PROJECT NO.: SM 188509-E

NOVEMBER 7, 2018
REISSUED: MAY 18, 2021

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
9 & 11 KERMAN AVENUE
GRIMSBY, ONTARIO

PREPARED FOR:

TARBUTT CONSTRUCTION

Soil-Mat

BY

SOIL-MAT ENGINEERS & CONSULTANTS LTD.
130 LANCING DRIVE
HAMILTON, ONTARIO
L8W 3A1

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SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT NO.: SM 188509-E

November 7, 2018
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TARBUTT CONSTRUCTION
189 South Service Road
Grimsby, Ontario
L3M 4H6

Attention: Mr. Jim Tarbutt

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT
9 & 11 KERMAN AVENUE
GRIMSBY, ONTARIO

Dear Mr. Tarbutt,

SOIL-MAT ENGINEERS & CONSULTANTS LTD. [SOIL-MAT ENGINEERS] were retained by TARBUTT CONSTRUCTION to undertake a Phase Two Environmental Site Assessment [ESA] on the above captioned property. It is our understanding that the Phase Two ESA s intended to support the filing of a Record of Site Condition [RSC]. In order to complete and file an RSC the subject property will either need to meet the applicable Ontario Regulation 153/04 [as amended] soil and groundwater standards or be subjected to some level of Risk Assessment activities.

Our fieldwork, laboratory testing and interpretation in connection with the assessment activities has been finalised and our comments and recommendations, based on our findings, are presented in the following paragraphs.

The subject property is herein referred to as the *Site*.

1.0 INTRODUCTION

1.1 SITE DESCRIPTION

The Site is comprised of an irregular shaped parcel of land located on the north side of Main Street West between Kerman Avenue and Linden Lane. At the time of this Report, the Site was recognised with the municipal addresses of 9 and 11 Kerman Avenue in the Town of Grimsby, Ontario.

The portion of the Site identified as 11 Kerman Avenue was occupied by a two-storey dwelling with a basement. In addition to the dwelling, a partially detached garage was constructed adjacent to the dwelling on the south side of the building. An asphaltic-concrete paved driveway ran along the southern edge of the property and connected the 9 Kerman Avenue portion of the Site to Kerman Avenue. There was a small paver stone surfaced area adjacent to the dwelling. The remainder of 11 Kerman Avenue was landscaped with grass and select flower bed/garden areas.

The portion of the Site identified with the municipal address 9 Kerman Avenue consisted of a large greenhouse building with an office that covered the majority of the property. A single-storey dwelling with a basement was constructed on the eastern edge of Site. An aboveground pool was located to the south of the on-Site dwelling. In addition to the two main structures, a temporary aluminum frame storage tent was erected on the southern edge of the Site. An asphaltic-concrete paved parking area connected to the adjacent driveway on the 11 Kerman Avenue portion of the Site. There was also a secondary gravel driveway that connected to Main Street West on the south edge of the Site. The remaining portion of the Site was surfaced with grass.

The Site was bound to the north by institutional lands [Blessed Trinity Catholic Secondary School, to the east by Kerman Avenue and residential lands, to the south by residential lands and Main Street West and to the west by residential lands.

For descriptive purposes, Kerman Avenue has been designated as having a north-south alignment.

The parcel of land described above comprise the Phase Two ESA property and is hereinafter are referred to as the "Site".

The legal description of the Site is "Part Lot 13, Concession 2 North Grimsby as in RO119550, RO189941, RO773096, Part 2 30R5445, Part 2 30R10174 Subject to RO783167; Grimsby".

The geographic coordinates of the Site using a hand held global positioning unit are [NAD 83] 17T 615448E/ 4783439N.

Refer to Drawing No.: 1, Appendix 'A' for a general site location drawing.

1.2 PROPERTY OWNERSHIP

SOIL-MAT ENGINEERS were retained by Tarbutt Construction to undertake Phase Two ESA activities on the Site to support a residential redevelopment of the Site.

The contact information for Tarbutt Construction is provided below:

Tarbutt Construction
189 South Service Road Grimsby, Ontario
L3M 4H6

Point of Contact: Mr. Jim Tarbutt [jim@tarbutt.com]

A previous Phase One ESA report prepared for the Site by this Office indicated that the Site was owned by Van Geest Bros. Holdings Limited at the time of the title search in June 2018 [refer to SOIL-MAT ENGINEERS' Report No.: SM 188450-E, dated August 16, 2018].

1.3 CURRENT AND PROPOSED FUTURE USES

The Site was most recently used for commercial and residential purposes. The proposed future use of the site is residential use.

In consideration of the above, the change in land use from a mixed commercial and residential use to a residential use triggers a mandatory RSC filing under Ontario Regulation 153/04 [as amended].

1.4 APPLICABLE SITE CONDITION STANDARDS

The following criteria was utilised to determine the appropriate site classification and Ontario Regulation 153/04 [as amended] soil and groundwater standards.

- Current land use: Commercial and Residential;
- Intended land use: Residential;
- Drinking Water Supply: Non-potable Ground Water;
- On-site Soil Texture: Coarse Grained Soils;
- Depth to Bedrock: greater than 6.7 metres;
- pH of soils on the Site: Within Standard range;
- Surface Water Body: None observed within 30 metres of the Site.

Based on the above, all soil and groundwater laboratory analytical test results were compared to the Table 3 Soil and Ground Water Standards for a Residential/Parkland/Institutional Property Use [RPI] in a non-potable groundwater condition from the Ministry of the Environment document “Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environment Protection Act, [2011], hereinafter referred to as the ‘Table 3 RPI Standards’.

2.0 BACKGROUND INFORMATION

2.1 PHYSICAL SETTING

At the time of this Report no construction activities were underway.

The Site was bound to the north by institutional lands [Blessed Trinity Catholic Secondary School, to the east by Kerman Avenue and residential lands, to the south by residential lands and Main Street West and to the west by residential lands.

The topography of the Site at 9 Kerman Avenue is relatively flat and level as well with a small swale running along the exterior of the greenhouse building. In addition, there were two localized lower elevation areas, one being just south of the dwelling and the other being the loading bay located on the south east corner of the greenhouse building.

The topography of the Site at 11 Kerman Avenue is relatively flat and level with slight relief towards the east and west edges of the parcel. Surface water on this portion of the Site is generally directed to catch basins within the pavement structure on Kerman Avenue.

2.2 PAST INVESTIGATIONS

A Phase One Environmental Site Assessment was previously prepared by SOIL-MAT ENGINEERS under our Project No.: SM 188450-E, dated August 16, 2018.

Upon completion of the Phase One ESA Report, three [3] potential contaminating activities [PCAs] were identified in connection with the Site. The PCAs are identified in table format below:

PCA Number	PCA Description
28	Gasoline and Associated Products Storage in Fixed Tanks
28	Gasoline and Associated Products Storage in Fixed Tanks
40	Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) manufacturing, Processing, Bulk Storage and Large-Scale Applications
28	Gasoline and Associated Products Storage in Fixed Tanks

Based on the above, SOIL-MAT ENGINEERS was retained to undertake Phase Two ESA activities to assess the potential adverse impacts to the soil and groundwater medium as a result of the noted PCAs.

The fieldwork was conducted in conjunction with the geotechnical investigation of the Site, reported under a separate cover, and included the advancement of ten [10] sampled boreholes as well as six [6] hand dug test pits on the Site to depths ranging between 0.1 to 5.3 metres below ground surface. In addition groundwater monitoring wells were installed in four [4] of the completed boreholes to allow for groundwater sampling.

The Table of Areas of Potential Environmental Concern [APEC] is presented on the following page for reference.

Area of Potential Environmental Concern	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity	Location of PCA (on-site or off-site)	Contaminants of Potential Concern	Media Potentially Impacted (Groundwater, soil and/or sediment)
APEC #1	Northeast corner of the existing greenhouse building	28. Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs and BTEX	Soil and Groundwater
APEC #2	East end of the existing greenhouse building	28. Gasoline and Associated Products Storage in Fixed Tanks	On-Site	PHCs and BTEX	Soil and Groundwater
APEC #3	Throughout the Site	40. Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) manufacturing, Processing, Bulk Storage and Large-Scale Applications	On-Site	Metals, OCs	Soil
APEC #4	Southeast corner of the Site	28. Gasoline and Associated Products Storage in Fixed Tanks	Off-Site	PHCs and BTEX	Soil and Groundwater

The attached Drawing No.: 2, Appendix 'A', illustrates the APECs on the Phase Two ESA property.

It is noted that APEC #4 did not become evident until the latter stages of the Phase One ESA research. As such it was not specifically addressed by sampling and testing in the current scope of Phase Two ESA.

3.0 SCOPE OF THE INVESTIGATION

3.1 OVERVIEW OF SITE INVESTIGATION

The Phase Two ESA fieldwork programme was carried out on June 28, June 29, and July 12, 2018 and included the advancement of ten [10] boreholes and six [6] hand dug test pits within the Site boundaries.

Specifically, twenty-five [25] discrete soil samples and three [3] duplicate soil samples were selected from Borehole Nos. 1 through 10, as well as the six [6] hand dug test pits, for submission to AGAT Laboratories Limited, [AGAT], [an accredited Canadian Environmental Laboratory] for analytical testing of the contaminants of potential concern [COPCs]. In this case, the COPCs were identified as metals, petroleum hydrocarbons [PHCs], benzene, toluene, ethylbenzene, and xylene mixture [BTEX], and organochlorine pesticides [OCs].

In addition to the above, groundwater monitoring wells were installed in Borehole Nos. 3, 5, 8, and 10, to allow for the collection of groundwater samples for laboratory analytical testing for the parameters listed above.

The laboratory analytical test results were interpreted from an environmental point-of-view and were compared to the applicable Ontario Regulation 153/04 [as amended] soil and groundwater standards for the Site.

3.2 MEDIA INVESTIGATED

The Phase Two ESA investigated potential exceedances to the surface and subsurface soil and groundwater mediums. The COPC grouping was determined based on the previous site use. As previously noted, the COPC groupings were limited to PHCs, BTEX, OCs, and Metals.

3.3 DEVIATIONS FROM SAMPLING AND ANALYSIS PLAN

No deviations from the Phase Two ESA sampling plan were encountered.

3.4 IMPEDIMENTS

SOIL-MAT ENGINEERS did not encounter any physical impediments on the Site and were not denied access to any parts of the Phase Two ESA property.

4.0 INVESTIGATION METHOD

4.1 GENERAL

The Phase Two ESA included securing both soil and groundwater samples.

Professional care was exercised during the retrieval of each sample, the placement of each sample in the appropriate sample jar, the labeling of the field samples and associated chain of custody and in the delivery of the samples to the testing laboratory.

As our standard operating procedures dictate unusual field observations, such as visual or olfactory evidence of a suspected impact, a deviation from SOIL-MAT ENGINEERS' field sampling and handling protocols or incident on the testing laboratories' side was documented either on our field borehole logs or in-house copy of the sample Certificate of Analysis.

4.2 DRILLING AND EXCAVATING

Determination Drilling and Soils Investigations [DDSI] were retained by SOIL-MAT ENGINEERS for the physical advancements of the boreholes and installation of the groundwater monitoring wells on June 28 and 29, 2018. Kodiak Drilling were retained by SOIL-MAT ENGINEERS for the physical advancement of the boreholes and installation of the groundwater monitoring wells on July 12, 2018. It is noted that both DDSI and Kodiak Drilling are registered water well contractors for the installation and abandonment of groundwater monitoring wells under Ontario Regulation 903.

The boreholes were advanced using a Geoprobe drill rig on June 28 and 29, 2018, and a Beaver drill rig on July 12, 2018 under the direction of SOIL-MAT ENGINEERS. Soil samples were secured at roughly 0.60 metre intervals via split spoon samplers to the termination of each borehole. The split spoon samples were driven in general accordance with the Standard Penetration Test [SPT] method.

Each split-spoon sampler was thoroughly washed with non-phosphate detergent then rinsed with water before the collection of each subsequent sample to minimise the potential for cross-contamination between samples. The boreholes were advanced on the Site using solid and hollow stem augers, as well as direct push sampling equipment.

A 50-millimetre diameter groundwater monitoring well was installed at Borehole Nos. 3, 5, 8, and 10 upon the completion of drilling activities. The groundwater monitoring wells were installed in accordance with *Regulation 903 [Wells]* under the Ontario Water Resources Act. The monitoring wells were outfitted with flush mount protective casings and secured with a lock.

A water well record was submitted to the Ministry of the Environment and Climate Change [MOECC] upon completion of drilling activities. It is the responsibility of the Site owner to ensure the groundwater monitoring well is maintained in an appropriate, safe and secure condition as per the Regulation and to arrange for the monitoring well to be abandoned in accordance with the Regulation when it is no longer in use.

A site plan drawing illustrating the borehole and groundwater monitoring well locations is included in Appendix 'A' for reference [refer to Drawing No.: 3].

4.3 SOIL SAMPLING

The soil samples were examined in the field for visual and olfactory evidence of potential impacts such as unusual staining and/or odours, etc., and were split into two separate samples, including the following:

- One half of the sample was sealed in sampling jars for submission to AGAT for analytical testing, and;
- One half of the sample was sealed in a plastic sampling bag for further characterisation in SOIL-MAT ENGINEERS' in-house soils laboratory.

The soil samples that were delivered to AGAT were sealed in pre-cleaned sample jars, with preservatives were required, as provided by the laboratory.

The June 28 & 29, 2018 samples were picked up at our office by AGAT. The samples left our office with a temperature of 8.2°C, however, arrived at the actual laboratory facility with a final recorded temperature of 11.9 °C.

The July 12 samples were delivered to AGAT's depot location in Stoney Creek, Ontario in coolers to maintain a temperature range between the applicable 0°C to 10°C [a recorded average temperature of 6.1°C].

A copy of SOIL-MAT ENGINEERS borehole logs is included in Appendix 'B' for reference.

4.4 FIELD SCREENING MEASUREMENTS

All of the Phase Two ESA soil samples were examined in the field for visual and olfactory evidence of potential PHC impact(s), such as unusual staining and/or odours, etc.

No hand held field screening units were utilised during the collection of the confirmatory soil samples.

4.5 GROUNDWATER MONITORING WELL INSTALLATION

DDSI and Kodiak Drilling were retained by SOIL-MAT ENGINEERS for the physical drilling and construction of the groundwater monitoring wells.

The boreholes were advanced using a Geoprobe drill rig on June 28 and 29, 2018, and a Beaver drill rig on July 12, 2018 under the direction of SOIL-MAT ENGINEERS and were advanced using hollow and solid stem augers, as well as direct push equipment.

A 50-millimetre diameter groundwater monitoring well was installed at Borehole Nos. 1 through 3 upon the completion of drilling activities. The groundwater monitoring wells were installed in accordance with *Regulation 903 [Wells]* under the Ontario Water Resources Act.

A water well record was submitted to the MOE upon completion of drilling activities. It is the responsibility of the Site owner to ensure the groundwater monitoring well is maintained in an appropriate, safe and secure condition as per the Regulation and to arrange for the monitoring well to be abandoned in accordance with the Regulation when it is no longer in use.

4.6 GROUNDWATER FIELD MEASUREMENT OF WATER QUALITY PARAMETERS

No hand held field screening units were utilised during the collection of the groundwater samples. The samples were delivered immediately to AGAT upon retrieval from the monitoring well and were subjected to AGAT's QA procedure which included a temperature reading upon their receipt.

In each case, the groundwater samples were delivered to AGAT's depot location in Stoney Creek, Ontario immediately after sampling on ice to begin the cooling process to get the sampled within the applicable 0°C to 10°C. The sampled were delivered to AGAT's depot location with a recorded average temperature of 10.4 °C [within 50 to 80 minutes of the sampling event], however, arrived at the actual laboratory facility with a final recorded temperature of 16.3 °C.

4.7 GROUNDWATER SAMPLING

Three [3] well volumes were purged from each groundwater monitoring well prior to the collection of the groundwater samples. The monitoring wells were then allowed to recharge back to recorded static groundwater levels prior to the physical sample collection.

The monitoring wells installed on the Site during this Phase Two ESA were equipped with dedicated sampling equipment, including a 25-millimetre diameter water bailer for sample collection for the PHC parameters and a high density 10-millimetre diameter tubing outfitted with a Waterra foot-valve pump.

Professional care was exercised during the retrieval of each sample, the placement of each sample in the appropriate sample jar, the labeling of the field samples and associated chain of custody and in the delivery of the samples to the testing laboratory.

As our standard operating procedures dictate unusual field observations, such as visual or olfactory evidence of a suspected impact, a deviation from SOIL-MAT ENGINEERS' field sampling and handling protocols or incident on the testing laboratories' side was documented either on our field borehole logs or in-house copy of the sample certificate of analysis.

There were no deviations recorded during the Phase Two ESAs.

4.8 SEDIMENT SAMPLING

Sediment sampling was not conducted as part of this Phase Two ESA.

4.9 ANALYTICAL TESTING

All laboratory analytical work was performed by AGAT Laboratories Limited [AGAT] in Mississauga, Ontario. AGAT is a member of the Canadian Association for Laboratory Accreditation [CALA] and meets the requirements of Section 47 of the RSC Regulation.

4.10 RESIDUE MANAGEMENT PROCEDURES

The residue soil generated during advancement of the boreholes was left on Site.

Purged groundwater was stored on-site until the results of the laboratory analytical testing demonstrated that the groundwater met the applicable SCS at which time the groundwater was discarded across the surface soil in the vicinity of each groundwater sampling point.

4.11 ELEVATION SURVEYING

The surveying of our borehole and groundwater monitoring wells were referenced to a temporary benchmark described as a catch basin on the west side of Kerman Avenue and given a temporary elevation of 100.00.

4.12 QUALITY ASSURANCE AND QUALITY CONTROL MEASURES

QA/QC was maintained during the field program through equipment decontamination and sampling procedures, as outlined in the "*MOE Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*" (May, 1996).

Standard QA/QC protocols were followed for bottle preparation, sample collection and transportation, as outlined by MOE guidance documents, including the MOE's 2011 "*Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act*".

In addition to these field-based measures, extensive QA/QC procedures were carried out by the analytical laboratories, including:

- Lab blanks;
- Spikes;
- Matrix blanks; and
- Instrument blanks and assessments of instrument tuning and performance.

Based on the evaluation of the sampling and analytical procedures used, the following data quality statements can be made:

- The data are adequate for the RSC objectives and approach utilized; and,
- Soil and groundwater analytical data were of an acceptable quality for comparison to 2011 MOE SCS as defined by *O.Reg.153/04, as amended,* for current investigations.

5.0 REVIEW AND EVALUATION

5.1 GEOLOGY

A copy of SOIL-MAT ENGINEERS' borehole logs are presented in Appendix 'B' for reference.

In summary, the Phase Two ESA revealed the following Site stratigraphy:

Pavement Structure

Borehole No. 1 was advanced through the pavement structure of the existing driveway, which was found to consist of approximately 50 millimetres of asphaltic concrete overlying 500 millimetres of compact granular base. Borehole No. 10 was advanced inside the existing greenhouse where the ground surface was found to consist of 90 millimetre thick interlocking paver stone overlaying approximately 100 millimetres of compact granular base. It is noted that the majority of the green house floor area was exposed soil.

Sand and Gravel Fill

A surficial veneer of sand and gravel fill was encountered in Borehole Nos. 2, 3, 6 and 7 to depths of approximately 75 to 300 millimetres. It should be noted the depth of sand and gravel fill may vary across the site and from the thickness measured at the borehole locations. It should be noted that the Sand and Gravel fill is associated with the gravel covered roadways and pathways on the Site.

Topsoil

A surficial veneer of topsoil approximately 125 to 750 millimetres in thickness was encountered in Borehole Nos. 4, 5, 8 and 9. It should be noted that the depth of topsoil may vary across the site and from the thicknesses measured at these borehole locations. It should be noted too that the term "topsoil" has been used strictly from a geotechnical point of view and does not necessarily reflect the soils nutrient content or ability to support plant life.

Silty Sand

Silty sand was encountered beneath the pavement structure, sand and gravel fill or topsoil at all boreholes. This fine grained granular soil is brown in colour, contains trace clay and gravel, as well as some coarser sand seams, and is generally in a loose to dense state. The upper levels of the silty sand have a 'reworked' appearance, likely associated with agricultural use, as well as being exposed to continual freeze/thaw cycles. The native silty sand was proven to termination to depths of approximately 4.8 to 5.3 metres at all borehole locations.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to consist of coarse-textured glaciolacustrine deposits of sand and gravel, with minor silt and clay, consistent with our experience in the area and observations during our fieldwork.

5.2 GROUNDWATER ELEVATIONS AND FLOW DIRECTIONS

All boreholes were recorded as 'wet' at depths of between approximately 2.1 to 3.4 metres below the ground surface. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes. As noted above, Borehole Nos. 3, 5, 8, and 10 were fitted with monitoring wells to allow for measurement of the static groundwater level. A representative of SOIL-MAT measured the groundwater level in the wells on July 27 and August 1, 2018, which have been summarised as follows:

Table A
Ground Water Level Measurements

Borehole No.	Surface Elevation [m]	July 27, 2018		August 1, 2018	
		Ground Water Depth (m)	Ground Water Elevation (m)	Ground Water Depth (m)	Ground Water Elevation (m)
BH3	99.95	2.58	97.37	1.7	98.25
BH5	101.61	2.51	99.1	2.5	99.11
BH8	101.73	2.75	98.98	2.8	98.93
BH10	100.54	2.0	98.54	2	98.54

These monitoring well observations may be considered to have generally stabilised, given the time elapsed since installation. The present data would indicate a static groundwater level at a depth of approximately 2.0 to 2.5 metres below the existing grade. It is noted that the static groundwater level would also be anticipated to be subject to seasonal fluctuations, being highest during the 'wetter' spring and fall periods of the year.

5.3 GROUNDWATER HYDRAULIC GRADIENTS

The horizontal hydraulic gradient was calculated based on the groundwater levels recorded during the Phase Two ESA. Based on these recordings, the distance between the monitoring wells and the depth of well installation the horizontal hydraulic gradient is estimated as 0.0087.

5.4 SOIL TEXTURE

SOIL-MAT ENGINEERS' borehole logs indicate that the surface and subsurface soil consists primarily of silty sand as the predominant soil type. As such the coarse textured soil standards have been considered.

A grain size distribution profile was not performed by SOIL-MAT ENGINEERS and would need to be used to confirm the soil was a medium fine texture if these SCSs are to be applied.

5.5 SOIL QUALITY –SOIL SAMPLING

In total, twenty-five [25] soil samples and three [3] duplicates were secured from the Site to assess potential exceedances on the Site.

The secured soil samples were submitted to AGAT for laboratory analytical testing as described in the summary table below:

TABLE B
SUMMARY OF ANALYTICAL TESTING – SOIL [TABLE 3 RPI]

Sample ID	Depth [m bgs]	Laboratory Analysis	Soil Description	Table 3 RPI Exceedances
BH3 SS3	1.5 – 2.1	PHCs and BTEX	Silty Sand	No exceedances reported
BH3 SS4	2.3 – 2.9	PHCs and BTEX	Silty Sand	No exceedances reported
BH3 SS5	3.0 – 3.6	PHCs and BTEX	Silty Sand	No exceedances reported
BH4 SS1	0 – 0.6	Metals and OCs	Silty Sand	No exceedances reported
BH4 SS2	0.8 – 1.4	Metals and OCs	Silty Sand	No exceedances reported
BH5 SS1	0 – 0.6	Metals and OCs	Silty Sand	No exceedances reported
BH5 SS2	0.8 – 1.4	Metals and OCs	Silty Sand	No exceedances reported
BH6 SS1	0 – 0.6	Metals and OCs	Silty Sand	No exceedances reported
BH6 SS2	0.8 – 1.4	Metals and OCs	Silty Sand	No exceedances reported
BH8 SS1	0 – 0.6	Metals and OCs	Silty Sand	No exceedances reported
BH8 SS2	0.8 – 1.4	Metals and OCs	Silty Sand	No exceedances reported
BH9 SS1	0 – 0.6	Metals and OCs	Topsoil	Exceeds the Table 3 RPI SCSs in: OCs: DDE – 0.68ppm vs 0.26ppm
BH9 SS2	0.8 – 1.4	Metals and OCs	Silty Sand	No exceedances reported
BH10 SS3	1.5 – 2.1	PHCs and BTEX	Silty Sand	No exceedances reported
BH10 SS4	2.3 – 2.9	PHCs and BTEX	Silty Sand	No exceedances reported
BH10 SS5	3.0 – 3.6	PHCs and BTEX	Silty Sand	No exceedances reported
S1 [TP1]	0.1	Metals and OCs	Topsoil	No exceedances reported
S2 [TP2]	0.1	Metals and OCs	Topsoil	Exceeds the Table 3 RPI SCSs in: Metals: Boron (Hot Water Soluble – 1.62ppm vs 1.5ppm OCs: Chlordane – 0.10ppm vs 0.05ppm Endosulfan – 0.092ppm vs 0.04ppm
S3 [TP2]	0.3	Metals and OCs	Silty Sand	Exceeds the Table 3 RPI SCSs in: OCs: Endosulfan – 0.042ppm vs 0.04ppm
S4 [TP3]	0.1	Metals and OCs	Topsoil	Exceeds the Table 3 RPI SCSs in: OCs: Dieldrin – 0.070ppm vs 0.05ppm

Sample ID	Depth [m bgs]	Laboratory Analysis	Soil Description	Table 3 RPI Exceedances
S5 [TP3]	0.3	Metals and OCs	Silty Sand	Exceeds the Table 3 RPI SCSs in: Metals: Lead – 130ppm vs 120ppm OCs: Endosulfan – 0.042ppm vs 0.04ppm
S6 [TP4]	0.1	Metals and OCs	Topsoil	No exceedances reported
S7 [TP5]	0.1	Metals and OCs	Topsoil	Exceeds the Table 3 RPI SCSs in: OCs: DDE – 0.35ppm vs 0.26ppm Endosulfan – 0.041ppm vs 0.04ppm
S8 [TP6]	0.1	Metals and OCs	Topsoil	Exceeds the Table 3 RPI SCSs in: Metals: Boron (Hot Water Soluble – 1.56ppm vs 1.5ppm
S9 [TP6]	0.3	Metals and OCs	Silty Sand	No exceedances reported
Dup 1 [BH3 SS4]	2.3 – 2.9	PHCs and BTEX	Silty Sand	No exceedances reported
Dup 2 [BH10 SS4]	2.3 – 2.9	PHCs and BTEX	Silty Sand	No exceedances reported
Dup 1 [BH5 SS1]	0 – 0.6	Metals and OCs	Silty Sand	No exceedances reported
Notes: PHCs = Petroleum Hydrocarbons, OCs = Organochlorine Pesticides, BTEX = Benzene, Toluene, Ethylbenzene, and Xylene Mixture				

In most cases, the laboratory analytical test results for the submitted soil samples meet the applicable Table 3 [RPI] Standards for the select tested parameters, with the following exceptions:

1. Borehole No. 'BH9', and Testpit Nos. 'TP2', 'TP3' and 'TP5' exceeds the applicable SCSs for select OC parameters from the surface downward to approximately 0.5 metres below ground surface elevation.
2. Testpit Nos. 'TP2', 'TP3' and 'TP6' exceeds the applicable SCSs for select Metal parameters from the surface downward to approximately 0.5 metres below ground surface elevation.

The AGAT Certificate of Analysis for the soil analytical data is contained in Appendix 'C' for reference.

5.6 SOIL QUALITY – IMPORTED FILL MATERIAL

With the exception of the Sand and Gravel associated with the roadways and pathways, fill material was not encountered at the borehole locations.

5.7 GROUNDWATER QUALITY

Groundwater samples were secured on August 1, 2018 from two [2] of the four [4] existing monitoring wells installed on the Site.

A summary of the field samples and laboratory analytical test results is presented in Tables C below:

TABLE C
SUMMARY OF ANALYTICAL TESTING – WATER [TABLE 3 NPGW]

Sample ID	Laboratory Analysis	Table 3 NPGW Exceedances
MW3 S1	PHCs & BTEX	No exceedances reported
MW10 S1	PHCs & BTEX	No exceedances reported
Dup 1 (MW3)	PHCs & BTEX	No exceedances reported
Notes: PHCs = Petroleum Hydrocarbons, BTEX = Benzene, Toluene, Ethylbenzene, and Xylene Mixture		

The laboratory analytical test results for the submitted ground water samples are all below the applicable Table 3 NPGW Standards for the select test parameters, being below the laboratory method detection limit in most cases.

The AGAT certificate of analysis for the groundwater analytical data is contained in Appendix 'D' for reference.

5.8 SEDIMENT QUALITY

Sediment sampling was not conducted as part of this Phase Two ESA. The APEC and COC groupings were limited to the soil and groundwater mediums.

5.9 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

QA/QC was maintained during the field program through equipment decontamination and sampling procedures, as outlined in the "*MOE Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*" (May, 1996). Each groundwater monitoring well was equipped with dedicated sampling equipment, including a 25 millimetre water bailer for sample collection. Standard QA/QC protocols were followed for bottle preparation, sample collection and transportation, as outlined by MOE guidance documents, including the MOE's 2011 "*Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act*".

In addition to these field-based measures, extensive QA/QC procedures were carried out by the analytical laboratories, including:

- Lab blanks;
- Spikes;
- Matrix blanks; and
- Instrument blanks and assessments of instrument tuning and performance.

Based on the evaluation of the sampling and analytical procedures used, the following data quality statements can be made:

- The data are adequate for the RSC objectives and approach utilized; and,

- Soil and groundwater analytical data were of an acceptable quality for comparison to 2011 MOE Standards as defined by *O.Reg.153/04* for current investigations.

5.10 PHASE TWO CONCEPTUAL SITE MODEL [CSM]

SOIL-MAT ENGINEERS' has not prepared a Phase Two CSM as part of this Phase Two ESA as additional assessment and/or remedial work is required. A final Phase Two CSM will be prepared to support the filing of an RSC once the Site has been subjected to additional delineation assessment activities and a remedial operation or site specific risk assessment activities, or a combination of the two.

6.0 CONCLUSIONS

As noted in the preamble of this Report, SOIL-MAT ENGINEERS were retained by PHELPS HOMES to undertake a Phase Two ESA programme on the Site to assess potential adverse environmental exceedance(s) to the soil and groundwater mediums as a result of three [3] PCAs associated with the Site and neighbouring lands.

The results of our Phase Two ESA findings are summarized below:

METAL SOIL EXCEEDANCE AREA

The Phase Two ESA activities carried out by SOIL-MAT ENGINEERS revealed select Metal exceedances on the property. The Metal exceedances [to date] were identified in the vicinity of Test Pit Nos. 2, 3, and 6. Additional intrusive soil sampling is required to assess the lateral and vertical extent of the Metal exceedances in the soil medium on the Site.

The metals soil sampling locations are illustrated on Drawing.: 4A, Appendix A.

PHC SOIL EXCEEDANCE AREA

The Phase Two ESA activities carried out by SOIL-MAT ENGINEERS did not reveal any PHC exceedances in the soil.

It is noted that soil sampling was not conducted to address the off-site PCA [APEC #4] as part of the current Phase Two ESA scope. However the fieldwork did not encountered evidence of potential PHC impact to soil on the site, including in Borehole Nos. 5, 6 and 7, which are located towards the southeast of the Site. From a due diligence standpoint the potential for an adverse impact to the subsurface soils on the Site from APEC #4 is considered low. However, it will be necessary to confirm this with discrete data to support an eventual RSC submission.

The PHC soil sampling locations are illustrated on Drawing No.: 4B, Appendix A.

BTEX SOIL EXCEEDANCE AREA

The Phase Two ESA activities carried out by SOIL-MAT ENGINEERS did not reveal any BTEX exceedances in the soil.

It is noted that soil sampling was not conducted to address the off-site PCA [APEC #4] as part of the current Phase Two ESA scope. However the fieldwork did not encountered evidence of potential BTEX impact to soil on the site, including in Borehole Nos. 5, 6 and 7, which are located towards the southeast of the Site. From a due diligence standpoint the potential for an adverse impact to the subsurface soils on the Site from APEC #4 is considered low. However, it will be necessary to confirm this with discrete data to support an eventual RSC submission.

The BTEX soil sampling locations are illustrated on Drawing No.: 4C, Appendix A.

OC SOIL EXCEEDANCE AREA

The Phase Two ESA activities carried out by SOIL-MAT ENGINEERS revealed select OC exceedances on the property. The OC exceedances [to date] were identified in the vicinity of Borehole No. 9 as well as Test Pit Nos. 2, 3, and 5. Additional intrusive soil sampling is required to assess the lateral and vertical extent of the OCs exceedances in the soil medium on the Site.

The PAH soil sampling locations are illustrated on Drawing.: 4D, Appendix A.

GROUNDWATER ANALYTICAL DATA

SOIL-MAT ENGINEERS' Phase Two ESA activities undertaken on the Site [to date] did not reveal any exceedances of the applicable Table 3 SCSs in the groundwater medium.

The groundwater sampling locations are illustrated on Drawings.: 5A and 5B, Appendix A.

It should be noted that the off-site PCA [APEC #4] was not addressed at the time of this Phase Two ESA. However, no evidence of potential groundwater impact was noted in Monitoring Well No. 5, installed near the southeast corner of the Site, towards APEC #4. As such, from a due diligence standpoint the likelihood of an adverse impact to groundwater is considered low. However, analytical testing of both the groundwater at the southeast corner of the Site would need to be addressed prior to the filing of the RSC.

PROPOSED FUTURE RESIDENTIAL REDEVELOPMENT

Given the proposed future use of the Site [residential], the Site would be subject to a mandatory Record of Site Condition [RSC] filing. In order to complete and file an RSC the properties will either need to meet the applicable Ontario Regulation 153/04 [as amended] soil and groundwater standards or be subjected to some level of risk assessment activities. In either scenario, additional intrusive sampling is recommended to complete the following:

- Further delineate the lateral and vertical extent of the OC and Metal exceedances within the on-Site soils. If removal of the subject material is pursued, the additional lateral and vertical assessment activities would be beneficial in determining an approximate volume of material requiring off-site disposal;
    - On a preliminary basis, considering the data presently available, a conservative assessment of the volume of material affected can be made. In general the data indicates that the OC and Metal exceedances are present within the upper perhaps 0.3 to 0.5 metres. The lateral extent has not been clearly delineated at present, as noted, however on a conservative basis it would appear that extent of the existing greenhouse footprint may be affected. This represents an area of approximately 12,000 m^2. Accounting for an average depth of perhaps 0.4 metres yields a volume estimate of roughly 4,800 m^3. Considering a material density of approximately 2.2 tonnes/m^3 provides a tonnage estimate of roughly 10,500 tonnes. A conservative budget allowance for removal and disposal of the affected material, depending on the disposal site, would be in the range of

$40 to $65 per tonne, or a cost on the order of $420,000.00 to $682,500.00. It is reiterated that this is a preliminary, conservative volume and cost estimate. Further testing will be required to delineate the actual extent of the affected material. As well project specific quotes may yield different rates from soil removal contractors.

- The on-Site materials may be remediated employing a traditional “dig and dump” operation. In this scenario, confirmatory soil sampling would be undertaken on the sidewalls and floor [base] of the remedial excavation(s). The number of samples would be determined based on the final dimensions of the remedial excavation(s);
- In the event that the Site is subjected to some level of Risk Assessment [whether a modified generic RA or a Site Specific RA], additional intrusive sampling will be required to establish the lateral and vertical extent of the exceedance(s). It is also noted, that although still preliminary in nature, the laboratory analytical test results [to date] indicate that some level of soil removal and future control measures, such as hard or soft caps, would be required to support the acceptance of a Modified Generic Risk Assessment [MGRA] or Site Specific Risk Assessment [SSRA] for the Site. As noted above, given the depths to which soil impacts have presently been identified, complete soil removal to this depth may not be logistically or economically preferable to the project, and so some level of risk assessment may be preferred.

7.0 CLOSURE

SOIL-MAT ENGINEERS & CONSULTANTS LTD. prepared this Report for the account of TARBUTT CONSTRUCTION. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any suffered by any third party as a result of decisions made or actions based on this report.

We trust this Report is satisfactory for your purposes. Please feel free to contact our Office if you have any questions, or we may be of further service to you.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

LICENSED PROFESSIONAL ENGINEER
MAY 18/21
I. D. SHAW
100042315
PROVINCE OF ONTARIO
Re issued

Peter Markesic, B.Sc.
Environmental Technician

Keith Gleadall, B.A., EA Dipl.
Environmental Manager

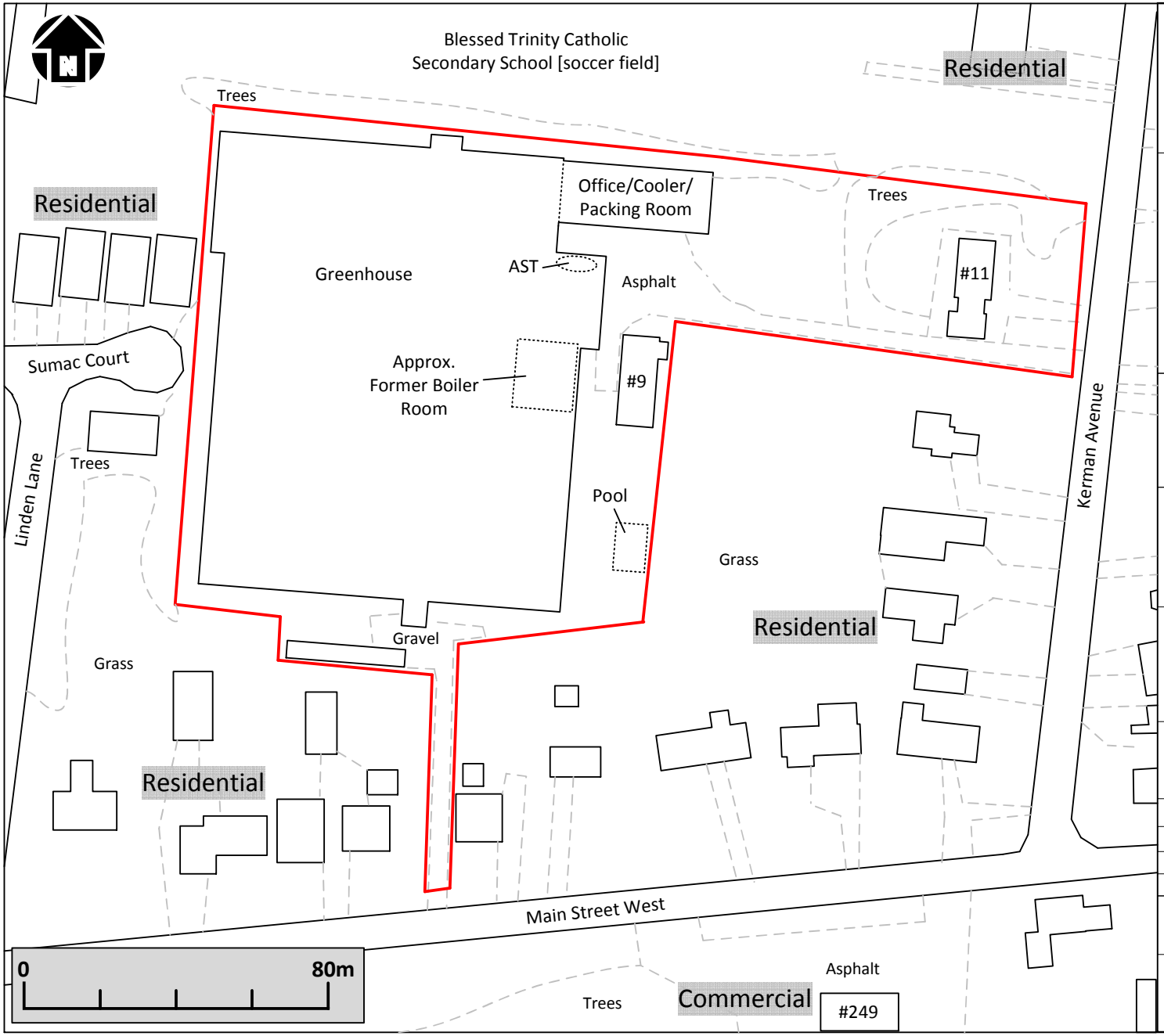
Ian Shaw, P.Eng., QP_{ESA}
Senior Engineer

Distribution: TARBUTT CONSTRUCTION [PDF BY EMAIL]

Enclosures:
- Appendix 'A': Drawing Nos. 1 to 5 – Borehole Location & Analytical Data Summary;
- Appendix 'B' Borehole Logs;
- Appendix 'C' AGAT Soil Analytical Data;
- Appendix 'D' AGAT Ground Water Analytical Data;
- Appendix 'E' Qualifications of Assessors;
- Appendix 'F' Statement of Limitations.

Appendix 'A'

1. Drawing No.: 1: Site Plan;
2. Drawing No.: 2: APECs;
3. Drawing No.: 3: Borehole Location Plan;
4. Drawing No.: 4a: Analytical Data Summary [Soil] Metals;
5. Drawing No.: 4b: Analytical Data Summary [Soil] PHCs;
6. Drawing No.: 4c: Analytical Data Summary [Soil] BTEX;
7. Drawing No.: 4d: Analytical Data Summary [Soil] OCs;
8. Drawing No.: 5a: Analytical Data Summary [Water] PHCs;
9. Drawing No.: 5b: Analytical Data Summary [Water] BTEX;



LEGEND

= Site Boundary

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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Tarbutt Construction

PROJECT TITLE

Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE

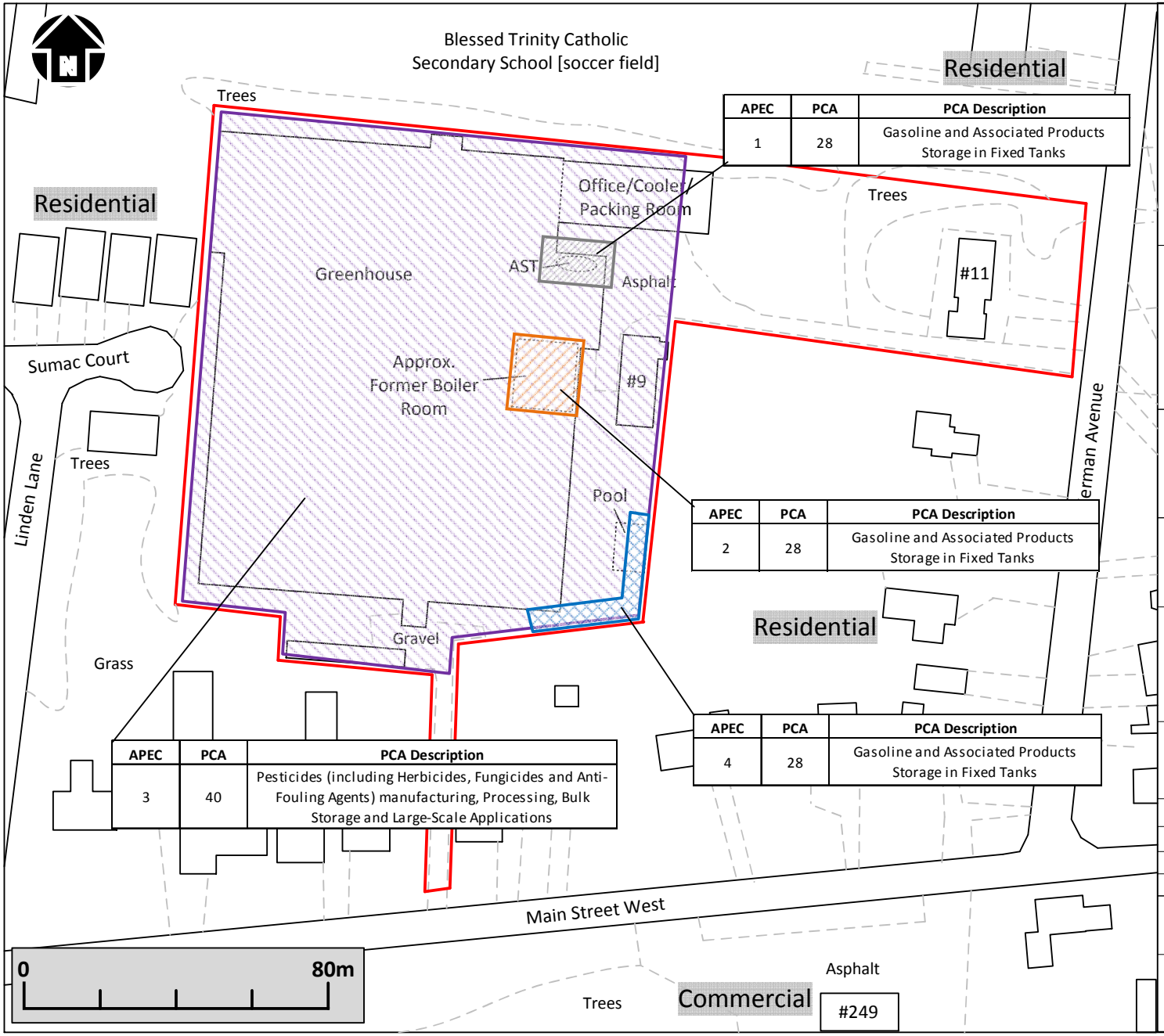
Study Area View

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME

188509 Site Plan.vsd

DRAWING No. 1



APEC	PCA	PCA Description
1	28	Gasoline and Associated Products Storage in Fixed Tanks

APEC	PCA	PCA Description
2	28	Gasoline and Associated Products Storage in Fixed Tanks

APEC	PCA	PCA Description
3	40	Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) manufacturing, Processing, Bulk Storage and Large-Scale Applications

APEC	PCA	PCA Description
4	28	Gasoline and Associated Products Storage in Fixed Tanks

LEGEND

- = Site Boundary
- = APEC #1
- = APEC #2
- = APEC #3
- = APEC #4

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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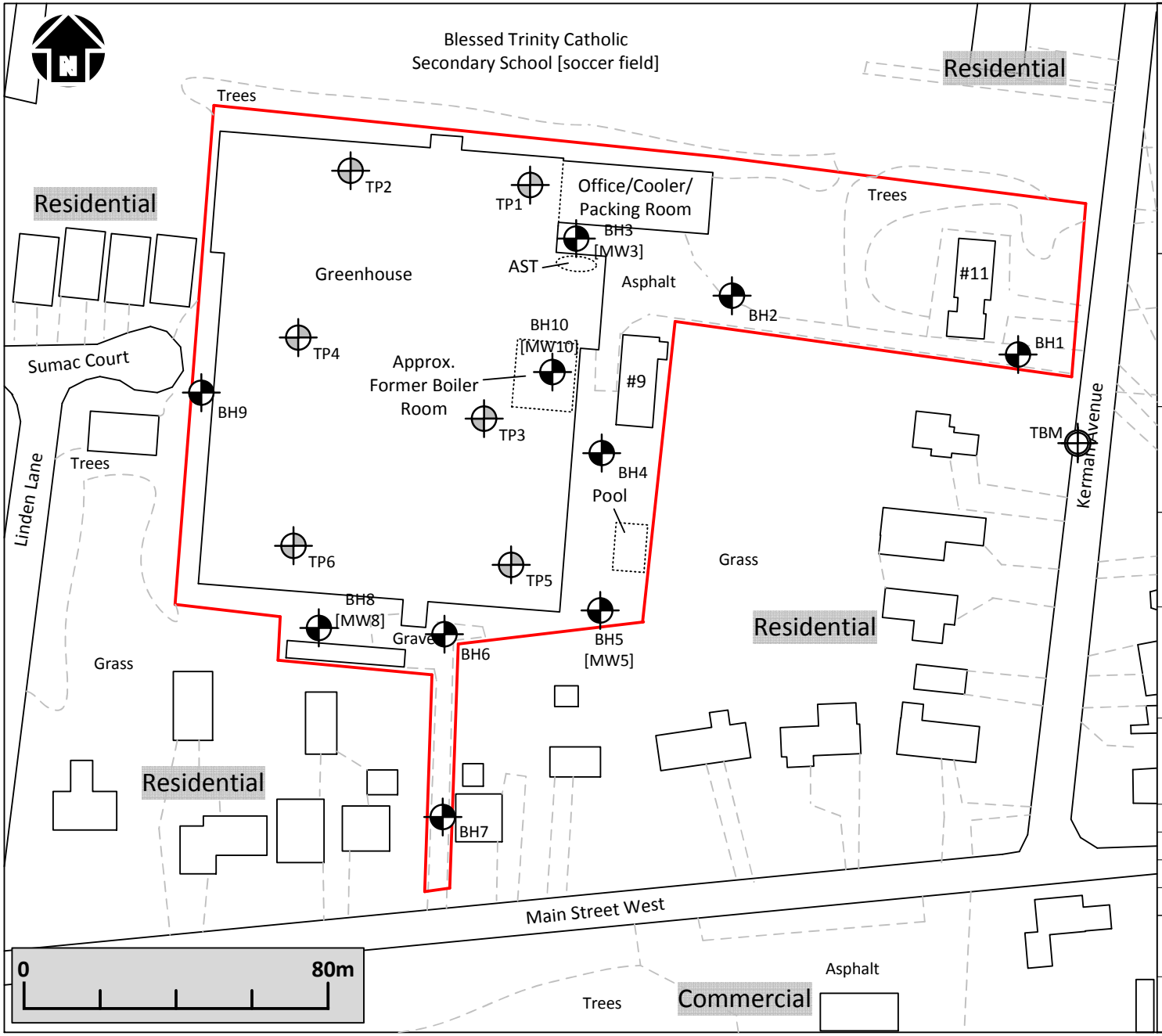
PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
APECs

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 APECs.vsd

DRAWING No. 2



LEGEND

- = Site Boundary
- = Borehole Location (BH#)
- = Test Pit Location (TP#)
- = Temporary Benchmark (TBM) [Catch Basin on west side of Kerman Ave. Assumed elevation of 100.00 metres]

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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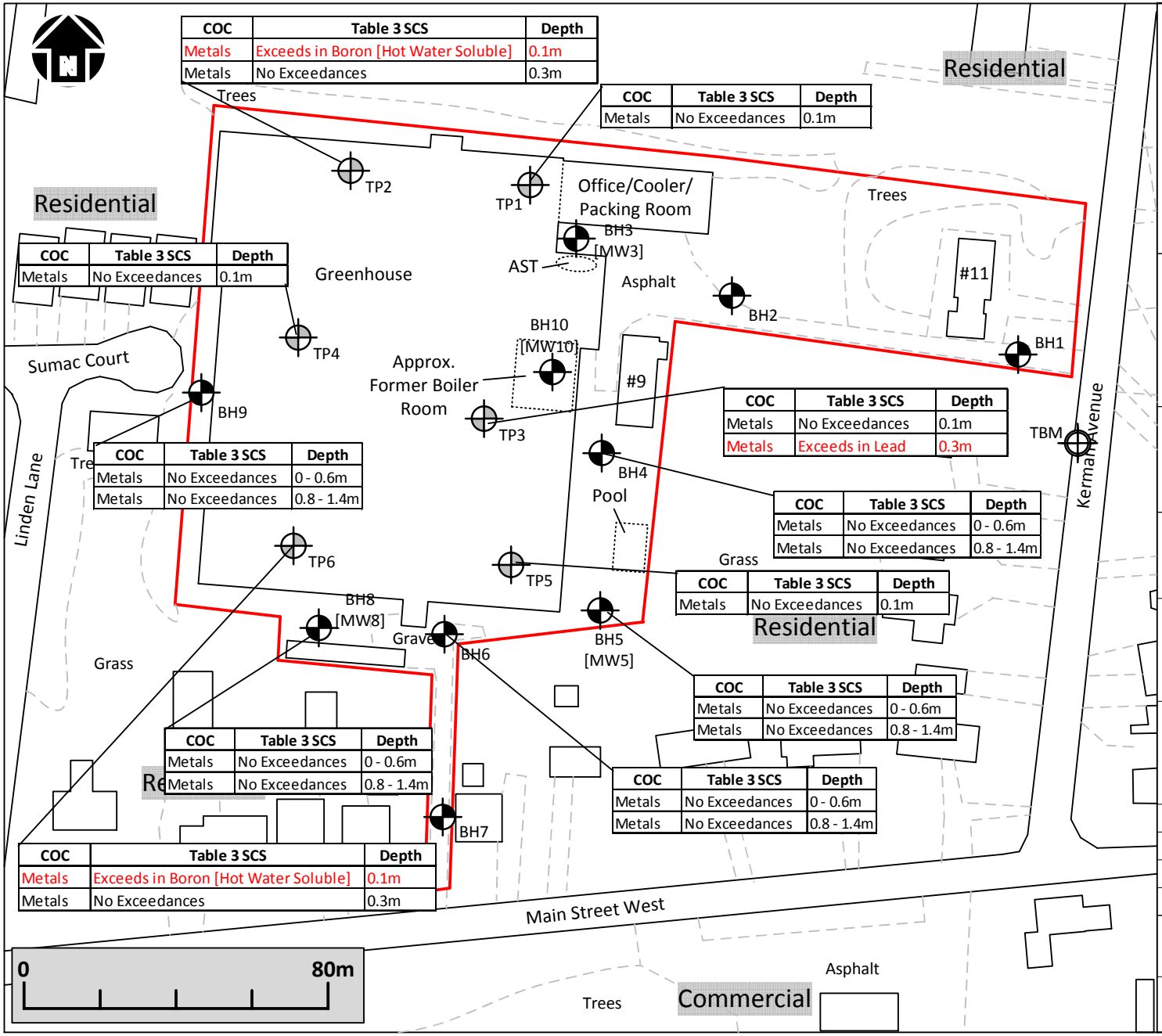
PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
Borehole Location Plan

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 Borehole Location Plan.vsd

DRAWING No. 3



LEGEND

- = Site Boundary
- = Borehole Location (BH#)
- = Test Pit Location (TP#)
- = Temporary Benchmark (TBM) [Catch Basin on west side of Kerman Ave. Assumed elevation of 100.00 metres]

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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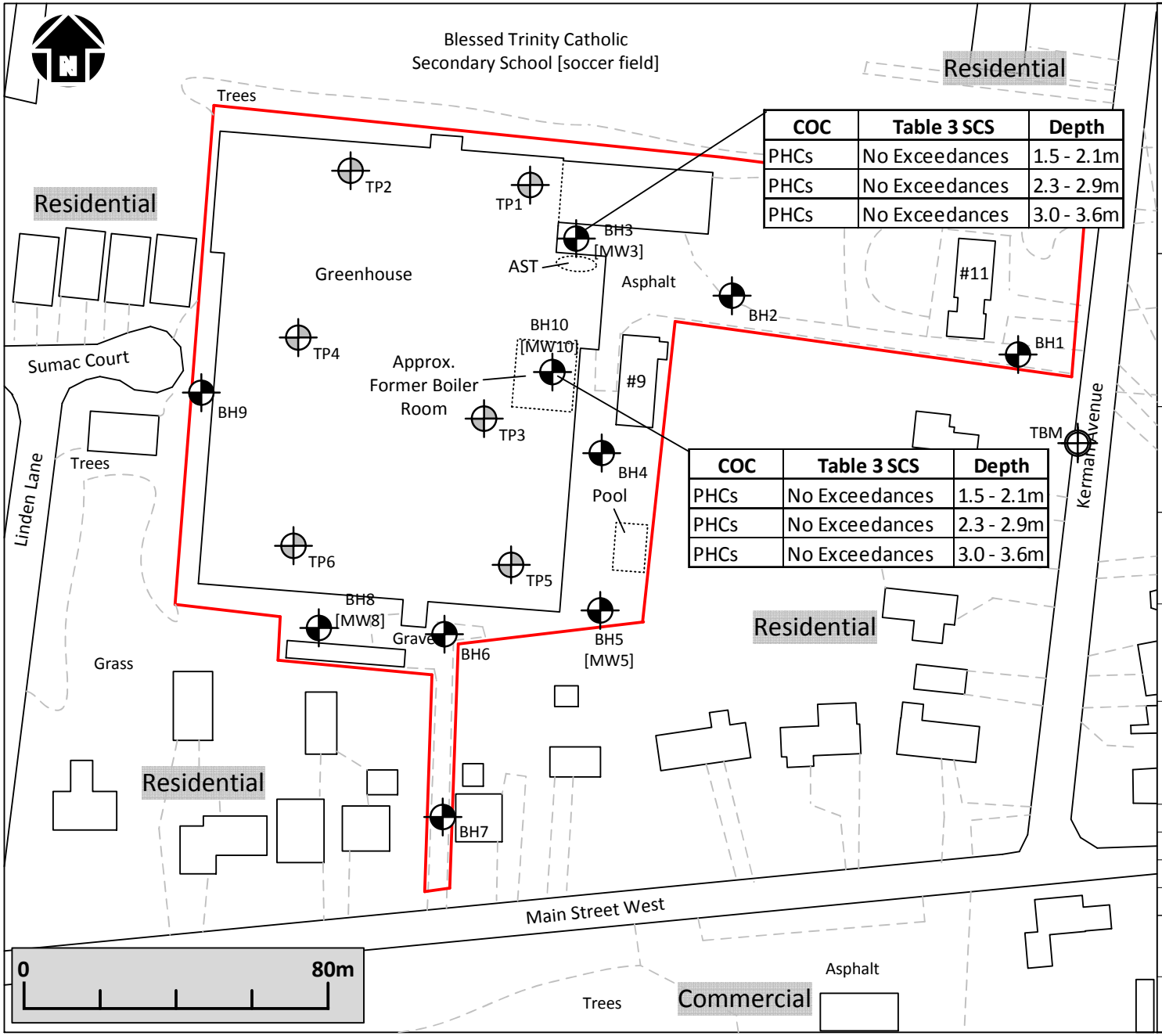
PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
Analytical Data Summary
Soil - Metals

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 Drawing 4a – Soil – Metals.vsd

DRAWING No. 4a



COC	Table 3 SCS	Depth
PHCs	No Exceedances	1.5 - 2.1m
PHCs	No Exceedances	2.3 - 2.9m
PHCs	No Exceedances	3.0 - 3.6m

COC	Table 3 SCS	Depth
PHCs	No Exceedances	1.5 - 2.1m
PHCs	No Exceedances	2.3 - 2.9m
PHCs	No Exceedances	3.0 - 3.6m

LEGEND

= Site Boundary

= Borehole Location
BH#

= Test Pit Location
TP#

= Temporary Benchmark
TBM
[Catch Basin on west side of Kerman Ave. Assumed elevation of 100.00 metres]

NOTES:

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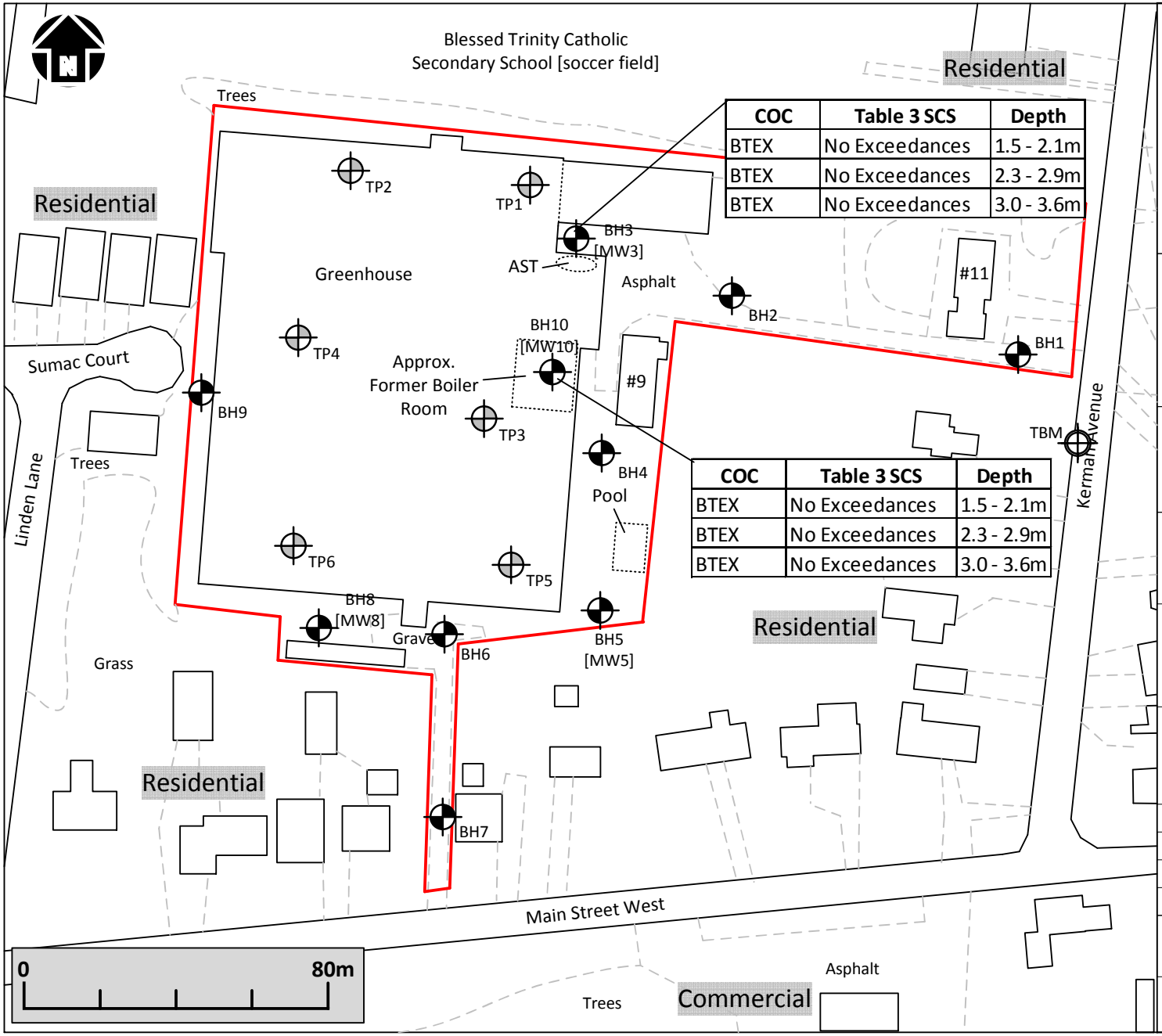
PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
Analytical Data Summary
Soil - PHCs

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 Drawing 4b – Soil – PHCs.vsd

DRAWING No. 4b



COC	Table 3 SCS	Depth
BTEX	No Exceedances	1.5 - 2.1m
BTEX	No Exceedances	2.3 - 2.9m
BTEX	No Exceedances	3.0 - 3.6m

COC	Table 3 SCS	Depth
BTEX	No Exceedances	1.5 - 2.1m
BTEX	No Exceedances	2.3 - 2.9m
BTEX	No Exceedances	3.0 - 3.6m

LEGEND

= Site Boundary

= Borehole Location
BH#

= Test Pit Location
TP#

= Temporary Benchmark
TBM
[Catch Basin on west side of Kerman Ave. Assumed elevation of 100.00 metres]

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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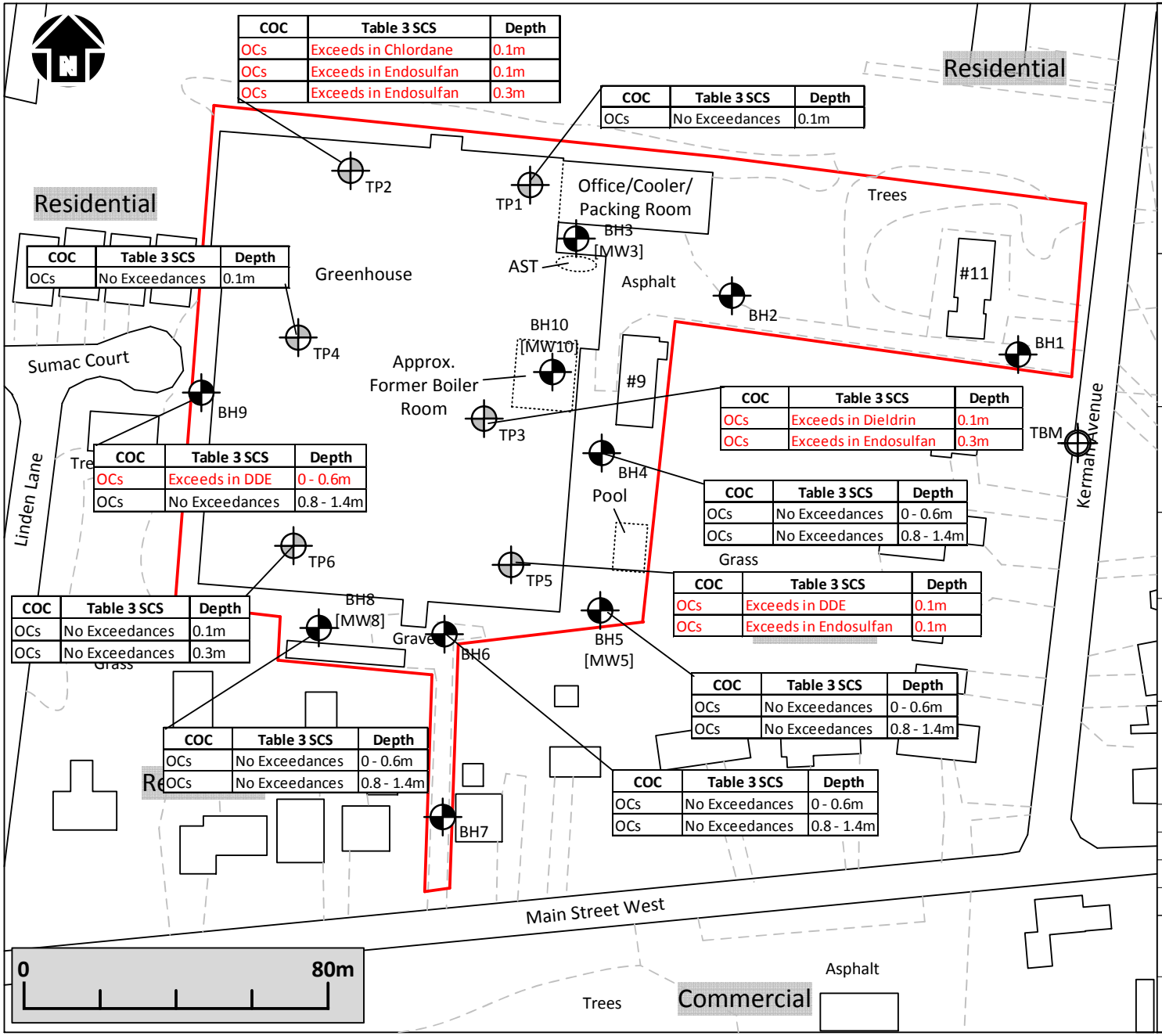
PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
Analytical Data Summary
Soil - BTEX

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 Drawing 4c – Soil – BTEX.vsd

DRAWING No. 4c



COC	Table 3 SCS	Depth
OCs	Exceeds in Chlordane	0.1m
OCs	Exceeds in Endosulfan	0.1m
OCs	Exceeds in Endosulfan	0.3m

COC	Table 3 SCS	Depth
OCs	No Exceedances	0.1m

COC	Table 3 SCS	Depth
OCs	No Exceedances	0.1m

COC	Table 3 SCS	Depth
OCs	Exceeds in Dieldrin	0.1m
OCs	Exceeds in Endosulfan	0.3m

COC	Table 3 SCS	Depth
OCs	Exceeds in DDE	0 - 0.6m
OCs	No Exceedances	0.8 - 1.4m

COC	Table 3 SCS	Depth
OCs	No Exceedances	0 - 0.6m
OCs	No Exceedances	0.8 - 1.4m

COC	Table 3 SCS	Depth
OCs	Exceeds in DDE	0.1m
OCs	Exceeds in Endosulfan	0.1m

COC	Table 3 SCS	Depth
OCs	No Exceedances	0.1m
OCs	No Exceedances	0.3m

COC	Table 3 SCS	Depth
OCs	No Exceedances	0 - 0.6m
OCs	No Exceedances	0.8 - 1.4m

COC	Table 3 SCS	Depth
OCs	No Exceedances	0 - 0.6m
OCs	No Exceedances	0.8 - 1.4m

COC	Table 3 SCS	Depth
OCs	No Exceedances	0 - 0.6m
OCs	No Exceedances	0.8 - 1.4m

LEGEND

= Site Boundary

= Borehole Location
BH#

= Test Pit Location
TP#

= Temporary Benchmark
TBM
[Catch Basin on west side of Kerman Ave. Assumed elevation of 100.00 metres]

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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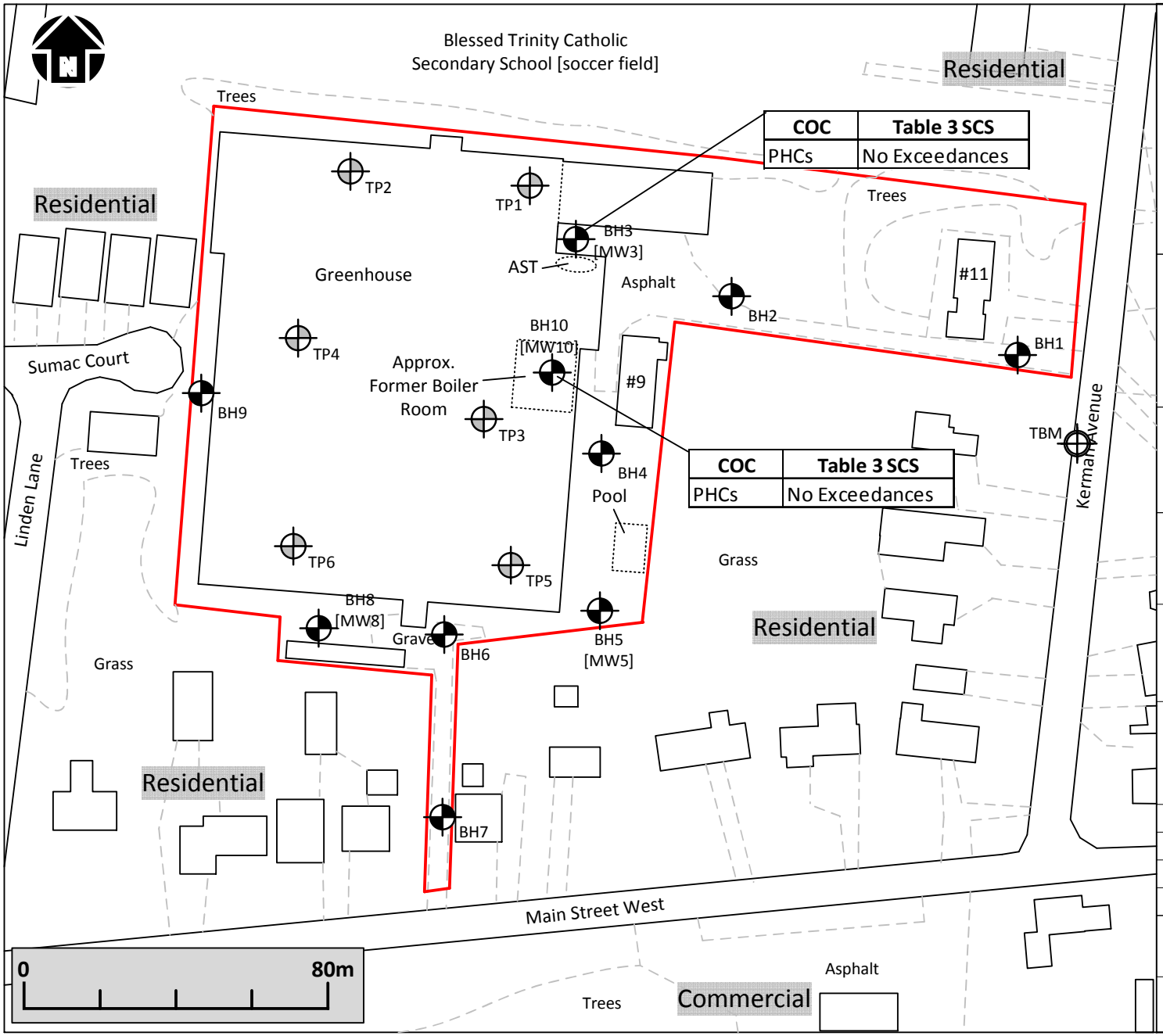
PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
Analytical Data Summary
Soil - OCs

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 Drawing 4d – Soil – OCs.vsd

DRAWING No. 4d



COC	Table 3 SCS
PHCs	No Exceedances

COC	Table 3 SCS
PHCs	No Exceedances

LEGEND

= Site Boundary

= Borehole Location
BH#

= Test Pit Location
TP#

= Temporary Benchmark
TBM [Catch Basin on west side of Kerman Ave. Assumed elevation of 100.00 metres]

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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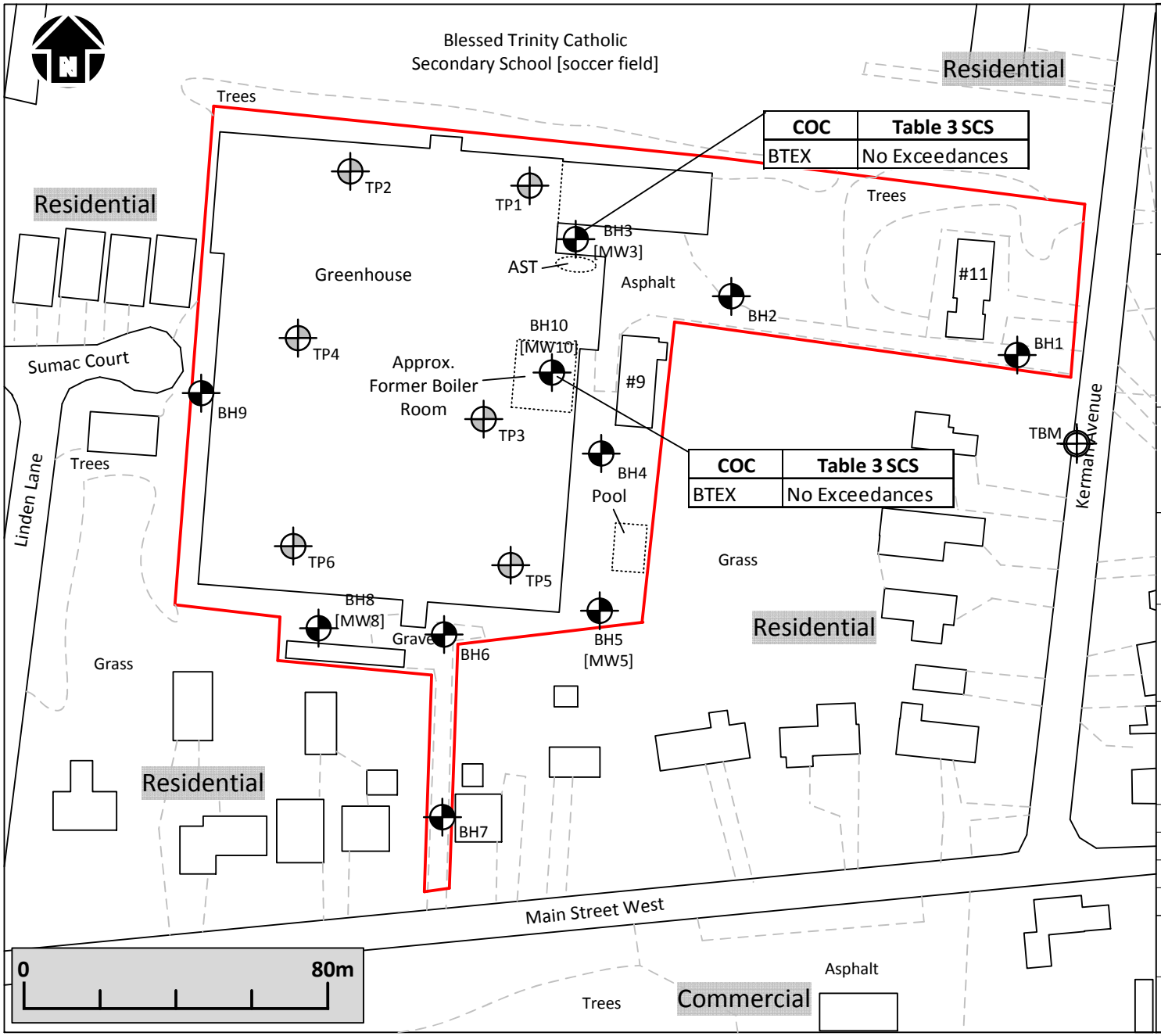
PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
Analytical Data Summary
Water - PHCs

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 Drawing 5a – Water – PHCs.vsd

DRAWING No. 5a



LEGEND

- = Site Boundary
- = Borehole Location (BH#)
- = Test Pit Location (TP#)
- = Temporary Benchmark (TBM) [Catch Basin on west side of Kerman Ave. Assumed elevation of 100.00 metres]

NOTES:

1. This map should be read in conjunction with Soil-Mat Engineers and Consultants Ltd. Report No.: SM 188509-E

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Tarbutt Construction

PROJECT TITLE
Phase Two Environmental Site Assessment
9 and 11 Kerman Avenue
Grimsby, Ontario

DRAWING TITLE
Analytical Data Summary
Water - BTEX

PROJECT No.	SM 188509-E
DATE	August 2018
CHECKED	KG
DRAWN	PM

FILE NAME
188509 Drawing 5b – Water – BTEX.vsd

DRAWING No. 5b

Appendix 'B'

1. Borehole Logs

Log of Borehole No. 1

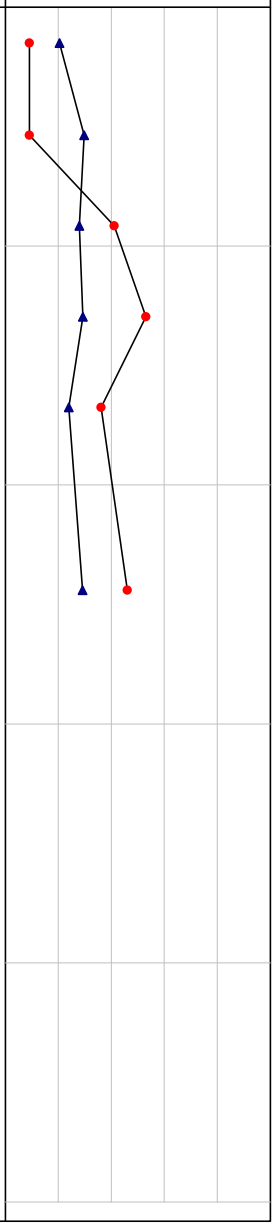
Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	99.72	Ground Surface								
0–2 / 0–1	99.17	**Pavement Structure** Approximately 50 millimetres of asphaltic concrete over 500 millimetres of compact granular base.		SS	1	10,6,3,2	9			
2–5 / 1–2		**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, loose to very dense.		SS	2	4,4,5,5	9			
				SS	3	18,21,20,30	41			
				SS	4	26,26,27,29	53			
				SS	5	14,19,17,24	36			
16 / 5	94.52	End of Borehole		SS	6	17,21,25,30	46			

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using direct push probe equipment on June 28, 2018 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open to 3.4 metres and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Direct Push Method
Drill Date: June 28, 2018
Hole Size: 100 millimetres
Drilling Contractor: DDSI

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 2

Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

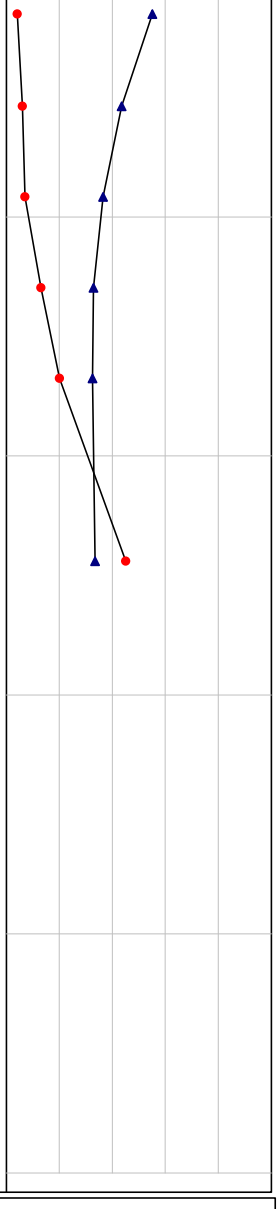
Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
	99.98		Ground Surface								
0 / 0	99.68		**Sand and Gravel Fill** Approximately 300 millimetres of sand and gravel fill.								
1 /			**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, very loose to dense.		SS	1	6,2,2,2	4			
2 / 1					SS	2	3,2,4,3	6			
3 /					SS	3	2,3,4,3	7			
4 / 2					SS	4	11,7,6,7	13			
5 /					SS	5	7,11,9,11	20			
6 / 3											
7 /					SS	6	34,24,21,32	45			
8 / 4	94.78		End of Borehole								
9 /			NOTES: 1. Borehole was advanced using direct push probe equipment on June 28, 2018 to termination at a depth of 5.2 metres. 2. Borehole was recorded as 'wet' at a depth of 2.1 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.								
10 / 5											
11 /											
12 / 6											
13 /											
14 / 7											
15 /											
16 / 8											
17 /											
18 / 9											
19 /											
20 / 10											
21 /											
22 / 11											
23 /											
24 / 12											
25 /											
26 / 13											
27 /											
28 / 14											
29 /											
30 / 15											
31 /											
32 / 16											
33 /											

Moisture Content w%
10 20 30 40

Standard Penetration Test blows/300mm
20 40 60 80



Drill Method: Direct Push Method
Drill Date: June 28, 2018
Hole Size: 100 millimetres
Drilling Contractor: DDSI

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 3

Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

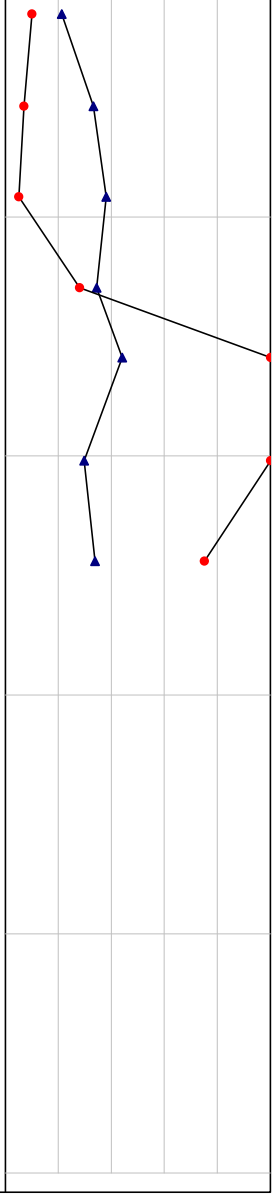
Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	99.95	Ground Surface								
0–3 / 0–1		**Sand and Gravel Fill** Approximately 125 millimetres of sand and gravel fill.		SS	1	6,4,6,8	10			
3–7 / 1–2		**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, loose to very dense.		SS	2	4,3,4,6	7			
6–7 / 2				SS	3	2,3,2,8	5			
8–10 / 2–3				SS	4	6,8,20,25	28			
10 / 3				SS	5	30,50/4"	100			
13 / 4				SS	6	35,44,50/5"	100			
16 / 5	94.75			SS	7	8,30,45,46	75			
17 / 5		End of Borehole								

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on July 12, 2018 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open to a depth of 2.6 metres and 'wet' at a depth of 2.3 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

July 27th - 2.58 metres
August 1st - 1.70 metres

Drill Method: Solid Stem Augers
Drill Date: July 12, 2018
Hole Size: 100 millimetres
Drilling Contractor: Kodiak Drilling

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
T: 905.318.7440 F: 905.318.7455
E: info@soil-mat.ca

Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 4

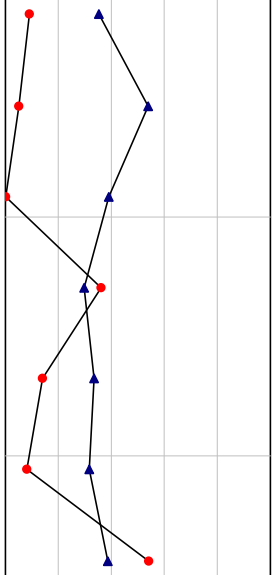
Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	100.72		Ground Surface								
0 / 0	100.47		**Topsoil** Approximately 250 millimetres of topsoil.								
1 / 0			**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, very loose to very dense.		SS	1	2,5,4,3	9			
2 / 1					SS	2	2,2,3,2	5			
3 / 1					SS	3	1,0,0,6	0			
4 / 2					SS	4	12,18,18,20	36			
5 / 2					SS	5	8,9,5,10	14			
6 / 3					SS	6	1,3,5,19	8			
7 / 4					SS	7	16,28,26,27	54			
8 / 5	95.52		End of Borehole								
9 / 6			NOTES: 1. Borehole was advanced using solid stem auger equipment on June 28, 2018 to termination at a depth of 5.2 metres. 2. Borehole was recorded as open to 3.7 metres and 'wet' at a depth of 3.0 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.								
33 / 9											

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



Drill Method: Soild Stem Augers
Drill Date: June 28, 2018
Hole Size: 100 millimetres
Drilling Contractor: DDSI

Soil-Mat Engineers & Consultants Ltd.
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Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 5

Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft / m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	101.61	Ground Surface							
0–3 / 0–1		**Topsoil** Approximately 125 millimetres of topsoil.							
3–16 / 1–5		**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, loose to compact.	SS	1	1,1,1,2	2			
			SS	2	2,2,3,8	5			
			SS	3	4,8,6,7	14			
			SS	4	7,13,15,18	28			
			SS	5	7,10,10,12	20			
			SS	6	5,8,9,13	17			
16 / 5	96.41	End of Borehole							

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using hollow stem auger equipment on June 29, 2018 to termination at a depth of 5.2 metres.

2. Borehole was recorded as 'wet' at a depth of 2.3 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

July 27th - 2.51 metres
August 1st - 2.50 metres

Drill Method: Hollow Stem Augers
Drill Date: June 29, 2018
Hole Size: 175 millimetres
Drilling Contractor: DDSI

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Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 6

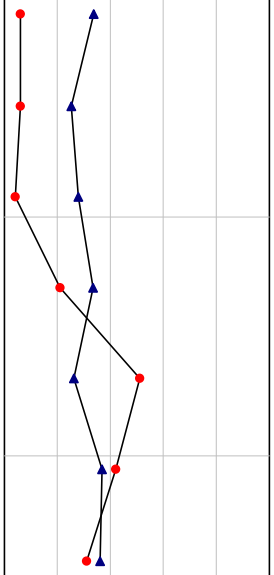
Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		101.76	Ground Surface							
0	0		**Sand and Gravel Fill** Approximately 75 millimtres of sand and gravel fill.	SS	1	4,4,2,2	6			
3	1		**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, loose to very dense.	SS	2	3,3,3,2	6			
6	2			SS	3	3,3,1,2	4			
10	3			SS	4	10,9,12,16	21			
13	4			SS	5	26,24,27,32	51			
16	5	96.56		SS	6	38,24,18,20	42			
				SS	7	22,15,16,27	31			
			End of Borehole							

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using direct push probe equipment on June 28, 2018 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open to 3.0 metres and 'wet' at a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Direct Push Method
Drill Date: June 28, 2018
Hole Size: 100 millimetres
Drilling Contractor: DDSI

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Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 7

Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

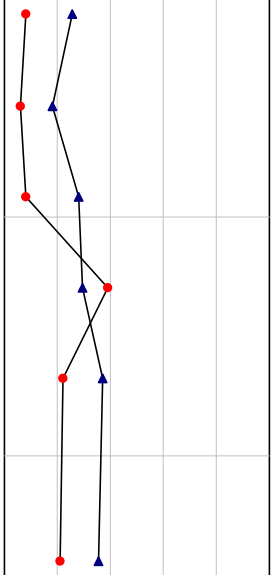
Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft / m)	Elevation (m)	Symbol	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	102.61		Ground Surface								
0 / 0	102.38		**Sand and Gravel Fill** Approximately 225 millimetres of sand and gravel fill.		SS	1	7,5,3,3	8			
3 / 1			**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, loose to dense.		SS	2	2,3,3,3	6			
7 / 2					SS	3	3,4,4,4,3	8			
10 / 3					SS	4	9,19,20,22	39			
11 / 3					SS	5	9,12,10,12	22			
16 / 5	97.41		End of Borehole		SS	6	3,9,12,18	21			

Moisture Content w% (10 20 30 40)

Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using hollow stem auger equipment on June 29, 2018 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open to 3.4 metres and 'wet' at a depth of 3.4 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Hollow Stem Augers
Drill Date: June 29, 2018
Hole Size: 175 millimetres
Drilling Contractor: DDSI

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Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 8

Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		101.73	Ground Surface							
0	0	101.50	**Topsoil** Approximately 225 millimetres of topsoil.							
1			**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, loose to dense.	SS	1	2,3,3,3	6			
2	1			SS	2	3,4,3,3	7			
3				SS	3	3,2,2,5	4			
4	2			SS	4	8,6,6,13	12			
5				SS	5	11,15,19,20	34			
6	3									
7				SS	6	3,5,8,32	13			
8	4	96.39	End of Borehole							
9			NOTES: 1. Borehole was advanced using hollow stem auger equipment on June 29, 2018 to termination at a depth of 5.3 metres. 2. Borehole was recorded as 'wet' at a depth of 3.0 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: July 27th - 2.75 metres August 1st - 2.80 metres							
10	5									
11										
12	6									
13										
14	7									
15										
16	8									
17										
18	9									
19										
20										
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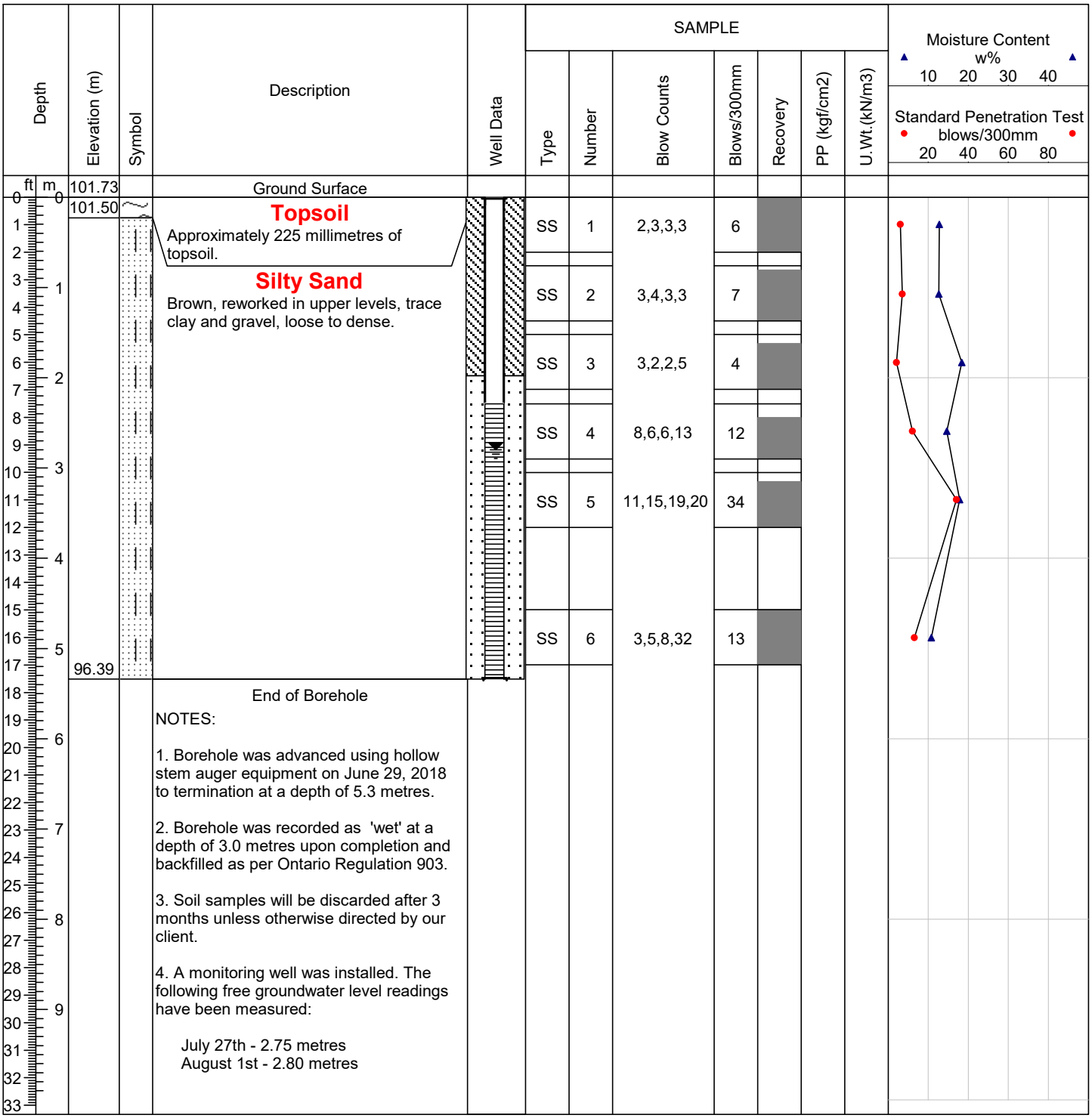

Drill Method: Hollow Stem Augers
Drill Date: June 29, 2018
Hole Size: 175 millimetres
Drilling Contractor: DDSI

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 9

Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		100.19	Ground Surface							
0-2	0	100.19 – 99.44	**Topsoil** Approximately 750 millimetres of topsoil.	SS	1	1,1,1,0	2			
3-16	1-5	99.44 – 94.99	**Silty Sand** Brown, reworked in upper levels, trace clay and gravel, loose to very dense.	SS	2	2,2,4,8	6			
				SS	3	12,14,14,20	28			
				SS	4	18,16,18,23	34			
				SS	5	32,28,24,20	52			
				SS	6	15,15,10,17	25			
17	5	94.99	End of Borehole							

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)

NOTES:

1. Borehole was advanced using direct push probe equipment on June 29, 2018 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open to 3.4 metres and 'wet' at a depth of 2.6 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Direct Push Method
Drill Date: June 29, 2018
Hole Size: 175 millimetres
Drilling Contractor: DDSI

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Log of Borehole No. 10

Project No: SM 188510-G
Project: Proposed Residential Development
Location: 9 & 11 KermanAvenue,Grimsby
Client: Tarbutt Construction

Project Manager: Ian Shaw, P.Eng.
Borehole Location: See Drawing No.1
:
:

Soil-Mat

Depth (ft / m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	100.54	Ground Surface							
0 / 0	100.35	**Pavement Structure** Approximately 90 millimetre thick interlocking tile over 100 millimetres of compact granular base.							
		Silty Sand Brown, reworked in upper levels, trace clay and gravel, loose to very dense.	SS	1	2,2,2,2	4			
			SS	2	1,2,3,3	5			
2 / 1			SS	3	14,4,6,4	10			
			SS	4	5,6,10,12	16			
4 / 2			SS	5	13,24,34,40	58			
			SS	6	50/5"	100			
5 / 3	95.74		SS	7	24,50/5"	100			
		End of Borehole							
6 / 4		NOTES: 1. Borehole was advanced using soilid stem auger equipment on July 12, 2018 to termination at a depth of 4.8 metres. 2. Borehole was recorded as open to a depth of 2.4 metres and 'wet' at a depth of 2.3 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: July 27th - 2.00 metres August 1st - 2.00 metres							
7 / 5									
8 / 6									
9 / 7									
10 / 8									
11 / 9									
12 / 10									
13 / 11									
14 / 12									
15 / 13									
16 / 14									
17 / 15									
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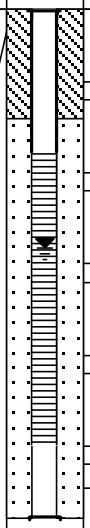
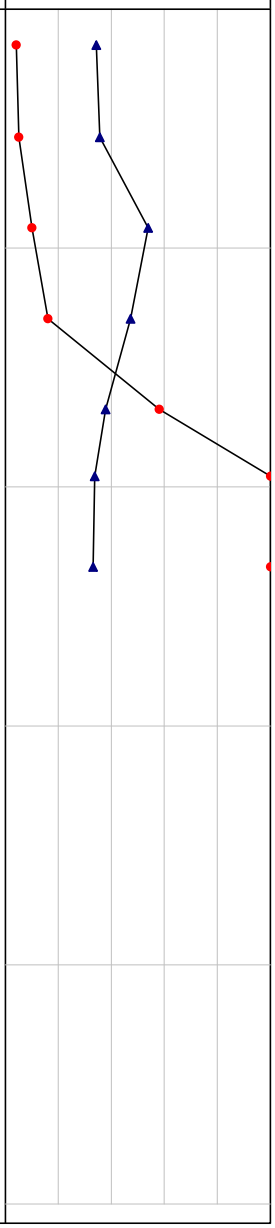
31 / 29									
32 / 30									
33 / 31									





Drill Method: Solid Stem Augers
Drill Date: July 12, 2018
Hole Size: 100 millimetres
Drilling Contractor: Kodiak Drilling

Soil-Mat Engineers & Consultants Ltd.
130 Lancing Drive, Hamilton, ON L8W 3A1
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E: info@soil-mat.ca

Datum: Temporary Benchmark
Field Logged by: MC
Checked by: IS
Sheet: 1 of 1

Appendix 'C'

1. AGAT Certificate of Analysis – Soil

AGAT Laboratories

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT
130 LANCING DRIVE
HAMILTON, ON L8W3A1
(905) 318-7440

ATTENTION TO: Ian Shaw

PROJECT: 188509

AGAT WORK ORDER: 18T359257

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

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

DATE REPORTED: Jul 25, 2018

PAGES (INCLUDING COVER): 13

VERSION*: 1

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

*NOTES

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

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 18T359257

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-07-06

DATE REPORTED: 2018-07-25

		SAMPLE DESCRIPTION:		BH4 SS1	BH4 SS2	BH5 SS1	BH5 SS2	BH6 SS1	BH6 SS2	BH8 SS1	BH8 SS2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-06-28	2018-06-28	2018-06-29	2018-06-29	2018-06-29	2018-06-28	2018-06-29	2018-06-29
Parameter	Unit	G / S	RDL	9383335	9383338	9383339	9383340	9383422	9383426	9383427	9383428
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	8	5	7	6	8	5	7	7
Barium	µg/g	220	2	44	50	39	52	46	29	44	42
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	<5	<5	<5	7	8	6	<5	6
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.51	0.28	0.20	<0.10	0.71	0.17	0.37	0.11
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	2	11	13	11	13	30	11	15	13
Cobalt	µg/g	21	0.5	5.6	7.0	5.1	8.0	5.3	6.2	4.9	6.8
Copper	µg/g	92	1	19	24	21	32	24	26	26	39
Lead	µg/g	120	1	41	12	30	8	36	6	29	7
Molybdenum	µg/g	2	0.5	0.7	0.5	<0.5	<0.5	0.8	<0.5	0.5	<0.5
Nickel	µg/g	82	1	11	15	10	18	12	14	10	17
Selenium	µg/g	1.5	0.4	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vanadium	µg/g	86	1	19	21	20	24	29	21	23	26
Zinc	µg/g	290	5	65	44	60	43	162	34	76	45
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

Certified By: Amanjot Bhela

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
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Certificate of Analysis

AGAT WORK ORDER: 18T359257

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-07-06

DATE REPORTED: 2018-07-25

		SAMPLE DESCRIPTION:		BH9 SS1	BH9 SS2	Dup 1	S1	S2	S3	S4	S5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-06-28	2018-06-28	2018-06-29	2018-06-29	2018-06-29	2018-06-29	2018-06-29	2018-06-29
Parameter	Unit	G / S	RDL	9383430	9383431	9383432	9383436	9383437	9383438	9383439	9383440
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	9	4	7	9	8	18	6	8
Barium	µg/g	220	2	55	29	41	81	55	42	55	65
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	5	<5	<5	<5	6	6	5	5
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.27	<0.10	0.21	0.46	1.62	0.89	1.28	1.37
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	2	15	11	11	18	12	12	12	10
Cobalt	µg/g	21	0.5	6.4	5.2	5.1	6.2	4.8	5.9	5.2	4.6
Copper	µg/g	92	1	27	24	22	29	33	21	31	49
Lead	µg/g	120	1	48	5	34	56	69	59	105	**130**
Molybdenum	µg/g	2	0.5	1.6	<0.5	<0.5	0.8	1.1	0.8	1.0	0.7
Nickel	µg/g	82	1	16	11	10	16	10	11	12	10
Selenium	µg/g	1.5	0.4	0.4	<0.4	<0.4	0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	0.6	<0.5	<0.5	0.9	0.6	0.5	0.7	0.6
Vanadium	µg/g	86	1	26	23	21	25	21	24	20	20
Zinc	µg/g	290	5	118	35	63	97	133	70	109	94
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	0.16

Certified By: Amanjot Bhela

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AGAT WORK ORDER: 18T359257

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-07-06

DATE REPORTED: 2018-07-25

		SAMPLE DESCRIPTION:		S6	S7	S8	S9
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-06-29	2018-06-29	2018-06-29	2018-06-29
Parameter	Unit	G / S	RDL	9383441	9383442	9383443	9383444
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	5	5	6	5
Barium	µg/g	220	2	24	51	41	42
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	7	<5	6	6
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.86	1.15	1.56	0.36
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	2	14	11	12	14
Cobalt	µg/g	21	0.5	7.4	4.8	6.9	8.0
Copper	µg/g	92	1	27	28	23	24
Lead	µg/g	120	1	8	67	28	10
Molybdenum	µg/g	2	0.5	<0.5	0.9	0.6	0.6
Nickel	µg/g	82	1	15	9	13	16
Selenium	µg/g	1.5	0.4	0.4	<0.4	<0.4	<0.4
Silver	µg/g	0.5	0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	1	0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	2.5	0.5	<0.5	0.6	<0.5	<0.5
Vanadium	µg/g	86	1	24	21	23	26
Zinc	µg/g	290	5	38	113	79	43
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2
Mercury	µg/g	0.27	0.10	<0.10	0.10	<0.10	<0.10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
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.

Certified By: Amanjot Bhela

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Certificate of Analysis

AGAT WORK ORDER: 18T359257

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-07-06 **DATE REPORTED: 2018-07-25**

		SAMPLE DESCRIPTION:		BH4 SS1	BH4 SS2	BH5 SS1	BH5 SS2	BH6 SS1	BH6 SS2	BH8 SS1	BH8 SS2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-06-28	2018-06-28	2018-06-29	2018-06-29	2018-06-29	2018-06-28	2018-06-29	2018-06-29
Parameter	**Unit**	**G / S**	**RDL**	**9383335**	**9383338**	**9383339**	**9383340**	**9383422**	**9383426**	**9383427**	**9383428**
Hexachloroethane	µg/g	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Gamma-Hexachlorocyclohexane	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chlordane	µg/g	0.05	0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
DDE	µg/g	0.05	0.007	**0.10**	<0.007	**0.15**	<0.007	0.041	<0.007	**0.23**	<0.007
DDD	µg/g	0.05	0.007	0.009	<0.007	0.009	<0.007	<0.007	<0.007	0.020	<0.007
DDT	µg/g	1.4	0.007	0.020	<0.007	0.026	<0.007	<0.007	<0.007	0.042	<0.007
Dieldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Moisture Content	%		0.1	23.7	30.3	20.7	19.8	18.4	15.3	29.4	17.8
Surrogate	**Unit**	**Acceptable Limits**									
TCMX	%	50-140		74	66	66	66	76	70	64	66
Decachlorobiphenyl	%	60-130		72	80	80	76	90	76	82	82

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Certificate of Analysis

AGAT WORK ORDER: 18T359257

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-07-06

DATE REPORTED: 2018-07-25

		SAMPLE DESCRIPTION:		BH9 SS1	BH9 SS2	Dup 1	S1	S2	S3	S4	S5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-06-28	2018-06-28	2018-06-29	2018-06-29	2018-06-29	2018-06-29	2018-06-29	2018-06-29
Parameter	**Unit**	**G / S**	**RDL**	**9383430**	**9383431**	**9383432**	**9383436**	**9383437**	**9383438**	**9383439**	**9383440**
Hexachloroethane	µg/g	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Gamma-Hexachlorocyclohexane	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	0.005	<0.005	<0.005	<0.005	0.012	**0.092**	**0.042**	0.038	**0.042**
Chlordane	µg/g	0.05	0.007	<0.007	<0.007	<0.007	0.019	**0.10**	0.028	0.028	0.045
DDE	µg/g	0.05	0.007	**0.68**	**0.062**	**0.19**	**0.15**	**0.23**	**0.23**	**0.25**	**0.17**
DDD	µg/g	0.05	0.007	**0.12**	0.014	0.012	0.012	0.018	0.022	0.035	0.029
DDT	µg/g	1.4	0.007	0.21	0.026	0.040	0.021	0.051	0.036	0.088	0.040
Dieldrin	µg/g	0.05	0.005	0.044	<0.005	<0.005	<0.005	0.012	0.021	**0.070**	0.028
Endrin	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Moisture Content	%		0.1	19.4	31.0	20.4	18.4	22.5	19.9	14.4	13.7
Surrogate	**Unit**	**Acceptable Limits**									
TCMX	%	50-140		76	66	80	68	64	70	82	70
Decachlorobiphenyl	%	60-130		76	92	96	68	78	88	108	84

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Certificate of Analysis

AGAT WORK ORDER: 18T359257

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-07-06

DATE REPORTED: 2018-07-25

		SAMPLE DESCRIPTION:		S6	S7	S8	S9
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-06-29	2018-06-29	2018-06-29	2018-06-29
Parameter	**Unit**	**G / S**	**RDL**	**9383441**	**9383442**	**9383443**	**9383444**
Hexachloroethane	µg/g	0.01	0.01	<0.01	<0.01	<0.01	<0.01
Gamma-Hexachlorocyclohexane	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor Epoxide	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	µg/g	0.04	0.005	<0.005	**0.041**	<0.005	<0.005
Chlordane	µg/g	0.05	0.007	<0.007	0.039	<0.007	<0.007
DDE	µg/g	0.05	0.007	<0.007	**0.35**	**0.11**	<0.007
DDD	µg/g	0.05	0.007	<0.007	0.036	<0.007	<0.007
DDT	µg/g	1.4	0.007	<0.007	0.071	0.009	<0.007
Dieldrin	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Endrin	µg/g	0.04	0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	µg/g	0.05	0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	µg/g	0.01	0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobutadiene	µg/g	0.01	0.01	<0.01	<0.01	<0.01	<0.01
Moisture Content	%		0.1	11.2	20.8	11.3	18.3
Surrogate	**Unit**	**Acceptable Limits**					
TCMX	%	50-140		72	92	68	64
Decachlorobiphenyl	%	60-130		72	110	76	88

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
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.

9383335-9383444 Results are based on the dry weight of the soil.
Note: DDT applies to the total of op'DDT and pp'DDT, DDD applies to the total of op'DDD and pp'DDD and DDE applies to the total of op'DDE and pp'DDE. Endosulfan applies to the total of Endosulfan I and Endosulfan II.
Chlordane applies to the total of Alpha-Chlordane and Gamma-Chlordane.

Certified By:

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Guideline Violation

AGAT WORK ORDER: 18T359257

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
9383335	BH4 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.10
9383339	BH5 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.15
9383427	BH8 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.23
9383430	BH9 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDD	µg/g	0.05	0.12
9383430	BH9 SS1	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.68
9383431	BH9 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.062
9383432	Dup 1	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.19
9383436	S1	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.15
9383437	S2	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	Chlordane	µg/g	0.05	0.10
9383437	S2	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.23
9383437	S2	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	Endosulfan	µg/g	0.04	0.092
9383438	S3	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.23
9383438	S3	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	Endosulfan	µg/g	0.04	0.042
9383439	S4	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.25
9383439	S4	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	Dieldrin	µg/g	0.05	0.070
9383440	S5	ON T1 S RPI/ICC	O. Reg. 153(511) - All Metals (Soil)	Lead	µg/g	120	130
9383440	S5	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.17
9383440	S5	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	Endosulfan	µg/g	0.04	0.042
9383442	S7	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.35
9383442	S7	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	Endosulfan	µg/g	0.04	0.041
9383443	S8	ON T1 S RPI/ICC	O. Reg. 153(511) - OC Pesticides (Soil)	DDE	µg/g	0.05	0.11

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Quality Assurance

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18T359257

PROJECT: 188509

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Jul 25, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - All Metals (Soil)															
Antimony	9383335	9383335	< 0.8	<0.8	NA	< 0.8	126%	70%	130%	89%	80%	120%	91%	70%	130%
Arsenic	9383335	9383335	8	8	0.0%	< 1	109%	70%	130%	102%	80%	120%	90%	70%	130%
Barium	9383335	9383335	44	44	0.0%	< 2	106%	70%	130%	101%	80%	120%	90%	70%	130%
Beryllium	9383335	9383335	< 0.5	<0.5	NA	< 0.5	85%	70%	130%	114%	80%	120%	100%	70%	130%
Boron	9383335	9383335	< 5	<5	NA	< 5	83%	70%	130%	108%	80%	120%	83%	70%	130%
Boron (Hot Water Soluble)	9383335	9383335	0.51	0.54	5.7%	< 0.10	101%	60%	140%	96%	70%	130%	99%	60%	140%
Cadmium	9383335	9383335	< 0.5	<0.5	NA	< 0.5	116%	70%	130%	104%	80%	120%	105%	70%	130%
Chromium	9383335	9383335	11	11	0.0%	< 2	96%	70%	130%	95%	80%	120%	99%	70%	130%
Cobalt	9383335	9383335	5.6	5.7	1.8%	< 0.5	94%	70%	130%	94%	80%	120%	98%	70%	130%
Copper	9383335	9383335	19	20	5.1%	< 1	88%	70%	130%	97%	80%	120%	93%	70%	130%
Lead	9383335	9383335	41	43	4.8%	< 1	108%	70%	130%	89%	80%	120%	92%	70%	130%
Molybdenum	9383335	9383335	0.7	0.7	NA	< 0.5	107%	70%	130%	105%	80%	120%	107%	70%	130%
Nickel	9383335	9383335	11	11	0.0%	< 1	100%	70%	130%	100%	80%	120%	102%	70%	130%
Selenium	9383335	9383335	0.4	0.4	NA	< 0.4	102%	70%	130%	103%	80%	120%	103%	70%	130%
Silver	9383335	9383335	< 0.2	<0.2	NA	< 0.2	116%	70%	130%	106%	80%	120%	101%	70%	130%
Thallium	9383335	9383335	< 0.4	<0.4	NA	< 0.4	94%	70%	130%	103%	80%	120%	105%	70%	130%
Uranium	9383335	9383335	< 0.5	<0.5	NA	< 0.5	93%	70%	130%	86%	80%	120%	87%	70%	130%
Vanadium	9383335	9383335	19	19	0.0%	< 1	98%	70%	130%	97%	80%	120%	100%	70%	130%
Zinc	9383335	9383335	65	67	3.0%	< 5	101%	70%	130%	95%	80%	120%	115%	70%	130%
Chromium VI	9383335	9383335	< 0.2	<0.2	NA	< 0.2	75%	70%	130%	101%	80%	120%	103%	70%	130%
Mercury	9383335	9383335	< 0.10	<0.10	NA	< 0.10	102%	70%	130%	93%	80%	120%	93%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL

Certified By: Amanjot Bhela

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Quality Assurance

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18T359257

PROJECT: 188509

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jul 25, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - OC Pesticides (Soil)															
Hexachloroethane	9383340	9383340	< 0.01	< 0.01	NA	< 0.01	116%	50%	140%	72%	50%	140%	82%	50%	140%
Gamma-Hexachlorocyclohexane	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	106%	50%	140%	80%	50%	140%	85%	50%	140%
Heptachlor	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	110%	50%	140%	92%	50%	140%	96%	50%	140%
Aldrin	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	104%	50%	140%	100%	50%	140%	94%	50%	140%
Heptachlor Epoxide	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	113%	50%	140%	80%	50%	140%	102%	50%	140%
Endosulfan	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	103%	50%	140%	93%	50%	140%	114%	50%	140%
Chlordane	9383340	9383340	< 0.007	< 0.007	NA	< 0.007	113%	50%	140%	79%	50%	140%	108%	50%	140%
DDE	9383340	9383340	< 0.007	< 0.007	NA	< 0.007	108%	50%	140%	75%	50%	140%	92%	50%	140%
DDD	9383340	9383340	< 0.007	< 0.007	NA	< 0.007	108%	50%	140%	83%	50%	140%	109%	50%	140%
DDT	9383340	9383340	< 0.007	< 0.007	NA	< 0.007	105%	50%	140%	84%	50%	140%	100%	50%	140%
Dieldrin	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	113%	50%	140%	85%	50%	140%	104%	50%	140%
Endrin	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	106%	50%	140%	86%	50%	140%	98%	50%	140%
Methoxychlor	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	108%	50%	140%	94%	50%	140%	114%	50%	140%
Hexachlorobenzene	9383340	9383340	< 0.005	< 0.005	NA	< 0.005	100%	50%	140%	114%	50%	140%	98%	50%	140%
Hexachlorobutadiene	9383340	9383340	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	92%	50%	140%	80%	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:

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Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18T359257

PROJECT: 188509

ATTENTION TO: Ian Shaw

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-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Trace Organics Analysis			
Hexachloroethane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Gamma-Hexachlorocyclohexane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Aldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Heptachlor Epoxide	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endosulfan	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Chlordane	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDE	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDD	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
DDT	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Dieldrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Endrin	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Methoxychlor	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobenzene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Hexachlorobutadiene	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
TCMX	ORG-91-5112	EPA SW-846 3541,3620 & 8081	GC/ECD
Decachlorobiphenyl	ORG-91-5113	EPA SW-846 3541,3620 & 8081	GC/ECD
Moisture Content		MOE E3139	BALANCE

AGAT Laboratories

1/5

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Mississauga, Ontario L4Z 1Y2
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Chain of Custody Record

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

Laboratory Use Only
Work Order #: 18T359257
Cooler Quantity:
Arrival Temperatures: 15.7 15.0 15.0 / 11.7 12.0 12.0
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes: ICE

Report Information:
Company: Soil-Mat Engineers
Contact: Matt LiVecchi
Address: 130 Lancing Drive, Hamilton, ON
Phone: 905-318-7440 Fax:
Reports to be sent to:
1. Email: mlivecchi@soil-mat.ca
2. Email: craigmd@mcmaster.ca

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

☑ Regulation 153/04 Table 1 (Indicate One)
☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use ☐ Sanitary ☐ Storm
Region (Indicate One)

☐ Regulation 558 ☐ CCME ☐ Prov. Water Quality Objectives (PWQO) ☐ Other (Indicate One)

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

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

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply): 5 days
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:
Project: SM 188353
Site Location: 250 Charlton Ave W
Sampled By: Malcolm Craig
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:

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr⁶⁺ ☐EC ☐FOC ☐NO_3/NO_2 ☐Total N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH_3 ☐TKN ☐NO_3 ☐NO_2 ☐NO_3/NO_2	Volatiles: ☐VOC ☐BTEX ☐THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	Corrosivity	Reg 153 All Metals
BH4 SS1	28June18	AM	2	S													X				X
BH4 SS2	28June18	AM	2	S													X				X
BH5 SS1	29June18	PM	2	S													X				X
BH5 SS1	29June18	PM	2	S													X				X
BH6 SS1	29June18	PM	2	S													X				X
BH6 SS2	28June18	PM	2	S													X				X
BH8 SS1	29June18	AM	2	S													X				X
BH8 SS2	29June18	AM	2	S													X				X
BH9 SS1	28June	PM	2	S													X				X
BH9 SS2	28June18	PM	2	S													X				X
Dup 1	29June	PM	2	S													X				X

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
[signature]	June 28/18	2:00	[signature] 20/08/07/06		2:40
[signature] 20/08/07/06		4:15			

Page 1 of 2
N°:

Document ID: GW-18-1511-009

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Date Issued: Jan 8, 2015

AGAT Laboratories

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Chain of Custody Record

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

Laboratory Use Only
Work Order #: 18T359257
Cooler Quantity:
Arrival Temperatures: 14.7 15.0 15.0 / 11.7 12.0 12.0
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: ICE

Report Information:
Company: Soil-Mat Engineers
Contact: Matt LiVecchi
Address: 130 Lancing Drive, Hamilton, ON
Phone: 905-318-7440 Fax:
Reports to be sent to:
1. Email: mlivecchi@soil-mat.ca
2. Email: craigmd@mcmaster.ca

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

☑ Regulation 153/04 Table 1 (Indicate One)
☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use ☐ Sanitary ☐ Storm
Region (Indicate One)

☐ Regulation 558 ☐ CCME ☐ Prov. Water Quality Objectives (PWQO) ☐ Other (Indicate One)

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

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

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply): 5 days
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:
Project: SM 188353
Site Location: 250 Charlton Ave W
Sampled By: Malcolm Craig
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:

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	(Check Applicable) ORPs: ☐B-HWS ☐Cl⁻ ☐CN⁻ ☐Cr⁶⁺ ☐EC ☐FOC ☐NO_3/NO_2 ☐Total N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH_3 ☐TKN ☐NO_3 ☐NO_2 ☐NO_3/NO_2	Volatiles: ☐VOC ☐BTEX ☐THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	Corrosivity	Reg 153 All Metals
S1	June 29	pm	2	S														X			X
S2	June 29		2															X			X
S3	June 29		2															X			X
S4	June 29		2															X			X
S5	June 29		2															X			X
S6			2															X			X
S7			2															X			X
S8			2															X			X
S9			2															X			X

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time	
[illegible]	June 29	2:00	[illegible] 2018/07/06		2:00	Page 2 of 2
[illegible] 2018/07/06		4:15				N°:

Document ID: DW-TR-1511-009

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Date Issued: Jan 8, 2015

AGAT Laboratories

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CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT
130 LANCING DRIVE
HAMILTON, ON L8W3A1
(905) 318-7440

ATTENTION TO: Ian Shaw

PROJECT: 188509

AGAT WORK ORDER: 18H362520

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

DATE REPORTED: Jul 20, 2018

PAGES (INCLUDING COVER): 5

VERSION*: 1

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

*NOTES
VERSION 1: Revised report with project number change, issued on July 20, 2018.

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

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Certificate of Analysis

AGAT WORK ORDER: 18H362520

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-07-16

DATE REPORTED: 2018-07-20

		SAMPLE DESCRIPTION:		BH3 SS3	BH3 SS4	BH3 SS5	BH10 SS3	BH10 SS4	BH10 SS5	Dup 1	Dup 2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2018-07-12	2018-07-12	2018-07-12	2018-07-12	2018-07-12	2018-07-12	2018-07-12	2018-07-12
Parameter	Unit	G / S	RDL	9405136	9405137	9405138	9405165	9405166	9405167	9405168	9405169
Benzene	µg/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	120	50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	21.2	14.5	16.4	19.0	19.3	15.4	14.1	18.9
Surrogate	Unit	Acceptable Limits									
Terphenyl	%	60-140		97	92	96	107	106	79	98	117

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
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.

9405136-9405169 Results are based on sample dry weight.
The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Certified By:

AGAT Laboratories

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http://www.agatlabs.com

Quality Assurance

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18H362520

PROJECT: 188509

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jul 20, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (Soil)															
Benzene	9402049		< 0.02	< 0.02	NA	< 0.02	83%	60%	130%	96%	60%	130%	106%	60%	130%
Toluene	9402049		< 0.05	< 0.05	NA	< 0.05	94%	60%	130%	104%	60%	130%	107%	60%	130%
Ethylbenzene	9402049		< 0.05	< 0.05	NA	< 0.05	98%	60%	130%	95%	60%	130%	106%	60%	130%
Xylene Mixture	9402049		< 0.05	< 0.05	NA	< 0.05	92%	60%	130%	97%	60%	130%	103%	60%	130%
F1 (C6 to C10)	9402049		< 5	< 5	NA	< 5	98%	60%	130%	100%	85%	115%	91%	70%	130%
F2 (C10 to C16)	9408476		< 10	< 10	NA	< 10	104%	60%	130%	90%	80%	120%	103%	70%	130%
F3 (C16 to C34)	9408476		< 50	< 50	NA	< 50	105%	60%	130%	93%	80%	120%	107%	70%	130%
F4 (C34 to C50)	9408476		< 50	< 50	NA	< 50	104%	60%	130%	96%	80%	120%	110%	70%	130%

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:

AGAT Laboratories

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

Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18H362520

PROJECT: 188509

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID

AGAT Laboratories

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

Chain of Custody Record

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

Report Information:

Company: Soil-Mat Engineers
Contact: Matt LiVecchi
Address: 130 Lancing Drive, Hamilton, ON
Ian Shaw
Phone: 905-318-7440 Fax:
Reports to be sent to:
1. Email: ishaw@soil-mat.ca
2. Email: rkeiller@soil-mat.ca

Project Information:

Project: SM 188450
Site Location: 9 Kerman Avenue
Sampled By: Malcolm Craig
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
Table 1 *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region *Indicate One*

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other *Indicate One*

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

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

Laboratory Use Only

Work Order #: 18H300520
Cooler Quantity: 1 G cooler
Arrival Temperatures: 20 | 6.9 | 6.8 | 6.5 | 5.9 | 5.8
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 ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply): 5 days
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	(Check Applicable) ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	(Check Applicable) Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	(Check Applicable) Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	Corrosivity
BH3 SS3	12July18	pm	2	S									☑							
BH3 SS4	12July18	pm	2	S									☑							
BH3 SS5	12July18	pm	2	S									☑							
BH10 SS3	12July18	am	2	S									☑							
BH10 SS4	12July18	am	2	S									☑							
BH10 SS5	12July18	am	2	S									☑							
Dup1	12July18	pm	2	S									☑							
Dup2	12July18	am	2	S									☑							

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Ross Keiller	July 16/18	12:40	Daniella Jaic	July 16/18	12:40pm
Daniella Jaic	July 16/18	3:05pm			3:05
	2018/07/16	4:10	2018/07/16		

Page 1 of 1
N°:

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

Date Issued: Jan 8 2015

Appendix 'D'

1. AGAT Certificate of Analysis – Water

AGAT Laboratories

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

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT
130 LANCING DRIVE
HAMILTON, ON L8W3A1
(905) 318-7440

ATTENTION TO: Ian Shaw

PROJECT: 188509

AGAT WORK ORDER: 18H369284

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

DATE REPORTED: Aug 07, 2018

PAGES (INCLUDING COVER): 5

VERSION*: 1

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

*NOTES

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

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

Certificate of Analysis

AGAT WORK ORDER: 18H369284

PROJECT: 188509

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2018-08-01

DATE REPORTED: 2018-08-07

		SAMPLE DESCRIPTION:		MW 3 S1	MW 10 S1	DUP 1
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2018-08-01	2018-08-01	2018-08-01
Parameter	Unit	G / S	RDL	9442106	9442107	9442108
Benzene	µg/L	0.5	0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.8	0.20	<0.20	<0.20	<0.20
Ethylbenzene	µg/L	0.5	0.10	<0.10	<0.10	<0.10
Xylene Mixture	µg/L	72	0.20	<0.20	<0.20	<0.20
F1 (C6 - C10)	µg/L	420	25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	420	25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L	500	500	NA	NA	NA
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140		78	76	80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses
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.

9442106-9442108 The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.
NA = Not Applicable

Certified By:

AGAT Laboratories

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

Quality Assurance

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18H369284

PROJECT: 188509

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Aug 07, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (Water)															
Benzene	9437875		< 0.20	< 0.20	NA	< 0.20	96%	50%	140%	97%	60%	130%	97%	50%	140%
Toluene	9437875		< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	95%	60%	130%	95%	50%	140%
Ethylbenzene	9437875		< 0.10	< 0.10	NA	< 0.10	98%	50%	140%	94%	60%	130%	93%	50%	140%
Xylene Mixture	9437875		< 0.20	< 0.20	NA	< 0.20	95%	50%	140%	97%	60%	130%	96%	50%	140%
F1 (C6 - C10)	9437875		< 25	< 25	NA	< 25	102%	60%	140%	97%	60%	140%	96%	60%	140%
F2 (C10 to C16)		TW	< 100	< 100	NA	< 100	80%	60%	140%	68%	60%	140%	69%	60%	140%
F3 (C16 to C34)		TW	< 100	< 100	NA	< 100	92%	60%	140%	83%	60%	140%	82%	60%	140%
F4 (C34 to C50)		TW	< 100	< 100	NA	< 100	82%	60%	140%	96%	60%	140%	78%	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:

AGAT Laboratories

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

Method Summary

CLIENT NAME: SOIL MAT ENGINEERS & CONSULTANTS LT

AGAT WORK ORDER: 18H369284

PROJECT: 188509

ATTENTION TO: Ian Shaw

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Toluene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Ethylbenzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Xylene Mixture	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 - C10)	VOL-91- 5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC-E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC-E3421	GC/FID
F4 (C34 to C50)	VOL-91-5010	MOE PHC-E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC-E3421	BALANCE
Terphenyl	VOL-91-5010		GC/FID

1 med Red

AGAT Laboratories

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

Chain of Custody Record

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

Laboratory Use Only

Work Order #: 18T018H369284

Cooler Quantity: 1 small

Arrival Temperatures: 10.7 | 10.1 | 10.3
LT 17.1 | 13.5 | 18.3

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: on ice

Report Information:

Company: Soilmat
Contact:
Address: 130 Lancing Dr Hamilton
Phone: Fax:
Reports to be sent to:
1. Email: Ross Kelly
2. Email: Don Swan

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 *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

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):

5 day

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

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

Project Information:

Project: 188509
Site Location:
Sampled By: RK
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:

Sample Matrix Legend

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N	Field Filtered - Metals, Hg, CrVI	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4 + BTEX	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use
MW 3 S1	Aug 1/18	130	4	GW										X						
MW 10 S1	↓	200	4	↓										X						
DUP1	↓	130	4	↓										X						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Ross Kelly	Aug 1/18	250	Chris Tahirovic	Aug 1/18	2:50pm
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
			Obong Talbot	02 Aug/2018	09:50am
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1

Nº: T 072754

Appendix 'E'

1. Qualifications of Assessors

COMPANY BACKGROUND

SOIL-MAT ENGINEERS & CONSULTANTS LTD. [SOIL-MAT ENGINEERS] is a Canadian Consulting Engineering firm owned by its senior staff. Over the past thirty years the principals of SOIL-MAT ENGINEERS have undertaken geotechnical investigations in all areas of Hamilton and surrounding area and are familiar with the distinct geology of the area and therefore well-versed with the various soil, bedrock and groundwater conditions. SOIL-MAT ENGINEERS has a staff of over twenty-five engineers and technical staff who specialize in geotechnical assignments, environmental assessments, hydrogeological investigations and construction quality control/assurance projects. The company commenced operation on June 15, 1992 and has undertaken over 5,000 projects since its inception. The firm and all professional staff are in good standing with Professional Engineers Ontario. The company has maintained a current Certificate of Authorisation since it was granted on April 28, 1992. The firm's office and laboratory facilities are located at 130 Lancing Drive in Hamilton, Ontario.

REPORT AUTHORS

Peter Markesic, B.Sc.
Project Manager

Mr. Markesic has over seven years of experience in conducting Phase I ESA research and Phase II ESA fieldwork, including soil and groundwater sampling. Mr. Markesic has also been a key project member on a number of Phase III Environmental Site Assessment projects, including the decommissioning of underground fuel storage tanks and both in-situ and ex-situ remediation projects.

Ian Shaw, P. Eng.
[Director/ Senior Professional]

Mr. Shaw has over fourteen years of experience in the geotechnical and geo-environmental fields. Mr. Shaw has supervised the geotechnical investigations for the replacement/rehabilitation of bridge/culvert structures located within the Haldimand County, numerous residential and industrial subdivision projects, slope stability assignments associated with Hamilton Conservation Authority and Conservation Halton requirements, and several high rise developments in Hamilton, Burlington, Oakville, Brantford, St. Catharines, and Niagara Falls. Mr. Shaw has also been involved in numerous hydrogeological investigations, primarily within the City of Hamilton, associated with the development of residential and commercial subdivision projects. Some of Mr. Shaw's projects have included the decommissioning of underground and above ground fuel oil storage tanks, the implementation of in-situ and ex-situ remediation programmes and numerous 'dig and dump' remediation projects.

Keith Gleadall, B.A., EA Dipl.

Vice-President [Senior Professional]

Mr. Gleadall has over sixteen years of experience in conducting Phase I, II and III Environmental Site Assessments and has successfully completed the requirements of the Associated Environmental Site Assessors of Canada and a Post Graduate Diploma in Environmental Site Assessment from Niagara College. Mr. Gleadall is responsible for undertaking numerous hydrogeological investigations, primarily within the City of Hamilton, associated with the development of residential and commercial subdivision projects, together with Phase I, II and III Environmental Site Assessments. Projects have included the decommissioning of underground and above ground fuel oil storage tanks, the implementation of in-situ and ex-situ remediation programmes, the decommissioning of a former dry cleaning facility and numerous 'dig and dump' remediation projects.

Appendix 'F'

1. Statement of Limitations

REPORT LIMITATIONS

Achieving the objectives that are stated in this report has required SOIL-MAT ENGINEERS to derive conclusions based upon the best and most recent information currently available to SOIL-MAT ENGINEERS. No investigative method can completely eliminate the possibility of obtaining partially imprecise information. SOIL-MAT ENGINEERS has expressed professional judgement in gathering and analysing the information obtained and in the formulation of its conclusions.

Information in this report was obtained from sources deemed to be reliable, however, no representation or warranty is made as to the accuracy of this information. To the best of SOIL-MAT ENGINEERS' knowledge, the information gathered from outside sources contained in this report on which SOIL-MAT ENGINEERS has formulated its opinions and conclusions, are both true and correct. SOIL-MAT ENGINEERS assumes no responsibility for any misrepresentation of facts gathered from outside sources.

This report was prepared to assess and document evidence of potential environmental contamination, and not to judge the acceptability of the risks associated with such environmental contamination. Much of the information gathered for this report is only accurate at the time of collection and a change in the Site conditions may alter the interpretation of SOIL-MAT ENGINEERS' findings. Furthermore, the reader should note that the Site reconnaissance described in this report was an environmental assessment of the Site, not a regulatory compliance or an environmental audit of the Site.

SOIL-MAT ENGINEERS & CONSULTANTS LTD. prepared this Report for the account of Tarbutt Construction The material in it reflects SOIL-MAT ENGINEERS best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any suffered by any third party as a result of decisions made or actions based on this report.