK, with thin to medium thick black slightly calcareous shale beds, occasional nodular sections		13.46	C2	NQ RC	DD				
14											
					C3	NQ RC	DD				
15		*CONTINUED NEXT PAGE*									

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DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-04

SHEET 2 OF 3

LOCATION: N 5026136.5 ;E 442406.0

BORING DATE: October 9, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
15	Rotary Drill / NQ Core	Fresh, thinly to medium bedded, dark grey to black, strong to very strong, fine grained LIMESTONE BEDROCK, with thin to medium thick black slightly calcareous shale beds, occasional nodular sections			C3	NQ RC	DD				
16				57.95							
		End of Borehole		16.13							
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-05

SHEET 1 OF 1

LOCATION: N 5026154.4 ;E 442383.3

BORING DATE: October 7, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		73.93							
0	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.00							Flush Mount Protective Casing
		FILL - (SW/GW) SAND and GRAVEL; grey brown, contains silty clay pockets, (PAVEMENT STRUCTURE); non-cohesive		0.15 / 73.47	1	50 DT	PH				
		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL		0.46	2	50 DT	PH				
1											
					3	50 DT	PH				Bentonite Seal
2				71.49							
		(CI/CH) SILTY CLAY; grey; cohesive, w>PL		2.44							
3					4	50 DT	PH				Silica Sand
4					5	50 DT	PH				
											32 mm Diam. PVC #10 Slot Screen
5					6	50 DT	PH				
				67.99							
6		(SC) CLAYEY SAND, some gravel; grey, (GLACIAL TILL); cohesive, w>PL		5.94	7	50 DT	PH				
		End of Borehole		6.10							W.L. in Screen at Elev. 71.84 m on October 14, 2015
7											W.L. in Screen at Elev. 71.17 m on November 9, 2015
8											
9											
10											
11											
12											
13											
14											
15											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-06

SHEET 1 OF 1

LOCATION: N 5026119.9 ;E 442491.6

BORING DATE: October 7, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		73.96							
0	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.10							Flush Mount Protective Casing
		FILL - (SW) gravelly SAND; dark brown to black, (PAVEMENT STRUCTURE)		73.45	1	50 DT	PH				
		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL		0.51	2	50 DT	PH				Bentonite Seal
1											
					3	50 DT	PH				Silica Sand
2				71.52							
		(CI/CH) SILTY CLAY; grey; cohesive, w>PL		2.44	4	50 DT	PH				
3											32 mm Diam. PVC #10 Slot Screen
					5	50 DT	PH				
4											
				69.08							
		(SC) CLAYEY SAND, some gravel; grey, (GLACIAL TILL); cohesive, w>PL		4.88	6	50 DT	PH				W.L. in Screen at Elev. 71.48 m on October 14, 2015
5											
					7	50 DT	PH				
6				67.86							
		End of Borehole		6.10							
7											
8											
9											
10											
11											
12											
13											
14											
15											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-08

SHEET 1 OF 1

LOCATION: N 5026295.6 ;E 442562.0

BORING DATE: October 8, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		74.33									
0	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.10	1	50 DT	PH						Flush Mount Protective Casing
		FILL - (SW/GW) SAND and GRAVEL; brown, (PAVEMENT STRUCTURE); non-cohesive		73.90									
				0.43	2	50 DT	PH						
1		(CL) SILTY CLAY; grey brown, with orange mottling; cohesive, w>PL		73.11									
		(SM) SILTY SAND; grey; non-cohesive, moist		1.22	3	50 DT	PH						Bentonite Seal
2				71.89	4	50 DT	PH						
		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL		2.44	5	50 DT	PH						Silica Sand
3				70.67									
		(SC) CLAYEY SAND; grey, contains cobbles and boulders, (GLACIAL TILL); cohesive, w>PL		3.66	6	50 DT	PH						32 mm Diam. PVC #10 Slot Screen
4				69.45									
		(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, moist		4.88	7	50 DT	PH						
5					8	50 DT	PH						
6				68.23									
		End of Borehole		6.10									W.L. in Screen at Elev. 69.60 m on October 14, 2015
7													W.L. in Screen at Elev. 69.70 m on November 9, 2015
8													
9													
10													
11													
12													
13													
14													
15													

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-09

SHEET 1 OF 3

LOCATION: N 5026180.8 ;E 442535.7

BORING DATE: October 13, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		74.54							
0	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALTIC CONCRETE		0.00							
		FILL - (SW) gravelly SAND, some silt; brown, (PAVEMENT STRUCTURE); non-cohesive, moist, compact		0.18	1	SS	16				
				73.78							
1		FILL - (CL) SILTY CLAY, some sand and gravel; grey brown, with red oxidation; cohesive, w>PL		0.76	2	SS	12				
				72.91							
2		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL, stiff to very stiff		1.63	3	SS	8				
					4	SS	11				
3					5	SS	2				
				70.88							
4		(CI/CH) SILTY CLAY; grey; cohesive, w>PL, stiff		3.66				⊕ + ⊕ +			
				69.97							
5		(SC) gravelly CLAYEY SAND; grey, (GLACIAL TILL); cohesive, w>PL, stiff to very stiff		4.57	6	SS	12				
					7	SS	9			M	
6				68.44							
		(ML) sandy SILT; some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose		6.10	8	SS	8				
7					9	SS	5				
				66.92							
8		(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, wet, compact		7.62	10	SS	25				
					11	SS	25				
9				65.55							
		(SM) gravelly SILTY SAND, some low to none plastic fines; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, wet, dense		8.99	12	SS	37			M	
				64.63							
10		(SW) SAND, some gravel, trace low to none plastic fines; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, wet, compact to dense		9.91	13	SS	11				
					14	SS	>30				
11				62.96							
	Rotary Drill NQ Core	(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, wet		11.58	C1	NQ RC	DD				
12											
13					C2	NQ RC	DD				
14											
					C3	NQ	DD				
15		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-09

SHEET 2 OF 3

LOCATION: N 5026180.8 ;E 442535.7

BORING DATE: October 13, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
15	Rotary Drill / NQ Core	(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, wet			C3	RC / NQ RC	DD				
16				58.26							
		FRESH, thinly to medium bedded, dark grey, strong to very strong, fine grained LIMESTONE BEDROCK, with shale partings and occassional nodular sections		16.28	C4	NQ RC	DD				
17										UCS= 104 MPa	
18					C5	NQ RC	DD				
19											
20					C6	NQ RC	DD				
				54.20							
		End of Borehole		20.34							
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-10

SHEET 1 OF 1

LOCATION: N 5026186.1 ;E 442607.2

BORING DATE: October 8, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) SHEAR STRENGTH Cu, kPa nat V. + Q - ● rem V. ⊕ U - ○ (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) WATER CONTENT PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		74.86							
0	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.10							Flush Mount Protective Casing
		FILL - (SW/GW) SAND and GRAVEL; brown, (PAVEMENT STRUCTURE)		74.30							
		FILL - (CL) SILTY CLAY; grey to black; cohesive, w>PL		0.56	1	50 DT	PH				
1				73.64							
		FILL - (CL) SILTY CLAY, trace gravel; grey brown; cohesive, w>PL		1.22	2	50 DT	PH				Bentonite Seal
2				72.42							
		(CI/CH) SILTY CLAY; grey; cohesive, w>PL		2.44	3	50 DT	PH				Silica Sand
3				71.20							
		(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive; moist		3.66	4	50 DT	PH				32 mm Diam. PVC #10 Slot Screen
4											
5					5	50 DT	PH				
6				68.76							
		End of Borehole		6.10							W.L. in Screen at Elev. 70.06 m on October 14, 2015
7											W.L. in Screen at Elev. 70.08 m on November 9, 2015
8											
9											
10											
11											
12											
13											
14											
15											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF BOREHOLE: 15-11

SHEET 1 OF 1

LOCATION: N 5026167.6 ;E 442500.3

BORING DATE: October 7, 2015

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		74.20							
0	Geoprobe 76 mm Diam. (Direct Push)	ASPHALTIC CONCRETE		0.10							
		FILL - (SW) gravelly SAND; (PAVEMENT STRUCTURE)		0.25	1	50 DT	PH				
		FILL - (SW/GW) SAND and GRAVEL; dark brown, (PAVEMENT STRUCTURE)		0.50	2	50 DT	PH				
1		(CI/CH) SILTY CLAY; grey brown, (Weathered Crust); cohesive, w>PL									
2					3	50 DT	PH				
3					4	50 DT	PH				
				70.54							
		(CI/CH) SILTY CLAY; grey; cohesive, w>PL		3.66							
4					5	50 DT	PH				
				69.32							
5		(SC) CLAYEY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); cohesive, stiff		4.88	6	50 DT	PH				
				68.71							
		(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive, moist		5.49	7	50 DT	PH				
6				68.10							
		End of Borehole		6.10							
7											
8											
9											
10											
11											
12											
13											
14											
15											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-BHS 001 1522569-17001.GPJ GAL-MIS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF DRILLHOLE: 15-04

SHEET 3 OF 3

LOCATION: N 5026136.5 ;E 442406.0

DRILLING DATE: October 9, 2015

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG:

DRILLING CONTRACTOR:

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 SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jcon	Jr	Ja	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -Q' AVG.	
		BEDROCK SURFACE		62.01																
13	Rotary Drill / NQ Core	(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders, (GLACIAL TILL); non-cohesive		12.07	C1	50-100														32 mm Diam. PVC #10 Slot Screen W.L. in Screen at Elev. 71.28 m on October 14, 2015
					C2A	50-100														
14		Fresh, thinly to medium bedded, dark grey to black, strong to very strong, fine grained LIMESTONE BEDROCK, with thin to medium thick black slightly calcareous shale beds, occasional nodular sections		60.62 13.46	C2B	50-100														
15					C3	100														
16				57.95																
		End of Drillhole		16.13																
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
27																				

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-RCK 004 1522569-17001.GPJ GAL-MISS.GDT 12/04/15 JEM

PROJECT: 1522569-17000

RECORD OF DRILLHOLE: 15-09

SHEET 3 OF 3

LOCATION: N 5026180.8 ;E 442535.7

DRILLING DATE: October 13, 2015

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG:

DRILLING CONTRACTOR:

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 SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jcon	Jr	Ja	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -Q' AVG.
		BEDROCK SURFACE		62.96															
12	Rotary Drill NQ Core	(SM) SILTY SAND, some gravel; grey, contains cobbles and bouders, (GLACIAL TILL); non-cohesive, wet		11.58	C1	100													
13																			
14					C2	100													
15					C3	100													
16				58.26	C4A	100													
17		FRESH, thinly to medium bedded, dark grey, strong to very strong, fine grained LIMESTONE BEDROCK, with shale partings and occassional nodular sections		16.28	C4B	100													
18					C5	100													
19					C6	100													
20				54.20															
		End of Drillhole		20.34															
21																			
22																			
23																			
24																			
25																			
26																			

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: AT

CHECKED: NRL

MIS-RCK 004 1522569-17001.GPJ GAL-MISS.GDT 12/04/15 JEM

APPENDIX A (iii)

Certificates of Analysis

AGAT Laboratories

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
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600

ATTENTION TO: Alyssa Troke

PROJECT: 1522569/17000

AGAT WORK ORDER: 15Z029766

SOIL ANALYSIS REVIEWED BY: Elizabeth Polakowska, MSc (Animal Sci), PhD (Agri Sci), Inorganic Lab Supervisor

TRACE ORGANICS REVIEWED BY: Gyulhan Yalamova, Report Reviewer

DATE REPORTED: Oct 23, 2015

PAGES (INCLUDING COVER): 19

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

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

Certificate of Analysis

AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-03 SA5	BH15-08 SA1	BH15-09 SA2	BH15-11 SA1	DUP3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		10/7/2015	10/8/2015	10/13/2015	10/7/2015	10/7/2015
Parameter	Unit	G / S	RDL	7083453	7083466	7083471	7083479	7083482
Antimony	µg/g	7.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	2	3	2	4	2
Boron	µg/g	120	5	6	6	5	10	6
Barium	µg/g	390	2	115	365	262	142	120
Beryllium	µg/g	4	0.5	0.5	<0.5	0.7	0.5	<0.5
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	160	2	33	20	79	40	36
Cobalt	µg/g	22	0.5	8.2	7.0	18.1	12.8	8.7
Copper	µg/g	140	1	20	16	32	27	22
Lead	µg/g	120	1	19	9	9	10	26
Molybdenum	µg/g	6.9	0.5	0.6	1.1	1.2	2.2	0.7
Nickel	µg/g	100	1	22	16	45	34	23
Selenium	µg/g	2.4	0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	23	0.5	0.5	0.5	0.9	1.0	0.5
Vanadium	µg/g	86	1	32	23	80	44	33
Zinc	µg/g	340	5	71	29	98	52	72

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

Certified By: Elizabeth Rotakowska

AGAT Laboratories

5835 COOPERS AVENUE
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Certificate of Analysis

AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-03 SA5	BH15-08 SA1	BH15-09 SA2	BH15-11 SA1	DUP3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		10/7/2015	10/8/2015	10/13/2015	10/7/2015	10/7/2015
Parameter	Unit	G / S	RDL	7083453	7083466	7083471	7083479	7083482
Naphthalene	µg/g	0.6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.15	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	7.9	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	62	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	6.2	0.05	<0.05	0.21	<0.05	<0.05	<0.05
Anthracene	µg/g	0.67	0.05	<0.05	0.06	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	0.05	0.06	0.31	<0.05	<0.05	0.09
Pyrene	µg/g	78	0.05	0.05	0.24	<0.05	<0.05	0.07
Benz(a)anthracene	µg/g	0.5	0.05	<0.05	0.12	<0.05	<0.05	<0.05
Chrysene	µg/g	7	0.05	<0.05	0.12	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.78	0.05	<0.05	0.14	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.78	0.05	<0.05	0.06	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	0.10	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.38	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<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	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.99	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	24.2	12.2	11.8	6.2	26.0
Surrogate	Unit	Acceptable Limits						
Chrysene-d12	%	50-140		86	107	75	91	78

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

7083453-7083482 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.

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AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-03 SA5	DUP3	BH15-10 SA4	BH15-08 SA6
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		10/7/2015	10/7/2015	10/8/2015	10/8/2015
Parameter	Unit	G / S	RDL	7083453	7083482	7097332	7097550
Aroclor 1242	µg/g		0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	µg/g		0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	µg/g		0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	µg/g		0.1	<0.1	<0.1	<0.1	<0.1
Polychlorinated Biphenyls	µg/g	0.35	0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits					
Decachlorobiphenyl	%	60-140		72	68	128	81

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

7083453-7097550 Results are based on the dry weight of soil extracted.

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AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-02 SA8	BH15-04 SA9
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		10/8/2015	10/9/2015
Parameter	Unit	G / S	RDL	7083451	7083455
F1 (C6 to C10)	µg/g		5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	55	5	<5	<5
F2 (C10 to C16)	µg/g	98	10	<10	<10
F3 (C16 to C34)	µg/g	300	50	<50	<50
F4 (C34 to C50)	µg/g	2800	50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA
Moisture Content	%		0.1	8.8	25.6
Surrogate	Unit	Acceptable Limits			
Terphenyl	%	60-140		96	61

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

7083451-7083455 Results are based on sample dry weight.
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 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 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 without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

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AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-01 SA7	BH15-05 SA7	BH15-06 SA5	BH15-10 SA4	BH15-08 SA6
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		10/9/2015	10/7/2015	10/7/2015	10/8/2015	10/8/2015
Parameter	Unit	G / S	RDL	7083432	7083457	7083459	7097332	7097550
Benzene	µg/g	0.21	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	2.3	0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	3.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	55	5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	98	10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	300	50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	2800	50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA	NA	NA	NA
Moisture Content	%		0.1	10.4	24.0	24.5	8.8	17.6
Surrogate	Unit	Acceptable Limits						
Terphenyl	%	60-140		124	101	91	110	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 - Soil - Residential/Parkland/Institutional Property Use - Coarse Textured Soils

7083432-7097550 Results are based on sample dry weight.
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 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 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.
Quality Control Data is available upon request.

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AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-03 SA5	DUP3
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		10/7/2015	10/7/2015
Parameter	Unit	G / S	RDL	7083453	7083482
F1 (C6 to C10)	µg/g		5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	55	5	<5	<5
F2 (C10 to C16)	µg/g	98	10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	98	10	<10	<10
F3 (C16 to C34)	µg/g	300	50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	300	50	<50	<50
F4 (C34 to C50)	µg/g	2800	50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA
Moisture Content	%		0.1	24.2	26.0
Surrogate	Unit	Acceptable Limits			
Terphenyl	%	60-140		78	75

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

7083453-7083482 Results are based on sample dry weight.
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 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.
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.

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PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-08 SA1	BH15-09 SA2	BH15-11 SA1
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		10/8/2015	10/13/2015	10/7/2015
Parameter	Unit	G / S	RDL	7083466	7083471	7083479
Benzene	µg/g	0.21	0.02	<0.02	<0.02	<0.02
Toluene	µg/g	2.3	0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	2	0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	3.1	0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g		5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	55	5	<5	<5	<5
F2 (C10 to C16)	µg/g	98	10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	98	10	<10	<10	<10
F3 (C16 to C34)	µg/g	300	50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	300	50	<50	<50	<50
F4 (C34 to C50)	µg/g	2800	50	<50	120	<50
Gravimetric Heavy Hydrocarbons	µg/g	2800	50	NA	NA	NA
Moisture Content	%		0.1	12.2	11.8	6.2
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140		103	100	100

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

7083466-7083479 Results are based on sample dry weight.
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 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.
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.

Certified By:

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AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-02 SA8	BH15-03 SA5	BH15-04 SA9	DUP3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		10/8/2015	10/7/2015	10/9/2015	10/7/2015
Parameter	Unit	G / S	RDL	7083451	7083453	7083455	7083482
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:

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Certificate of Analysis

AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

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

DATE RECEIVED: 2015-10-13

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		BH15-02 SA8	BH15-03 SA5	BH15-04 SA9	DUP3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		10/8/2015	10/7/2015	10/9/2015	10/7/2015
Parameter	Unit	G / S	RDL	7083451	7083453	7083455	7083482
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	µg/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	50-140		93	99	94	92
4-Bromofluorobenzene	% Recovery	50-140		96	98	92	99

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

7083451-7083482 The sample was analysed 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.

Certified By:

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

Soil Analysis

RPT Date: Oct 23, 2015			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) - Metals (Comprehensive) (Soil)															
Antimony	7083459	7083459	<0.8	<0.8	NA	< 0.8	89%	70%	130%	108%	80%	120%	107%	70%	130%
Arsenic	7083459	7083459	<1	<1	NA	< 1	107%	70%	130%	95%	80%	120%	95%	70%	130%
Boron	7083459	7083459	9	9	NA	< 5	75%	70%	130%	103%	80%	120%	95%	70%	130%
Barium	7083459	7083459	359	365	1.7%	< 2	101%	70%	130%	98%	80%	120%	101%	70%	130%
Beryllium	7083459	7083459	0.7	0.7	NA	< 0.5	86%	70%	130%	100%	80%	120%	99%	70%	130%
Cadmium	7083459	7083459	<0.5	<0.5	NA	< 0.5	103%	70%	130%	96%	80%	120%	103%	70%	130%
Chromium	7083459	7083459	69	68	1.5%	< 2	91%	70%	130%	98%	80%	120%	108%	70%	130%
Cobalt	7083459	7083459	18.5	17.5	5.6%	< 0.5	93%	70%	130%	98%	80%	120%	99%	70%	130%
Copper	7083459	7083459	38	37	2.7%	< 1	90%	70%	130%	100%	80%	120%	89%	70%	130%
Lead	7083459	7083459	6	6	0.0%	< 1	95%	70%	130%	95%	80%	120%	89%	70%	130%
Molybdenum	7083459	7083459	0.9	0.9	NA	< 0.5	102%	70%	130%	102%	80%	120%	106%	70%	130%
Nickel	7083459	7083459	40	40	0.0%	< 1	100%	70%	130%	103%	80%	120%	95%	70%	130%
Selenium	7083459	7083459	<0.4	<0.4	NA	< 0.4	116%	70%	130%	94%	80%	120%	107%	70%	130%
Silver	7083459	7083459	<0.2	<0.2	NA	< 0.2	89%	70%	130%	100%	80%	120%	102%	70%	130%
Thallium	7083459	7083459	<0.4	<0.4	NA	< 0.4	95%	70%	130%	95%	80%	120%	93%	70%	130%
Uranium	7083459	7083459	1.1	1.1	NA	< 0.5	104%	70%	130%	101%	80%	120%	98%	70%	130%
Vanadium	7083459	7083459	89	87	2.3%	< 1	95%	70%	130%	99%	80%	120%	103%	70%	130%
Zinc	7083459	7083459	111	116	4.4%	< 5	100%	70%	130%	98%	80%	120%	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: Elizabeth Rolakowska

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 15Z029766
PROJECT: 1522569/17000
ATTENTION TO: Alyssa Troke
SAMPLING SITE:
SAMPLED BY:Alyssa Troke

Trace Organics Analysis

RPT Date: Oct 23, 2015

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
O. Reg. 153(511) - PHCs F1 - F4 (Soil)															
Benzene	7099135		< 0.02	< 0.02	NA	< 0.02	92%	60%	130%	123%	60%	130%	119%	60%	130%
Toluene	7099135		< 0.08	< 0.08	NA	< 0.08	87%	60%	130%	104%	60%	130%	106%	60%	130%
Ethylbenzene	7099135		< 0.05	< 0.05	NA	< 0.05	92%	60%	130%	107%	60%	130%	106%	60%	130%
Xylene Mixture	7099135		< 0.05	< 0.05	NA	< 0.05	94%	60%	130%	113%	60%	130%	108%	60%	130%
F1 (C6 to C10)	7099135		< 5	< 5	NA	< 5	100%	60%	130%	89%	85%	115%	77%	70%	130%
F2 (C10 to C16)	7071444		< 10	< 10	NA	< 10	100%	60%	130%	107%	80%	120%	84%	70%	130%
F3 (C16 to C34)	7071444		< 50	< 50	NA	< 50	104%	60%	130%	106%	80%	120%	90%	70%	130%
F4 (C34 to C50)	7071444		< 50	< 50	NA	< 50	92%	60%	130%	103%	80%	120%	85%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	101%	50%	140%	96%	50%	140%
Vinyl Chloride	7083482	7083482	< 0.02	< 0.02	NA	< 0.02	123%	50%	140%	114%	50%	140%	95%	50%	140%
Bromomethane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	78%	50%	140%	89%	50%	140%
Trichlorofluoromethane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	86%	50%	140%	95%	50%	140%
Acetone	7083482	7083482	< 0.50	< 0.50	NA	< 0.50	102%	50%	140%	85%	50%	140%	124%	50%	140%
1,1-Dichloroethylene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	72%	50%	140%	88%	60%	130%	97%	50%	140%
Methylene Chloride	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	96%	60%	130%	117%	50%	140%
Trans- 1,2-Dichloroethylene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	71%	50%	140%	76%	60%	130%	80%	50%	140%
Methyl tert-butyl Ether	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	73%	50%	140%	71%	60%	130%	72%	50%	140%
1,1-Dichloroethane	7083482	7083482	< 0.02	< 0.02	NA	< 0.02	94%	50%	140%	76%	60%	130%	75%	50%	140%
Methyl Ethyl Ketone	7083482	7083482	< 0.50	< 0.50	NA	< 0.50	88%	50%	140%	91%	50%	140%	101%	50%	140%
Cis- 1,2-Dichloroethylene	7083482	7083482	< 0.02	< 0.02	NA	< 0.02	76%	50%	140%	82%	60%	130%	99%	50%	140%
Chloroform	7083482	7083482	< 0.04	< 0.04	NA	< 0.04	70%	50%	140%	80%	60%	130%	103%	50%	140%
1,2-Dichloroethane	7083482	7083482	< 0.03	< 0.03	NA	< 0.03	81%	50%	140%	86%	60%	130%	129%	50%	140%
1,1,1-Trichloroethane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	70%	50%	140%	75%	60%	130%	91%	50%	140%
Carbon Tetrachloride	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	70%	50%	140%	71%	60%	130%	78%	50%	140%
Benzene	7083482	7083482	< 0.02	< 0.02	NA	< 0.02	100%	50%	140%	111%	60%	130%	102%	50%	140%
1,2-Dichloropropane	7083482	7083482	< 0.03	< 0.03	NA	< 0.03	99%	50%	140%	106%	60%	130%	128%	50%	140%
Trichloroethylene	7083482	7083482	< 0.03	< 0.03	NA	< 0.03	82%	50%	140%	96%	60%	130%	107%	50%	140%
Bromodichloromethane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	75%	50%	140%	74%	60%	130%	95%	50%	140%
Methyl Isobutyl Ketone	7083482	7083482	< 0.50	< 0.50	NA	< 0.50	103%	50%	140%	88%	50%	140%	116%	50%	140%
1,1,2-Trichloroethane	7083482	7083482	< 0.04	< 0.04	NA	< 0.04	96%	50%	140%	87%	60%	130%	107%	50%	140%
Toluene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	83%	50%	140%	93%	60%	130%	104%	50%	140%
Dibromochloromethane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	74%	50%	140%	72%	60%	130%	78%	50%	140%
Ethylene Dibromide	7083482	7083482	< 0.04	< 0.04	NA	< 0.04	91%	50%	140%	80%	60%	130%	98%	50%	140%
Tetrachloroethylene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	83%	50%	140%	91%	60%	130%	91%	50%	140%
1,1,1,2-Tetrachloroethane	7083482	7083482	< 0.04	< 0.04	NA	< 0.04	76%	50%	140%	71%	60%	130%	75%	50%	140%
Chlorobenzene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	91%	60%	130%	99%	50%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
PROJECT: 1522569/17000
SAMPLING SITE:

AGAT WORK ORDER: 15Z029766
ATTENTION TO: Alyssa Troke
SAMPLED BY:Alyssa Troke

Trace Organics Analysis (Continued)

RPT Date: Oct 23, 2015			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
Ethylbenzene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	90%	60%	130%	100%	50%	140%
m & p-Xylene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	92%	60%	130%	99%	50%	140%
Bromoform	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	81%	50%	140%	70%	60%	130%	73%	50%	140%
Styrene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	88%	60%	130%	98%	50%	140%
1,1,2,2-Tetrachloroethane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	91%	60%	130%	115%	50%	140%
o-Xylene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	92%	60%	130%	102%	50%	140%
1,3-Dichlorobenzene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	87%	60%	130%	93%	50%	140%
1,4-Dichlorobenzene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	89%	50%	140%	88%	60%	130%	99%	50%	140%
1,2-Dichlorobenzene	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	87%	60%	130%	97%	50%	140%
1,3-Dichloropropene	7083482	7083482	< 0.04	< 0.04	NA	< 0.04	97%	50%	140%	86%	60%	130%	92%	50%	140%
n-Hexane	7083482	7083482	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	126%	60%	130%	82%	50%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
O. Reg. 153(511) - PCBs (Soil)															
Aroclor 1242	7090301		< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1248	7090301		< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1254	7090301		< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1260	7090301		< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Polychlorinated Biphenyls	7090301		< 0.1	< 0.1	NA	< 0.1	84%	60%	140%	68%	60%	140%	102%	60%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	7083552		< 0.05	< 0.05	NA	< 0.05	77%	50%	140%	72%	50%	140%	100%	50%	140%
Acenaphthylene	7083552		< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	86%	50%	140%	99%	50%	140%
Acenaphthene	7083552		< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	83%	50%	140%	88%	50%	140%
Fluorene	7083552		< 0.05	< 0.05	NA	< 0.05	89%	50%	140%	88%	50%	140%	100%	50%	140%
Phenanthrene	7083552		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	90%	50%	140%	100%	50%	140%
Anthracene	7083552		< 0.05	< 0.05	NA	< 0.05	91%	50%	140%	89%	50%	140%	100%	50%	140%
Fluoranthene	7083552		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	87%	50%	140%	98%	50%	140%
Pyrene	7083552		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	88%	50%	140%	98%	50%	140%
Benz(a)anthracene	7083552		< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	87%	50%	140%	97%	50%	140%
Chrysene	7083552		< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	84%	50%	140%	99%	50%	140%
Benzo(b)fluoranthene	7083552		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	83%	50%	140%	63%	50%	140%
Benzo(k)fluoranthene	7083552		< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	81%	50%	140%	87%	50%	140%
Benzo(a)pyrene	7083552		< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	85%	50%	140%	98%	50%	140%
Indeno(1,2,3-cd)pyrene	7083552		< 0.05	< 0.05	NA	< 0.05	127%	50%	140%	90%	50%	140%	87%	50%	140%
Dibenz(a,h)anthracene	7083552		< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	90%	50%	140%	99%	50%	140%
Benzo(g,h,i)perylene	7083552		< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	87%	50%	140%	86%	50%	140%
2-and 1-methyl Naphthalene	7083552		< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	79%	50%	140%	99%	50%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

Trace Organics Analysis (Continued)

RPT Date: Oct 23, 2015			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

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	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
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

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Method Summary

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AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

ATTENTION TO: Alyssa Troke

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SAMPLED BY:Alyssa Troke

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
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
Moisture Content	ORG-91-5106	EPA SW-846 3541 & 8270	BALANCE
Chrysene-d12	ORG-91-5106	EPA SW846 3541 & 8270	GC/MS
Moisture Content		MOE E3139	BALANCE
Aroclor 1242	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1248	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1254	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Aroclor 1260	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Polychlorinated Biphenyls	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541 & 8082	GC/ECD
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	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	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method, SW846 5035,8015	BALANCE
Terphenyl	VOL-91-5009		GC/FID
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, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	GC / FID

AGAT Laboratories

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z029766

PROJECT: 1522569/17000

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:Alyssa Troke

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
F1 (C6 to C10) minus BTEX	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
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

AGAT Laboratories

SL2

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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)

Laboratory Use Only

Work Order #: 1520 9766

Cooler Quantity:

Arrival Temperatures:

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: Golder Associates Ltd.
Contact: Alyssa Trake / Keith Holmes
Address: 1931 Robertson Road
Ottawa, ON
Phone: 613-592-9600 Fax:
Reports to be sent to:
1. Email: atrake@golder.com
2. Email: kholmes@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

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

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

Project Information:

Project: 1522569/17000
Site Location:
Sampled By: Alyssa Trake
AGAT Quote #: 60260 PO:
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 Trake
Address: 1931 Robertson Road
Email: atrake@golder.com

Sample Matrix Legend

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

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: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Hg ☐ pH ☐ SAR ☐ Total N	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☒ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4, incl. BTEX	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH15-01 SA7	10/9/15	—	2	S									X	X						
BH15-02 SA8	10/8/15	—	2									X	X							
BH15-03 SA5	10/7/15	—	3 2		Submitted 250 mL jar for metals		X					X	X	X	X					
BH15-04 SA9	10/9/15	—	2									X	X							
BH15-05 SA7	10/7/15	—	2										X							
BH15-06 SA5	10/7/15	—	3		Cancelled metals								X							
BH15-08 SA1	10/8/15	—	3		Cancelled PCBs		X						X	X						
BH15-09 SA2	10/13/15	—	3				X						X	X						
BH15-10 SA3	10/8/15	—	2		HOLD								X	X		X				
BH15-10 SA4	10/8/15	—	2		Do not do metals analysis								X			X				
BH15-11 SA1	10/7/15	—	3	↓			X						X	X						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Alyssa Trake	Oct. 16/15	11:30			
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 2

N°: T 011333

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Document ID: OIN-TS-1511.009 Date Issued: Jan 9, 2015

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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 Ltd.
Contact: Alyssa Trake / Keith Holmes
Address: 1931 Robertson Road
Ottawa, ON
Phone: 613-592-9600 Fax:
Reports to be sent to:
1. Email: atrake@golder.com
2. Email: Kholmes@golder.com

Project Information:

Project: 1522569/17000
Site Location:
Sampled By: Alyssa Trake
AGAT Quote #: 60260 PO:
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 Ltd.
Contact: Alyssa Trake
Address: 1931 Robertson Road, Ottawa, ON
Email: atrake@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

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures:
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

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

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions
DUP3	10/7/15	-	3	S	Submitted 250mL for metals
DUP9	10/13/15	-	1	S	HOLD - Run PAHs out of Same jar
BH15-08 SA6	10/8/15	-	2	S	

(Check Applicable)

Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐B-HWS ☐Cl⁻ ☐CN⁻ ☐Cr⁶⁺ ☐EC ☐FOC ☐NO_3/NO_2 ☐Total N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH_3 ☐TKN ☐NO_3 ☐NO_2 ☐NO_3/NO_2	Volatiles: ☒VOC ☐BTEX ☐THM	CCME Fractions 1 to 4, incl. BTEX	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
	X					X	X		X		X			
	X								X				HOLD	
							X				X			

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Alyssa Trake	10/16/15	10:30			
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 2 of 2

Nº: T 011329

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Document ID: DIV-78-1511-009 Date Issued: Jan 8, 2015

AGAT Laboratories

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http://www.agatlabs.com

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

ATTENTION TO: Alyssa Troke

PROJECT: 1522569

AGAT WORK ORDER: 15Z030915

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

WATER ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

DATE REPORTED: Oct 23, 2015

PAGES (INCLUDING COVER): 25

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.

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Certificate of Analysis

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		15-08	DUP 8	Field Blank
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		10/14/2015	10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094721	7094768	7094809
Naphthalene	µg/L	1400	0.20	<0.20	<0.20	<0.20
Acenaphthylene	µg/L	1.8	0.20	<0.20	<0.20	<0.20
Acenaphthene	µg/L	600	0.20	<0.20	<0.20	<0.20
Fluorene	µg/L	400	0.20	<0.20	<0.20	<0.20
Phenanthrene	µg/L	580	0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	2.4	0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	130	0.20	<0.20	<0.20	<0.20
Pyrene	µg/L	68	0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	µg/L	4.7	0.20	<0.20	<0.20	<0.20
Chrysene	µg/L	1	0.10	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	µg/L	0.75	0.10	<0.10	<0.10	<0.10
Benzo(k)fluoranthene	µg/L	0.4	0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	µg/L	0.81	0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.2	0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	µg/L	0.52	0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	µg/L	0.2	0.20	<0.20	<0.20	<0.20
2-and 1-methyl Naphthalene	µg/L	1800	0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits				
Chrysene-d12	%	50-140		78	65	59

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

7094721-7094809 Note: The result for Benzo(b)Flouranthene is the total of the Benzo(b)&(j)Flouranthene isomers because the isomers co-elute on the GC column.

Certified By:

AGAT Laboratories

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CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		15-02	15-03	15-08	15-10	DUP 3	DUP 8	Field Blank
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		10/14/2015	10/14/2015	10/14/2015	10/14/2015	10/14/2015	10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094678	7094689	7094721	7094750	7094754	7094768	7094809
Aroclor 1242	µg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	µg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	µg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	µg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Polychlorinated Biphenyls	µg/L	7.8	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits								
Decachlorobiphenyl	%	60-140		68	90	79	89	76	78	64

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:

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		15-02	15-03	15-04	DUP 3
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		10/14/2015	10/14/2015	10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094678	7094689	7094697	7094754
F1 (C6 to C10)	µg/L		25	<25	470	<25	470
F1 (C6 to C10) minus BTEX	µg/L	750	25	<25	470	<25	470
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA	NA	NA
Surrogate	Unit	Acceptable Limits					
Terphenyl	%	60-140		86	108	83	107

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

7094678-7094754 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 nC34.
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:

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		15-01	15-05	15-06
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		10/14/2015	10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094669	7094705	7094712
Benzene	µg/L	44	0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	2300	0.10	<0.10	<0.10	<0.10
Xylene Mixture	µg/L	4200	0.20	<0.20	<0.20	<0.20
F1 (C6 to C10)	µg/L		25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	750	25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA	NA
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140		84	97	106

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

7094669-7094712 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 nC34.
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 153/04, results are considered valid without determining the PAH contribution if not requested by the client.
NA = Not Applicable

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AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		15-08	DUP 8	Field Blank
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		10/14/2015	10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094721	7094768	7094809
Benzene	µg/L	44	0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	2300	0.10	<0.10	<0.10	<0.10
Xylene Mixture	µg/L	4200	0.20	<0.20	<0.20	<0.20
F1 (C6 to C10)	µg/L		25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	750	25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100
F2 (C10 to C16) minus Naphthalene	µg/L	150	100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100
F3 (C16 to C34) minus PAHs	µg/L	500	100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA	NA
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140		100	94	79

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

7094721-7094809 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 nC34.
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 and PAH 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.

Certified By:

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AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

SAMPLE DESCRIPTION:				15-02		15-03		15-04		DUP 3
SAMPLE TYPE:				Water		Water		Water		Water
DATE SAMPLED:				10/14/2015		10/14/2015		10/14/2015		10/14/2015
Parameter	Unit	G / S	RDL	7094678	RDL	7094689	RDL	7094697	RDL	7094754
Dichlorodifluoromethane	µg/L	4400	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
Vinyl Chloride	µg/L	0.5	0.17	<0.17	1.70	52	0.17	<0.17	1.70	52
Bromomethane	µg/L	5.6	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
Trichlorofluoromethane	µg/L	2500	0.40	<0.40	4.00	<4.00	0.40	<0.40	4.00	<4.00
Acetone	µg/L	130000	1.0	<1.0	10.0	<10.0	1.0	<1.0	10.0	<10.0
1,1-Dichloroethylene	µg/L	1.6	0.30	<0.30	3.00	<3.00	0.30	<0.30	3.00	<3.00
Methylene Chloride	µg/L	610	0.30	<0.30	3.00	<3.00	0.30	<0.30	3.00	<3.00
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	2.00	7.5	0.20	<0.20	2.00	8.8
Methyl tert-butyl ether	µg/L	190	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
1,1-Dichloroethane	µg/L	320	0.30	<0.30	3.00	<3.00	0.30	<0.30	3.00	<3.00
Methyl Ethyl Ketone	µg/L	470000	1.0	<1.0	10.0	<10.0	1.0	<1.0	10.0	<10.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	2.00	590	0.20	<0.20	2.00	670
Chloroform	µg/L	2.4	0.20	<0.20	2.00	<2.00	0.20	0.35	2.00	<2.00
1,2-Dichloroethane	µg/L	1.6	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
1,1,1-Trichloroethane	µg/L	640	0.30	<0.30	3.00	<3.00	0.30	<0.30	3.00	<3.00
Carbon Tetrachloride	µg/L	0.79	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
Benzene	µg/L	44	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
1,2-Dichloropropane	µg/L	16	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
Trichloroethylene	µg/L	1.6	0.20	<0.20	2.00	440	0.20	<0.20	2.00	540
Bromodichloromethane	µg/L	85000	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
Methyl Isobutyl Ketone	µg/L	140000	1.0	<1.0	10.0	<10.0	1.0	<1.0	10.0	<10.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
Toluene	µg/L	18000	0.20	0.41	2.00	<2.00	0.20	0.33	2.00	<2.00
Dibromochloromethane	µg/L	82000	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
Ethylene Dibromide	µg/L	0.25	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
Tetrachloroethylene	µg/L	1.6	0.20	<0.20	2.00	2700	0.20	<0.20	2.00	2800
1,1,1,2-Tetrachloroethane	µg/L	3.3	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
Chlorobenzene	µg/L	630	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
Ethylbenzene	µg/L	2300	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
m & p-Xylene	µg/L		0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00

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AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		15-02		15-03		15-04		DUP 3
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		10/14/2015		10/14/2015		10/14/2015		10/14/2015
Parameter	Unit	G / S	RDL	7094678	RDL	7094689	RDL	7094697	RDL	7094754
Bromoform	µg/L	380	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
Styrene	µg/L	1300	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
1,1,2,2-Tetrachloroethane	µg/L	3.2	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
o-Xylene	µg/L		0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
1,3-Dichlorobenzene	µg/L	9600	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
1,4-Dichlorobenzene	µg/L	8	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
1,2-Dichlorobenzene	µg/L	4600	0.10	<0.10	1.00	<1.00	0.10	<0.10	1.00	<1.00
1,3-Dichloropropene	µg/L	5.2	0.30	<0.30	3.00	<3.00	0.30	<0.30	3.00	<3.00
Xylene Mixture	µg/L	4200	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
n-Hexane	µg/L	51	0.20	<0.20	2.00	<2.00	0.20	<0.20	2.00	<2.00
Surrogate	Unit	Acceptable Limits								
Toluene-d8	% Recovery	50-140		102		104		106		100
4-Bromofluorobenzene	% Recovery	50-140		97		92		97		91

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AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		Trip Blank	Field Blank
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094797	7094809
Dichlorodifluoromethane	µg/L	4400	0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.5	0.17	<0.17	<0.17
Bromomethane	µg/L	5.6	0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	<0.40	<0.40
Acetone	µg/L	130000	1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	1.6	0.30	<0.30	<0.30
Methylene Chloride	µg/L	610	0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	190	0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	320	0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	470000	1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
Chloroform	µg/L	2.4	0.20	<0.20	1.7
1,2-Dichloroethane	µg/L	1.6	0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	640	0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.79	0.20	<0.20	<0.20
Benzene	µg/L	44	0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	16	0.20	<0.20	<0.20
Trichloroethylene	µg/L	1.6	0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	<0.20	0.51
Methyl Isobutyl Ketone	µg/L	140000	1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	<0.20	<0.20
Dibromochloromethane	µg/L	82000	0.10	<0.10	0.20
Ethylene Dibromide	µg/L	0.25	0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	1.6	0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	3.3	0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20	<0.20

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AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		Trip Blank	Field Blank
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094797	7094809
Bromoform	µg/L	380	0.10	<0.10	<0.10
Styrene	µg/L	1300	0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	3.2	0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	8	0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	4600	0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	5.2	0.30	<0.30	<0.30
Xylene Mixture	µg/L	4200	0.20	<0.20	<0.20
n-Hexane	µg/L	51	0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits			
Toluene-d8	% Recovery	50-140		120	105
4-Bromofluorobenzene	% Recovery	50-140		97	101

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

7094689 Dilution factor=10
The sample was diluted to keep the target compounds in the calibration range of the instrument and avoid contaminating the Purge and Trap system. The reporting detection limit has been corrected for the dilution factor used.

7094754 Dilution factor=10
The sample was diluted to keep the target compounds in the calibration range of the instrument and avoid contaminating the Purge and Trap system. The reporting detection limit has been corrected for the dilution factor used.

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AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		Trip Spike
		SAMPLE TYPE:		Water
		DATE SAMPLED:		10/14/2015
Parameter	Unit	G / S	RDL	7094780
Dichlorodifluoromethane	% Recovery			98
Vinyl Chloride	% Recovery			101
Bromomethane	% Recovery			92
Trichlorofluoromethane	% Recovery			103
Acetone	% Recovery			98
1,1-Dichloroethylene	% Recovery			110
Methylene Chloride	% Recovery			75
trans- 1,2-Dichloroethylene	% Recovery			118
Methyl tert-butyl ether	% Recovery			75
1,1-Dichloroethane	% Recovery			73
Methyl Ethyl Ketone	% Recovery			81
cis- 1,2-Dichloroethylene	% Recovery			73
Chloroform	% Recovery			75
1,2-Dichloroethane	% Recovery			71
1,1,1-Trichloroethane	% Recovery			84
Carbon Tetrachloride	% Recovery			75
Benzene	% Recovery			85
1,2-Dichloropropane	% Recovery			109
Trichloroethylene	% Recovery			87
Bromodichloromethane	% Recovery			102
Methyl Isobutyl Ketone	% Recovery			100
1,1,2-Trichloroethane	% Recovery			122
Toluene	% Recovery			108
Dibromochloromethane	% Recovery			105
Ethylene Dibromide	% Recovery			110
Tetrachloroethylene	% Recovery			96
1,1,1,2-Tetrachloroethane	% Recovery			119
Chlorobenzene	% Recovery			106
Ethylbenzene	% Recovery			99
m & p-Xylene	% Recovery			102

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

		SAMPLE DESCRIPTION:		Trip Spike
		SAMPLE TYPE:		Water
		DATE SAMPLED:		10/14/2015
Parameter	Unit	G / S	RDL	7094780
Bromoform	% Recovery			107
Styrene	% Recovery			93
1,1,2,2-Tetrachloroethane	% Recovery			122
o-Xylene	% Recovery			103
1,3-Dichlorobenzene	% Recovery			97
1,4-Dichlorobenzene	% Recovery			100
1,2-Dichlorobenzene	% Recovery			102
1,3-Dichloropropene	% Recovery			85
Xylene Mixture	% Recovery			103
n-Hexane	% Recovery			84
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140		105
4-Bromofluorobenzene	% Recovery	50-140		103

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

Certified By:

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AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

SAMPLE DESCRIPTION:				15-08	DUP 8	Field Blank
SAMPLE TYPE:				Water	Water	Water
DATE SAMPLED:				10/14/2015	10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL	7094721	7094768	7094809
Antimony	µg/L	20000	0.5	<0.5	<0.5	<0.5
Arsenic	µg/L	1900	1.0	6.5	6.7	<1.0
Barium	µg/L	29000	2.0	502	479	<2.0
Beryllium	µg/L	67	0.5	<0.5	<0.5	<0.5
Boron	µg/L	45000	10.0	75.8	71.2	<10.0
Cadmium	µg/L	2.7	0.2	<0.2	<0.2	<0.2
Chromium	µg/L	810	2.0	3.1	5.8	<2.0
Cobalt	µg/L	66	0.5	3.3	3.2	<0.5
Copper	µg/L	87	1.0	1.0	<1.0	<1.0
Lead	µg/L	25	0.5	<0.5	<0.5	<0.5
Molybdenum	µg/L	9200	0.5	5.6	5.3	<0.5
Nickel	µg/L	490	1.0	7.1	7.4	<1.0
Selenium	µg/L	63	1.0	1.4	2.8	<1.0
Silver	µg/L	1.5	0.2	<0.2	<0.2	<0.2
Thallium	µg/L	510	0.3	<0.3	<0.3	<0.3
Uranium	µg/L	420	0.5	3.9	3.9	<0.5
Vanadium	µg/L	250	0.4	6.4	6.2	<0.4
Zinc	µg/L	1100	5.0	5.4	<5.0	<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:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

				SAMPLE DESCRIPTION:	Field Blank
				SAMPLE TYPE:	Water
				DATE SAMPLED:	10/14/2015
Parameter	Unit	G / S	RDL	7094809	
Chromium VI	µg/L	140	5	<5	

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

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Certificate of Analysis

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - ORPs (Water) Hg, CrVI

DATE RECEIVED: 2015-10-15

DATE REPORTED: 2015-10-23

				SAMPLE DESCRIPTION:	15-08	DUP 8
				SAMPLE TYPE:	Water	Water
				DATE SAMPLED:	10/14/2015	10/14/2015
Parameter	Unit	G / S	RDL		7094721	7094768
Mercury	µg/L	0.29	0.02		<0.02	<0.02
Chromium VI	µg/L	140	5		<5	<5

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:

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

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CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Alyssa Troke

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
7094689	15-03	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	Tetrachloroethylene	1.6	2700
7094689	15-03	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	Trichloroethylene	1.6	440
7094689	15-03	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	Vinyl Chloride	0.5	52
7094689	15-03	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	cis- 1,2-Dichloroethylene	1.6	590
7094689	15-03	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	trans- 1,2-Dichloroethylene	1.6	7.5
7094754	DUP 3	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	Tetrachloroethylene	1.6	2800
7094754	DUP 3	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	Trichloroethylene	1.6	540
7094754	DUP 3	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	Vinyl Chloride	0.5	52
7094754	DUP 3	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	cis- 1,2-Dichloroethylene	1.6	670
7094754	DUP 3	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	trans- 1,2-Dichloroethylene	1.6	8.8

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 15Z030915
PROJECT: 1522569
ATTENTION TO: Alyssa Troke
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Oct 23, 2015

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			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 (Water)															
Benzene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	79%	50%	140%	92%	60%	130%	99%	50%	140%
Toluene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	89%	50%	140%	96%	60%	130%	104%	50%	140%
Ethylbenzene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	92%	50%	140%	97%	60%	130%	105%	50%	140%
Xylene Mixture	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	92%	50%	140%	101%	60%	130%	101%	50%	140%
F1 (C6 to C10)	7094809	7094809	< 25	< 25	NA	< 25	104%	60%	140%	90%	60%	140%	89%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	96%	60%	140%	69%	60%	140%	76%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	100%	60%	140%	79%	60%	140%	104%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	98%	60%	140%	90%	60%	140%	81%	60%	140%
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	125%	50%	140%	95%	50%	140%	81%	50%	140%
Vinyl Chloride	7094809	7094809	< 0.17	< 0.17	NA	< 0.17	117%	50%	140%	87%	50%	140%	81%	50%	140%
Bromomethane	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	98%	50%	140%	88%	50%	140%	80%	50%	140%
Trichlorofluoromethane	7094809	7094809	< 0.40	< 0.40	NA	< 0.40	109%	50%	140%	95%	50%	140%	79%	50%	140%
Acetone	7094809	7094809	< 1.0	< 1.0	NA	< 1.0	103%	50%	140%	93%	50%	140%	94%	50%	140%
1,1-Dichloroethylene	7094809	7094809	< 0.30	< 0.30	NA	< 0.30	72%	50%	140%	88%	60%	130%	85%	50%	140%
Methylene Chloride	7094809	7094809	< 0.30	< 0.30	NA	< 0.30	103%	50%	140%	116%	60%	130%	83%	50%	140%
trans- 1,2-Dichloroethylene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	81%	50%	140%	86%	60%	130%	82%	50%	140%
Methyl tert-butyl ether	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	100%	50%	140%	93%	60%	130%	83%	50%	140%
1,1-Dichloroethane	7094809	7094809	< 0.30	< 0.30	NA	< 0.30	92%	50%	140%	87%	60%	130%	84%	50%	140%
Methyl Ethyl Ketone	7094809	7094809	< 1.0	< 1.0	NA	< 1.0	106%	50%	140%	100%	50%	140%	83%	50%	140%
cis- 1,2-Dichloroethylene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	89%	50%	140%	90%	60%	130%	82%	50%	140%
Chloroform	7094809	7094809	1.7	1.9	11.1%	< 0.20	95%	50%	140%	87%	60%	130%	80%	50%	140%
1,2-Dichloroethane	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	99%	60%	130%	91%	50%	140%
1,1,1-Trichloroethane	7094809	7094809	< 0.30	< 0.30	NA	< 0.30	92%	50%	140%	87%	60%	130%	90%	50%	140%
Carbon Tetrachloride	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	84%	50%	140%	81%	60%	130%	75%	50%	140%
Benzene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	117%	50%	140%	98%	60%	130%	108%	50%	140%
1,2-Dichloropropane	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	119%	50%	140%	100%	60%	130%	103%	50%	140%
Trichloroethylene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	99%	60%	130%	94%	50%	140%
Bromodichloromethane	7094809	7094809	0.51	0.47	NA	< 0.20	109%	50%	140%	103%	60%	130%	99%	50%	140%
Methyl Isobutyl Ketone	7094809	7094809	< 1.0	< 1.0	NA	< 1.0	109%	50%	140%	119%	50%	140%	95%	50%	140%
1,1,2-Trichloroethane	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	77%	50%	140%	122%	60%	130%	116%	50%	140%
Toluene	7094809	7094809	< 0.20	<0.20	NA	< 0.20	113%	50%	140%	119%	60%	130%	119%	50%	140%
Dibromochloromethane	7094809	7094809	0.20	0.20	NA	< 0.10	120%	50%	140%	109%	60%	130%	99%	50%	140%
Ethylene Dibromide	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	124%	50%	140%	109%	60%	130%	99%	50%	140%
Tetrachloroethylene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	95%	50%	140%	115%	60%	130%	107%	50%	140%
1,1,1,2-Tetrachloroethane	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	109%	50%	140%	108%	60%	130%	102%	50%	140%
Chlorobenzene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	104%	50%	140%	116%	60%	130%	106%	50%	140%
Ethylbenzene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	122%	50%	140%	110%	60%	130%	104%	50%	140%

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD
AGAT WORK ORDER: 15Z030915
PROJECT: 1522569
ATTENTION TO: Alyssa Troke
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 23, 2015

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
m & p-Xylene	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	121%	50%	140%	114%	60%	130%	106%	50%	140%
Bromoform	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	114%	50%	140%	104%	60%	130%	95%	50%	140%
Styrene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	111%	50%	140%	102%	60%	130%	94%	50%	140%
1,1,2,2-Tetrachloroethane	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	105%	50%	140%	124%	60%	130%	110%	50%	140%
o-Xylene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	121%	50%	140%	115%	60%	130%	106%	50%	140%
1,3-Dichlorobenzene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	113%	50%	140%	108%	60%	130%	101%	50%	140%
1,4-Dichlorobenzene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	121%	50%	140%	115%	60%	130%	106%	50%	140%
1,2-Dichlorobenzene	7094809	7094809	< 0.10	< 0.10	NA	< 0.10	111%	50%	140%	110%	60%	130%	101%	50%	140%
1,3-Dichloropropene	7094809	7094809	< 0.30	< 0.30	NA	< 0.30	112%	50%	140%	103%	60%	130%	101%	50%	140%
n-Hexane	7094809	7094809	< 0.20	< 0.20	NA	< 0.20	105%	50%	140%	107%	60%	130%	115%	50%	140%
O. Reg. 153(511) - PCBs (Water)															
Aroclor 1242		TW	< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1248		TW	< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1254		TW	< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1260		TW	< 0.1	< 0.1	NA	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Polychlorinated Biphenyls		TW	< 0.1	< 0.1	NA	< 0.1	89%	60%	140%	63%	60%	140%	99%	60%	140%
O. Reg. 153(511) - PAHs (Water)															
Naphthalene		TW	< 0.20	< 0.20	NA	< 0.20	77%	50%	140%	62%	50%	140%	74%	50%	140%
Acenaphthylene		TW	< 0.20	< 0.20	NA	< 0.20	88%	50%	140%	81%	50%	140%	92%	50%	140%
Acenaphthene		TW	< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	78%	50%	140%	88%	50%	140%
Fluorene		TW	< 0.20	< 0.20	NA	< 0.20	87%	50%	140%	89%	50%	140%	95%	50%	140%
Phenanthrene		TW	< 0.10	< 0.10	NA	< 0.10	87%	50%	140%	96%	50%	140%	102%	50%	140%
Anthracene		TW	< 0.10	< 0.10	NA	< 0.10	88%	50%	140%	95%	50%	140%	100%	50%	140%
Fluoranthene		TW	< 0.20	< 0.20	NA	< 0.20	86%	50%	140%	95%	50%	140%	105%	50%	140%
Pyrene		TW	< 0.20	< 0.20	NA	< 0.20	87%	50%	140%	98%	50%	140%	106%	50%	140%
Benz(a)anthracene		TW	< 0.20	< 0.20	NA	< 0.20	84%	50%	140%	93%	50%	140%	103%	50%	140%
Chrysene		TW	< 0.10	< 0.10	NA	< 0.10	81%	50%	140%	88%	50%	140%	99%	50%	140%
Benzo(b)fluoranthene		TW	< 0.10	< 0.10	NA	< 0.10	92%	50%	140%	89%	50%	140%	82%	50%	140%
Benzo(k)fluoranthene		TW	< 0.10	< 0.10	NA	< 0.10	91%	50%	140%	84%	50%	140%	93%	50%	140%
Benzo(a)pyrene		TW	< 0.01	< 0.01	NA	< 0.01	94%	50%	140%	93%	50%	140%	99%	50%	140%
Indeno(1,2,3-cd)pyrene		TW	< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	98%	50%	140%	98%	50%	140%
Dibenz(a,h)anthracene		TW	< 0.20	< 0.20	NA	< 0.20	105%	50%	140%	100%	50%	140%	99%	50%	140%
Benzo(g,h,i)perylene		TW	< 0.20	< 0.20	NA	< 0.20	101%	50%	140%	91%	50%	140%	90%	50%	140%
2-and 1-methyl Naphthalene		TW	< 0.20	< 0.20	NA	< 0.20	94%	50%	140%	69%	50%	140%	81%	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).
TW: Tap water analysis has been performed as QC sample testing for duplicate and matrix spike due to insufficient sample volume.

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 23, 2015			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

Certified By:

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Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Oct 23, 2015			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) - Metals (Comprehensive) (Water)															
Antimony	7095134		<0.5	<0.5	NA	< 0.5	102%	70%	130%	103%	80%	120%	100%	70%	130%
Arsenic	7095134		<1.0	<1.0	NA	< 1.0	105%	70%	130%	103%	80%	120%	118%	70%	130%
Barium	7095134		52.9	53.1	0.4%	< 2.0	101%	70%	130%	101%	80%	120%	91%	70%	130%
Beryllium	7095134		<0.5	<0.5	NA	< 0.5	101%	70%	130%	101%	80%	120%	87%	70%	130%
Boron	7095134		23.1	22.6	NA	< 10.0	104%	70%	130%	102%	80%	120%	87%	70%	130%
Cadmium	7095134		<0.2	<0.2	NA	< 0.2	101%	70%	130%	106%	80%	120%	103%	70%	130%
Chromium	7095134		<2.0	<2.0	NA	< 2.0	103%	70%	130%	102%	80%	120%	107%	70%	130%
Cobalt	7095134		<0.5	<0.5	NA	< 0.5	104%	70%	130%	108%	80%	120%	103%	70%	130%
Copper	7095134		1.2	1.1	NA	< 1.0	104%	70%	130%	105%	80%	120%	101%	70%	130%
Lead	7095134		<0.5	<0.5	NA	< 0.5	103%	70%	130%	106%	80%	120%	95%	70%	130%
Molybdenum	7095134		0.6	0.6	NA	< 0.5	101%	70%	130%	100%	80%	120%	100%	70%	130%
Nickel	7095134		<1.0	<1.0	NA	< 1.0	109%	70%	130%	107%	80%	120%	106%	70%	130%
Selenium	7095134		<1.0	<1.0	NA	< 1.0	103%	70%	130%	97%	80%	120%	125%	70%	130%
Silver	7095134		<0.2	<0.2	NA	< 0.2	99%	70%	130%	109%	80%	120%	102%	70%	130%
Thallium	7095134		<0.3	<0.3	NA	< 0.3	102%	70%	130%	104%	80%	120%	93%	70%	130%
Uranium	7095134		<0.5	<0.5	NA	< 0.5	108%	70%	130%	109%	80%	120%	101%	70%	130%
Vanadium	7095134		<0.4	<0.4	NA	< 0.4	97%	70%	130%	102%	80%	120%	101%	70%	130%
Zinc	7095134		<5.0	<5.0	NA	< 5.0	110%	70%	130%	114%	80%	120%	103%	70%	130%
O. Reg. 153(511) - ORPs (Water) Hg, CrVI															
Mercury	7095498		<0.02	<0.02	NA	< 0.02	98%	70%	130%	98%	80%	120%	95%	70%	130%
Chromium VI	7093722		<5	<5	NA	< 5	107%	70%	130%	109%	80%	120%	110%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL (Reporting Limit), 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:

AGAT Laboratories

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Acenaphthylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Acenaphthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Fluorene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Phenanthrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benz(a)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Chrysene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Chrysene-d12	ORG-91-5105	EPA SW-846 3510 & 8270	GC/MS
Aroclor 1242	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1248	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1254	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1260	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Polychlorinated Biphenyls	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
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
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
Xylene Mixture	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
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
Benzene	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS
Toluene	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS
Ethylbenzene	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS
Xylene Mixture	VOL-91-5010	MOE PHC E3421	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5010	MOE PHC E3421	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5010	MOE PHC E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC E3421	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5010	MOE PHC E3421	GC/FID

AGAT Laboratories

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
F4 (C34 to C50)	VOL -91- 5010	MOE PHC- E3421	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

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Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 15Z030915

PROJECT: 1522569

ATTENTION TO: Alyssa Troke

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
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
Chromium VI	INOR-93-6034	SM 3500-Cr B	SPECTROPHOTOMETER
Mercury	MET-93-6100	EPA SW-846 7470 & 245.1	CVAAS

AGAT Laboratories

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 intended for human consumption)

Laboratory Use Only

Work Order #: 15Z030915

Cooler Quantity: 2

Arrival Temperatures: 5.0 | 5.5 | 5.3

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: 04.9/6.6/4.3 @ 5.1/3.8/3.4

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

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

Report Information:

Company: Golder
Contact:
Address:
Phone: 613-592-9600 Fax:
Reports to be sent to:
1. Email: atroke@golder.com / kholmes@golder.com
2. Email: dplendirleith@golder.com

Regulatory Requirements: (Please check all applicable boxes) ☐ No Regulatory Requirement

☑ Regulation 153/04 — Table 2 (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

Project Information:

Project: 1522569
Site Location: Westgate
Sampled By: James Doyle / Tony Lyon
AGAT Quote #: 60260 PO:

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

Invoice Information: Bill To Same: Yes ☐ No ☐

Company:
Contact:
Address:
Email:

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- ☐ Cr6+ ☐ EC ☐ FOC ☐ NO3/NO2 ☐ Total N ☐ Hg ☐ pH ☐ SAR; Nutrients: ☐ TP ☐ NH3 ☐ TKN ☐ NO3 ☐ NO2 ☐ NO3/NO2; Volatiles: ☑ VOC ☐ BTEX ☐ THM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan, incl. Hg + Cr VI	Hydride Forming Metals	Client Custom Metals	ORPs	Nutrients	Volatiles	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	BTEX
15-01	Oct 14.15	13:00	4	GW									✓								✓
15-02	↓	~~PCB~~ 10:30	8	↓	PCBs on Oct 15.'15							✓	✓				✓				✓ (3)
15-03	↓	14:00	8	↓								✓	✓				✓				✓ (3)
15-04	↓	15:00	7	↓								✓	✓								✓ (1)
15-05	↓	16:00	4	↓									✓								✓
15-06	↓	10:00	7	↓	Cancel metals analysis	~~✓~~	✓						✓		~~✓~~		~~✓~~	~~✓~~			✓
15-08	↓	8:30	9	↓		~~✓~~	✓						✓		✓		✓				✓
15-10	↓	9:30	1	↓													✓				
DUP 3	↓	12:00	8	↓								✓	✓				✓				✓ (1)
DUP 8	↓	12:00	9	↓		~~✓~~	✓						✓		✓		✓				✓
Trip spike	↓	12:00	12	↓	VOC only							✓									

Samples Relinquished By (Print Name and Sign): Tony Lyon [signature] Date: Oct 15.15 Time: 15:00

Samples Received By (Print Name and Sign): L Berthelot [signature] Date: 15-Oct-15 Time: 15h00

Samples Relinquished By (Print Name and Sign): Date: Time:

Samples Received By (Print Name and Sign): Sharmin [signature] Oct 16/15 Date: Time: 9:35

Page 1 of 2

Nº: T 014600

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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)

Laboratory Use Only

Work Order #: 1570309 15

Cooler Quantity: 2

Arrival Temperatures: 5.0 | 5.5 | 5.3

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Report Information:

Company:

Contact:

Address:

Phone: Fax:

Reports to be sent to:

1. Email:

2. Email:

Regulatory Requirements: ☐ **No Regulatory Requirement**

(Please check all applicable boxes)

☐ Regulation 153/04
Table ___ *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

Turnaround Time (TAT) Required:

Regular TAT ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project:

Site Location:

Sampled By:

AGAT Quote #: PO:

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

Is this submission for a **Record of Site Condition?** ☑ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company:

Contact:

Address:

Email:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan, incl. Hg + CrVI	Hydride Forming Metals	Client Custom Metals	ORPs: ☐B-HWS ☐Cl ☐CN⁻ ☐Cr^{6+} ☐EC ☐FOC ☐NO_3/NO_2 ☐Total N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH_3 ☐TKN ☐NO_3 ☐NO_2 ☐NO_3/NO_2	Volatiles: ☑VOC ☐BTEX ☐THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	BTEX
Trip blank	Oct 14, 15	12:00	9	GW	VOC only							✓									
Field blank	↓	12:00	11	GW		✓	✓					✓	✓		✓		✓				✓

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Tony Lyon			Berthelet	15-Oct-15	15h00
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
			Oct 16/15		

Page 2 of ___

N°: T 011334

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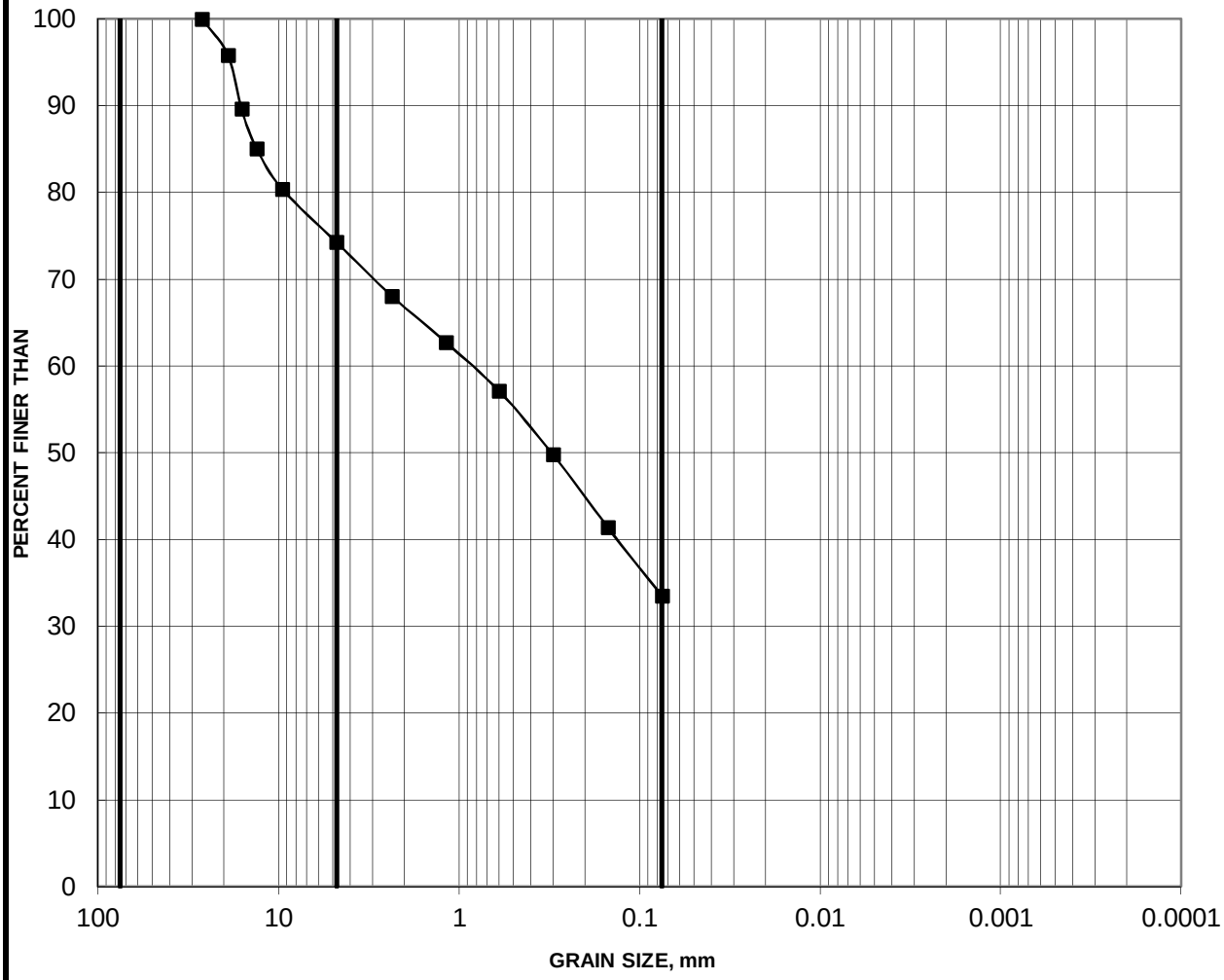
GRAIN SIZE DISTRIBUTION

Gravelly CLAYEY SAND (TILL)



Cobble	coarse	fine	coarse	medium	fine	SILT AND CLAY
Size	GRAVEL SIZE		SAND SIZE			

Borehole	Sample	Depth (m)
15-9	7	5.33-5.95

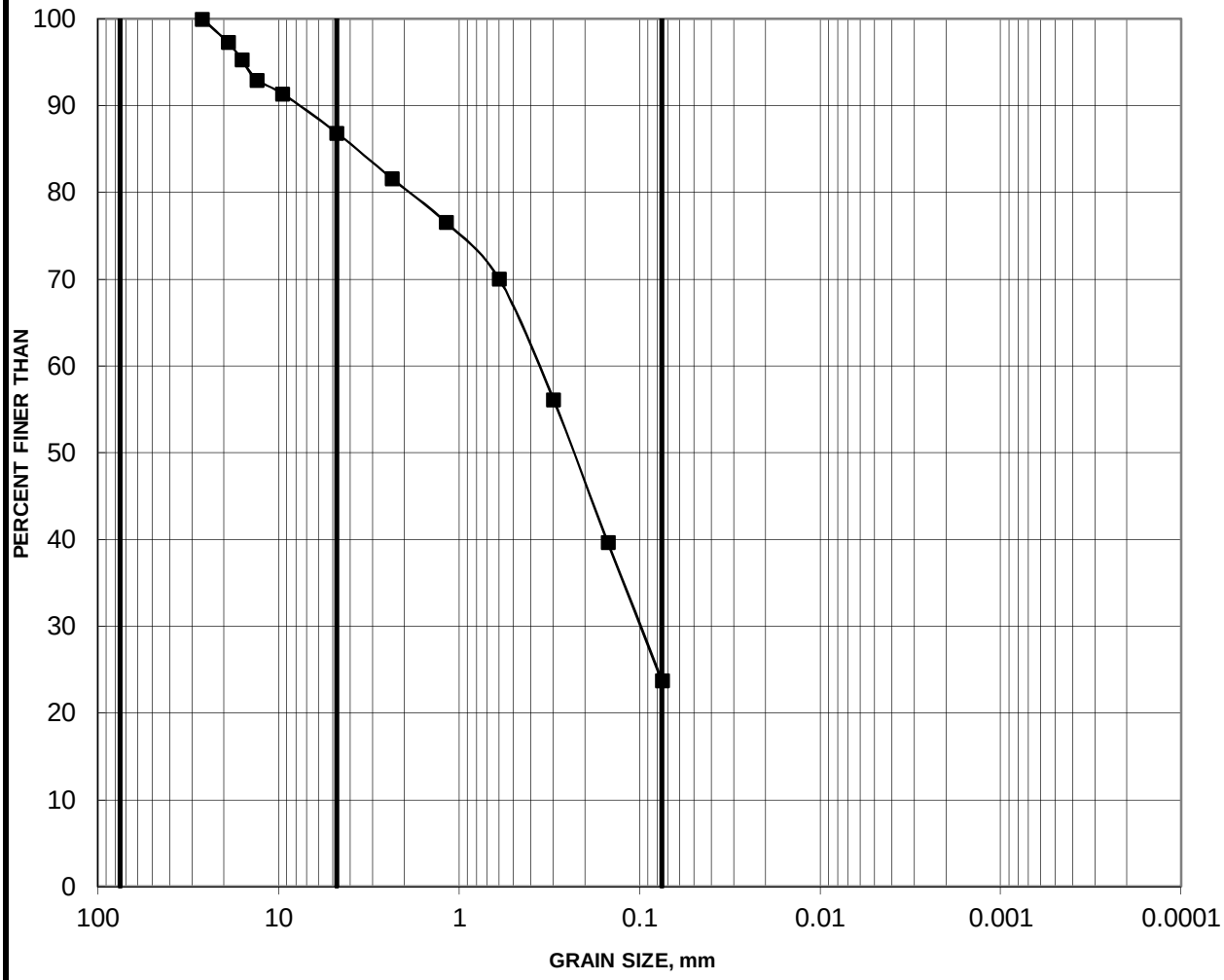
Project: 1522569/17001

Golder Associates

Created by: MI
Checked by: CNM

GRAIN SIZE DISTRIBUTION

Gravelly SILTY SAND (TILL)



Cobble	coarse	fine	coarse	medium	fine	SILT AND CLAY
Size	GRAVEL SIZE		SAND SIZE			

Borehole	Sample	Depth (m)
15-9	12	9.15-9.76

Project: 1522569/17001

Golder Associates

Created by: MI
Checked by: CNM

As a global, employee-owned organisation with over 50 years of experience, Golder Associates is driven by our purpose to engineer earth's development while preserving earth's integrity. We deliver solutions that help our clients achieve their sustainable development goals by providing a wide range of independent consulting, design and construction services in our specialist areas of earth, environment and energy.

For more information, visit golder.com

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