



Phase Two Environmental Site Assessment

211 Centrum Boulevard
Ottawa, Ontario

Le Groupe Maurice





Executive Summary

GHD Limited (GHD) was retained by Le Groupe Maurice (Groupe Maurice) to complete a Phase Two Environmental Site Assessment (Phase Two ESA) in general accordance with the Ontario Regulation (O. Reg.) 153/04 Phase Two ESA format for the property located at Civic No. 211 Centrum Boulevard in Ottawa, Ontario (hereinafter referred to as the Site, Property, or Phase Two Property). GHD previously prepared a Phase One Environmental Site Assessment (Phase One ESA) (Ref No. 11206675-E1-RPT-1, dated February 12, 2020) at the Site for Groupe Maurice. The Phase One ESA was conducted as part of environmental due diligence requirements by Groupe Maurice prior to their potential acquisition of the Property, as well as part of the local municipal planning department requirements associated with the potential redevelopment of the Site (future retirement home complex).

The Phase One ESA identified three potentially contaminating activities (PCAs) on the Site, and 14 properties with PCAs observed in the Phase One Study Area. The three on-Site PCAs (importation of fill material of unknown quantity [two occurrences]); and gasoline and associated products storage in fixed tanks), as well as one off-Site PCA (gasoline and associated products storage in fixed tanks; Petro Canada gasoline station south of the Site at 3055 St. Joseph Boulevard) were considered to represent areas of potential environmental concern (APEC) for the Site. The remaining off-Site PCAs identified as part of the Phase One ESA were not considered to represent APECs for the Site based on distances and/or down- or cross-gradient orientations to the Site and are not expected to have impacted the Property.

The Phase Two ESA was recommended based on the APECs identified in the Phase One ESA, in order to assess the soil and groundwater quality at the Site. The Phase Two ESA included advancement of 10 test pits and 12 boreholes, and selection of soil samples for testing of contaminants of potential concern (CPCs) based upon visual and olfactory observations and combustible vapour screening. Eight of the boreholes were then equipped with groundwater monitoring wells to allow collection of water level data, and sample collection for testing of CPCs in the groundwater. Soil and groundwater samples were submitted for laboratory analysis of the following CPCs: metals and inorganic parameters, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbon fractions F1 through F4 (PHCs F1-F4), volatile organic compounds (VOCs), and general chemistry parameters.

Contamination - Soil

Soil samples were collected from test pits advanced on December 13, 2019 and from boreholes advanced between January 9 and 15, 2020. Analytical testing of the aforementioned soil samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture):

- TP-02 (along eastern (center) boundary of Site): lead concentration of 134 µg/g (criteria of 120 µg/g).
- TP-06 (northeast portion of Site): barium concentration of 443 µg/g (criteria of 390 µg/g); cobalt concentration of 25.3 µg/g (criteria of 22 µg/g); and vanadium concentration of 110 µg/g (criteria of 86 µg/g).



- BH1 (southwest portion of Site): cyanide concentration of 0.072 µg/g (criteria of 0.051 µg/g).

All of the other analyzed soil samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Although concentrations of metals/inorganics (lead, barium, cobalt, vanadium, and cyanide) were greater than O. Reg. 153/04 Table 7 Criteria, the exceedances appear to be isolated, and there were no concentrations of these parameters in excess of the O. Reg. 153/04 Table 7 Criteria in any of the analyzed groundwater samples collected at the Site. The source of the soil impact is suspected to be associated with natural-occurring metals within this region, and is not likely specific to any current or historic land uses at the Site.

Contamination - Groundwater

Groundwater samples were collected from the on-Site monitoring wells between January 22 and 23, 2020. Analytical testing of the aforementioned groundwater samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria:

- MW1 (along western (south) boundary of Site): Chloride concentration of 2,320,000 µg/L (criteria of 1,800,000 µg/L).
- MW4 (center (east) portion of Site): Chloroform concentration of 3.9 µg/L (criteria of 2 µg/L).
- MW11 (northwest portion of Site): Chloride concentration of 3,020,000 µg/L (criteria of 1,800,000 µg/L).
- MW11 (duplicate; northwest portion of Site): Chloride concentration of 3,010,000 µg/L (with criteria of 1,800,000 µg/L).

All of the other analyzed groundwater samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Although concentrations of chloroform and chloride were greater than O. Reg. 153/04 Table 7 Criteria, the exceedances appear to be isolated. The source of the chloride impact is suspected to be associated potentially with nearby road/parking lot salting operations, or from the use of municipal-supplied potable water provided during drilling operations, and is not likely specific to any current or historic land uses at the Site. The source of the chloroform impact is also suspected to be associated with the use of municipal-supplied potable water provided during drilling operations, and is not likely specific to any current or historic land uses at the Site.

The presence of LNAPL/DNAPL was not identified in any of the monitoring wells.

Site Compliance

There were O. Reg. 153/04 Table 7 Criteria exceedances in soil and groundwater samples collected from the Site. The Site is not considered to be in compliance with the O. Reg. 153/04 for the proposed land use and requires remediation and/or a risk assessment. However, it is recommended that the generic remediation approach be conducted during Site redevelopment to manage and dispose of any contaminated materials encountered on the Site, particularly as the Site is intended to be developed as a multi-story retirement home complex with underground parking. At the time of Site redevelopment, based on current soil and groundwater conditions, a soil and groundwater management program is recommended in order to manage and/or dispose of contaminated soil and groundwater. Future monitoring/sampling of soil and/or groundwater conditions closer to the date of



Site redevelopment (i.e., as part of pre-construction planning and potential excess soil purposes) may alter the need for or the requirements of the management plan based on compliance with O. Reg. 153/04.



Table of Contents

1.	Introduction.....	1
1.1	Site Description	1
1.2	Property Ownership	1
1.3	Current and Proposed Future Uses.....	1
1.4	Applicable Site Condition Standard	2
2.	Background Information	3
2.1	Physical Setting	3
2.2	Past Investigations.....	3
3.	Scope of the Investigation	5
3.1	Overview of Site Investigation	5
3.2	Media Investigated.....	8
3.3	Phase One Conceptual Site Model.....	8
3.4	Deviations from Sampling and Analysis Plan	12
3.5	Impediments	12
4.	Investigation Method	12
4.1	General	12
4.2	Drilling and Excavating	13
4.3	Soil Sampling	13
4.4	Field Screening Measurements	15
4.5	Groundwater Monitoring Well Installation	15
4.6	Field Measurement of Water Quality Parameters	16
4.7	Groundwater Sampling	16
4.8	Sediment Sampling.....	17
4.9	Analytical Testing.....	17
4.10	Residue Management Procedures	17
4.11	Elevation Surveying	17
4.12	Quality Assurance and Quality Control Program	18
5.	Review and Evaluation.....	19
5.1	Geology.....	19
5.2	Groundwater Elevations and Flow Direction.....	20
5.3	LNAPL / DNAPL Assessment.....	22
5.4	Groundwater Hydraulic Gradients	22
5.5	Soil Texture	22
5.6	Soil Field Screening.....	22



5.7	Soil Quality	22
5.8	Ground Water Quality	24
5.9	Sediment Quality.....	25
5.10	Quality Assurance and Quality Control Results.....	25
5.11	Phase Two Conceptual Site Model.....	27
6.	Conclusions	34
7.	References	35

Figure Index

Figure 1	Site Location Map
Figure 2	Borehole Location Plan

Table Index

Table 3.1	Potentially Contaminating Activities (PCAs).....	10
Table 3.2	Area of Potential Environmental Concerns (APECs)	11
Table 4.1	Summary of Borehole and Monitoring Well Elevations	17
Table 5.1	Potentially Contaminating Activities (PCAs).....	27
Table 5.2	Area of Potential Environmental Concerns (APECs)	28
Table 1	Monitoring Well Elevations and DNAPL / LNAPL Assessment	
Table 2	Summary of Test Pit Soil Analysis	
Table 3	Summary of Borehole Soil Analysis	
Table 4	Summary of Groundwater Analysis	
Table 5	Maximum Soil Parameter Concentrations	
Table 6	Maximum Groundwater Parameter Concentrations	

Appendix Index

Appendix A	Utility Clearances
Appendix B	Test Pit and Borehole Logs
Appendix C	Laboratory Certificates of Analysis



1. Introduction

1.1 Site Description

Location and Identifier

The Phase Two Property is located at Civic No. 211 Centrum Boulevard Avenue in Ottawa, Ontario (hereinafter referred to as the Site, Property, or Phase Two Property). The Site is legally described as Concession 10S part of lot 37 RP 50R6839, parts 1 to 6 (property identification numbers (PINs) 145080053 and 145080054).

The location of the Site within the City of Ottawa is presented on Figure 1 – Site Location Map.

Size and Boundaries

The Site is irregular in shape and covers an area of approximately 15,200 square metres (m²) (1.52 hectares). The Site is bordered by Regional Road 174 followed by residential and/or forested properties to the north, by Place d'Orleans Drive and the Place d'Orleans Shopping Centre to the west, by Centrum Boulevard followed by commercial properties to the south, and by Brisebois Crescent and commercial properties to the east.

The Property boundaries and location of the existing buildings are presented on Figure 2 – Borehole Location Plan.

1.2 Property Ownership

The Phase Two Property is currently owned by Devmar Cumberland Developments Inc. and Aseldev Developments Inc., represented by Morguard Investments Limited (Morguard). Ms. Lise St-Amour is the Phase Two Property owner's representative and can be contacted at 613-745-0224 or lstamour@morguard.com (mailing address: 1200 St. Laurent Boulevard, Box 199, Ottawa, Ontario K1K 3B8).

1.3 Current and Proposed Future Uses

The Site is located within a suburban area on the east side of the City of Ottawa which is developed predominantly for commercial and residential use. The current property use of the Site is commercial, with a vacant bank and parking garage (both constructed prior to 1991) and a paved parking area in the southern portion of the Property, and vacant land in the northern portion of the Property. Prior to development as a bank, the Site was used for residential and agricultural purposes.

The Site is currently occupied by a one-story irregular-shaped building with a finished lower level and a two level parking garage in the southwest corner of the Site. A portion of the lower level of the building extends into the lower level of the parking garage beneath a drive-through ATM awning. Access to the building is via the main entrance off the ground level from Centrum Boulevard and the lower level entrance from the parking garage. The parking garage is located north of the building. A storage room is located in the northeast corner of the parking garage.



GHD understands that this Phase Two ESA is being conducted as part of environmental due diligence requirements by the Client prior to their potential acquisition of the Phase Two Property. At this time, the future proposed Property use includes existing commercial (at former bank building) and development of a retirement home complex (on vacant land and parking areas/structures). It is understood that the Client may be required to submit this Phase Two ESA report to the local municipal planning department to support the proposed Property redevelopment. This report was completed in general accordance with Ontario Regulation 153/04 – Record of Site Condition (amended) (O. Reg. 153/04), even though the Property is currently zoned for mixed-use including various commercial and/or residential purposes and would not necessarily require filing of a Record of Site Condition (RSC) to the Ontario Ministry of Environment, Conservation, and Parks (MECP) in accordance with O. Reg. 153/04 unless there was to be a change in zoning to more sensitive land use(s).

1.4 Applicable Site Condition Standard

The pH of the soil was tested and observed to be within the range of 5-9. There are no Areas of Natural Scientific Interest (ANSI) identified by the Ministry of Natural Resources (MNR) within 250 m of the Property boundary. The nearest area designated by the municipality in its current official plan (Bylaw 2008-250-Zoning) as 'EP' (Environmentally Protected zoning) is located approximately 0.3 kilometres (km) east of the Site, south of St. Joseph Boulevard. Under O. Reg. 153/04, a municipal EP zone is classified as an "area of natural significance". As the Site does not contain an area of natural significance, and properties within 30 m of the Site limits do not contain areas of natural significance, the Site is not classified as an environmentally sensitive property (O. Reg. 153/04, s41).

Subsurface excavation and drilling conducted as part of this investigation revealed that there is less than 2 m of soil in several of the test pits and boreholes advanced in the southern portion of the Site, which is consistent with the locations of visible bedrock outcroppings north of the parking garage. As more than 1/3 of the Property appears to consist of soil less than 2m in depth (excluding any non-soil surface treatment such as asphalt, concrete or aggregate), the Property would be considered a Shallow Soil site (O. Reg. 153/04, s43.1[3]).

No natural surface water bodies were identified on the Site or within 250 m of the Property boundaries. The nearest natural surface body is the Ottawa River, which is located approximately 1.2 km to the North of the Site. There are no open surface water bodies within 30 m of the Site limits. As the Property does not include all or part of a water body, and the Property is not adjacent to a water body, and does not include land that is within 30 m of a water body, the Property is not considered a Surface Water site (O. Reg. 153/04, s43.1[1]).

The existing property zoning for the Site is mixed-use including various commercial and residential uses. The proposed Property use after redevelopment will include a new retirement home complex, which falls under the current mixed use municipal zoning. As such, GHD considered the Site as being for residential/parkland/institutional land use (O. Reg. 153/04, s1[3]).

The Property, and all other properties located, in whole or in part, within 250 m of the boundaries of the Property, are supplied by a municipal drinking water system. The Site is not in an area designated on the City of Ottawa official plan as an intake protection zone. The Site is not in an area designated on the City of Ottawa official plan as a well-head protection area (WHPA). The Site is not



an agricultural property. The Site is considered as being non-potable water use (O. Reg. 153/04, s35).

Grain size analysis of the recovered soil samples was not conducted as part of this investigation; accordingly, the most conservative soil texture criteria will be applied to the Site. The Site is therefore considered as being coarse-grained soil texture (O. Reg. 153/04, s42).

Based upon the above described assessments, the generic O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture) is considered the applicable Site comparison.

2. Background Information

2.1 Physical Setting

Surface Water

No natural surface water bodies were identified on the Site or within 250 m of the Property boundary. The nearest natural surface water body is the Ottawa River, which is located approximately 1.2 km to the North of the Site.

Topography and Drainage

The Site is relatively flat across the southern portion with a slight downward slope to the north followed by a steep slope towards Regional Road 174 in the northern portion. The elevation of the Site is approximately 65 +/- 5 metres above mean sea level (true m AMSL)¹. The Site's southern and eastern edge is approximately level with respect to neighbouring streets, while the western edge is generally elevated approximately 2.0 to 3.0 m with respect to the neighbouring street to the west. The grading to the north was observed to be up to 5.0 metres below the grade of the southern portion of the Site. The regional topography in the general area of the Site is generally flat, sloping down to the north-northwest toward the Ottawa River. The Site location and general topography is presented on Figure 1.

Hard surfaces at the Site include the parking garage on the southwest portion of the Site. Access to the lower level of the parking garage is via an asphalt ramp and driveway from Brisebois Crescent to the east and access to the upper level of the parking garage is via a driveway from Centrum Boulevard. An at-grade asphalt parking area is located east of the Site building. Precipitation falling on improved paved surfaces will travel by sheet flow to the Site storm drains. Precipitation falling on unimproved landscaped surfaces will infiltrate at the ground surface.

2.2 Past Investigations

The following environmental reports were reviewed prior to conducting this Phase Two ESA:

- "Phase One Environmental Site Assessment, 211 Centrum Boulevard, Ottawa, Ontario" Reference No. 11180894-E1-RPT-1, prepared by GHD, dated February 12, 2020 (Phase One ESA).

¹ Ontario Basic – Topographic Maps (2014), <http://www.geographynetwork.ca/website/obm/viewer.htm>.



Phase One ESA

The Phase One ESA was completed for the entire Site in general accordance with O. Reg. 153/04, which is currently occupied with a vacant bank building and parking garage (constructed prior to 1991), as well as paved parking area, in the southern portion of the Property, and vacant land in the northern portion of the Property.

According to the historical research (title search documents, city directories, and aerial photographs), the earliest developed use of the Site is approximately 1860 and has been used for agricultural and/or residential purposes since 1860 to prior to 1991. The Site was reportedly redeveloped in the early 1990's, when the agricultural and residential structures were removed and the current commercial building and parking garage were constructed. At the time of the Phase One ESA, the Site was developed with a one-story, irregular-shaped building with a finished lower level, and a two level parking garage in the southwest corner of the Site.

Based on the historical research and known information of the general area of the Site, one off-Site potentially contaminating activity (PCA) was identified in the Phase One Study Area and considered to represent an area of potential environmental concern (APEC) for the subject Site:

1. Off-Site - Gasoline and Associated Products Storage in Fixed Tanks | A Petro Canada gasoline station is located approximately 50 metres (m) to the south of the Site at 3055 St. Joseph Boulevard. The gasoline station was reported to have historic and current USTs dating back to 1983. The presence of fuel storage is identified as a PCA in accordance with O. Reg. 153/04 (Gasoline and Associated Products Storage in Fixed Tanks) and based on the gas station's distance and orientation with respect to the Site (up-gradient of the Site) this PCA has been included as APEC #1 for the Site.

Three suspected on-Site PCAs were also identified in the Phase One Study Area and considered to represent additional APECs for the Site:

2. Site – Importation of Fill Material of Unknown Quality | Fill material was identified during a Subsurface Investigation completed by Golder in 1989. The investigation identified localized deposits of fill material across the northern and central portions of the Site, ranging in thickness from 0.1 to 1.2 m. Concrete, metal, and organic materials were identified within the fill material. The presence of fill material at the Site is considered a PCA (Importation of Fill Material of an Unknown Quality) in accordance with O. Reg. 153/04, and has been included as APEC #2 for the Site.
3. Site – Gasoline and Associated Products Storage in Fixed Tanks | A release of an unknown quantity of cement and fuel from a cement truck was reported to have occurred in the western portion of the Site on March 28, 2017. GHD observed concrete on the ground surface in the general area where the release was reported to have occurred. No visual or olfactory evidence of a fuel release was noted in the area during the Site visit; however, the reported release of fuel has been identified as a PCA in accordance with O. Reg. 153/04 (Gasoline and Associated Products Storage in Fixed Tanks) and based on the reported location of the release (on the western portion of the Site) this PCA has been included as APEC #3 for the Site.
4. Site – Importation of Fill Material of Unknown Quality | Fill material was potentially placed on the Site in the location of the former residential and agricultural building footprints as observed



in aerial photographs located in the southern portion of the Site. The presence of potential fill material at the Site is considered a PCA (Importation of Fill Material of an Unknown Quality) in accordance with O. Reg. 153/04, and has been included as APEC #4 for the Site.

A Phase Two ESA was recommended for the Phase One Property to assess the soil and groundwater quality at the Site as a result of the identified APECs.

3. Scope of the Investigation

3.1 Overview of Site Investigation

Underground utilities (both public and private services) were identified by GHD prior to excavation and drilling activities. Copies of the underground utility clearances are included in Appendix A.

Test pits and soil samples from boreholes were logged for geologic detail, according to the Unified Soil Classification System (USCS). Test pit logs and borehole logs are presented in Appendix B.

Test Pit and Soil Sampling Program

On December 13, 2019, 10 test pits (TP-01 to TP-10) were advanced by excavator as part of a test pit program to assess soil quality in specific areas across the Site associated with APECs noted in Section 3.1, as well as for geological assessment. The location of the test pits are presented on Figure 2. Test pits were completed to refusal on boulder or limestone bedrock with bottom depths ranging from 0.6 to 3.4 metres below ground surface (m BGS). GHD supervised the test pits and noted soil conditions within each test pit, along with completion of soil screening using a photo-ionization detector (PID) and field observations of the soil noting any potential evidence of visual and/or olfactory contamination. Select soil samples from each test pit were submitted to AGAT Laboratories (AGAT) in Ottawa, Ontario, under chain-of-custody (COC) protocol for analysis of metals and inorganic parameters, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbon fractions F1 through F4 (PHCs F1-F4), volatile organic compounds (VOCs), and general chemistry parameters to assess soil quality across the Site.

Borehole and Monitoring Well Advancement and Sampling Program

Between January 9 and 15, 2020, 12 boreholes (BH1 through BH12) were advanced by means of a track-mounted CME 55 power drill rig equipped for environmental soil sampling under the supervision of GHD field staff. Samples were recovered using 50 mm diameter split spoon samplers advanced to the sampling depth with a hydraulic hammer. Recovered soil samples were screened in the field for evidence of visual and olfactory evidence of contamination, as well as field screened using a PID. Boreholes BH1, BH2, BH4, BH5, BH8, BH9, BH11, and BH12 were instrumented with groundwater monitoring wells respectively identified as MW1, MW2, MW4, MW5, MW8, MW9, MW11, and MW12 to measure the groundwater levels and collect representative groundwater samples. The location of the boreholes and monitoring wells are presented on Figure 2. The specific rationale for each borehole/monitoring well location is summarized as follows:

- Borehole BH1 was advanced to a depth of approximately 6.8 m BGS near the southwest limit of the Site, located approximately 6.5 m east of Place d'Orleans Drive and immediately southwest of the parking garage. The borehole was equipped with a groundwater monitoring well identified



as MW1. The monitoring well was screened in the bedrock to intercept the bedrock groundwater table. This borehole was located to assess the environmental soil and groundwater quality associated with proximity to the Petro-Canada Gas station located at 3055 St. Joseph Boulevard (APEC #1) and the imported fill materials (APEC#4).

- Borehole BH2 was advanced to a depth of approximately 6.3 m BGS in the south portion of the site, near the north limit of the paved parking area and approximately 33.5 m north of Centrum Boulevard. The borehole was equipped with a groundwater monitoring well identified as MW2. The monitoring well was screened in the bedrock to intercept the bedrock groundwater table. This borehole was located to assess geologic conditions and the environmental groundwater quality associated with proximity to the Petro-Canada Gas station located at 3055 St. Joseph Boulevard (APEC #1) and the imported fill materials (APEC#4).
- Borehole BH3 was advanced to a depth of approximately 7.2 m BGS near the western Property line, located approximately 6.0 m east of Place d'Orleans Drive at the northwest corner of the parking garage. This borehole was located to assess the environmental soil quality associated with the cement truck spill (APEC #3).
- Borehole BH4 was advanced to a depth of approximately 6.0 m BGS in the center portion of the Site, located approximately 29.0 m west of Brisebois Crescent. The borehole was equipped with a groundwater monitoring well identified as MW4. The monitoring well was screened in the overburden soil to intercept the shallow groundwater table. This borehole was located to assess geologic conditions and the environmental groundwater quality associated with imported fill materials (APEC#2 and APEC#4).
- Borehole BH5 was advanced to a depth of approximately 7.1 m BGS in the center portion of the Site, located approximately 23.4 m east of Place d'Orleans Drive. The borehole was equipped with a groundwater monitoring well identified as MW5. The monitoring well was screened in the overburden soil to intercept the shallow groundwater table. This borehole was located to assess geologic conditions and the environmental groundwater quality associated with the cement truck spill (APEC #3) and quality of the imported fill materials (APEC#2).
- Borehole BH6 was advanced to a depth of approximately 2.6 m BGS in the center portion of the Site, approximately 14.5 m west of Brisebois Crescent. This borehole was located to assess geologic conditions.
- Borehole BH7 was advanced to a depth of approximately 5.8 m BGS in the north portion of the Site, approximately 36.0 m east of Place d'Orleans Drive. This borehole was located to assess geologic conditions.
- Borehole BH8 was advanced to a depth of approximately 7.5 m BGS in the north portion of the Site, approximately 30.5 m west of Brisebois Crescent. The borehole was equipped with a groundwater monitoring well identified as MW8. The monitoring well was screened in the overburden soil to intercept the shallow groundwater table. This borehole was located to assess geologic conditions and the environmental groundwater quality of the imported fill materials (APEC#2).
- Borehole BH9 was advanced to a depth of approximately 6.6 m BGS at the northwestern corner of the Site, located approximately 11.0 m east of Place d'Orleans Drive. The borehole was equipped with a groundwater monitoring well identified as MW9. The monitoring well was



screened in the bedrock to intercept the bedrock groundwater table. This borehole was located to assess geologic conditions and the environmental groundwater quality associated with the imported fill materials (APEC#2).

- Borehole BH10 was advanced to a depth of approximately 2.7 m BGS in the north portion of the Site, approximately 24.5 m south of the eastbound on-ramp to Regional Road 174. This borehole was located to assess geologic conditions of the imported fill materials (APEC#2).
- Borehole BH11 was advanced to a depth of approximately 6.0 m BGS at the northeastern corner of the Site. The borehole was equipped with a groundwater monitoring well identified as MW11. The monitoring well was screened in the overburden soil to intercept the shallow groundwater table. This borehole was located to assess geologic conditions and the environmental groundwater quality of the imported fill materials (APEC#2).
- Borehole BH12 was advanced to a depth of approximately 4.46 m BGS at the southwest corner of the Site, located approximately 5 m east of Place d'Orleans Drive. The borehole was equipped with a groundwater monitoring well identified as MW12. The monitoring well was screened in the bedrock to intercept the bedrock groundwater table. This borehole was located to assess the environmental soil and groundwater quality associated with proximity to the Petro-Canada Gas station located at 3055 St. Joseph Boulevard (APEC #1) and the imported fill materials (APEC#4).

Soil samples from select boreholes (BH1, BH3, and BH12) were submitted to AGAT, under COC protocol on January 15, 2020, for analysis of metals and inorganic parameters, PAHs, PHCs F1-F4, VOCs, and general chemistry parameters to assess soil quality across the Site. A duplicate soil sample was collected from BH12 for quality assurance/quality control (QA/QC purposes).

Monitoring wells were developed on January 14, 2020 (MW11) and January 15, 2020 (MW1, MW2, MW4, MW5, MW8, MW9, and MW12), with GHD purging the wells dry at least twice. Groundwater monitoring wells were developed using dedicated Waterra foot valves and polyethylene tubing to hydraulically stabilize the monitoring well following installation and to remove as many residual fines as possible from the water column to reduce sample turbidity.

On January 22 and 23, 2020 GHD returned to Site to measure static groundwater levels, check for evidence of free product, and purge/sample monitoring wells MW1, MW2, MW4, MW5, MW8, MW9, MW11, and MW12. Groundwater monitoring wells were purged using dedicated Waterra foot valves and polyethylene tubing to remove a minimum of three times the standing groundwater volume, or until dry on at least two occasions. Field measurements of pH, temperature, and conductivity were collected after each purged well volume in order to measure stabilization of the groundwater.

Groundwater samples were collected from MW1, MW2, MW4, MW5, MW8, MW9, MW11, and MW12. A duplicate groundwater sample was collected from MW11 for QA/QC purposes. The groundwater samples to be analyzed for metals were filtered using dedicated 45um filters while the remainder of the samples were unfiltered. Groundwater samples were collected and retained in sample containers specific to the analytical parameters, kept cool, and appropriately preserved when required. All groundwater samples were submitted to AGAT under COC protocol on January 23, 2020 for analysis of metals and inorganic parameters, PAHs, PHCs F1-F4, VOCs, and general chemistry parameters.



On January 22, 2020 GHD surveyed the relative elevations of the advanced boreholes and monitoring wells, relative to an assigned elevation of 100.00 m of the fire hydrant on the south side of Centrum Avenue.

Ground surface and well riser elevations, static water depths and elevations, and free product data are presented in Table 1.

3.2 Media Investigated

Rationale for Inclusion of Various Media

Based on known current and historic PCAs in the Phase One Study Area, it was suspected that soil and groundwater at the Site may have been potentially impacted by these PCAs. A Phase One Study Area is defined in O. Reg. 153/04 as 250 m from the Site boundaries, or any other property beyond this limit that the qualified person considers should be included. PCAs in the Phase One Study area, which are considered to represent APECs for the Site, consisted of an active gasoline station with underground storage tanks (USTs) to the south of the Site (PCA/APEC#1), on-Site imported fill material of unknown quality in the north and central portion of the Site (PCA/APEC#2), a historical release of cement and fuel in the western portion of the Site (PCA/APEC#3), and on-Site imported fill material of unknown quality in the southern portion of the Site (PCA/APEC#4).

As detailed in Section 4.1, to assess the environmental quality of soil at the Site, test pits and boreholes were advanced across the Site as part of an environmental sampling program performed in conjunction with a geotechnical testing program completed across the Site. Soil samples were collected from test pits and boreholes placed across the Site to assess environmental soil quality and investigate APECs identified as part of the Phase One ESA.

In addition, to assess the environmental quality of the groundwater at the Site, and investigate APECs identified as part of the Phase One ESA, several of the above-noted boreholes were instrumented with groundwater monitoring wells, which were screened in the overburden and bedrock to intercept the groundwater table in each unit. A bentonite seal was installed above the sand pack to the ground surface to mitigate downward migration of potential contaminants. Groundwater was sampled from the aforementioned monitoring wells using a Waterra inertial pump following a period of stabilization, well development, and purging the day of sampling.

There were no natural surface water bodies observed at the Site during the Phase Two ESA, and therefore no sampling of surface water or sediment was conducted at the time of this investigation.

3.3 Phase One Conceptual Site Model

The Site is located at Civic No. 211 Centrum Boulevard Avenue between the intersections of Centrum Boulevard, Place d'Orleans Drive, and Regional Road 174, and is located in a suburban area in the eastern portion of the City of Ottawa. The Site is approximately 15,200 m² (1.52 ha), is irregular in shape, and is legally described as: Concession 10S part of lot 37 RP 50R6839, parts 1 to 6 (PINs 145080053 and 145080054).

The Phase One Property is currently occupied by a one-storey irregular shaped building with a finished lower level and a two level parking garage in the southwest corner of the Site, both constructed prior to 1991. A paved parking lot is located east of the Site building, and vacant land is



located on the central and northern portions of the Site (vegetated with sumac trees and overgrown grasses/weeds; bedrock outcroppings are visible in the central portion of the Site and observed on the east and north sides of the parking garage). Prior to these developments, the Site was used for residential and agricultural purposes.

The building, which was previously used as a bank, is of concrete construction with a brick exterior façade. Interior finishes consist of carpet, ceramic floor tiles, vinyl floor tiles, gypsum board walls, dropped acoustic tile ceilings, and aluminum frame windows and doors. A portion of the lower level of the building extends into the lower level of the parking garage beneath a drive through ATM awning. Access to the building is via the main entrance off the ground level from Centrum Boulevard and the lower level entrance from the parking garage. The parking garage, located north of the building, consists of concrete masonry block construction and asphalt parking surfaces. A storage room is located in the northeast corner of the parking garage.

Electricity at the Site is provided by Hydro Ottawa. Two pad-mounted electrical transformers were observed on the Site. The transformers appears to be in good condition and no staining was observed on the concrete pads or surrounding ground surface. No other sources of electricity are present at the Site. Natural gas, municipal water, and municipal sanitary sewer services are all available at the Site. No septic systems or wells were reported by Site personnel to exist on the Site and no evidence of septic systems or wells was observed during the Site visit. Two storm water catch basins were observed on the Property in the driveway from Centrum Boulevard and drain to the municipal storm sewer system along Centrum Boulevard. Storm sewer catch basins were observed along Centrum Boulevard and Place d'Orleans Drive

The Phase One Study Area included the Site and all properties located wholly or partially within 250 m of the Site boundary, as required by O. Reg. 153/04. Properties within the Phase One Study Area as observed during the Site reconnaissance were predominantly used for commercial and residential purposes.

Subsurface Conditions

The Site is relatively flat across the southern portion with a slight downward slope to the north followed by a steep slope towards Regional Road 174 in the northern portion. Topography in the area of the Site generally slopes in a northerly direction. Based on topographical information and the location of major surface water bodies, it is expected that the regional groundwater flow direction in the Phase One Study Area is to the north towards the Ottawa River, located approximately 1.2 km north of the Site. Local shallow groundwater flow at the Site may be influenced by other subsurface features, underground utility trenches, conduits, and structures in the area, that cannot be predicted based on topographic and surface water information.

According to the information obtained from the Geological Survey of Canada, Surficial Materials and Terrain Features, Ottawa Hull (Map No. 1425A), the natural soil conditions near the Site appear to consist of "Post Champlain Sea deposits, Abandoned River Channel Deposits: silt and silty clay, commonly including lenses of sand and generally underlain at variable depth by Champlain Sea Deposits: Deep Water Facies." According to the Geological Survey of Canada, Surficial Geology Map for Ottawa (Map No. 1506A) and the Generalized Bedrock Geology for Ottawa (Map No. 1508A), the natural soil at the Site consists of clay and silty underlying erosional terraces, and is underlain by limestone with some shale and sandstone of the Paleozoic Ottawa Formation.



No water bodies are located on the Phase One Property or within 250 m of the Site. There were no Areas of Natural or Scientific Interest (ANSIs) identified within the Phase One Study Area.

Potentially Contaminating Activities (PCAs)

The following PCAs have been identified to be on, in, or under the Phase One Property, or located within the Phase One Study Area and have the potential to contribute to an APEC. Three PCAs were observed on the Site, while 14 properties with PCAs were observed in the Phase One Study Area.

Table 3.1 Potentially Contaminating Activities (PCAs)

PCA No.	Location and Description	Potentially Contaminating Activity
1	Off-Site at 3055 St. Joseph Boulevard (approximately 50 m south of the Site) – Petro Canada gasoline service station and car wash	Gasoline and associated products storage in fixed tanks;
2	On-Site (northern and central portions of Property) – known placement of fill material	Importation of fill material of unknown quality
3	On-Site (western portion of Property) – historical release of cement and fuel	Gasoline and associated products storage in fixed tanks
4	On-Site (southern portion of Property) – potential placement of backfill material	Potential importation of fill material of unknown quality
5	Off-Site at 210 Centrum Boulevard (approximately 30 m south of the Site) – cleaning company	Soap and detergent manufacturing, processing and bulk storage
6	Off-Site at 210 Centrum Boulevard (approximately 30 m south of the Site) – neon sign company	Chemical manufacturing, processing and bulk storage
7	Off-Site at 210 Centrum Boulevard (approximately 30 m south of the Site) – pharmacy and medical laboratory	Pharmaceutical manufacturing and processing
8	Off-Site at 245 Centrum Boulevard (approximately 75 m east of the Site) – waste generators	Gasoline and associated products storage in fixed tanks
9	Off-Site at 250 Centrum Boulevard (approximately 90 m southeast of the Site) – waste generators	Gasoline and associated products storage in fixed tanks
10	Off-Site at 3025 St. Joseph Boulevard (approximately 115 m southwest of the Site) – historical gasoline service station	Gasoline and associated products storage in fixed tanks
11	Off-Site at 255 Centrum Boulevard (approximately 160 m east of the Site) – waste generators	Gasoline and associated products storage in fixed tanks
12	Off-Site at 3095 St. Joseph Boulevard (approximately 170 m east of the Site) – waste generators	Pharmaceutical manufacturing and processing



Table 3.1 Potentially Contaminating Activities (PCAs)

PCA No.	Location and Description	Potentially Contaminating Activity
13	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – car wash	Soap and detergent manufacturing, processing and bulk storage
14	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – laundry/dry cleaner	Operation of dry cleaning equipment (where chemicals are used)
15	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – public transportation facility	Gasoline and associated products storage in fixed tanks
16	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – waste generators	Gasoline and associated products storage in fixed tanks; Pharmaceutical manufacturing and processing; Solvent manufacturing, processing and bulk storage; Soap and detergent manufacturing, processing and bulk storage; Paints manufacturing, processing and bulk storage; Pesticides (including herbicides, fungicides and anti-fouling agents) manufacturing, processing, bulk storage and large-scale applications; Acid and alkali manufacturing, processing and bulk storage
17	Off-Site at 3017 St. Joseph Boulevard (approximately 215 m southwest of the Site) – historical automobile repair garage and gasoline service station	Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems; Gasoline and associated products storage in fixed tanks

Areas of Potential Environmental Concern (APECs)

The following areas of actual or potential environmental concern have been identified by the Phase One ESA Site reconnaissance and records review and are summarized in the table below.

Table 3.2 Area of Potential Environmental Concerns (APECs)

APEC No.	Location on the Phase One Property	Potentially Contaminating Activity	Location of PCA (on-Site or off-Site)	Contaminants of Concern	Media Potentially Impacted
1	Southern portion of Site	Gasoline and associated products storage in fixed tanks	Off-Site	PHCs and VOCs	Soil and Groundwater
2	Northern and Central portions of Site	Importation of fill material of unknown quality	On-Site	PAHs, PHCs, VOCs, Metals and Inorganics	Soil and Groundwater



Table 3.2 Area of Potential Environmental Concerns (APECs)

APEC No.	Location on the Phase One Property	Potentially Contaminating Activity	Location of PCA (on-Site or off-Site)	Contaminants of Concern	Media Potentially Impacted
3	Western Portion of Site	Gasoline and associated products storage in fixed tanks	On-Site	PHCs	Soil and Groundwater
4	Southern portion of Site	Importation of fill material of unknown quality	On-Site	PAHs, PHCs, VOCs, Metals and Inorganics	Soil and Groundwater
Notes: PAHs - Polycyclic Aromatic Hydrocarbons PHCs - Petroleum Hydrocarbons VOCs - Volatile Organic Compounds					

3.4 Deviations from Sampling and Analysis Plan

Screens in each groundwater monitoring well should have a maximum wetted length of 3.0 m and a minimum total length of 1.5 m. The base of monitoring well screens used to assess PHCs should extend approximately 1.0 m below the expected groundwater table based on field observations. The water table was higher than anticipated at several locations, resulting in a wetted screen length greater than 3 m at MW1, MW2, MW9, and MW11.

Development of the monitoring wells was conducted on January 14 and 15, 2020, with monitoring wells MW4, MW5, MW9, and MW12 only developed twice, purging each well dry each time. Groundwater samples were collected on January 22 and 23, 2020, with only monitoring well MW4 being purged dry twice prior to sampling.

The above noted deviations are not believed to have caused any adverse effect to this assessment.

3.5 Impediments

There were no impediments that prevented completion of the work plan.

4. Investigation Method

4.1 General

The investigation method took into account the surficial features of the Site, the location and observations on the Site, and the PCAs and APECs identified for the Site. Based upon these conditions, GHD determined that test pit, borehole, and monitoring well advancements/installations, along with applicable development, purging, monitoring, and/or sampling activities were considered adequate to assess if CPCs would be detected within the soil and groundwater.



The fieldwork as part of the Phase Two ESA included advancement of 10 test pits and 12 boreholes, and selection of soil samples for testing based upon visual and olfactory observations and combustible vapour screening. Eight of the boreholes were then equipped with groundwater monitoring wells to allow collection of water level data, and sample collection for testing of CPCs in the groundwater. The boreholes and monitoring wells were surveyed relative to a readily identified benchmark (top of spindle of fire hydrant located on the south side of Centrum Boulevard, directly southeast of the Site), which was assigned an elevation of 100 m AMSL.

Samples were kept in ice chilled coolers and then submitted to AGAT, an accredited laboratory, under COC protocol for chemical analysis of CPCs. Quality control procedures were followed, including analysis of trip blanks and duplicate samples.

The following sections present more detailed descriptions of each activity of the investigation.

4.2 Drilling and Excavating

Test Pit Program

Advancement of test pits TP-01 through TP-10 was conducted on December 13, 2019, by Demolition Plus (Demo Plus) of Cornwall, Ontario, using a track-mounted excavator. The location of the test pits are presented on Figure 2. The test pit excavating was conducted under full-time supervision and direction by GHD personnel. Soil conditions within each test pit were logged for geologic detail according to USCS with special attention to any visual or olfactory evidence of soil impact. Test pits were completed to refusal on boulder or limestone bedrock with depths ranging from 0.30 to 3.40 m BGS. Test pit logs are presented in Appendix B.

Borehole and Monitoring Well Advancement

Advancement of BH/MW1 through BH/MW12 was conducted on January 9 to 15, 2020 by George Downing Estate Drilling Ltd. of Grenville Sur La Rouge, Quebec, using a track-mounted CME 55 power drill rig. The location of the boreholes and monitoring wells are presented on Figure 2. Drilling was conducted under full-time supervision and direction by GHD personnel. Soil samples were recovered using 50 mm diameter split spoon samplers advanced to the sampling depth with a hydraulic hammer, and washed with soapy water between uses to avoid cross contamination. Soil samples were collected at pre-defined intervals to the maximum proposed depth of drilling. Borehole logs are presented in Appendix B.

4.3 Soil Sampling

Equipment

Soil samples from TP-01 through TP-10 were collected directly from the excavator bucket during the test pit program on December 13, 2019. Select soil samples from TP-01 through TP-10 were collected in laboratory jars for chemical analysis.

Split spoon soil samples were recovered from BH1 through BH12 on January 9 to 15, 2020 using 50 mm diameter continually advanced stainless steel split spoon samplers advanced with a hydraulic hammer. Decontamination procedures included cleaning hand tooling and reusable drill string components with a wire brush using a phosphate-free detergent solution. Drill rigs and all



other down-hole equipment were decontaminated off-Site prior to initiation of Site activities. Select soil samples from BH1, BH3, and BH12 were collected in laboratory-supplied jars for chemical analysis.

During the test pit program and borehole/monitoring well advancement, soil samples intended for PHCs F1-range and VOC analysis were collected using 2 cubic centimetre (cc) syringes and placed in methanol vials supplied by the laboratory. Additional soil samples for metals/inorganics, PAH, and PHC F2-F4 analyses were collected in laboratory supplied jars, and in Ziploc bags for headspace analysis.

Laboratory samples were held in coolers with ice packs prior to delivery to the laboratory.

Description

Field findings reflect that there are generally four main materials above the limestone bedrock:

- Asphalt
- Topsoil and grassy vegetation
- Fill – Gravelly Sand; Silty Sand/Sandy Silt; or Clayey Sand/Sandy Clay
- Native Till – Clayey Sand; Silty Sand; or Silty Clay

The subsurface soil encountered in the test pits and borehole locations is described in the following sections, and is presented on the test pit and borehole logs presented in Appendix B.

Asphalt

A surface layer of asphalt was encountered in boreholes BH2. This layer was found at the ground surface extending down approximately 0.1 m BGS.

Topsoil

A surface layer of topsoil and grass was encountered in test pits TP-01 through TP-10 (except as noted at TP-04, fill [bedrock blocks]) and at boreholes BH1, BH3, BH4, BH5, BH8, BH9, BH10, and BH12. This material was described as silty sand with organics, brown, moist (where not frozen), with grass and roots. This layer was found at the ground surface extending down approximately 0.1 to 0.3 m BGS.

No petroleum odours or visible evidence of staining were noted within any of the topsoil materials.

Fill – Gravelly Sand; Silty Sand/Sandy Silt; or Clayey Sand/Sandy Clay

A layer of fill material was found in TP-01, TP-02, TP-03, TP-04, TP-05, TP-07, and TP-10, and all boreholes advanced at the Site.

- Clayey silty sand and clayey sand fill were identified in applicable test pits. The fill material was described as containing cobbles and/or boulders and organics, and was brown and damp to moist. This material was found to be between approximately 0.45 and 2.2 m thick. In addition, bedrock blocks (fill) were observed from the surface to 0.9 m BGS at TP-04.



- Gravelly sand fill was identified in BH1, BH3, and BH4. The material was described as loose to compact, grey, moist, and containing fragments of brick and glass. This material was found to be between approximately 0.2 and 1.0 m thick.
- Silty sand or sandy silt fill was encountered in BH2, BH6, BH7, BH8, BH10, and BH12. The material was described as loose to very dense, brown to grey, moist, and containing trace organics, roots, and rubber varying with depth and location. This material was found to be between approximately 0.1 and 2.9 m thick. Field observations reported a faint odour, possibly hydrocarbon in origin, within the fill at BH12. No evidence of staining was observed.
- Sandy clay or clayey sandy silt fill was encountered in BH5, BH9, and BH11. The material was described as stiff, grey, highly plastic, and moist. This material was found to be between approximately 1.5 and 1.66 m thick. Field observations reported a faint odour, possibly organic or septic in origin, within the fill at BH5. No evidence of staining was observed.

Other than the above-noted examples, no petroleum odours or visible evidence of staining were noted within any of the fill materials encountered as part of this assessment.

Native Till – Clayey Sand; Silty Sand; or Silty Clay

A till layer consisting primarily of clayey sand with cobbles/boulders, and generally described as brown and/or grey, damp to moist, and containing organics was encountered in TP-03, TP-04, TP-05, TP-07, TP-08, and TP-09. This material was found to be between approximately 0.6 m and 3.0 m thick. In addition, silty clay (described as brown and grey, damp to moist) was encountered at TP-06 from below topsoil to 3.0 m BGS [above limestone bedrock].

A till layer consisting primarily of silty sand with varying proportions of clay, cobble, gravel, and boulder, was encountered resting on the limestone bedrock in BH4, BH5, BH6, BH7, BH8, BH9, and BH10. It was generally described as compact to very dense, brown to grey, and moist to wet. This layer was found to be approximately 0.4 to 4.1 m in thickness.

A till layer consisting primarily of silty clay was encountered resting on the limestone bedrock in BH11. It was described as stiff to very stiff, grey, highly plastic, and moist. This layer was found to be approximately 2.9 m in thickness.

No petroleum odors were noted within these materials.

4.4 Field Screening Measurements

Soil samples were field screened for the olfactory and visible presence of CPCs in all test pits and boreholes. Soil samples were also screened using a PID to determine relative concentrations of undifferentiated organic vapors. PID readings for all soil samples collected ranged from 0.1 to 1.0 parts per million (ppm) as noted in Tables 2 and 3.

4.5 Groundwater Monitoring Well Installation

Instrumentation of MW1, MW2, MW4, MW5, MW8, MW9, MW11, and MW12 was conducted on January 9 to 15, 2020 by George Downing Estate Drilling using a track mounted CME 75 drill rig.



All eight of the aforementioned boreholes were equipped with 51 mm diameter groundwater monitoring wells. The monitoring wells were constructed with 51 mm diameter, between 1.5 and 3.0 m polyvinyl chloride (PVC) well screens connected to 51 mm diameter, flush threaded PVC riser pipe. The well screens were installed within the anticipated hydrogeological unit (overburden and bedrock) to intercept the groundwater interface. The wells were completed with stick-up well protectors, with the exception of MW12 which was completed with a flush-mount well protector. A PVC slip cap was installed at the base of the screen to prevent sediment infiltration. A J-plug was used in the installations at the top of the riser to prevent surface water or precipitation influence.

Each well was backfilled with pre-washed well sand to approximately 0.1 to 0.3 m above the top of the screen. The remaining annular space was backfilled with a bentonite holeplug layer (0.5 to 1.0 m thick), then backfilled with sand and/or additional bentonite and equipped with a well protector.

Each well was equipped with dedicated 12 mm low-density polyethylene (LDPE) tubing and a dedicated Waterra inertial pump, and developed following installation to hydraulically stabilize the monitoring well and to remove as many residual fines as possible from the water column to reduce turbidity. Monitoring wells MW1, MW4, MW5, MW9, and MW12 were observed to go dry during development; each well was left for a period of 15 to 60 minutes and subsequently purged dry at least two times. A period of stabilization of approximately one week was allowed to pass prior to sampling.

4.6 Field Measurement of Water Quality Parameters

Field measurements of pH, turbidity, electrical conductivity (EC), and temperature were collected after each well volume during development using a Horiba U-50 portable multiparameter water quality instrument. Measurements were collected following the removal of each well volume to measure stabilization of the groundwater. Well development was continued until the water quality parameters stabilized (e.g. subsequent readings within 10 percent difference), or the well went dry.

4.7 Groundwater Sampling

Groundwater monitoring wells were purged and sampled using dedicated 12 mm low-density polyethylene (LDPE) tubing and a dedicated Waterra inertial pump. A Solinst oil/water interface probe was used to record stabilized groundwater levels and assess the potential for non-aqueous phase liquid (NAPL) impairment of the water column prior to initiating purging activities.

All monitoring wells were purged to remove a minimum of three times the standing groundwater volume prior to sampling, with the exception of MW4. Due to low volumes and poor recharge conditions, MW4 was purged dry twice. Field measurements of water quality parameters were collected, as described above, to measure stabilization of groundwater parameters prior to sampling.

All groundwater samples were collected in dedicated sample containers prepared by the laboratory and specific to the analytical parameters, and appropriately preserved when required. Groundwater samples submitted for metal analysis were field filtered; groundwater samples submitted for analysis of PAHs, PHCs, VOCs, and other inorganic and general chemistry parameters were not field filtered.

Following sampling, the groundwater samples were stored in an ice pack chilled cooler and were taken directly to the laboratory following the sampling event.



4.8 Sediment Sampling

Sediment was not sampled as part of this assessment, as no natural surface water bodies were present at the Site.

4.9 Analytical Testing

All soil and groundwater analytical testing as part of this assessment was conducted by AGAT Laboratories Ltd. (AGAT). AGAT is a member of the Standards Council of Canada (SCC), the Canadian Association for Laboratory Accreditation (CALA), and SAI Global.

4.10 Residue Management Procedures

Soil cuttings from drilling activities were containerized in metal drums and placed in designated areas of the Site. The analytical soil results indicated exceedances of the O. Reg. 153/04 Table 7 criteria for several parameters, but do not exceed applicable Schedule 4 – Leachate Quality Criteria under O. Reg. 558. The cuttings should be disposed of off-Site at a facility licenced to accept non-hazardous waste soil.

Purge water from drilling activities was containerized in metals drums and placed in designated areas of the Site. The analytical groundwater results indicated exceedances of the O. Reg. 153/04 Table 7 criteria for several parameters. The purge water should be disposed of off-Site at a facility licensed to accept waste water.

4.11 Elevation Surveying

GHD undertook a survey of each test pit, borehole, and monitoring well to document the horizontal and/or vertical positioning of these locations. The horizontal positioning of each location was completed using a Garmin 64S GPS. A laser level and rod was used to determine the vertical height of the ground surface at each borehole, and top of the PVC riser pipe at each monitoring well. A survey benchmark was established on the top of fire hydrant located on the south side of Centrum Boulevard, directly southeast of the Site, with an assumed reference elevation of 100.00 m AMSL.

A summary of the recorded elevations is presented in Table 1 (monitoring wells only) and Table 5.1 below (boreholes and monitoring wells):

Table 4.1 Summary of Borehole and Monitoring Well Elevations

Location	Relative Grade Elevation (m AMSL)	Relative TOR Elevation (m AMSL)	Remarks
Hydrant Spindle	100.00	N/A	TBM; Assumed elevation 100.00 m AMSL
BH/MW1	95.392	96.399	
BH/MW2	97.987	98.945	
BH3	93.660	N/A	
BH/MW4	96.543	97.431	
BH/MW5	95.662	96.667	
BH6	96.044	N/A	
BH7	95.114	N/A	



Table 4.1 Summary of Borehole and Monitoring Well Elevations

Location	Relative Grade Elevation (m AMSL)	Relative TOR Elevation (m AMSL)	Remarks
BH/MW8	94.403	95.161	
BH/MW9	92.738	93.524	
BH10	92.387	N/A	
BH/MW11	91.856	92.674	
BH/MW12	95.663	95.446	
Notes: m AMSL – metres above mean sea level (based on assumed benchmark of 100.00 m AMSL) N/A – Not Applicable TBM – Temporary Bench Mark TOR – Top of Riser			

4.12 Quality Assurance and Quality Control Program

A Quality Assurance/Quality Control (QA/QC) program was undertaken as part of the soil and groundwater quality investigation at the Site. This program involved appropriate field procedures to mitigate cross-contamination of soil and groundwater samples, the collection and analysis of soil/groundwater field duplicate samples and trip blanks, as well as assessment of the final results and supporting QA/QC data.

All soil and groundwater sampling jars were provided by AGAT. All PHC F1 range and BTEX soil samples were collected with laboratory provided single-use 2 cubic centimetre (cc) soil syringes. All groundwater samples were transferred directly from the dedicated LDPE tubing directly to the sampling containers. Groundwater samples submitted for metal analysis were field filtered; groundwater samples submitted for analysis of PAHs, PHCs, VOCs, and other inorganic and general chemistry parameters were not field filtered. Each soil and groundwater sample was given a unique identification.

Stainless steel split spoons were used to recover soil samples from the boreholes; decontamination procedures included cleaning the split spoons with a wire brush using a phosphate-free detergent solution. While transferring samples from split spoons into the sample jars, GHD field staff wore disposable, nitrile gloves which were changed prior to jarring each sample to mitigate the potential for cross-contamination.

To assess the analytical and sampling protocol precision, one field duplicate sample was collected for every 10 samples (one each for soil and groundwater), and submitted "blind" to the laboratory. Field duplicate results were within acceptable agreement to the original sample, demonstrating acceptable sampling and analytical precision.

To evaluate contamination from sample collection, transportation, storage and analytical activities, two trip blank samples, originally supplied by the laboratory, were submitted with the soil samples on December 13, 2019 and with the groundwater samples on January 23, 2020. All results were non-detect for the compounds of interest.

Based on GHD review of the analytical data, no QA/QC sample issues were identified and the results are considered final with no qualifications.



There were no deviations from the original sampling plan.

5. Review and Evaluation

5.1 Geology

The subsurface soil encountered in the test pits and borehole locations is described in the following sections, and is presented on the test pit and borehole logs presented in Appendix B.

Asphalt

A surface layer of asphalt was encountered in borehole BH2. This layer was found at the ground surface extending down approximately 0.1 m BGS.

No soil samples from this layer were submitted for chemical analysis of CPCs, as asphalt is not considered to be a soil.

Topsoil

A surface layer of topsoil and grass was encountered in test pits TP-01 through TP-10 (except as noted at TP-04, fill [bedrock blocks]) and at boreholes BH1, BH3, BH4, BH5, BH8, BH9, BH10, and BH12. This material was described as silty sand with organics, brown, moist (where not frozen), with grass and roots. This layer was found at the ground surface extending down approximately 0.1 to 0.3 m BGS.

No petroleum odours or visible evidence of staining was noted within any of the topsoil materials.

No soil samples from this layer were submitted for chemical analysis of CPCs.

Fill – Gravelly Sand; Silty Sand/Sandy Silt; or Clayey Sand/Sandy Clay

A layer of fill material was found in TP-01, TP-02, TP-03, TP-04, TP-05, TP-07, and TP-10, and all boreholes advanced at the Site.

- Clayey silty sand and clayey sand fill were identified in applicable test pits. The fill material was described as containing cobbles and/or boulders and organics, and was brown and damp to moist. This material was found to be between approximately 0.45 and 2.2 m thick. In addition, bedrock blocks (fill) were observed from the surface to 0.9 m BGS at TP-04.
- Gravelly sand fill was identified in BH1, BH3, and BH4. The material was described as loose to compact, grey, moist, and containing fragments of brick and glass. This material was found to be between approximately 0.2 and 1.0 m thick.
- Silty sand or sandy silt fill was encountered in BH2, BH6, BH7, BH8, BH10, and BH12. The material was described as loose to very dense, brown to grey, moist, and containing trace organics, roots, and rubber varying with depth and location. This material was found to be between approximately 0.1 and 2.9 m thick. Field observations reported a faint odour, possibly hydrocarbon in origin, within the fill at BH12. No evidence of staining was observed.
- Sandy clay or clayey sandy silt fill was encountered in BH5, BH9, and BH11. The material was described as stiff, grey, highly plastic, and moist. This material was found to be between



approximately 1.5 and 1.66 m thick. Field observations reported a faint odour, possibly organic or septic in origin, within the fill at BH5. No evidence of staining was observed.

Other than the above-noted examples, no petroleum odours or visible evidence of staining were noted within any of the fill materials encountered as part of this assessment. Soil samples of these fill materials were collected from various test pits and boreholes, and submitted for chemical analysis of CPCs.

Native Till – Clayey Sand; Silty Sand; or Silty Clay

A till layer consisting primarily of clayey sand with cobbles/boulders, and generally described as brown and/or grey, damp to moist, and containing organics was encountered in TP-03, TP-04, TP-05, TP-07, TP-08, TP-09. This material was found to be between approximately 0.6 m and 3.0 m thick. In addition, silty clay (described as brown and grey, damp to moist) was encountered at TP-06 from below topsoil to 3.0 m BGS (above limestone bedrock).

A till layer consisting primarily of silty sand with varying proportions of clay, cobble, gravel, and boulder, was encountered resting on the limestone bedrock in BH4, BH5, BH6, BH7, BH8, BH9, and BH10. It was generally described as compact to very dense, brown to grey, and moist to wet. This layer was found to be approximately 0.4 to 4.1 m in thickness.

A till layer consisting primarily of silty clay was encountered resting on the limestone bedrock in BH11. It was described as stiff to very stiff, grey, highly plastic, and moist. This layer was found to be approximately 2.9 m in thickness.

No petroleum odors or visible evidence of staining were noted within these materials. Soil samples of these till materials were collected from TP-06, TP-08, and TP-09

Limestone Bedrock

During the test pit program, bedrock refusal was encountered at all test pit locations, with the top of bedrock depth ranging from approximately 0.3 to 3.4 m BGS. During the borehole drilling, the top of bedrock depth ranged from approximately 0.2 to 6 m BGS.

Bedrock coring completed as part of the borehole drilling activities was completed at BH1, BH2, BH3, BH4, BH5, BH8, BH9, BH11, and BH12. Limestone of good to excellent quality was encountered at each of these locations, with the exception of poor and fractured zones at BH2 and BH3. The limestone was described as grey with dark grey bands.

5.2 Groundwater Elevations and Flow Direction

In order to assess the environmental quality of the groundwater at the Site, eight of the 12 boreholes advanced as part of the Phase Two ESA were instrumented as groundwater monitoring wells (MW1, MW2, MW4, MW5, MW8, MW9, MW11, and MW12). Four monitoring wells (MW4, MW5, MW8, and MW11) were instrumented within the overburden (i.e. fill and/or native till) to assess groundwater quality within the overburden hydrogeological unit at the Site, and the remaining monitoring wells (MW1, MW2, MW9, and MW12) were screened within the bedrock hydrogeological unit.



Three groundwater monitoring wells are required to triangulate groundwater elevations in order to provide a reasonable interpretation of the direction of groundwater flow. A total of four wells were installed in each hydrogeological unit (overburden and bedrock) as part of this investigation.

Following a period of stabilization of the groundwater in the monitoring wells, water levels were collected on January 22, 2020. Groundwater elevations were determined based on the assumed elevation of the surveyed benchmark (fire hydrant located on the south side of Centrum Boulevard, directly southeast of the Site), the results of the monitoring well survey, and the groundwater levels recorded each monitoring well. Depths and elevations to the groundwater table are presented in Table 1.

Municipal water and sewer services are supplied by underground service trenches to the southeast of the Site building from Centrum Boulevard. Natural gas is also supplied to the Site buildings from underground service trenches, and are assumed to originate either from the south of the Site, on Centrum Boulevard, or from the west of the Site, on Place d'Orleans Drive. The presence of buried utilities is not expected to impact measurements of the overburden or bedrock groundwater table.

Overburden Hydrogeological Unit

Monitoring wells MW4, MW5, MW8, and MW11 were screened into the overburden hydrogeological unit, which consists of a fill and native till materials. Monitoring well construction details for the overburden wells are presented in the borehole logs presented in Appendix B. Ground surface elevation, top of riser elevation, and well bottom elevation are presented in Table 1.

Based on the water table elevations recorded in the overburden monitoring wells installed as part of this assessment (refer to Table 1), the direction of overburden groundwater flow in the vicinity of the boreholes was determined to be towards the north. This direction of groundwater flow is logical based on the surficial topography observed at the Site and neighbouring properties and the location of the nearest significant surface water body.

Bedrock Hydrogeological Unit

Monitoring wells MW1, MW2, MW9, and MW12 were screened within the bedrock hydrogeological unit, which consists of a good to excellent quality grey limestone. Monitoring well construction details for the bedrock wells are presented in Appendix B. Ground surface elevation, top of riser elevation, and well bottom elevation are presented in Table 1.

Based on the water table elevations recorded in the bedrock monitoring wells installed as part of this assessment (refer to Table 1), the direction of bedrock groundwater flow in the vicinity of the boreholes was determined to be towards the west, which is not consistent with flow from the overburden hydrogeological unit. It would be anticipated that bedrock flow would generally be to the north or northwest in a linear path towards the Ottawa River. The discrepancy between anticipated and calculated bedrock groundwater flow direction may be indicative of a localized flow path as a result of the erosional terraces (e.g. "stepped bedrock") present at the Site, where groundwater flow within the bedrock is directed toward the Ottawa River via a more indirect pathway.



5.3 LNAPL / DNAPL Assessment

Light Non-Aqueous Phase Liquids (LNAPL) and/or Dense Non-Aqueous Phase Liquids (DNAPL) are groundwater contaminants that are insoluble, frequently derived from hydrocarbons (e.g. gasoline, tetrachloroethylene [dry cleaning fluid]), and have lesser (LNAPL) or greater (DNAPL) specific gravities (densities) compared to groundwater.

Based on the conclusions of the Phase One ESA, LNAPLs were considered to be a potential contaminant in the groundwater at the Site as a result of PCA/APECs #1 to #4. Monitoring wells were assessed using a Solinst oil/water interface probe which has the capability to detect the presence of LNAPL and/or DNAPL in the water column during groundwater elevation monitoring.

Based on field observations, no LNAPL or DNAPL (e.g. "free product") was identified at any monitoring well location during well development, purging, or sampling. A summary of the results of the LNAPL/DNAPL assessment are presented in Table 1.

5.4 Groundwater Hydraulic Gradients

The hydraulic gradient for the overburden and bedrock groundwater tables were calculated by dividing the difference in hydraulic head by the lateral distance between monitoring locations. Based on the recorded groundwater elevations in Table 1, the horizontal hydraulic gradient is approximately 0.04 m/m in the overburden hydrogeological unit and 0.058 m/m in the bedrock hydrogeological unit.

5.5 Soil Texture

Based on field observations and a review of the results of the December 2019 Test Pit Program, the predominant soil type on Site is considered to be a mixture of coarse-textured to fine-textured soils. Grain size analysis of the recovered soil samples was not conducted as part of this investigation; accordingly, the most conservative soil texture criteria (coarse) will be applied to the Site.

5.6 Soil Field Screening

Soil samples were field screened for the olfactory and visible presence of CPCs in all test pits and boreholes. Soil samples were also screened using a PID to determine relative concentrations of undifferentiated organic vapors. PID readings for all soil samples collected ranged from 0.1 to 1.0 ppm, which is considered negligible for the CPCs being assessed as part of this investigation.

5.7 Soil Quality

Location and Depth of Sampling

The location of soil samples collected from test pits and boreholes are presented on Figure 2. The soil sample depths, material sampled, and laboratory analytical results are presented in Table 2 for test pit samples and Table 3 for borehole samples.

Contaminants of Concern

The contaminants of potential concern (CPC) in soil for the Site were based on the APECs identified at the Site during the Phase One ESA as referenced in Section 3.2:



- APEC #1 – Off-Site at 3055 St. Joseph Boulevard, active service station with fuel in underground storage tanks | PHCs and VOCs
- APEC #2 – On-Site (northern and central portions of Site), importation of fill of unknown quality | Metals/Inorganics, PAHs, PHCs, and VOCs
- APEC #3 – On-Site (western portion of Site), historic cement and fuel spill | PHCs
- APEC #4 – On-Site (southern portion of Site), importation of fill of unknown quality | Metals/Inorganics, PAHs, PHCs, and VOCs

Comparison of Analytical Results to O. Reg. 153/04 Criteria

A complete summary of the analytical soil testing conducted as part of this Phase Two ESA, is presented in Table 2 for test pit soil samples and Table 3 for borehole soil samples. The maximum soil concentrations detected as part of this investigation are presented in Table 5. A copy of the laboratory certificates of analysis for the soil samples are presented in Appendix C.

Analytical testing of the aforementioned soil samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture):

- TP-02: Lead concentration of 134 µg/g, with criteria of 120 µg/g.
- TP-06: Barium concentration of 443 µg/g, with criteria of 390 µg/g.
- TP-06: Cobalt concentration of 25.3 µg/g, with criteria of 22 µg/g.
- TP-06: Vanadium concentration of 110 µg/g, with criteria of 86 µg/g.
- BH1: Cyanide concentration of 0.072 µg/g, with criteria of 0.051 µg/g.

All of the other analyzed soil samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Chemical or Biological Transformations

Parameters related to chemical or biological transformations of CPCs (i.e., chlorinated VOC degradation of tetrachloroethylene, trichloroethylene, etc.) were not suspected to be present and were not detected in the analytical results as part of this investigation.

Soil Acting as a Contaminant Mass Contributing to Other Media

Although concentrations of metals/inorganics (lead, barium, cobalt, vanadium, and cyanide) were greater than O. Reg. 153/04 Table 7 Criteria, there were no concentrations of these parameters in excess of the O. Reg. 153/04 Table 7 Criteria in any of the analyzed groundwater samples collected at the Site. The soil sample exceedances appear to be isolated, and the source of the soil impact is suspected to be associated with natural-occurring metals within this region, and is not likely specific to any current or historic land uses at the Site.

Based on the laboratory results of the analyzed soil samples, there is no soil on the Site which is acting as a contaminant mass contributing to other media.



LNAPL/DNAPL

Based on the conclusions of the Phase One ESA, LNAPLs were considered to be a potential contaminant in the groundwater at the Site as a result of APECs #1 to #4.

Based on the soil analytical results from this Phase Two ESA, all PHC and VOC parameters were reported below the laboratory method detection limit (MDL) and O. Reg. 153/04 Table 7 criteria. The presence of PHC fraction F1-F4 parameters, which would be indicative of the presence of LNAPL at the Site, were not detected in any soil sample submitted as part of this investigation. The presence of VOC parameters, which would be indicative of DNAPL at the Site, were not detected in any soil sample submitted as part of this investigation. The presence of LNAPL/DNAPL was not identified in any of the monitoring wells.

5.8 Ground Water Quality

Location and Depth of Sampling

The location of groundwater samples collected from monitoring wells are presented on Figure 2. The monitoring well screen intervals, intercepted hydrogeological units (i.e. overburden, bedrock), and laboratory analytical results are presented in Table 4. The screened intervals for the overburden wells were generally situated within the overburden (i.e. native till), while the screened intervals for the bedrock wells were screened within the shallow limestone bedrock.

Field Filtering

Field filtering was conducted for metal analysis using a 45 um filter. Field filtering is not conducted under standard field protocols for groundwater sampling of PAHs, PHCs, VOCs, or other inorganic and general chemistry parameters.

Contaminants of Concern

The CPCs in groundwater for the Site were based on the APECs identified at the Site during the Phase One ESA as referenced in Section 3.2:

- APEC #1 – Off-Site at 3055 St. Joseph Boulevard, active service station with fuel in underground storage tanks | PHCs and VOCs
- APEC #2 – On-Site (northern and central portions of Site), importation of fill of unknown quality | Metals/Inorganics, PAHs, PHCs, and VOCs
- APEC #3 – On-Site (western portion of Site), historic cement and fuel spill | PHCs
- APEC #4 – On-Site (southern portion of Site), importation of fill of unknown quality | Metals/Inorganics, PAHs, PHCs, and VOCs

Comparison of Analytical Results to O. Reg. 153/04 Criteria

A complete summary of the analytical groundwater testing conducted as part of this Phase Two ESA, is presented in Table 4. The maximum groundwater concentrations detected as part of this investigation are presented in Table 6. A copy of the laboratory certificates of analysis for the groundwater samples are presented in Appendix C.



Analytical testing of the aforementioned groundwater samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture):

- MW1: Chloride concentration of 2,320,000 µg/L, with criteria of 1,800,000 µg/L.
- MW11: Chloride concentration of 3,020,000 µg/L, with criteria of 1,800,000 µg/L.
- MW11 (duplicate): Chloride concentration of 3,010,000 µg/L, with criteria of 1,800,000 µg/L.
- MW4: Chloroform concentration of 3.9 µg/L, with criteria of 2 µg/L.

All of the other analyzed soil samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Chemical or Biological Transformations

Parameters related to chemical or biological transformations of CPCs (i.e., chlorinated VOC degradation of tetrachloroethylene, trichloroethylene, etc.) were not suspected to be present and were not detected in the analytical results as part of this investigation.

LNAPL/DNAPL

Based on the conclusions of the Phase One ESA, LNAPLs were considered to be a potential contaminant in the groundwater at the Site as a result of APECs #1 to #4.

Based on the groundwater analytical results from this Phase Two ESA, all PHC and VOC parameters were reported below the laboratory MDL and O. Reg. 153/04 Table 7 criteria. The presence of PHC fraction F1-F4 parameters, which would be indicative of the presence of LNAPL at the Site, were not detected in any groundwater sample submitted as part of this investigation. The presence of VOC parameters, which would be indicative of DNAPL at the Site, were not detected in any groundwater sample submitted as part of this investigation. The presence of LNAPL/DNAPL was not identified in any of the monitoring wells.

5.9 Sediment Quality

Natural surface water bodies were not present on the Site; as such sediment sampling was not conducted at the Site as part of the Phase Two ESA.

5.10 Quality Assurance and Quality Control Results

Quality Control

One duplicate soil sample was collected at BH12 on January 15, 2020 and was submitted for laboratory analysis of metals and inorganic parameters, PAHs, PHCs, VOCs, and general chemistry parameters. This duplicate analysis provides QA/QC for parameter sets analyzed in the soil samples submitted as part of this assessment. In general, the relative percent differences (RPDs) were less than 20 percent for the duplicate soil sample compared to the original soil sample. Given the low level concentrations of parameters which were generally detected in the analyzed soil sample duplicates, the level of variability among results is considered acceptable to indicate that the duplicate soil results do indicate general consistency in the laboratory data.



One duplicate groundwater sample was collected at MW11 (sample ID GW-11206675-012220-JC-002, a duplicate of sample ID GW-11206675-012220-JC-001) and was submitted for laboratory analysis of metals and inorganic parameters, PAHs, PHCs, VOCs, and general chemistry parameters. This duplicate provides QA/QC for parameter sets analyzed in the groundwater samples submitted as part of this assessment. The RPDs were equal to less than 10 percent for the duplicate groundwater sample compared to the original groundwater sample. Given the low level concentrations of parameters which were generally detected in the analyzed groundwater sample duplicates, the level of variability among results is considered acceptable to indicate that the duplicate soil results do indicate general consistency in the laboratory data.

Two trip blank samples (one for soil and one for groundwater) were submitted for laboratory analysis of VOCs. These trip blanks provide QA/QC for volatile parameter sets analyzed for groundwater samples submitted as part of this assessment. No CPCs were detected in the analyzed trip blank samples.

Handling and Transport

All samples were delivered to the laboratory in laboratory supplied containers. Samples were hand delivered to the laboratory in coolers, equipped with ice packs and trip blanks. All samples were delivered to the laboratory within the mandated holding time and temperature requirements.

Analytical Documentation

The documentation provided from the laboratory meets the requirements of O. Reg. 153/04 Section 47(3). Documentation for each laboratory submitted sample has been included as an appendix to this report. Full documentation, including the laboratory certificates of analysis, is provided in Appendix C.

Analytical Qualifiers

No analytical qualifiers were reported on AGAT report 19Z555973 dated December 16, 2019 (test pit soil samples) with respect to submissions as part of this assessment.

No analytical qualifiers were reported on AGAT report 20Z564516 dated January 24, 2020 (borehole soil samples) with respect to submissions as part of this assessment, with the exception of soil sample BH1-ENV1 identified that "[Reported Detection Limit] was increased to correct for the moisture content of the sample" for cyanide, and that the "value was confirmed by re-analysis". Given that the analytical results for this sample exceed the O. Reg. 153/04 Table 7 Criteria for cyanide parameters, the qualifier for cyanide is not considered to represent uncertainty in the laboratory results.

No analytical qualifiers were reported on AGAT report 20Z566618 dated January 31, 2020 (groundwater samples) with respect to submissions as part of this assessment, with the exception of all groundwater samples identified "Elevated [Reported Detection Limits] indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument." Given that the elevated RDL's appear to apply solely to sodium and chloride (chloride exceeding the O. Reg. 153/04 Table 7 Criteria in three sample sets), and that analytical results for the remaining metals and inorganics parameters for all



groundwater samples were in compliance with the O. Reg. Table 7 Criteria, this qualifier is not considered to represent uncertainty in the laboratory results.

General Comments on Field Data

For the purposes of this investigation, the quality of the field data:

- Meets the objectives of the investigation.
- Did not affect the decision making process.

5.11 Phase Two Conceptual Site Model

Potentially Contaminating Activities (PCAs)

Based on the known information of the general area of the Site, there were three on-Site PCAs, and 14 off-Site PCAs identified in the Study Area.

Table 5.1 Potentially Contaminating Activities (PCAs)

PCA No.	Location and Description	Potentially Contaminating Activity
1	Off-Site at 3055 St. Joseph Boulevard (approximately 50 m south of the Site) – Petro Canada gasoline service station and car wash	Gasoline and associated products storage in fixed tanks;
2	On-Site (northern and central portions of Property) – known placement of fill material	Importation of fill material of unknown quality
3	On-Site (western portion of Property) – historical release of cement and fuel	Gasoline and associated products storage in fixed tanks
4	On-Site (southern portion of Property) – potential placement of backfill material	Potential importation of fill material of unknown quality
5	Off-Site at 210 Centrum Boulevard (approximately 30 m south of the Site) – cleaning company	Soap and detergent manufacturing, processing and bulk storage
6	Off-Site at 210 Centrum Boulevard (approximately 30 m south of the Site) – neon sign company	Chemical manufacturing, processing and bulk storage
7	Off-Site at 210 Centrum Boulevard (approximately 30 m south of the Site) – pharmacy and medical laboratory	Pharmaceutical manufacturing and processing
8	Off-Site at 245 Centrum Boulevard (approximately 75 m east of the Site) – waste generators	Gasoline and associated products storage in fixed tanks
9	Off-Site at 250 Centrum Boulevard (approximately 90 m southeast of the Site) – waste generators	Gasoline and associated products storage in fixed tanks
10	Off-Site at 3025 St. Joseph Boulevard (approximately 115 m southwest of the Site) – historical gasoline service station	Gasoline and associated products storage in fixed tanks



Table 5.1 Potentially Contaminating Activities (PCAs)

PCA No.	Location and Description	Potentially Contaminating Activity
11	Off-Site at 255 Centrum Boulevard (approximately 160 m east of the Site) – waste generators	Gasoline and associated products storage in fixed tanks
12	Off-Site at 3095 St. Joseph Boulevard (approximately 170 m east of the Site) – waste generators	Pharmaceutical manufacturing and processing
13	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – car wash	Soap and detergent manufacturing, processing and bulk storage
14	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – laundry/dry cleaner	Operation of dry cleaning equipment (where chemicals are used)
15	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – public transportation facility	Gasoline and associated products storage in fixed tanks
16	Off-Site at 210 Place d'Orleans Drive (approximately 200 m west of the Site) – waste generators	Gasoline and associated products storage in fixed tanks; Pharmaceutical manufacturing and processing; Solvent manufacturing, processing and bulk storage; Soap and detergent manufacturing, processing and bulk storage; Paints manufacturing, processing and bulk storage; Pesticides (including herbicides, fungicides and anti-fouling agents) manufacturing, processing, bulk storage and large-scale applications; Acid and alkali manufacturing, processing and bulk storage
17	Off-Site at 3017 St. Joseph Boulevard (approximately 215 m southwest of the Site) – historical automobile repair garage and gasoline service station	Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems; Gasoline and associated products storage in fixed tanks

Areas of Potential Environmental Concern (APECs)

The potentially contaminating activities considered to represent areas of potential environmental concern for the Site are:

Table 5.2 Area of Potential Environmental Concerns (APECs)

APEC No.	Location on the Phase One Property	Potentially Contaminating Activity	Location of PCA (on-Site or off-Site)	Contaminants of Concern	Media Potentially Impacted
1	Southern portion of Site	Gasoline and associated	Off-Site	PHCs and VOCs	Soil and Groundwater

**Table 5.2 Area of Potential Environmental Concerns (APECs)**

APEC No.	Location on the Phase One Property	Potentially Contaminating Activity	Location of PCA (on-Site or off-Site)	Contaminants of Concern	Media Potentially Impacted
		products storage in fixed tanks			
2	Northern and Central portions of Site	Importation of fill material of unknown quality	On-Site	PAHs, PHCs, VOCs, Metals and Inorganics	Soil and Groundwater
3	Western Portion of Site	Gasoline and associated products storage in fixed tanks	On-Site	PHCs	Soil and Groundwater
4	Southern portion of Site	Importation of fill material of unknown quality	On-Site	PAHs, PHCs, VOCs, Metals and Inorganics	Soil and Groundwater
Notes: PAHs - Polycyclic Aromatic Hydrocarbons PHCs - Petroleum Hydrocarbons VOCs - Volatile Organic Compounds					

Contaminants of Potential Concern (CPCs)

The contaminants of potential concern (CPCs) in soil and groundwater for the Site were based on the APECs identified at the Site during the Phase One ESA. The following CPCs for the Site were suspected to be associated with the off-Site retail fuel outlets, on-Site historical cement and fuel release, and importation of fill material at the Site:

5. Metals and Inorganics
6. Petroleum Hydrocarbon ranges F1-F4 (PHCs)
7. Polycyclic Aromatic Hydrocarbons (PAHs)
8. Volatile Organic Compounds (VOCs)

An assessment of the CPCs for the Site was completed as part of this Phase Two ESA investigation. Soil and groundwater samples were submitted for a combination of the CPCs dependent on test pit and borehole/monitoring well locations with respect to the APECs.

Subsurface Conditions

Municipal water and sewer services are supplied by underground service trenches to the southeast of the Site building from Centrum Boulevard. Natural gas is also supplied to the Site buildings from underground service trenches, and are assumed to originate either from the south of the Site, on Centrum Boulevard, or from the west of the Site, on Place d'Orleans Drive. The presence of buried utilities is not expected to impact measurements of the overburden or bedrock groundwater table, but are considered to have the potential to act as conduits for contaminant migration, as applicable.



Physical Setting - Stratigraphy

As presented/diagrammed in the test pit and borehole logs in Appendix B, five subsurface soil types were identified within the depth investigated at the Site, namely:

- Asphalt
- Topsoil and grassy vegetation
- Fill – Gravelly Sand; Silty Sand/Sandy Silt; or Clayey Sand/Sandy Clay
- Native till – Clayey Sand; Silty Sand; or Silty Clay
- Limestone bedrock

Physical Setting – Bedrock

During the test pit program, bedrock refusal was encountered at all test pit locations, with the top of bedrock depth ranging from approximately 0.3 to 3.4 m BGS. During the borehole drilling, the top of bedrock depth ranged from approximately 0.2 to 6 m BGS.

Limestone bedrock encountered in boreholes BH1, BH2, BH3, BH4, BH5, BH8, BH9, BH11, and BH12 was generally of good to excellent quality at each of these locations, with the exception of poor and fractured zones observed at BH2 and BH3. The limestone was described as grey with dark grey bands.

Physical Setting – Groundwater Table

The static groundwater table in the overburden wells installed by GHD, considered to be representative of the unconfined upper hydrogeological unit, was measured at depths ranging from approximately 1.20 to 2.77 m BGS (2.02 to 3.67 m below top of riser [m BTOR]) on January 22, 2020.

The static groundwater table in the bedrock wells installed by GHD, considered to be representative of the unconfined bedrock hydrogeological unit, was measured at depths ranging from approximately 0.86 to 3.55 m BGS (0.64 to 4.56 m BTOR) on January 22, 2020.

It should be noted that the water table elevations are expected to vary with seasonal and weather conditions.

Physical Setting – Hydrogeological

The interpretation of groundwater flow was based upon the generally known geology, the location and flow direction of surface water bodies and the static water levels collected from monitoring wells completed on the Site as part of this assessment.

Based on the water table elevations recorded in the overburden monitoring wells installed as part of this assessment, the direction of overburden groundwater flow in the vicinity of the boreholes was determined to be towards the north. This direction of groundwater flow is logical based on the surficial topography observed at the Site and neighbouring properties and the location of the nearest significant surface water body.

Based on the water table elevations recorded in the bedrock monitoring wells installed as part of this assessment, the direction of bedrock groundwater flow in the vicinity of the boreholes was



determined to be towards the west, which is not consistent with flow from the overburden hydrogeological unit. It would be anticipated that bedrock flow would generally be to the north or northwest in a linear path towards the Ottawa River. The discrepancy between anticipated and calculated bedrock groundwater flow direction may be indicative of a localized flow path as a result of the erosional terraces (e.g. "stepped bedrock") present at the Site, where groundwater flow within the bedrock is directed toward the Ottawa River via a more indirect pathway.

The hydraulic gradient for the overburden and bedrock groundwater tables were calculated by dividing the difference in hydraulic head by the lateral distance between monitoring locations. Based on the recorded groundwater elevations in Table 1, the horizontal hydraulic gradient is approximately 0.04 m/m in the overburden hydrogeological unit and 0.058 m/m in the bedrock hydrogeological unit. The hydraulic gradient is expected to vary with seasonal and weather conditions.

Based on the geology observed at the Site, the overburden and bedrock hydrogeological units are considered unconfined.

Physical Setting – Sensitive or Shallow or Surface Water

The pH of the soil was tested and observed to be within the range of 5-9.

There are no Areas of Natural Scientific Interest (ANSI) identified by the Ministry of Natural Resources (MNR) within 250 m of the Property boundary.

Subsurface excavation and drilling conducted as part of this investigation revealed that there is less than 2 m of soil in several of the test pits and boreholes advanced in the southern portion of the Site, which is consistent with the locations of visible bedrock outcroppings north of the parking garage. As more than 1/3 of the Property appears to consist of soil less than 2m in depth (excluding any non-soil surface treatment such as asphalt, concrete or aggregate), the Property would be considered a Shallow Soil site (O. Reg. 153/04, s43.1[3]).

No natural surface water bodies were identified on the Site or within 250 m of the Property boundaries.

The existing property zoning for the Site is mixed-use including various commercial and residential uses. The proposed Property use after redevelopment will include a new retirement home complex, which falls under the current mixed use municipal zoning.

The Property, and all other properties located, in whole or in part, within 250 m of the boundaries of the Property, are considered as being under non-potable water use.

Grain size analysis of the recovered soil samples was not conducted as part of this investigation; accordingly, the most conservative soil texture criteria (coarse-grained soil texture) will be applied to the Site.

Based upon the above described assessments, the generic O. Reg. 153/04 Table 7 criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture) is considered the applicable Site comparison.



Physical Setting – Fill

A layer of fill material was found in TP-01, TP-02, TP-03, TP-04, TP-05, TP-07, and TP-10, and all boreholes advanced at the Site.

- Clayey silty sand and clayey sand fill were identified in applicable test pits. The fill material was described as containing cobbles and/or boulders and organics, and was brown and damp to moist. This material was found to be between approximately 0.45 and 2.2 m thick. In addition, bedrock blocks (fill) were observed from the surface to 0.9 m BGS at TP-04.
- Gravelly sand fill was identified in BH1, BH3, and BH4. The material was described as loose to compact, grey, moist, and containing fragments of brick and glass. This material was found to be between approximately 0.2 and 1.0 m thick.
- Silty sand or sandy silt fill was encountered in BH2, BH6, BH7, BH8, BH10, and BH12. The material was described as loose to very dense, brown to grey, moist, and containing trace organics, roots, and rubber varying with depth and location. This material was found to be between approximately 0.1 and 2.9 m thick. Field observations reported a faint odour, possibly hydrocarbon in origin, within the fill at BH12. No evidence of staining was observed.
- Sandy clay or clayey sandy silt fill was encountered in BH5, BH9, and BH11. The material was described as stiff, grey, highly plastic, and moist. This material was found to be between approximately 1.5 and 1.66 m thick. Field observations reported a faint odour, possibly organic or septic in origin, within the fill at BH5. No evidence of staining was observed.

Other than the above-noted examples, no petroleum odours or visible evidence of staining were noted within any of the fill materials encountered as part of this assessment.

In addition to the fill material identified in the test pit and drilling programs, it is expected that underground services on the Property are bedded in imported granular material. It is also expected that the construction and demolition of the foundations and/or basements of both the existing and previously demolished on-Site buildings included off-Site sourced backfill. Backfill around these existing structures and services was not investigated as part of the Phase Two ESA.

Physical Setting – Existing and Proposed Structures

The Site is currently occupied by a one-story, irregular-shaped building with a finished lower level and a two level parking garage in the southwest corner of the Site. A portion of the lower level of the building extends into the lower level of the parking garage beneath a drive-through ATM awning. The parking garage is located immediately north of the building. A paved parking lot is located east of the Site building, and vacant land is located on the central and northern portions of the Site (vegetated with sumac trees and overgrown grasses/weeds; bedrock outcroppings are visible in the central portion of the Site and observed on the east and north sides of the parking garage). Prior to these developments, the Site was used for residential and agricultural purposes.

At this time, the future proposed Property use includes existing commercial (at former bank building) and development of a retirement home complex (on vacant land and land occupied by the parking areas/structures).



Contamination - Soil

Soil samples were collected from test pits advanced on December 13, 2019 and from boreholes advanced between January 9 and 15, 2020. Soil samples were analyzed for metals and inorganic parameters, PAHs, PHCs, VOCs, and general chemistry parameters. Analytical testing of the aforementioned soil samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture):

- TP-02 (along eastern (center) boundary of Site): lead concentration of 134 µg/g (criteria of 120 µg/g).
- TP-06 (northeast portion of Site): barium concentration of 443 µg/g (criteria of 390 µg/g); cobalt concentration of 25.3 µg/g (criteria of 22 µg/g); and vanadium concentration of 110 µg/g (criteria of 86 µg/g).
- BH1 (southwest portion of Site): cyanide concentration of 0.072 µg/g (criteria of 0.051 µg/g).

All of the other analyzed soil samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Although concentrations of metals/inorganics (lead, barium, cobalt, vanadium, and cyanide) were greater than O. Reg. 153/04 Table 7 Criteria, the exceedances appear to be isolated, and there were no concentrations of these parameters in excess of the O. Reg. 153/04 Table 7 Criteria in any of the analyzed groundwater samples collected at the Site. The source of the soil impact is suspected to be associated with natural-occurring metals within this region, and is not likely specific to any current or historic land uses at the Site.

Contamination - Groundwater

Groundwater samples were collected from the on-Site monitoring wells between January 22 and 23, 2020 and analyzed metals and inorganic parameters, PAHs, PHCs, VOCs, and general chemistry parameters. Analytical testing of the aforementioned groundwater samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture):

- MW1 (along western (south) boundary of Site): Chloride concentration of 2,320,000 µg/L (criteria of 1,800,000 µg/L).
- MW4 (center (east) portion of Site): Chloroform concentration of 3.9 µg/L (criteria of 2 µg/L).
- MW11 (northwest portion of Site): Chloride concentration of 3,020,000 µg/L (criteria of 1,800,000 µg/L).
- MW11 (duplicate; northwest portion of Site): Chloride concentration of 3,010,000 µg/L (with criteria of 1,800,000 µg/L).

All of the other analyzed groundwater samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Although concentrations of chloroform and chloride were greater than O. Reg. 153/04 Table 7 Criteria, the exceedances appear to be isolated. The source of the chloride impact is suspected to be associated potentially with road/parking lot salting operations, or from the use of municipal-supplied potable water provided during drilling operations, and is not likely specific to any current or



historic land uses at the Site. The source of the chloroform impact is also suspected to be associated with the use of municipal-supplied potable water provided during drilling operations, and is not likely specific to any current or historic land uses at the Site.

The presence of LNAPL/DNAPL was not identified in any of the monitoring wells.

6. Conclusions

Contamination - Soil

Soil samples were collected from test pits advanced on December 13, 2019 and from boreholes advanced between January 9 and 15, 2020. Soil samples were analyzed for metals and inorganic parameters, PAHs, PHCs, VOCs, and general chemistry parameters. Analytical testing of the aforementioned soil samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture):

- TP-02 (along eastern (center) boundary of Site): lead concentration of 134 µg/g (criteria of 120 µg/g).
- TP-06 (northeast portion of Site): barium concentration of 443 µg/g (criteria of 390 µg/g); cobalt concentration of 25.3 µg/g (criteria of 22 µg/g); and vanadium concentration of 110 µg/g (criteria of 86 µg/g).
- BH1 (southwest portion of Site): cyanide concentration of 0.072 µg/g (criteria of 0.051 µg/g).

All of the other analyzed soil samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Although concentrations of metals/inorganics (lead, barium, cobalt, vanadium, and cyanide) were greater than O. Reg. 153/04 Table 7 Criteria, the exceedances appear to be isolated, and there were no concentrations of these parameters in excess of the O. Reg. 153/04 Table 7 Criteria in any of the analyzed groundwater samples collected at the Site. The source of the soil impact is suspected to be associated with natural-occurring metals within this region, and is not likely specific to any current or historic land uses at the Site.

Contamination - Groundwater

Groundwater samples were collected from the on-Site monitoring wells between January 22 and 23, 2020 and analyzed metals and inorganic parameters, PAHs, PHCs, VOCs, and general chemistry parameters. Analytical testing of the aforementioned groundwater samples indicated the following parameters exceed the O. Reg. 153/04 Table 7 Criteria (shallow soil property, residential/institutional land use, non-potable groundwater use, coarse grained soil texture):

- MW1 (along western (south) boundary of Site): Chloride concentration of 2,320,000 µg/L (criteria of 1,800,000 µg/L).
- MW4 (center (east) portion of Site): Chloroform concentration of 3.9 µg/L (criteria of 2 µg/L).
- MW11 (northwest portion of Site): Chloride concentration of 3,020,000 µg/L (criteria of 1,800,000 µg/L).



- MW11 (duplicate; northwest portion of Site): Chloride concentration of 3,010,000 µg/L (with criteria of 1,800,000 µg/L).

All of the other analyzed groundwater samples were in compliance with O. Reg. 153/04 Table 7 Criteria.

Although concentrations of chloroform and chloride were greater than O. Reg. 153/04 Table 7 Criteria, the exceedances appear to be isolated. The source of the chloride impact is suspected to be associated potentially with road/parking lot salting operations, or from the use of municipal-supplied potable water provided during drilling operations, and is not likely specific to any current or historic land uses at the Site. The source of the chloroform impact is also suspected to be associated with the use of municipal-supplied potable water provided during drilling operations, and is not likely specific to any current or historic land uses at the Site.

The presence of LNAPL/DNAPL was not identified in any of the monitoring wells.

Site Compliance

There were O. Reg. 153/04 Table 7 Criteria exceedances in soil and groundwater samples collected from the Site. The Site is not considered to be in compliance with the O. Reg. 153/04 for the proposed land use and requires remediation and/or a risk assessment. However, it is recommended that the generic remediation approach be conducted during Site redevelopment to manage and dispose of any contaminated materials encountered on the Site, particularly as the Site is intended to be developed as a multi-story retirement home complex with underground parking. At the time of Site redevelopment, based on current soil and groundwater conditions, a soil and groundwater management program is recommended in order to manage and/or dispose of contaminated soil and groundwater. Future monitoring/sampling of soil and/or groundwater conditions closer to the date of Site redevelopment (i.e., as part of pre-construction planning and potential excess soil purposes) may alter the need for or the requirements of the management plan based on compliance with O. Reg. 153/04.

7. References

Ontario Regulation 153/04 (amended)

Ontario Regulation 558/00 (amended)

Phase One Environmental Site Assessment, 211 Centrum Boulevard, Ottawa, Ontario. Reference No. 11206675-E1 (1), prepared by GHD Ltd., dated February 12, 2020

Certificate of Analysis – AGAT #19Z555973 – Soil – December 16, 2019

Certificate of Analysis – AGAT #20Z564516 – Soil and Waste – January 24, 2020

Certificate of Analysis – AGAT #20Z566618 – Groundwater – January 31, 2020



All of Which is Respectfully Submitted,

GHD

A handwritten signature in blue ink, appearing to read "Marc Bouchard". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

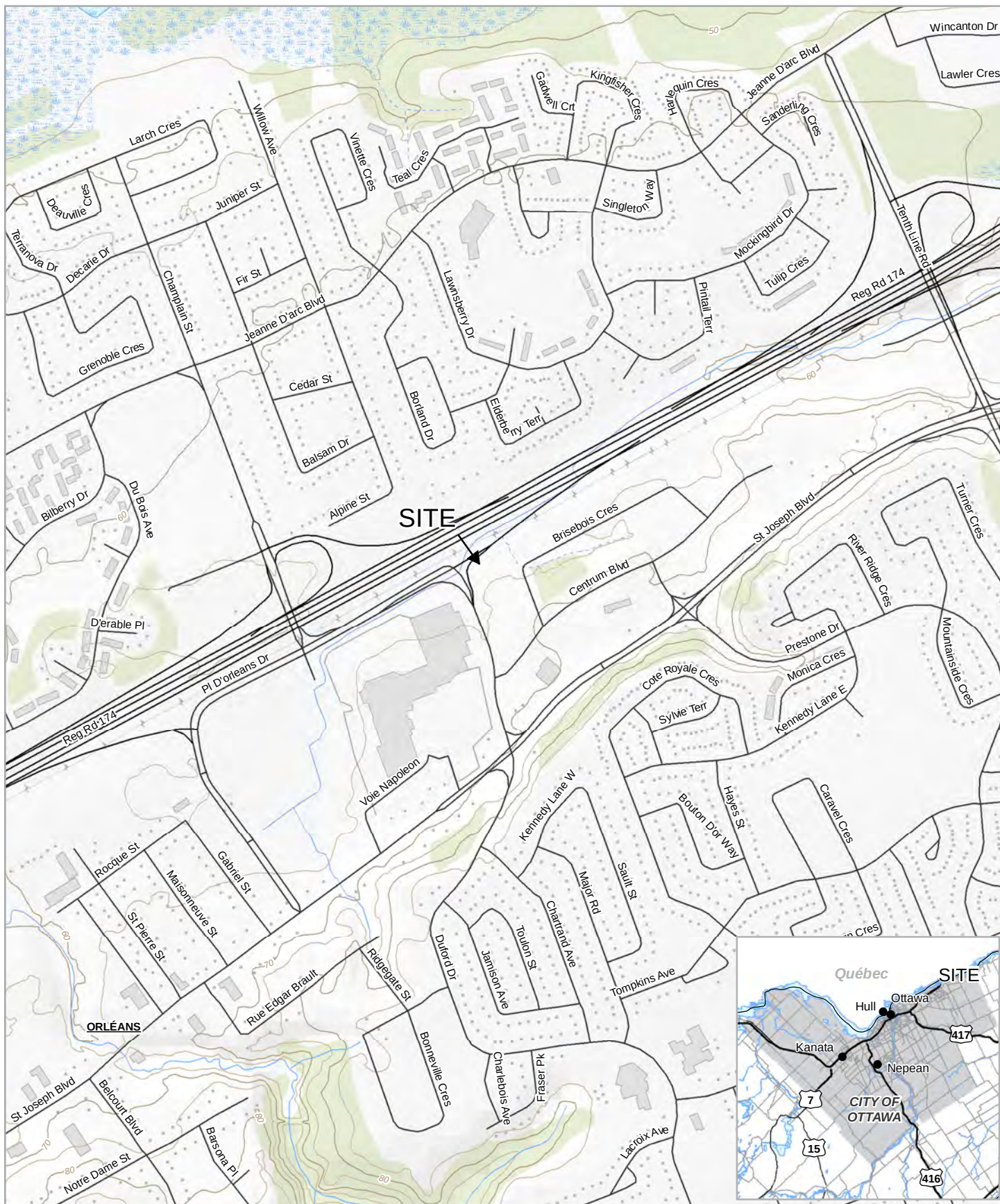
Marc Bouchard, B.Sc.

A handwritten signature in blue ink, appearing to read "Joseph R. Drader". The signature is cursive and somewhat stylized, with the first name being the most prominent.

Joseph R. Drader, P. Eng., P.E.

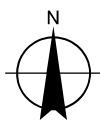
Joseph Drader, P. Eng., Qualified Person for Environmental Site Assessment under O. Reg. 153/04, confirms the carrying out of the Phase Two Environmental Site Assessment and the findings and conclusions of this report.

Figures



Paper Size ANSI A
0 70 140 210 280
Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 18N



LE GROUPE MAURICE
211 CENTRUM BLVD, OTTAWA, ONTARIO
PHASE TWO ENVIRONMENTAL SITE ASSESSMENT

Project No. 11206675
Revision No. -
Date Feb 6, 2020

SITE LOCATION MAP

FIGURE 1

Tables

**Monitoring Well Elevations and DNAPL / LNAPL Assessment
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa Ontario**

Instrumented Unit	WELL ID	Grade Elevation (m AMSL)	TOR Elevation (m AMSL)	Bottom Depth (m BGS)	Bottom Elevation (m AMSL)	January 22, 2020 Depth to Water Table (m BTOR)	Water Table Elevation (m AMSL)	Thickness of LNAPL (m)	Thickness of DNAPL (m)
Bedrock	BH/MW1	95.392	96.399	7.68	87.71	4.56	91.84	0.00	0.00
Bedrock	BH/MW2	97.987	98.945	7.28	90.71	4.02	94.93	0.00	0.00
Bedrock	BH/MW9	92.738	93.524	7.45	85.29	2.17	91.36	0.00	0.00
Bedrock	BH/MW12	95.663	95.446	4.00	91.66	0.64	94.81	0.00	0.00
Overburden	BH/MW4	96.543	97.431	4.03	92.51	3.67	93.77	0.00	0.00
Overburden	BH/MW5	95.662	96.667	5.22	90.44	3.51	93.16	0.00	0.00
Overburden	BH/MW8	94.403	95.161	5.31	89.09	2.46	92.70	0.00	0.00
Overburden	BH/MW11	91.856	92.674	4.90	86.96	2.02	90.65	0.00	0.00

Elevation relative to Site benchmark=100.00 m, assigned to Top of Spindle of Hydrant on South Side of Centrum Boulevard

DNAPL - Dense Non-Aqueous Phase Liquid

LNAPL - Light Non-Aqueous Phase Liquid

m BTOR - Metres below top of riser (monitoring well)

m AMSL - Metres above mean sea level (relative to Site benchmark)

m BGS - Metres below ground surface

Summary of Test Pit Soil Analysis
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa, Ontario

			O.Reg.153/04 Table 1	O.Reg.153/04 Table 7	TP-01	TP-02	TP-03	TP-04	TP-05
			Background	non-potable, shallow soil (coarse texture) residential/ parkland/ institutional	0.0-0.61 mBGS	0.0-0.61 mBGS	0.0-0.33 mBGS	0.91-1.52 mBGS	0.0-0.61 m BGS
Parameter	Units	MDL	non-agricultural		fill	fill	fill	fill	fill
Field Volatiles									
PID Headspace Reading	ppm	-	-	-	0.3	0.4	0.2	0.3	0.2
Metals and Inorganics									
Antimony	ug/g dry	0.8	1.3	7.5	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)
Arsenic	ug/g dry	1.0	18	18	5.00	4.00	2.00	2.00	6.00
Barium	ug/g dry	2.0	220	390	142.00	198.00	65.00	187.00	96.00
Beryllium	ug/g dry	0.5	2.5	4	0.60	0.60	ND (0.5)	ND (0.5)	0.50
Boron	ug/g dry	5.0	36	120	6.00	7.00	ND (5)	ND (5)	6.00
Boron (Hot Water Soluble)	ug/g dry	0.1	-	1.5	0.19	0.25	0.15	0.16	0.19
Cadmium	ug/g dry	0.5	1.2	1.2	ND (0.5)	0.60	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	2.0	70	160	51.00	34.00	27.00	50.00	30.00
Cobalt	ug/g dry	0.5	21	22	10.70	9.00	5.70	11.00	10.00
Copper	ug/g dry	1.0	92	140	19.00	17.00	11.00	24.00	18.00
Lead	ug/g dry	1.0	120	120	13.00	134.00	5.00	7.00	17.00
Molybdenum	ug/g dry	0.5	2	6.9	0.60	0.90	ND (0.5)	ND (0.5)	0.50
Nickel	ug/g dry	1.0	82	100	29.00	21.00	15.00	27.00	21.00
Selenium	ug/g dry	0.4	1.5	2.4	0.60	0.60	ND (0.4)	ND (0.4)	ND (0.4)
Silver	ug/g dry	0.2	0.5	20	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Thallium	ug/g dry	0.4	1	1	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Uranium	ug/g dry	0.5	2.5	23	0.80	0.80	0.60	0.70	0.50
Vanadium	ug/g dry	1.0	86	86	47.00	37.00	27.00	51.00	34.00
Zinc	ug/g dry	5.0	290	340	61.00	111.00	30.00	68.00	61.00
Chromium VI	ug/g dry	0.2	0.66	8	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Cyanide	ug/g dry	0.04	0.051	0.051	ND (0.040)	ND (0.040)	ND (0.040)	ND (0.040)	ND (0.040)
Mercury	ug/g dry	0.1	0.27	0.27	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Electrical Conductivity	mS/cm	0.005	0.57	0.7	0.22	0.17	0.16	0.20	0.15
Sodium Adsorption Ratio	-	-	2.4	5	0.85	0.11	0.11	0.13	0.10
pH	pH units	-	-	-	7.24	7.38	7.45	7.35	7.28
Volatiles									
Acetone	ug/g dry	0.130	0.5	16	ND (0.130)	ND (0.130)	ND (0.130)	ND (0.130)	ND (0.130)
Benzene	ug/g dry	0.002	0.02	0.21	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Bromodichloromethane	ug/g dry	0.003	0.05	13	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
Bromoform	ug/g dry	0.002	0.05	0.27	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Bromomethane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Carbon Tetrachloride	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Chlorobenzene	ug/g dry	0.002	0.05	2.4	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Chloroethane	ug/g dry	0.005	-	-	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloroform	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Chloromethane	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Dibromochloromethane	ug/g dry	0.003	0.05	9.4	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
1,2-Dichlorobenzene	ug/g dry	0.002	0.05	3.4	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,3-Dichlorobenzene	ug/g dry	0.002	0.05	4.8	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,4-Dichlorobenzene	ug/g dry	0.002	0.05	0.083	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1-Dichloroethane	ug/g dry	0.002	0.05	3.5	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,2-Dichloroethane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1-Dichloroethylene	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
cis-1,2-Dichloroethylene	ug/g dry	0.003	0.05	3.4	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
trans-1,2-Dichloroethylene	ug/g dry	0.002	0.05	0.084	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,2-Dichloropropane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
cis-1,3-Dichloropropylene	ug/g dry	0.003	-	-	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
trans-1,3-Dichloropropylene	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,3-Dichloropropene, total	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Ethylbenzene	ug/g dry	0.002	0.05	2	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Ethylene dibromide	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
2-Hexanone	ug/g dry	0.470	-	-	ND (0.470)	ND (0.470)	ND (0.470)	ND (0.470)	ND (0.470)
Methyl Ethyl Ketone	ug/g dry	0.044	0.5	16	ND (0.044)	ND (0.044)	ND (0.044)	ND (0.044)	ND (0.044)
Methyl Isobutyl Ketone	ug/g dry	0.041	0.5	1.7	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.041)
Methyl tert-butyl ether	ug/g dry	0.004	0.05	0.75	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Methylene Chloride	ug/g dry	0.002	0.05	0.1	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Styrene	ug/g dry	0.002	0.05	0.7	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1,1,2-Tetrachloroethane	ug/g dry	0.002	0.05	0.058	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1,2,2-Tetrachloroethane	ug/g dry	0.004	0.05	0.05	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Tetrachloroethylene	ug/g dry	0.002	0.05	0.28	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Toluene	ug/g dry	0.002	0.2	2.3	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,2,4-Trichlorobenzene	ug/g dry	0.007	0.05	0.36	ND (0.007)	ND (0.007)	ND (0.007)	ND (0.007)	ND (0.007)
1,1,1-Trichloroethane	ug/g dry	0.002	0.05	0.38	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1,2-Trichloroethane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Trichloroethylene	ug/g dry	0.004	0.05	0.061	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Trichlorofluoromethane	ug/g dry	0.004	0.25	4	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Vinyl Chloride	ug/g dry	0.002	0.02	0.02	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
m/p-Xylene	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
o-Xylene	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Xylenes, total	ug/g dry	0.002	0.05	3.1	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Hydrocarbons									
F1 PHCs (C6-C10)	ug/g dry	5	25	55	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
F2 PHCs (C10-C16)	ug/g dry	10	10	98	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
F3 PHCs (C16-C34)	ug/g dry	50	240	300	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
F4 PHCs (C34-C50)	ug/g dry	50	120	2800	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
F4G PHCs (gravimetric)	ug/g dry	50	120	2800	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
Semi-Volatiles									
Acenaphthene	ug/g dry	0.05	0.072	7.9	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Acenaphthylene	ug/g dry	0.05	0.093	0.15	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Anthracene	ug/g dry	0.05	0.16	0.67	ND (0.05)	0.13	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[a]anthracene	ug/g dry	0.05	0.36	0.5	ND (0.05)	0.24	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[a]pyrene	ug/g dry	0.05	0.3	0.3	ND (0.05)	0.12	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[b]fluoranthene	ug/g dry	0.05	0.47	0.78	ND (0.05)	0.14	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[g,h,i]perylene	ug/g dry	0.05	0.68	6.6	ND (0.05)	0.06	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[k]fluoranthene	ug/g dry	0.05	0.48	0.78	ND (0.05)	0.12	ND (0.05)	ND (0.05)	ND (0.05)
Chrysene	ug/g dry	0.05	2.8	7	ND (0.05)	0.18	ND (0.05)	ND (0.05)	ND (0.05)
Dibenzo[a,h]anthracene	ug/g dry	0.05	0.1	0.1	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Fluoranthene	ug/g dry	0.05	0.56	0.69	ND (0.05)	0.68	ND (0.05)	ND (0.05)	ND (0.05)
Fluorene	ug/g dry	0.05	0.12	62	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Indeno[1,2,3-cd]pyrene	ug/g dry	0.05	0.23	0.38	ND (0.05)	0.06	ND (0.05)	ND (0.05)	ND (0.05)
Methylnaphthalene (1&2)	ug/g dry	0.05	0.59	0.99	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Naphthalene	ug/g dry	0.05	0.09	0.6	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Phenanthrene	ug/g dry	0.05	0.69	6.2	ND (0.05)	0.52	ND (0.05)	ND (0.05)	ND (0.05)
Pyrene	ug/g dry	0.05	1	78	ND (0.05)	0.55	ND (0.05)	ND (0.05)	ND (0.05)
Lab ID					800115	800117	800118	800119	800120
GHD Sample ID					TP-01	TP-02	TP-03	TP-04	TP-05
Sample Date					13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19

Notes

- BOLD**
- Concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria
-
- Concentration meets or exceeds O.Reg. 153/04 Table 7 (shallow soil, non-potable, residential land use, coarse grained soil) criteria
- BOLD**
- MDL
- Method Detection Limit
- ND (##)
- Concentration not detected above Method Detection Limit
- N/A
- Parameter not analysed by laboratory
- m BGS
- Metres below ground surface

Summary of Test Pit Soil Analysis
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa, Ontario

			O.Reg.153/04 Table 1	O.Reg.153/04 Table 7	TP-06	TP-07	TP-08	TP-09	TP-10
			Background	non-potable, shallow soil (coarse texture) residential/ parkland/ institutional	0.0-0.61 m BGS	0.0-0.61 m BGS	0.23-0.84 m BGS	0.12-0.74 m BGS	0.10-0.71 m BGS
Parameter	Units	MDL	non-agricultural		native	fill	native	native	fill
Field Volatiles									
PID Headspace Reading	ppm	-	-	-	0.3	0.5	1.0	0.9	0.4
Metals and Inorganics									
Antimony	ug/g dry	0.8	1.3	7.5	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)
Arsenic	ug/g dry	1.0	18	18	2.00	2.00	2.00	2.00	2.00
Barium	ug/g dry	2.0	220	390	443.00	164.00	110.00	82.00	54.00
Beryllium	ug/g dry	0.5	2.5	4	0.70	0.60	ND (0.5)	ND (0.5)	ND (0.5)
Boron	ug/g dry	5.0	36	120	ND (5)	ND (5)	6.00	9.00	8.00
Boron (Hot Water Soluble)	ug/g dry	0.1	-	1.5	ND (0.10)	ND (0.10)	0.12	ND (0.10)	ND (0.10)
Cadmium	ug/g dry	0.5	1.2	1.2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	2.0	70	160	124.00	56.00	33.00	16.00	24.00
Cobalt	ug/g dry	0.5	21	22	25.30	10.40	9.90	9.50	10.10
Copper	ug/g dry	1.0	92	140	50.00	25.00	20.00	13.00	15.00
Lead	ug/g dry	1.0	120	120	9.00	6.00	9.00	7.00	7.00
Molybdenum	ug/g dry	0.5	2	6.9	ND (0.5)	ND (0.5)	ND (0.5)	0.80	ND (0.5)
Nickel	ug/g dry	1.0	82	100	65.00	29.00	23.00	17.00	19.00
Selenium	ug/g dry	0.4	1.5	2.4	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Silver	ug/g dry	0.2	0.5	20	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Thallium	ug/g dry	0.4	1	1	0.50	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Uranium	ug/g dry	0.5	2.5	23	0.90	1.00	0.70	ND (0.5)	ND (0.5)
Vanadium	ug/g dry	1.0	86	86	110.00	55.00	36.00	20.00	26.00
Zinc	ug/g dry	5.0	290	340	142.00	59.00	38.00	20.00	26.00
Chromium VI	ug/g dry	0.2	0.66	8	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Cyanide	ug/g dry	0.04	0.051	0.051	ND (0.040)	ND (0.040)	ND (0.040)	ND (0.040)	ND (0.040)
Mercury	ug/g dry	0.1	0.27	0.27	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Electrical Conductivity	mS/cm	0.005	0.57	0.7	0.16	0.17	0.16	0.14	0.11
Sodium Adsorption Ratio	-	-	2.4	5	0.75	0.32	0.22	0.16	0.19
pH	pH units	-	-	-	7.33	7.48	7.43	7.73	7.64
Volatiles									
Acetone	ug/g dry	0.130	0.5	16	ND (0.130)	ND (0.130)	ND (0.130)	ND (0.130)	ND (0.130)
Benzene	ug/g dry	0.002	0.02	0.21	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Bromodichloromethane	ug/g dry	0.003	0.05	13	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
Bromoform	ug/g dry	0.002	0.05	0.27	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Bromomethane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Carbon Tetrachloride	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Chlorobenzene	ug/g dry	0.002	0.05	2.4	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Chloroethane	ug/g dry	0.005	-	-	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloroform	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Chloromethane	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Dibromochloromethane	ug/g dry	0.003	0.05	9.4	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
1,2-Dichlorobenzene	ug/g dry	0.002	0.05	3.4	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,3-Dichlorobenzene	ug/g dry	0.002	0.05	4.8	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,4-Dichlorobenzene	ug/g dry	0.002	0.05	0.083	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1-Dichloroethane	ug/g dry	0.002	0.05	3.5	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,2-Dichloroethane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1-Dichloroethylene	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
cis-1,2-Dichloroethylene	ug/g dry	0.003	0.05	3.4	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
trans-1,2-Dichloroethylene	ug/g dry	0.002	0.05	0.084	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,2-Dichloropropane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
cis-1,3-Dichloropropylene	ug/g dry	0.003	-	-	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)	ND (0.003)
trans-1,3-Dichloropropylene	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,3-Dichloropropene, total	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Ethylbenzene	ug/g dry	0.002	0.05	2	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Ethylene dibromide	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
2-Hexanone	ug/g dry	0.470	-	-	ND (0.470)	ND (0.470)	ND (0.470)	ND (0.470)	ND (0.470)
Methyl Ethyl Ketone	ug/g dry	0.044	0.5	16	ND (0.044)	ND (0.044)	ND (0.044)	ND (0.044)	ND (0.044)
Methyl Isobutyl Ketone	ug/g dry	0.041	0.5	1.7	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.041)	ND (0.041)
Methyl tert-butyl ether	ug/g dry	0.004	0.05	0.75	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Methylene Chloride	ug/g dry	0.002	0.05	0.1	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Styrene	ug/g dry	0.002	0.05	0.7	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1,1,2-Tetrachloroethane	ug/g dry	0.002	0.05	0.058	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1,2,2-Tetrachloroethane	ug/g dry	0.004	0.05	0.05	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Tetrachloroethylene	ug/g dry	0.002	0.05	0.28	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Toluene	ug/g dry	0.002	0.2	2.3	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,2,4-Trichlorobenzene	ug/g dry	0.007	0.05	0.36	ND (0.007)	ND (0.007)	ND (0.007)	ND (0.007)	ND (0.007)
1,1,1-Trichloroethane	ug/g dry	0.002	0.05	0.38	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
1,1,2-Trichloroethane	ug/g dry	0.002	0.05	0.05	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Trichloroethylene	ug/g dry	0.004	0.05	0.061	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Trichlorofluoromethane	ug/g dry	0.004	0.25	4	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)	ND (0.004)
Vinyl Chloride	ug/g dry	0.002	0.02	0.02	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
m/p-Xylene	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
o-Xylene	ug/g dry	0.002	-	-	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Xylenes, total	ug/g dry	0.002	0.05	3.1	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.002)
Hydrocarbons									
F1 PHCs (C6-C10)	ug/g dry	5	25	55	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
F2 PHCs (C10-C16)	ug/g dry	10	10	98	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
F3 PHCs (C16-C34)	ug/g dry	50	240	300	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
F4 PHCs (C34-C50)	ug/g dry	50	120	2800	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
F4G PHCs (gravimetric)	ug/g dry	50	120	2800	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
Semi-Volatiles									
Acenaphthene	ug/g dry	0.05	0.072	7.9	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Acenaphthylene	ug/g dry	0.05	0.093	0.15	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Anthracene	ug/g dry	0.05	0.16	0.67	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[a]anthracene	ug/g dry	0.05	0.36	0.5	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[a]pyrene	ug/g dry	0.05	0.3	0.3	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[b]fluoranthene	ug/g dry	0.05	0.47	0.78	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[g,h,i]perylene	ug/g dry	0.05	0.68	6.6	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[k]fluoranthene	ug/g dry	0.05	0.48	0.78	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Chrysene	ug/g dry	0.05	2.8	7	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Dibenzo[a,h]anthracene	ug/g dry	0.05	0.1	0.1	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Fluoranthene	ug/g dry	0.05	0.56	0.69	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Fluorene	ug/g dry	0.05	0.12	62	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Indeno[1,2,3-cd]pyrene	ug/g dry	0.05	0.23	0.38	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Methylnaphthalene (1&2)	ug/g dry	0.05	0.59	0.99	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Naphthalene	ug/g dry	0.05	0.09	0.6	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Phenanthrene	ug/g dry	0.05	0.69	6.2	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Pyrene	ug/g dry	0.05	1	78	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Lab ID					800121	800122	800123	800124	800125
GHD Sample ID					TP-06	TP-07	TP-08	TP-09	TP-10
Sample Date					13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19	13-Dec-19

Notes

BOLD	- Concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria
	- Concentration meets or exceeds O.Reg. 153/04 Table 7 (shallow soil, non-potable, residential land use, coarse grained soil) criteria
BOLD	
MDL	- Method Detection Limit
ND (##)	- Concentration not detected above Method Detection Limit
N/A	- Parameter not analysed by laboratory
m BGS	- Metres below ground surface

Summary of Borehole Soil Analysis
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa, Ontario

			O.Reg.153/04 Table 1	O.Reg.153/04 Table 7	BH1	BH3	BH12	BH12 DUPLICATE
			Background	non-potable, shallow soil (coarse texture)	0.0-0.5 m BGS	0.0-0.61 m BGS	0.0-0.59 m BGS	0.0-0.59 m BGS
Parameter	Units	MDL	non-agricultural	residential/ parkland/ institutional	fill	fill	fill	fill
Field Volatiles								
PID Headspace Reading	ppm	-	-	-	0.1	0.1	0.4	0.4
Metals and Inorganics								
Antimony	ug/g dry	0.8	1.3	7.5	ND (0.8)	ND (0.8)	ND (0.8)	ND (0.8)
Arsenic	ug/g dry	1.0	18	18	2	3	3	3
Barium	ug/g dry	2.0	220	390	67	123	35	40
Beryllium	ug/g dry	0.5	2.5	4	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron	ug/g dry	5.0	36	120	6	10	6	6
Boron (Hot Water Soluble)	ug/g dry	0.1	-	1.5	0.21	0.34	0.31	0.3
Cadmium	ug/g dry	0.5	1.2	1.2	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Chromium	ug/g dry	2.0	70	160	16	10	13	14
Cobalt	ug/g dry	0.5	21	22	4.8	3.3	3.7	3.8
Copper	ug/g dry	1.0	92	140	10	6	8	8
Lead	ug/g dry	1.0	120	120	7	5	7	7
Molybdenum	ug/g dry	0.5	2	6.9	1.9	ND (0.5)	ND (0.5)	ND (0.5)
Nickel	ug/g dry	1.0	82	100	9	7	7	7
Selenium	ug/g dry	0.4	1.5	2.4	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Silver	ug/g dry	0.2	0.5	20	0.8	ND (0.2)	ND (0.2)	ND (0.2)
Thallium	ug/g dry	0.4	1	1	ND (0.4)	ND (0.4)	ND (0.4)	ND (0.4)
Uranium	ug/g dry	0.5	2.5	23	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Vanadium	ug/g dry	1.0	86	86	21	8	13	14
Zinc	ug/g dry	5.0	290	340	31	16	40	43
Chromium VI	ug/g dry	0.2	0.66	8	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Cyanide	ug/g dry	0.04	0.051	0.051	0.072	ND (0.040)	ND (0.040)	ND (0.040)
Mercury	ug/g dry	0.1	0.27	0.27	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Electrical Conductivity	mS/cm	0.005	0.57	0.7	0.331	0.233	0.561	0.515
Sodium Adsorption Ratio	-	-	2.4	5	0.643	0.216	1.83	1.53
pH	pH units	-	-	-	7.59	8.12	7.85	7.83
Volatiles								
Acetone	ug/g dry	0.5	0.5	16	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Benzene	ug/g dry	0.02	0.02	0.21	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Bromodichloromethane	ug/g dry	0.05	0.05	13	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Bromoform	ug/g dry	0.05	0.05	0.27	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Bromomethane	ug/g dry	0.05	0.05	0.05	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Carbon Tetrachloride	ug/g dry	0.05	0.05	0.05	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Chlorobenzene	ug/g dry	0.05	0.05	2.4	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Chloroform	ug/g dry	0.04	0.05	0.05	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
Dibromochloromethane	ug/g dry	0.05	0.05	9.4	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Dichlorodifluoromethane	ug/g dry	0.05	0.05	16	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,2-Dichlorobenzene	ug/g dry	0.05	0.05	3.4	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,3-Dichlorobenzene	ug/g dry	0.05	0.05	4.8	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,4-Dichlorobenzene	ug/g dry	0.05	0.05	0.083	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1-Dichloroethane	ug/g dry	0.02	0.05	3.5	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
1,2-Dichloroethane	ug/g dry	0.03	0.05	0.05	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)
1,1-Dichloroethylene	ug/g dry	0.05	0.05	0.05	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
cis-1,2-Dichloroethylene	ug/g dry	0.02	0.05	3.4	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
trans-1,2-Dichloroethylene	ug/g dry	0.05	0.05	0.084	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,2-Dichloropropane	ug/g dry	0.03	0.05	0.05	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)
cis-1,3-Dichloropropylene	ug/g dry	0.04	-	-	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
trans-1,3-Dichloropropylene	ug/g dry	0.04	-	-	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
1,3-Dichloropropene, total	ug/g dry	0.04	0.05	0.05	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
Ethylbenzene	ug/g dry	0.05	0.05	2	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Ethylene dibromide	ug/g dry	0.04	0.05	0.05	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
Hexane	ug/g dry	0.05	0.05	2.8	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Methyl Ethyl Ketone	ug/g dry	0.5	0.5	16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Methyl Isobutyl Ketone	ug/g dry	0.5	0.5	1.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Methyl tert-butyl ether	ug/g dry	0.05	0.05	0.75	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Methylene Chloride	ug/g dry	0.05	0.05	0.1	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Styrene	ug/g dry	0.05	0.05	0.7	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1,1,2-Tetrachloroethane	ug/g dry	0.04	0.05	0.058	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
1,1,2,2-Tetrachloroethane	ug/g dry	0.05	0.05	0.05	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Tetrachloroethylene	ug/g dry	0.05	0.05	0.28	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Toluene	ug/g dry	0.05	0.2	2.3	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1,1-Trichloroethane	ug/g dry	0.05	0.05	0.38	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
1,1,2-Trichloroethane	ug/g dry	0.04	0.05	0.05	ND (0.04)	ND (0.04)	ND (0.04)	ND (0.04)
Trichloroethylene	ug/g dry	0.03	0.05	0.061	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)
Trichlorofluoromethane	ug/g dry	0.05	0.25	4	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Vinyl Chloride	ug/g dry	0.02	0.02	0.02	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
m/p-Xylene	ug/g dry	0.05	-	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
o-Xylene	ug/g dry	0.05	-	-	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Xylenes, total	ug/g dry	0.05	0.05	3.1	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Hydrocarbons								
F1 PHCs (C6-C10)	ug/g dry	5	25	55	ND (5)	ND (5)	ND (5)	ND (5)
F2 PHCs (C10-C16)	ug/g dry	10	10	98	ND (10)	ND (10)	ND (10)	ND (10)
F3 PHCs (C16-C34)	ug/g dry	50	240	300	ND (50)	ND (50)	ND (50)	ND (50)
F4 PHCs (C34-C50)	ug/g dry	50	120	2800	ND (50)	ND (50)	ND (50)	ND (50)
F4G PHCs (gravimetric)	ug/g dry	50	120	2800	N/A	N/A	N/A	N/A
Semi-Volatiles								
Acenaphthene	ug/g dry	0.05	0.072	7.9	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Acenaphthylene	ug/g dry	0.05	0.093	0.15	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Anthracene	ug/g dry	0.05	0.16	0.67	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[a]anthracene	ug/g dry	0.05	0.36	0.5	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[a]pyrene	ug/g dry	0.05	0.3	0.3	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[b]fluoranthene	ug/g dry	0.05	0.47	0.78	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[g,h,i]perylene	ug/g dry	0.05	0.68	6.6	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Benzo[k]fluoranthene	ug/g dry	0.05	0.48	0.78	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Chrysene	ug/g dry	0.05	2.8	7	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Dibenzo[a,h]anthracene	ug/g dry	0.05	0.1	0.1	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Fluoranthene	ug/g dry	0.05	0.56	0.69	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Fluorene	ug/g dry	0.05	0.12	62	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Indeno[1,2,3-cd]pyrene	ug/g dry	0.05	0.23	0.38	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Methylnaphthalene (1&2)	ug/g dry	0.05	0.59	0.99	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Naphthalene	ug/g dry	0.05	0.09	0.6	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Phenanthrene	ug/g dry	0.05	0.69	6.2	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Pyrene	ug/g dry	0.05	1	78	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Lab ID					868252	868253	868250	868254
GHD Sample ID					BH1_ENV1	BH3_ENV1	BH12_ENV1	DUP1
Sample Date					15-Jan-20	15-Jan-20	15-Jan-20	15-Jan-20
Notes								
BOLD			- Concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria					
BOLD			- Concentration meets or exceeds O.Reg. 153/04 Table 7 (shallow soil, non-potable, residential land use, coarse grained soil) criteria					
MDL			- Method Detection Limit					
ND (##)			- Concentration not detected above Method Detection Limit					
N/A			- Parameter not analysed by laboratory					
m BGS			- Metres below ground surface					

Table 4
Summary of Groundwater Analysis
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa, Ontario

			O.Reg.153/04 Table 1 background	O.Reg.153/04 Table 7 non-potable, shallow soil (coarse texture)	MW1	MW2	MW4	MW5	MW8
Parameter	Units	MDL	any	any	Bedrock 91.59-88.59 m	Bedrock 94.69-91.69 m	Overburden 94.84-93.34 m	Overburden 94.46-91.46 m	Overburden 92.90-89.90 m
Metals and Inorganics									
Antimony	µg/L	1.0	1.5	16000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	µg/L	1.0	13	1500	1.9	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Barium	µg/L	2.0	610	23000	250	42.1	122	71.2	97.6
Beryllium	µg/L	0.5	0.5	53	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron	µg/L	10.0	1700	36000	162	21.5	43.6	26.7	25.4
Cadmium	µg/L	0.2	0.5	2.1	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Chromium	µg/L	2.0	11	640	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Cobalt	µg/L	0.5	3.8	52	0.6	ND (0.5)	19.6	5.9	4.8
Copper	µg/L	1.0	5	69	2.2	1.5	4.1	1.5	1.3
Lead	µg/L	0.5	1.9	20	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Molybdenum	µg/L	0.5	23	7300	9	1.4	4.3	1.1	1
Nickel	µg/L	1.0	14	390	2	ND (1.0)	5.1	5.9	11.6
Selenium	µg/L	1.0	5	50	1.6	ND (1.0)	ND (1.0)	ND (1.0)	1
Silver	µg/L	0.2	0.3	1.2	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
Thallium	µg/L	0.3	0.5	400	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Uranium	µg/L	0.5	8.9	330	1.5	0.6	1.7	1.2	0.8
Vanadium	µg/L	0.4	3.9	200	1.4	1.3	0.4	ND (0.4)	0.8
Zinc	µg/L	5.0	160	890	ND (5.0)	ND (5.0)	42.8	7.6	ND (5.0)
Mercury	µg/L	0.02	0.1	0.1	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Chromium VI	µg/L	5	25	110	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Cyanide	µg/L	2	5	52	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
Sodium	µg/L	5000	490000	1800000	1440000	265000	9570	12000	8250
Chloride	µg/L	10000	790000	1800000	2320000	201000	6160	10400	5370
Electrical Conductivity	uS/cm	2	-	-	8080	1840	919	1170	901
pH	pH Units	-	-	-	7.8	7.74	7.81	7.42	7.53
Volatiles									
Acetone	ug/L	1.0	2700	100000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Benzene	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	0.33	ND (0.20)	ND (0.20)
Bromodichloromethane	ug/L	0.20	2	67000	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Bromoform	ug/L	0.10	5	5	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Bromomethane	ug/L	0.20	0.89	0.89	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Carbon Tetrachloride	ug/L	0.20	0.2	0.2	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Chlorobenzene	ug/L	0.10	0.5	140	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Chloroform	ug/L	0.20	2	2	ND (0.20)	1.1	3.9	0.51	ND (0.20)
Dibromochloromethane	ug/L	0.10	2	65000	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Dichlorodifluoromethane	ug/L	0.20	590	3500	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,2-Dichlorobenzene	ug/L	0.10	0.5	150	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,3-Dichlorobenzene	ug/L	0.10	0.5	7600	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,4-Dichlorobenzene	ug/L	0.10	0.5	0.5	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,1-Dichloroethane	ug/L	0.30	0.5	11	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
1,2-Dichloroethane	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,1-Dichloroethylene	ug/L	0.30	0.5	0.5	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
cis-1,2-Dichloroethylene	ug/L	0.20	1.6	1.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
trans-1,2-Dichloroethylene	ug/L	0.20	1.6	1.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,2-Dichloropropane	ug/L	0.20	0.5	0.58	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,3-Dichloropropene, total	ug/L	0.30	0.5	0.5	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
Ethylbenzene	ug/L	0.10	0.5	54	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Ethylene dibromide (dibromoe	ug/L	0.10	0.2	0.2	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Hexane	ug/L	0.20	5	5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methyl Ethyl Ketone (2-Butan	ug/L	1.0	400	21000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Methyl Isobutyl Ketone	ug/L	1.0	640	5200	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Methyl tert-butyl ether	ug/L	0.20	15	15	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methylene Chloride	ug/L	0.30	5	26	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
Styrene	ug/L	0.10	0.5	43	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,1,1,2-Tetrachloroethane	ug/L	0.10	1.1	1.1	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,1,2,2-Tetrachloroethane	ug/L	0.10	0.5	0.5	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Tetrachloroethylene	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Toluene	ug/L	0.20	0.8	320	ND (0.20)	ND (0.20)	0.65	ND (0.20)	ND (0.20)
1,1,1-Trichloroethane	ug/L	0.30	0.5	23	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
1,1,2-Trichloroethane	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichloroethylene	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichlorofluoromethane	ug/L	0.40	150	2000	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Vinyl Chloride	ug/L	0.17	0.5	0.5	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)
m/p-Xylene	ug/L	0.20	-	-	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
o-Xylene	ug/L	0.10	-	-	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Xylenes, total	ug/L	0.20	72	72	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Hydrocarbons									
F1 PHCs (C6-C10)	ug/L	25	420	420	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
F2 PHCs (C10-C16)	ug/L	100	150	150	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
F3 PHCs (C16-C34)	ug/L	100	500	500	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
F4 PHCs (C34-C50)	ug/L	100	500	500	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
Semi-Volatiles									
Acenaphthene	ug/L	0.20	4.1	17	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Acenaphthylene	ug/L	0.20	1	1	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Anthracene	ug/L	0.10	0.1	1	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Benzo[a]anthracene	ug/L	0.20	0.2	1.8	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Benzo[a]pyrene	ug/L	0.01	0.01	0.81	0.02	0.01	ND (0.01)	0.01	ND (0.01)
Benzo[b]fluoranthene	ug/L	0.10	0.1	0.75	0.15	ND (0.10)	0.1	ND (0.10)	ND (0.10)
Benzo[g,h,i]perylene	ug/L	0.20	0.2	0.2	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Benzo[k]fluoranthene	ug/L	0.10	0.1	0.4	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Chrysene	ug/L	0.10	0.1	0.7	0.22	ND (0.10)	0.1	ND (0.10)	ND (0.10)
Dibenzo[a,h]anthracene	ug/L	0.20	0.2	0.4	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Fluoranthene	ug/L	0.20	0.4	44	0.73	ND (0.20)	0.56	ND (0.20)	ND (0.20)
Fluorene	ug/L	0.20	120	290	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Indeno[1,2,3-cd]pyrene	ug/L	0.20	0.2	0.2	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methylnaphthalene (1&2)	ug/L	0.20	2	1500	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene	ug/L	0.20	7	7	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Phenanthrene	ug/L	0.10	0.1	380	0.5	0.12	0.75	0.17	ND (0.10)
Pyrene	ug/L	0.20	0.2	5.7	1.1	ND (0.20)	0.7	ND (0.20)	ND (0.20)
Lab ID					884829	884830	884832	884833	884834
GHD Sample ID (GW-11206675-##)					-12320-JC-003	-012320-JC-004	-012320-JC-006	-012320-JC-007	-012320-JC-008
Sample Date					23-Jan-20	23-Jan-20	23-Jan-20	23-Jan-20	23-Jan-20
Notes									
BOLD - Concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria									
- Concentration meets or exceeds O.Reg. 153/04 Table 7 (shallow soil, non-potable, any land use, coarse grained soil) criteria									
MDL - Method Detection Limit									
ND (##) - Concentration not detected above Method Detection Limit									
N/A - Parameter not analysed by laboratory									

Summary of Groundwater Analysis
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa, Ontario

			O.Reg.153/04 Table 1 background	O.Reg.153/04 Table 7 non-potable, shallow soil (coarse texture)	MW9	MW11	MW11 DUPLICATE	MW12
Parameter	Units	MDL	any	any	Bedrock 88.54-86.09 m	Overburden 90.86-87.86 m	Overburden 90.86-87.86 m	Bedrock 94.66-91.66 m
Metals and Inorganics								
Antimony	µg/L	1.0	1.5	16000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Arsenic	µg/L	1.0	13	1500	ND (1.0)	ND (1.0)	1.5	ND (1.0)
Barium	µg/L	2.0	610	23000	442	402	402	143
Beryllium	µg/L	0.5	0.5	53	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron	µg/L	10.0	1700	36000	183	45.8	54.3	52.4
Cadmium	µg/L	0.2	0.5	2.1	ND (0.2)	ND (0.2)	ND (0.2)	0.2
Chromium	µg/L	2.0	11	640	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Cobalt	µg/L	0.5	3.8	52	2	1.1	1.2	0.8
Copper	µg/L	1.0	5	69	1.5	3.3	3	7.4
Lead	µg/L	0.5	1.9	20	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Molybdenum	µg/L	0.5	23	7300	1.4	0.8	0.8	199
Nickel	µg/L	1.0	14	390	4.8	4.2	3.8	7.4
Selenium	µg/L	1.0	5	50	ND (1.0)	ND (1.0)	1.3	1.2
Silver	µg/L	0.2	0.3	1.2	ND (0.2)	ND (0.2)	0.2	ND (0.2)
Thallium	µg/L	0.3	0.5	400	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Uranium	µg/L	0.5	8.9	330	ND (0.5)	6.8	6.6	1.2
Vanadium	µg/L	0.4	3.9	200	ND (0.4)	1.4	1.5	ND (0.4)
Zinc	µg/L	5.0	160	890	ND (5.0)	13.1	13.6	6
Mercury	µg/L	0.02	0.1	0.1	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Chromium VI	µg/L	5	25	110	ND (5)	ND (5)	ND (5)	ND (5)
Cyanide	µg/L	2	5	52	ND (2)	ND (2)	ND (2)	ND (2)
Sodium	µg/L	5000	490000	1800000	317000	1050000	1060000	671000
Chloride	µg/L	10000	790000	1800000	1260000	3020000	3010000	1230000
Electrical Conductivity	uS/cm	2	-	-	4470	9390	9350	4250
pH	pH Units	-	-	-	7.62	7.39	7.3	7.85
Volatiles								
Acetone	ug/L	1.0	2700	100000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Benzene	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Bromodichloromethane	ug/L	0.20	2	67000	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Bromoform	ug/L	0.10	5	5	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Bromomethane	ug/L	0.20	0.89	0.89	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Carbon Tetrachloride	ug/L	0.20	0.2	0.2	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Chlorobenzene	ug/L	0.10	0.5	140	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Chloroform	ug/L	0.20	2	2	ND (0.20)	ND (0.20)	ND (0.20)	1.6
Dibromochloromethane	ug/L	0.10	2	65000	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Dichlorodifluoromethane	ug/L	0.20	590	3500	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,2-Dichlorobenzene	ug/L	0.10	0.5	150	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,3-Dichlorobenzene	ug/L	0.10	0.5	7600	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,4-Dichlorobenzene	ug/L	0.10	0.5	0.5	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,1-Dichloroethane	ug/L	0.30	0.5	11	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
1,2-Dichloroethane	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,1-Dichloroethylene	ug/L	0.30	0.5	0.5	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
cis-1,2-Dichloroethylene	ug/L	0.20	1.6	1.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
trans-1,2-Dichloroethylene	ug/L	0.20	1.6	1.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,2-Dichloropropane	ug/L	0.20	0.5	0.58	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
1,3-Dichloropropene, total	ug/L	0.30	0.5	0.5	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
Ethylbenzene	ug/L	0.10	0.5	54	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Ethylene dibromide (dibromodichloromethane)	ug/L	0.10	0.2	0.2	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Hexane	ug/L	0.20	5	5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methyl Ethyl Ketone (2-Butanone)	ug/L	1.0	400	21000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Methyl Isobutyl Ketone	ug/L	1.0	640	5200	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Methyl tert-butyl ether	ug/L	0.20	15	15	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methylene Chloride	ug/L	0.30	5	26	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
Styrene	ug/L	0.10	0.5	43	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,1,1,2-Tetrachloroethane	ug/L	0.10	1.1	1.1	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,1,2,2-Tetrachloroethane	ug/L	0.10	0.5	0.5	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Tetrachloroethylene	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Toluene	ug/L	0.20	0.8	320	ND (0.20)	ND (0.20)	ND (0.20)	0.49
1,1,1-Trichloroethane	ug/L	0.30	0.5	23	ND (0.30)	ND (0.30)	ND (0.30)	ND (0.30)
1,1,2-Trichloroethane	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichloroethylene	ug/L	0.20	0.5	0.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Trichlorofluoromethane	ug/L	0.40	150	2000	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)
Vinyl Chloride	ug/L	0.17	0.5	0.5	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)
m/p-Xylene	ug/L	0.20	-	-	ND (0.20)	ND (0.20)	ND (0.20)	0.36
o-Xylene	ug/L	0.10	-	-	ND (0.10)	ND (0.10)	ND (0.10)	0.13
Xylenes, total	ug/L	0.20	72	72	ND (0.20)	ND (0.20)	ND (0.20)	0.49
Hydrocarbons								
F1 PHCs (C6-C10)	ug/L	25	420	420	ND (25)	ND (25)	ND (25)	ND (25)
F2 PHCs (C10-C16)	ug/L	100	150	150	ND (100)	ND (100)	ND (100)	ND (100)
F3 PHCs (C16-C34)	ug/L	100	500	500	ND (100)	ND (100)	ND (100)	ND (100)
F4 PHCs (C34-C50)	ug/L	100	500	500	ND (100)	ND (100)	ND (100)	ND (100)
Semi-Volatiles								
Acenaphthene	ug/L	0.20	4.1	17	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Acenaphthylene	ug/L	0.20	1	1	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Anthracene	ug/L	0.10	0.1	1	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Benzo[a]anthracene	ug/L	0.20	0.2	1.8	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Benzo[a]pyrene	ug/L	0.01	0.01	0.81	ND (0.01)	0.01	0.01	0.02
Benzo[b]fluoranthene	ug/L	0.10	0.1	0.75	ND (0.10)	ND (0.10)	ND (0.10)	0.1
Benzo[g,h,i]perylene	ug/L	0.20	0.2	0.2	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Benzo[k]fluoranthene	ug/L	0.10	0.1	0.4	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Chrysene	ug/L	0.10	0.1	0.7	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Dibenzo[a,h]anthracene	ug/L	0.20	0.2	0.4	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Fluoranthene	ug/L	0.20	0.4	44	ND (0.20)	0.54	0.55	ND (0.20)
Fluorene	ug/L	0.20	120	290	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Indeno[1,2,3-cd]pyrene	ug/L	0.20	0.2	0.2	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methylnaphthalene (1&2)	ug/L	0.20	2	1500	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Naphthalene	ug/L	0.20	7	7	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Phenanthrene	ug/L	0.10	0.1	380	ND (0.10)	0.55	0.58	0.1
Pyrene	ug/L	0.20	0.2	5.7	0.22	0.75	0.77	0.23
Lab ID					884836	884827	884828	884835
GHD Sample ID (GW-11206675-##)					-012320-JC-010	-012220-JC-001	-012220-JC-002	-012320-JC-009
Sample Date					23-Jan-20	22-Jan-20	22-Jan-20	23-Jan-20
Notes								
BOLD	- Concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria							
	- Concentration meets or exceeds O.Reg. 153/04 Table 7 (shallow soil, non-potable, any land use, coarse grained soil) criteria							
BOLD								
MDL	- Method Detection Limit							
ND (##)	- Concentration not detected above Method Detection Limit							
N/A	- Parameter not analysed by laboratory							

Maximum Soil Parameter Concentrations
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa, Ontario

			O.Reg.153/04 Table 1	O.Reg.153/04 Table 7			
			Background	non-potable, shallow soil (coarse texture)	Maximum Soil Concentration	Sample location	Sample depth
Parameter	Units	MDL	non-agricultural	residential/ parkland/ institutional			m BGS
Metals and Inorganics							
Antimony	ug/g dry	0.8	1.3	7.5	ND	all	
Arsenic	ug/g dry	1	18	18	6	TP-05	0.0-0.61
Barium	ug/g dry	2	220	390	443	TP-06	0.0-0.61
Beryllium	ug/g dry	0.5	2.5	4	0.7	TP-06	0.0-0.61
Boron	ug/g dry	5	36	120	10	BH3	0.0-0.61
Boron (Hot Water Soluble)	ug/g dry	0.1	-	1.5	0.34	BH3	0.0-0.61
Cadmium	ug/g dry	0.5	1.2	1.2	0.6	TP-02	0.0-0.61
Chromium	ug/g dry	2	70	160	124	TP-06	0.0-0.61
Cobalt	ug/g dry	0.5	21	22	25.3	TP-06	0.0-0.61
Copper	ug/g dry	1	92	140	50	TP-06	0.0-0.61
Lead	ug/g dry	1	120	120	134	TP-02	0.0-0.61
Molybdenum	ug/g dry	0.5	2	6.9	1.9	BH1	0.0-0.5
Nickel	ug/g dry	1	82	100	65	TP-06	0.0-0.61
Selenium	ug/g dry	0.4	1.5	2.4	0.6	TP-01, TP-02	0.0-0.61
Silver	ug/g dry	0.2	0.5	20	0.8	BH1	0.0-0.5
Thallium	ug/g dry	0.4	1	1	0.5	TP-06	0.0-0.61
Uranium	ug/g dry	0.5	2.5	23	1	TP-07	0.0-0.61
Vanadium	ug/g dry	1	86	86	110	TP-06	0.0-0.61
Zinc	ug/g dry	5	290	340	142	TP-06	0.0-0.61
Chromium VI	ug/g dry	0.2	0.66	8	ND	all	
Cyanide	ug/g dry	0.04	0.051	0.051	0.072	BH1	0.0-0.5
Mercury	ug/g dry	0.1	0.27	0.27	ND	all	
Electrical Conductivity	mS/cm	0.005	0.57	0.7	0.561	BH12	0.0-0.59
Sodium Adsorption Ratio	-	-	2.4	5	1.83	BH12	0.0-0.59
pH	pH units	-	-	-	8.12	BH3	0.0-0.61
Volatiles							
Acetone	ug/g dry	0.5	0.5	16	ND	all	
Benzene	ug/g dry	0.02	0.02	0.21	ND	all	
Bromodichloromethane	ug/g dry	0.05	0.05	13	ND	all	
Bromoform	ug/g dry	0.05	0.05	0.27	ND	all	
Bromomethane	ug/g dry	0.05	0.05	0.05	ND	all	
Carbon Tetrachloride	ug/g dry	0.05	0.05	0.05	ND	all	
Chlorobenzene	ug/g dry	0.05	0.05	2.4	ND	all	
Chloroethane	ug/g dry	0.005	-	-	ND	all	
Chloroform	ug/g dry	0.04	0.05	0.05	ND	all	
Chloromethane	ug/g dry	0.002	-	-	ND	all	
Dibromochloromethane	ug/g dry	0.05	0.05	9.4	ND	all	
Dichlorodifluoromethane	ug/g dry	0.05	0.05	16	ND	all	
1,2-Dichlorobenzene	ug/g dry	0.05	0.05	3.4	ND	all	
1,3-Dichlorobenzene	ug/g dry	0.05	0.05	4.8	ND	all	
1,4-Dichlorobenzene	ug/g dry	0.05	0.05	0.083	ND	all	
1,1-Dichloroethane	ug/g dry	0.02	0.05	3.5	ND	all	
1,2-Dichloroethane	ug/g dry	0.03	0.05	0.05	ND	all	
1,1-Dichloroethylene	ug/g dry	0.05	0.05	0.05	ND	all	
cis-1,2-Dichloroethylene	ug/g dry	0.02	0.05	3.4	ND	all	
trans-1,2-Dichloroethylene	ug/g dry	0.05	0.05	0.084	ND	all	
1,2-Dichloropropane	ug/g dry	0.03	0.05	0.05	ND	all	
cis-1,3-Dichloropropylene	ug/g dry	0.04	-	-	ND	all	
trans-1,3-Dichloropropylene	ug/g dry	0.04	-	-	ND	all	
1,3-Dichloropropene, total	ug/g dry	0.04	0.05	0.05	ND	all	
Ethylbenzene	ug/g dry	0.05	0.05	2	ND	all	
Ethylene dibromide	ug/g dry	0.04	0.05	0.05	ND	all	
Hexane	ug/g dry	0.05	0.05	2.8	ND	all	
2-Hexanone	ug/g dry	0.47	-	-	ND	all	
Methyl Ethyl Ketone	ug/g dry	0.5	0.5	16	ND	all	
Methyl Isobutyl Ketone	ug/g dry	0.5	0.5	1.7	ND	all	
Methyl tert-butyl ether	ug/g dry	0.05	0.05	0.75	ND	all	
Methylene Chloride	ug/g dry	0.05	0.05	0.1	ND	all	
Styrene	ug/g dry	0.05	0.05	0.7	ND	all	
1,1,1,2-Tetrachloroethane	ug/g dry	0.04	0.05	0.058	ND	all	
1,1,2,2-Tetrachloroethane	ug/g dry	0.05	0.05	0.05	ND	all	
Tetrachloroethylene	ug/g dry	0.05	0.05	0.28	ND	all	
Toluene	ug/g dry	0.05	0.2	2.3	ND	all	
1,1,1-Trichloroethane	ug/g dry	0.05	0.05	0.38	ND	all	
1,1,2-Trichloroethane	ug/g dry	0.04	0.05	0.05	ND	all	
Trichloroethylene	ug/g dry	0.03	0.05	0.061	ND	all	
Trichlorofluoromethane	ug/g dry	0.05	0.25	4	ND	all	
Vinyl Chloride	ug/g dry	0.02	0.02	0.02	ND	all	
m/p-Xylene	ug/g dry	0.05	-	-	ND	all	
o-Xylene	ug/g dry	0.05	-	-	ND	all	
Xylenes, total	ug/g dry	0.05	0.05	3.1	ND	all	
Hydrocarbons							
F1 PHCs (C6-C10)	ug/g dry	5	25	55	ND	all	
F2 PHCs (C10-C16)	ug/g dry	10	10	98	ND	all	
F3 PHCs (C16-C34)	ug/g dry	50	240	300	ND	all	
F4 PHCs (C34-C50)	ug/g dry	50	120	2800	ND	all	
Semi-Volatiles							
Acenaphthene	ug/g dry	0.05	0.072	7.9	ND	all	
Acenaphthylene	ug/g dry	0.05	0.093	0.15	ND	all	
Anthracene	ug/g dry	0.05	0.16	0.67	0.13	TP-02	0.0-0.61
Benzo[a]anthracene	ug/g dry	0.05	0.36	0.5	0.24	TP-02	0.0-0.61
Benzo[a]pyrene	ug/g dry	0.05	0.3	0.3	0.12	TP-02	0.0-0.61
Benzo[b]fluoranthene	ug/g dry	0.05	0.47	0.78	0.14	TP-02	0.0-0.61
Benzo[g,h,i]perylene	ug/g dry	0.05	0.68	6.6	0.06	TP-02	0.0-0.61
Benzo[k]fluoranthene	ug/g dry	0.05	0.48	0.78	0.12	TP-02	0.0-0.61
Chrysene	ug/g dry	0.05	2.8	7	0.18	TP-02	0.0-0.61
Dibenzo[a,h]anthracene	ug/g dry	0.05	0.1	0.1	ND	all	
Fluoranthene	ug/g dry	0.05	0.56	0.69	0.68	TP-02	0.0-0.61
Fluorene	ug/g dry	0.05	0.12	62	ND	all	
Indeno[1,2,3-cd]pyrene	ug/g dry	0.05	0.23	0.38	0.06	TP-02	0.0-0.61
Methylnaphthalene (1&2)	ug/g dry	0.05	0.59	0.99	ND	all	
Naphthalene	ug/g dry	0.05	0.09	0.6	ND	all	
Phenanthrene	ug/g dry	0.05	0.69	6.2	0.52	TP-02	0.0-0.61
Pyrene	ug/g dry	0.05	1	78	0.55	TP-02	0.0-0.61

Notes

- BOLD**
- BOLD**
- MDL
- ND
- m BGS
- Concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria
- Concentration meets or exceeds O.Reg. 153/04 Table 7 (shallow soil, non-potable, residential land use, coarse grained soil) criteria
- Method Detection Limit
- Concentration not detected above Method Detection Limit
- Metres below ground surface

Table 6

Maximun Groundwater Parameter Concentrations
Phase Two Environmental Site Assessment
211 Centrum Boulevard
Ottawa, Ontario

Parameter	Units	MDL	O.Reg.153/04 Table 1 background any	O.Reg.153/04 Table 7 non-potable, shallow soil (coarse texture) any	Maximum groundwater concentration	Sample ID	Sample Location
Metals and Inorganics							
Antimony	µg/L	1.0	1.5	16000	ND	all	
Arsenic	µg/L	1.0	13	1500	1.9	GW-11206675-012320-JC-003	MW1
Barium	µg/L	2.0	610	23000	442	GW-11206675-012320-JC-010	MW9
Beryllium	µg/L	0.5	0.5	53	ND	all	
Boron	µg/L	10.0	1700	36000	183	GW-11206675-012320-JC-010	MW9
Cadmium	µg/L	0.2	0.5	2.1	0.2	GW-11206675-012320-JC-009	MW12
Chromium	µg/L	2.0	11	640	ND	all	
Cobalt	µg/L	0.5	3.8	52	19.6	GW-11206675-012320-JC-006	MW4
Copper	µg/L	1.0	5	69	7.4	GW-11206675-012320-JC-009	MW12
Lead	µg/L	0.5	1.9	20	ND	all	
Molybdenum	µg/L	0.5	23	7300	199	GW-11206675-012320-JC-009	MW12
Nickel	µg/L	1.0	14	390	11.6	GW-11206675-012320-JC-008	MW8
Selenium	µg/L	1.0	5	50	1.6	GW-11206675-012320-JC-003	MW1
Silver	µg/L	0.2	0.3	1.2	0.2	GW-11206675-012220-JC-002	Duplicate of MW11
Thallium	µg/L	0.3	0.5	400	ND	all	
Uranium	µg/L	0.5	8.9	330	6.8	GW-11206675-012220-JC-001	MW11
Vanadium	µg/L	0.4	3.9	200	1.5	GW-11206675-012220-JC-002	Duplicate of MW11
Zinc	µg/L	5.0	160	890	42.8	GW-11206675-012320-JC-006	MW4
Mercury	µg/L	0.02	0.1	0.1	ND	all	
Chromium VI	µg/L	5	25	110	ND	all	
Cyanide	µg/L	2	5	52	ND	all	
Sodium	µg/L	5000	490000	1800000	1440000	GW-11206675-012320-JC-003	MW1
Chloride	µg/L	10000	790000	1800000	3020000	GW-11206675-012220-JC-001	MW11
Electrical Conductivity	uS/cm	2	-	-	9390	GW-11206675-012220-JC-001	MW11
pH	pH Units	-	-	-	7.85	GW-11206675-012320-JC-009	MW12
Volatiles							
Acetone	ug/L	5.0	2700	100000	ND	all	
Benzene	ug/L	0.5	0.5	0.5	0.33	GW-11206675-012320-JC-006	MW4
Bromodichloromethane	ug/L	0.5	2	67000	ND	all	
Bromoform	ug/L	0.5	5	5	ND	all	
Bromomethane	ug/L	0.5	0.89	0.89	ND	all	
Carbon Tetrachloride	ug/L	0.2	0.2	0.2	ND	all	
Chlorobenzene	ug/L	0.5	0.5	140	ND	all	
Chloroform	ug/L	0.5	2	2	3.9	GW-11206675-012320-JC-006	MW4
Dibromochloromethane	ug/L	0.5	2	65000	ND	all	
Dichlorodifluoromethane	ug/L	1.0	590	3500	ND	all	
1,2-Dichlorobenzene	ug/L	0.5	0.5	150	ND	all	
1,3-Dichlorobenzene	ug/L	0.5	0.5	7600	ND	all	
1,4-Dichlorobenzene	ug/L	0.5	0.5	0.5	ND	all	
1,1-Dichloroethane	ug/L	0.5	0.5	11	ND	all	
1,2-Dichloroethane	ug/L	0.5	0.5	0.5	ND	all	
1,1-Dichloroethylene	ug/L	0.5	0.5	0.5	ND	all	
cis-1,2-Dichloroethylene	ug/L	0.5	1.6	1.6	ND	all	
trans-1,2-Dichloroethylene	ug/L	0.5	1.6	1.6	ND	all	
1,2-Dichloropropane	ug/L	0.5	0.5	0.58	ND	all	
1,3-Dichloropropane, total	ug/L	0.5	0.5	0.5	ND	all	
Ethylbenzene	ug/L	0.5	0.5	54	ND	all	
Ethylene dibromide (dibromoe	ug/L	0.2	0.2	0.2	ND	all	
Hexane	ug/L	1.0	5	5	ND	all	
Methyl Ethyl Ketone (2-Butan	ug/L	5.0	400	21000	ND	all	
Methyl Isobutyl Ketone	ug/L	5.0	640	5200	ND	all	
Methyl tert-butyl ether	ug/L	2.0	15	15	ND	all	
Methylene Chloride	ug/L	5.0	5	26	ND	all	
Styrene	ug/L	0.5	0.5	43	ND	all	
1,1,1,2-Tetrachloroethane	ug/L	0.5	1.1	1.1	ND	all	
1,1,2,2-Tetrachloroethane	ug/L	0.5	0.5	0.5	ND	all	
Tetrachloroethylene	ug/L	0.5	0.5	0.5	ND	all	
Toluene	ug/L	0.5	0.8	320	0.65	GW-11206675-012320-JC-006	MW4
1,1,1-Trichloroethane	ug/L	0.5	0.5	23	ND	all	
1,1,2-Trichloroethane	ug/L	0.5	0.5	0.5	ND	all	
Trichloroethylene	ug/L	0.5	0.5	0.5	ND	all	
Trichlorofluoromethane	ug/L	1.0	150	2000	ND	all	
Vinyl Chloride	ug/L	0.5	0.5	0.5	ND	all	
m/p-Xylene	ug/L	0.5	-	-	0.36	GW-11206675-012320-JC-009	MW12
o-Xylene	ug/L	0.5	-	-	0.13	GW-11206675-012320-JC-009	MW12
Xylenes, total	ug/L	0.5	72	72	0.49	GW-11206675-012320-JC-009	MW12
Hydrocarbons							
F1 PHCs (C6-C10)	ug/L	25	420	420	ND	all	
F2 PHCs (C10-C16)	ug/L	100	150	150	ND	all	
F3 PHCs (C16-C34)	ug/L	100	500	500	ND	all	
F4 PHCs (C34-C50)	ug/L	100	500	500	ND	all	
Semi-Volatiles							
Acenaphthene	ug/L	0.05	4.1	17	ND	all	
Acenaphthylene	ug/L	0.05	1	1	ND	all	
Anthracene	ug/L	0.01	0.1	1	ND	all	
Benzo[a]anthracene	ug/L	0.01	0.2	1.8	ND	all	
Benzo[a]pyrene	ug/L	0.01	0.01	0.81	0.02	GW-11206675-012320-JC-003	MW1
						GW-11206675-012320-JC-009	MW12
Benzo[b]fluoranthene	ug/L	0.05	0.1	0.75	0.15	GW-11206675-012320-JC-003	MW1
Benzo[g,h,i]perylene	ug/L	0.05	0.2	0.2	ND	all	
Benzo[k]fluoranthene	ug/L	0.05	0.1	0.4	ND	all	
Chrysene	ug/L	0.05	0.1	0.7	0.22	GW-11206675-012320-JC-003	MW1
Dibenzo[a,h]anthracene	ug/L	0.05	0.2	0.4	ND	all	
Fluoranthene	ug/L	0.01	0.4	44	0.73	GW-11206675-012320-JC-003	MW1
Fluorene	ug/L	0.05	120	290	ND	all	
Indeno[1,2,3-cd]pyrene	ug/L	0.05	0.2	0.2	ND	all	
Methylnaphthalene (1&2)	ug/L	0.10	2	1500	ND	all	
Naphthalene	ug/L	0.05	7	7	ND	all	
Phenanthrene	ug/L	0.05	0.1	380	0.75	GW-11206675-012320-JC-006	MW4
Pyrene	ug/L	0.01	0.2	5.7	1.1	GW-11206675-012320-JC-003	MW1
Notes							
BOLD		- Concentration meets or exceeds O.Reg. 153/04 Table 1 (non-agricultural) criteria					
BOLD		- Concentration meets or exceeds O.Reg. 153/04 Table 7 (shallow soil, non-potable, any land use, coarse grained soil) criteria					
MDL		- Method Detection Limit					
ND		- Concentration not detected above Method Detection Limit					

Appendices

Appendix A

Utility Clearances

UNDERGROUND SERVICE LOCATORS - PRIVATE UTILITY REPORT DATE: 12-16-2018
ONE-CALL SYSTEMS INC.
775 TAYLOR CREEK DRIVE
OTTAWA, ON, K4A 0Z9
PHONE (613) 226-8750
FAX (613) 226-8677

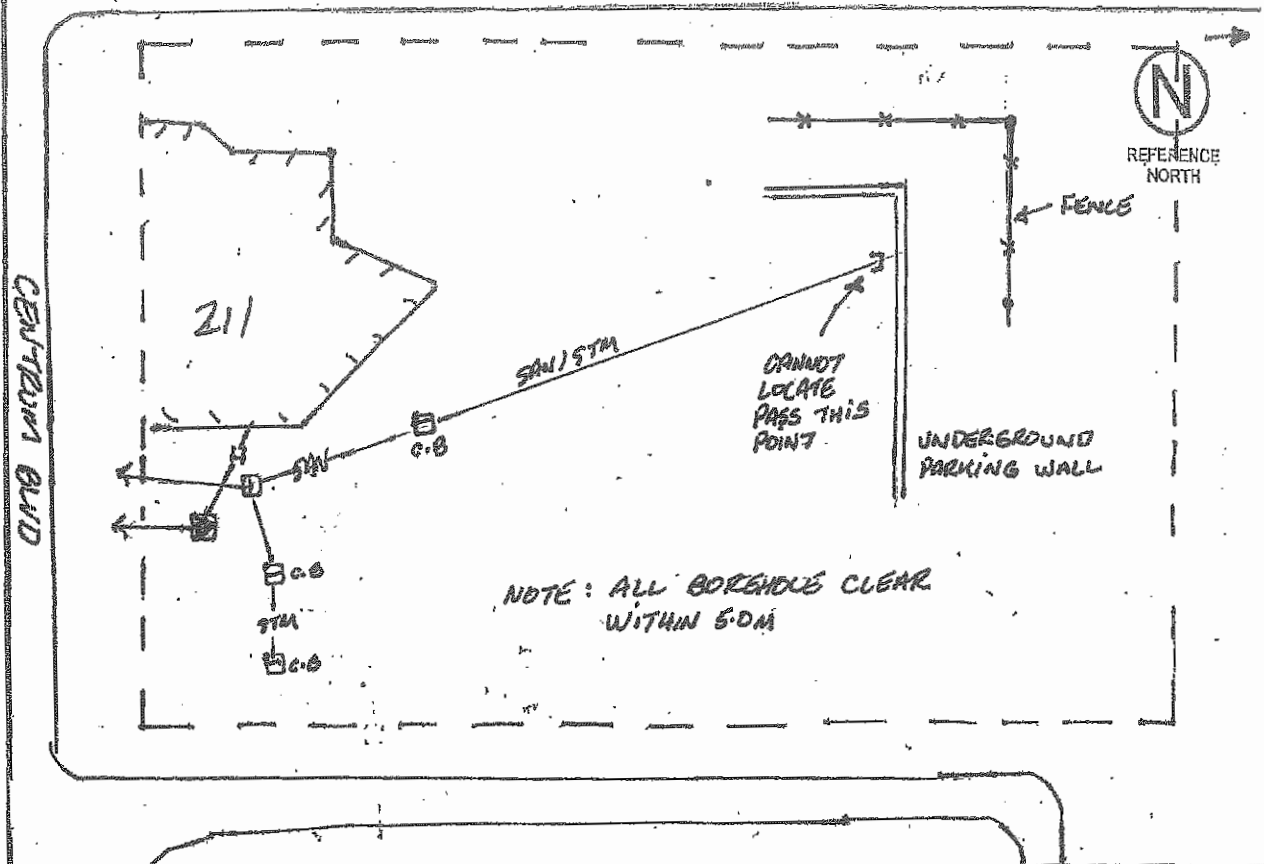
CUSTOMER: GMD REQUESTED BY: DEMETRIUS COOPER

LOCATION OF WORK: 211 CENTRUM BLVD LIMITS OF WORK: AS PER MAP

HYDRO	☒ H	CABLE T.V.	☐ TV	STEAM	☐ STEAM
GAS	☐ G	SANITARY	☒ SAN	ELECTRICAL	☐ E
BELL	☐ B	STORM	☒ ST	COMMUNICATIONS	☐ COM
UNIDENTIFIED CABLE	☐ UC	FIBER OPTIC	☐ FOC	OTHER:	
WATER	☐ W				

LOCATES ONLY APPLICABLE TO INFO ABOVE - LOCATES VOID AFTER 30 DAYS!

SKETCH NOT TO SCALE



- USL-1 as a Private utility locator, is not permitted to locate Publicly owned utilities. In some cases, Public utilities may be noted on a sketch, but are FOR REFERENCE ONLY, and under no circumstances shall be used for excavation purposes. It is the contractor's responsibility to verify any Public utilities noted on the USL-1 sketch by referring to the Public utility locate sheets for physical LOCATION AND ACCURACY. USL-1 DOES NOT ASSUME LIABILITY FOR PUBLIC LOCATE INACCURACIES.
- If the proposed work area is on Private property, it does NOT mean that all buried utilities are Private. Regardless of when you are digging, and what the proposed depth of excavation is, it is the law to notify Ontario One Call (or Info-Excavation in Quebec) to obtain Public utility locates.

COMMENTS: NO OTHER PRIVATE UTILITIES DETECTED

THIS SKETCH IS NOT A PUBLIC UTILITY LOCATE/DOCUMENT. PUBLIC UTILITIES SHOWN ARE FOR REFERENCE ONLY. REFER TO USL-1 DISCLAIMER - FORM 101. CONTRACTOR IS RESPONSIBLE TO ENSURE THEY HAVE PUBLIC UTILITY LOCATES BEFORE COMMENCING WORK.

LOCATORS NAME: CHRIS WHARTON SIGNATURE: [Signature]

LOCATE RECEIVED AND REVIEWED BY

Print Name

Signature

CAUTION: HAND DIG WITHIN 1.5 METERS OF MARKINGS

White = Client

Yellow = USL-1

Pink = USL-1

FORM 1002 - 10/01/08

USL-1 DISCLAIMER - FORM 101

- It is our Clients responsibility to fully read and understand this document, prior to any ground disturbance taking place. Should any questions or clarifications be required, contact USL-1 before commencing work
- Locate is VOID after 30 days from the date the locate was completed. Contact USL-1 for remarks and/or new ticket requests, with a minimum notice of 5 business days
- If the scope of work, locate area, or site information changes, contact USL-1 before continuing work. In certain instances, a new ticket request may be required
- Any work within 1.5 metres laterally of a marked utility, must be hand dug or daylighted. Utility depths vary, as does the accuracy of the locate equipment, and therefore depths are typically not provided and should not be used for excavation purposes. Depth of utilities should also be verified by hand digging or daylighting. The best information is provided at the time of the locate, however the accuracy of field markings can vary with regard to equipment accuracy and external interference
- If the paint markings or flags on site differ from that of the sketch provided, please contact USL-1 before commencing work. If possible, the issue will be clarified by USL-1 and/or a site meet may be requested with the appropriate parties
- The "Excavator" is responsible for keeping a current copy of the locates on site, with the operators and in/on the excavation equipment AT ALL TIMES
- It is the "Excavator/Contractor's" responsibility to read ALL locate sheets, both public and private, to ensure they understand what potential hazards or buried utilities exist in their work area
- Special purpose locates such as sewer sondeling, locate surveys, tunnel identification, conduit identification, ground fault detections, ground penetrating radar, well cap location, concrete scanning, or anything else that requires use of more than Radiodetection equipment, must be identified at the time of the original locate request. Should a USL-1 locator identify any special needs services during a normal Private utility locate, the client will be notified for the appropriate course of action
- Not all buried utilities can be traced. In many instances, water and sewer lines, irrigation systems, grounding cables, fibre optic cables, heating cables, protection cables, and communication cables may not be traceable. Typically, sewer lines will be painted and lined up directionally from manhole to manhole where possible. It may not be possible to detect bends in the sewer lines between manholes. If tracer wires have been buried with the utility, they will be used to locate the buried utility where possible. If a buried utility cannot be traced, it will be noted on the USL-1 report. USL-1 is not liable for damage to untraceable utilities
- Public utility locators have maps, plans and as-built diagrams for reference to work from. Private utility locators, for the most part, do not. USL-1 will attempt to locate any Private utilities on a site, using as-built plans provided to them. Building access is mandatory and must be arranged by our client. Any conduits or utilities noted entering or exiting a building will be traced if possible, as well as any other visible utilities observed on site. It is the responsibility of the contractor to provide any and all buried utility information and site contacts that they have. There is no guarantee that USL-1 can find all buried utilities if the property owner does not have records or information regarding their own buried utilities
- USL-1 cannot be held liable for damage to Private water and/or sewer laterals unless building access is granted, and the utility is locatable
- Thick snow and ice, frozen manhole lids, live traffic, parked cars, construction debris and activities etc, are all factors that can interfere with USL-1's ability to perform Private utility locates. USL-1 cannot guaranty location of all buried utilities when such factors impede the locate process. It is the contractor's responsibility to ensure that the work areas are safe and accessible for locates, prior to USL-1's arrival to site
- USL-1 as a Private utility locator, is not permitted to locate Publicly owned utilities. In some cases, Public utilities may be noted on a sketch, but are FOR REFERENCE ONLY, and under no circumstances shall be used for excavation purposes. It is the contractor's responsibility to verify any Public utilities noted on the USL-1 sketch by referring to the Public utility locate sheets for physical LOCATION AND ACCURACY. USL-1 DOES NOT ASSUME LIABILITY FOR PUBLIC LOCATE INNACCURACIES
- If the proposed work area is on Private property, it does NOT mean that all buried utilities are Private. Regardless of where you are digging, and what the proposed depth of excavation is, it is the law to notify Ontario One Call (or Info-Excavation in Quebec) to obtain Public utility locates
- NCC PROPERTY - assuming the contractor has been issued a Land Access Permit from the NCC, it is typically indicated within the permit that it is the contractor's responsibility to contact NCC for utility locates of their buried utilities



Location of underground infrastructures

Primary Locate Sheet

UNION GAS EMERGENCY #

1-877-969-0999

Fax: 613-723-9277

Toll free: 1-800-371-8866

Email:

Request #
2019491095
NORMAL

Utilities Located: ☒ Bell ☒ Gas ☐ Hydro Ottawa ☒ Hydro One ☐ Videotron ☐ Lakefront Utilities ☐ Ellexicon Energy		Revised Excavation Date N/A mm/dd/yyyy	Excavation Date 12/09/2019 00:00:00 mm/dd/yyyy	Status STANDARD
Requested by: DEMETRIUS COOPER	Company: GHD	Phone: (613)-875-9532 ext.	Fax/email: N/A	Homeowner ☐ Contractor ☒ Project ☐

Appt Date: N/A mm/dd/yyyy	Received Date: 12/02/2019 mm/dd/yyyy	Locate Address: 211, CENTRUM BLVD	
		1st Inters.: BRISBOIS CRES	2nd Inters.: PLACE D'ORLEANS DR
Type of work: TEST PITS			City: OTTAWA

Caller's Remarks:
 GEOTECHNICAL INVESTIGATION COMPRISING OF DRILLING OF BOREHOLES USING DRILLING RIG AND TEST PITS USING AN EXCAVATOR.
 MACH. DIG
 CORLOT=J BORES AND TEST PITS DUG VERTICALLY AND SPREAD WITHIN LOT BOUNDARIES (AS PER ATTACHED MAP). CURRENTLY NO ONE ON SITE.
 CONTACT DEMETRIUS IF REQUIRED AS PER ABOVE CONTACT DETAILS. BORE AND TEST PIT LOCATIONS CURRENTLY UNMARKED.
 -75.512794, 45.480108, NB_SEGMENTS::1, NO_PLAN::613 837, BC0E01, OTWATS01, ROGOTT01, H40E01, OTWASL01, OTWAWS01, ENOE01

Bell Mark Clear 1	Enbridge Gas Mark Clear 1	Hydro Ottawa Mark Clear N/A	Street Lighting Mark Clear N/A	Lakefront Mark Clear N/A	Hydro One Mark Clear 1	Veridian Mark Clear N/A	Union Gas Mark Clear N/A	Videotron Mark Clear N/A
---------------------------	-----------------------------------	--	---	---	--------------------------------	--	---	---

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE.

Records Reference: ☒ Map ☐ Network X # PMOTT01178 ☐ Byers ☒ Datapak: ☒ LAC Multiviewer Field Notes: GL231,6N0362-5 Other: 6N5961-6 DPT Remarks: N/A	Third Party Notification N/A N/A
---	--

PLEASE NOTE: MEASUREMENTS TAKEN WITH WHEEL. Apply Sticker Here if Required

Excavator shall notify & receive a clearance from Utility prior to excavation for the following:

Telecon ☐ High Priority Cable ☐ Central Office Vicinity

Method of Field Marking: ☒ Paint ☐ Stakes ☒ Flags ☐ Offset Flags ☐ Chalk (Telecom=Orange, Gas=Yellow, Hydro Ott.=Red)

Caution: Locates VOID after 30 days. Enbridge Gas/Hydro One/Hydro Ottawa valid for 60 days. See disclaimer for facility owner guidelines.

Caution: Any changes to location or nature of work require new locate. The Excavator must not work outside the Located Area without a new locate. Privately owned services within the located area have not been marked - check with service/property owner. For all Locate requests including remarks contact: Ontario One Call at 1-800-400-2255 or www.on1call.com.

Locator Name: GAUTHIER DAN	Start Time: 10:30	☐ Mark & Fax ☐ Left on Site ☒ Emailed
ID #: 15845	End Time: 14:30	Print: N/A
Date: 12/05/2019	Total Hours: 6:00	Signature: N/A

A copy of this Primary Locate Sheet and Auxiliary Locate Sheet(s) must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

Promark
telecon

Location of underground infrastructure

Auxiliary Locate Sheet

 Union Gas Emergency #
 1-877-969-0999

 Fax:
 613-723-9277

 Toll free:
 1-800-371-8866

Email

 Utilities Located: ☐ Bell ☒ Gas ☐ HydroOttawa ☐ Hydro One
☐ Videotron ☐ Peel Fibre ☐ Elxicon Energy

 Date Located:
 mm/dd/yyyy 12/05/2019

 Request #
 2019491095

 Number of Services marked: (Specify building/house numbers) **N/A**
LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: W.FL 211 CENTRUM BLVD

TO: 7.0M W. W.AE BRISEBOIS CRES

FROM: N.FL 211 CENTRUM BLVD

TO: TRANSFORMER 17342

Legend

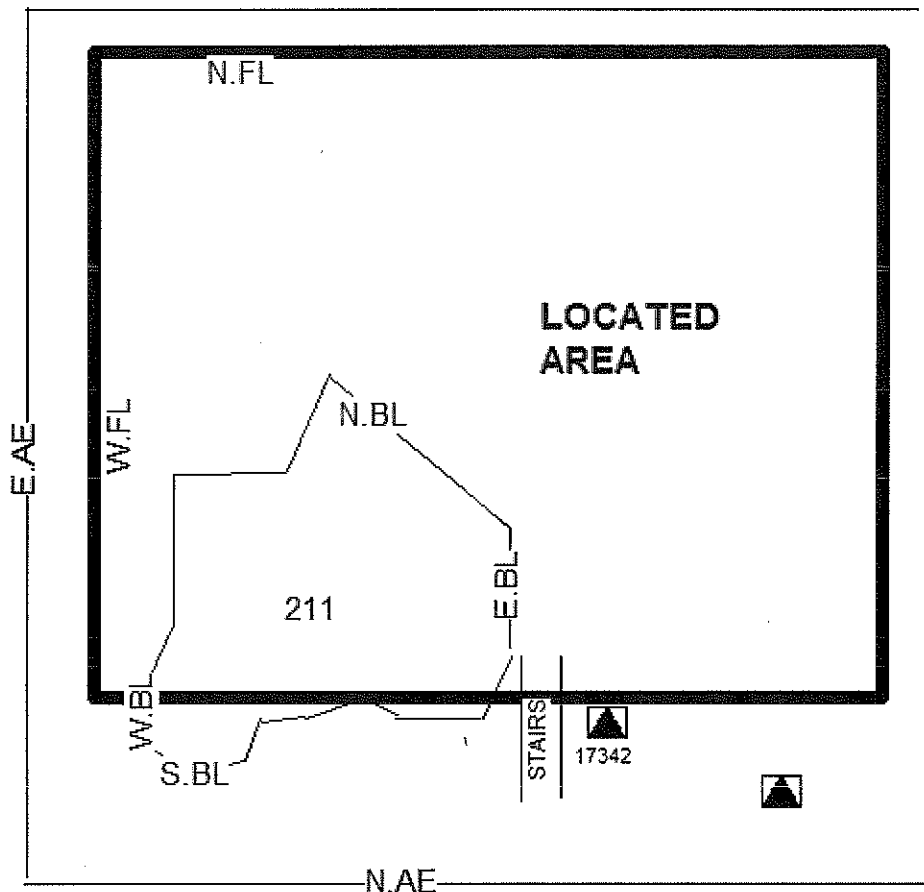
 Building Line — BL—
 Fence Line — FL—
 Face of Curb — FC—
 Road Edge — RE—
 WATER STAND PIPE = ●
 Hydro Primary — HP—
 Hydro Secondary — HS—
 Driveway — DW—
 Catch Basin ☐ CB
 Sidewalk ☐ SW
 Demarcation ☐ DM
 Railway ☐
 Pole ☐ O
 Flush to Grade Pedestal ☐
 Pedestal ☐ X
 Buried Cable — B—
 Conduit — C—
 Buried Service Wire — BSW—
 Manhole ☐ MH
 Fibre Optic Cable — FO—
 Bell Hydro Service — BH—
 Gas Main — GM—
 Gas Service — GS—
 Gas Valve ☐
 Hydrant ☐
 Transformer ☐
 Hydro — H—
 Hydro Pole X
 Street Light Cable — SL—
 Street Light ☐
 North N.
 South S.
 East E.
 West W.

CAUTION: Hand dig within 1M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and **MUST** be verified by hand digging or vacuum excavation.

LOCATED AREA HAS BEEN ALTERED AS PER: N/A



PLACE D'ORLEANS DR



BRISEBOIS CRES

CENTRUM BLVD

**NO BURIED ENBRIDGE GAS NETWORK
 IN THE LOCATED AREA**

 ASPHALT EDGE AE
 SIDEWALK EDGE SE

THIS FORM VALID ONLY WITH Primary Locate Form. This sketch is not to scale.

Any privately owned services within the located area have not been marked- check with service/property owner.

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

Promark
telecon

Location of underground infrastructure

Auxiliary Locate Sheet

Union Gas Emergency #
1-877-969-0998

Fax:
613-723-9277

Toll free:
1-800-371-8866

Email

Utilities ☒ Bell ☐ Gas ☐ Hydro Ottawa ☐ Hydro One
Located: ☐ Videotron ☐ Peel Fibre ☐ Ellexicon Energy

Date Located:
mm/dd/yyyy 12/05/2019

Request #
2019491095

Number of Services marked: (Specify building/house numbers) **N/A**

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: W.FL 211 CENTRUM BLVD

TO: 7.0M W. W.AE BRISEBOIS CRES

FROM: N.FL 211 CENTRUM BLVD

TO: TRANSFORMER 17342

Legend

Building Line — BL—
Fence Line — FL—
Face of Curb — FC—
Road Edge — RE—

WATER STAND PIPE — ●—

Hydro Primary — HP—

Hydro Secondary — HS—

Driveway — DW—

Catch Basin ☐ CB

Sidewalk ☐ SW

Demarcation ☐ DM

Railway ☐

Pole ☐ O

Flush to Grade ☐

Pedestal ☐

Buried Cable ☐ B—

Conduit ☐ C—

Buried Service Wire ☐ BSW—

Manhole ☐ MH

Fibre Optic ☐

Cable ☐ FO—

Bell Hydro Service — BH—

Gas Main — GM—

Gas Service — GS—

Gas Valve ☐

Hydrant ☐

Transformer ☐

Hydro — H—

Hydro Pole X

Street Light Cable — SL—

Street Light ☐

North N.

South S.

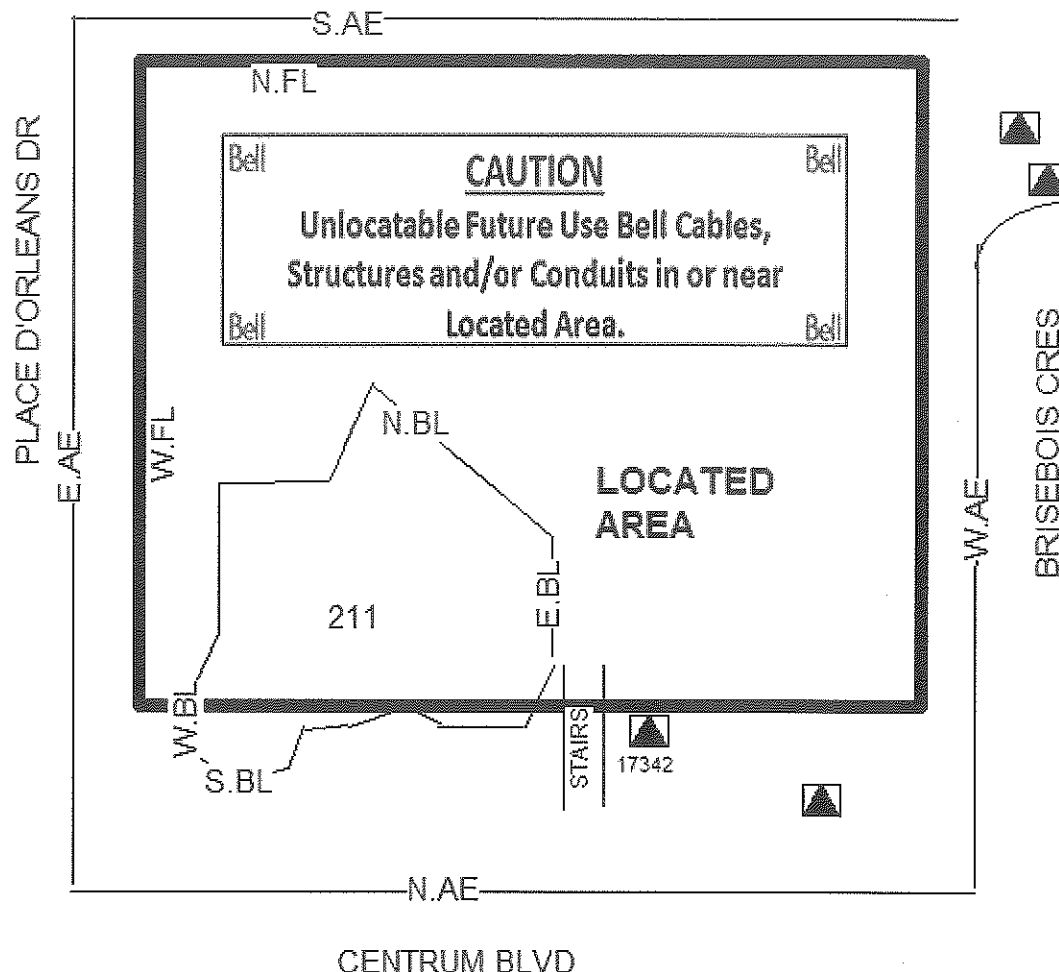
East E.

West W.

ASPHALT EDGE AE

SIDEWALK EDGE SE

CAUTION: Hand dig within 1 M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and **MUST** be verified by hand digging or vacuum excavation. **LOCATED AREA HAS BEEN ALTERED AS PER: N/A**



**NO BURIED ENBRIDGE GAS NETWORK
IN THE LOCATED AREA**

THIS FORM VALID ONLY WITH Primary Locate Form. This sketch is not to scale.

Any privately owned services within the located area have not been marked- check with service/property owner.

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

Promark
telecon

Location of underground infrastructure

Auxiliary Locate Sheet

 Union Gas Emergency #
 1-877-969-0999

 Fax:
 613-723-9277

 Toll free:
 1-800-371-8866

Email

 Utilities Located: ☒ Bell ☐ Gas ☐ HydroOttawa ☐ Hydro One
☐ Videotron ☐ Peel Fibre ☐ Ellexicon Energy

 Data Located:
 mm/dd/yyyy 12/05/2019

 Request #
 2019491095

Number of Services marked: (Specify building/house numbers) (1)211 CENTRUM BLVD

LOCATED AREA: EXCAVATOR SHALL NOT WORK OUTSIDE THE LOCATED AREA WITHOUT OBTAINING ANOTHER LOCATE

FROM: W.FL 211 CENTRUM BLVD

TO: 7.0M W. W.AE BRISEBOIS CRES

FROM: N.FL 211 CENTRUM BLVD

TO: TRANSFORMER 17342

Legend

 Building Line — BL—
 Fence Line — FL—
 Face of Curb — FC—
 Road Edge — RE—

WATER STAND PIPE = ●

Hydro Primary —HP—

Hydro Secondary —HS—

Driveway —DW—

Catch Basin Sidewalk Demarcation Railway Pole Flush to Grade Pedestal Pedestal Buried Cable —B—
Conduit —C—

Buried Service Wire —BSW—

Manhole 

Fibre Optic Cable —FO—

Bell Hydro Service —BH—

Gas Main —GM—

Gas Service —GS—

Gas Valve Hydrant Transformer 

Hydro —H—

Hydro Pole X

Street Light Cable —SL—

Street Light 

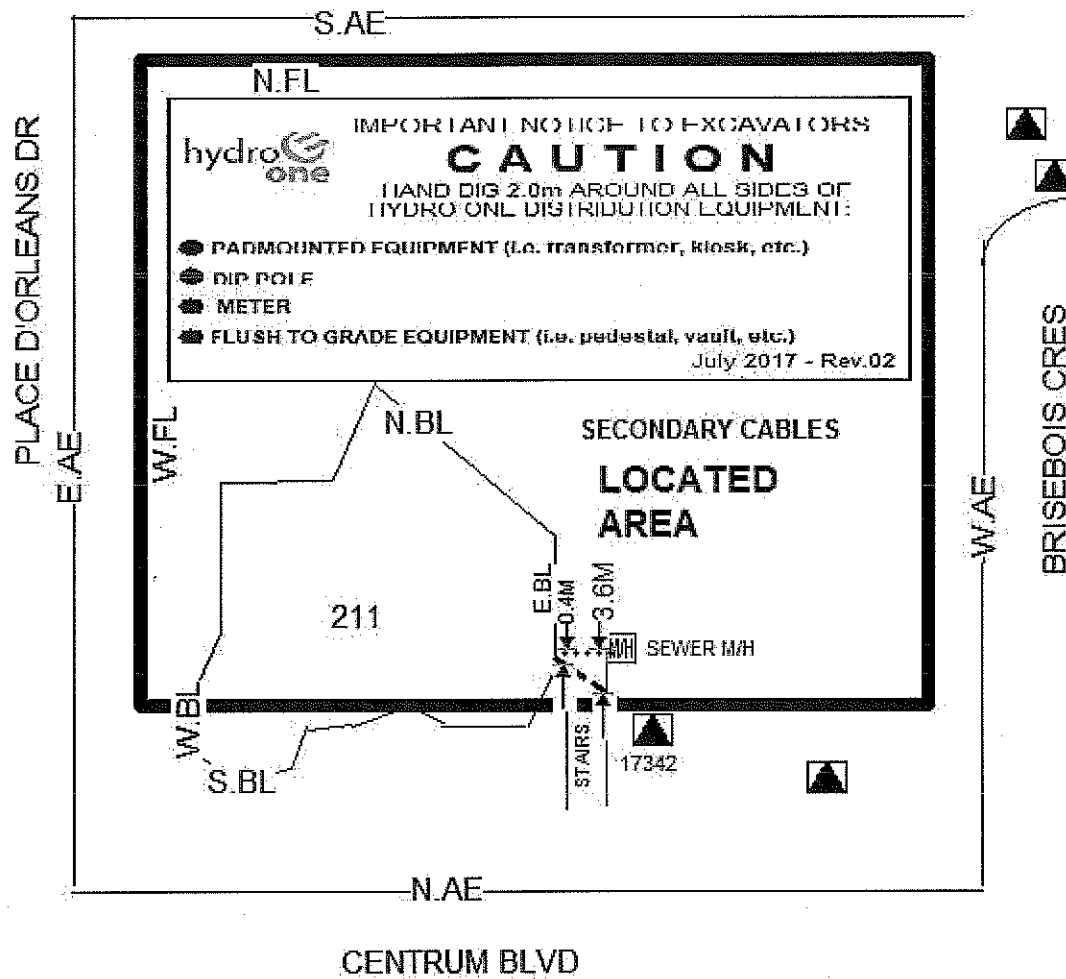
North N.

South S.

East E.

West W.

CAUTION: Hand dig within 1 M as measured horizontally from the field markings to avoid damaging the underground utilities. If you damage the plant, you may be held liable. If you damage underground plant, contact the facility owner immediately. Depth varies and **MUST** be verified by hand digging or vacuum excavation. LOCATED AREA HAS BEEN ALTERED AS PER: **N/A**



ASPHALT EDGE AE

SIDEWALK EDGE SE

THIS FORM VALID ONLY WITH Primary Locate Form. This sketch is not to scale.

Any privately owned services within the located area have not been marked- check with service/property owner.

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. If sketch and markings do not coincide, the Excavator must obtain a new locate.

2019491095

Queensway

174

Site Location

Google

Map data ©2019 Google

2019491095

Queensway

174

Site Location

Google

Map data ©2019 Google



February 9 2015

To all Excavators:

Bell locates are now valid for the life of the excavation project and will not automatically be relocated every 60 days.

Please note the following for the above to apply:

- a) Construction within the located area begins within 60 days of the "locate completed" date on the original ticket.
- b) The construction company named on the locate remains active on the site.

Bell expects excavators will protect and preserve the paint marks put down on the original locate ticket. If markings are removed due to weather or excavation work the excavator is expected to recreate the markings based on the tie-in measurements provided on the original locate ticket.

If an excavator would like their markings freshened up they can contact Promark (the Bell Canada Locate Service Provider in this area) directly to arrange for them to place fresh markings on the ground however this will be at the excavators expense. Promark can be reached at 613-723-9888.

The locate will be considered officially expired one day after the final day of construction.

Thank you.

Bell Canada

ENBRIDGE GAS INC.; operating as Enbridge Gas Distribution

Thank you for calling for a locate prior to starting your project.

Please note Enbridge Gas Distribution has changed the locate validity period and this completed locate is valid for a period of **60 days** from the completion date on the Primary Locate Sheet.

You must adhere to the following:

- You must follow all STOP letters associated with your locate if provided in your locate package.
- You should always review the Primary and all the Auxiliary Sheets of your locate package and understand the validity period for all utilities / infrastructure owners.
- It is the responsibility of Excavators to protect and preserve the original yellow paint markings. White paint can be used to preserve/maintain the markings but should be placed beside or at the top / bottom of the original markings ensuring not to replace the yellow paint.
- For your locate to be valid beyond 30 days you must maintain custody of the work site during all business days until expiry.

When winter conditions exist, such as snow, pink paint and stakes or flags can be used.

Please be aware new gas services or mains can be installed after this locate was completed. Newly buried gas plant flags will be installed as visual identifier if this occurs.



If any discrepancies are identified with the locates, please contact our Locate Service Provider indicated on your completed locate.

Enbridge Gas Distribution's Third Party Requirements in the Vicinity of Natural Gas Facilities must always be followed.

A copy of this document can be found at:

<https://www.enbridgegas.com/~media/Extranet-Pages/Safety/Before-you-dig/Third-Party-Requirements-in-the-Vicinity-of-Natural-Gas-Facilities>

Thank you



MESSAGE REGARDING REQUESTED LOCATE

Dear Excavator,

Hydro One has completed your locate request based on the information you provided to Ontario One Call. The underground facility locate on our **Distribution system** is valid for **60 days** from the date shown on the Underground Cable Stakeout Report attached. The 60 day validity does not include Transmission locate requests. Please be aware new underground facilities can be installed any time after this locate was completed. It is your responsibility to contact Ontario One Call for a new locate if any changes are known or suspected or for a Relocate if excavation continues beyond 60 days.

Hydro One expects excavators to protect and preserve the paint marks and flags placed at the time of the original locate ticket. If markings are removed due to weather or excavation work, the excavator is expected to recreate the markings based on the tie-in measurements provided on the original locate ticket. However, if an excavator would like Hydro One to refresh their markings, please contact Ontario One Call at 1-800-400-2255 to request a Remark.

WARNINGS AND DISCLAIMERS:

Hand dig cautiously 1 meter around Hydro One's Red Paint Markings as indicated on the Underground Cable Stakeout Report. It is understood that the attached information has been provided from our records, and represents our knowledge of the approximate location of **Hydro One** plant only: the contractor must request stakeouts from other utilities to establish the location of their plant. The company or contractor must exercise extreme caution where mechanical equipment is used in the vicinity of the underground cable plant and where necessary to locate by hand its actual position. Liability for damages rests with the company or contractor.

Thank you,
Hydro One

DISCLAIMER

Warning!

The Excavator must have a copy of this locate on the job site during excavation.

Located Area: The Excavator must not work outside the area indicated by the Located Area in the Diagram without a further locate by the Company

Locate the plant: The plant location information provided is the best we have available but constitutes only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Mechanical equipment must not be used within one metre of the estimated location of the plant.

Expose the plant: Once the plant has been located by hand digging, it must be exposed along its length adjacent to or in the immediate vicinity of the proposed excavation. For this purpose, mechanical equipment must not be used within 0.5 metres of the plant.

Digging around the exposed plant: When the plant has been exposed, any further excavation within 0.3 metres, must only be done by hand digging and not with mechanical equipment.

Support Requirements: If the underground plant is exposed over a distance of more than 1.25 metres, the Facility Owner must be notified. Underground plant must be supported at all times.

O. Reg. 210/01 Oil and Gas Pipeline systems EXCERPTS

9. (1) No person shall dig, bore, trench, grade, excavate or break ground with mechanical equipment or explosives without first ascertaining the location of any pipeline that may be interfered with.

10. No person shall interfere with or damage any pipeline without authority to do so.

Technical Standards & Safety Act 2000 EXCERPT

37 (1) Every person who contravenes or fails to comply with any provision of this act or the regulations; etc... is guilty of an offense and on conviction is liable to a fine of not more than \$50,000 or to imprisonment for a term of not more than one year, or to both.

Caution: The markings may disappear or be misplaced. Should sketch and markings not coincide, Excavator must obtain a new locate. This is based on information given at the time. Any changes to location or nature of work require a new locate. The Excavator must not work outside the indicated Located Area without a further locate. Privately owned services within the located area have not been marked - check with service/property owner.

Locate is VOID after 30 days.

For remarks contact Ontario One Call 1-800-400-2255.
or www.on1call.com



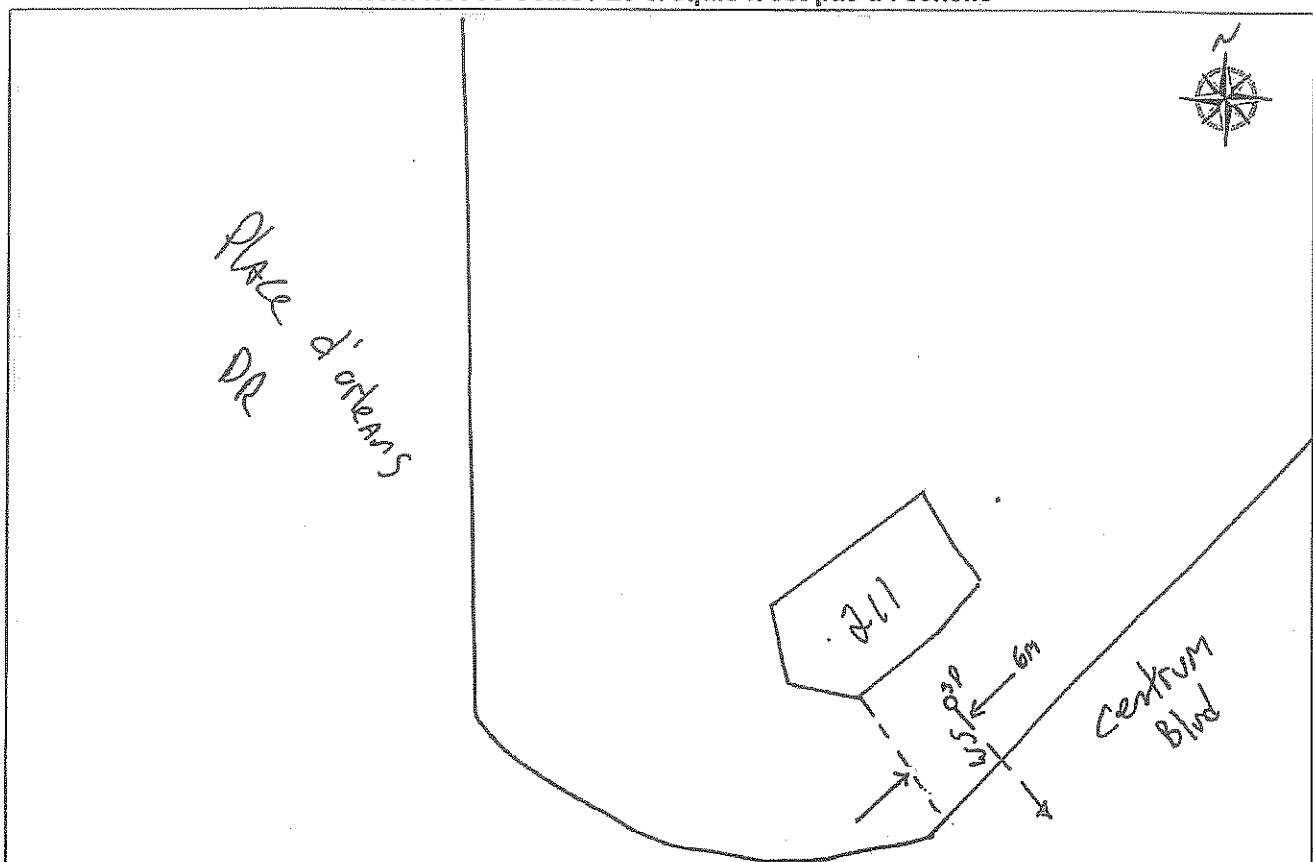
City of Ottawa Locate Report – Water and Sewer Utilities
Rapport de localisation des conduites d'eau et d'égout d'Ottawa



For more information / Pour de plus amples renseignements : 3-1-1 or/ou (613) 580-2424, ext. (poste) 22336.

Date : Jan 3 2019	Work Order # / No d'ordre de travail : SR# 1331844
Location of Work / Lieu de travail : 211 Centrum Blvd	ON1CALL # / No d'appel ON1 : 2020011754
Type of Work / Type de travail : Boreholes	☒ ArcView attached Plan ArcView ci-joint
Contractor / Entrepreneur : GHD	Fax / Télécopieur :

Sketch Not To Scale / Le croquis n'est pas à l'échelle



Contractor signature
Signature de l'entrepreneur

T. Wyke
Locator (please print)
Marqueurs [en lettres moulées]

Method of marking / Méthode de marquage

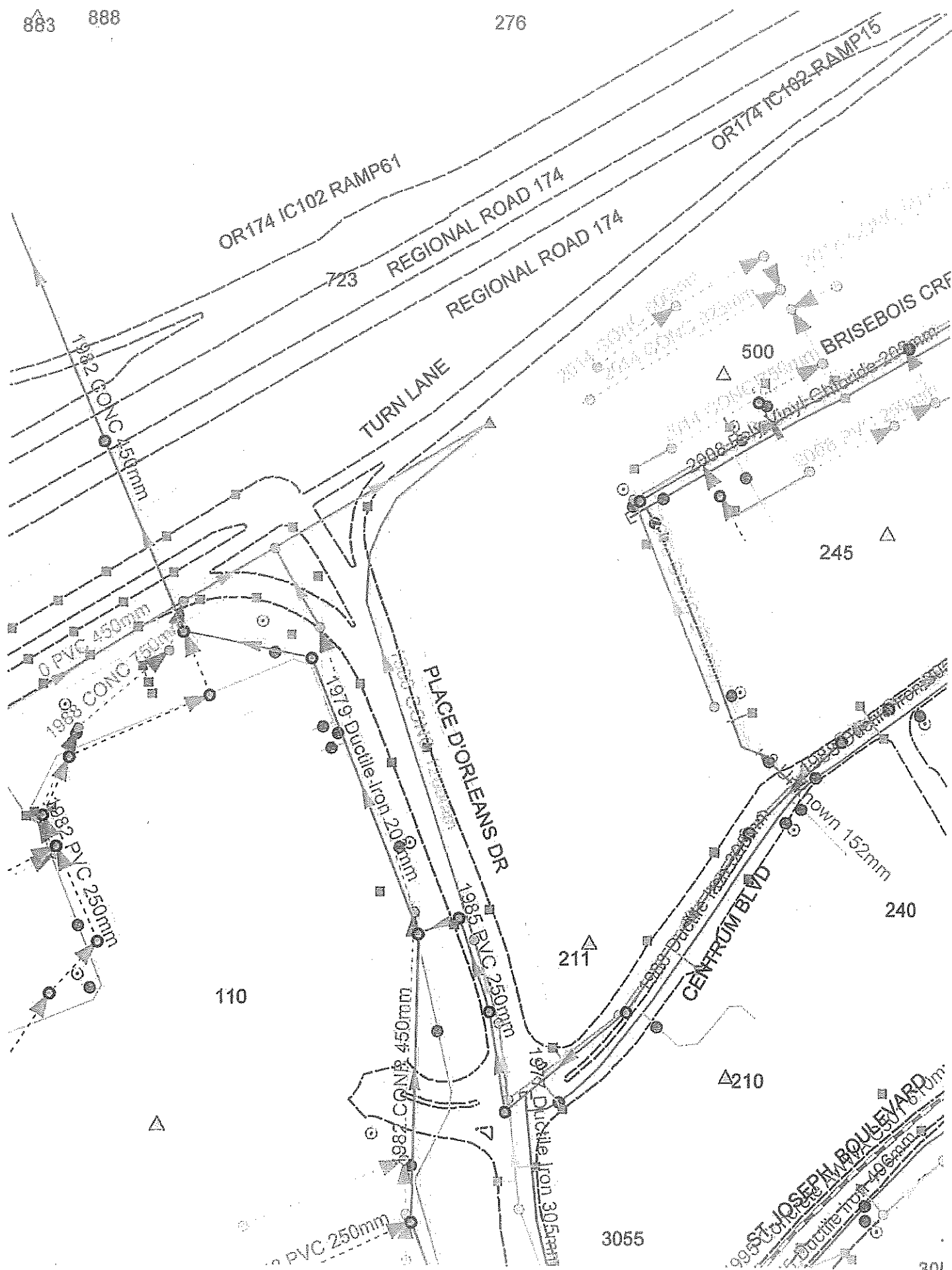
☐ Flags / Drapeaux ☐ Paint / Peinture ☐ Other (specify) / Autre [précisez] :

Remarks / Commentaires : Unlocatable Room str in Locate Area
See Attached Arcview

Office copy : White
Copie du bureau : Blanc

Contractor copy: Yellow
Copie de l'entrepreneur : Jaune

Void after 60 days.
Périmé après 60 jours.





DISCLAIMER

The excavator must have a copy of this locate on the job site during excavation.

Locate area: The excavator must not work outside the area indicated in the location of work or located area in the diagram without an updated locate. Stakes or markings may disappear or be displaced. If any delays occur in acting on the stakesout information, or if markings become unclear, a new locate must be obtained.

Locating the plant: The plant location information provided is only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Warning: Do not use mechanical equipment within one (1) metre of the estimated location of the water or sewer plant. If the plant is larger than 406mm, mechanical equipment must not be used within three (3) meters.

Digging around exposed plants: Must do any further excavation within 0.3 metres of an exposed water or sewer plant by hand.

Contractors are to perform all work in accordance with applicable City of Ottawa By-laws and any applicable federal and provincial legislation or regulations, including but not limited to the *Public Utilities Act, R.S.O. 1990, c. P.52, s. 56(1)*; *Ontario Regulation 210/01 under the Technical Safety Standards Act, 2000, S.O. 2000 c. 16*; *Ontario Regulation 213/91 under the Occupational Health and Safety Act, R.S.O. 1990, c. O.1*.

AVIS DE NON-RESPONSABILITÉ

L'opérateur de l'excavatrice doit avoir en sa possession ce rapport de localisation pendant l'excavation.

Zone de localisation : l'opérateur de l'excavatrice ne doit pas creuser en dehors de la zone indiquée sur l'ordre de travail ni à l'extérieur de la zone indiquée sur le diagramme, à moins d'avoir en sa possession un rapport de localisation actualisé. Les piquets ou les marques peuvent disparaître ou être déplacés. S'il y a un retard à intervenir sur la base des données de surveillance ou si le marquage devient imprécis, il faut obtenir un nouveau rapport de localisation.

Déterminer l'emplacement des conduites : les renseignements sur l'emplacement des conduites sont approximatifs. Pour déterminer l'emplacement et la profondeur, on doit creuser manuellement avant d'utiliser une excavatrice.

Avertissement : n'utilisez pas d'équipement mécanique [excavatrice] à moins d'un [1] mètre de l'emplacement supposé de la conduite d'eau ou d'égout. Si la conduite compte plus de 406 mm de diamètre, aucun équipement mécanique ne doit être utilisé à moins [3] de trois mètres de celle-ci.

Creuser autour des conduites exposées : toute excavation à moins de 0,3 m d'une conduite d'eau ou d'égout doit se faire manuellement.

Les entrepreneurs doivent exécuter tous les travaux conformément aux règlements de la Ville d'Ottawa et aux lois et règlements fédéraux ou provinciaux applicables, y compris, mais sans s'y limiter, la *Loi sur les services publics, L.R.O. 1990, chap. P.52, art. 56[1]*; le *Règlement 210/01 de l'Ontario en vertu de la Loi de 2000 sur les normes techniques et la sécurité, L.O. 2000, chap. 16*; et le *Règlement 213/91 de l'Ontario en vertu de la Loi sur la santé et la sécurité au travail L.R.O. 1990, chap. O.1*.



ROGERS LOCATE SERVICE

TICKET #: 2020011754

8200 Dixie Rd
East Bldg., 2nd Floor
Brampton, Ontario, L6T 0C1
Tel.: (855) 232-0342
Fax.: (905) 780-7379

LOCATE CONFIRMATION

LOCATOR: CLI Phone: 905-479-5674

CONFIRMATION DATE: 2020-01-03 1:57:15AM Station Code: ROGOTT01

Requested by Company: GHD

Contact Name: Demetrius Cooper

Ph: 6138759532

Fax:

Dig Site Location and Details

Municipality: OTTAWA

Call Date: 2020-01-02 3:14:50PM

Start Date: 2020-01-09 12:00:00

Address: 211 CENTRUM BLVD

Intersection: BRISEBOIS CRES

Type of Work: BORE HOLES

Remarks (Additional Dig Information):

CORLOT=2 Works comprise vertical geotech boreholes max diameter 0.3m, to depths up to 15 m scattered across site as per attached figure(labelled as BH and NP). No crew on site. Contact Demetrius Cooper(6138759532) site meet not required. Site not pre

Important Comments to Excavator:

YOU WILL BE LIABLE FOR ANY DAMAGES TO ROGERS FACILITIES IF EXCAVATING/ DIGGING PRIOR TO RECEIVING A COMPLETED LOCATE OR CLEARANCE NUMBER FROM ROGERS OR IT'S AGENTS.

PLEASE CALL ROGERS LOCATE SERVICES AT (800) 738-7893. IF THERE ARE ANY CHANGES TO THIS LOCATE REQUEST. LOCATES AND CLEARANCES ARE VALID FOR 60 DAYS ONLY.

CAUTION: Stakes and or markings may disappear or be displaced. Should the sketches and markings not coincide, a new stake out must be obtained.

**FOR ALL CUT CABLES CALL
1-800-265-9501**

Ph: (905) 479-5674 Email: ontario@canadianlocators.com

Contractor / Excavator : GHD			Contact Name : Demetrius Cooper		
Tel : 613-875-5532	Alt. Phone : 613-875-5532	Email : demetrius.cooper@ghd.com			
Received Date : Jan 3 2020	Excavation Date : Jan 9 2020	Revised Excavation Date :	Type of Work : BORE HOLES		
Locate Address : 211 CENTRUM BLVD			City / Municipality : OTTAWA, ONTARIO		
Nearest Intersection : BRISBOIS CRES & PLACE DORLEANS DR					
Method of Field Marking : ☒ Paint ☐ Stakes ☐ Flags					

Callers Remarks (Additional Info) :
CORLOT-2 Works comprise vertical geotech boreholes max diameter 0.3m, to depths up to 15 m scattered across site as per attached figure (labelled as BH and NP). No crew on site. Contact Demetrius Cooper (6138755532) site meet not required. Site not pre//Site has been previously located however borehole locations have been adjusted.

Utilities Marked : ☐ Coaxial Plant ☒ Fibre Optics Plant					This locate has multiple work areas which are greater than 100 m apart : ☒ Yes ☐ No
Total Length : m	Total Length : 160 m				

Field sketch and Located Area shown on auxiliary locate sheet(s)

This locate is for ROGERS plant / infrastructure ONLY!

Apply sticker here if required

CAUTION : Locate is VOID after 60 days !

CAUTION : Hand dig within one (1) meter or 3.28 feet of markings. The Located Area defined on the Auxiliary Locate Sheet(s) contains all known ROGERS infrastructure. Any changes to excavation area or nature of work requires a new locate.

For all cut cable, please call :

1-800-265-9501

Locator's Comments :
ROGERS FIBER MARKED WITH ORANGE PAINT

Locator's Name : (Please Print)
Dan Morosnick

Date : Jan 10 2020	Start Time : 3:00 PM	End Time : 3:45 PM
------------------------------	--------------------------------	------------------------------

A copy of this Primary Locate Sheet and Auxiliary Locate Sheet(s) must be on site and in the hands of the machine operator during work operations. Should sketch and markings not coincide, a new locate MUST be obtained.

Ph: (905) 479-5674 Email: ontario@canadianlocators.com

Utilities Marked :

☐ Coaxial Plant m ☒ Fibre Optics Plant 160 m

Number of Services Marked : (specify building/house numbers)

LOCATED AREA CONTAINS ALL KNOWN ROGERS INFRASTRUCTURE

FROM :
E RE PLACE D ORLEANS

TO :
W RE BRISEBOIS

FROM :
N RE CENTRUM

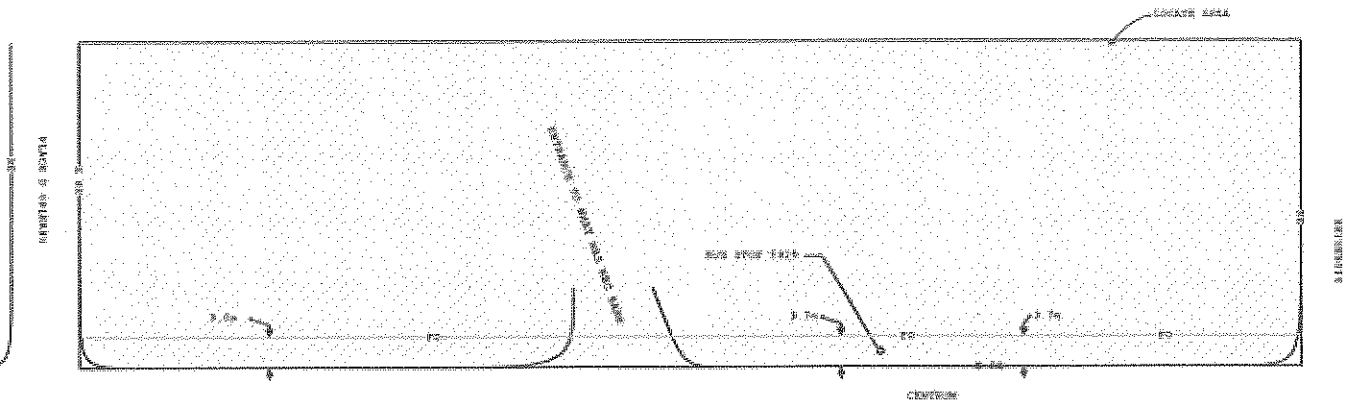
TO :
210.0M N OF N RE CENTRUM

Hand dig within 1 meter or 3.28 feet as measured horizontally from the field markings to avoid damaging the underground utilities.

If you damage the utilities, you may be held liable. For all cut cable, please call: 1-800-265-9501 immediately!

Depth of cable plant varies and **MUST** be determined by hand digging or vacuum excavation.

LOCATED AREA ALTERED AS PER :



Sketch not drawn to scale

LEGEND :

Fibre Optic — FO —
Cable / T.V. — CATV —
Conduit — C —
Railway —  —
Work Area —  —

Road Edge — RE —
Bldg Line — BL —
North Direction —  —
Sidewalk — SW —
Measurement —  —

Property Line — PL —
Lot Line — LL —
Face of Curb — FC —
Driveway — DW —
Fence Line — FL —

Tree —  —
Pedestal —  —
Pole —  —
Valve —  —
Vault —  —

Transformer —  —
Manhole —  —
Catch Basin —  —
North — N —
South — S —

Streetlight —  —
Hand Hole —  —
Hydrant —  —
East — E —
West — W —

A copy of this Auxiliary Locate Sheet(s) and the Primary Locate Sheet must be on site and in the hands of the machine operator during work operations. Should sketch and markings not coincide, a new locate **MUST** be obtained.

Joe Drader

From: Sigouin, Francois <Francois.Sigouin@ottawa.ca>
Sent: Thursday, January 2, 2020 3:42 PM
To: Demetrius Cooper
Subject: 2020011754

2020011754

This Ontario One Ticket is ****Clear** of Underground City of Ottawa / Ville d'Ottawa Traffic Lights Infrastructure in Proposed Work Area **

"Locates are Valide for 60 Days"

Ce billet Ontario One est **** libre** de toute infrastructure souterraine de la ville d'Ottawa pour les feux de signalisation dans la zone de travail proposée **

"Les habitants sont valides pendant 60 jours"

Frank Sigouin
City of Ottawa
Traffic U/G Utilities Investigator
Cell: (613)229-0580
Email: francois.sigouin@ottawa.ca
Mon-Fri 7h30 to 16h00

'

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'

This e-mail has been scanned for viruses

NOTICE OF INTENT TO EXCAVATE

Header Code: STANDARD
Request Type: NORMAL

Ticket No: 2020011754

Original Call Date: 01/02/2020 3:27:49 PM

Work To Begin Date: 01/09/2020

Company: GHD

Contact Name: DEMETRIUS COOPER

Pager:

Contact Phone: (613)-875-9532 ext.

Cell: (613)-875-9532 ext.

Fax:

Alternate Contact: RYAN VANDEN TILLAART

Alt. Phone: (613)-316-8220 ext.

Place: OTTAWA

Street: 211 CENTRUM BLVD

Nearest Intersecting Street: BRISEBOIS CRES

Second Intersecting Street: PLACE DORLEANS DR

Subdivision: OTTAWA

Additional Dig Information:

SITE HAS BEEN PREVIOUSLY LOCATED HOWEVER BOREHOLE LOCATIONS HAVE BEEN ADJUSTED. CORLOT=2 WORKS COMPRISE VERTICAL GEOTECH BOREHOLES MAX DIAMETER 0.3M, TO DEPTHS UP TO 15 M SCATTERED ACROSS SITE AS PER ATTACHED FIGURE(LABELLED AS BH AND NP). NO CREW ON SITE. CONTACT DEMETRIUS COOPER(6138759532) SITE MEET NOT REQUIRED. SITE NOT PRE NO_PLAN::613 837

WO/ JOB #: 9-5

Type Of Work: BORE HOLES

Remarks:

-75.512797 45.480155 NB_SEGMENTS::2 BCOE01 ROGOTT01 OTWATS01 H4OE01 OTWASL01 OTWAWS01 ENOE01

Disclaimer

Black & McDonald

Warning!

The Excavator must have a copy of this locate on the job site during excavation.

Located Area: The Excavator must not work outside the area indicated, by the located area in the diagram, without a further locate completed by Black & McDonald Limited.

Locate the Plant: The plant location information provided is the best we have available, but constitutes only an estimate. Depth of underground plant varies and the exact location must be determined by hand digging prior to excavation with mechanical equipment.

Mechanical equipment must not be used within 1.0 meter of the estimated location of the plant.

Valid Documentation: This locate is valid only for the Agency accepting it. Other parties must obtain and accept their respective underground locate from Ontario 1 Call.

Excavator Alterations: Under no circumstance shall an Excavator touch or move an underground power cable. Arrangements must be made to have qualified personnel relocate any such cable.

Expose the plant: Once the plant has been located by hand digging, it must be exposed along its length adjacent to or in the immediate vicinity of the proposed excavation. For this purpose, mechanical equipment must not be used within 0.5 meters of the plant.

Digging around the Exposed Plant: When the plant has been exposed, any further excavation within 0.3 meters, must only be done by hand digging and not with mechanical equipment.

Support Requirements: If the underground plant is exposed over a distance of more than 1.25 meters, the Facility Owner must be notified. Underground plant must be supported at all times.

Private Cables: Please be advised that Black & McDonald Limited is not responsible for and does not locate private cables

New Cables: Be aware that new cables could be installed at any time after the locate has been completed. It is the Excavator's responsibility to call for new locates if any changes are known or suspected.

Caution: The markings may disappear or be misplaced. Should sketch and markings not coincide, the Excavator must obtain a new locate. This is based on the information given at the time. Any changes to location or nature of work require a new locate. The Excavator must not work outside the indicated located area without a further locate. Privately owned services within the located area have not been marked- check with service/property owner.

Liability: Any person or Excavator who interferes with or damages any underground electrical cable without having obtained a valid locate/clearance from Black & McDonald Limited, shall be liable for all cost incurred during the repair of the cable as well as any resulting legal actions.

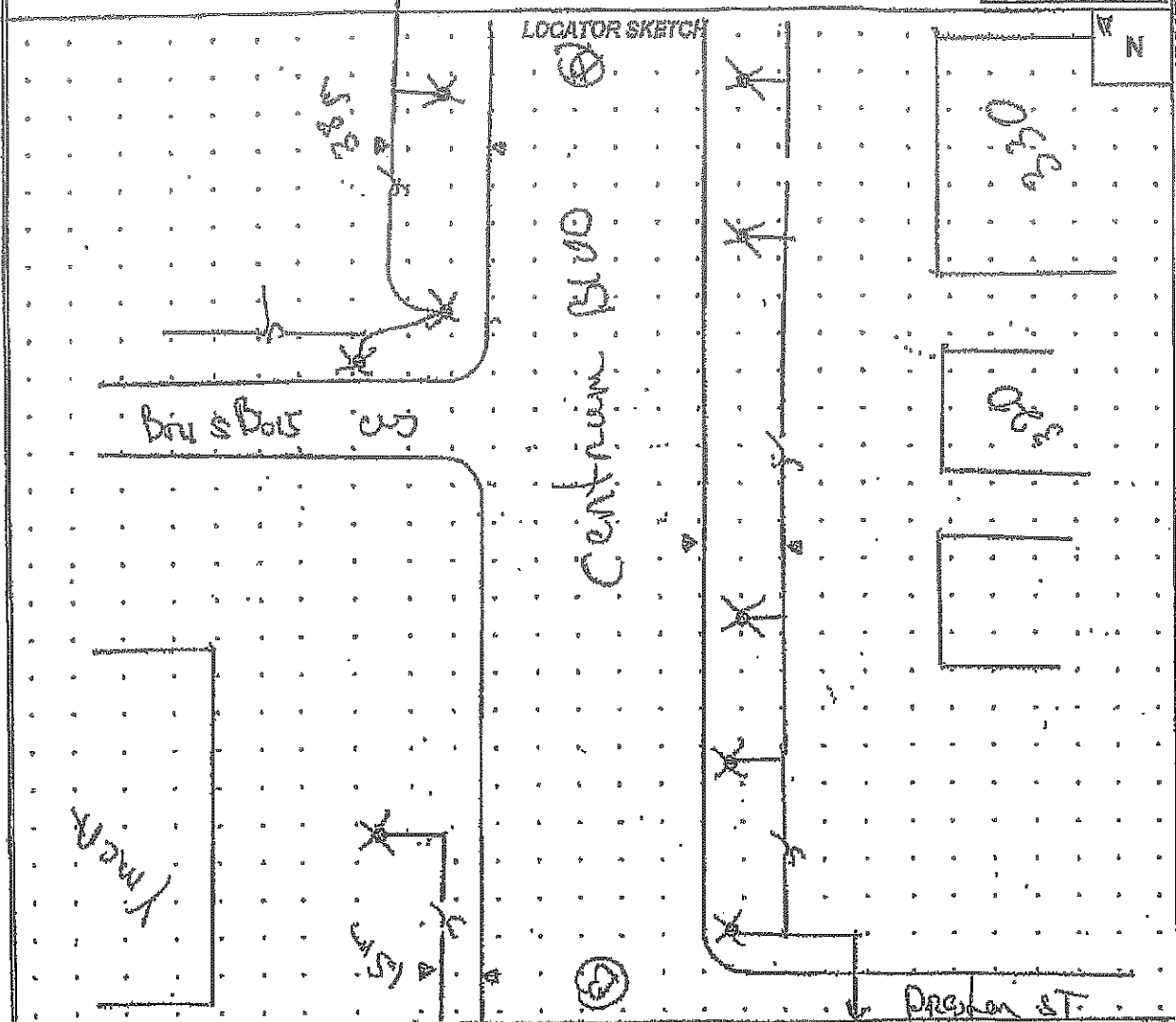
This locate has been given as accurately as possible, but no locate is guaranteed. Excavators must always dig with extreme caution to prevent the possibility of damaging electrical cables and endangering safety.

Locate is void after 60 days

For remarks contact Ontario One Call 1-800-400-2255 or www.on1call.com



<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">On1 Call #</td> <td>2020011754</td> </tr> <tr> <td>Date Requested</td> <td>01/02/2020 3:27:49 PM</td> </tr> </table>	On1 Call #	2020011754	Date Requested	01/02/2020 3:27:49 PM	City of Ottawa Street Light Locate	Black&McDonald										
On1 Call #	2020011754															
Date Requested	01/02/2020 3:27:49 PM															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Company</td> <td>GHD</td> </tr> <tr> <td>Name</td> <td>DEMETRIUS COOPER</td> </tr> <tr> <td>Phone</td> <td>(613)-875-9532 ext.</td> </tr> <tr> <td>FAX</td> <td></td> </tr> <tr> <td>Site Contact</td> <td>RYAN VANDEN TILLAART</td> </tr> <tr> <td>Phone</td> <td>(613)-316-8220 ext.</td> </tr> </table>		Company	GHD	Name	DEMETRIUS COOPER	Phone	(613)-875-9532 ext.	FAX		Site Contact	RYAN VANDEN TILLAART	Phone	(613)-316-8220 ext.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #f0f0f0;">Instructions</td> </tr> <tr> <td> 211, CENTRUM BLVD SITE HAS BEEN PREVIOUSLY LOCATED HOWEVER BOREHOLE LOCATIONS HAVE BEEN ADJUSTED. CORLOT=2 WORKS COMPRISE VERTICAL GEOTECH BOREHOLES MAX DIAMETER 0.3M, TO DEPTHS UP TO 15 M SCATTERED ACROSS SITE AS PER ATTACHED FIGURE(LABELLED AS BH AND NP). NO CREW ON SITE. CONTACT DEMETRIUS COOPER(6138759532) SITE MEET NOT REQUIRED. SITE NOT PRE NO_PLAN: 613 837 </td> </tr> </table>	Instructions	211, CENTRUM BLVD SITE HAS BEEN PREVIOUSLY LOCATED HOWEVER BOREHOLE LOCATIONS HAVE BEEN ADJUSTED. CORLOT=2 WORKS COMPRISE VERTICAL GEOTECH BOREHOLES MAX DIAMETER 0.3M, TO DEPTHS UP TO 15 M SCATTERED ACROSS SITE AS PER ATTACHED FIGURE(LABELLED AS BH AND NP). NO CREW ON SITE. CONTACT DEMETRIUS COOPER(6138759532) SITE MEET NOT REQUIRED. SITE NOT PRE NO_PLAN: 613 837
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LOCATOR SKETCH Clear No City of Ottawa Street Light assets in dig area REVISED Clear 5.0 meters past all road edges as per Demetrius Cooper																
<table style="width: 100%;"> <tr> <td style="width: 33%;"> —SL— Underground Street Light Cable Street Light </td> <td style="width: 33%;"> —OH— Overhead/Aerial Wires Globe/Decorative Light </td> <td style="width: 33%;"> Source/Transformer Hydro Pole </td> </tr> </table>			—SL— Underground Street Light Cable Street Light	—OH— Overhead/Aerial Wires Globe/Decorative Light	Source/Transformer Hydro Pole											
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Locator Notes/Comments:																
Locate is valid for 60 days. If sketch is different from markings, location or nature of work changes, a new locate must be requested. Hand dig within 1m (3.28ft) on either side of markings. Depth of buried plant varies. Cette fiche n'est pas valide 60 jours de calendrier apres le reperege. Si les marques ne concordent pas avec celles sur le croquis, un nouveau reperege est requis. Tout changement a l'emplacement ou a la nature du travail necessite un nouveau reperege. Creuser a la main un metre (3.28 pieds) du repere. La profondeur des installation varie d'un endroit a l'autre.		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Date Located</td> <td>01/10/2020</td> </tr> <tr> <td>Time of day</td> <td></td> </tr> <tr> <td>Located by</td> <td>KRISTOFER LOBO</td> </tr> <tr> <td>Signature</td> <td></td> </tr> </table> Page 2 of 2	Date Located	01/10/2020	Time of day		Located by	KRISTOFER LOBO	Signature							
Date Located	01/10/2020															
Time of day																
Located by	KRISTOFER LOBO															
Signature																



- | | | |
|-------------------------|----------------------------|----------------------|
| —SL— Street Light Cable | —OH— Overhead/Aerial Wires | △ Source/Transformer |
| ⊗ Street Light | ⊗ Globe/Decorative Light | ○ Hydro Pole |
| BL = Building Line | FL = Fence Line | CL = Face of Curb |
| | RE = Road Edge | PL = Property Line |

ALL MEASUREMENTS ARE FROM OUTSIDE CURB EDGE

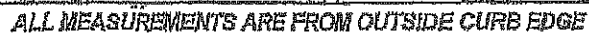
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Date Located	Jan 08 / 20
Time of day	
Located by	WLL

Page 2 of 3



Page 1 of 3



2020011754



Appendix B

Test Pit and Borehole Logs



Notes on Borehole and Test Pit Reports

Soil description :

Each subsurface stratum is described using the following terminology. The relative density of granular soils is determined by the Standard Penetration Index ("N" value), while the consistency of clayey soils is measured by the value of undrained shear strength (Cu).

Classification (Unified system)			
Clay	< 0.002 mm		
Silt	0.002 to 0.075 mm		
Sand	0.075 to 4.75 mm	fine	0.075 to 4.25 mm
		medium	0.425 to 2.0 mm
		coarse	2.0 to 4.75 mm
Gravel	4.75 to 75 mm	fine	4.75 to 19 mm
Cobbles Boulders	75 to 300 mm >300 mm	coarse	19 to 75 mm

Terminology	
"trace"	1-10%
"some"	10-20%
adjective (silty, sandy)	20-35%
"and"	35-50%

Relative density of granular soils	Standard penetration index "N" value (BLOWS/ft – 300 mm)
Very loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

Consistency of cohesive soils	Undrained shear strength (Cu)	
	(P.S.F)	(kPa)
Very soft	<250	<12
Soft	250-500	12-25
Firm	500-1000	25-50
Stiff	1000-2000	50-100
Very stiff	2000-4000	100-200
Hard	>4000	>200

Rock quality designation	
"RQD" (%) Value	Quality
<25	Very poor
25-50	Poor
50-75	Fair
75-90	Good
>90	Excellent

STRATIGRAPHIC LEGEND			
Sand	Gravel	Cobbles & boulders	Bedrock
Silt	Clay	Organic soil	Fill

Samples:

Type and Number

The type of sample recovered is shown on the log by the abbreviation listed hereafter. The numbering of samples is sequential for each type of sample.

SS: Split spoon

ST: Shelby tube

AG: Auger

SSE, GSE, AGE: Environmental sampling

PS: Piston sample (Osterberg)

RC: Rock core

GS: Grab sample

Recovery

The recovery, shown as a percentage, is the ratio of length of the sample obtained to the distance the sampler was driven/pushed into the soil

RQD

The "Rock Quality Designation" or "RQD" value, expressed as percentage, is the ratio of the total length of all core fragments of 4 inches (10 cm) or more to the total length of the run.

IN-SITU TESTS:

N: Standard penetration index

N_c: Dynamic cone penetration index

k: Permeability

R: Refusal to penetration

Cu: Undrained shear strength

ABS: Absorption (Packer test)

Pr: Pressure meter

LABORATORY TESTS:

I_p: Plasticity index

H: Hydrometer analysis

A: Atterberg limits

C: Consolidation

O.V.: Organic vapor

W_l: Liquid limit

GSA: Grain size analysis

w: Water content

CS: Swedish fall cone

W_p: Plastic limit

γ: Unit weight

CHEM: Chemical analysis



TEST PIT No.: TP-01
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**GSE Grab Sample
(environmental)GS Grab Sample
(Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on
Pocket Penetrometer**SCALE FOR TEST RESULTS**

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (150 mm)			
0.5			CLAYEY SILTY SAND possible fill, cobbles, organics, brown, damp			
1.0			Test pit terminated at 0.7 mbgs on bedrock / boulders			
1.5						
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						

NOTES:

mbgs: meters below ground surface



TEST PIT No.: TP-02
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**GSE Grab Sample
(environmental)GS Grab Sample
(Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on
Pocket Penetrometer**SCALE FOR TEST RESULTS**

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (125 mm)			
			CLAYEY SILTY SAND possible fill, cobbles, organics, brown, damp			
0.5						
			Test pit terminated at 0.6 mbgs on bedrock / boulders			
1.0						
1.5						
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						

NOTES:
 mbgs: meters below ground surface



TEST PIT No.: TP-03
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**

GSE Grab Sample (environmental)

GS Grab Sample (Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

← Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on Pocket Penetrometer

SCALE FOR TEST RESULTS

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (125 mm)			
			FILL, CLAYEY SILTY SAND possible fill, organics, cobbles, brown, damp			
0.5			FILL, CLAYEY SAND cobbles/boulders, organics, brown, damp to moist			
1.0						
1.5						
2.0						
2.5			CLAYEY SAND (TILL) cobbles/boulders, organics, grey, damp to moist			
3.0			Test pit terminated at 3.0 mbgs on bedrock / boulders			
3.5						
4.0						
4.5						

NOTES:

mbgs: meters below ground surface

BOREHOLE LOG 11206675-TEST PIT LOGS.GPJ INSPEC_SOL_GDT 2/11/20



TEST PIT No.: TP-04
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**GSE Grab Sample
(environmental)GS Grab Sample
(Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on
Pocket Penetrometer**SCALE FOR TEST RESULTS**

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			FILL (BEDROCK BLOCKS)			
0.5						
1.0			FILL - Clayey sand, cobbles/boulders, organics, brown, damp			
1.5						
2.0						
2.5			CLAYEY SAND (TILL) cobbles/boulders, organics, brown and grey, damp to moist			
3.0						
3.5			Test pit terminated at 3.4 mbgs on bedrock / boulders			
4.0						
4.5						

NOTES:

mbgs: meters below ground surface



TEST PIT No.: TP-05
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**GSE Grab Sample
(environmental)GS Grab Sample
(Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on
Pocket Penetrometer**SCALE FOR TEST RESULTS**

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (125 mm)			
0.5			FILL / REWORKED CLAYEY SAND organics, cobbles/boulders, brown, damp to moist			
1.0						
1.5			CLAYEY SAND (TILL) cobbles/boulders, grey, damp to moist			
2.0						
2.5						
3.0						
3.5			Test pit terminated at 3.4 mbgs on bedrock / boulders			
4.0						
4.5						

NOTES:

mbgs: meters below ground surface

BOREHOLE LOG 11206675-TEST PIT LOGS.GPJ INSPEC_SOL_GDT 2/11/20



TEST PIT No.: TP-06
ELEVATION:

TEST PIT LOG

Page: 1 of 1

LEGEND

GSE Grab Sample (environmental)

GS Grab Sample (Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

← Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on Pocket Penetrometer

SCALE FOR TEST RESULTS

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (150 mm)			
			SILTY CLAY - brown and grey, damp to moist			
0.5						
1.0						
1.5						
2.0						
2.5						
3.0			Test pit terminated at 3.0 mbgs on bedrock / boulders			
3.5						
4.0						
4.5						

NOTES:

mbgs: meters below ground surface



TEST PIT No.: TP-07
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**

GSE Grab Sample (environmental)

GS Grab Sample (Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on Pocket Penetrometer

SCALE FOR TEST RESULTS

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (125 mm)			
			FILL, CLAYEY SAND possible fill, organics, brown, damp			
0.5						
			TILL, CLAYEY SAND presence cobbles/boulders, grey, damp, moist,			
1.0						
			becoming brown			
1.5						
2.0			Test pit terminated at 2.1 mbgs on bedrock / boulders			
2.5						
3.0						
3.5						
4.0						
4.5						

NOTES:
 mbgs: meters below ground surface



TEST PIT No.: TP-08
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**

GSE Grab Sample (environmental)

GS Grab Sample (Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on Pocket Penetrometer

SCALE FOR TEST RESULTS

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (220 mm)			
0.5			CLAYEY SAND (TILL) organics, cobbles/boulders, brown, damp to moist			
1.0						
1.5						
2.0						
2.5						
3.0			Test pit terminated at 3.0 mbgs on bedrock / boulders			
3.5						
4.0						
4.5						

NOTES:
 mbgs: meters below ground surface



TEST PIT No.: TP-09
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**GSE Grab Sample
(environmental)GS Grab Sample
(Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on
Pocket Penetrometer**SCALE FOR TEST RESULTS**

50kPa 100kPa 150kPa 200kPa

10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (125 mm)			
0.5			CLAYEY SAND (TILL) organics, cobbles/boulders, brown, damp to moist			
1.0						
1.5						
2.0						
2.5			becoming grey			
3.0						
3.5			Test pit terminated at 3.2 mbgs on bedrock / boulders			
4.0						
4.5						

NOTES:
 mbgs: meters below ground surface



TEST PIT No.: TP-10
ELEVATION: _____

TEST PIT LOGPage: 1 of 1**LEGEND**GSE Grab Sample
(environmental)GS Grab Sample
(Geotechnical)

CHEM Chemical Analysis

▼ Water Level

○ Water content (%)

┌─┐ Atterberg limits (%)

□ Cu Shear Strength based on Lab Vane

S Sensitivity Value of Soil

▲ Shear Strength based on
Pocket Penetrometer**SCALE FOR TEST RESULTS**50kPa 100kPa 150kPa 200kPa
10 20 30 40 50 60 70 80 90

SCALE		STRATIGRAPHY		SAMPLE DATA		
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Test Type	OVC
meters			GROUND SURFACE			ppm
			TOPSOIL (100 mm)			
			CLAYEY SAND possible fill, organics, cobbles, brown, damp to moist			
0.5						
1.0			Test pit terminated at 1.0 mbgs on bedrock / boulders			
1.5						
2.0						
2.5						
3.0						
3.5						
4.0						
4.5						

NOTES:
mbgs: meters below ground surface



BOREHOLE No.: BH1

ELEVATION: 95.39 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 15, 2020

DATE (FINISH): January 15, 2020

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		Type and Number	Recovery	OVC	Penetration Index / RQD
meters	95.39		GROUND SURFACE			%	ppm	N
0.5	95.1 94.9		TOPSOIL, Silty SAND trace of clay, brown, presence rootlets, frozen	1.05 — 1.01 — 0.30 — Bentonite 0.50 —	SS1	56	0.1	10
1.0			0.1 m, becoming unfrozen, moist, loose to compact FILL, Gravelly SAND with some silt, grey, moist, loose to compact		RC2	100		94
1.5			LIMESTONE, grey with dark grey bands, fresh, excellent quality					
2.0				Sand	RC3	100		100
2.5				2" non slotted PVC pipe				
3.0				3.00 —				
3.5				Bentonite	RC4	99		97
4.0				WL 3.55 1/23/20 8:00am 3.60 3.80				
4.5			4.19 m, becoming good quality					
5.0				2" slotted PVC pipe	RC5	99		86
5.5				Sand				
6.0					RC6	100		83
6.5								
7.0	88.6			6.80 —				
7.5								

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 0.55 m



BOREHOLE No.: BH2

ELEVATION: 97.99 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 9, 2020

DATE (FINISH): January 9, 2020

LEGEND

- ☒ SS Split Spoon
- ☒ GS Auger Sample
- ☒ ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		Type and Number	Recovery	OVC	Penetration Index / RQD
meters	97.99		GROUND SURFACE			%	ppm	N
97.9	97.8		ASPHALT	1.00 — 0.96 —	SS1	100	0.0	R
0.5			FILL, Silty SAND with some gravel, grey, moist, very dense	0.30 — Bentonite 0.50 —	RC1	88		20
1.0			LIMESTONE, grey with dark grey bands, fresh, fractured in zones, very poor quality		RC2	100		100
1.5			0.72 m, becoming excellent quality, without fractured zones	2" non slotted PVC pipe Sand				
2.0				2.00 —	RC3	100		99
2.5			2.3 m, 2 cm zone of crushed rock with clay infill	Bentonite				
3.0				3.00 — WL 3.06 1/23/20 9:50 3.30 —	RC4	100		100
3.5								
4.0								
4.5			4.22 m, becoming good quality	2" slotted PVC pipe Sand	RC5	95		83
5.0								
5.5								
6.0			5.69 m, becoming excellent quality		RC6	100		100
6.5	91.7			6.30 —				
7.0								
7.5								

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation.



BOREHOLE No.: BH3
ELEVATION: 93.66 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 15, 2020

DATE (FINISH): January 15, 2020

LEGEND

- ☒ SS Split Spoon
- ☒ GS Auger Sample
- ☒ ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY			SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD
meters	93.66		GROUND SURFACE			%	ppm	N
0.5	93.6		TOPSOIL, Silty SAND, brown, presence organics, frozen FILL, Gravelly Silty SAND, grey, moist compact		SS1	77	0.1	26
1.0	92.7		LIMESTONE, grey with dark grey bands, fresh, abundantly fractured, very poor quality		SS2	60	0	R
1.5			1.16 m, becoming good quality		RC3	100		0
2.0			1.35 m, bedrock no longer abundantly fractured					
2.5			1.45 m, joint at approx 45° to core axis, planar, rough and no infill		RC4	100		81
3.0								
3.5					RC5	100		88
4.0								
4.5			4.16 m, becoming excellent quality					
5.0					RC6	97		97
5.5								
6.0								
6.5					RC7	100		92
7.0								
7.5	86.4							

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 0.96 m



BOREHOLE No.: BH4

ELEVATION: 96.54 m

BOREHOLE LOG

Page: 1 of 1

LEGEND

- ☒ SS Split Spoon
- ☒ GS Auger Sample
- ☒ ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 9, 2020

DATE (FINISH): January 9, 2020

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA														
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		State	Type and Number	Recovery	OVC	Penetration Index / RQD										
meters	96.54		GROUND SURFACE				%	ppm	N	SCALE FOR TEST RESULTS									
										50kPa	100kPa	150kPa	200kPa						
	96.5		TOPSOIL, Sandy SILT, presence abundant organics and rootlets, brown, frozen	Bentonite 0.30	X	SS1	40	0.1	R										
0.5			FILL, Gravelly Silty SAND, brown, presence brick and glass fragments, moist, compact	2" non slotted PVC pipe Sand 1.00															
1.0	95.5		Clayey SILT, traces of sand, brown, low plasticity, grey, moist, stiff	Bentonite	X	SS2	84	0	16										
1.5	95.2		Clayey SAND, brown, moist compact	1.60 1.70	X	SS3	46	0	R										
2.0	94.9		Cobbles and Boulders (TILL) with some gravel, sand, silt and clay, boulders up to a minimum 0.45 m diameter	2" slotted PVC pipe Sand		RC4	62												
2.5				WL 2.78 1/22/20 9:30															
3.0				3.20															
3.5	93.3		LIMESTONE, grey with dark grey bands, fresh, excellent quality			RC5	100		100										
4.0																			
4.5																			
5.0						RC6	100		94										
5.5																			
6.0	90.5					RC7	100		100										
6.5																			
7.0																			
7.5																			

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 1.7 m



BOREHOLE No.: BH5

ELEVATION: 95.66 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 10, 2020

DATE (FINISH): January 10, 2020

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		Type and Number	Recovery	OVC	Penetration Index / RQD
meters	95.66		GROUND SURFACE			%	ppm	N
0.5	95.6		TOPSOIL, Silty SAND with some gravel, trace of clay, brown, presence rootlets, frozen	1.05 — 1.01 —				
1.0			FILL, Clayey sand, presence cobbles boulders, brown, presence of organics, moist, compact, presence organic/septic odour	0.30 — Bentonite 2" non slotted PVC pipe 1.00 — 1.20 —	SS1	36	0.1	32
1.5	94.1		Silty SAND, dark brown, presence organics and rootlets, moist, loose to compact		SS2	28	0.1	R
2.0	93.7		Clayey SILT with some sand, grey to brown, low plasticity, moist to wet, compact		SS3	92	0	10
2.5	93.3		2.29 m, becoming sandy clay	WL 2.51 — 1/22/20 9.40 — Sand	SS4	64	0	39
3.0			Silty SAND (TILL), trace clay and gravel, grey, moist to wet, dense	2" slotted PVC pipe				
3.5			2.8 m, becoming with a presence cobbles / boulders		SS5	20		R
4.0	91.5		LIMESTONE, grey with dark grey bands, fresh, excellent quality	4.20 —	RC6	100		97
4.5								
5.0								
5.5			5.66 m, becoming fair quality					
6.0								
6.5			6.30 m - 6.90 m, multiple bedding partings perpendicular to core axis, generally tight, thin clay veneer on defect faces.		RC7	100		60
7.0								
7.5	88.5							

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 1.1 m



BOREHOLE No.: BH6

ELEVATION: 96.04 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 10, 2020

DATE (FINISH): January 10, 2020

LEGEND

- ☒ SS Split Spoon
- ☒ GS Auger Sample
- ☒ ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY			SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD
meters	96.04		GROUND SURFACE			%	ppm	N
0.5			FILL, Sandy SILT, brown, presence organics, rootlets rubber, boulders and cobbles, moist, loose to compact	X	SS1	63	0.2	R
1.0			0.76 m becoming SAND with some clay	X	SS2	21	0	23
1.5			1.5 m, presence rubber	X	SS3	41	0.1	7
2.0				X				
2.5	93.8		SILT & SAND (TILL), with some gravel, grey with brown mottles, moist, very dense	X	SS4	94		R
2.5	93.4							
3.0								
3.5								
4.0								
4.5								
5.0								
5.5								
6.0								
6.5								
7.0								
7.5								

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 2.64 m



BOREHOLE No.: BH7
ELEVATION: 94.93 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 14, 2020

DATE (FINISH): January 14, 2020

LEGEND

- ☒ SS Split Spoon
- ☒ GS Auger Sample
- ☒ ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY			SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD
meters	94.93		GROUND SURFACE			%	ppm	N
0.5			FILL, Silty SAND, with some gravel, presence organics, brown to grey, frozen 0.1 m, becoming not frozen, moist to wet, dense 0.51 m, presence boulders/cobbles		SS1	65	0.2	42
1.0								
1.5			1.22 m to 2.9 m, one large continuous limestone boulder					
2.0								
2.5								
3.0	92.0		Sandy SILT (TILL), with some gravel, trace of clay, brown, presence cobbles up to 0.36m diameter, wet compact,		SS2	91	0	13
3.5								
4.0								
4.5			4.34 m, becoming very dense					
4.6			4.6 m, becoming grey		SS3	50	0	70
5.0								
5.5								
6.0	89.1							
6.5								
7.0								
7.5								

SCALE FOR TEST RESULTS
 50kPa 100kPa 150kPa 200kPa
 10 20 30 40 50 60 70 80 90

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 1.22 m



BOREHOLE No.: BH8

ELEVATION: 94.40 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 13, 2020

DATE (FINISH): January 13, 2020

LEGEND

- ☒ SS Split Spoon
- ☒ GS Auger Sample
- ☒ ST Shelby Tube
- ▼ Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA				SCALE FOR TEST RESULTS									
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		Type and Number	Recovery	OVC	Penetration Index / RQD										
meters	94.40		GROUND SURFACE			%	ppm	N										
0.5	94.4		TOPSOIL, silty sand, presence rootlets and organics, brown, frozen	Bentonite 0.30	SS1	66	0.0	13	●									
1.0	93.5		FILL, Silty SAND with some gravel, trace of clay, presence organics, brown, frozen 0.1 m, becoming unfrozen, moist, loose to compact	2" non slotted PVC pipe Sand Bentonite	SS2	60	0.1	7	●									
1.5	92.9		Clayey SAND, possible fill, brown, moist, loose	1.30														
2.0	92.5		Silty CLAY, grey, moist, stiff	1.50	SS3	98	0.0	12	●									>>4
2.5			SILT & SAND (TILL), with some gravel, grey, moist to wet, compact	WL 1.70 1/23/20 11:30														
3.0					SS4	66	0.0	29	●									
3.5			3.05 m - 3.60 m, presence cobbles/boulders. trace of clay, grey	Sand 2" slotted PVC pipe	SS5	34	0.0	R										
4.0					SS6	33	0.0	23	●									
4.5				4.50	SS7	16	0.0	29	●									
5.0					SS8	30	0.0	5	●									
5.5			5.28 m, becoming loose															
6.0	88.4		LIMESTONE, grey with dark grey bands, fresh, excellent quality		RC9	100		100										
6.5																		
7.0																		
7.5	86.9																	

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 5.97 m



BOREHOLE No.: BH9

ELEVATION: 92.74 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

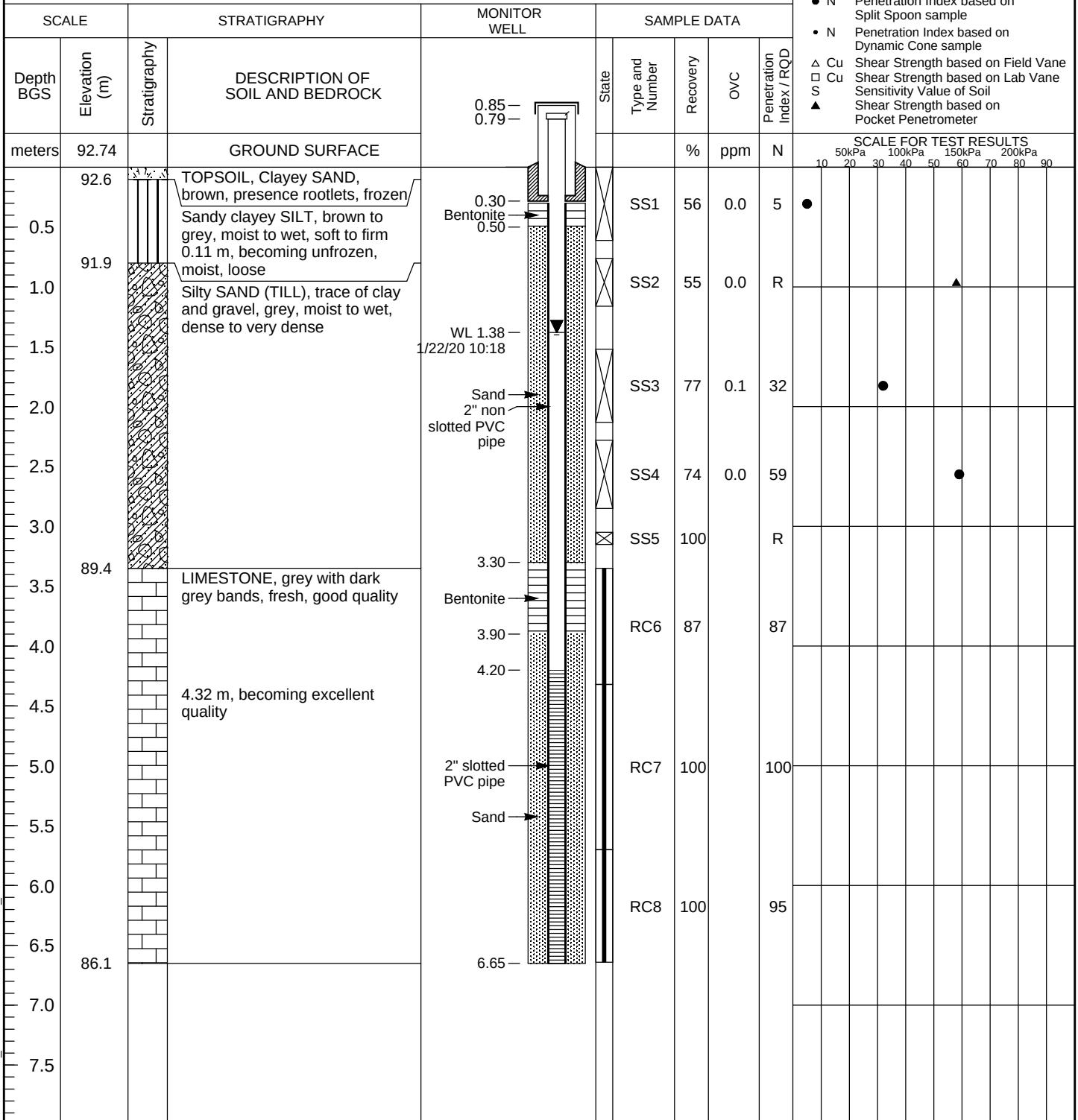
CHECKED BY:

DATE (START): January 14, 2020

DATE (FINISH): January 14, 2020

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer



NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 3.15 m



BOREHOLE No.: BH10

ELEVATION: 92.39 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 14, 2020

DATE (FINISH): January 14, 2020

LEGEND

- ☒ SS Split Spoon
- ☒ GS Auger Sample
- ☒ ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY			SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	OVC	Penetration Index / RQD
meters	92.39		GROUND SURFACE			%	ppm	N
0.5	92.3		TOPSOIL, Silty SAND, brown, presence, organics and rootlets, frozen		SS1	61	0.1	20
	91.8		FILL, Silty SAND, with some gravel, trace of clay, presence organics, moist and compact					
1.0	91.4		Silty SAND, brown, moist, compact					
1.5			Sandy SILT (TILL), trace of gravel and clay, moist and compact		SS2	95	0.1	10
2.0			1.25 m, becoming wet					
2.5					SS3	33	0.0	25
2.7					SS4	45	0.1	R
3.0	89.7							
3.5								
4.0								
4.5								
5.0								
5.5								
6.0								
6.5								
7.0								
7.5								

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 2.7 m



BOREHOLE No.: BH11

ELEVATION: 91.86 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: Le Groupe Maurice

PROJECT: 211 Centrum Boulevard, Orleans

LOCATION: 211 Centrum Boulevard, Orleans

DESCRIBED BY: D.Cooper

CHECKED BY:

DATE (START): January 13, 2020

DATE (FINISH): January 13, 2020

LEGEND

- SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		Type and Number	Recovery	OVC	Penetration Index / RQD
meters	91.86		GROUND SURFACE			%	ppm	N
0.5			FILL, Clayey Sandy SILT, trace of gravel, grey, frozen 0.1 m, becoming moist to wet, loose to compact	0.90 — 0.82 — Bentonite 2" non slotted PVC pipe 0.30 — 1.00 — WL 1.20 — 1/22/20 12:20	SS1	74	0.0	10
1.0					SS2	57	0.0	10
1.5					SS3	43	0.0	10
2.0	90.2		Silty CLAY trace of sand, high plasticity, grey, moist, stiff to very stiff		VA1			
2.5					SS4	100	0.0	2
3.0					VA2			
3.5								
4.0								
4.5	87.3		LIMESTONE, grey with dark grey bands, fresh, excellent quality					
5.0								
5.5					RC5	100		98
6.0	85.8							
6.5								
7.0								
7.5								

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 4.6 m



BOREHOLE No.: BH12
ELEVATION: 95.66 m

BOREHOLE LOG

Page: 1 of 1

LEGEND

- ☒ SS Split Spoon
- GS Auger Sample
- ST Shelby Tube
- Water Level
- Water content (%)
- Atterberg limits (%)
- Penetration Index based on Split Spoon sample
- Penetration Index based on Dynamic Cone sample
- Shear Strength based on Field Vane
- Shear Strength based on Lab Vane
- Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

CLIENT: Le Groupe Maurice
 PROJECT: 211 Centrum Boulevard, Orleans
 LOCATION: 211 Centrum Boulevard, Orleans
 DESCRIBED BY: D.Cooper CHECKED BY:
 DATE (START): January 15, 2020 DATE (FINISH): January 15, 2020

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA			
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		Type and Number	Recovery	OVC	Penetration Index / RQD
meters	95.66		GROUND SURFACE			%	ppm	N
0.5	95.5		TOPSOIL, Silty SAND, brown, presence rootlets & organics, frozen	0.36	SS1	59	0.4	29
1.0	95.1		FILL, Silty SAND with some gravel, grey, dry to moist, compact, faint odour (hydrocarbon?)	2" 1.00 slotted PVC Bentonite WL 1.00 1/22/20 8:45	RC2	87		78
1.5			LIMESTONE, grey with dark grey bands, fresh, good quality		RC3	100		93
2.0			1.45 m, becoming excellent quality		RC4	100		97
4.5	91.2			3.50 2" slotted PVC pipe Bentonite 4.00				
5.0								
5.5								
6.0				Sand				
6.5								
7.0								
7.5				7.20				

NOTES:

Elevations are based on an assigned benchmark and measurements shown in brackets refer to the respective elevation. Auger refusal at 0.51 m

Appendix C

Laboratory Certificates of Analysis

CLIENT NAME: GHD LIMITED
455 Phillip St
WATERLOO, ON N2V1C2
(519) 884-0510

ATTENTION TO: Pascal Renella

PROJECT: 11206675-E1 (PO#73518359)

AGAT WORK ORDER: 19Z555973

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

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

DATE REPORTED: Dec 16, 2019

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.

Certificate of Analysis

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		TP-01	TP-02	TP-03	TP-04	TP-05	TP-06
				SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800115	800117	800118	800119	800120	800121
Antimony	µg/g	7.5	0.8	2019-12-16	2019-12-16	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	2019-12-16	2019-12-16	5	4	2	2	6	2
Barium	µg/g	390	2	2019-12-16	2019-12-16	142	198	65	187	96	443
Beryllium	µg/g	5	0.5	2019-12-16	2019-12-16	0.6	0.6	<0.5	<0.5	0.5	0.7
Boron	µg/g	120	5	2019-12-16	2019-12-16	6	7	<5	<5	6	<5
Boron (Hot Water Soluble)	µg/g	1.5	0.10	2019-12-16	2019-12-16	0.19	0.25	0.15	0.16	0.19	<0.10
Cadmium	µg/g	1.2	0.5	2019-12-16	2019-12-16	<0.5	0.6	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	160	2	2019-12-16	2019-12-16	51	34	27	50	30	124
Cobalt	µg/g	22	0.5	2019-12-16	2019-12-16	10.7	9.0	5.7	11.0	10.0	25.3
Copper	µg/g	180	1	2019-12-16	2019-12-16	19	17	11	24	18	50
Lead	µg/g	120	1	2019-12-16	2019-12-16	13	134	5	7	17	9
Molybdenum	µg/g	6.9	0.5	2019-12-16	2019-12-16	0.6	0.9	<0.5	<0.5	0.5	<0.5
Nickel	µg/g	130	1	2019-12-16	2019-12-16	29	21	15	27	21	65
Selenium	µg/g	2.4	0.4	2019-12-16	2019-12-16	0.6	0.6	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	25	0.2	2019-12-16	2019-12-16	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	2019-12-16	2019-12-16	<0.4	<0.4	<0.4	<0.4	<0.4	0.5
Uranium	µg/g	23	0.5	2019-12-16	2019-12-16	0.8	0.8	0.6	0.7	0.5	0.9
Vanadium	µg/g	86	1	2019-12-16	2019-12-16	47	37	27	51	34	110
Zinc	µg/g	340	5	2019-12-16	2019-12-16	61	111	30	68	61	142
Chromium VI	µg/g	10	0.2	2019-12-16	2019-12-16	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	2019-12-16	2019-12-16	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	1.8	0.10	2019-12-16	2019-12-16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	0.7	0.005	2019-12-16	2019-12-16	0.218	0.166	0.162	0.203	0.147	0.159
Sodium Adsorption Ratio	NA	5	NA	2019-12-16	2019-12-16	0.848	0.107	0.106	0.133	0.104	0.754
pH, 2:1 CaCl2 Extraction	pH Units		NA			7.24	7.38	7.45	7.35	7.28	7.33

Certified By:

divine Basily



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION:		TP-07	TP-08	TP-09	TP-10
				SAMPLE TYPE:		Soil	Soil	Soil	Soil
				DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13
				Date Prepared	Date Analyzed	800122	800123	800124	800125
Antimony	µg/g	7.5	0.8	2019-12-16	2019-12-16	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	2019-12-16	2019-12-16	2	2	2	2
Barium	µg/g	390	2	2019-12-16	2019-12-16	164	110	82	54
Beryllium	µg/g	5	0.5	2019-12-16	2019-12-16	0.6	<0.5	<0.5	<0.5
Boron	µg/g	120	5	2019-12-16	2019-12-16	<5	6	9	8
Boron (Hot Water Soluble)	µg/g	1.5	0.10	2019-12-16	2019-12-16	<0.10	0.12	<0.10	<0.10
Cadmium	µg/g	1.2	0.5	2019-12-16	2019-12-16	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	160	2	2019-12-16	2019-12-16	56	33	16	24
Cobalt	µg/g	22	0.5	2019-12-16	2019-12-16	10.4	9.9	9.5	10.1
Copper	µg/g	180	1	2019-12-16	2019-12-16	25	20	13	15
Lead	µg/g	120	1	2019-12-16	2019-12-16	6	9	7	7
Molybdenum	µg/g	6.9	0.5	2019-12-16	2019-12-16	<0.5	<0.5	0.8	<0.5
Nickel	µg/g	130	1	2019-12-16	2019-12-16	29	23	17	19
Selenium	µg/g	2.4	0.4	2019-12-16	2019-12-16	<0.4	0.4	<0.4	<0.4
Silver	µg/g	25	0.2	2019-12-16	2019-12-16	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	2019-12-16	2019-12-16	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	23	0.5	2019-12-16	2019-12-16	1.0	0.7	<0.5	<0.5
Vanadium	µg/g	86	1	2019-12-16	2019-12-16	55	36	20	26
Zinc	µg/g	340	5	2019-12-16	2019-12-16	59	38	20	26
Chromium VI	µg/g	10	0.2	2019-12-16	2019-12-16	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	2019-12-16	2019-12-16	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	1.8	0.10	2019-12-16	2019-12-16	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	0.7	0.005	2019-12-16	2019-12-16	0.170	0.158	0.139	0.108
Sodium Adsorption Ratio	NA	5	NA	2019-12-16	2019-12-16	0.321	0.223	0.159	0.191
pH, 2:1 CaCl2 Extraction	pH Units		NA			7.48	7.43	7.73	7.64

Certified By:

Divine Basily



Certificate of Analysis

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

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

800115-800125 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl₂ extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily

Certificate of Analysis

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

5835 COOPERS AVENUE
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CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		TP-01	TP-02	TP-03	TP-04	TP-05	TP-06
				SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800115	800117	800118	800119	800120	800121
Naphthalene	µg/g	0.75	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.17	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	58	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	69	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	7.8	0.05	2019-12-16	2019-12-16	<0.05	0.52	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.74	0.05	2019-12-16	2019-12-16	<0.05	0.13	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	0.05	2019-12-16	2019-12-16	<0.05	0.68	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	78	0.05	2019-12-16	2019-12-16	<0.05	0.55	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.63	0.05	2019-12-16	2019-12-16	<0.05	0.24	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	7.8	0.05	2019-12-16	2019-12-16	<0.05	0.18	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.78	0.05	2019-12-16	2019-12-16	<0.05	0.14	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.78	0.05	2019-12-16	2019-12-16	<0.05	0.12	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	2019-12-16	2019-12-16	<0.05	0.12	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.48	0.05	2019-12-16	2019-12-16	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	7.8	0.05	2019-12-16	2019-12-16	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	3.4	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	2019-12-16	2019-12-16	22.4	15.2	14.7	23.3	16.4	26.3
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		2019-12-16	2019-12-16	65	62	79	70	79	78
Acenaphthene-d10	%	50-140		2019-12-16	2019-12-16	74	68	93	82	85	96
Chrysene-d12	%	50-140		2019-12-16	2019-12-16	73	75	91	68	96	82

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		TP-07	TP-08	TP-09	TP-10
				SAMPLE TYPE:		Soil	Soil	Soil	Soil
				DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800122	800123	800124	800125
Naphthalene	µg/g	0.75	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.17	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	58	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	69	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	7.8	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.74	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.69	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	78	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g	0.63	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	7.8	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.78	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.78	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.48	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	7.8	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	3.4	0.05	2019-12-16	2019-12-16	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	2019-12-16	2019-12-16	17.6	17.8	10.6	12.7
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140		2019-12-16	2019-12-16	87	87	84	87
Acenaphthene-d10	%	50-140		2019-12-16	2019-12-16	96	96	96	96
Chrysene-d12	%	50-140		2019-12-16	2019-12-16	82	84	72	82

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

800115-800125 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





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AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

					SAMPLE DESCRIPTION:		TP-01	TP-02	TP-03	TP-04	TP-05	TP-06
					SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
					DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800115	800117	800118	800119	800120	800121	
F1 (C6 to C10)	µg/g	65	5	2019-12-16	2019-12-16	<5	<5	<5	<5	<5	<5	
F1 (C6 to C10) minus BTEX	µg/g	65	5	2019-12-16	2019-12-16	<5	<5	<5	<5	<5	<5	
F2 (C10 to C16)	µg/g	150	10	2019-12-16	2019-12-16	<10	<10	<10	<10	<10	<10	
F2 (C10 to C16) minus Naphthalene	µg/g		10	2019-12-16	2019-12-16	<10	<10	<10	<10	<10	<10	
F3 (C16 to C34)	µg/g	1300	50	2019-12-16	2019-12-16	<50	<50	<50	<50	<50	<50	
F3 (C16 to C34) minus PAHs	µg/g		50	2019-12-16	2019-12-16	<50	<50	<50	<50	<50	<50	
F4 (C34 to C50)	µg/g	5600	50	2019-12-16	2019-12-16	<50	<50	<50	<50	<50	<50	
Gravimetric Heavy Hydrocarbons	µg/g	5600	50			NA	NA	NA	NA	NA	NA	
Moisture Content	%		0.1			22.4	15.2	14.7	23.3	16.4	26.3	
Surrogate	Unit	Acceptable Limits										
Terphenyl	%	60-140		2019-12-16	2019-12-16	103	92	75	104	68	108	
					SAMPLE DESCRIPTION:		TP-07	TP-08	TP-09	TP-10		
					SAMPLE TYPE:		Soil	Soil	Soil	Soil		
					DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13		
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800122	800123	800124	800125			
F1 (C6 to C10)	µg/g	65	5	2019-12-16	2019-12-16	<5	<5	<5	<5			
F1 (C6 to C10) minus BTEX	µg/g	65	5	2019-12-16	2019-12-16	<5	<5	<5	<5			
F2 (C10 to C16)	µg/g	150	10	2019-12-16	2019-12-16	<10	<10	<10	<10			
F2 (C10 to C16) minus Naphthalene	µg/g		10	2019-12-16	2019-12-16	<10	<10	<10	<10			
F3 (C16 to C34)	µg/g	1300	50	2019-12-16	2019-12-16	<50	<50	<50	<50			
F3 (C16 to C34) minus PAHs	µg/g		50	2019-12-16	2019-12-16	<50	<50	<50	<50			
F4 (C34 to C50)	µg/g	5600	50	2019-12-16	2019-12-16	<50	<50	<50	<50			
Gravimetric Heavy Hydrocarbons	µg/g	5600	50			NA	NA	NA	NA			
Moisture Content	%		0.1			17.6	17.8	10.6	12.7			
Surrogate	Unit	Acceptable Limits										
Terphenyl	%	60-140		2019-12-16	2019-12-16	103	100	98	74			

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AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

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

800115-800125 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PHCs F1/BTEX (MEOH)

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

SAMPLE DESCRIPTION: Trip Blank						
SAMPLE TYPE: MeOH						
DATE SAMPLED: 2019-12-13						
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800127
F1 (C6 to C10)	µg/g	65	5	2019-12-16	2019-12-16	<5
F1 (C6 to C10) minus BTEX	µg/g	65	5	2019-12-16	2019-12-16	<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 - Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

800127 A small amount of the methanol extract was diluted in water and the purge & trap GC/MS/FID analysis was performed.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		Trip Blank
				SAMPLE TYPE:		MeOH
				DATE SAMPLED:		2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800127
Dichlorodifluoromethane	µg/g	25	0.05	2019-12-16	2019-12-16	<0.05
Vinyl Chloride	ug/g	0.022	0.02	2019-12-16	2019-12-16	<0.02
Bromomethane	ug/g	0.05	0.05	2019-12-16	2019-12-16	<0.05
Trichlorofluoromethane	ug/g	5.8	0.05	2019-12-16	2019-12-16	<0.05
Acetone	ug/g	28	0.50	2019-12-16	2019-12-16	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	2019-12-16	2019-12-16	<0.05
Methylene Chloride	ug/g	0.96	0.05	2019-12-16	2019-12-16	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.75	0.05	2019-12-16	2019-12-16	<0.05
Methyl tert-butyl Ether	ug/g	1.4	0.05	2019-12-16	2019-12-16	<0.05
1,1-Dichloroethane	ug/g	11	0.02	2019-12-16	2019-12-16	<0.02
Methyl Ethyl Ketone	ug/g	44	0.50	2019-12-16	2019-12-16	<0.50
Cis- 1,2-Dichloroethylene	ug/g	30	0.02	2019-12-16	2019-12-16	<0.02
Chloroform	ug/g	0.18	0.04	2019-12-16	2019-12-16	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	2019-12-16	2019-12-16	<0.03
1,1,1-Trichloroethane	ug/g	3.4	0.05	2019-12-16	2019-12-16	<0.05
Carbon Tetrachloride	ug/g	0.12	0.05	2019-12-16	2019-12-16	<0.05
Benzene	ug/g	0.17	0.02	2019-12-16	2019-12-16	<0.02
1,2-Dichloropropane	ug/g	0.085	0.03	2019-12-16	2019-12-16	<0.03
Trichloroethylene	ug/g	0.52	0.03	2019-12-16	2019-12-16	<0.03
Bromodichloromethane	ug/g	13	0.05	2019-12-16	2019-12-16	<0.05
Methyl Isobutyl Ketone	ug/g	4.3	0.50	2019-12-16	2019-12-16	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	2019-12-16	2019-12-16	<0.04
Toluene	ug/g	6	0.05	2019-12-16	2019-12-16	<0.05
Dibromochloromethane	ug/g	9.4	0.05	2019-12-16	2019-12-16	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	2019-12-16	2019-12-16	<0.04
Tetrachloroethylene	ug/g	2.3	0.05	2019-12-16	2019-12-16	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	2019-12-16	2019-12-16	<0.04
Chlorobenzene	ug/g	2.7	0.05	2019-12-16	2019-12-16	<0.05
Ethylbenzene	ug/g	15	0.05	2019-12-16	2019-12-16	<0.05
m & p-Xylene	ug/g		0.05	2019-12-16	2019-12-16	<0.05

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		Trip Blank
				SAMPLE TYPE:		MeOH
				DATE SAMPLED:		2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800127
Bromoform	ug/g	0.26	0.05	2019-12-16	2019-12-16	<0.05
Styrene	ug/g	2.2	0.05	2019-12-16	2019-12-16	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	2019-12-16	2019-12-16	<0.05
o-Xylene	ug/g		0.05	2019-12-16	2019-12-16	<0.05
1,3-Dichlorobenzene	ug/g	6	0.05	2019-12-16	2019-12-16	<0.05
1,4-Dichlorobenzene	ug/g	0.097	0.05	2019-12-16	2019-12-16	<0.05
1,2-Dichlorobenzene	ug/g	4.3	0.05	2019-12-16	2019-12-16	<0.05
Xylene Mixture	ug/g	25	0.05	2019-12-16	2019-12-16	<0.05
1,3-Dichloropropene	µg/g	0.083	0.04	2019-12-16	2019-12-16	<0.04
n-Hexane	µg/g	34	0.05	2019-12-16	2019-12-16	<0.05
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	50-140		2019-12-16	2019-12-16	101
4-Bromofluorobenzene	% Recovery	50-140		2019-12-16	2019-12-16	92

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

800127 A small amount of methanol extract was diluted in water and analyzed by purge & trap GC/MS.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		TP-01	TP-02	TP-03	TP-04	TP-05	TP-06
				SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800115	800117	800118	800119	800120	800121
Chloromethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vinyl Chloride	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Bromomethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chloroethane	µg/g		0.005	2019-12-16	2019-12-16	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Trichlorofluoromethane	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acetone	µg/g		0.130	2019-12-16	2019-12-16	<0.130	<0.130	<0.130	<0.130	<0.130	<0.130
1,1-Dichloroethylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Methylene Chloride	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
TRANS-1,2-Dichloroethylene	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Methyl tert-butyl Ether	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
1,1-Dichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Methyl Ethyl Ketone	µg/g		0.044	2019-12-16	2019-12-16	<0.044	<0.044	<0.044	<0.044	<0.044	<0.044
CIS 1,2-Dichloroethylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chloroform	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,2- Dichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1,1-Trichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Carbon Tetrachloride	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Benzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,2-Dichloropropane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Trichloroethylene	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Bromodichloromethane	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
CIS-1,3-Dichloropropene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Methyl Isobutyl Ketone	µg/g		0.041	2019-12-16	2019-12-16	<0.041	<0.041	<0.041	<0.041	<0.041	<0.041
TRANS-1,3-Dichloropropene	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
1,1,2-Trichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Toluene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2-Hexanone	µg/g		0.470	2019-12-16	2019-12-16	<0.470	<0.470	<0.470	<0.470	<0.470	<0.470
Dibromochloromethane	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Ethylene Dibromide	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Tetrachloroethene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

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AGAT WORK ORDER: 19Z555973

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		TP-01	TP-02	TP-03	TP-04	TP-05	TP-06
				SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13	2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800115	800117	800118	800119	800120	800121
1,1,1,2-Tetrachloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Chlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Ethylbenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
m & p-Xylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Bromoform	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Styrene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1,2,2- Tetrachloroethane	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
o-Xylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,3-Dichlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,4-Dichlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,2-Dichlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,2,4-Trichlorobenzene	µg/g		0.007	2019-12-16	2019-12-16	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Xylenes (Total)	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,3-Dichloropropene (Cis + Trans)	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		2019-12-16	2019-12-16	113	97	109	98	103	102
4-Bromofluorobenzene	% Recovery	50-140		2019-12-16	2019-12-16	84	105	78	117	94	96

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

Parameter	Unit	G / S	RDL	Date Prepared	SAMPLE DESCRIPTION:	TP-07	TP-08	TP-09	TP-10
					SAMPLE TYPE:	Soil	Soil	Soil	Soil
					DATE SAMPLED:	2019-12-13	2019-12-13	2019-12-13	2019-12-13
						800122	800123	800124	800125
Chloromethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Vinyl Chloride	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Bromomethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Chloroethane	µg/g		0.005	2019-12-16	2019-12-16	<0.005	<0.005	<0.005	<0.005
Trichlorofluoromethane	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004
Acetone	µg/g		0.130	2019-12-16	2019-12-16	<0.130	<0.130	<0.130	<0.130
1,1-Dichloroethylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Methylene Chloride	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
TRANS-1,2-Dichloroethylene	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003
Methyl tert-butyl Ether	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004
1,1-Dichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Methyl Ethyl Ketone	µg/g		0.044	2019-12-16	2019-12-16	<0.044	<0.044	<0.044	<0.044
CIS 1,2-Dichloroethylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Chloroform	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,2- Dichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,1,1-Trichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Carbon Tetrachloride	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Benzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,2-Dichloropropane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Trichloroethylene	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004
Bromodichloromethane	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003
CIS-1,3-Dichloropropene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Methyl Isobutyl Ketone	µg/g		0.041	2019-12-16	2019-12-16	<0.041	<0.041	<0.041	<0.041
TRANS-1,3-Dichloropropene	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003
1,1,2-Trichloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Toluene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
2-Hexanone	µg/g		0.470	2019-12-16	2019-12-16	<0.470	<0.470	<0.470	<0.470
Dibromochloromethane	µg/g		0.003	2019-12-16	2019-12-16	<0.003	<0.003	<0.003	<0.003
Ethylene Dibromide	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Tetrachloroethene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil

DATE RECEIVED: 2019-12-13

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:		TP-07	TP-08	TP-09	TP-10
				SAMPLE TYPE:		Soil	Soil	Soil	Soil
				DATE SAMPLED:		2019-12-13	2019-12-13	2019-12-13	2019-12-13
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	800122	800123	800124	800125
1,1,1,2-Tetrachloroethane	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Chlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Ethylbenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
m & p-Xylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Bromoform	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Styrene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,1,2,2- Tetrachloroethane	µg/g		0.004	2019-12-16	2019-12-16	<0.004	<0.004	<0.004	<0.004
o-Xylene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,3-Dichlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,4-Dichlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,2-Dichlorobenzene	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,2,4-Trichlorobenzene	µg/g		0.007	2019-12-16	2019-12-16	<0.007	<0.007	<0.007	<0.007
Xylenes (Total)	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
1,3-Dichloropropene (Cis + Trans)	µg/g		0.002	2019-12-16	2019-12-16	<0.002	<0.002	<0.002	<0.002
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		2019-12-16	2019-12-16	99	101	98	97
4-Bromofluorobenzene	% Recovery	50-140		2019-12-16	2019-12-16	109	110	108	112

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

800115-800125 Results are based on the dry weight of the soil.
Results relate only to the items tested.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Pascal Renella

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
800117	TP-02	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Lead	µg/g	120	134
800121	TP-06	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Barium	µg/g	390	443
800121	TP-06	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Cobalt	µg/g	22	25.3
800121	TP-06	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Vanadium	µg/g	86	110

Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11206675-E1 (PO#73518359)

SAMPLING SITE:

AGAT WORK ORDER: 19Z555973

ATTENTION TO: Pascal Renella

SAMPLED BY:

Soil Analysis															
RPT Date: Dec 16, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	800115	800115	<0.8	<0.8	NA	< 0.8	124%	70%	130%	96%	80%	120%	92%	70%	130%
Arsenic	800115	800115	5	5	0.0%	< 1	111%	70%	130%	106%	80%	120%	107%	70%	130%
Barium	800115	800115	142	145	2.1%	< 2	102%	70%	130%	102%	80%	120%	105%	70%	130%
Beryllium	800115	800115	0.6	0.6	NA	< 0.5	90%	70%	130%	106%	80%	120%	82%	70%	130%
Boron	800115	800115	6	6	NA	< 5	87%	70%	130%	99%	80%	120%	94%	70%	130%
Boron (Hot Water Soluble)	800115	800115	0.19	0.20	NA	< 0.10	104%	60%	140%	102%	70%	130%	95%	60%	140%
Cadmium	800115	800115	<0.5	<0.5	NA	< 0.5	87%	70%	130%	106%	80%	120%	105%	70%	130%
Chromium	800115	800115	51	54	5.7%	< 2	91%	70%	130%	101%	80%	120%	103%	70%	130%
Cobalt	800115	800115	10.7	10.6	0.9%	< 0.5	93%	70%	130%	103%	80%	120%	98%	70%	130%
Copper	800115	800115	19	19	0.0%	< 1	90%	70%	130%	111%	80%	120%	100%	70%	130%
Lead	800115	800115	13	13	0.0%	< 1	105%	70%	130%	102%	80%	120%	101%	70%	130%
Molybdenum	800115	800115	0.6	0.7	NA	< 0.5	95%	70%	130%	97%	80%	120%	99%	70%	130%
Nickel	800115	800115	29	30	3.4%	< 1	96%	70%	130%	106%	80%	120%	101%	70%	130%
Selenium	800115	800115	0.6	0.6	NA	< 0.4	108%	70%	130%	104%	80%	120%	108%	70%	130%
Silver	800115	800115	<0.2	<0.2	NA	< 0.2	86%	70%	130%	102%	80%	120%	96%	70%	130%
Thallium	800115	800115	<0.4	<0.4	NA	< 0.4	105%	70%	130%	99%	80%	120%	98%	70%	130%
Uranium	800115	800115	0.8	0.9	NA	< 0.5	107%	70%	130%	99%	80%	120%	101%	70%	130%
Vanadium	800115	800115	47	48	2.1%	< 1	92%	70%	130%	98%	80%	120%	103%	70%	130%
Zinc	800115	800115	61	61	0.0%	< 5	101%	70%	130%	112%	80%	120%	106%	70%	130%
Chromium VI	800123	800123	<0.2	<0.2	NA	< 0.2	98%	80%	120%	83%	70%	130%	89%	70%	130%
Cyanide	800123	800123	<0.040	<0.040	NA	< 0.040	92%	70%	130%	95%	80%	120%	105%	70%	130%
Mercury	800115	800115	<0.10	<0.10	NA	< 0.10	108%	70%	130%	95%	80%	120%	102%	70%	130%
Electrical Conductivity	800115	800115	0.218	0.222	1.8%	< 0.005	100%	90%	110%						
Sodium Adsorption Ratio	800115	800115	0.848	0.809	4.7%	NA									
pH, 2:1 CaCl2 Extraction	800125	800125	7.64	7.68	0.5%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.

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

pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:

divine Basily

Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Dec 16, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

F1 (C6 to C10)	800125	800125	< 5	< 5	NA	< 5	75%	60%	130%	87%	85%	115%	80%	70%	130%
F2 (C10 to C16)	800115	800115	< 10	< 10	NA	< 10	93%	60%	130%	93%	80%	120%	71%	70%	130%
F3 (C16 to C34)	800115	800115	< 50	< 50	NA	< 50	94%	60%	130%	98%	80%	120%	73%	70%	130%
F4 (C34 to C50)	800115	800115	< 50	< 50	NA	< 50	92%	60%	130%	113%	80%	120%	94%	70%	130%

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

Naphthalene	800125	800125	< 0.05	< 0.05	NA	< 0.05	79%	50%	140%	81%	50%	140%	73%	50%	140%
Acenaphthylene	800125	800125	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	86%	50%	140%	78%	50%	140%
Acenaphthene	800125	800125	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	79%	50%	140%	71%	50%	140%
Fluorene	800125	800125	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	98%	50%	140%	90%	50%	140%
Phenanthrene	800125	800125	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	95%	50%	140%	84%	50%	140%
Anthracene	800125	800125	< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	97%	50%	140%	89%	50%	140%
Fluoranthene	800125	800125	< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	106%	50%	140%	98%	50%	140%
Pyrene	800125	800125	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	109%	50%	140%	84%	50%	140%
Benz(a)anthracene	800125	800125	< 0.05	< 0.05	NA	< 0.05	79%	50%	140%	75%	50%	140%	96%	50%	140%
Chrysene	800125	800125	< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	87%	50%	140%	76%	50%	140%
Benzo(b)fluoranthene	800125	800125	< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	104%	50%	140%	101%	50%	140%
Benzo(k)fluoranthene	800125	800125	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	99%	50%	140%	98%	50%	140%
Benzo(a)pyrene	800125	800125	< 0.05	< 0.05	NA	< 0.05	110%	50%	140%	107%	50%	140%	102%	50%	140%
Indeno(1,2,3-cd)pyrene	800125	800125	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	95%	50%	140%	82%	50%	140%
Dibenz(a,h)anthracene	800125	800125	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	106%	50%	140%	93%	50%	140%
Benzo(g,h,i)perylene	800125	800125	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	93%	50%	140%	90%	50%	140%

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

Dichlorodifluoromethane	795489		< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	94%	50%	140%	95%	50%	140%
Vinyl Chloride	795489		< 0.02	< 0.02	NA	< 0.02	114%	50%	140%	101%	50%	140%	79%	50%	140%
Bromomethane	795489		< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	114%	50%	140%	86%	50%	140%
Trichlorofluoromethane	795489		< 0.05	< 0.05	NA	< 0.05	84%	50%	140%	74%	50%	140%	87%	50%	140%
Acetone	795489		< 0.50	< 0.50	NA	< 0.50	102%	50%	140%	90%	50%	140%	98%	50%	140%
1,1-Dichloroethylene	795489		< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	108%	60%	130%	103%	50%	140%
Methylene Chloride	795489		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	103%	60%	130%	93%	50%	140%
Trans- 1,2-Dichloroethylene	795489		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	86%	60%	130%	109%	50%	140%
Methyl tert-butyl Ether	795489		< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	114%	60%	130%	102%	50%	140%
1,1-Dichloroethane	795489		< 0.02	< 0.02	NA	< 0.02	107%	50%	140%	79%	60%	130%	90%	50%	140%
Methyl Ethyl Ketone	795489		< 0.50	< 0.50	NA	< 0.50	117%	50%	140%	90%	50%	140%	88%	50%	140%
Cis- 1,2-Dichloroethylene	795489		< 0.02	< 0.02	NA	< 0.02	109%	50%	140%	77%	60%	130%	91%	50%	140%
Chloroform	795489		< 0.04	< 0.04	NA	< 0.04	87%	50%	140%	76%	60%	130%	87%	50%	140%
1,2-Dichloroethane	795489		< 0.03	< 0.03	NA	< 0.03	102%	50%	140%	75%	60%	130%	93%	50%	140%
1,1,1-Trichloroethane	795489		< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	75%	60%	130%	102%	50%	140%
Carbon Tetrachloride	795489		< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	80%	60%	130%	94%	50%	140%

Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Dec 16, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Benzene	795489		< 0.02	< 0.02	NA	< 0.02	115%	50%	140%	74%	60%	130%	91%	50%	140%
1,2-Dichloropropane	795489		< 0.03	< 0.03	NA	< 0.03	107%	50%	140%	86%	60%	130%	78%	50%	140%
Trichloroethylene	795489		< 0.03	< 0.03	NA	< 0.03	117%	50%	140%	96%	60%	130%	73%	50%	140%
Bromodichloromethane	795489		< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	103%	60%	130%	102%	50%	140%
Methyl Isobutyl Ketone	795489		< 0.50	< 0.50	NA	< 0.50	110%	50%	140%	82%	50%	140%	91%	50%	140%
1,1,2-Trichloroethane	795489		< 0.04	< 0.04	NA	< 0.04	103%	50%	140%	85%	60%	130%	84%	50%	140%
Toluene	795489		< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	71%	60%	130%	90%	50%	140%
Dibromochloromethane	795489		< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	83%	60%	130%	103%	50%	140%
Ethylene Dibromide	795489		< 0.04	< 0.04	NA	< 0.04	117%	50%	140%	84%	60%	130%	81%	50%	140%
Tetrachloroethylene	795489		< 0.05	< 0.05	NA	< 0.05	119%	50%	140%	102%	60%	130%	77%	50%	140%
1,1,1,2-Tetrachloroethane	795489		< 0.04	< 0.04	NA	< 0.04	103%	50%	140%	86%	60%	130%	99%	50%	140%
Chlorobenzene	795489		< 0.05	< 0.05	NA	< 0.05	119%	50%	140%	88%	60%	130%	80%	50%	140%
Ethylbenzene	795489		< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	88%	60%	130%	75%	50%	140%
m & p-Xylene	795489		< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	99%	60%	130%	75%	50%	140%
Bromoform	795489		< 0.05	< 0.05	NA	< 0.05	71%	50%	140%	87%	60%	130%	98%	50%	140%
Styrene	795489		< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	102%	60%	130%	96%	50%	140%
1,1,2,2-Tetrachloroethane	795489		< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	103%	60%	130%	78%	50%	140%
o-Xylene	795489		< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	100%	60%	130%	76%	50%	140%
1,3-Dichlorobenzene	795489		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	115%	60%	130%	75%	50%	140%
1,4-Dichlorobenzene	795489		< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	86%	60%	130%	71%	50%	140%
1,2-Dichlorobenzene	795489		< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	103%	60%	130%	75%	50%	140%
1,3-Dichloropropene	795489		< 0.04	< 0.04	NA	< 0.04	87%	50%	140%	94%	60%	130%	98%	50%	140%
n-Hexane	795489		< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	102%	60%	130%	96%	50%	140%
Volatile Organic Compounds in Soil															
Chloromethane	800115	800115	< 0.002	< 0.002	NA	< 0.002	95%	60%	140%	85%	60%	140%	82%	60%	140%
Vinyl Chloride	800115	800115	< 0.002	< 0.002	NA	< 0.002	81%	60%	140%	115%	60%	140%	112%	60%	140%
Bromomethane	800115	800115	< 0.002	< 0.002	NA	< 0.002	83%	60%	140%	80%	60%	140%	91%	60%	140%
Chloroethane	800115	800115	< 0.005	< 0.005	NA	< 0.005	88%	60%	140%	94%	60%	140%	84%	60%	140%
Trichlorofluoromethane	800115	800115	< 0.004	< 0.004	NA	< 0.004	111%	60%	140%	99%	60%	140%	87%	60%	140%
Acetone	800115	800115	< 0.130	< 0.130	NA	< 0.130	108%	60%	140%	97%	60%	140%	107%	60%	140%
1,1-Dichloroethylene	800115	800115	< 0.002	< 0.002	NA	< 0.002	109%	60%	140%	104%	60%	140%	103%	60%	140%
Methylene Chloride	800115	800115	< 0.002	< 0.002	NA	< 0.002	92%	60%	140%	117%	60%	140%	89%	60%	140%
TRANS-1,2-Dichloroethylene	800115	800115	< 0.003	< 0.003	NA	< 0.003	92%	60%	140%	84%	60%	140%	78%	60%	140%
Methyl tert-butyl Ether	800115	800115	< 0.004	< 0.004	NA	< 0.004	92%	60%	140%	101%	60%	140%	83%	60%	140%
1,1-Dichloroethane	800115	800115	< 0.002	< 0.002	NA	< 0.002	117%	60%	140%	102%	60%	140%	93%	60%	140%
Methyl Ethyl Ketone	800115	800115	< 0.044	< 0.044	NA	< 0.044	83%	60%	140%	111%	60%	140%	86%	60%	140%
CIS 1,2-Dichloroethylene	800115	800115	< 0.002	< 0.002	NA	< 0.002	95%	60%	140%	89%	60%	140%	90%	60%	140%
Chloroform	800115	800115	< 0.002	< 0.002	NA	< 0.002	103%	60%	140%	94%	60%	140%	79%	60%	140%
1,2- Dichloroethane	800115	800115	< 0.002	< 0.002	NA	< 0.002	101%	60%	140%	92%	60%	140%	88%	60%	140%

Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11206675-E1 (PO#73518359)

SAMPLING SITE:

AGAT WORK ORDER: 19Z555973

ATTENTION TO: Pascal Renella

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Dec 16, 2019			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,1,1-Trichloroethane	800115	800115	< 0.002	< 0.002	NA	< 0.002	114%	60%	140%	103%	60%	140%	71%	60%	140%
Carbon Tetrachloride	800115	800115	< 0.002	< 0.002	NA	< 0.002	113%	60%	140%	116%	60%	140%	80%	60%	140%
Benzene	800115	800115	< 0.002	< 0.002	NA	< 0.002	99%	60%	140%	90%	60%	140%	77%	60%	140%
1,2-Dichloropropane	800115	800115	< 0.002	< 0.002	NA	< 0.002	104%	60%	140%	96%	60%	140%	84%	60%	140%
Trichloroethylene	800115	800115	< 0.004	< 0.004	NA	< 0.004	88%	60%	140%	83%	60%	140%	84%	60%	140%
Bromodichloromethane	800115	800115	< 0.003	< 0.003	NA	< 0.003	117%	60%	140%	107%	60%	140%	83%	60%	140%
CIS-1,3-Dichloropropene	800115	800115	< 0.002	< 0.002	NA	< 0.002	93%	60%	140%	113%	60%	140%	109%	60%	140%
Methyl Isobutyl Ketone	800115	800115	< 0.041	< 0.041	NA	< 0.041	105%	60%	140%	88%	60%	140%	100%	60%	140%
TRANS-1,3-Dichloropropene	800115	800115	< 0.003	< 0.003	NA	< 0.003	88%	60%	140%	111%	60%	140%	78%	60%	140%
1,1,2-Trichloroethane	800115	800115	< 0.002	< 0.002	NA	< 0.002	95%	60%	140%	91%	60%	140%	81%	60%	140%
Toluene	800115	800115	< 0.002	< 0.002	NA	< 0.002	101%	60%	140%	99%	60%	140%	78%	60%	140%
2-Hexanone	800115	800115	< 0.470	< 0.470	NA	< 0.470	103%	60%	140%	83%	60%	140%	99%	60%	140%
Dibromochloromethane	800115	800115	< 0.003	< 0.003	NA	< 0.003	114%	60%	140%	110%	60%	140%	89%	60%	140%
Ethylene Dibromide	800115	800115	< 0.002	< 0.002	NA	< 0.002	94%	60%	140%	94%	60%	140%	78%	60%	140%
Tetrachloroethene	800115	800115	< 0.002	< 0.002	NA	< 0.002	96%	60%	140%	93%	60%	140%	83%	60%	140%
1,1,1,2-Tetrachloroethane	800115	800115	< 0.002	< 0.002	NA	< 0.002	114%	60%	140%	114%	60%	140%	95%	60%	140%
Chlorobenzene	800115	800115	< 0.002	< 0.002	NA	< 0.002	96%	60%	140%	96%	60%	140%	93%	60%	140%
Ethylbenzene	800115	800115	< 0.002	< 0.002	NA	< 0.002	98%	60%	140%	97%	60%	140%	96%	60%	140%
m & p-Xylene	800115	800115	< 0.002	< 0.002	NA	< 0.002	94%	60%	140%	92%	60%	140%	82%	60%	140%
Bromoform	800115	800115	< 0.002	< 0.002	NA	< 0.002	104%	60%	140%	95%	60%	140%	99%	60%	140%
Styrene	800115	800115	< 0.002	< 0.002	NA	< 0.002	77%	60%	140%	83%	60%	140%	89%	60%	140%
1,1,2,2- Tetrachloroethane	800115	800115	< 0.004	< 0.004	NA	< 0.004	100%	60%	140%	91%	60%	140%	85%	60%	140%
o-Xylene	800115	800115	< 0.002	< 0.002	NA	< 0.002	97%	60%	140%	96%	60%	140%	96%	60%	140%
1,3-Dichlorobenzene	800115	800115	< 0.002	< 0.002	NA	< 0.002	83%	60%	140%	88%	60%	140%	84%	60%	140%
1,4-Dichlorobenzene	800115	800115	< 0.002	< 0.002	NA	< 0.002	82%	60%	140%	86%	60%	140%	103%	60%	140%
1,2-Dichlorobenzene	800115	800115	< 0.002	< 0.002	NA	< 0.002	82%	60%	140%	85%	60%	140%	85%	60%	140%
1,2,4-Trichlorobenzene	800115	800115	< 0.007	< 0.007	NA	< 0.007	87%	60%	140%	87%	60%	140%	88%	60%	140%
1,3-Dichloropropene (Cis + Trans)	800115	800115	< 0.002	< 0.002	NA	< 0.002	91%	60%	140%	112%	60%	140%	94%	60%	140%

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

Certified By:



Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

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
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6068	SW 846 Method 3060A; Method 7196A	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A; SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	ICP/OES
pH, 2:1 CaCl ₂ Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER

Method Summary

CLIENT NAME: GHD LIMITED
PROJECT: 11206675-E1 (PO#73518359)
SAMPLING SITE:
AGAT WORK ORDER: 19Z555973
ATTENTION TO: Pascal Renella
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Moisture Content	ORG-91-5106	Tier 1 Method	BALANCE
Naphthalene-d8	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Acenaphthene-d10	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Chrysene-d12	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

Method Summary

CLIENT NAME: GHD LIMITED
PROJECT: 11206675-E1 (PO#73518359)
SAMPLING SITE:
AGAT WORK ORDER: 19Z555973
ATTENTION TO: Pascal Renella
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
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
Chloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroethane	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
CIS 1,2-Dichloroethylene	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
CIS-1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
TRANS-1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
2-Hexanone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 19Z555973

PROJECT: 11206675-E1 (PO#73518359)

ATTENTION TO: Pascal Renella

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,1,2,2- Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2,4-Trichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002		(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002		(P&T)GC/MS

Chain of Custody Record

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

Report Information: GHD Limited

Company: _____

Contact: Pascal Renella

Address: _____

Phone: _____ Fax: _____

Reports to be sent to: Pascal.Renella@ghd.com

1. Email: _____

2. Email: _____

Project Information:

Project: 11206675-E1

Site Location: 211 Central Blvd

Sampled By: Ryan VanderPluit

AGAT Quote #: 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:	GIRD Limited	
Contact:		
Address:		
Email:	AP Invoices-735@gird.com	

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

☒ Regulation 153/04 ☐ Sewer Use ☐ Regulation 558

Table 3 ☐ Sanitary ☐ CCME
Indicate One

☐ Ind/Com ☐ Storm ☐ Prov. Water Quality Objectives (PWQO)

☒ Res/Park ☐ Other

☐ Agriculture

Soil Texture (Check One) Region _____ _____
Indicate One

☐ Coarse ☐ MISA

☒ Fine _____
Indicate One

Is this submission for a **Record of Site Condition?** **Report Guideline on Certificate of Analysis**

☒ Yes ☐ No ☐ Yes ☒ No

Sample Matrix Legend

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

[illegible]

Samples Relinquished By (Print Name and Sign): <i>R. on [Signature]</i>	Date: <i>Dec 13/19</i>	Time: <i>14:47</i>	Samples Received By (Print Name and Sign): <i>Jess Saes [Signature]</i>	Date: <i>13/Dec/19</i>	Time: <i>1445</i>	Page <i>1</i> of <i>1</i>
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign): <i>[Signature]</i>	Date: <i>Dec 14/19</i>	Time: <i>1105AM</i>	
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign): <i>[Signature]</i>	Date: <i>Dec 14/19</i>	Time: <i>1105AM</i>	

No: **T 098420**

Laboratory Use Only

Work Order #: 19T555972

Cooler Quantity: 5.5 | 5.7 | 5.6

Arrival Temperatures: 8.8 | 9.8 | 9.4

Custody Seal Intact: ☐ Yes ☐ No ☒ N/A

Notes: ice packs

Turnaround Time (TAT) Required:

Regular TAT ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Monday, Dec 16, 2014

Please provide prior notification for rush TAT

**TAT is exclusive of weekends and statutory holidays*

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

CLIENT NAME: GHD LIMITED
455 Phillip St
WATERLOO, ON N2V1C2
(519) 884-0510

ATTENTION TO: Joseph Drader

PROJECT: 11206675-E2 (PO#73518359)

AGAT WORK ORDER: 20Z564516

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

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

DATE REPORTED: Jan 24, 2020

PAGES (INCLUDING COVER): 24

VERSION*: 1

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

*NOTES

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



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

ATTENTION TO: Joseph Drader

SAMPLED BY:

Ignitability in Soil

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

SAMPLE DESCRIPTION: Composite

SAMPLE TYPE: Soil

DATE SAMPLED: 2020-01-15

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	872106
Ignitability				2020-01-24	2020-01-24	N

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

872106 N = Non-Flammable Solid
Non-ignitable-Wet soil sample with pebbles

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

				SAMPLE DESCRIPTION:		BH12-ENV1		BH1-ENV1		BH3-ENV1		DUP1
				SAMPLE TYPE:		Soil		Soil		Soil		Soil
				DATE SAMPLED:		2020-01-15		2020-01-15		2020-01-15		2020-01-15
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	868250	RDL	868252	RDL	868253	RDL	868254
Antimony	µg/g		0.8	2020-01-24	2020-01-24	<0.8	0.8	<0.8	0.8	<0.8		<0.8
Arsenic	µg/g		1	2020-01-24	2020-01-24	3	1	2	1	3		3
Barium	µg/g		2	2020-01-24	2020-01-24	35	2	67	2	123		40
Beryllium	µg/g		0.5	2020-01-24	2020-01-24	<0.5	0.5	<0.5	0.5	<0.5		<0.5
Boron	µg/g		5	2020-01-24	2020-01-24	6	5	6	5	10		6
Boron (Hot Water Soluble)	µg/g		0.10	2020-01-24	2020-01-24	0.31	0.10	0.21	0.10	0.34		0.30
Cadmium	µg/g		0.5	2020-01-24	2020-01-24	<0.5	0.5	<0.5	0.5	<0.5		<0.5
Chromium	µg/g		2	2020-01-24	2020-01-24	13	2	16	2	10		14
Cobalt	µg/g		0.5	2020-01-24	2020-01-24	3.7	0.5	4.8	0.5	3.3		3.8
Copper	µg/g		1	2020-01-24	2020-01-24	8	1	10	1	6		8
Lead	µg/g		1	2020-01-24	2020-01-24	7	1	7	1	5		7
Molybdenum	µg/g		0.5	2020-01-24	2020-01-24	<0.5	0.5	1.9	0.5	<0.5		<0.5
Nickel	µg/g		1	2020-01-24	2020-01-24	7	1	9	1	7		7
Selenium	µg/g		0.4	2020-01-24	2020-01-24	<0.4	0.4	<0.4	0.4	<0.4		<0.4
Silver	µg/g		0.2	2020-01-24	2020-01-24	<0.2	0.2	0.8	0.2	<0.2		<0.2
Thallium	µg/g		0.4	2020-01-24	2020-01-24	<0.4	0.4	<0.4	0.4	<0.4		<0.4
Uranium	µg/g		0.5	2020-01-24	2020-01-24	<0.5	0.5	<0.5	0.5	<0.5		<0.5
Vanadium	µg/g		1	2020-01-24	2020-01-24	13	1	21	1	8		14
Zinc	µg/g		5	2020-01-24	2020-01-24	40	5	31	5	16		43
Chromium VI	µg/g		0.2	2020-01-24	2020-01-24	<0.2	0.2	<0.2	0.2	<0.2		<0.2
Cyanide	µg/g		0.040	2020-01-24	2020-01-24	<0.040	0.050	0.072	0.040	<0.040		<0.040
Mercury	µg/g		0.10	2020-01-24	2020-01-24	<0.10	0.10	<0.10	0.10	<0.10		<0.10
Electrical Conductivity	mS/cm		0.005	2020-01-24	2020-01-24	0.561	0.005	0.331	0.005	0.233		0.515
Sodium Adsorption Ratio	NA		NA	2020-01-24	2020-01-24	1.83	NA	0.643	NA	0.216		1.53
pH, 2:1 CaCl2 Extraction	pH Units		NA	2020-01-24	2020-01-24	7.85	NA	7.59	NA	8.12		7.83

Certified By:

Divine Basily



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

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

868250 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl₂ extract prepared at 2:1 ratio. SAR is a calculated parameter.

868252 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl₂ extract prepared at 2:1 ratio. SAR is a calculated parameter.

Cyanide - RDL was increased to correct for the moisture content of the sample.
Value reported was confirmed by re-analysis

868253-868254 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl₂ extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

ATTENTION TO: Joseph Drader

SAMPLED BY:

O. Reg. 558 Metals

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

SAMPLE DESCRIPTION: Composite						
SAMPLE TYPE: Soil						
DATE SAMPLED: 2020-01-15						
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	872106
Arsenic Leachate	mg/L	2.5	0.010	2020-01-23	2020-01-23	<0.010
Barium Leachate	mg/L	100	0.100	2020-01-23	2020-01-23	0.499
Boron Leachate	mg/L	500	0.050	2020-01-23	2020-01-23	<0.050
Cadmium Leachate	mg/L	0.5	0.010	2020-01-23	2020-01-23	<0.010
Chromium Leachate	mg/L	5	0.010	2020-01-23	2020-01-23	<0.010
Lead Leachate	mg/L	5	0.010	2020-01-23	2020-01-23	<0.010
Selenium Leachate	mg/L	1	0.010	2020-01-23	2020-01-23	<0.010
Silver Leachate	mg/L	5	0.010	2020-01-23	2020-01-23	<0.010
Uranium Leachate	mg/L	10	0.050	2020-01-23	2020-01-23	<0.050

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

O. Reg. 558 TCLP Preparation

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

				SAMPLE DESCRIPTION: Composite	
				SAMPLE TYPE: Soil	
				DATE SAMPLED: 2020-01-15	
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed
Analysis Start Date					872106
pH (Initial)	pH Units		N/A		2020/01/21
pH (Final)	pH Units		N/A		8.76
Extraction Fluid					6.22
					2

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Divine Basily



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

				SAMPLE DESCRIPTION:		BH12-ENV1	BH1-ENV1	BH3-ENV1	DUP1
				SAMPLE TYPE:		Soil	Soil	Soil	Soil
				DATE SAMPLED:		2020-01-15	2020-01-15	2020-01-15	2020-01-15
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	868250	868252	868253	868254
Naphthalene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g		0.05	2020-01-21	2020-01-22	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	2020-01-21	2020-01-22	7.0	15.7	3.5	4.7
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140		2020-01-21	2020-01-22	70	69	73	78
Acenaphthene-d10	%	50-140		2020-01-21	2020-01-22	69	75	66	73
Chrysene-d12	%	50-140		2020-01-21	2020-01-22	87	84	76	84

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

868250-868254 Results are based on the dry weight of the soil.

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

2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

				SAMPLE DESCRIPTION:		BH12-ENV1	BH1-ENV1	BH3-ENV1	DUP1
				SAMPLE TYPE:		Soil	Soil	Soil	Soil
				DATE SAMPLED:		2020-01-15	2020-01-15	2020-01-15	2020-01-15
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	868250	868252	868253	868254
F1 (C6 to C10)	µg/g		5	2020-01-21	2020-01-21	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	2020-01-21	2020-01-21	<5	<5	<5	<5
F2 (C10 to C16)	µg/g		10	2020-01-23	2020-01-24	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	2020-01-23	2020-01-24	<10	<10	<10	<10
F3 (C16 to C34)	µg/g		50	2020-01-23	2020-01-24	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g		50	2020-01-23	2020-01-24	<50	<50	<50	<50
F4 (C34 to C50)	µg/g		50	2020-01-23	2020-01-24	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50			NA	NA	NA	NA
Moisture Content	%		0.1			7.0	15.7	3.5	4.7
Surrogate	Unit	Acceptable Limits							
Terphenyl	%		60-140	2020-01-23	2020-01-24	77	126	106	81

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

868250-868254

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

The chromatogram has returned to baseline by the retention time of nC50.

Total C6 - C50 results are corrected for BTEX and PAH contributions.

C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.

C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

				SAMPLE DESCRIPTION:		Trip Blank
				SAMPLE TYPE:		MeOH
				DATE SAMPLED:		2020-01-15
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	868256
Dichlorodifluoromethane	µg/g		0.05	2020-01-17	2020-01-24	<0.05
Vinyl Chloride	ug/g		0.02	2020-01-17	2020-01-24	<0.02
Bromomethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Trichlorofluoromethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Acetone	ug/g		0.50	2020-01-17	2020-01-24	<0.50
1,1-Dichloroethylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Methylene Chloride	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Trans- 1,2-Dichloroethylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Methyl tert-butyl Ether	ug/g		0.05	2020-01-17	2020-01-24	<0.05
1,1-Dichloroethane	ug/g		0.02	2020-01-17	2020-01-24	<0.02
Methyl Ethyl Ketone	ug/g		0.50	2020-01-17	2020-01-24	<0.50
Cis- 1,2-Dichloroethylene	ug/g		0.02	2020-01-17	2020-01-24	<0.02
Chloroform	ug/g		0.04	2020-01-17	2020-01-24	<0.04
1,2-Dichloroethane	ug/g		0.03	2020-01-17	2020-01-24	<0.03
1,1,1-Trichloroethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Carbon Tetrachloride	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Benzene	ug/g		0.02	2020-01-17	2020-01-24	<0.02
1,2-Dichloropropane	ug/g		0.03	2020-01-17	2020-01-24	<0.03
Trichloroethylene	ug/g		0.03	2020-01-17	2020-01-24	<0.03
Bromodichloromethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Methyl Isobutyl Ketone	ug/g		0.50	2020-01-17	2020-01-24	<0.50
1,1,2-Trichloroethane	ug/g		0.04	2020-01-17	2020-01-24	<0.04
Toluene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Dibromochloromethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Ethylene Dibromide	ug/g		0.04	2020-01-17	2020-01-24	<0.04
Tetrachloroethylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
1,1,1,2-Tetrachloroethane	ug/g		0.04	2020-01-17	2020-01-24	<0.04
Chlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Ethylbenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
m & p-Xylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

SAMPLE DESCRIPTION: Trip Blank						
SAMPLE TYPE: MeOH						
DATE SAMPLED: 2020-01-15						
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	868256
Bromoform	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Styrene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
1,1,2,2-Tetrachloroethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05
o-Xylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
1,3-Dichlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
1,4-Dichlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
1,2-Dichlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05
Xylene Mixture	ug/g		0.05	2020-01-17	2020-01-24	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g		0.04	2020-01-17	2020-01-24	<0.04
n-Hexane	µg/g		0.05	2020-01-17	2020-01-24	<0.05
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	50-140		2020-01-17	2020-01-24	122
4-Bromofluorobenzene	% Recovery	50-140		2020-01-17	2020-01-24	90

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

868256 A small amount of methanol extract was diluted in water and analyzed by purge & trap GC/MS.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

Parameter	Unit	G / S	RDL	Date Prepared	SAMPLE DESCRIPTION:				
					SAMPLE TYPE:				
					DATE SAMPLED:				
					868250 868252 868253 868254				
Dichlorodifluoromethane	µg/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g		0.02	2020-01-17	2020-01-24	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g		0.50	2020-01-17	2020-01-24	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g		0.02	2020-01-17	2020-01-24	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g		0.50	2020-01-17	2020-01-24	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g		0.02	2020-01-17	2020-01-24	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g		0.04	2020-01-17	2020-01-24	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g		0.03	2020-01-17	2020-01-24	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g		0.02	2020-01-17	2020-01-24	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g		0.03	2020-01-17	2020-01-24	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g		0.03	2020-01-17	2020-01-24	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g		0.50	2020-01-17	2020-01-24	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g		0.04	2020-01-17	2020-01-24	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g		0.04	2020-01-17	2020-01-24	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g		0.04	2020-01-17	2020-01-24	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

				SAMPLE DESCRIPTION:		BH12-ENV1	BH1-ENV1	BH3-ENV1	DUP1
				SAMPLE TYPE:		Soil	Soil	Soil	Soil
				DATE SAMPLED:		2020-01-15	2020-01-15	2020-01-15	2020-01-15
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	868250	868252	868253	868254
Bromoform	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	ug/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g		0.04	2020-01-17	2020-01-24	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g		0.05	2020-01-17	2020-01-24	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		2020-01-17	2020-01-24	120	120	122	121
4-Bromofluorobenzene	% Recovery	50-140		2020-01-17	2020-01-24	89	91	91	91

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

868250-868254 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

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

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

ATTENTION TO: Joseph Drader

SAMPLED BY:

O. Reg. 558 - Benzene

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

SAMPLE DESCRIPTION: Composite

SAMPLE TYPE: Soil

DATE SAMPLED: 2020-01-15

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	872106
Benzene	mg/L	0.5	0.020	2020-01-24	2020-01-24	<0.020

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

872106 Surrogate Recovery for Toluene-d8:101 %
Surrogate recovery for 4-Bromofluorobenzene:98 %
Sample was prepared using Regulation 558 protocol and a zero headspace extractor.
Results relate only to the items tested.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

O. Reg. 558 - Benzo(a) pyrene

DATE RECEIVED: 2020-01-16

DATE REPORTED: 2020-01-24

SAMPLE DESCRIPTION: Composite						
SAMPLE TYPE: Soil						
DATE SAMPLED: 2020-01-15						
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	872106
Benzo(a)pyrene	mg/L	0.001	0.001	2020-01-23	2020-01-24	<0.001
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%	50-140		2020-01-23	2020-01-24	93
Acenaphthene-d10	%	50-140		2020-01-23	2020-01-24	97
Chrysene-d12	%	50-140		2020-01-23	2020-01-24	101

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

872106 The sample was leached according to Regulation 558 protocol. Analysis was performed on the leachate.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11206675-E2 (PO#73518359)

SAMPLING SITE:

AGAT WORK ORDER: 20Z564516

ATTENTION TO: Joseph Drader

SAMPLED BY:

Soil Analysis

RPT Date: Jan 24, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

Antimony	872637		<0.8	<0.8	NA	< 0.8	129%	70%	130%	106%	80%	120%	99%	70%	130%
Arsenic	872637		1	1	NA	< 1	111%	70%	130%	111%	80%	120%	111%	70%	130%
Barium	872637		26	27	3.8%	< 2	106%	70%	130%	96%	80%	120%	98%	70%	130%
Beryllium	872637		<0.5	<0.5	NA	< 0.5	91%	70%	130%	103%	80%	120%	92%	70%	130%
Boron	872637		<5	<5	NA	< 5	77%	70%	130%	103%	80%	120%	91%	70%	130%
Boron (Hot Water Soluble)	872637		<0.10	<0.10	NA	< 0.10	100%	60%	140%	95%	70%	130%	91%	60%	140%
Cadmium	872637		<0.5	<0.5	NA	< 0.5	98%	70%	130%	95%	80%	120%	98%	70%	130%
Chromium	872637		6	6	NA	< 2	97%	70%	130%	98%	80%	120%	93%	70%	130%
Cobalt	872637		2.2	2.1	NA	< 0.5	102%	70%	130%	99%	80%	120%	94%	70%	130%
Copper	872637		5	5	0.0%	< 1	97%	70%	130%	106%	80%	120%	90%	70%	130%
Lead	872637		2	2	NA	< 1	105%	70%	130%	99%	80%	120%	95%	70%	130%
Molybdenum	872637		<0.5	<0.5	NA	< 0.5	95%	70%	130%	95%	80%	120%	94%	70%	130%
Nickel	872637		3	3	NA	< 1	94%	70%	130%	97%	80%	120%	89%	70%	130%
Selenium	872637		<0.4	<0.4	NA	< 0.4	113%	70%	130%	95%	80%	120%	94%	70%	130%
Silver	872637		<0.2	<0.2	NA	< 0.2	96%	70%	130%	95%	80%	120%	89%	70%	130%
Thallium	872637		<0.4	<0.4	NA	< 0.4	109%	70%	130%	97%	80%	120%	92%	70%	130%
Uranium	872637		<0.5	<0.5	NA	< 0.5	118%	70%	130%	101%	80%	120%	103%	70%	130%
Vanadium	872637		15	15	0.0%	< 1	99%	70%	130%	92%	80%	120%	96%	70%	130%
Zinc	872637		14	13	NA	< 5	103%	70%	130%	104%	80%	120%	100%	70%	130%
Chromium VI	883504		<0.2	<0.2	NA	< 0.2	92%	80%	120%	92%	70%	130%	89%	70%	130%
Cyanide	868252	868252	0.072	0.083	NA	< 0.040	94%	70%	130%	100%	80%	120%	99%	70%	130%
Mercury	872637		<0.10	<0.10	NA	< 0.10	97%	70%	130%	85%	80%	120%	86%	70%	130%
Electrical Conductivity	872637		0.568	0.558	1.8%	< 0.005	101%	90%	110%						
Sodium Adsorption Ratio	872637		5.38	5.41	0.6%	NA									
pH, 2:1 CaCl2 Extraction	883504		7.92	7.89	0.4%	NA	100%	80%	120%						

O. Reg. 558 Metals

Arsenic Leachate	872106	872106	<0.010	<0.010	NA	< 0.010	105%	70%	130%	109%	80%	120%	109%	70%	130%
Barium Leachate	872106	872106	0.499	0.516	3.5%	< 0.100	102%	70%	130%	101%	80%	120%	109%	70%	130%
Boron Leachate	872106	872106	<0.050	<0.050	NA	< 0.050	96%	70%	130%	117%	80%	120%	90%	70%	130%
Cadmium Leachate	872106	872106	<0.010	<0.010	NA	< 0.010	100%	70%	130%	97%	80%	120%	94%	70%	130%
Chromium Leachate	872106	872106	<0.010	<0.010	NA	< 0.010	102%	70%	130%	114%	80%	120%	98%	70%	130%
Lead Leachate	872106	872106	<0.010	<0.010	NA	< 0.010	102%	70%	130%	94%	80%	120%	94%	70%	130%
Selenium Leachate	872106	872106	<0.010	<0.010	NA	< 0.010	96%	70%	130%	101%	80%	120%	100%	70%	130%
Silver Leachate	872106	872106	<0.010	<0.010	NA	< 0.010	104%	70%	130%	93%	80%	120%	90%	70%	130%
Uranium Leachate	872106	872106	<0.050	<0.050	NA	< 0.050	102%	70%	130%	101%	80%	120%	101%	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
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Jan 24, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Ignitability in Soil

Ignitability	872106	872106	N	N	NA
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Comments: N = Non-Flammable Solid

NA = Not Applicable

Certified By:



Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jan 24, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

Dichlorodifluoromethane	868254	868254	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	94%	50%	140%	72%	50%	140%
Vinyl Chloride	868254	868254	< 0.02	< 0.02	NA	< 0.02	106%	50%	140%	98%	50%	140%	91%	50%	140%
Bromomethane	868254	868254	< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	99%	50%	140%	89%	50%	140%
Trichlorofluoromethane	868254	868254	< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	79%	50%	140%	78%	50%	140%
Acetone	868254	868254	< 0.50	< 0.50	NA	< 0.50	70%	50%	140%	91%	50%	140%	84%	50%	140%
1,1-Dichloroethylene	868254	868254	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	105%	60%	130%	96%	50%	140%
Methylene Chloride	868254	868254	< 0.05	< 0.05	NA	< 0.05	108%	50%	140%	104%	60%	130%	91%	50%	140%
Trans- 1,2-Dichloroethylene	868254	868254	< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	108%	60%	130%	102%	50%	140%
Methyl tert-butyl Ether	868254	868254	< 0.05	< 0.05	NA	< 0.05	86%	50%	140%	77%	60%	130%	84%	50%	140%
1,1-Dichloroethane	868254	868254	< 0.02	< 0.02	NA	< 0.02	98%	50%	140%	116%	60%	130%	103%	50%	140%
Methyl Ethyl Ketone	868254	868254	< 0.50	< 0.50	NA	< 0.50	85%	50%	140%	70%	50%	140%	100%	50%	140%
Cis- 1,2-Dichloroethylene	868254	868254	< 0.02	< 0.02	NA	< 0.02	109%	50%	140%	70%	60%	130%	107%	50%	140%
Chloroform	868254	868254	< 0.04	< 0.04	NA	< 0.04	116%	50%	140%	78%	60%	130%	112%	50%	140%
1,2-Dichloroethane	868254	868254	< 0.03	< 0.03	NA	< 0.03	119%	50%	140%	92%	60%	130%	106%	50%	140%
1,1,1-Trichloroethane	868254	868254	< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	113%	60%	130%	112%	50%	140%
Carbon Tetrachloride	868254	868254	< 0.05	< 0.05	NA	< 0.05	82%	50%	140%	111%	60%	130%	93%	50%	140%
Benzene	868254	868254	< 0.02	< 0.02	NA	< 0.02	117%	50%	140%	115%	60%	130%	112%	50%	140%
1,2-Dichloropropane	868254	868254	< 0.03	< 0.03	NA	< 0.03	110%	50%	140%	117%	60%	130%	109%	50%	140%
Trichloroethylene	868254	868254	< 0.03	< 0.03	NA	< 0.03	102%	50%	140%	116%	60%	130%	104%	50%	140%
Bromodichloromethane	868254	868254	< 0.05	< 0.05	NA	< 0.05	112%	50%	140%	73%	60%	130%	108%	50%	140%
Methyl Isobutyl Ketone	868254	868254	< 0.50	< 0.50	NA	< 0.50	82%	50%	140%	91%	50%	140%	116%	50%	140%
1,1,2-Trichloroethane	868254	868254	< 0.04	< 0.04	NA	< 0.04	104%	50%	140%	91%	60%	130%	117%	50%	140%
Toluene	868254	868254	< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	108%	60%	130%	107%	50%	140%
Dibromochloromethane	868254	868254	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	81%	60%	130%	103%	50%	140%
Ethylene Dibromide	868254	868254	< 0.04	< 0.04	NA	< 0.04	107%	50%	140%	108%	60%	130%	105%	50%	140%
Tetrachloroethylene	868254	868254	< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	102%	60%	130%	100%	50%	140%
1,1,1,2-Tetrachloroethane	868254	868254	< 0.04	< 0.04	NA	< 0.04	105%	50%	140%	76%	60%	130%	120%	50%	140%
Chlorobenzene	868254	868254	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	81%	60%	130%	105%	50%	140%
Ethylbenzene	868254	868254	< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	117%	60%	130%	100%	50%	140%
m & p-Xylene	868254	868254	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	95%	60%	130%	106%	50%	140%
Bromoform	868254	868254	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	94%	60%	130%	117%	50%	140%
Styrene	868254	868254	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	83%	60%	130%	106%	50%	140%
1,1,2,2-Tetrachloroethane	868254	868254	< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	112%	60%	130%	116%	50%	140%
o-Xylene	868254	868254	< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	75%	60%	130%	105%	50%	140%
1,3-Dichlorobenzene	868254	868254	< 0.05	< 0.05	NA	< 0.05	114%	50%	140%	84%	60%	130%	98%	50%	140%
1,4-Dichlorobenzene	868254	868254	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	89%	60%	130%	105%	50%	140%
1,2-Dichlorobenzene	868254	868254	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	99%	60%	130%	105%	50%	140%
1,3-Dichloropropene (Cis + Trans)	868254	868254	< 0.04	< 0.04	NA	< 0.04	101%	50%	140%	74%	60%	130%	109%	50%	140%
n-Hexane	868254	868254	< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	102%	60%	130%	87%	50%	140%

Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jan 24, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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

F1 (C6 to C10)	868254	868254	< 5	< 5	NA	< 5	114%	60%	130%	106%	85%	115%	106%	70%	130%
F2 (C10 to C16)	868254	868254	< 10	< 10	NA	< 10	97%	60%	130%	113%	80%	120%	85%	70%	130%
F3 (C16 to C34)	868254	868254	< 50	< 50	NA	< 50	95%	60%	130%	117%	80%	120%	100%	70%	130%
F4 (C34 to C50)	868254	868254	< 50	< 50	NA	< 50	84%	60%	130%	99%	80%	120%	99%	70%	130%

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

Naphthalene	868253	868253	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	81%	50%	140%	81%	50%	140%
Acenaphthylene	868253	868253	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	82%	50%	140%	82%	50%	140%
Acenaphthene	868253	868253	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	81%	50%	140%	81%	50%	140%
Fluorene	868253	868253	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	86%	50%	140%	85%	50%	140%
Phenanthrene	868253	868253	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	94%	50%	140%	90%	50%	140%
Anthracene	868253	868253	< 0.05	< 0.05	NA	< 0.05	119%	50%	140%	100%	50%	140%	85%	50%	140%
Fluoranthene	868253	868253	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	105%	50%	140%	105%	50%	140%
Pyrene	868253	868253	< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	107%	50%	140%	106%	50%	140%
Benz(a)anthracene	868253	868253	< 0.05	< 0.05	NA	< 0.05	70%	50%	140%	87%	50%	140%	108%	50%	140%
Chrysene	868253	868253	< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	107%	50%	140%	99%	50%	140%
Benzo(b)fluoranthene	868253	868253	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	84%	50%	140%	93%	50%	140%
Benzo(k)fluoranthene	868253	868253	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	81%	50%	140%	95%	50%	140%
Benzo(a)pyrene	868253	868253	< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	97%	50%	140%	108%	50%	140%
Indeno(1,2,3-cd)pyrene	868253	868253	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	80%	50%	140%	83%	50%	140%
Dibenz(a,h)anthracene	868253	868253	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	84%	50%	140%	89%	50%	140%
Benzo(g,h,i)perylene	868253	868253	< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	77%	50%	140%	81%	50%	140%

O. Reg. 558 - Benzo(a) pyrene

Benzo(a)pyrene	872106	872106	< 0.001	< 0.001	NA	< 0.001	116%	70%	130%	105%	70%	130%	NA	70%	130%
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O. Reg. 558 - Benzene

Benzene	872106	872106	< 0.020	< 0.020	NA	< 0.020	98%	50%	140%	107%	50%	140%	105%	60%	130%
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Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:



Method Summary

CLIENT NAME: GHD LIMITED

PROJECT: 11206675-E2 (PO#73518359)

SAMPLING SITE:

AGAT WORK ORDER: 20Z564516

ATTENTION TO: Joseph Drader

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Ignitability	INOR-93-6063	EPA SW-846 1030	BURN MOLD
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium VI	INOR-93-6068	SW 846 Method 3060A; Method 7196A	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A; SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010C	ICP/OES
pH, 2:1 CaCl ₂ Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Arsenic Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Barium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Boron Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Cadmium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Chromium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS

Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Lead Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Selenium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Silver Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Uranium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Analysis Start Date			N/A
pH (Initial)	LAB 4025	EPA SW-846 1311	PH METER
pH (Final)	LAB 4025	EPA SW-846 1311	PH METER
Extraction Fluid	LAB-93-4025	EPA SW-846 1311	N/A

Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Moisture Content	ORG-91-5106	Tier 1 Method	BALANCE
Naphthalene-d8	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Acenaphthene-d10	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
Chrysene-d12	ORG-91-5106	modified from EPA 3541 and EPA 8270E	GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P&T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
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 (Cis + Trans)	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
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z564516

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Xylene Mixture	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	EPA 1311, EPA 8260D	(P&T)GC/MS
Benzo(a)pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthene-d10	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Chrysene-d12	ORG-91-5105	modified from EPA 3541 and EPA 8270E	GC/MS



Chain of Custody Record

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

Report Information:

Company: GHD
Contact: Joseph Drader
Address: 179 Colonnade Road, Ottawa
Ontario, K2E 7J4
613 288 1715 Fax: _____
Reports to be sent to: Joseph.Drader@ghd.com
1. Email: demetrius.cooper@ghd.com
2. Email: _____

Project Information:

Project: 11206675
Site Location: 211 Cantrun Boulevard
Sampled By: Demetrius Cooper
AGAT Quote #: _____ 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: _____

Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☒ Regulation 153/04

☐ Sewer Use

☐ Regulation 558

Table _____

Indicate One

☐ Ind/Com

☐ Sanitary

☐ CCME

☒ Res/Park

☐ Storm

☐ Prov. Water Quality Objectives (PWQO)

☐ Agriculture

☐ Other

Soil Texture (Check One)

Region _____

Indicate One

☒ Coarse

☐ Fine

☐ MISA

Indicate One

Is this submission for a
Record of Site Condition?

☐ Yes ☐ No

Report Guideline on
Certificate of Analysis

☐ Yes ☐ No

Sample Matrix Legend

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

Field Filtered - Metals, Hg, CrVI

O. Reg 153

Metals and Inorganics

☐ All Metals ☐ 153 Metals (excl. Hydrides)
☐ Hydride Metals ☐ 153 Metals (incl. Hydrides)

ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN
☐ Cu²⁺ ☐ EC ☐ FOC ☐ Hg

☒ pH ☒ SAR

Full Metals Scan

Regulation/Custom Metals

Nutrients: ☐ TP ☐ NH₃ ☐ TKN
☐ NO₃ ☐ NO₂ ☐ NO₃+NO₂

Volatiles: ☒ VOC ☐ BTEX ☐ THM

PHCs F1 - F4

ABNS

PAHs

PCBs: ☐ Total ☐ Aroclors

Organochlorine Pesticides

TCLP: ☐ M&I ☐ VOCs ☐ ABNS ☐ B(a)P ☐ PCBs

Sewer Use

Potentially Hazardous or High Concentration (Y/N)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Metals and Inorganics	ORPs	Full Metals Scan	Regulation/Custom Metals	Nutrients	Volatiles	PHCs F1 - F4	ABNS	PAHs	PCBs: Total	Organochlorine Pesticides	TCLP: M&I	Sewer Use	Potentially Hazardous or High Concentration (Y/N)
BH12 - ENVI	15/1/20	8:00am	5	SW			X	X	X			X	X		X					
BH1 - ENVI	15/1/20	11:00am	6	S			X	X	X			X	X		X					
BH3 - ENVI	15/1/20	1:30pm	5	S			X	X	X			X	X		X					
OPP1	15/1/20	-	6	S			X	X	X			X	X		X					

Samples Relinquished By (Print Name and Sign): <u>K</u>	Date: <u>16 Jan 20</u>	Time: <u>3:00pm</u>	Samples Received By (Print Name and Sign): <u>Uberthelet</u>	Date: <u>2020/01/16</u>	Time: <u>14h55</u>
Samples Relinquished By (Print Name and Sign): <u>Uberthelet</u>	Date: <u>2020/01/16</u>	Time: <u>16h00</u>	Samples Received By (Print Name and Sign): <u>Shamir</u>	Date: <u>Jan 17/2020</u>	Time: <u>9:05am</u>
Samples Relinquished By (Print Name and Sign): <u>Uberthelet</u>	Date: <u>2020/01/16</u>	Time: <u>16h00</u>	Samples Received By (Print Name and Sign): <u>Shamir</u>	Date: <u>Jan 17/2020</u>	Time: <u>9:05am</u>

Laboratory Use Only

Work Order #: 202564516

Cooler Quantity: one - on ice

Arrival Temperatures: 1.7 | 2.0 | 1.8

LT-1.4 | 1.8 | 1.6

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: (on ice)

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

*TAT is exclusive of weekends and statutory holidays

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

CLIENT NAME: GHD LIMITED
455 Phillip St
WATERLOO, ON N2V1C2
(519) 884-0510

ATTENTION TO: Joseph Drader

PROJECT: 11206675-E2 (PO#73518359)

AGAT WORK ORDER: 20Z566618

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Jan 31, 2020

PAGES (INCLUDING COVER): 24

VERSION*: 1

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

*NOTES

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



Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

						GW-11206675-012220-JC-001	GW-11206675-012220-JC-002	GW-11206675-012320-JC-003	GW-11206675-012320-JC-004	GW-11206675-012320-JC-006	GW-11206675-012320-JC-007
SAMPLE DESCRIPTION:						Water	Water	Water	Water	Water	Water
SAMPLE TYPE:						Water	Water	Water	Water	Water	Water
DATE SAMPLED:						2020-01-22	2020-01-22	2020-01-23	2020-01-23	2020-01-23	2020-01-23
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884827	884828	884829	884830	884832	884833
Naphthalene	µg/L	1400	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	µg/L	1.8	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthene	µg/L	600	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Fluorene	µg/L	400	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Phenanthrene	µg/L	580	0.10	2020-01-28	2020-01-30	0.55	0.58	0.50	0.12	0.75	0.17
Anthracene	µg/L	2.4	0.10	2020-01-28	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	130	0.20	2020-01-28	2020-01-30	0.54	0.55	0.73	<0.20	0.56	<0.20
Pyrene	µg/L	68	0.20	2020-01-28	2020-01-30	0.75	0.77	1.1	<0.20	0.70	<0.20
Benz(a)anthracene	µg/L	4.7	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	µg/L	1	0.10	2020-01-28	2020-01-30	<0.10	<0.10	0.22	<0.10	0.10	<0.10
Benzo(b)fluoranthene	µg/L	0.75	0.10	2020-01-28	2020-01-30	<0.10	<0.10	0.15	<0.10	0.10	<0.10
Benzo(k)fluoranthene	µg/L	0.4	0.10	2020-01-28	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	µg/L	0.81	0.01	2020-01-28	2020-01-30	0.01	0.01	0.02	0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.2	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	µg/L	0.52	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	µg/L	0.2	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-and 1-methyl Naphthalene	µg/L	1800	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		2020-01-28	2020-01-30	83	100	104	93	108	115
Acenaphthene-d10	%	50-140		2020-01-28	2020-01-30	113	114	117	109	116	116
Chrysene-d12	%	50-140		2020-01-28	2020-01-30	110	118	110	91	105	94

Certified By:

N Popmukolof

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-11206675-	GW-11206675-	GW-11206675-
						012320-JC-008	012320-JC-009	012320-JC-010
						Water	Water	Water
						2020-01-23	2020-01-23	2020-01-23
Naphthalene	µg/L	1400	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Acenaphthylene	µg/L	1.8	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Acenaphthene	µg/L	600	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Fluorene	µg/L	400	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Phenanthrene	µg/L	580	0.10	2020-01-28	2020-01-30	<0.10	0.10	<0.10
Anthracene	µg/L	2.4	0.10	2020-01-28	2020-01-30	<0.10	<0.10	<0.10
Fluoranthene	µg/L	130	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Pyrene	µg/L	68	0.20	2020-01-28	2020-01-30	<0.20	0.23	0.22
Benz(a)anthracene	µg/L	4.7	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Chrysene	µg/L	1	0.10	2020-01-28	2020-01-30	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	µg/L	0.75	0.10	2020-01-28	2020-01-30	<0.10	0.10	<0.10
Benzo(k)fluoranthene	µg/L	0.4	0.10	2020-01-28	2020-01-30	<0.10	<0.10	<0.10
Benzo(a)pyrene	µg/L	0.81	0.01	2020-01-28	2020-01-30	<0.01	0.02	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.2	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	µg/L	0.52	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	µg/L	0.2	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
2-and 1-methyl Naphthalene	µg/L	1800	0.20	2020-01-28	2020-01-30	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits						
Naphthalene-d8	%	50-140		2020-01-28	2020-01-30	117	100	107
Acenaphthene-d10	%	50-140		2020-01-28	2020-01-30	119	107	113
Chrysene-d12	%	50-140		2020-01-28	2020-01-30	93	116	113

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

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

884827-884836 Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.

2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

						GW-11206675-012220-JC-001	GW-11206675-012220-JC-002	GW-11206675-012320-JC-003	GW-11206675-012320-JC-004	GW-11206675-012320-JC-006	GW-11206675-012320-JC-007
SAMPLE DESCRIPTION:						Water	Water	Water	Water	Water	Water
SAMPLE TYPE:						Water	Water	Water	Water	Water	Water
DATE SAMPLED:						2020-01-22	2020-01-22	2020-01-23	2020-01-23	2020-01-23	2020-01-23
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884827	884828	884829	884830	884832	884833
F1 (C6-C10)	µg/L	750	25	2020-01-28	2020-01-28	<25	<25	<25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	750	25	2020-01-28	2020-01-28	<25	<25	<25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	2020-01-29	2020-01-29	<100	<100	<100	<100	<100	<100
F2 (C10 to C16) minus Naphthalene	µg/L		100	2020-01-29	2020-01-29	<100	<100	<100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	2020-01-29	2020-01-29	<100	<100	<100	<100	<100	<100
F3 (C16 to C34) minus PAHs	µg/L		100	2020-01-29	2020-01-29	<100	<100	<100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	2020-01-29	2020-01-29	<100	<100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500			NA	NA	NA	NA	NA	NA
Surrogate	Unit	Acceptable Limits									
Terphenyl	%	60-140		2020-01-29	2020-01-29	68	65	73	73	75	105
						GW-11206675-012320-JC-008	GW-11206675-012320-JC-009	GW-11206675-012320-JC-010			
SAMPLE DESCRIPTION:						Water	Water	Water			
SAMPLE TYPE:						Water	Water	Water			
DATE SAMPLED:						2020-01-23	2020-01-23	2020-01-23			
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884834	884835	884836			
F1 (C6-C10)	µg/L	750	25	2020-01-28	2020-01-28	<25	<25	<25			
F1 (C6 to C10) minus BTEX	µg/L	750	25	2020-01-28	2020-01-28	<25	<25	<25			
F2 (C10 to C16)	µg/L	150	100	2020-01-29	2020-01-29	<100	<100	<100			
F2 (C10 to C16) minus Naphthalene	µg/L		100	2020-01-29	2020-01-29	<100	<100	<100			
F3 (C16 to C34)	µg/L	500	100	2020-01-29	2020-01-29	<100	<100	<100			
F3 (C16 to C34) minus PAHs	µg/L		100	2020-01-29	2020-01-29	<100	<100	<100			
F4 (C34 to C50)	µg/L	500	100	2020-01-29	2020-01-29	<100	<100	<100			
Gravimetric Heavy Hydrocarbons	µg/L	500	500			NA	NA	NA			
Surrogate	Unit	Acceptable Limits									
Terphenyl	%	60-140		2020-01-29	2020-01-29	60	79	60			

Certified By:

N Popmukolof



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

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

884827-884836 The C6-C10 fraction is calculated using toluene response factor.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

**AGAT** Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

				SAMPLE DESCRIPTION:		TRIP-002
				SAMPLE TYPE:		Water
				DATE SAMPLED:		2020-01-07
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884837
F1 (C6-C10)	µg/L	750	25	2020-01-30	2020-01-30	<25
F1 (C6 to C10) minus BTEX	µg/L	750	25	2020-01-30	2020-01-30	<25

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

884837 The C6-C10 fraction is calculated using Toluene response factor.
Total C6-C10 results are corrected for BTEX contributions.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
Extraction and holding times were met for this sample.
NA = Not Applicable

Analysis performed at AGAT Toronto (unless marked by *)

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Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

						GW-11206675-012220-JC-001	GW-11206675-012220-JC-002	GW-11206675-012320-JC-003	GW-11206675-012320-JC-004	GW-11206675-012320-JC-006	GW-11206675-012320-JC-007
SAMPLE DESCRIPTION:						Water	Water	Water	Water	Water	Water
SAMPLE TYPE:						Water	Water	Water	Water	Water	Water
DATE SAMPLED:						2020-01-22	2020-01-22	2020-01-23	2020-01-23	2020-01-23	2020-01-23
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884827	884828	884829	884830	884832	884833
Dichlorodifluoromethane	µg/L	4400	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.5	0.17	2020-01-29	2020-01-30	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	5.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	2020-01-29	2020-01-30	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L	130000	1.0	2020-01-29	2020-01-30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	1.6	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	610	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	190	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	320	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	470000	1.0	2020-01-29	2020-01-30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	2.4	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	1.1	3.9	0.51
1,2-Dichloroethane	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	640	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.79	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L	44	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	0.33	<0.20
1,2-Dichloropropane	µg/L	16	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	140000	1.0	2020-01-29	2020-01-30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	0.65	<0.20
Dibromochloromethane	µg/L	82000	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.25	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	3.3	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

						GW-11206675-012220-JC-001	GW-11206675-012220-JC-002	GW-11206675-012320-JC-003	GW-11206675-012320-JC-004	GW-11206675-012320-JC-006	GW-11206675-012320-JC-007
SAMPLE DESCRIPTION:						Water	Water	Water	Water	Water	Water
SAMPLE TYPE:						Water	Water	Water	Water	Water	Water
DATE SAMPLED:						2020-01-22	2020-01-22	2020-01-23	2020-01-23	2020-01-23	2020-01-23
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884827	884828	884829	884830	884832	884833
m & p-Xylene	µg/L		0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromoform	µg/L	380	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L	1300	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	3.2	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	8	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	4600	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	5.2	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/L	4200	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L	51	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		2020-01-29	2020-01-30	93	93	95	93	92	94
4-Bromofluorobenzene	% Recovery	50-140		2020-01-29	2020-01-30	88	92	87	92	94	94

Certified By:

N Popmukolof



Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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CLIENT NAME: GHD LIMITED

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SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-11206675-	GW-11206675-	GW-11206675-	TRIP-002
						012320-JC-008	012320-JC-009	012320-JC-010	
						Water	Water	Water	
						2020-01-23	2020-01-23	2020-01-23	
						884834	884835	884836	884837
Dichlorodifluoromethane	µg/L	4400	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Vinyl Chloride	µg/L	0.5	0.17	2020-01-29	2020-01-30	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	5.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	2500	0.40	2020-01-29	2020-01-30	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L	130000	1.0	2020-01-29	2020-01-30	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	1.6	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	610	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	190	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	320	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	470000	1.0	2020-01-29	2020-01-30	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	2.4	0.20	2020-01-29	2020-01-30	<0.20	1.6	<0.20	<0.20
1,2-Dichloroethane	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	640	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.79	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L	44	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	16	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	85000	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	140000	1.0	2020-01-29	2020-01-30	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	4.7	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	18000	0.20	2020-01-29	2020-01-30	<0.20	0.49	<0.20	<0.20
Dibromochloromethane	µg/L	82000	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.25	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	1.6	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	3.3	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	630	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L	2300	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10

Certified By:

N Popmukolof

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

				SAMPLE DESCRIPTION:		GW-11206675-012320-JC-008	GW-11206675-012320-JC-009	GW-11206675-012320-JC-010	TRIP-002
				SAMPLE TYPE:		Water	Water	Water	Water
				DATE SAMPLED:		2020-01-23	2020-01-23	2020-01-23	2020-01-07
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884834	884835	884836	884837
m & p-Xylene	µg/L		0.20	2020-01-29	2020-01-30	<0.20	0.36	<0.20	<0.20
Bromoform	µg/L	380	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L	1300	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	3.2	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	2020-01-29	2020-01-30	<0.10	0.13	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	9600	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	8	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	4600	0.10	2020-01-29	2020-01-30	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	5.2	0.30	2020-01-29	2020-01-30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture	µg/L	4200	0.20	2020-01-29	2020-01-30	<0.20	0.49	<0.20	<0.20
n-Hexane	µg/L	51	0.20	2020-01-29	2020-01-30	<0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		2020-01-29	2020-01-30	94	93	93	95
4-Bromofluorobenzene	% Recovery	50-140		2020-01-29	2020-01-30	92	90	93	90

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

884827-884837 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

						GW-11206675-012220-JC-001	GW-11206675-012220-JC-002	GW-11206675-012320-JC-003	GW-11206675-012320-JC-004	
SAMPLE DESCRIPTION:						Water	Water	Water	Water	
SAMPLE TYPE:						2020-01-22	2020-01-22	2020-01-23	2020-01-23	
DATE SAMPLED:						884827	884828	884829	884830	
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed				RDL	
Antimony	µg/L	20000	1.0	2020-01-24	2020-01-24	<1.0	<1.0	<1.0	1.0	<1.0
Arsenic	µg/L	1900	1.0	2020-01-24	2020-01-24	<1.0	1.5	1.9	1.0	<1.0
Barium	µg/L	29000	2.0	2020-01-24	2020-01-24	402	402	250	2.0	42.1
Beryllium	µg/L	67	0.5	2020-01-24	2020-01-24	<0.5	<0.5	<0.5	0.5	<0.5
Boron	µg/L	45000	10.0	2020-01-24	2020-01-24	45.8	54.3	162	10.0	21.5
Cadmium	µg/L	2.7	0.2	2020-01-24	2020-01-24	<0.2	<0.2	<0.2	0.2	<0.2
Chromium	µg/L	810	2.0	2020-01-24	2020-01-24	<2.0	<2.0	<2.0	2.0	<2.0
Cobalt	µg/L	66	0.5	2020-01-24	2020-01-24	1.1	1.2	0.6	0.5	<0.5
Copper	µg/L	87	1.0	2020-01-24	2020-01-24	3.3	3.0	2.2	1.0	1.5
Lead	µg/L	25	0.5	2020-01-24	2020-01-24	<0.5	<0.5	<0.5	0.5	<0.5
Molybdenum	µg/L	9200	0.5	2020-01-24	2020-01-24	0.8	0.8	9.0	0.5	1.4
Nickel	µg/L	490	1.0	2020-01-24	2020-01-24	4.2	3.8	2.0	1.0	<1.0
Selenium	µg/L	63	1.0	2020-01-24	2020-01-24	<1.0	1.3	1.6	1.0	<1.0
Silver	µg/L	1.5	0.2	2020-01-24	2020-01-24	<0.2	0.2	<0.2	0.2	<0.2
Thallium	µg/L	510	0.3	2020-01-24	2020-01-24	<0.3	<0.3	<0.3	0.3	<0.3
Uranium	µg/L	420	0.5	2020-01-24	2020-01-24	6.8	6.6	1.5	0.5	0.6
Vanadium	µg/L	250	0.4	2020-01-24	2020-01-24	1.4	1.5	1.4	0.4	1.3
Zinc	µg/L	1100	5.0	2020-01-24	2020-01-24	13.1	13.6	<5.0	5.0	<5.0
Mercury	µg/L	0.29	0.02	2020-01-27	2020-01-27	<0.02	<0.02	<0.02	0.02	<0.02
Chromium VI	µg/L	140	5	2020-01-30	2020-01-30	<5	<5	<5	5	<5
Cyanide	µg/L	66	2	2020-01-28	2020-01-28	<2	<2	<2	2	<2
Sodium	µg/L	2300000	5000	2020-01-29	2020-01-29	1050000	1060000	1440000	1000	265000
Chloride	µg/L	2300000	10000	2020-01-27	2020-01-27	3020000	3010000	2320000	500	201000
Electrical Conductivity	µS/cm		2	2020-01-24	2020-01-24	9390	9350	8080	2	1840
pH	pH Units		NA	2020-01-24	2020-01-24	7.39	7.30	7.80	NA	7.74

Certified By:

Jris Verastegui



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

SAMPLE DESCRIPTION: GW-11206675-012320-JC-006						GW-11206675-012320-JC-007		GW-11206675-012320-JC-008		
SAMPLE TYPE: Water						Water		Water		
DATE SAMPLED: 2020-01-23						2020-01-23		2020-01-23		
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	884832	RDL	884833	RDL	884834
Antimony	µg/L	20000	1.0	2020-01-24	2020-01-24	<1.0	1.0	<1.0	1.0	<1.0
Arsenic	µg/L	1900	1.0	2020-01-24	2020-01-24	<1.0	1.0	<1.0	1.0	<1.0
Barium	µg/L	29000	2.0	2020-01-24	2020-01-24	122	2.0	71.2	2.0	97.6
Beryllium	µg/L	67	0.5	2020-01-24	2020-01-24	<0.5	0.5	<0.5	0.5	<0.5
Boron	µg/L	45000	10.0	2020-01-24	2020-01-24	43.6	10.0	26.7	10.0	25.4
Cadmium	µg/L	2.7	0.2	2020-01-24	2020-01-24	<0.2	0.2	<0.2	0.2	<0.2
Chromium	µg/L	810	2.0	2020-01-24	2020-01-24	<2.0	2.0	<2.0	2.0	<2.0
Cobalt	µg/L	66	0.5	2020-01-24	2020-01-24	19.6	0.5	5.9	0.5	4.8
Copper	µg/L	87	1.0	2020-01-24	2020-01-24	4.1	1.0	1.5	1.0	1.3
Lead	µg/L	25	0.5	2020-01-24	2020-01-24	<0.5	0.5	<0.5	0.5	<0.5
Molybdenum	µg/L	9200	0.5	2020-01-24	2020-01-24	4.3	0.5	1.1	0.5	1.0
Nickel	µg/L	490	1.0	2020-01-24	2020-01-24	5.1	1.0	5.9	1.0	11.6
Selenium	µg/L	63	1.0	2020-01-24	2020-01-24	<1.0	1.0	<1.0	1.0	1.0
Silver	µg/L	1.5	0.2	2020-01-24	2020-01-24	<0.2	0.2	<0.2	0.2	<0.2
Thallium	µg/L	510	0.3	2020-01-24	2020-01-24	<0.3	0.3	<0.3	0.3	<0.3
Uranium	µg/L	420	0.5	2020-01-24	2020-01-24	1.7	0.5	1.2	0.5	0.8
Vanadium	µg/L	250	0.4	2020-01-24	2020-01-24	0.4	0.4	<0.4	0.4	0.8
Zinc	µg/L	1100	5.0	2020-01-24	2020-01-24	42.8	5.0	7.6	5.0	<5.0
Mercury	µg/L	0.29	0.02	2020-01-27	2020-01-27	<0.02	0.02	<0.02	0.02	<0.02
Chromium VI	µg/L	140	5	2020-01-30	2020-01-30	<5	5	<5	5	<5
Cyanide	µg/L	66	2	2020-01-28	2020-01-28	<2	2	<2	2	<2
Sodium	µg/L	2300000	500	2020-01-29	2020-01-29	9570	1000	12000	500	8250
Chloride	µg/L	2300000	500	2020-01-27	2020-01-27	6160	500	10400	500	5370
Electrical Conductivity	uS/cm		2	2020-01-24	2020-01-24	919	2	1170	2	901
pH	pH Units		NA	2020-01-24	2020-01-24	7.81	NA	7.42	NA	7.53

Certified By:

Iris Veraestegui



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-11206675-	GW-11206675-
						012320-JC-009	012320-JC-010
						Water	Water
						2020-01-23	2020-01-23
Antimony	µg/L	20000	1.0	2020-01-24	2020-01-24	<1.0	<1.0
Arsenic	µg/L	1900	1.0	2020-01-24	2020-01-24	<1.0	<1.0
Barium	µg/L	29000	2.0	2020-01-24	2020-01-24	143	442
Beryllium	µg/L	67	0.5	2020-01-24	2020-01-24	<0.5	<0.5
Boron	µg/L	45000	10.0	2020-01-24	2020-01-24	52.4	183
Cadmium	µg/L	2.7	0.2	2020-01-24	2020-01-24	0.2	<0.2
Chromium	µg/L	810	2.0	2020-01-24	2020-01-24	<2.0	<2.0
Cobalt	µg/L	66	0.5	2020-01-24	2020-01-24	0.8	2.0
Copper	µg/L	87	1.0	2020-01-24	2020-01-24	7.4	1.5
Lead	µg/L	25	0.5	2020-01-24	2020-01-24	<0.5	<0.5
Molybdenum	µg/L	9200	0.5	2020-01-24	2020-01-24	199	1.4
Nickel	µg/L	490	1.0	2020-01-24	2020-01-24	7.4	4.8
Selenium	µg/L	63	1.0	2020-01-24	2020-01-24	1.2	<1.0
Silver	µg/L	1.5	0.2	2020-01-24	2020-01-24	<0.2	<0.2
Thallium	µg/L	510	0.3	2020-01-24	2020-01-24	<0.3	<0.3
Uranium	µg/L	420	0.5	2020-01-24	2020-01-24	1.2	<0.5
Vanadium	µg/L	250	0.4	2020-01-24	2020-01-24	<0.4	<0.4
Zinc	µg/L	1100	5.0	2020-01-24	2020-01-24	6.0	<5.0
Mercury	µg/L	0.29	0.02	2020-01-27	2020-01-27	<0.02	<0.02
Chromium VI	µg/L	140	5	2020-01-30	2020-01-30	<5	<5
Cyanide	µg/L	66	2	2020-01-28	2020-01-28	<2	<2
Sodium	µg/L	2300000	2500	2020-01-29	2020-01-29	671000	317000
Chloride	µg/L	2300000	5000	2020-01-27	2020-01-27	1230000	1260000
Electrical Conductivity	µS/cm		2	2020-01-24	2020-01-24	4250	4470
pH	pH Units		NA	2020-01-24	2020-01-24	7.85	7.62

Certified By:

José Verástegui



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

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

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

884827-884836 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraistegui



Certificate of Analysis

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

SAMPLING SITE: 211 Centrum Blvd, Ottawa

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

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

DATE RECEIVED: 2020-01-23

DATE REPORTED: 2020-01-31

						GW-11206675-012220-JC-001	GW-11206675-012220-JC-002	GW-11206675-012320-JC-003	GW-11206675-012320-JC-004	GW-11206675-012320-JC-006	GW-11206675-012320-JC-007
SAMPLE DESCRIPTION:						Water	Water	Water	Water	Water	Water
SAMPLE TYPE:						2020-01-22	2020-01-22	2020-01-23	2020-01-23	2020-01-23	2020-01-23
DATE SAMPLED:						884827	884828	884829	884830	884832	884833
DATE ANALYZED:											
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed						
Sodium Adsorption Ratio (Calculated)			NA	2020-01-29	2020-01-29	9.92	9.90	28.1	7.75	0.188	0.204
SAMPLE DESCRIPTION:						GW-11206675-012320-JC-008	GW-11206675-012320-JC-009	GW-11206675-012320-JC-010			
SAMPLE TYPE:						Water	Water	Water			
DATE SAMPLED:						2020-01-23	2020-01-23	2020-01-23			
DATE ANALYZED:						884834	884835	884836			
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed						
Sodium Adsorption Ratio (Calculated)			NA	2020-01-29	2020-01-29	0.167	17.1	3.74			

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraistegui



AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Joseph Drader

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
884827	GW-11206675-012220-JC-001	ON T3 NPGW CT	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	2300000	3020000
884828	GW-11206675-012220-JC-002	ON T3 NPGW CT	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	2300000	3010000
884829	GW-11206675-012320-JC-003	ON T3 NPGW CT	O. Reg. 153(511) - Metals & Inorganics (Water)	Chloride	µg/L	2300000	2320000
884832	GW-11206675-012320-JC-006	ON T3 NPGW CT	O. Reg. 153(511) - VOCs (Water)	Chloroform	µg/L	2.4	3.9

Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11206675-E2 (PO#73518359)

SAMPLING SITE: 211 Centrum Blvd, Ottawa

AGAT WORK ORDER: 20Z566618

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

Trace Organics Analysis

RPT Date: Jan 31, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

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

Naphthalene	884430	884830	< 0.20	< 0.20	NA	< 0.20	114%	50%	140%	102%	50%	140%	102%	50%	140%
Acenaphthylene	884430	884830	< 0.20	< 0.20	NA	< 0.20	111%	50%	140%	113%	50%	140%	117%	50%	140%
Acenaphthene	884430	884830	< 0.20	< 0.20	NA	< 0.20	108%	50%	140%	99%	50%	140%	118%	50%	140%
Fluorene	884430	884830	< 0.20	< 0.20	NA	< 0.20	111%	50%	140%	116%	50%	140%	116%	50%	140%
Phenanthrene	884430	884830	0.12	0.11	NA	< 0.10	109%	50%	140%	97%	50%	140%	113%	50%	140%
Anthracene	884430	884830	< 0.10	< 0.10	NA	< 0.10	117%	50%	140%	114%	50%	140%	113%	50%	140%
Fluoranthene	884430	884830	< 0.20	< 0.20	NA	< 0.20	110%	50%	140%	112%	50%	140%	117%	50%	140%
Pyrene	884430	884830	< 0.20	< 0.20	NA	< 0.20	117%	50%	140%	116%	50%	140%	108%	50%	140%
Benz(a)anthracene	884430	884830	< 0.20	< 0.20	NA	< 0.20	110%	50%	140%	118%	50%	140%	110%	50%	140%
Chrysene	884430	884830	< 0.10	< 0.10	NA	< 0.10	116%	50%	140%	115%	50%	140%	108%	50%	140%
Benzo(b)fluoranthene	884430	884830	< 0.10	< 0.10	NA	< 0.10	119%	50%	140%	114%	50%	140%	114%	50%	140%
Benzo(k)fluoranthene	884430	884830	< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	117%	50%	140%	113%	50%	140%
Benzo(a)pyrene	884430	884830	0.01	< 0.01	NA	< 0.01	111%	50%	140%	107%	50%	140%	104%	50%	140%
Indeno(1,2,3-cd)pyrene	884430	884830	< 0.20	< 0.20	NA	< 0.20	107%	50%	140%	118%	50%	140%	119%	50%	140%
Dibenz(a,h)anthracene	884430	884830	< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	86%	50%	140%	90%	50%	140%
Benzo(g,h,i)perylene	884430	884830	< 0.20	< 0.20	NA	< 0.20	119%	50%	140%	82%	50%	140%	90%	50%	140%

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

F1 (C6-C10)	884836	884836	< 25	< 25	NA	< 25	83%	60%	140%	90%	60%	140%	92%	60%	140%
F2 (C10 to C16)	884830	884830	< 100	< 100	NA	< 100	98%	60%	140%	68%	60%	140%	60%	60%	140%
F3 (C16 to C34)	884830	884830	< 100	< 100	NA	< 100	103%	60%	140%	85%	60%	140%	94%	60%	140%
F4 (C34 to C50)	884830	884830	< 100	< 100	NA	< 100	94%	60%	140%	95%	60%	140%	87%	60%	140%

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

Dichlorodifluoromethane	884836	884836	< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	82%	50%	140%	104%	50%	140%
Vinyl Chloride	884836	884836	< 0.17	< 0.17	NA	< 0.17	87%	50%	140%	88%	50%	140%	101%	50%	140%
Bromomethane	884836	884836	< 0.20	< 0.20	NA	< 0.20	94%	50%	140%	107%	50%	140%	116%	50%	140%
Trichlorofluoromethane	884836	884836	< 0.40	< 0.40	NA	< 0.40	78%	50%	140%	87%	50%	140%	98%	50%	140%
Acetone	884836	884836	< 1.0	< 1.0	NA	< 1.0	95%	50%	140%	104%	50%	140%	112%	50%	140%
1,1-Dichloroethylene	884836	884836	< 0.30	< 0.30	NA	< 0.30	110%	50%	140%	116%	60%	130%	105%	50%	140%
Methylene Chloride	884836	884836	< 0.30	< 0.30	NA	< 0.30	103%	50%	140%	96%	60%	130%	82%	50%	140%
trans- 1,2-Dichloroethylene	884836	884836	< 0.20	< 0.20	NA	< 0.20	98%	50%	140%	88%	60%	130%	84%	50%	140%
Methyl tert-butyl ether	884836	884836	< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	104%	60%	130%	104%	50%	140%
1,1-Dichloroethane	884836	884836	< 0.30	< 0.30	NA	< 0.30	103%	50%	140%	93%	60%	130%	118%	50%	140%
Methyl Ethyl Ketone	884836	884836	< 1.0	< 1.0	NA	< 1.0	106%	50%	140%	92%	50%	140%	109%	50%	140%
cis- 1,2-Dichloroethylene	884836	884836	< 0.20	< 0.20	NA	< 0.20	99%	50%	140%	99%	60%	130%	94%	50%	140%
Chloroform	884836	884836	< 0.20	< 0.20	NA	< 0.20	119%	50%	140%	102%	60%	130%	107%	50%	140%
1,2-Dichloroethane	884836	884836	< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	109%	60%	130%	119%	50%	140%
1,1,1-Trichloroethane	884836	884836	< 0.30	< 0.30	NA	< 0.30	110%	50%	140%	100%	60%	130%	88%	50%	140%
Carbon Tetrachloride	884836	884836	< 0.20	< 0.20	NA	< 0.20	82%	50%	140%	83%	60%	130%	79%	50%	140%

Quality Assurance

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE: 211 Centrum Blvd, Ottawa

SAMPLED BY: Jacquelyn Curphey

Trace Organics Analysis (Continued)

RPT Date: Jan 31, 2020			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
Benzene	884836	884836	< 0.20	< 0.20	NA	< 0.20	108%	50%	140%	101%	60%	130%	94%	50%	140%
1,2-Dichloropropane	884836	884836	< 0.20	< 0.20	NA	< 0.20	112%	50%	140%	114%	60%	130%	111%	50%	140%
Trichloroethylene	884836	884836	< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	80%	60%	130%	74%	50%	140%
Bromodichloromethane	884836	884836	< 0.20	< 0.20	NA	< 0.20	111%	50%	140%	112%	60%	130%	105%	50%	140%
Methyl Isobutyl Ketone	884836	884836	< 1.0	< 1.0	NA	< 1.0	112%	50%	140%	118%	50%	140%	120%	50%	140%
1,1,2-Trichloroethane	884836	884836	< 0.20	< 0.20	NA	< 0.20	101%	50%	140%	111%	60%	130%	109%	50%	140%
Toluene	884836	884836	< 0.20	< 0.20	NA	< 0.20	104%	50%	140%	101%	60%	130%	108%	50%	140%
Dibromochloromethane	884836	884836	< 0.10	< 0.10	NA	< 0.10	85%	50%	140%	103%	60%	130%	114%	50%	140%
Ethylene Dibromide	884836	884836	< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	111%	60%	130%	109%	50%	140%
Tetrachloroethylene	884836	884836	< 0.20	< 0.20	NA	< 0.20	83%	50%	140%	73%	60%	130%	81%	50%	140%
1,1,1,2-Tetrachloroethane	884836	884836	< 0.10	< 0.10	NA	< 0.10	82%	50%	140%	97%	60%	130%	98%	50%	140%
Chlorobenzene	884836	884836	< 0.10	< 0.10	NA	< 0.10	91%	50%	140%	97%	60%	130%	104%	50%	140%
Ethylbenzene	884836	884836	< 0.10	< 0.10	NA	< 0.10	101%	50%	140%	100%	60%	130%	106%	50%	140%
m & p-Xylene	884836	884836	< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	101%	60%	130%	107%	50%	140%
Bromoform	884836	884836	< 0.10	< 0.10	NA	< 0.10	77%	50%	140%	96%	60%	130%	101%	50%	140%
Styrene	884836	884836	< 0.10	< 0.10	NA	< 0.10	91%	50%	140%	98%	60%	130%	106%	50%	140%
1,1,2,2-Tetrachloroethane	884836	884836	< 0.10	< 0.10	NA	< 0.10	113%	50%	140%	116%	60%	130%	96%	50%	140%
o-Xylene	884836	884836	< 0.10	< 0.10	NA	< 0.10	102%	50%	140%	108%	60%	130%	113%	50%	140%
1,3-Dichlorobenzene	884836	884836	< 0.10	< 0.10	NA	< 0.10	85%	50%	140%	89%	60%	130%	97%	50%	140%
1,4-Dichlorobenzene	884836	884836	< 0.10	< 0.10	NA	< 0.10	86%	50%	140%	95%	60%	130%	102%	50%	140%
1,2-Dichlorobenzene	884836	884836	< 0.10	< 0.10	NA	< 0.10	89%	50%	140%	96%	60%	130%	106%	50%	140%
1,3-Dichloropropene	884836	884836	< 0.30	< 0.30	NA	< 0.30	103%	50%	140%	78%	60%	130%	109%	50%	140%
n-Hexane	884836	884836	< 0.20	< 0.20	NA	< 0.20	101%	50%	140%	107%	60%	130%	102%	50%	140%

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

Certified By:



Quality Assurance

CLIENT NAME: GHD LIMITED

PROJECT: 11206675-E2 (PO#73518359)

SAMPLING SITE: 211 Centrum Blvd, Ottawa

AGAT WORK ORDER: 20Z566618

ATTENTION TO: Joseph Drader

SAMPLED BY: Jacquelyn Curphey

Water Analysis															
RPT Date: Jan 31, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Water)															
Antimony	884827	884827	<1.0	<1.0	NA	< 1.0	106%	70%	130%	104%	80%	120%	101%	70%	130%
Arsenic	884827	884827	<1.0	<1.0	NA	< 1.0	102%	70%	130%	101%	80%	120%	106%	70%	130%
Barium	884827	884827	402	395	1.8%	< 2.0	98%	70%	130%	100%	80%	120%	102%	70%	130%
Beryllium	884827	884827	<0.5	<0.5	NA	< 0.5	105%	70%	130%	103%	80%	120%	122%	70%	130%
Boron	884827	884827	45.8	45.2	NA	< 10.0	103%	70%	130%	103%	80%	120%	114%	70%	130%
Cadmium	884827	884827	<0.2	<0.2	NA	< 0.2	100%	70%	130%	101%	80%	120%	99%	70%	130%
Chromium	884827	884827	<2.0	<2.0	NA	< 2.0	98%	70%	130%	101%	80%	120%	106%	70%	130%
Cobalt	884827	884827	1.1	1.1	NA	< 0.5	99%	70%	130%	100%	80%	120%	102%	70%	130%
Copper	884827	884827	3.3	3.0	NA	< 1.0	100%	70%	130%	100%	80%	120%	91%	70%	130%
Lead	884827	884827	<0.5	<0.5	NA	< 0.5	99%	70%	130%	103%	80%	120%	92%	70%	130%
Molybdenum	884827	884827	0.8	0.7	NA	< 0.5	101%	70%	130%	103%	80%	120%	108%	70%	130%
Nickel	884827	884827	4.2	3.4	NA	< 1.0	100%	70%	130%	101%	80%	120%	97%	70%	130%
Selenium	884827	884827	<1.0	<1.0	NA	< 1.0	109%	70%	130%	104%	80%	120%	101%	70%	130%
Silver	884827	884827	<0.2	<0.2	NA	< 0.2	101%	70%	130%	100%	80%	120%	88%	70%	130%
Thallium	884827	884827	<0.3	<0.3	NA	< 0.3	102%	70%	130%	102%	80%	120%	93%	70%	130%
Uranium	884827	884827	6.8	6.5	4.5%	< 0.5	100%	70%	130%	103%	80%	120%	102%	70%	130%
Vanadium	884827	884827	1.4	1.5	NA	< 0.4	99%	70%	130%	102%	80%	120%	111%	70%	130%
Zinc	884827	884827	13.1	14.3	NA	< 5.0	101%	70%	130%	100%	80%	120%	93%	70%	130%
Mercury	884827	884827	<0.02	<0.02	NA	< 0.02	105%	70%	130%	102%	80%	120%	96%	70%	130%
Chromium VI	884832	884832	<5	<5	NA	< 5	102%	70%	130%	98%	80%	120%	105%	70%	130%
Cyanide	884827	884827	<2	<2	NA	< 2	108%	70%	130%	103%	80%	120%	107%	70%	130%
Sodium	884834	884834	8250	8100	1.8%	< 500	99%	70%	130%	95%	80%	120%	103%	70%	130%
Chloride	884832	884832	6160	6070	1.5%	< 100	95%	70%	130%	104%	70%	130%	109%	70%	130%
Electrical Conductivity	884827	884827	9390	9350	0.4%	< 2	99%	90%	110%						
pH	884827	884827	7.39	7.35	0.5%	NA	100%	90%	110%						

Comments: NA signifies Not Applicable.

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

Certified By:



Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE: 211 Centrum Blvd, Ottawa

SAMPLED BY: Jacquelyn Curphey

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Fluorene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Chrysene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthene-d10	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Chrysene-d12	ORG-91-5105	modified from EPA 3541 and EPA 8270E	GC/MS
F1 (C6-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
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
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
F1 (C6-C10)	VOL-91- 5010	MOE E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC-E3421	P&T GC/FID
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE: 211 Centrum Blvd, Ottawa

SAMPLED BY: Jacquelyn Curphey

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Bromomethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030C & 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 20Z566618

PROJECT: 11206675-E2 (PO#73518359)

ATTENTION TO: Joseph Drader

SAMPLING SITE: 211 Centrum Blvd, Ottawa

SAMPLED BY: Jacquelyn Curphey

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
Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Chromium VI	INOR-93-6034	SM 3500-Cr B	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE METHOD CN- 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Sodium Adsorption Ratio (Calculated)		McKeague 3.26 & EPA SW-846 6010B CALCULATION	



Chain of Custody Record

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

Report Information:

Company: GHD
Contact: JOE DRADER
Address: 179 COLONNADE RD, SUITE 400
OTTAWA, ON K2J 7E4
Phone: 613-218-3463 Fax: _____
Reports to be sent to:
1. Email: JOSEPH.DRADER@GHD.COM
2. Email: PASCAL.RENELLA@GHD.COM

Project Information:

Project: 11206675-E2
Site Location: 211 CENTRUM BLVD, OTTAWA
Sampled By: JACQUELYN CURPHEY
AGAT Quote #: _____ PO: 78510359
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: _____

Regulatory Requirements:

(Please check all applicable boxes.)

☒ Regulation 153/04

Table 3 Indicate One

☐ Ind/Com

☒ Res/Park

☐ Agriculture

Soil Texture (Check One)

☒ Coarse

☐ Fine

☐ Sewer Use

☐ Sanitary

☐ Storm

Region _____ Indicate One

☐ MISA

☐ Regulation 558

☐ CCME

☐ Prov. Water Quality Objectives (PWQO)

☐ Other

Indicate One

Is this submission for a
Record of Site Condition?

☐ Yes ☐ No

Report Guideline on
Certificate of Analysis

☐ Yes ☐ No

Sample Matrix Legend

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

Field Filtered - Metals (Hg, Cu, Ni)

O. Reg 153

Metals and Inorganics
☐ All Metals ☐ 153 Metals (excl. Hydrides)
☐ Hydride Metals ☐ 153 Metals (incl. Hydrides)

ORPs: ☐ B-HWS ☐ Cl ☐ CN
☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg
☐ pH ☐ SAR

Full Metals Scan

Regulation/Custom Metals

Nutrients: ☐ TP ☐ NH₃ ☐ TKN
☐ NO₃ ☐ NO₂ ☐ NO₃+NO₂

Volatiles: ☐ VOC ☐ BTEX ☐ THM

PHCs F1 - F4

ABNs

PAHs

PCBs: ☐ Total ☐ Aroclors

Organochlorine Pesticides

TCUP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs

Sewer Use

Potentially Hazardous or High Concentration (Y/N)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N	Metals and Inorganics	ORPs	Nutrients	Volatiles	PHCs F1 - F4	ABNs	PAHs	PCBs	Organochlorine Pesticides	TCUP	Sewer Use	Potentially Hazardous or High Concentration (Y/N)
GW-11206675-012220-SC-001	JAN 22 2020	12:37	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012220-SC-002	JAN 22 2020	12:37	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012320-SC-003	JAN 23 2020	8:45	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012320-SC-004	JAN 23 2020	10:12	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012320-SC-005	JAN 23 2020	10:30	4	GW	LAB QC BOTTLES	N					X	X	X					
GW-11206675-012320-SC-006	JAN 23 2020	10:45	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012320-SC-007	JAN 23 2020	11:05	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012320-SC-008	JAN 23 2020	11:55	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012320-SC-009	JAN 23 2020	12:35	13	GW		Y	X	X		X	X	X	X					
GW-11206675-012320-SC-010	JAN 23 2020	13:00	13	GW		Y	X	X		X	X	X	X					
TRIP-002	JAN 23 2020		3		TRIP BLANK													

Samples Relinquished By (Print Name and Sign): <u>JACQUELYN CURPHEY</u>	Date: <u>JAN 23/2020</u>	Time: <u>14:15</u>	Samples Received By (Print Name and Sign): <u>Uerthele (Sun)</u>	Date: <u>2020/01/23</u>	Time: <u>14h30</u>	<u>3 COOLERS</u>
Samples Relinquished By (Print Name and Sign): <u>U/I to FedEx</u>	Date: <u>2020/01/23</u>	Time: <u>16:00</u>	Samples Received By (Print Name and Sign): <u>Shanmin</u>	Date: <u>Jan 24/2020</u>	Time: <u>10 AM</u>	Page <u>1</u> of <u>1</u>
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:	Nº: <u>T 098875</u>

Laboratory Use Only

Work Order #: 202506618
Cooler Quantity: three-onice
Arrival Temperatures: see attached
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 ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

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

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



AGAT Laboratories

Sample Temperature Log

Client: GHD

COC# or Work Order #: 20260618

of Coolers: three-onice

of Submissions: one

Arrival Temperatures - Branch/Driver

Cooler #1: 8.0 / 8.0 / 8.3

Cooler #2: 4.3 / 4.1 / 4.0

Cooler #3: 5.5 / 5.1 / 5.6

Cooler #4: / /

Cooler #5: / /

Cooler #6: / /

Cooler #7: / /

Cooler #8: / /

Cooler #9: / /

Cooler #10: / /

IR Gun ID: 1439003407

Taken By: Linda D

Date (yyyy/mm/dd): 2020/01/23 Time: 15:08 AM / PM

Arrival Temperatures - Laboratory

Cooler #1: 3.6 / 2.9 / 2.4

Cooler #2: 3.1 / 3.7 / 3.3

Cooler #3: 4.0 / 4.2 / 2.9

Cooler #4: / /

Cooler #5: / /

Cooler #6: / /

Cooler #7: / /

Cooler #8: / /

Cooler #9: / /

Cooler #10: / /

IR Gun ID:

Taken By: Sherrin

Date (yyyy/mm/dd): Time: : AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)



about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

Marc Bouchard

Marc.Bouchard@ghd.com
613.288.1724

Joseph R. Drader

Joseph.Drader@ghd.com
613.288.1715

www.ghd.com