



Geotechnical Investigation for Maintenance Building Expansion at Road Operations Centre at 3525 Baseline Road

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Project Number:
ET23-1438A

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EXECUTIVE SUMMARY

Engtec Consulting Inc. ('Engtec') was retained by GEC Architect ('GEC') to carry out a Geotechnical Investigation for the proposed addition of York Region North District Roads Maintenance Facility located at 3525 Baseline Road in the Town of Georgina, Ontario. This submission discusses the geotechnical investigation findings, and it provides recommendations for the design and construction of the project.

The fieldwork comprised a total of ten (10) boreholes advanced to depths ranging from 2.0m to 4.5m below the existing grade/pavement surface. Based on the conditions encountered in the boreholes, subsurface soil profile consisted of surficial (gravel/asphalt) cover underlain by compact to very dense sandy silt till to the depth of termination.

From the investigation findings, it is Engtec's opinion that use of shallow strip/spread footing is feasible. However, the founding grade must be extended to competent undisturbed ground and certified by a geotechnical engineer. Recommendations for footing construction are provided in this report.

1 Introduction

Engtec Consulting Inc. (Engtec) was retained by GEC Architect (on behalf of Region of York) to conduct a geotechnical investigation for the proposed office/garage addition to York Region North District Roads Maintenance Facility located at 3525 Baseline Road in the Town of Georgina, Ontario. The site plan showing the proposed addition is illustrated in Drawing No. 1, attached in Appendix A.

The purpose of the geotechnical investigation is to obtain information on the prevailing sub-surface soil and groundwater information at the subject site by means of drilling boreholes, in-situ tests, and laboratory tests. Based on Engtec's interpretation of the data obtained, geotechnical engineering recommendations pertaining to the design and construction of the proposed addition.

The geotechnical investigation was carried out in compliance with Engtec's Proposal No. ETP23-1131 dated October 3, 2023. Authorization to proceed with this geotechnical investigation was received from Angela Ng of GEC Architecture, via email dated October 6, 2023.

2 Project Description

The York Region North District Roads Maintenance Facility (YRRMF) is located on Baseline Road, about 800m West of Kennedy Road in the Town of Georgina, Ontario. The Municipal address is 3525 Baseline Road. The facility is approximately rectangular in shape with a plan area of 45,000 sq.m. and it is mostly asphaltic concrete paved. From the survey map provided to Engtec, the topography of the YRRMF is fairly flat with an elevation of ± 254.5 m. The facility presently includes several buildings/dome shaped structures. The main building (FFE 254.8m) is a two-story metal clad slab-on-grade structure (± 34 m by ± 24 m in plan), located at the central part (see Picture 1 in Appendix B). This building serves for plow truck storage, and wash bay and office space. York Region plans an addition adjoining the existing main building in the South (see Picture 2 in Appendix B). The proposed addition would likely be identical to the existing structure and when completed would be used for offices, common spaces and storage and repair garage areas.

The YRRMF has two gravel paved areas as illustrated in Drawing No.1 (see, Pictures 3 and 4). The gravel area 1 is ± 50 m by 20m and area 2 is 50m by 40m. In their email dated 25 October 2023, GEC requested for replacement of these gravel areas with asphalt pavements.

3 Investigation Procedure

The field work was carried out on October 30, 2023, during which time, a total of ten (10) boreholes were advanced at the approximate locations shown in the Borehole Location Plan, attached in Appendix A. The boreholes were drilled to depths ranging from 2.1m to 4.4m below the existing ground surface. The borehole details are shown in Table 1 below.

Table 1: Borehole Details.

BH No.	Elevation (m)	Depth (mBGS**)	Location
BH1	254.8m*	2.1m	Existing Gravel at Area 1
BH2		2.9m	
BH3		2.9m	Existing Gravel at Area 2.
BH4		3.7m	
BH5		3.7m	
BH6		4.4m	
BH7		4.1m	Proposed Addition Area.
BH8		3.4m	
BH9		4.1m	
BH10		4.4m	

*Note: * Approximate Elevation taken from Sheet 2 Drawing No. SS-1 dated March 2001, prepared by URS Cole Sherman
**mBGS = meter below the existing ground surface.*

The boreholes were advanced using a D-50 truck-mount drill rig supplied by a drilling specialist subcontracted to Engtec. All boreholes were advanced using solid stem continuous flight augers, and soil samples were retrieved with a 51mm (2 inches) O.D. split-barrel (split spoon) sampler driven with a hammer weighing 624N with a drop height of 760mm (30 inches), which is in accordance with the Standard Penetration Test (SPT) Method (ASTM D1586) and protocols.

The field work for this investigation was monitored by a member of our engineering staff who also logged the boreholes and cared for the recovered samples. The boreholes were located and marked on the asphalt pavement by Engtec. The boreholes were backfilled upon completion of drilling along with the site cleanup. All soil samples, obtained during borehole drilling and sampling, were brought to our laboratory for further examination and moisture content determination on all soil samples.

The existing ground surface elevation at each borehole, as shown in the borehole logs in Appendix C, was interpreted from the York Region Drawings (Drawing No. 2 "Site Servicing and Grading") provided by GEC Architecture on September 25th, 2023. It should be noted that the borehole surface elevations shown in the borehole logs are approximate only, for the purpose of relating the soil stratigraphy, and should not be used or relied on for any other purpose.

4 Subsurface and Groundwater Conditions

The subsurface and groundwater conditions encountered in the boreholes as well as field and laboratory testing results are presented on the Record of Boreholes in Appendix C.

The following is a summarized account of the subsurface conditions encountered in the boreholes. It should be noted that soil and groundwater conditions might vary between the borehole locations.

4.1 Ground Surface Cover

Boreholes BH1 through BH6, drilled in the gravel areas, encountered relatively deep earth fill at the existing grade. The measured thickness ranged from 1.8m to 3.2m. The fill comprises predominantly of sand and gravel

(recycled asphaltic concrete). Traces of silt and debris were found in the fill material. The granular fill thickness may vary with locations at the site. The recorded SPT N-values (blows/0.3m) mostly ranged from 25 blows/0.3m to greater than 50 blows/0.3m.

Boreholes BH7 through BH10 encountered a layer of asphaltic concrete at the existing grade. The existing pavement structure is summarized in Table 2 below, while borehole Logs are provided in Appendix C.

Table 2: Measured Pavement Structure Thickness.

Pavement Component	Pavement Structure Thickness				
	BH7	BH8	BH9	BH10	AVERAGE
Asphaltic Concrete	120mm	120mm	125mm	120mm	121mm
Granular Base/sub-base	450mm	480mm	460mm	460mm	462mm
Total Pavement Thickness	570mm	600mm	585mm	580mm	583mm

Four (4) representative samples of sand and gravel fill (granular base and subbase) recovered from the auger cuttings were selected for grain size analysis. The test results were used to compare OPSS 1010 – Granular “A” and “B” Type I specifications. The results are shown in Table 3 below and the detailed test results are attached in Appendix D.

Table 3: Results of Grain Size Analysis.

BH No.	Sample ID	Depth (m)	Grain Size Distribution (%)		
			Gravel	Sand	Silt + Clay
BH7	SS1	0.2m – 0.46m	38	50	12
BH8	SS1		57	32	11
BH9	SS1		41	45	14
BH10	SS1		39	47	14

The results of the grain size analysis indicate the existing granular materials, beneath the asphalt pavement, have high amounts of fines (percent passing US Sieve No. 200 is greater than 10%).

4.2 Native Ground

Native ground consisting of sandy silt till was encountered beneath the surficial granular fill in Boreholes BH1 through BH6, and below the granular base in Boreholes BH7 through BH10. The sandy silt till extends to the termination depth. The measured SPT N-values of sandy silt till sand ranges from 6 blows to greater than 50 blows per 300 mm penetration indicating compact to very dense compactness condition. The measured moisture content ranged from 15% to 30%.

Four (4) representative samples of sandy silt till recovered from the SPT spoons were selected for complete grain size distribution analysis by means of Hydrometer. The results are shown in Table 4 below. The grain size distribution (GSD) curves are shown in Appendix D.

Table 4: Summary of Grain Size Distribution by Hydrometer.

BH No.	Sample ID	Depth (m)	Grain Size Distribution (%)			
			Gravel	Sand	Silt	Clay
BH1	SS3	1.5m - 2.0m	5	22	46	26
BH3	SS4	2.3m - 2.8m	17	34	38	11
BH7	SS3	1.5m - 1.8m	24	36	26	14
BH9	SS2	0.8m - 1.3m	16	39	34	11

4.3 Groundwater Conditions

Observations for groundwater were made in the open boreholes on completion. All boreholes were dry.

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to weather events.

5 Discussion and Recommendations

The following conclusions and recommendations are based on the findings from the field SPT tests and laboratory tests carried out for this project.

5.1 Foundation Design

Based on the drawing ("Site Servicing and Grading") submitted to Engtec on September 25th, 2023, by GEC, the finished floor elevation (FFE) of the existing building is 254.8m. It is likely that the proposed addition underside of the shallow footing would likely be at $\pm 253.6\text{m}$.

From the investigation results, proposed addition can be supported using shallow strip/spread footings placed on competent undisturbed ground at elevation of 253.6m (and below). A geotechnical reaction of 150 kPa at Serviceability Limit States (SLS) and factored geotechnical resistance of 225 kPa at Ultimate Limit States (ULS) may be used for foundation design.

For spread/strip footings, minimum footing sizes, footing thickness, excavations and other footing requirements should comply with the latest edition of the Ontario Building Code. For design purposes, the friction between concrete and till soils may be taken as 0.30. All footings exposed to seasonal freezing conditions must have at least 1.2m of soil cover for frost protection.

New footings constructed adjacent to the existing footings should be founded at the same level as the existing footings. Where it is necessary to place foundations at different levels, the upper foundation must be founded below an imaginary 10 horizontal to 7 vertical lines drawn up from the base of the lower foundation. We recommend that the new footings adjacent to the existing building should not be structurally connected to the existing footings.

The recommended soil bearing pressures assume that prior to pouring concrete, all soft/disturbed/loose soil /debris, if any, is completely removed from the excavated grade. Regardless, the footing subgrade should be inspected and evaluated by a geotechnical engineer prior to placing concrete to ensure that footings are founded on competent subgrade capable of supporting the recommended design pressure.

5.2 Floor Slab

Concrete floor slab-on-grade may be built on properly prepared subgrade. Prior to commencing the floor slab construction, excavated subgrade surface should be proof rolled with a heavy roller or partially loaded truck and examined by a geotechnical engineer. Any soft areas detected during proof-rolling process should be sub-excavated and replaced with approved material and compacted to 100 percent standard Proctor maximum dry density. The floor slab may be designed using a soil modulus of subgrade reaction (k_s) of 30 MPa/m.

Underneath the slab, a minimum 200mm thick base course consisting of Granular A (OPSS 1010) should be placed for levelling and drainage purposes. The base course should be compacted using vibratory equipment to at least 100 percent standard Proctor maximum dry density. If the subgrade is wet, Granular A should be separated from the subgrade by an approved filter fabric (e.g., Terrafix 270R or equivalent). It should be noted that crushed concrete products are not permitted to be installed underneath the slab on grade. Ground surfaces should be sloped away from the building to promote surface water run-off and reduce groundwater infiltration adjacent to the foundation.

5.3 Excavation and Groundwater Control

It is anticipated that excavations to competent native founding soils for footings would continue to about 1.3 m depth below the existing ground surface. The excavations are anticipated to be carried out within the pavement structure/native sandy silt till to silty sand.

All excavations shall be carried out in accordance with the latest version of the Occupational Health and Safety Act and Regulations for Construction Projects. The site soil to be excavated can be classified as follows.

Existing fill/possible fill:	Type 3
Compact to dense sandy silt to silty sand:	Type 2

Accordingly, a bank slope of 1H:1V is required for excavations in Type 2 & 3 soils in accordance with the Ontario Health and Safety Regulations (Appendix C). For Type 2 soils, a 1.2m high vertical cut at the bottom of excavation may generally be constructed. Near the ground surface, occasional 2H:1V slope may be required due to loose/soft surficial soils.

Normal excavation equipment would be suitable for excavation of overburden. The till is non-sorted sediment and cobbles and boulders should be anticipated during construction. Cobbles and boulders influence the progress of excavation. Consequently, provisions should be made in the contract documents to cover any delays caused by limestone lenses, boulders, obstructions, etc.

No groundwater problem is anticipated. Seepage from the perched water entrapped within the fill materials should be expected which can be handled using sump pumps.

Excavations for the building addition foundations located immediately adjacent to the existing foundations should be carried out in a manner which does not result in loss of subgrade support for the existing building foundations (i.e., excavations immediately adjacent to the existing foundations should not extend deeper than the existing foundations).

5.4 Seismic Considerations

In conformance with the criteria in Table 4.1.8.4.A, Part 4, Division B of the 2016 Building Code (Ontario), the project site may be classified as “Site Class D, Stiff Soil” for footings founded on till soils.

The four values of the spectral response acceleration, $S_a(T)$, for different periods and the Peak Ground Acceleration (PGA) can be obtained from Table C-2 in Appendix C, Division B of the National Building Code (2015). The design values of F_a and F_v for the project site should be determined in accordance with Table 4.1.8.4.B in Part 4, Division B of the 2020 Building Code (Ontario).

5.5 Pavement Design

Boreholes BH1 and BH2 were drilled in gravel paved area-1 while, boreholes BH3 through BH6 were drilled in gravel paved area-2. In the boreholes, 1.8m to 2.1m thick recycled asphaltic concrete fill (average 2m) was encountered. Based on the SPT N-values, the granular fill is in dense compactness condition. It is our understanding that the gravel paved areas would be replaced by asphaltic concrete for equipment storage purposes.

Engtec recommends the following minimum pavement structure, based on the subsoil condition encountered at the site, and anticipated construction equipment loads (Table 5).

Table 5: Recommended Asphaltic Concrete Pavement Structure.

Pavement Structure	Minimum Compaction Requirements	Minimum Thicknesses (mm)
HL8 Asphaltic Concrete	92 percent of MRD ⁽¹⁾	2 x 50mm
Granular A Base (OPSS 1010) or	100 percent of SPMDD ⁽²⁾	200mm
Granular B Subbase (Type II, OPSS 1010)		400mm

Notes: HL-8 asphaltic concrete to conform to OPSS 1150;

⁽¹⁾MRD: Maximum Relative Density; and

⁽²⁾SPMDD: Standard Proctor Maximum Dry Density

5.5.1 Construction Considerations

The granular and asphalt pavement materials and their placement should conform to OPSS Forms 310, 501, 1010, 1101 and 1150 and pertinent Town of Georgina specifications. PG 58-28 asphalt cement is recommended for use in the HL8 lifts. The granular materials should be placed in lifts of not greater than 200 mm thick and compacted to a minimum of 100 percent and 98 percent SPMDD for granular base and granular sub-base, respectively.

For longevity of the pavement, the finished surface should be free of depressions and should be sloped (preferably at a minimum grade of 2%) to provide effective drainage towards adjacent edges of pavement areas. Based on the groundwater condition encountered in the open boreholes, it is anticipated that groundwater

levels would be about 1 m below the floor slab level. Therefore, perimeter subdrains are required for the proposed expansion building. The proposed floor should be at least 300 mm above the exterior final grade.

Around the perimeter of the building, the ground surface should be sloped away from the structure to promote surface drainage. The upper 0.5 m of backfill should consist of a relatively impermeable clayey soil, which will minimize the ingress of surface water.

It is recommended that a permanent drainage system consisting of weeping tiles be installed along the perimeters of the building to prevent accumulation of water in the backfill and possible dampness of floor slabs. The weeping tile system should be installed to provide a positive discharge to a non-frost susceptible sump or outlet. The weeping tiles should be surrounded by a designed graded granular filter or wrapped with an approved geotextile to prevent migration of fines into the system. The catch basin frost treatment is illustrated in Appendix F.

5.5.2 Subgrade Preparation

The subgrade preparation would require removal of all debris, earth fill (if any) and any soil containing organic matter, deleterious materials, and soft/wet/sponge/loose spots to at least 800mm depth. The excavation subsoil should be inspected and approved by a geotechnical engineer. The exposed surface should be proof rolled with a suitable roller to identify the weak areas and backfilled with clean earth fill placed in 150 mm thick lifts and compacted to a minimum of 98% Standard Proctor Maximum Dry Density (SPMDD). Local sub-excavation may be required in areas where incompetent (loose/firm/wet) subgrade conditions are identified, and significant organic/topsoil inclusions are encountered during subgrade preparation. These areas must be locally sub-excavated and backfilled with clean and compacted earth fill. The earth fill materials encountered on the site may be utilized for subgrade preparation provided they do not contain excessive amounts of organics, debris and deleterious materials; as well as their in-situ moisture content is within 2 percent of the optimum moisture content. Due to the erodible nature of the subgrade, permeable non-oven geotextile separator (e.g., Terrafix 360R or equivalent) is recommended between the subgrade and sub-base to prevent mixing of subgrade with subbase material. The geotextile should allow passage of water while retaining in-situ soil without clogging.

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the fill soils can be classified as Type 3 and till can be classified as Type 2 Soil. Normal excavation equipment could be used for excavation, if required. Groundwater was not observed on completion of drilling. No major groundwater problem is anticipated during excavations in the recycled fill soils. Minor seepage, if any, occurs during excavation, can be handled using the conventional sump pumps.

6 Chemical Testing of Soil

Engtec submitted two (2) selected soil samples retrieved from Boreholes BH5 and BH10 (auger cutting from the depths shown below) for a limited soil chemical testing program. The purpose of the limited soil chemical testing program is to assist in the preliminary assessment of the quality of the excess fill at the subject site and assess the presence or absence of any contamination. The soil samples were submitted to AGAT Laboratories, which is accredited by the Canadian Association of Laboratory Accreditation (CALA). Sampling locations were chosen to ensure testing of both the pavement and landscape areas. It should be noted that based on the design and volume of excess soil generated, further chemical testing analysis may be required for excess soil disposal.

The sample reported under this submission has the following identification information:

- *BH5: collected from 0.9m (3ft) depth.*
- *BH10: collected from 3.5m (12ft) depth.*

The identification of the soil samples along with the required tests are summarized in Table 6.

Table 6: Sample Identification and Requested Chemical Testing.

Parameter	BH5	BH10
Metal and Inorganics	YES	YES
PHCs F1-F4	YES	YES
BTEX	YES	YES
Polycyclic aromatic hydrocarbons (PAHs)	YES	YES
TCLP (Metals and Inorganics, Volatile organic compounds (VOCs) and Benzo(a)pyrene (BAP)	YES	YES

The Standards with which the results were compared provided in Ontario Ministry of the Environment, Conservation, and Parks (MECP) documents titled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environment Protection Act of the Environment Protection Act", dated April 15, 2011, in accordance with Ontario Regulation (O. Reg.) 153/04 (as amended) and "Rules for Soil Management and Excess Soil Standards", dated 2022 in accordance with O.Reg. 406 (as amended);

- Table 1 Full Depth Background Site Condition Standards for Residential/Parkland/Institutional/Industrial, Commercial, Community property use (Table 1);
- Table 2.1: Excess Soil Quality Standards (ESQS) for Industrial/Commercial/Community Property use (Table 2.1);
- Table 3.1: Excess Soil Quality Standards (ESQS) for Industrial/Commercial/Community Property use (Table 3.1).

Table 7: Comparison to Applicable Specifications and Exceedances (Table 1 as applicable for comparison).

Parameters	BH5	BH10
Metal and Inorganics	Sodium Adsorption Ratio (SAR) & Electrical Conductivity (EC)	SAR & EC
PHCs - F1-F4	PASS	PASS
BTEX	PASS	PASS
PAHs	PASS	PASS

RED Colour Indicates Exceedance of MECP Table 1 Criterion.

Table 8: Comparison to Applicable Specifications and Exceedances (Table 2.1 as applicable for comparison).

Parameters	BH5	BH10
Metal and Inorganics	SAR & EC	SAR & EC
PHCs - F1-F4	PASS	PASS
BTEX	PASS	PASS
PAHs	PASS	PASS

RED Colour Indicates Exceedance of MOECP Table 2 ICC Criterion.

Table 9: Comparison to Applicable Specifications and Exceedances (Table 3.1 as applicable for comparison).

Parameters	BH5	BH10
Metal and Inorganics	SAR & EC	SAR & EC
PHCs - F1-F4	PASS	PASS
BTEX	PASS	PASS
PAHs	PASS	PASS

RED Colour Indicates Exceedance of MOECP Table 3 ICC Criterion.

The results of the chemical analyses are as follows:

- The collected soil samples BH5 and BH10 in this submission showed exceedances of EC and SAR for Table 1 RPIICC, Table 2.1 RPI ESQS and Table 3.1 RPI ESQS.

Toxicity Characteristics Leachate Procedure (TCLP)

The results of the Metals and Inorganics, VOCs, and BAP for Toxicity Characteristics Leachate Procedure (TCLP) for the collected soil samples BH10 did not indicate it as a leachate toxic waste as per O.Reg. 558 Schedule 4 Leachate Quality Criteria (LQC). Based on the TCLP analysis the soil is non-hazardous and thus can be disposed of at a landfill or reused at the site accepting soil with the abovementioned soil chemical testing. Detailed chemical test results are attached in Appendix E of this submission.

6.1 Conclusion

Based upon the analysis provided herein, the collected soil sample in this submission showed exceedances of EC and SAR in all soil sample collected for Table 1 RPIICC, Table 2.1 RPI ESQS and Table 3.1 RPI ESQS. The exceedances for SAR and EC are likely the result of road salt application for safety purposes. Consequently, the excess soil stored/generated at the subject site, represented by soil sample BH5 and BH10 can be reuse at a site that accepts soil with the highlighted exceedances or alternatively can be disposed of at an MECP approved landfill that accept soil with the above exceedance. Based on the TCLP data the soil is considered nonhazardous for disposal at landfill site for the parameters.

7 Concluding Remarks

This report has been prepared for the exclusive use of the GEC Architect and Regional Municipality of York and their authorized users for the specific application outlined in this report. This report has been prepared within generally accepted geotechnical engineering practice.

We trust that this submission meets your requirements. Should you have any questions, please don't hesitate to contact this office.

Yours truly,



Mohammad Mollah, M.Eng., P.Eng.
Senior Geotechnical Engineer
Engtec Consulting Inc.



Salman Bhutta, Ph.D., P.Eng.
Principal
Engtec Consulting Inc.

Appendix A:

Key Plan and Site Plan Showing the Borehole Locations

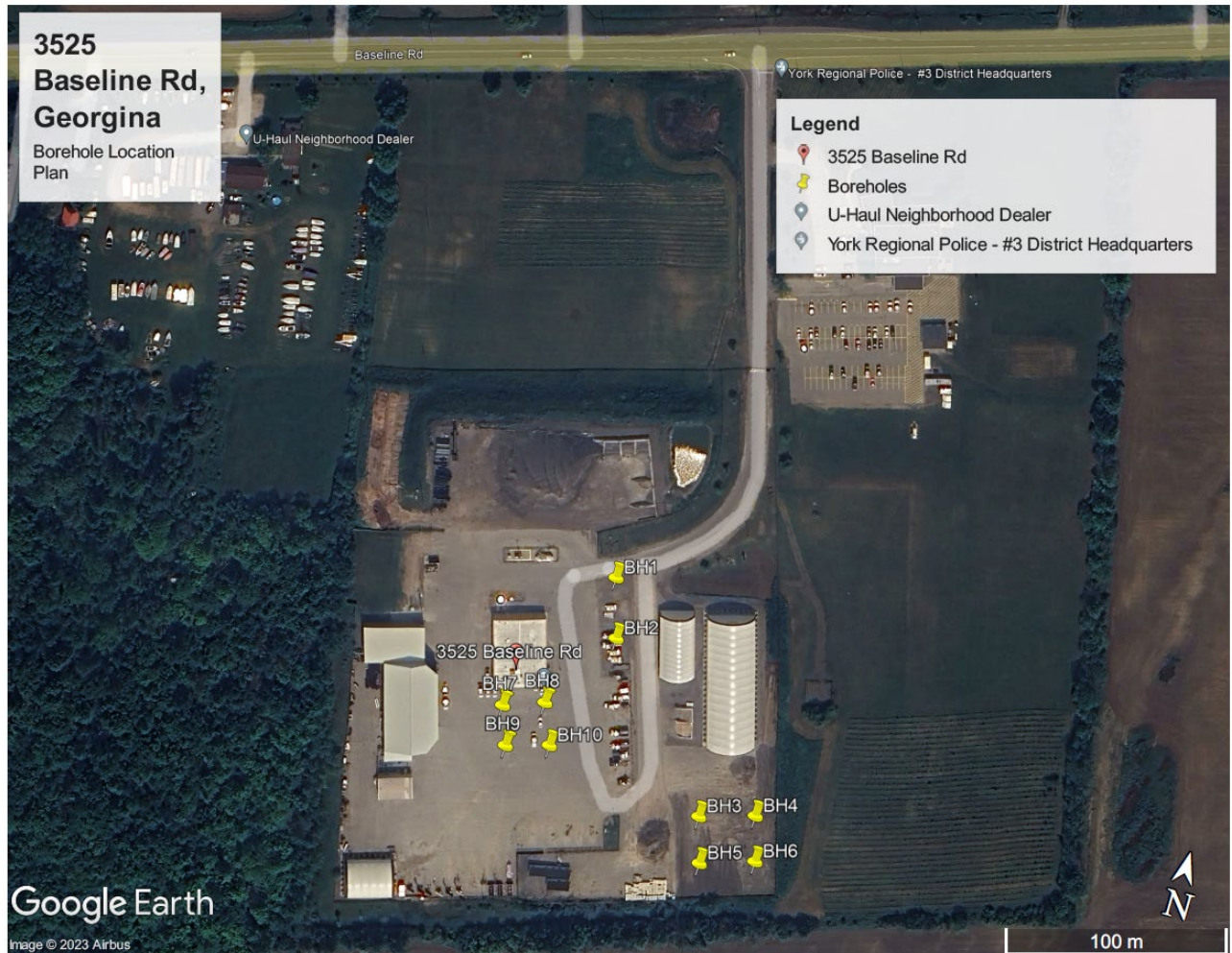
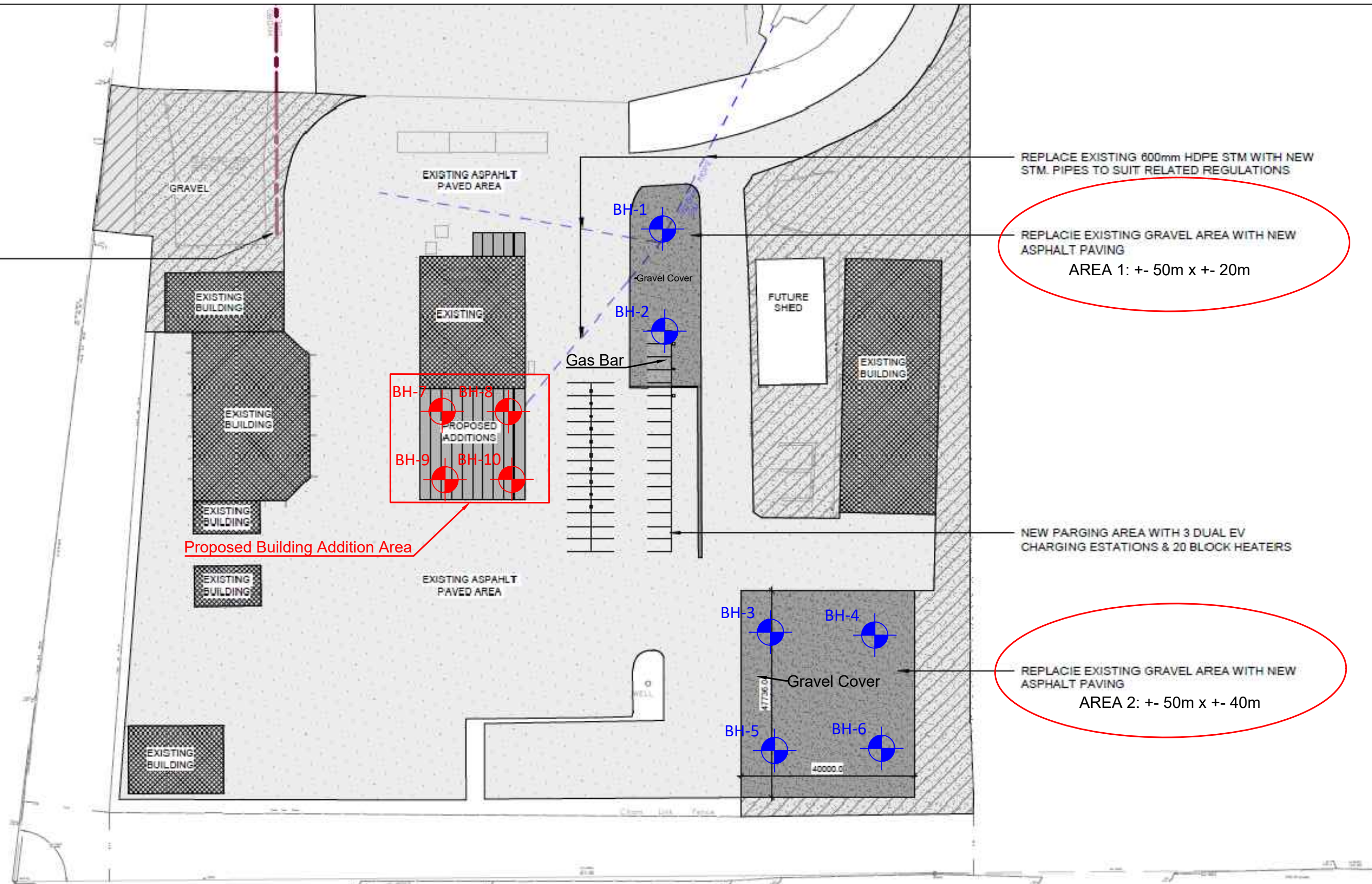


Figure 1: Boreholes Locations Site Plan



EXISTING AERIAL HYDRO LINE
ENDS AT THIS POINT



BH-X
Boreholes @ 5m depth

BH-X
Boreholes @ 2m depth

Project Name: Geotechnical Investigation

Project Location: 3525 Baseline Road, Georgina, ON

Drawing Title: Borehole Plan

Drawing No. 01

Project No. ET23-1438A

Contract No.

Drawn By: L.W Checked By: M.M

Date: November 17, 2023 Scale: NTS

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Appendix B:

Site Photographs



Picture 1: West View of the Main Building.



Picture 2: South View of the Main Building.



Picture 3: Gravel Paved Area 1 located at SE Corner of the Main Building.



Picture 3: Gravel Paved Area 2 located in front of the Main Building.

Appendix C:

Borehole Logs

Log of Borehole BH1

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Figure No. 1

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample

SPT (N) Value

Drill Type: D-50

Dynamic Cone Test

Shelby Tube

Datum: Approximate Geodetic

Field Vane Test

Combustible Vapour Reading ☐

Natural Moisture ✕

Plastic and Liquid Limit

Undrained Triaxial at
% Strain at Failure

Penetrometer [illegible]

Log of Borehole BH2

Project No. ET23-1438A

Figure No. 2

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample



SPT (N) Value



Dynamic Cone Test



Shelby Tube



Field Vane Test



Combustible Vapour Reading



Natural Moisture



Plastic and Liquid Limit



Undrained Triaxial at % Strain at Failure



Penetrometer



Drill Type: D-50

Datum: Approximate Geodetic

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH m	N Value				Combustible Vapour Reading (ppm)			Natural Unit Weight kN/m ³
					20	40	60	80	250	500	750	
					Shear Strength kPa				Natural Moisture Content % Atterberg Limits (% Dry Weight)			
				0	100			200	10	20	30	
		FILL - Recycled asphaltic concrete, moist	254.80					82				
				1			56					
			252.8	2	28							
		SANDY SILT TILL - some clay, some gravel, dense, brown, moist.					32					
			251.9									
		END OF BOREHOLE										

ENGTEC1 ET23-1438A - 3525 BASELINE ROAD.GPJ NEW.GDT 23-11-23



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Borehole data requires interpretation assistance from ENGTEC before use by others.
See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
Oct 30, 2023	dry	2.8m

Log of Borehole BH3

Project No. ET23-1438A

Figure No. 3

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at

% Strain at Failure

Penetrometer

Drill Type: D-50

Datum: Approximate Geodetic

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH m	N Value				Combustible Vapour Reading (ppm)			Natural Unit Weight kN/m ³
									250	500	750	
					Shear Strength kPa				Natural Moisture Content % Atterberg Limits (% Dry Weight)			
					20	40	60	80	10	20	30	
		FILL - Recycled asphaltic concrete, moist	254.80	0				66			X	
				1		25					X	
				2		6					X	
		SANDY SILT TILL - some clay, some gravel, dense, brown, moist.	252.7									
						32					X	
		END OF BOREHOLE	251.9									

ENGTEC1 ET23-1438A - 3525 BASELINE ROAD.GPJ NEW.GDT 23-11-23



Engtec Consulting Inc.
1-2447 Anson Drive
Mississauga, ON, L5S 1G5
(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.
See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
Oct 30, 2023	dry	2.8m

Log of Borehole BH4

Figure No. 4

Sheet No. 1 of 1

Auger Sample

☐ ☐

9

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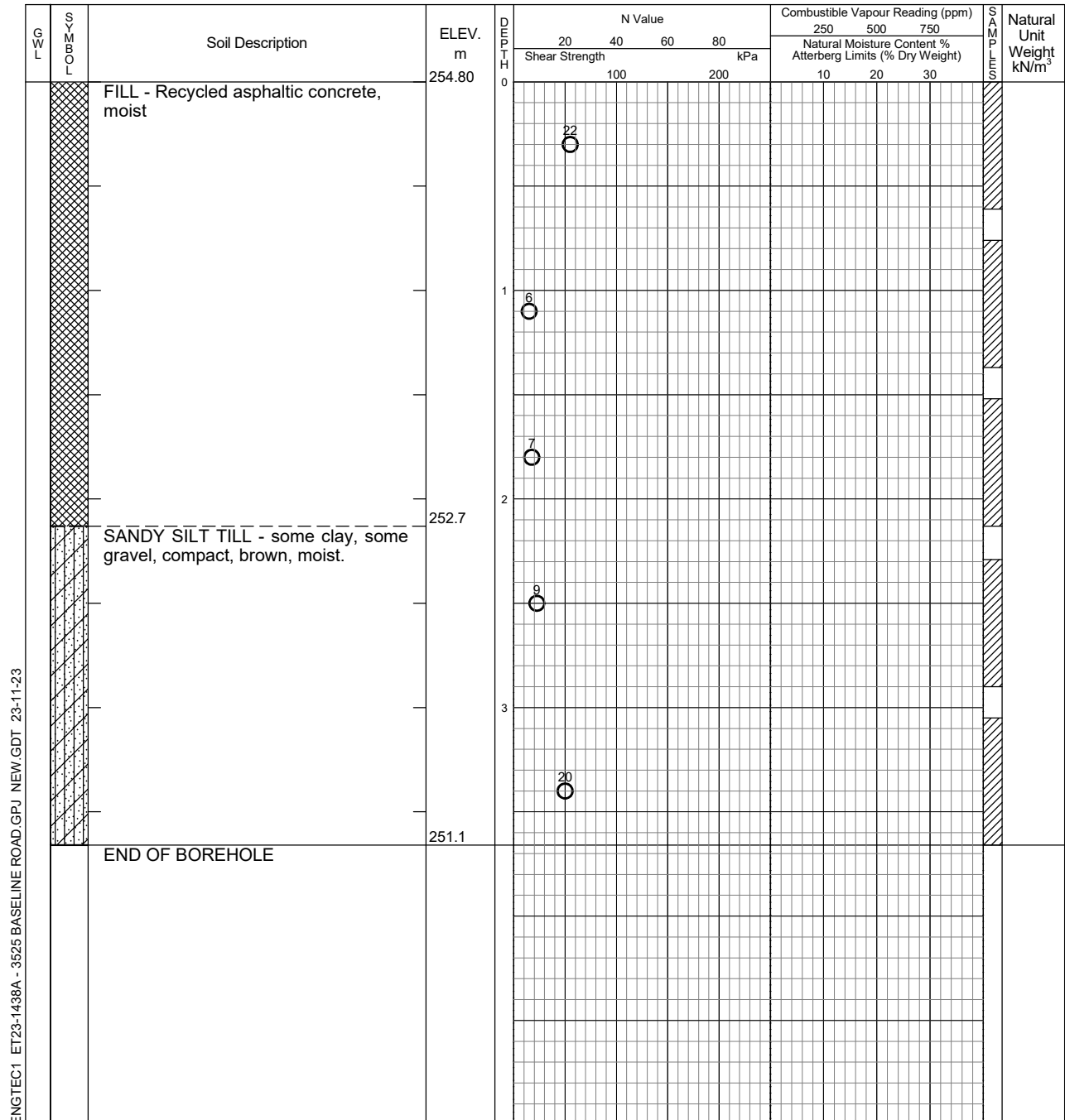
▲

Dynamic Cone Test

■

Field Vane Test

Field Vane Test



Log of Borehole BH5

Project No. ET23-1438A

Figure No. 5

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample

SPT (N) Value

Drill Type: D-50

Dynamic Cone Test

Shelby Tube

Datum: Approximate Geodetic

Field Vane Test

Combustible Vapour Reading ☐

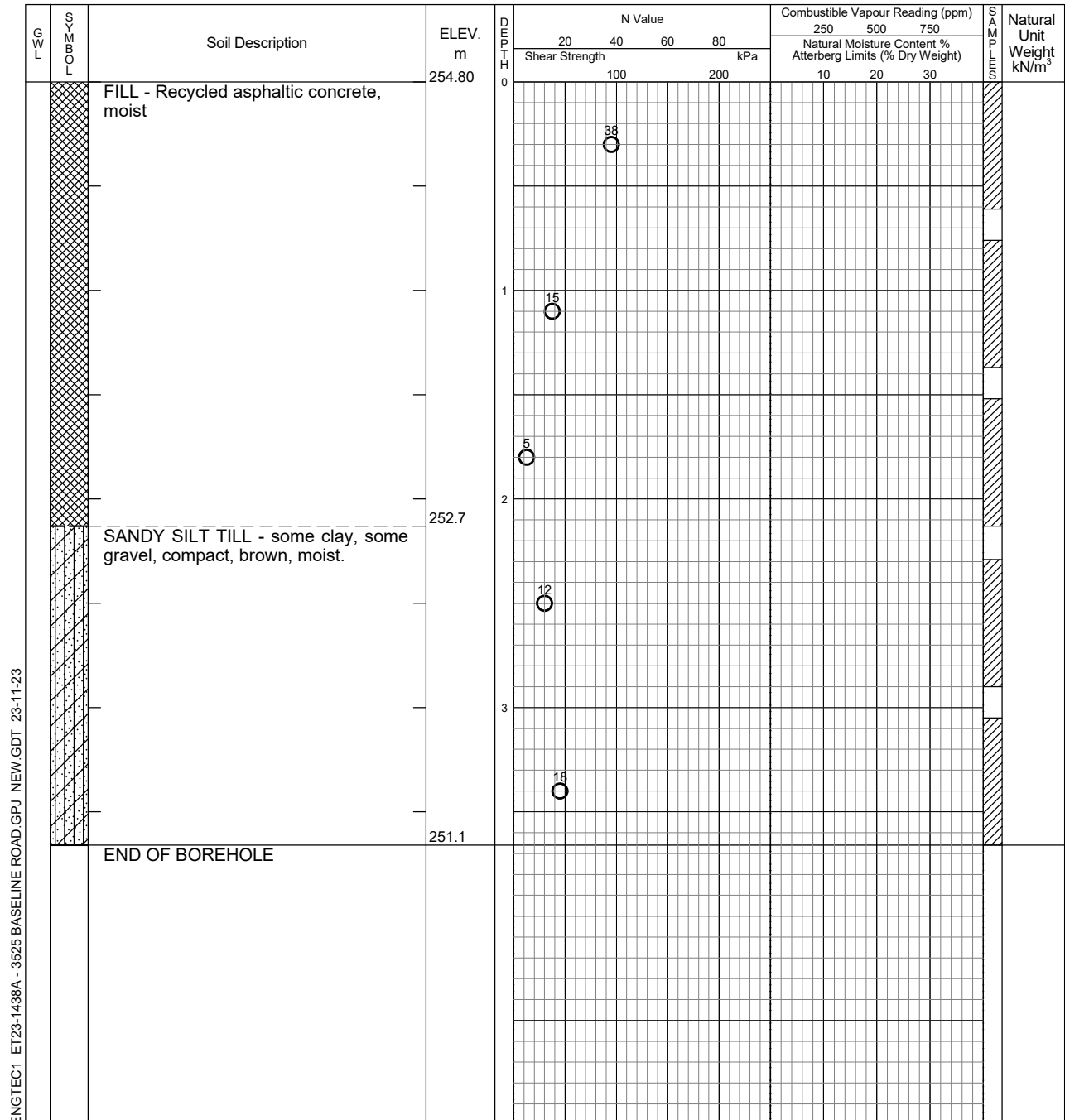
Natural Moisture ✕

Plastic and Liquid Limit

Undrained Triaxial at

% Strain at Failure

Penetrometer ▲



Time	Water Level (m)	Depth to Cave (m)
Oct 30, 2023	dry	3.5m

Log of Borehole BH6

Project No. ET23-1438A

Figure No. 6

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample

SPT (N) Value

Drill Type: D-50

Dynamic Cone Test

Shelby Tube

Datum: Approximate Geodetic

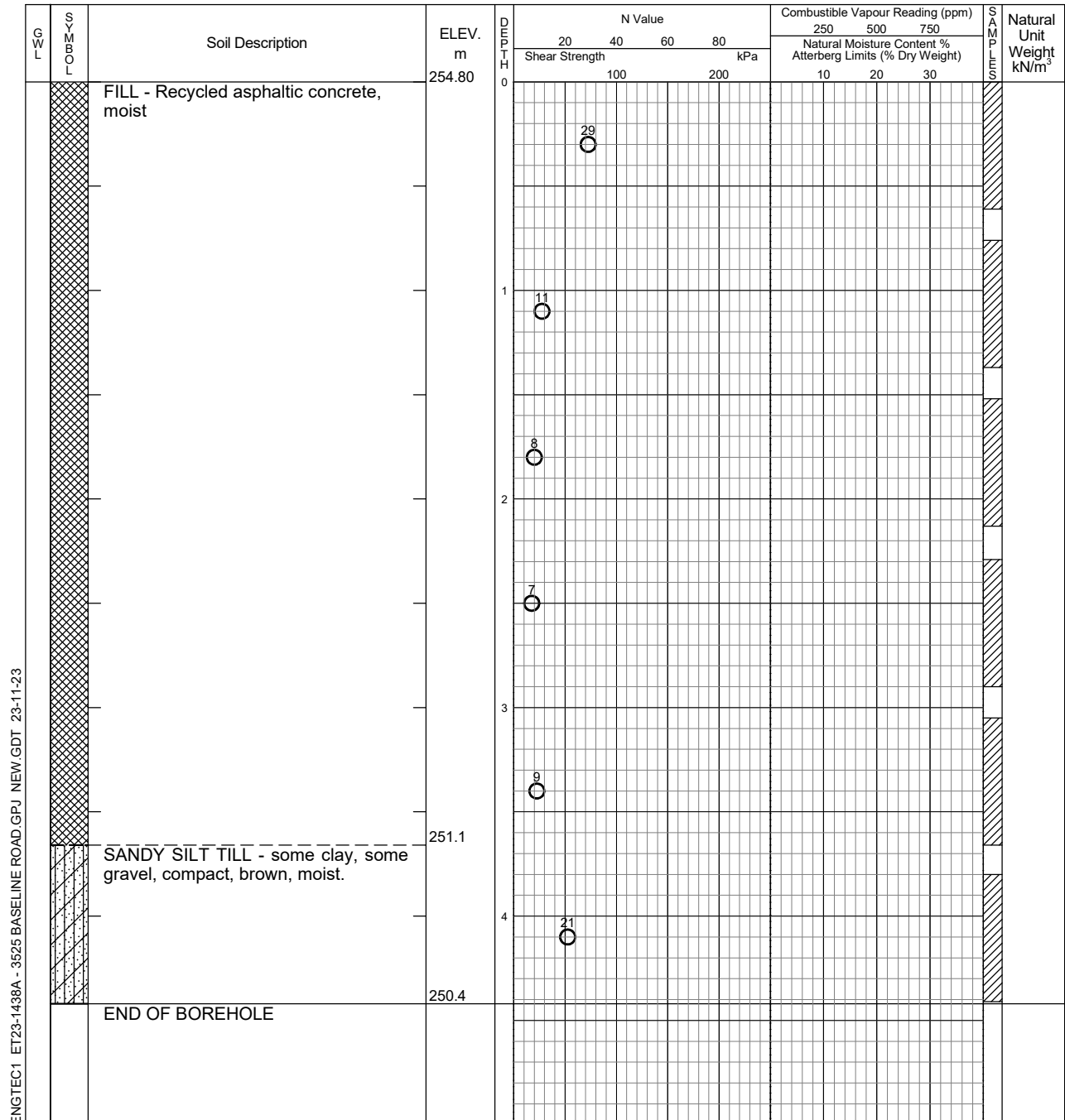
Field Vane Test

Combustible Vapour Reading ☐

Natural Moisture ✕

Plastic and Liquid Limit

Undrained Triaxial at
% Strain at Failure

Penetrometer 

Time	Water Level (m)	Depth to Cave (m)
Oct 30, 2023	dry	4.3m

Log of Borehole BH7

Project No. ET23-1438A

Figure No. 7

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample ☒

Combustible Vapour Reading ☐

Drill Type: D-50

SPT (N) Value ☐ ☒

Natural Moisture ✕

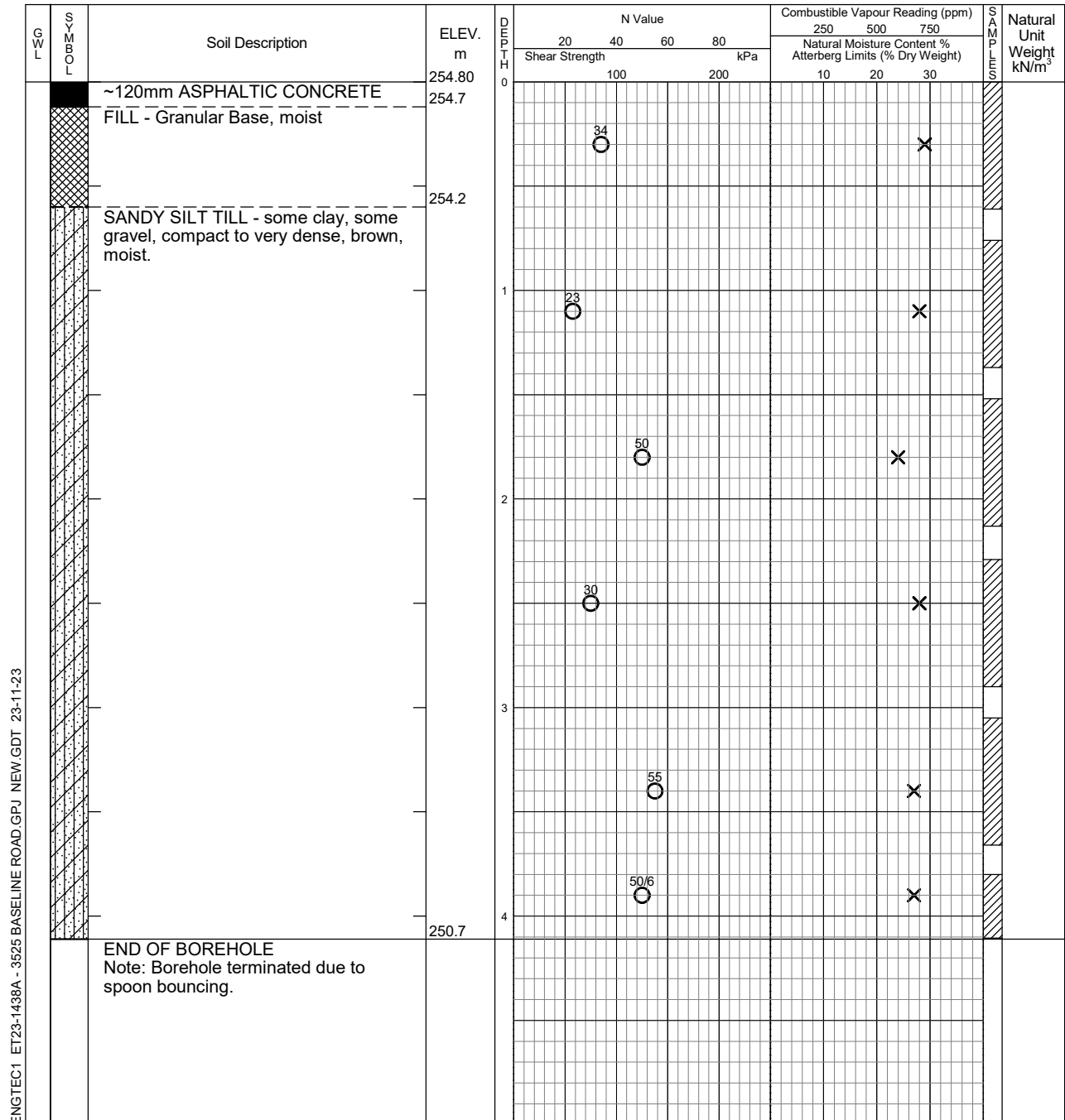
Datum: Approximate Geodetic

Dynamic Cone Test —————

Plastic and Liquid Limit

Shelby Tube Undrained Triaxial at $\sigma_3 = 100$ kPa Field Vane Test

% Strain at Failure



Log of Borehole BH8

Project No. ET23-1438A

Figure No. 8

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample



SPT (N) Value



Dynamic Cone Test



Shelby Tube



Field Vane Test



Combustible Vapour Reading



Natural Moisture



Plastic and Liquid Limit



Undrained Triaxial at



% Strain at Failure

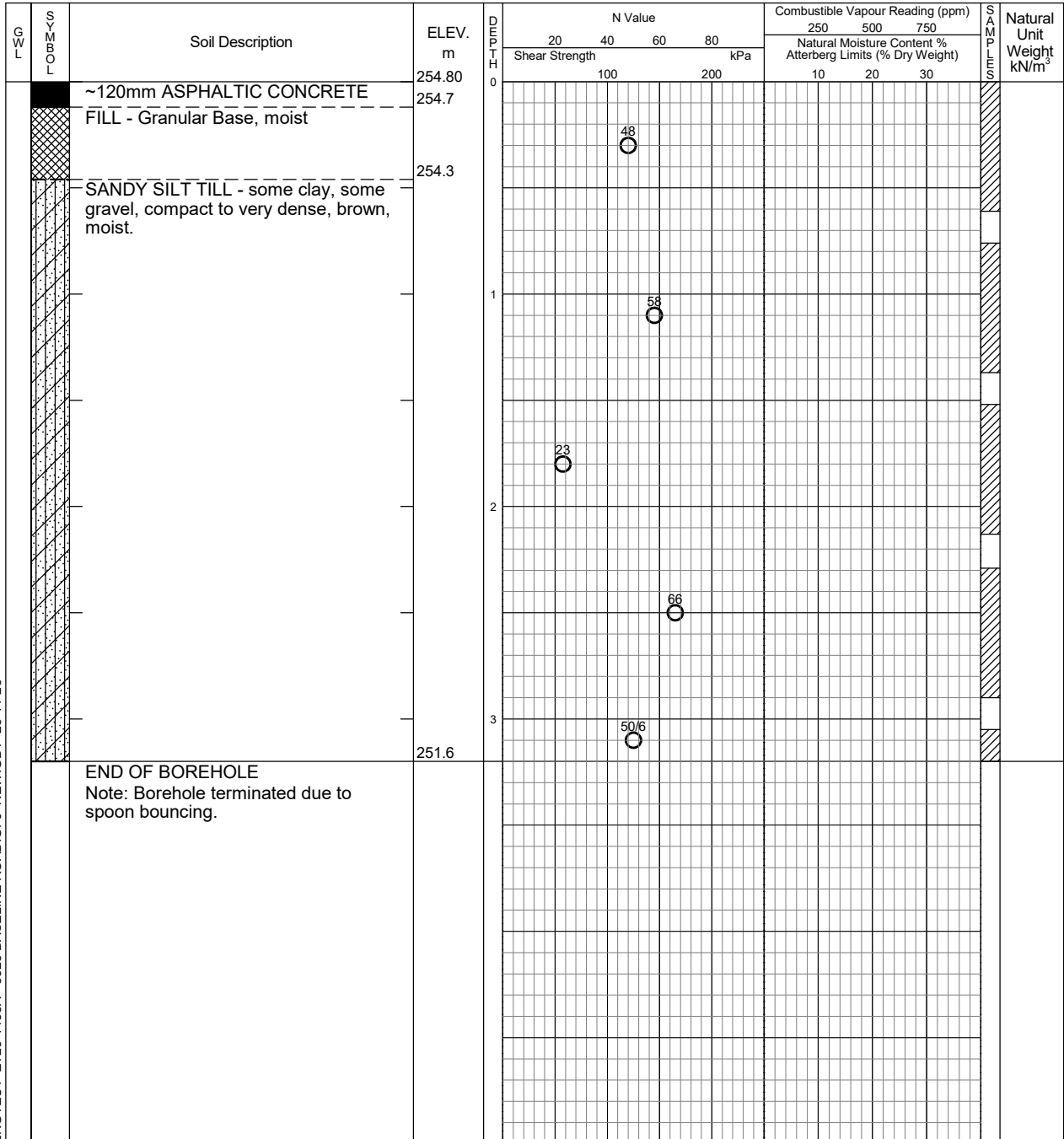


Penetrometer



Drill Type: D-50

Datum: Approximate Geodetic



Engtec Consulting Inc.
1-2447 Anson Drive
Mississauga, ON, L5S 1G4
(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.
See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
Oct 30, 2023	dry	3.0m

Log of Borehole BH10

Project No. ET23-1438A

Figure No. 10

Project: Geotechnical Investigation for Proposed Addition

Sheet No. 1 of 1

Location: 3525 Baseline Road, Town of Goergina, ON.

Date Drilled: October 30, 2023

Auger Sample



Combustible Vapour Reading



SPT (N) Value



Natural Moisture



Drill Type: D-50

Dynamic Cone Test



Plastic and Liquid Limit



Datum: Approximate Geodetic

Shelby Tube



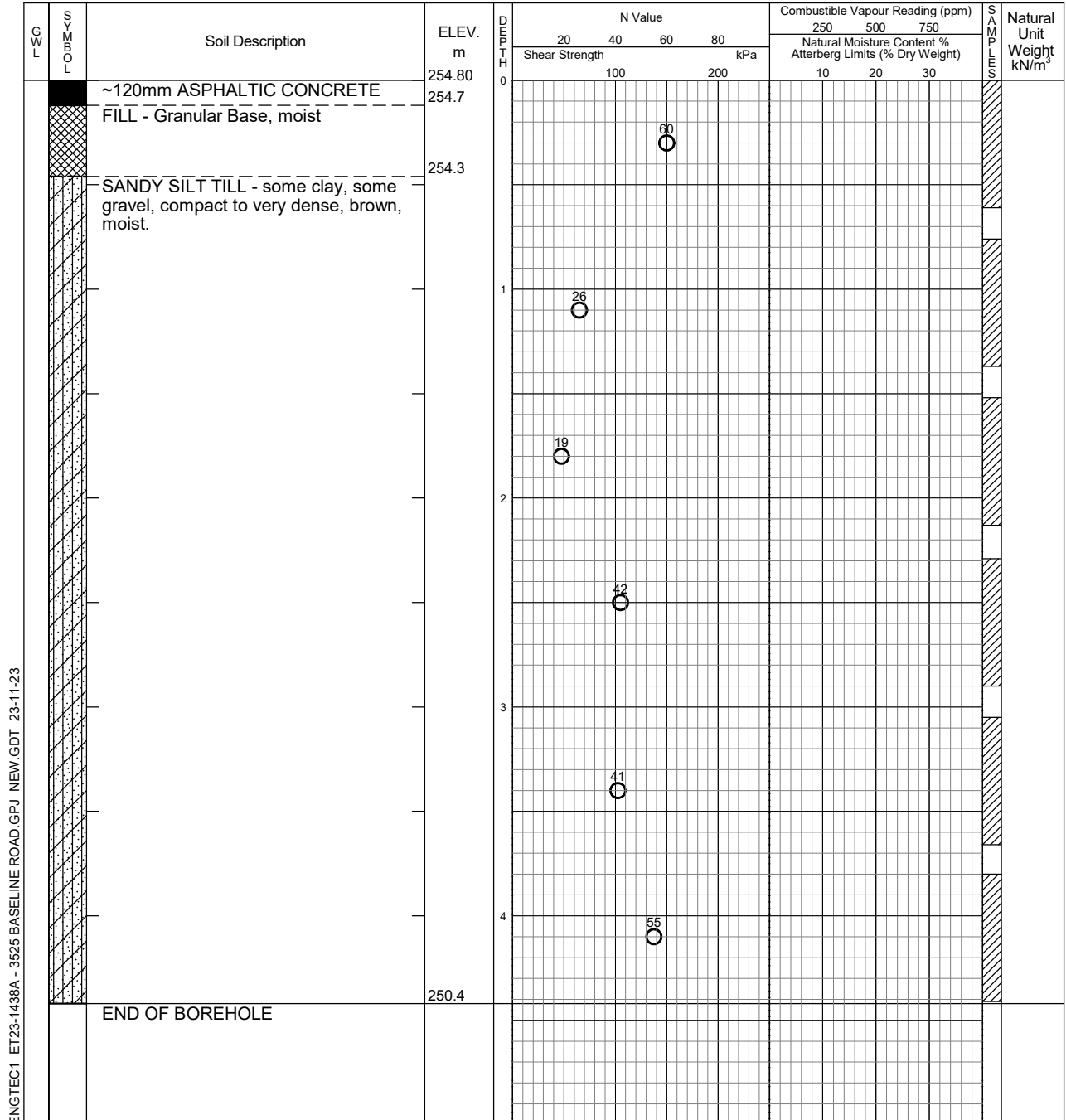
Undrained Triaxial at
% Strain at Failure



Field Vane Test



Penetrometer



Engtec Consulting Inc.
1-2447 Anson Drive
Mississauga, ON, L5S 1G7
(905) 856-2988

Borehole data requires interpretation assistance from ENGTEC before use by others.
See Figures 1A and 1B for Notes on Sample Descriptions and Terminology.

Time	Water Level (m)	Depth to Cave (m)
Oct 30, 2023	dry	4.3m

Appendix D:

Laboratory Test Results



Engtec Consulting Inc.
 1-2447 Anson Drive, Mississauga
 Ontario, L5S 1G1
 Telephone: (905) 856-2988
 Fax: (905) 856-2989

Moisture Content

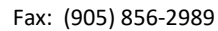
Project Name :	3525 Baseline, Georgina, Ontario	Date sampled:	02-Nov-22
Project No.:	ET22-1438A	Date tested:	07-Nov-22
Lab Sample No.:	G09177		

BOREHOLE #	BH1	BH1	BH1
SAMPLE#	SS1	SS2	SS3
TARE #	1	2	3
WT. OF TARE (gms)	25.5	24.6	24.7
WT. OF TARE+WET SOIL (gms)	115.1	120.5	126.6
WT. OF TARE+DRY SOIL (gms)	100.0	94.0	97.8
WT. OF WATER (gms)	15.1	26.5	28.8
WT. OF DRY SOIL (gms.)	74.5	69.4	73.1
% MOISTURE CONTENT (%)	15.1	28.2	29.4

BOREHOLE #	BH3	BH3	BH3	BH3
SAMPLE#	SS1	SS2	SS3	SS4
TARE #	1	2	3	4
WT. OF TARE (gms)	25.7	25.7	24.7	25.6
WT. OF TARE+WET SOIL (gms)	125.0	125.0	139.1	122.0
WT. OF TARE+DRY SOIL (gms)	98.4	95.3	113.2	94.0
WT. OF WATER (gms)	26.6	29.7	25.9	28
WT. OF DRY SOIL (gms.)	72.7	69.6	88.5	68.4
% MOISTURE CONTENT (%)	27.0	31.2	22.9	29.8

BOREHOLE #	BH7	BH7	BH7	BH7	BH7	BH7
SAMPLE#	SS1	SS2	SS3	SS4	SS5	SS6
TARE #	1	2	3	4	5	6
WT. OF TARE (gms)	25.7	25.7	24.7	25.6	24.6	24.6
WT. OF TARE+WET SOIL (gms)	127.2	122.0	140.0	120.0	121.0	120.8
WT. OF TARE+DRY SOIL (gms)	98.4	95.3	113.2	94.0	95.4	95.4
WT. OF WATER (gms)	28.8	26.7	26.8	26	25.6	25.4
WT. OF DRY SOIL (gms.)	72.7	69.6	88.5	68.4	70.8	70.8
% MOISTURE CONTENT (%)	29.3	28.0	23.7	27.7	26.8	26.6

BOREHOLE #	BH9	BH9	BH9	BH9	BH9	BH9
SAMPLE#	SS1	SS2	SS3	SS4	SS5	SS6
TARE #	1	2	3	4	5	6
WT. OF TARE (gms)	25.7	25.7	24.7	25.6	24.6	24.6
WT. OF TARE+WET SOIL (gms)	123.0	120.0	132.0	120.0	122.1	122.0
WT. OF TARE+DRY SOIL (gms)	98.4	95.3	113.2	94.0	95.4	95.4
WT. OF WATER (gms)	24.6	24.7	18.8	26	26.7	26.6
WT. OF DRY SOIL (gms.)	72.7	69.6	88.5	68.4	70.8	70.8
% MOISTURE CONTENT (%)	25.0	25.9	16.6	27.7	28.0	27.9



Lab Sample No.: G09177

Project Name: Geo- Investigation - 3525 Baseline, Georgina, On.

Date Reported: November 8, 2023

Project No: ET23-1138A

Grain Size Proportion (%)	
Gravel - Coarse	0.0
Gravel - Fine	5.1
Sand - Coarse	2.5
Sand - Medium	4.2
Sand - Fine	15.8
Silt (> 2mm), < 75mm):	46.0
Clay (< 2mm):	26.4
Total	100.0

Sample Information	
Borehole No.:	BH#1, SS3
Sample Method:	Bulk
Depth:	5' to 7' depth
Sample Description:	Sandy, Silt and Clay with Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 2, 2023
Client Sample ID:	N/A
Comments:	Sandy, Silt and Clay with Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	0.0392	54.3
26.5	100.0	0.0280	52.9
19	100.0	0.0182	48.6
16	100.0	0.0108	44.3
13.2	100.0	0.0077	41.5
9.5	98.0	0.0055	38.6
4.75	94.9	0.0028	30.0
2	92.4	0.0012	22.9
0.85	90.7	0.0000	0.0
0.425	88.2		
0.25	85.0		
0.106	76.8		
0.075	72.3		

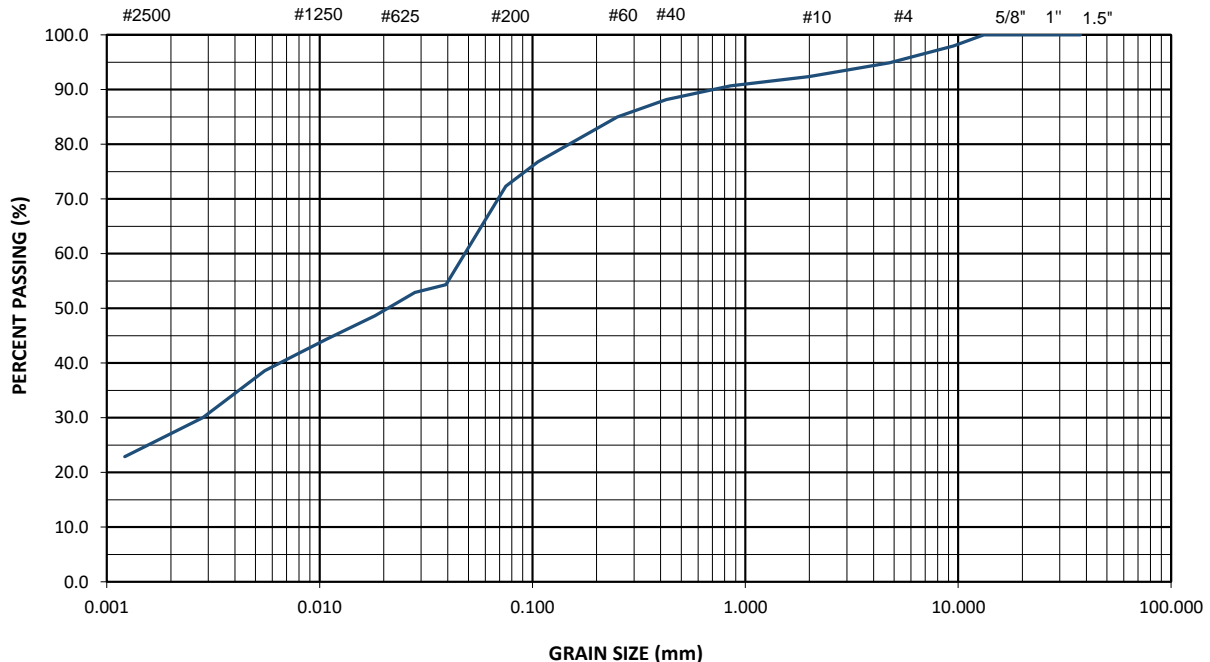
Review Status - Laboratory Manager

☒ Reviewed
☐ Not Reviewed

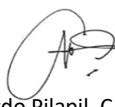
UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT			SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	26.4	46.0	15.8	4.2	2.5	5.1	0.0

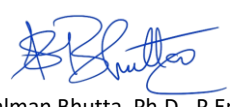
SIEVE DESIGNATION (Imperial)



Reported By:


Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By:


Salman Bhutta, Ph.D., P.Eng.
Project Manager

Lab Sample No.: G09177

Project Name: Geo- Investigation - 3525 Baseline , Georgina, ON.

Date Reported: November 8, 2023

Project No: ET23-1438A

Grain Size Proportion (%)	
Gravel - Coarse	12.8
Gravel - Fine	4.3
Sand - Coarse	4.6
Sand - Medium	8.1
Sand - Fine	25.2
Silt (> 2mm), < 75mm):	33.9
Clay (< 2mm):	11.1
Total	100.0

Sample Information	
Borehole No.:	BH# 3, SS4
Sample Method:	Bulk
Depth:	7.5' to 9.5' depth
Sample Description:	Silty Sand with Gravel & Clay - Brown
Sampled By:	Engtec
Sampling Date:	November 2, 2023
Client Sample ID:	N/A
Comments:	Silty Sand with Gravel & Clay - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	0.0455	22.8
26.5	100.0	0.0327	20.4
19	88.6	0.0208	19.2
16	87.2	0.0121	16.8
13.2	86.9	0.0086	15.6
9.5	84.5	0.0062	14.4
4.75	82.9	0.0030	13.2
2	78.3	0.0013	9.6
0.85	74.9	0.0000	0.0
0.425	70.1		
0.25	64.6		
0.106	52.0		
0.075	44.9		

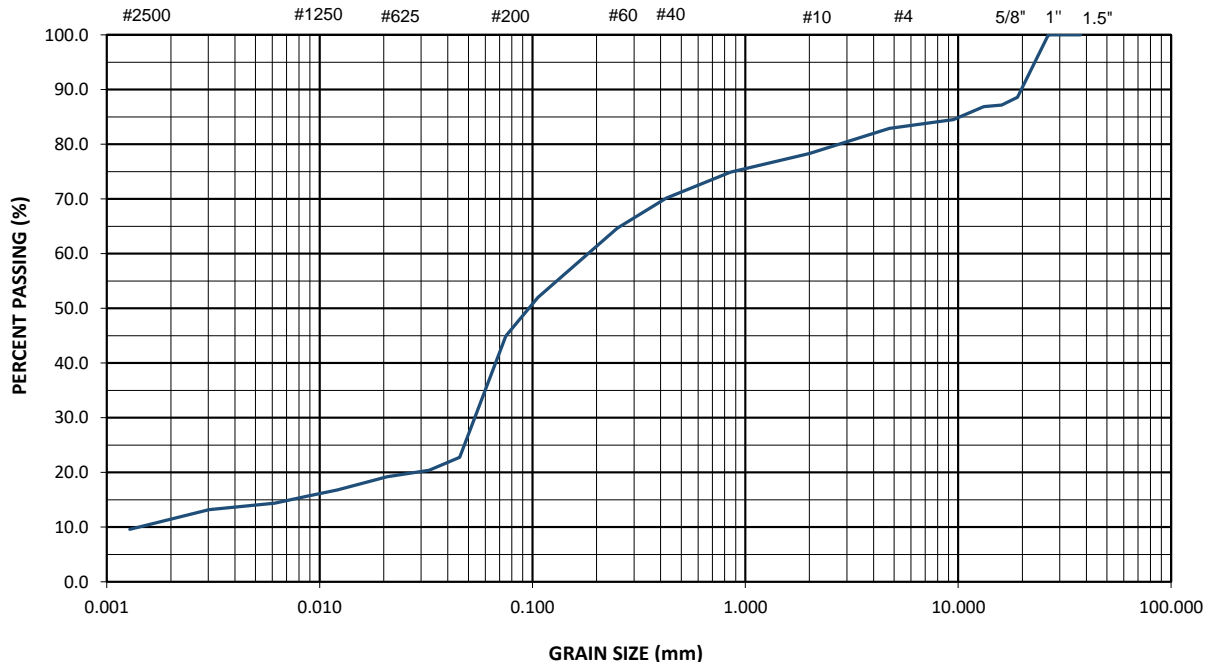
Review Status - Laboratory Manager

☒ Reviewed
☐ Not Reviewed

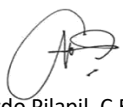
UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT			SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	11.1	33.9	25.2	8.1	4.6	4.3	12.8


SIEVE DESIGNATION (Imperial)



Reported By:


Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By:


Salman Bhutta, Ph.D., P.Eng.
Project Manager

**Grain Size Analysis
& Hydrometer
LS - 702**

Lab Sample No.: G09177

Project Name: Geo- Investigation - 3525 Baseline, Georgina, ON.

Date Reported: November 8, 2023

Project No: ET23-1438A

Grain Size Proportion (%)	
Gravel - Coarse	11.2
Gravel - Fine	12.7
Sand - Coarse	3.6
Sand - Medium	8.3
Sand - Fine	24.2
Silt (> 2mm), < 75mm):	25.7
Clay (< 2mm):	14.3
Total	100.0

Sample Information	
Borehole No.:	BH# 7, SS3
Sample Method:	Bulk
Depth:	5'to 7'depth
Sample Description:	Clayey, Sand, Silt & Gravel - Brown
Sampled By:	Engtec
Sampling Date:	November 2, 2023
Client Sample ID:	N/A
Comments:	Clayey, Sand, Silt & Gravel - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	0.0418	32.5
26.5	100.0	0.0298	31.4
19	90.7	0.0191	29.2
16	88.8	0.0113	26.0
13.2	85.5	0.0081	22.7
9.5	82.8	0.0059	18.4
4.75	76.1	0.0029	17.3
2	72.6	0.0013	11.9
0.85	68.8	0.0000	0.0
0.425	64.3		
0.25	58.3		
0.106	45.4		
0.075	40.1		

Review Status - Laboratory Manager

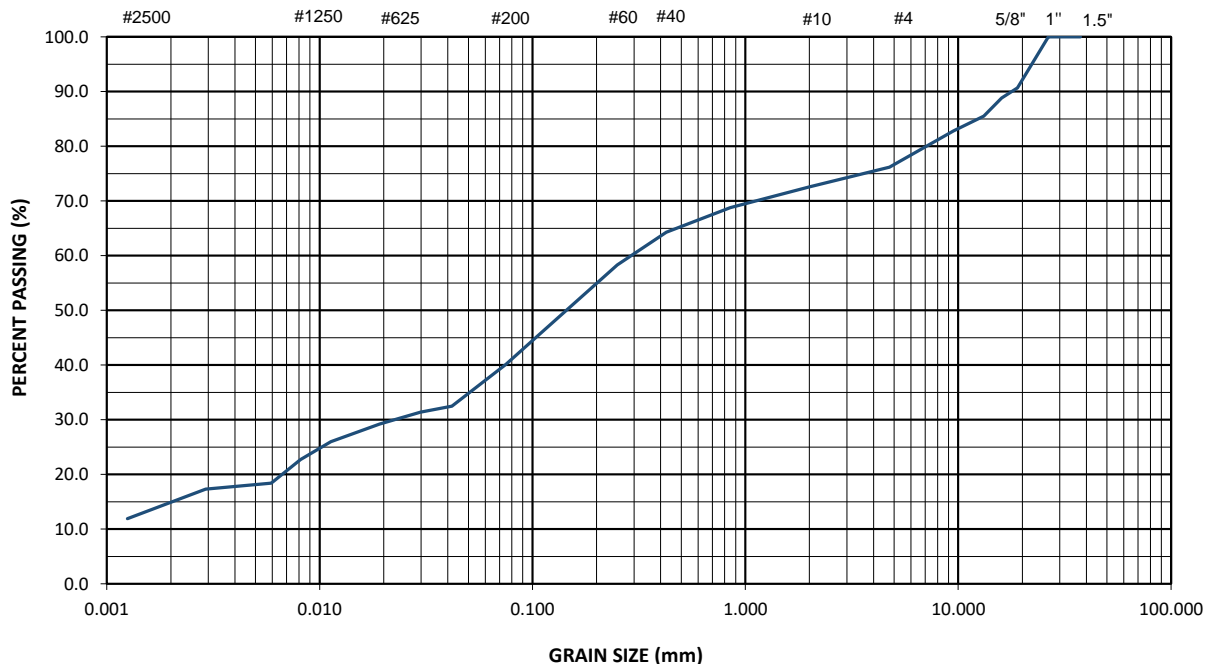
☒ Reviewed

☐ Not Reviewed

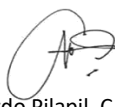
UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT			SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	14.3	25.7	24.2	8.3	3.6	12.7	11.2

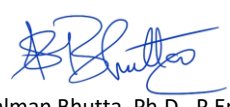
SIEVE DESIGNATION (Imperial)



Reported By:


Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By:


Salman Bhutta, Ph.D., P.Eng.
Project Manager

**Grain Size Analysis
& Hydrometer
LS - 702**

Lab Sample No.: G09177

Project Name: Geo- Investigation - 3525 Baseline ,Georgina, ON.

Date Reported: November 7, 2023

Project No: ET23-1438A

Grain Size Proportion (%)	
Gravel - Coarse	7.5
Gravel - Fine	8.7
Sand - Coarse	4.7
Sand - Medium	9.6
Sand - Fine	25.4
Silt (> 2mm), < 75mm):	33.7
Clay (< 2mm):	10.5
Total	100.0

Sample Information	
Borehole No.:	BH#9, SS2
Sample Method:	Bulk
Depth:	2.5'to 4.5' depth
Sample Description:	Silty Sand with Gravel & Clay - Brown
Sampled By:	Engtec
Sampling Date:	November 2, 2023
Client Sample ID:	N/A
Comments:	Silty Sand with Gravel & Clay - Brown

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
37.5	100.0	0.0433	31.5
26.5	100.0	0.0310	29.0
19	96.2	0.0199	26.6
16	92.5	0.0117	24.2
13.2	91.4	0.0083	23.0
9.5	85.2	0.0059	21.8
4.75	83.8	0.0030	13.3
2	79.1	0.0013	8.5
0.85	74.6	0.0000	0.0
0.425	69.6		
0.25	63.3		
0.106	49.9		
0.075	44.1		

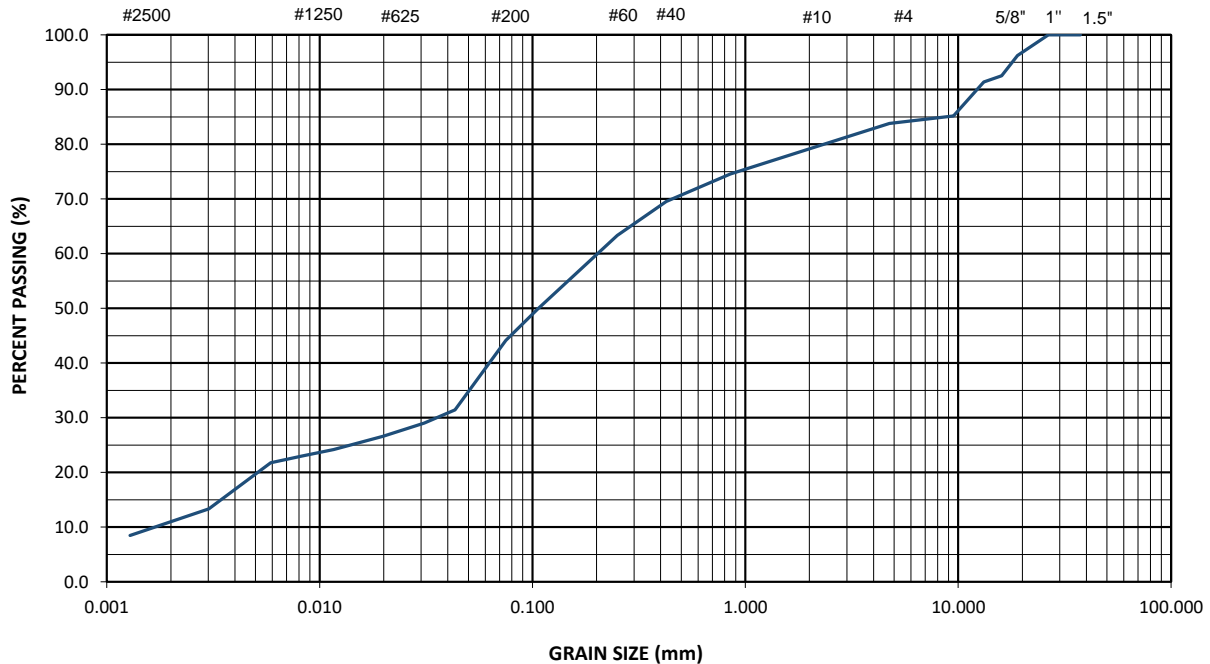
Review Status - Laboratory Manager

☒ Reviewed
☐ Not Reviewed

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT			SAND			GRAVEL	
			Fine	Medium	Coarse	Fine	Coarse
%	10.5	33.7	25.4	9.6	4.7	8.7	7.5

SIEVE DESIGNATION (Imperial)



Reported By:

Leonardo Pilapil, C.E.T.
Laboratory Supervisor

Approved By:

Salman Bhutta, Ph.D., P.Eng.
Project Manager

Appendix E:

Chemical Test Results

CLIENT NAME: ENGTEC CONSULTING INC
2447 ANSON DRIVE
MISSISSAUGA, ON L5S 1G1
(905) 856-2988

ATTENTION TO: Salman Bhutta

PROJECT: York Region

AGAT WORK ORDER: 23T086913

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganic Team Lead

TRACE ORGANICS REVIEWED BY: Radhika Chakraborty, Trace Organics Lab Manager

DATE REPORTED: Nov 07, 2023

PAGES (INCLUDING COVER): 19

VERSION*: 1

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

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.



Certificate of Analysis

AGAT WORK ORDER: 23T086913

PROJECT: York Region

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

CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

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

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

Parameter	Unit	SAMPLE DESCRIPTION:			BH10	BH5
		SAMPLE TYPE:			Soil	Soil
		DATE SAMPLED:			2023-10-30	2023-10-30
		G / S: A	G / S: B	RDL	5411161	5411163
Antimony	µg/g	40	40	0.8	<0.8[<A]	<0.8[<A]
Arsenic	µg/g	18	18	1	2[<A]	2[<A]
Barium	µg/g	670	670	2.0	30.3[<A]	80.4[<A]
Beryllium	µg/g	8	8	0.5	<0.5[<A]	0.6[<A]
Boron	µg/g	120	120	5	6[<A]	9[<A]
Boron (Hot Water Soluble)	µg/g	2	2	0.10	<0.10[<A]	0.18[<A]
Cadmium	µg/g	1.9	1.9	0.5	<0.5[<A]	<0.5[<A]
Chromium	µg/g	160	160	5	11[<A]	22[<A]
Cobalt	µg/g	80	80	0.8	4.8[<A]	7.1[<A]
Copper	µg/g	230	230	1.0	7.8[<A]	10.1[<A]
Lead	µg/g	120	120	1	3[<A]	6[<A]
Molybdenum	µg/g	40	40	0.5	<0.5[<A]	<0.5[<A]
Nickel	µg/g	270	270	1	7[<A]	13[<A]
Selenium	µg/g	5.5	5.5	0.8	<0.8[<A]	<0.8[<A]
Silver	µg/g	40	40	0.5	<0.5[<A]	<0.5[<A]
Thallium	µg/g	3.3	3.3	0.5	<0.5[<A]	<0.5[<A]
Uranium	µg/g	33	33	0.50	<0.50[<A]	<0.50[<A]
Vanadium	µg/g	86	86	2.0	20.9[<A]	34.9[<A]
Zinc	µg/g	340	340	5	23[<A]	35[<A]
Chromium, Hexavalent	µg/g	8	8	0.2	<0.2[<A]	<0.2[<A]
Cyanide, WAD	µg/g	0.051	0.051	0.040	<0.040[<A]	<0.040[<A]
Mercury	µg/g	0.27	0.27	0.10	<0.10[<A]	<0.10[<A]
Electrical Conductivity (2:1)	mS/cm	1.4	1.4	0.005	2.50[>B]	3.58[>B]
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	12	N/A	33.9[>B]	12.3[>B]
pH, 2:1 CaCl2 Extraction	pH Units			NA	7.26	7.23

Certified By:



Nivine Basly



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23T086913

PROJECT: York Region

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

CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

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

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind, B Refers to O. Reg. 406/19 TABLE 3.1: Full Depth Non-Potable Ground Water Condition Volume Independent - Ind/Com/Community
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.

5411161-5411163 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl₂ extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basily



AGAT Laboratories

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CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

O. Reg. 558 - Metals & Inorganics

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

		SAMPLE DESCRIPTION:		BH10	
		SAMPLE TYPE:		Soil	
		DATE SAMPLED:		2023-10-30	
Parameter	Unit	G / S	RDL	5411161	
Arsenic Leachate	mg/L	2.5	0.010	<0.010	
Barium Leachate	mg/L	100	0.020	0.223	
Boron Leachate	mg/L	500	0.050	<0.050	
Cadmium Leachate	mg/L	0.5	0.010	<0.010	
Chromium Leachate	mg/L	5	0.050	<0.050	
Lead Leachate	mg/L	5	0.010	<0.010	
Mercury Leachate	mg/L	0.1	0.01	<0.01	
Selenium Leachate	mg/L	1	0.020	<0.020	
Silver Leachate	mg/L	5	0.010	<0.010	
Uranium Leachate	mg/L	10	0.050	<0.050	
Fluoride Leachate	mg/L	150	0.10	0.19	
Cyanide Leachate	mg/L	20	0.05	<0.05	
(Nitrate + Nitrite) as N Leachate	mg/L	1000	0.70	<0.70	

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

Certified By:



Nivine Basly



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AGAT WORK ORDER: 23T086913

PROJECT: York Region

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CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

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

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

		SAMPLE DESCRIPTION:			BH10	BH5
		SAMPLE TYPE:			Soil	Soil
		DATE SAMPLED:			2023-10-30	2023-10-30
Parameter	Unit	G / S: A	G / S: B	RDL	5411161	5411163
Naphthalene	µg/g	0.2	1.8	0.05	<0.05[<A]	<0.05[<A]
Acenaphthylene	µg/g	0.093	0.093	0.05	<0.05[<A]	<0.05[<A]
Acenaphthene	µg/g	2.5	15	0.05	<0.05[<A]	<0.05[<A]
Fluorene	µg/g	6.8	6.8	0.05	<0.05[<A]	<0.05[<A]
Phenanthrene	µg/g	12	12	0.05	<0.05[<A]	<0.05[<A]
Anthracene	µg/g	0.16	0.16	0.05	<0.05[<A]	<0.05[<A]
Fluoranthene	µg/g	2.8	70	0.05	<0.05[<A]	<0.05[<A]
Pyrene	µg/g	28	70	0.05	<0.05[<A]	<0.05[<A]
Benz(a)anthracene	µg/g	0.92	1	0.05	<0.05[<A]	<0.05[<A]
Chrysene	µg/g	9.4	14	0.05	<0.05[<A]	<0.05[<A]
Benzo(b)fluoranthene	µg/g	3.2	7	0.05	<0.05[<A]	<0.05[<A]
Benzo(k)fluoranthene	µg/g	3.1	7	0.05	<0.05[<A]	<0.05[<A]
Benzo(a)pyrene	µg/g	0.31	0.7	0.05	<0.05[<A]	<0.05[<A]
Indeno(1,2,3-cd)pyrene	µg/g	0.76	0.76	0.05	<0.05[<A]	<0.05[<A]
Dibenz(a,h)anthracene	µg/g	0.7	0.7	0.05	<0.05[<A]	<0.05[<A]
Benzo(g,h,i)perylene	µg/g	13	13	0.05	<0.05[<A]	<0.05[<A]
1 and 2 Methylnaphthalene	µg/g	0.59	8.7	0.05	<0.05[<A]	<0.05[<A]
Moisture Content	%			0.1	6.2	23.1
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%		50-140		70	85
Acridine-d9	%		50-140		75	80
Terphenyl-d14	%		50-140		85	95

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind, B Refers to O. Reg. 406/19 TABLE 3.1: Full Depth Non-Potable Ground Water Condition Volume Independent - Ind/Com/Community
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.

5411161-5411163 Results are based on the dry weight of the soil.

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

R. Chakraborty



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23T086913

PROJECT: York Region

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CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

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

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

		SAMPLE DESCRIPTION:			BH10	BH5
		SAMPLE TYPE:			Soil	Soil
		DATE SAMPLED:			2023-10-30	2023-10-30
Parameter	Unit	G / S: A	G / S: B	RDL	5411161	5411163
Benzene	µg/g	0.02	0.034	0.02	<0.02[<A]	<0.02[<A]
Toluene	µg/g	0.2	7.8	0.05	<0.05[<A]	<0.05[<A]
Ethylbenzene	µg/g	0.05	0.05	0.05	<0.05[<A]	<0.05[<A]
m & p-Xylene	µg/g			0.05	<0.05	<0.05
o-Xylene	µg/g			0.05	<0.05	<0.05
Xylenes (Total)	µg/g	0.091	3	0.05	<0.05[<A]	<0.05[<A]
F1 (C6 - C10)	µg/g			5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	25	5	<5[<A]	<5[<A]
F2 (C10 to C16)	µg/g	26	26	10	<10[<A]	<10[<A]
F2 (C10 to C16) minus Naphthalene	µg/g			10	<10	<10
F3 (C16 to C34)	µg/g	240	1700	50	<50[<A]	<50[<A]
F3 (C16 to C34) minus PAHs	µg/g	240	1700	50	<50[<A]	<50[<A]
F4 (C34 to C50)	µg/g	3300	3300	50	<50[<A]	<50[<A]
Gravimetric Heavy Hydrocarbons	µg/g			50	NA	NA
Moisture Content	%			0.1	6.2	23.1
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery		60-140		85	113
Terphenyl	%		60-140		73	81

Certified By:

R. Chakraborty



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23T086913

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CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

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

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O. Reg. 406/19 TABLE 2.1: Full Depth Potable Ground Water Condition Volume Independent - Com/Ind, B Refers to O. Reg. 406/19 TABLE 3.1: Full Depth Non-Potable Ground Water Condition Volume Independent - Ind/Com/Community
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.

5411161-5411163 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
C6-C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 - C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

R. Chakraborty



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23T086913

PROJECT: York Region

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CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

O. Reg. 558 - Benzo(a) pyrene

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

		SAMPLE DESCRIPTION:		BH10
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2023-10-30
Parameter	Unit	G / S	RDL	5411161
Benzo(a)pyrene Leachate	mg/L	0.001	0.001	<0.001
Surrogate	Unit	Acceptable Limits		
Acridine-d9	%	50-140		75
Naphthalene-d8	%	50-140		97
Terphenyl-d14	%	50-140		85

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

5411161 The sample was leached according to Regulation 558 protocol. Analysis was performed on the leachate.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

R. Chakraborty



Certificate of Analysis

AGAT WORK ORDER: 23T086913

PROJECT: York Region

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CLIENT NAME: ENGTEC CONSULTING INC

SAMPLING SITE: 3525 Baseline Rd, Georgina

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

O. Reg. 558 - VOCs

DATE RECEIVED: 2023-10-31

DATE REPORTED: 2023-11-07

		SAMPLE DESCRIPTION:		BH10
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2023-10-30
Parameter	Unit	G / S	RDL	5411161
Vinyl Chloride Leachate	mg/L	0.2	0.030	<0.030
1,1 Dichloroethene Leachate	mg/L	1.4	0.020	<0.020
Dichloromethane Leachate	mg/L	5.0	0.030	<0.030
Methyl Ethyl Ketone Leachate	mg/L	200	0.090	<0.090
Chloroform Leachate	mg/L	10.0	0.020	<0.020
1,2-Dichloroethane Leachate	mg/L	0.5	0.020	<0.020
Carbon Tetrachloride Leachate	mg/L	0.5	0.020	<0.020
Benzene Leachate	mg/L	0.5	0.020	<0.020
Trichloroethene Leachate	mg/L	5.0	0.020	<0.020
Tetrachloroethene Leachate	mg/L	3.0	0.050	<0.050
Chlorobenzene Leachate	mg/L	8.0	0.010	<0.010
1,2-Dichlorobenzene Leachate	mg/L	20.0	0.010	<0.010
1,4-Dichlorobenzene Leachate	mg/L	0.5	0.010	<0.010
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140	94	
4-Bromofluorobenzene	% Recovery	50-140	107	

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

5411161 Sample was prepared using Regulation 558 protocol and a zero headspace extractor.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

R. Chakraborty

**Exceedance Summary**

AGAT WORK ORDER: 23T086913

PROJECT: York Region

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CLIENT NAME: ENGTEC CONSULTING INC

ATTENTION TO: Salman Bhutta

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
5411161	BH10	ON 406/19 T2.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	1.4	2.50
5411161	BH10	ON 406/19 T2.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	33.9
5411161	BH10	ON 406/19 T3.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	1.4	2.50
5411161	BH10	ON 406/19 T3.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	33.9
5411163	BH5	ON 406/19 T2.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	1.4	3.58
5411163	BH5	ON 406/19 T2.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	12.3
5411163	BH5	ON 406/19 T3.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	1.4	3.58
5411163	BH5	ON 406/19 T3.1 IC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	12.3

Quality Assurance

CLIENT NAME: ENGTEC CONSULTING INC

PROJECT: York Region

SAMPLING SITE:3525 Baseline Rd, Georgina

AGAT WORK ORDER: 23T086913

ATTENTION TO: Salman Bhutta

SAMPLED BY:Jamal Hajaj

Soil Analysis

RPT Date: Nov 07, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	5407790		<0.8	<0.8	NA	< 0.8	125%	70%	130%	103%	80%	120%	74%	70%	130%
Arsenic	5407790		2	2	NA	< 1	127%	70%	130%	105%	80%	120%	111%	70%	130%
Barium	5407790		72.0	72.5	0.7%	< 2.0	113%	70%	130%	106%	80%	120%	124%	70%	130%
Beryllium	5407790		<0.5	<0.5	NA	< 0.5	105%	70%	130%	98%	80%	120%	106%	70%	130%
Boron	5407790		13	13	NA	< 5	84%	70%	130%	97%	80%	120%	100%	70%	130%
Boron (Hot Water Soluble)	5421152		0.43	0.39	NA	< 0.10	90%	60%	140%	103%	70%	130%	97%	60%	140%
Cadmium	5407790		<0.5	<0.5	NA	< 0.5	116%	70%	130%	103%	80%	120%	107%	70%	130%
Chromium	5407790		9	10	NA	< 5	109%	70%	130%	100%	80%	120%	106%	70%	130%
Cobalt	5407790		2.8	2.9	NA	< 0.8	111%	70%	130%	108%	80%	120%	112%	70%	130%
Copper	5407790		12.4	12.6	2.1%	< 1.0	111%	70%	130%	99%	80%	120%	100%	70%	130%
Lead	5407790		62	63	2.0%	< 1	109%	70%	130%	97%	80%	120%	120%	70%	130%
Molybdenum	5407790		<0.5	<0.5	NA	< 0.5	115%	70%	130%	104%	80%	120%	107%	70%	130%
Nickel	5407790		5	5	1.0%	< 1	109%	70%	130%	101%	80%	120%	102%	70%	130%
Selenium	5407790		<0.8	<0.8	NA	< 0.8	100%	70%	130%	105%	80%	120%	117%	70%	130%
Silver	5407790		<0.5	<0.5	NA	< 0.5	112%	70%	130%	104%	80%	120%	98%	70%	130%
Thallium	5407790		<0.5	<0.5	NA	< 0.5	86%	70%	130%	102%	80%	120%	103%	70%	130%
Uranium	5407790		0.51	0.51	NA	< 0.50	97%	70%	130%	95%	80%	120%	97%	70%	130%
Vanadium	5407790		13.0	13.3	2.7%	< 2.0	110%	70%	130%	108%	80%	120%	115%	70%	130%
Zinc	5407790		42	43	3.2%	< 5	121%	70%	130%	111%	80%	120%	114%	70%	130%
Chromium, Hexavalent	5413288		<0.2	<0.2	NA	< 0.2	105%	70%	130%	96%	80%	120%	86%	70%	130%
Cyanide, WAD	5412560		<0.040	<0.040	NA	< 0.040	106%	70%	130%	100%	80%	120%	90%	70%	130%
Mercury	5407790		0.15	0.14	NA	< 0.10	113%	70%	130%	101%	80%	120%	106%	70%	130%
Electrical Conductivity (2:1)	5409523		0.112	0.120	7.0%	< 0.005	106%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	5413436		11.3	11.5	1.9%	NA									
pH, 2:1 CaCl2 Extraction	5411161	5411161	7.26	7.45	2.6%	NA	101%	80%	120%						

Comments: NA signifies Not Applicable.

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

Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 558 - Metals & Inorganics

Arsenic Leachate	5411161	5411161	<0.010	<0.010	NA	< 0.010	102%	70%	130%	115%	80%	120%	117%	70%	130%
Barium Leachate	5411161	5411161	0.223	0.226	1.1%	< 0.020	102%	70%	130%	100%	80%	120%	101%	70%	130%
Boron Leachate	5411161	5411161	<0.050	<0.050	NA	< 0.050	93%	70%	130%	100%	80%	120%	108%	70%	130%
Cadmium Leachate	5411161	5411161	<0.010	<0.010	NA	< 0.010	100%	70%	130%	108%	80%	120%	111%	70%	130%
Chromium Leachate	5411161	5411161	<0.050	<0.050	NA	< 0.050	102%	70%	130%	99%	80%	120%	103%	70%	130%
Lead Leachate	5411161	5411161	<0.010	<0.010	NA	< 0.010	100%	70%	130%	96%	80%	120%	98%	70%	130%
Mercury Leachate	5411161	5411161	<0.01	<0.01	NA	< 0.01	99%	70%	130%	89%	80%	120%	106%	70%	130%
Selenium Leachate	5411161	5411161	<0.020	<0.020	NA	< 0.020	103%	70%	130%	115%	80%	120%	123%	70%	130%
Silver Leachate	5411161	5411161	<0.010	<0.010	NA	< 0.010	97%	70%	130%	104%	80%	120%	93%	70%	130%

Quality Assurance

CLIENT NAME: ENGTEC CONSULTING INC

PROJECT: York Region

SAMPLING SITE: 3525 Baseline Rd, Georgina

AGAT WORK ORDER: 23T086913

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

Soil Analysis (Continued)

RPT Date: Nov 07, 2023			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
Uranium Leachate	5411161	5411161	<0.050	<0.050	NA	< 0.050	101%	70%	130%	100%	80%	120%	101%	70%	130%
Fluoride Leachate	5411161	5411161	0.19	0.20	NA	< 0.10	105%	90%	110%	100%	90%	110%	106%	70%	130%
Cyanide Leachate	5411161	5411161	<0.05	<0.05	NA	< 0.05	93%	70%	130%	102%	80%	120%	110%	70%	130%
(Nitrate + Nitrite) as N Leachate	5411161	5411161	<0.70	<0.70	NA	< 0.70	98%	80%	120%	96%	80%	120%	103%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:


Nivine Basily



Quality Assurance

CLIENT NAME: ENGTEC CONSULTING INC

PROJECT: York Region

SAMPLING SITE:3525 Baseline Rd, Georgina

AGAT WORK ORDER: 23T086913

ATTENTION TO: Salman Bhutta

SAMPLED BY:Jamal Hajaj

Trace Organics Analysis

RPT Date: Nov 07, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 558 - VOCs

Vinyl Chloride Leachate	5411161	5411161	<0.030	<0.030	NA	< 0.030	106%	50%	140%	118%	50%	140%	102%	50%	140%
1,1 Dichloroethene Leachate	5411161	5411161	<0.020	<0.020	NA	< 0.020	76%	50%	140%	95%	60%	130%	79%	50%	140%
Dichloromethane Leachate	5411161	5411161	<0.030	<0.030	NA	< 0.030	104%	50%	140%	109%	60%	130%	105%	50%	140%
Methyl Ethyl Ketone Leachate	5411161	5411161	<0.090	<0.090	NA	< 0.090	89%	50%	140%	109%	50%	140%	92%	50%	140%
Chloroform Leachate	5411161	5411161	<0.020	<0.020	NA	< 0.020	92%	50%	140%	117%	60%	130%	101%	50%	140%
1,2-Dichloroethane Leachate	5411161	5411161	<0.020	<0.020	NA	< 0.020	85%	50%	140%	76%	60%	130%	81%	50%	140%
Carbon Tetrachloride Leachate	5411161	5411161	<0.020	<0.020	NA	< 0.020	76%	50%	140%	81%	60%	130%	82%	50%	140%
Benzene Leachate	5411161	5411161	<0.020	<0.020	NA	< 0.020	98%	50%	140%	107%	60%	130%	100%	50%	140%
Trichloroethene Leachate	5411161	5411161	<0.020	<0.020	NA	< 0.020	76%	50%	140%	75%	60%	130%	71%	50%	140%
Tetrachloroethene Leachate	5411161	5411161	<0.050	<0.050	NA	< 0.050	62%	50%	140%	73%	60%	130%	61%	50%	140%
Chlorobenzene Leachate	5411161	5411161	<0.010	<0.010	NA	< 0.010	78%	50%	140%	92%	60%	130%	72%	50%	140%
1,2-Dichlorobenzene Leachate	5411161	5411161	<0.010	<0.010	NA	< 0.010	83%	50%	140%	90%	60%	130%	81%	50%	140%
1,4-Dichlorobenzene Leachate	5411161	5411161	<0.010	<0.010	NA	< 0.010	82%	50%	140%	94%	60%	130%	79%	50%	140%

O. Reg. 558 - Benzo(a) pyrene

Benzo(a)pyrene Leachate	5413065		< 0.001	< 0.001	NA	< 0.001	85%	50%	140%	102%	50%	140%	67%	50%	140%
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O. Reg. 153(511) - PHCs F1 - F4 (with PAHs) (Soil)

Benzene	5412968		<0.02	<0.02	NA	< 0.02	104%	60%	140%	98%	60%	140%	84%	60%	140%
Toluene	5412968		<0.05	<0.05	NA	< 0.05	95%	60%	140%	88%	60%	140%	92%	60%	140%
Ethylbenzene	5412968		<0.05	<0.05	NA	< 0.05	104%	60%	140%	108%	60%	140%	77%	60%	140%
m & p-Xylene	5412968		<0.05	<0.05	NA	< 0.05	97%	60%	140%	102%	60%	140%	97%	60%	140%
o-Xylene	5412968		<0.05	<0.05	NA	< 0.05	110%	60%	140%	111%	60%	140%	85%	60%	140%
F1 (C6 - C10)	5412968		<5	<5	NA	< 5	106%	60%	140%	81%	60%	140%	115%	60%	140%
F2 (C10 to C16)	5422210		< 10	< 10	NA	< 10	100%	60%	140%	108%	60%	140%	102%	60%	140%
F3 (C16 to C34)	5422210		< 50	< 50	NA	< 50	106%	60%	140%	124%	60%	140%	118%	60%	140%
F4 (C34 to C50)	5422210		< 50	< 50	NA	< 50	92%	60%	140%	89%	60%	140%	109%	60%	140%

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

Naphthalene	5417721		<0.05	<0.05	NA	< 0.05	75%	50%	140%	80%	50%	140%	105%	50%	140%
Acenaphthylene	5417721		<0.05	<0.05	NA	< 0.05	109%	50%	140%	75%	50%	140%	115%	50%	140%
Acenaphthene	5417721		<0.05	<0.05	NA	< 0.05	88%	50%	140%	80%	50%	140%	85%	50%	140%
Fluorene	5417721		<0.05	<0.05	NA	< 0.05	90%	50%	140%	75%	50%	140%	108%	50%	140%
Phenanthrene	5417721		<0.05	<0.05	NA	< 0.05	82%	50%	140%	75%	50%	140%	113%	50%	140%
Anthracene	5417721		<0.05	<0.05	NA	< 0.05	97%	50%	140%	95%	50%	140%	83%	50%	140%
Fluoranthene	5417721		<0.05	<0.05	NA	< 0.05	90%	50%	140%	83%	50%	140%	88%	50%	140%
Pyrene	5417721		<0.05	<0.05	NA	< 0.05	86%	50%	140%	93%	50%	140%	76%	50%	140%
Benz(a)anthracene	5417721		<0.05	<0.05	NA	< 0.05	88%	50%	140%	103%	50%	140%	105%	50%	140%
Chrysene	5417721		<0.05	<0.05	NA	< 0.05	94%	50%	140%	88%	50%	140%	80%	50%	140%
Benzo(b)fluoranthene	5417721		<0.05	<0.05	NA	< 0.05	70%	50%	140%	93%	50%	140%	83%	50%	140%
Benzo(k)fluoranthene	5417721		<0.05	<0.05	NA	< 0.05	99%	50%	140%	98%	50%	140%	70%	50%	140%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 13 of 19

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

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



Quality Assurance

CLIENT NAME: ENGTEC CONSULTING INC

PROJECT: York Region

SAMPLING SITE: 3525 Baseline Rd, Georgina

AGAT WORK ORDER: 23T086913

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

Trace Organics Analysis (Continued)

RPT Date: Nov 07, 2023			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
Benzo(a)pyrene	5417721		<0.05	<0.05	NA	< 0.05	95%	50%	140%	90%	50%	140%	90%	50%	140%
Indeno(1,2,3-cd)pyrene	5417721		<0.05	<0.05	NA	< 0.05	92%	50%	140%	78%	50%	140%	93%	50%	140%
Dibenz(a,h)anthracene	5417721		<0.05	<0.05	NA	< 0.05	76%	50%	140%	75%	50%	140%	85%	50%	140%
Benzo(g,h,i)perylene	5417721		<0.05	<0.05	NA	< 0.05	99%	50%	140%	100%	50%	140%	90%	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:

R. Chakraborty

Method Summary

CLIENT NAME: ENGTEC CONSULTING INC

PROJECT: York Region

SAMPLING SITE:3525 Baseline Rd, Georgina

AGAT WORK ORDER: 23T086913

ATTENTION TO: Salman Bhutta

SAMPLED BY:Jamal Hajaj

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, WAD	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	SEGMENTED FLOW ANALYSIS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl ₂ Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE
Arsenic Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Barium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Boron Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Cadmium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS
Chromium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B	ICP-MS

Method Summary

CLIENT NAME: ENGTEC CONSULTING INC

PROJECT: York Region

SAMPLING SITE: 3525 Baseline Rd, Georgina

AGAT WORK ORDER: 23T086913

ATTENTION TO: Salman Bhutta

SAMPLED BY: Jamal Hajaj

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Lead Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Mercury Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Selenium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Silver Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Uranium Leachate	MET-93-6103	EPA 1311 & modified from EPA 6020B ICP-MS	
Fluoride Leachate	INOR-93-6000	EPA SW 846-1311; SM 4500F-C	ION SELECTIVE ELECTRODE
Cyanide Leachate	INOR-93-6052	EPA 1311 modified from MOE 3015 SM 4500 CN-I, G387	SEGMENTED FLOW ANALYSIS
(Nitrate + Nitrite) as N Leachate	INOR-93-6053	EPA SW 846-1311 & modified from SM 4500 - NO3- I	LACHAT FIA

Method Summary

CLIENT NAME: ENGTEC CONSULTING INC

AGAT WORK ORDER: 23T086913

PROJECT: York Region

ATTENTION TO: Salman Bhutta

SAMPLING SITE:3525 Baseline Rd, Georgina

SAMPLED BY:Jamal Hajaj

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benz(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
1 and 2 Methlynaphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Benzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Toluene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Ethylbenzene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
m & p-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
o-Xylene	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
Xylenes (Total)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/MS
F1 (C6 - C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91-5009	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID

Method Summary

CLIENT NAME: ENGTEC CONSULTING INC

PROJECT: York Region

SAMPLING SITE:3525 Baseline Rd, Georgina

AGAT WORK ORDER: 23T086913

ATTENTION TO: Salman Bhutta

SAMPLED BY:Jamal Hajaj

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Benzo(a)pyrene Leachate	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Vinyl Chloride Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,1 Dichloroethene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Dichloromethane Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Chloroform Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Benzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Trichloroethene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Tetrachloroethene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Chlorobenzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene Leachate	VOL-91-5001	EPA 1311, modified from EPA 5030C & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS



Chain of Custody Record

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

Report Information:

Company: Engtec consulting INC
Contact: salman bhutta
Address: 2447 ANSON DRIVE
MISSISSAUGA, ONT L5S 1G1
Phone: 905-856-2988 Fax: 905-856-2989
Reports to be sent to:
1. Email: sa.bhutta@engtec.ca Hamed.DIN@engtec.ca
2. Email: annie.shah@engtec.ca

Project Information:

Project: YORK Region
Site Location: 3525 Bessie Line RD Georgina
Sampled By: JAHAL HAJAJ
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:

(Please check all applicable boxes)

2.1/3.1 (1CC)

☐ Regulation 153/04 ☒ Regulation 406 ☐ Sewer Use
☐ Sanitary ☐ Storm

Table Indicate One Table Indicate One
☐ Ind/Com ☐ Res/Park ☐ Agriculture
☒ Regulation 558 ☐ Prov. Water Quality Objectives (PWQO)
Soil Texture (Check One) ☐ CCME ☐ Other
☐ Coarse ☐ Fine

Indicate One

Is this submission for a Record of Site Condition?

☐ Yes ☐ No

Report Guideline on Certificate of Analysis

☐ Yes ☐ No

Sample Matrix Legend

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

Laboratory Use Only

Work Order #: 23T086913
Cooler Quantity: 1 med
Arrival Temperatures: 2.6 12.7 2.4
Custody Seal Intact: ☐ Yes ☐ No ☒ N/A
Notes: 10052.ca

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

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

OR Date Required (Rush Surcharges May Apply):

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

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N	Field Filtered - Metals, Hg, CrVI, DOC	0. Reg 153	0. Reg 558	0. Reg 406	Potentially Hazardous or High Concentration (Y/N)
1. <u>BH10</u>	<u>oct 30</u>	<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2. <u>BH15</u>	<u>oct 30</u>	<u>PM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
5.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
6.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
7.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
8.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
11.		<u>AM</u>						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Samples Relinquished By (Print Name and Sign):

Samples Relinquished By (Print Name and Sign):

Samples Relinquished By (Print Name and Sign):

Date

Date

Date

Time

Time

Time

Samples Received By (Print Name and Sign):

Samples Received By (Print Name and Sign):

Samples Received By (Print Name and Sign):

Date

Date

Date

Time

Time

Time

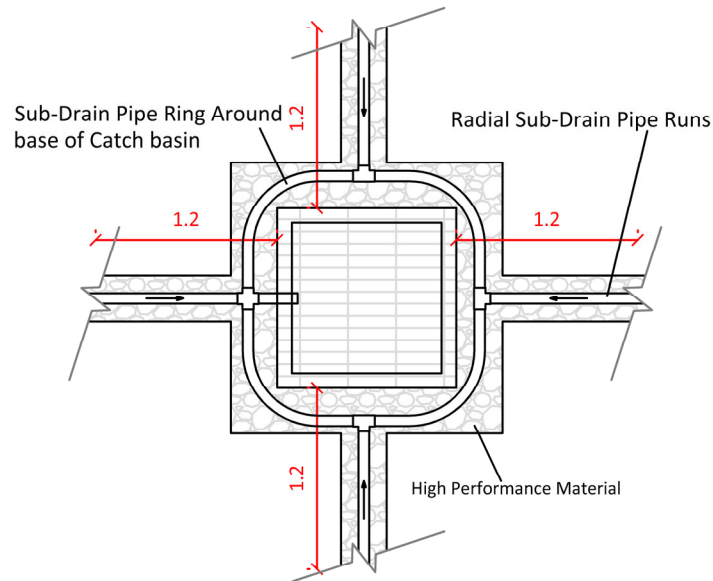
Page _____ of _____

N^o: T-149175

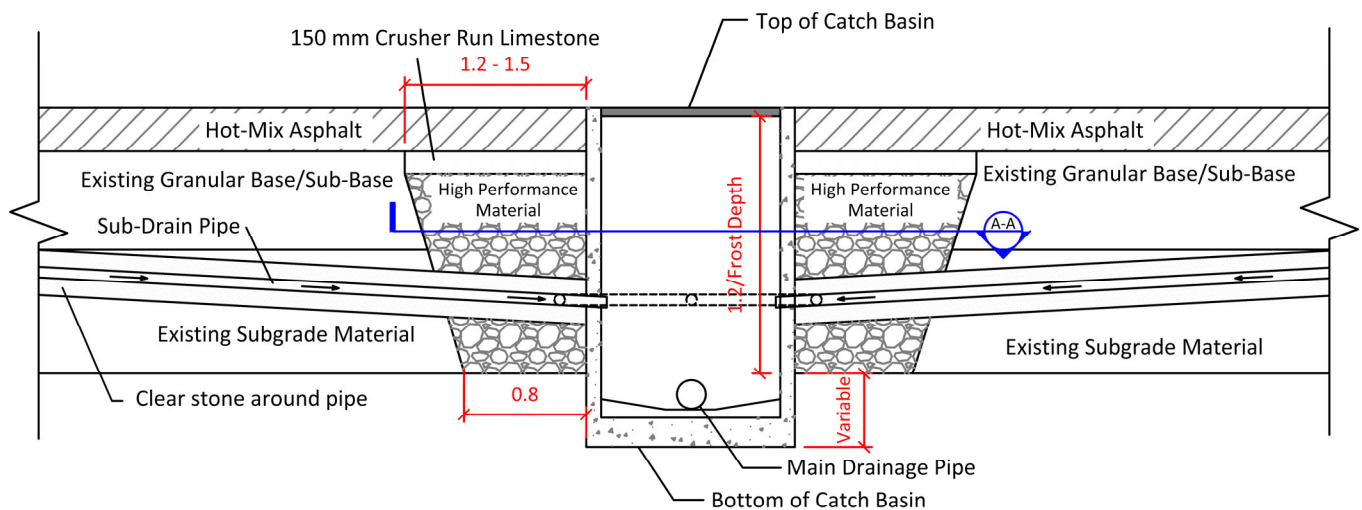
Appendix F:

Catch Basin Frost Treatment

CATCH BASIN FROST TREATMENT DETAIL



SECTION A-A: PLAN VIEW TYPICAL CATCH BASIN FROST TREATMENT AREA



SECTION A-B: CATCH BASIN FROST TREATMENT

Scale:NTS