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#### A REPORT TO MAYFIELD MCLAUGHLIN DEVELOPMENTS INC.

A GEOTECHNICAL INVESTIGATION FOR PROPOSED RESIDENTIAL DEVELOPMENT

#### MAYFIELD WEST PHASE 2 PART OF LOT 18, CONCESSION 2 NORTH SIDE OF MAYFIELD ROAD, BETWEEN MCLAUGHLIN ROAD AND CHINGUACOUSY ROAD

**TOWN OF CALEDON** 

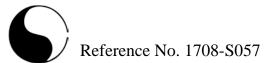
**REFERENCE NO. 1708-S057** 

**APRIL 2018** 

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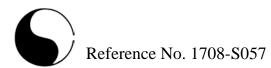


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#### 1.0 INTRODUCTION

In accordance with written authorization dated August 9, 2017, from Mr. Jonathan Hunt of Cedar City Developments on behalf of Mayfield McLaughlin Developments Inc., a geotechnical investigation was carried out at a parcel of land located on the north side of Mayfield Road, between McLaughlin Road and Chinguacousy Road, in the City of Brampton, for a proposed Residential Development.

The purpose of the investigation was to reveal the subsurface conditions and determine the engineering properties of the disclosed soils for the design and construction of the proposed project.

The geotechnical findings and resulting recommendations are presented in this Report.

It should be noted that a Report on Geotechnical Investigation was previously completed by WSP Canada Inc. (WSP) for Mayfield Station Landowners Group Inc. for the proposed sanitary trunk sewer within the Mayfield West Phase 2 property (WSP Project No. 161-01403-00, dated July 11 2017). A 'Consent to Rely on Report' letter was provided by WSP, dated July 25, 2017, allowing Soil Engineers Ltd. third party reliance on the WSP report. Some of the relevant boreholes from the WSP report have been incorporated in preparation of this report.



#### 2.0 SITE AND PROJECT DESCRIPTION

The Town of Caledon is situated on Peel-Markham till plain where the drift dominates the soil stratigraphy. In places, lacustrine sand, silt, clay and drift which has been reworked by the water action of Peel Ponding (glacial lake) have modified the drift stratigraphy.

The investigated property is bounded by Mayfield Road to the south, McLaughlin Road to the east and Chinguacousy Road to the west, with additional farm fields located north of the property. At the time of the investigation, the site consisted of farm lands, of which the crops were harvested prior to the field work. The southeast portion of the property is open and partially weed-covered; storage containers were found within this portion of the property. The ground surface at the site is generally relatively flat, but on a gentle incline with the higher ground located at the north end.

It is understood that the proposed project will consist of a residential development which will include two school blocks, two parks, a commercial block and two stormwater management ponds. The development will be provided with municipal services and roadways meeting current standards.

Further investigation will be required for the commercial and school blocks once their designs are available.



#### 3.0 FIELD WORK

The field work, consisting of 56 boreholes to depths of 6.2 to 12.2 m, was performed during the period from November 23 to December 8, 2017, at the locations shown on the Borehole and Test Pit Location Plan, Drawing No. 1. Initially, 58 boreholes were to be conducted at the site; however, upon review of the existing Borehole Logs and Borehole Location Plan prepared for WSP's investigation, and upon observation of the existing WSP wells at the site, Boreholes 3 and 18 were cancelled as WSP boreholes and wells at BH 16-5, BH 16-6 and BH 16-8 are able to be utilized for the current investigation at these locations. Furthermore, 50 test pits were conducted on December 5 and 6, 2017, to verify the thickness of the topsoil.

The holes were advanced at intervals to the sampling depths by a track-mounted, continuous-flight power-auger machine equipped for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed "List of Abbreviations and Terms", were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or 'N' values) of the subsoil. The relative density of the granular strata and the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing.

A 50-mm diameter groundwater monitoring well was installed at each of the 15 selected borehole locations, with a shallower nested well installed at 1 of the 15 locations. The wells were installed in order to facilitate a hydrogeological assessment at the site. The well details are provided in the respective Borehole Logs.

The field work was supervised and the findings were recorded by a Geotechnical Technician.



The elevation at each of the borehole locations was interpreted from the spot elevations and contours shown on the provided topographic plan.



#### 4.0 SUBSURFACE CONDITIONS

Detailed descriptions of the encountered subsurface conditions at the boreholes are presented on the Borehole Logs, comprising Figures 1 to 58, inclusive. The revealed stratigraphy is plotted on the Subsurface Profile, Drawing Nos. 2 to 7, inclusive, and the engineering properties of the disclosed soils are discussed herein. In addition, some of the boreholes from the WSP investigation were conducted within the boundaries of the current investigation, of which the borehole information of select boreholes has been incorporated into this report; the Borehole Logs of the select boreholes and Borehole Location Plan are included in the Appendix.

The current investigation has disclosed that beneath a veneer of topsoil at all except one location, the site is primarily underlain by a stratum of silty clay till, with strata of silty clay, silty sand till, sandy silt till, silty fine sand, sandy silt, silt and/or gravelly sand encountered at various locations and depths. The soils bed onto shale bedrock at moderate depths in the south and east portions of the site.

#### 4.1 **<u>Topsoil</u>** (All Boreholes, except Borehole 49)

The revealed topsoil layer at the site is approximately 8 to 30 cm thick. In addition, 50 test pits were conducted at the site on December 5 and 6, 2017, to determine the topsoil thickness at various locations. The locations of the test pits are shown on Drawing No. 1, and the topsoil thickness at each test pit location has been summarized in Table 1.

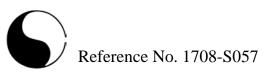


Table 1	- Topsoil	Thickness
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Test Pit No.	Topsoil Thickness (cm)	Test Pit No.	Topsoil Thickness (cm)
1	28	26	30
2	25	27	33
3	30	28	20
4	33	29	28
5	23	30	20
6	30	31	20
7	23	32	28
8	38	33	20
9	30	34	28
10	30	35	20
11	33	36	28
12	28	37	25
13	30	38	15
14	28	39	25
15	28	40	28
16	25	41	20
17	23	42	20
18	33	43	20
19	23	44	18
20	25	45	23
21	25	46	18
22	28	47	20
23	28	48	15
24	38	49	18
25	25	50	20



The topsoil is dark brown in colour, indicating that it contains appreciable amounts of roots and humus. These materials are compressible under loads; therefore, the topsoil is considered to be void of engineering value. Due to its humus content, the topsoil will generate an offensive odour and may produce volatile gases under anaerobic conditions. Therefore, the topsoil must not be buried below any structures or deeper than 1.2 m below the exterior finished grade so it will not have an adverse impact on the environmental well-being of the developed area.

Topsoil thicker than that found in the boreholes and at the test pit locations may occur in places. In order to prevent overstripping, diligent control of the stripping operation will be required.

Since the topsoil is void of engineering value, it can only be used for general landscape contouring purposes. Its suitability for planting and sodding purposes can be further assessed by fertility testing.

# 4.2 <u>Silty Clay Till</u> (All Boreholes, except Borehole 27) and <u>Silty Clay</u> (Boreholes 2, 13, 24, 27 and 33)

The silty clay till was the dominant soil encountered at the site, and was generally found from just beneath the surficial topsoil and at various depths through the site. The silty clay till consists of a random mixture of soils; the particle sizes range from clay to gravel, with the clay fraction exerting the dominant influence on its soil properties. The till is embedded with occasional wet sand and silt seams and layers, cobbles and boulders. The structure of the till is heterogeneous, indicating that it is a glacial deposit. The silty clay was generally found in the mid to lower zone of the revealed soil stratigraphy, generally beneath the silty clay till, but was also encountered beneath the topsoil at one location. The silty clay contains a trace to



some sand, with occasional gravel in places. The laminated structure shows that the silty clay is a lacustrine deposit.

The clay till and clay within the top  $0.5\pm$  to  $1.5\pm$  m below the prevailing ground surface, in places, has been permeated with fissures showing they have been fractured by the weathering process.

The obtained 'N' values for the silty clay till range from 4 blows per 30 cm of penetration to 50 per 5 cm, with a median of 21 per 30 cm, showing the consistency of the till is soft to hard, being generally very stiff. The obtained 'N' values for the silty clay range from 7 to 20, with a median of 14 per 30 cm, showing the consistency of the clay is firm to very stiff, being generally stiff. The soft to firm soils are generally encountered in the weathered zone.

The Atterberg Limits of 1 representative silty clay till sample and the water content of all of the silty clay till and silty clay samples were determined. The results are plotted on the Borehole Logs and summarized below:

	Silty Clay Till	Silty Clay
Liquid Limit	35%	-
Plastic Limit	19%	-
Natural Water Content	7% to 28%	17% to 27%
	(median 14%)	(median 20%)

Sample examinations and the above results show that the clay till and clay are cohesive materials with low to medium plasticity. The natural water content of the silty clay till ranges from below its plastic limits to between its plastic and liquid limits, being generally below it plastic limit, confirming the generally very stiff consistency of the clay till as disclosed by the 'N' values.



In addition, thin layers of silty fine sand, sandy silt, silt or silty sand till were encountered within the clay samples in places. The natural water content of these sand and silt samples ranged from 9% to 17%, indicating they are in a moist to wet condition.

A grain size analysis was performed on 1 representative sample of the silty clay till; the result is plotted on Figure 59.

Based on the above findings, the deduced engineering properties pertaining to the project are given below:

- High frost susceptibility and low water erodibility.
- The silty clay till has low soil-adfreezing potential, while the silty clay has high soil-adfreezing potential.
- Low permeability, with an estimated coefficient of permeability of  $10^{-7}$  cm/sec, and runoff coefficients of:

Slope	
0% - 2%	0.15
2% - 6%	0.20
6% +	0.28

- Cohesive soils, their shear strength is derived from consistency and augmented by internal friction of the silt. Their shear strength is moisture dependent and, to a lesser degree, directly dependent on the soil density.
- They will generally be stable in a relatively steep cut. However, prolonged exposure will allow infiltrating precipitation to saturate the weathered zone and the sand and silt seams and layers; this may lead to localized sloughing.
- Very poor pavement-supportive materials, with an estimated California Bearing Ratio (CBR) value of 3% or less.



- 6
- Moderately high corrosivity to buried metal, with an estimated electrical resistivity of 2500 to 3000 ohm·cm.
- 4.3 <u>Silty Sand Till</u> (Boreholes 1, 2, 4, 10, 12, 17, 24, 25, 27, 30, 31, 33, 34D, 42, 43, 46, 47, 49, 52 and 57) and <u>Sandy Silt Till</u> (Boreholes 4, 5, 8, 16, 26, 27, 30, 32, 33, 36, 37, 39, 40, 50, 53 and 54)

The silty sand till and/or sandy silt till were encountered at varying depths throughout the site. The tills consist of a random mixture of soils; the particle sizes range from clay to gravel, with either the sand or silt fraction exerting the dominant influence on their soil properties. The tills are heterogeneous and amorphous, in places, with occasional wet sand and silt seams and layers, cobbles and boulders, showing they are glacial deposits.

The tills within the top  $0.8\pm$  to  $1.5\pm$  m below the prevailing ground surface, in places, have been permeated with fissures showing they have been fractured by the weathering process.

The obtained 'N' values for the silty sand till range from 7 per 30 cm to 50 per 5 cm, with a median of 25 per 30 cm, indicating that its relative density is loose to very dense, being generally compact. The obtained 'N' values for sandy silt till range from 7 per 30 cm to 50 per 8 cm, with a median of 54 per 30 cm, indicating that its relative density is very loose to very dense, being generally very dense. The loose tills were encountered in the weathered zone.

The natural water content of the samples was determined and the results are plotted on the Borehole Logs; the values for the silty sand till range from 6% to 18%, with a median of 11%, and the values for the sandy silt till range from 6% to 21%, with a



median of 8%. This indicates that the tills are in a damp to very moist, generally moist condition.

Grain size analyses were performed on 2 representative samples of the silty sand till and 5 representative samples of the sandy silt till; the results are plotted on Figures 60 and 61.

Based on the above findings, the deduced engineering properties pertaining to the project are given below:

- High frost susceptibility and moderately low water erodibility.
- Relatively low to low permeability, with an estimated coefficient of permeability of  $10^{-5}$  to  $10^{-6}$  cm/sec, and runoff coefficients of:

Slope	
0% - 2%	0.11 to 0.15
2% - 6%	0.12 to 0.20
6% +	0.23 to 0.28

Slope

- Frictional soils, their shear strength is primarily derived from internal friction and is augmented by cementation. Therefore, their strength is primarily soil density dependent.
- In steep cuts, they will be stable; however, under prolonged exposure, localized sheet collapse will occur, particularly in the weathered zone and where the wet sand and silt layers are prevalent.
- Fair pavement-supportive materials, with an estimated CBR value of 8% to 10%.
- Moderate to moderately low corrosivity to buried metal, with an estimated electrical resistivity of 4500 to 5000 ohm·cm.



#### 4.4 <u>Silty Fine Sand</u> (Boreholes 33 and 43) and <u>Sandy Silt</u> (Boreholes 16, 33 and 44)

The silty fine sand and sandy silt were generally found in the upper to mid zone of the revealed soil stratigraphy. The deposits contain traces of clay and gravel, in places. The sorted structure indicates that the silty fine sand and sandy silt are glaciolacustrine deposits. The silty fine sand at Borehole 33 has been loosened by the weathering process.

The obtained 'N' values for the silty fine sand are 6 and 32 per 30 cm, indicating that its relative density is loose to dense. The obtained 'N' values for sandy silt range from 24 to 27, with a median of 26 per 30 cm, indicating that its relative density is compact. The loose soil is restricted to the surficial weathered zone.

The natural water content of the samples was determined and the results are plotted on the Borehole Logs; the values for the silty fine sand are 14% and 16%, and the values for the sandy silt range from 11% to 19%, with a median of 17%. This indicates that the silty fine sand and sandy silt are in a very moist to wet condition.

Grain size analyses were performed on 1 representative sample of the silty fine sand and 2 representative samples of the sandy silt; the results are plotted on Figure 62.

Based on the above findings, the deduced engineering properties pertaining to the project are given below:

- High frost susceptibility and high soil-adfreezing potential.
- High water erodibility; they are susceptible to migration through small openings under low to moderate seepage pressure.
- Soils of high capillarity and water retention capacity.

Clana

• Pervious to relatively pervious, with an estimated coefficient of permeability of  $10^{-3}$  to  $10^{-4}$  cm/sec, and runoff coefficients of:

Slope	
0% - 2%	0.04 to 0.07
2% - 6%	0.09 to 0.12
6% +	0.13 to 0.18

- Frictional soils, their shear strength is primarily derived from internal friction and is soil density dependent. Due to their dilatancy, the strength of the wet sand and silt is susceptible to impact disturbance; i.e., the disturbance will induce a build-up of pore pressure within the soil mantle, resulting in soil dilation and a reduction of shear strength.
- In excavation, the wet sand and silt will slough in steep cuts, run slowly with water seepage, and boil under a piezometric head of 0.4 m.
- Poor pavement-supportive materials, with an estimated CBR value of 5%.
- Moderately low corrosivity to buried metal, with an estimated electrical resistivity of 5000 to 6000 ohm·cm.

4.5 <u>Silt</u> (Boreholes 4, 14, 19, 27, 28, 36, 38, 41, 44 and 45)

The silt was generally encountered in the mid to lower zone of the revealed soil stratigraphy, but found below the surficial topsoil at Borehole 27; the silt at Borehole 27 has been loosened by the weathering process. The silt contains traces to some clay and sand. The sorted structure indicates that it is a glaciolacustrine deposit.

The obtained 'N' values range from 7 per 30 cm to 50 per 5 cm, with a median of 22 per 30 cm, indicating that the relative density of the silt is loose to very dense, being generally compact.



The natural water content of the samples was determined and the results are plotted on the Borehole Logs; the values range from 12% to 23%, with a median of 17%, indicating that the silt is in a very moist to wet, generally wet condition. The wet silt samples displayed dilatancy when shaken by hand.

A grain size analysis was performed on 1 representative sample of the silt; the result is plotted on Figure 63.

Based on the above findings, the deduced engineering properties pertaining to the project are given below:

- High frost susceptibility and high soil-adfreezing potential.
- High water erodibility; it is susceptible to migration through small openings under seepage pressure.
- A soil of high capillarity and water retention capacity.
- Relatively low permeability, with an estimated coefficient of permeability of  $10^{-5}$  cm/sec, and runoff coefficients of:

Slope	
0% - 2%	0.11
2% - 6%	0.16
6% +	0.23

- A frictional soil, its shear strength is derived from internal friction; therefore, its shear strength is density dependent. Due to its dilatancy, the strength of the wet silt is susceptible to impact disturbance; i.e., the disturbance will induce a build-up of pore pressure within the soil mantle, resulting in soil dilation and a reduction of shear strength.
- In excavation, the silt will slough and run slowly with seepage bleeding from the cut face. It will boil under a piezometric head of 0.4 m.



- A poor pavement-supportive material, with an estimated CBR value of 5%.
- Moderate corrosivity to buried metal, with an estimated electrical resistivity of 4500 ohm·cm.

#### 4.6 Gravelly Sand (Borehole 26)

A thin layer of gravelly sand was encountered between the silty clay till and sandy silt till at Borehole 26 within the lower zone of the revealed soil stratigraphy. The gravelly sand particles are subangular in shape. The sorted structure shows that the sand is a glaciolacustrine deposit.

The natural water content of the sample was determined and the result is plotted on the Borehole Log; the value is 9%, indicating that the gravelly sand is in a very moist condition.

Based on the above findings, the deduced engineering properties pertaining to the project are given below:

- Low frost susceptibility and high water erodibility.
- Susceptible to migration through small openings under seepage pressure.
- Pervious, with an estimated coefficient of permeability of 10<sup>-2</sup> cm/sec, and runoff coefficients of:

Slope	
0% - 2%	0.04
2% - 6%	0.09
6% +	0.13

• A frictional soil, its shear strength is derived from internal friction and is soil density dependent.



- In steep cuts, the sand will slough; it will run with seepage and boil under a piezometric head of 0.4 m.
- A good pavement-supportive material, with an estimated CBR value of 30%.
- Low corrosivity to buried metal, with an estimated electrical resistivity of 7000 ohm·cm.

#### 4.7 Shale Bedrock (Boreholes 25, 26, 31, 32, 38, 46, 47, 48, 49, 56, 57, 58)

Shale bedrock was encountered in the boreholes in the south and east portions of the site at depths ranging from  $3.4\pm$  to  $9.1\pm$  m below the prevailing ground surface; the shallower bedrock was generally encountered with the southeast portion of the site.

The shale is red in colour, indicating that it is of Queenston Formation. It is thinly to thickly bedded and consists predominantly of mudstone with occasional hard limestone and dolomite bands. The shale is susceptible to disintegration and swelling upon exposure to air and water, with subsequent reversion to a clay soil, but the laminated limy and sandy layers would remain as rock slabs.

The bedrock within the investigated depth can be penetrated by power-augering with some difficulty in grinding through the hard layers found at lower depths. The water content values of the samples obtained from the sampler range from 3% to 31%, with a median of 9%. The high water content of 31% occurred in a slurry sample of the shale bedrock. The obtained 'N' values from the shale bedrock range from 60 per 30 cm to 50 per 3 cm, with a median of 50 per 8 cm. The upper layer of the shale within depths ranging from  $1.0\pm$  to  $3.0\pm$  m from the surface of the bedrock is generally in a weathered condition, becoming sound with depth.



The shale has low permeability, and occasional pockets of groundwater may be trapped in its fissures. This water is often under moderate subterranean artesian pressure. Upon release through excavation, the water is likely to drain readily with a limited yield.

The weathered rock can be excavated with considerable effort by a heavy-duty backhoe equipped with a rock-ripper; however, excavation will become progressively more difficult with depth into the sound shale. Efficient removal of the sound shale may require the aid of pneumatic hammering and/or rock blasting.

The excavated spoil may contain large amounts of hard limy and sandy rock slabs, rendering it virtually impossible to obtain uniform compaction. Therefore, unless the spoil is sorted, it is considered unsuitable for engineering applications. Limy shale fragments larger than 15 cm should be pulverized by mechanical means.

In sound shale excavation, slight lateral displacement of the excavation walls is often experienced. This is due to the release of residual stress stored in the bedrock mantle and the swelling characteristics of the rock.

4.8 <u>Soils from WSP's Report on Geotechnical Investigation</u> (Boreholes 16-1, 16-2, 16-3, 16-4, 16-5, 16-6, 16-8, 16-24, 16-25, 16-26 and 16-36)

The subsurface soils from the noted boreholes were utilized in this report preparation as they were conducted within the areas of the current investigation, as well as boreholes that were utilized to replace proposed Boreholes 3 and 18 of the current investigation.



The subsurface soil information from WSP's borehole investigation shows that beneath a layer of fill, consisting of silty clay extending to a depth of  $1.1\pm$  to  $1.8\pm$  m below the prevailing ground surface, the site is underlain primarily by stiff to hard silty clay till, with layers of firm to very stiff silty clay, very stiff to hard clayey silt till, compact to very dense silty sand till, dense to very dense sandy silt till, very stiff to hard clayey silt and compact to very dense silt. In addition, the till at Boreholes 16-5 and 16-36 has been described with the term 'shale complex' with the understanding that broken bedrock/shale fragments were encountered within the till. Furthermore, shale bedrock of Queenston Formation was encountered at Borehole 16-36.

The fill encountered at the boreholes is likely similar to the weathered soils encountered during the current investigation.

#### 4.9 Soil Compatibility with Concrete

In order to assess the potential for concrete attack by the occurring soils, ten (10) soil samples were selected for testing to determine pH values and suphalte concentration. The results are summarized in Table 2.

Borehole/Sample No.	Depth (m)	Soil Description	pH Value	Sulphates (ppm)
6/6	4.8	Silty Clay Till	7.8	20
11/6	4.8	Silty Clay Till	7.9	20
16/5	3.3	Sandy Silt	7.9	20
22/5	3.3	Silty Clay Till	7.8	20
28/4	2.5	Silt	7.9	20

**Table 2** - pH and Sulphates



Borehole/Sample No.	Depth (m)	Soil Description	pH Value	Sulphates (ppm)
35/6	4.8	Silty Clay Till	8.0	20
43/5	3.3	Silty Fine Sand	8.1	20
47/6	4.8	Silty Sand Till	7.9	150
53/8	7.9	Sandy Silt Till	8.1	150
56/6	4.8	Silty Clay Till	7.8	20

**Table 2** - pH and Sulphates (cont'd)

The above results reveal that the tested samples have neutral pH values and a sulphate concentration of 20 ppm and 150 ppm, which is less than 0.1% for a water-soluble sulphate in soil samples. Thus, it is inferred that the soils have a negligible potential of sulphate attack on a normal concrete type (Type GU cement).

#### 4.10 Compaction Characteristics of the Revealed Soils

The obtainable degree of compaction is primarily dependent on the soil moisture and, to a lesser extent, on the type of compactor used and the effort applied. As a general guide, the typical water content values of the revealed soils from the current investigation for Standard Proctor compaction are presented in Table 3.

	Determined Natural	Water Content (%) for Standard Proctor Compaction	
Soil Type	Water Content (%)	100% (optimum)	Range for 95% or +
Silty Clay Till	7 to 28 (median 14)	14 to 18	10 to 23
Silty Clay	17 to 27 (median 20)	16 to 19	12 to 24

 Table 3 - Estimated Water Content for Compaction



	Determined Natural	Water Content (%) for Standard Proctor Compaction		
Soil Type	Water Content (%)	100% (optimum)	Range for 95% or +	
Silty Sand Till	6 to 18 (median 11)	10 to 11	6 to 16	
Sandy Silt Till	6 to 21 (median 8)	12	8 to 16	
Silty Fine Sand	14 and 16	11	6 to 16	
Sandy Silt	11 to 19 (median 17)	12	8 to 16	
Silt	12 to 23 (median 17)	13	8 to 17	
Gravelly Sand	9	8	4 to 13	
Broken Shale	3 to 31 (median 9)	16	12 to 21	

**Table 3** - Estimated Water Content for Compaction (cont'd)

The above values show that the majority of the in situ soils are suitable for a 95% or + Standard Proctor compaction. However, portions of the in situ soils, except the gravelly sand, are too wet and will require aeration or mixing with drier soils prior to structural compaction. Aeration of these materials can be achieved by spreading them thinly on the ground in the dry, warm weather. Furthermore, a portion of the silty clay till and the majority of the excavated shale are too dry and will require the addition of water prior to structural compaction.

The tills and clay should be compacted using a heavy-weight, kneading-type roller. The sands and silts can be compacted by a smooth roller with or without vibration, depending on the moisture content of the soils being compacted. The lifts for compaction should be limited to 20 cm, or to a suitable thickness as assessed by test strips performed by the equipment which will be used at the time of construction.



When compacting the very stiff to hard silty clay till and silty clay, and the cemented, dense to very dense silty sand till and sandy silt till on the dry side of the optimum, the compactive energy will frequently bridge over the chunks in the soils and be transmitted laterally into the soil mantle. Therefore, the lifts must be limited to 20 cm or less (before compaction). It is difficult to monitor the lifts of backfill placed in deep trenches; therefore, it is preferable that the compaction of backfill at depths over 1.0 m below the subgrade be carried out on the wet side of the optimum. This would allow a wider latitude of lift thickness.

One should be aware that with considerable effort, a  $90\% \pm$  Standard Proctor compaction of the wet sands and silts is achievable. Further densification is prevented by the pore pressure induced by the compactive effort; however, large random voids will have been expelled and, with time, the pore pressure will dissipate and the percentage of compaction will increase. There are many cases on record where after a few months of rest, the density of the compacted mantle had increased to over 95% of its maximum Standard Proctor dry density.

If the compaction of the soils is carried out with the water content within the range for 95% Standard Proctor dry density but on the wet side of the optimum, the surface of the compacted soil mantle will roll under the dynamic compactive load. This is unsuitable for road construction since each component of the pavement structure is to be placed under dynamic conditions which will induce the rolling action of the subgrade surface and cause structural failure of the new pavement. The slab-on-grade, foundations or bedding of the underground services will be placed on a subgrade which will not be subjected to impact loads. Therefore, the structurally compacted soil mantle with the water content on the wet side or dry side of the optimum will provide adequate subgrade strength for the project construction.



The presence of boulders and large shale fragments will prevent transmission of the compactive energy into the underlying material to be compacted. If an appreciable amount of boulders and shale fragments over 15 cm in size is mixed with the material, it must either be sorted or must not be used for structural backfill and/or construction of engineered fill.

As noted, the shale is susceptible to disintegration and will revert to a clay soil. The shale spoil which has been exposed to weathering may be selected for use as structural fill. To achieve this, the shale must be excavated by a rock-ripper to break up the limy shale and sandstone slabs and piled thinly on the ground for optimum exposure to weathering. If shale spoil is to be used immediately for structural fill, it should be pulverized to sizes of 15 cm or less and must be compacted with lifts of 15 cm or less and consistently wetted. It should be compacted to achieve at least 95% of its maximum Standard Proctor dry density. The structurally compacted shale debris fill must be left for a period of at least 1 winter to allow the shale to swell prior to the construction of the foundations. In order to reduce the time required for the shale to swell, the shale to be reused must be pulverized and mixed with the silty clay under the supervision of a geotechnical firm.

It should be noted that if the shale spoil is to be left on the ground surface for a period of 1 or 2 winters for weathering, its swelling characteristic will result in a significant increase in soil volume, even in a compacted state. This phenomenon must be considered in the cut and fill calculations.



#### 5.0 GROUNDWATER CONDITIONS

The boreholes were checked for the presence of groundwater and the occurrence of cave-in upon their completion. The data are plotted on the Borehole Logs and summarized in Table 4.

		Soil Colour Changes Brown	/leasured Gro Cave-in*			
BH	Borehole	to Grey/ Reddish- Grey/Red	On Cor	npletion	In We February	
No.	Depth (m)	Depth (m)	Depth (m)	<b>El.</b> (m)	Depth (m)	<b>El.</b> (m)
1	6.6	4.6	Dry	-	N/A	-
2	6.6	4.6	Dry	-	N/A	-
3			CANCELL	ED		
4	9.4	3.0	4.6/4.6*	255.0/255.0*	N/A	-
5	6.6	3.0	Dry	-	3.9	256.7
6	6.6	3.3	Dry	-	N/A	-
7	6.6	4.6	Dry	-	N/A	-
8	6.6	3.0	Dry	-	N/A	-
9	6.6	3.0	Dry	-	N/A	-
10	6.6	2.4	Dry	-	2.9	255.2
11	6.6	3.0	Dry	-	N/A	-
12	6.6	4.6	Dry	-	2.5	255.5
13	6.6	3.0	Dry	-	N/A	-
14	6.6	3.0	Dry	-	N/A	-
15	6.6	3.1	Dry	-	N/A	-
16	6.6	4.6	5.2*	252.4*	3.8	253.8

#### Table 4 - Groundwater/Cave-in Levels



		Soil Colour Changes Brown	es Brown Cave-in* ]				
BH	Borehole	to Grey/ Reddish- Grey/Red	On Con	npletion	In We February		
No.	Depth (m)	Depth (m)	Depth (m)	<b>El.</b> (m)	Depth (m)	<b>El.</b> (m)	
17	6.6	2.5	5.8*	250.7*	N/A	-	
18			CANCELL	ED			
19	6.6	3.0	Dry	-	N/A	-	
20	6.6	3.3	5.8	252.1	N/A	-	
21	6.6	3.3	5.9	250.9	3.1	253.7	
22	6.6	3.0	5.8	251.1	N/A	-	
23	6.6	2.7	Dry	-	N/A	-	
24	6.6	3.0	Dry	-	N/A	-	
25	9.2	2.5	Dry	-	N/A	-	
26	9.3	2.5	9.0	246.8	2.1	253.7	
27	9.3	4.6	Dry	-	N/A	-	
28	6.6	2.4	Dry	-	N/A	-	
29	6.6	3.3	Dry	-	N/A	-	
30	6.6	3.4	Dry	-	N/A	-	
31	12.2	3.2	Dry	-	4.4	251.4	
32	7.8	3.0	Dry	-	N/A	-	
33	8.1	3.4	7.3	248.6	N/A	-	
34D	6.2	4.6	Dry	-	0.8	258.7	
34S		Nested Well to	4.0 m depth		0.8	258.7	
35	6.4	3.2	Dry	-	2.9	257.6	
36	6.2	3.0	Dry	-	N/A	-	
37	6.2	3.2	Dry	-	N/A	_	

# Table 4 - Groundwater/Cave-in Levels (cont'd 1)



		Soil Colour Changes Brown	Ν	/leasured Gro Cave-in*		
BH	Borehole	to Grey/ Reddish- Grey/Red	On Cor	npletion	In We February	
No.	Depth (m)	Depth (m)	Depth (m)	<b>El.</b> (m)	Depth (m)	<b>El.</b> (m)
38	7.7	3.2	7.3	252.7	1.4	258.6
39	6.6	3.0	Dry	-	N/A	-
40	6.4	3.3	Dry	-	N/A	-
41	6.6	4.6	Dry	-	N/A	-
42	6.4	4.6	Dry	-	N/A	-
43	6.4	4.6	3.0/3.4*	256.0/255.6*	N/A	-
44	6.6	3.3	Dry	-	0.8	257.6
45	6.6	4.6	Dry	-	N/A	-
46	6.3	3.0	Dry	-	1.6	256.8
47	6.2	3.0	5.8	253.0	N/A	-
48	9.1	3.0	8.8	250.1	2.5	256.4
49	6.1	3.4	5.8	252.9	N/A	-
50	6.2	4.6	Dry	-	N/A	-
51	6.6	4.6	Dry	-	N/A	-
52	6.2	4.6	Dry	-	N/A	-
53	8.1	4.6	Dry	-	N/A	-
54	8.1	4.6	Dry	-	1.5	256.2
55	6.4	4.6	Dry	-	N/A	-
56	9.1	3.0	5.2	251.5	N/A	-
57	9.1	3.4	4.3	253.1	N/A	-
58	9.1	3.2	3.7	253.3	0.9	256.1

 Table 4 - Groundwater/Cave-in Levels (cont'd 2)

\* Cave-in level (In wet sand and silt layers, the level generally represents the groundwater at the time of investigation.)



As shown above, groundwater was encountered at depths ranging from  $3.0\pm$  to  $9.0\pm$  m below the prevailing ground surface in 14 out of 58 boreholes. In addition, 4 out of 58 boreholes caved at depths of  $3.4\pm$  to  $5.8\pm$  m below the prevailing ground surface. Most of the boreholes remained dry upon their completion. The groundwater level will fluctuate with the seasons.

In addition, 50-mm diameter groundwater monitoring wells were installed at 15 boreholes, with a shallower nested well at one location, to facilitate a hydrogeological assessment. The stabilized water levels were measured in the wells on February 1, 2018, and have been presented in Table 4. The measured water levels in the wells were at depths ranging from  $0.8\pm$  to  $4.4\pm$  m below the prevailing ground surface.

The soil colour changes from brown to grey, reddish-grey or red at depths of  $2.4\pm$  to  $4.6\pm$  m below the prevailing ground surface. The brown colour indicates that the soils have oxidized.

The groundwater yield, if any, from the silty clay till and silty clay is expected to be small and limited in quantity, due to the low permeability of the soils, and the yield from the silty sand till and sandy silt till may be slight to some, while the yield from the sands and silts will be moderate to appreciable, and likely persistent, depending on their extent and continuity. Groundwater under subterranean artesian pressure may occur in places within the shale bedrock, which is generally considered to be a poor aquifer. Therefore, the yield of groundwater from the bedrock, if encountered, will be appreciable initially; however, if allowed to drain freely, it will often dissipate or be depleted with time.



#### 6.0 DISCUSSION AND RECOMMENDATIONS

The investigation has disclosed that beneath a veneer of topsoil at all except one location, the site is primarily underlain by a stratum of soft to hard, generally very stiff silty clay till, with strata of firm to very stiff, generally stiff silty clay; loose to very dense, generally compact silty sand till; loose to very dense, generally very dense sandy silt till; loose to dense silty fine sand; compact sandy silt; loose to very dense, generally compact silt; and/or gravelly sand encountered at various locations and depths. The soils within a depth of  $0.8\pm$  to  $1.5\pm$  m below the prevailing ground surface have been weathered. The soils bed onto shale bedrock at moderate depths in the south and east portions of the site at depths ranging from  $3.4\pm$  to  $9.1\pm$  m below the prevailing ground surface; the upper layer of the shale bedrock within a depth of  $1.0\pm$  to  $3.0\pm$  m from the surface of the bedrock is generally in a weathered condition.

Groundwater levels were measured in 14 of the 58 boreholes at depths of 3.0 to 9.0 m below the prevailing ground surface on completion of the boreholes and 4 of the 58 boreholes caved at depths of  $3.4\pm$  to  $5.8\pm$  m below the prevailing ground surface; the rest of the boreholes remained dry upon their completion. The stabilized groundwater level was measured on February 1, 2018 at depths of  $0.8\pm$  to  $4.4\pm$  m in the groundwater monitoring wells installed at 15 borehole locations during the current investigation. The groundwater level will fluctuate with the seasons.

The groundwater yield, if any, from the silty clay till and silty clay is expected to be small and limited in quantity, and the yield from the silty sand till and sandy silt till may be slight to some, while the yield from the sands and silts will be moderate to appreciable, and likely persistent, depending on their extent and continuity. In the shale bedrock, the yield may be appreciable initially in localized places due to

possible occurrence of groundwater pockets under subterranean artesian pressure; however, if allowed to drain freely, it will often dissipate or be depleted with time.

The geotechnical findings which warrant special consideration are presented below:

- The topsoil is unsuitable for engineering applications and must be removed. For the environmental as well as the geotechnical well-being of the future development, it should not be buried below any structures or deeper than 1.2 m below the exterior finished grade. Fertility testing can be carried out to assess the suitability of the topsoil as landscaping material.
- 2. The badly weathered soils are not suitable to support any structural loads. The weathered soils must be subexcavated, sorted free of any topsoil inclusions or deleterious material and aerated before being used as structural backfill or for the construction of engineered fill at the site.
- 3. The sound natural soils below the topsoil and weathered soil are suitable for normal spread and strip footing construction. The footing subgrade must be inspected by a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer, to ensure that its condition is compatible with the design of the foundation.
- 4. Extended footings and/or cut and fill may be required for the site grading. It is generally more economical to place engineered fill for normal footing, sewer and road construction.
- 5. Some of the in situ soils have high soil-adfreezing potential. Special measures must be implemented in the project construction to minimize the risk of damage to the foundations caused by frost action.
- For slab-on-grade construction, the slab should be constructed on a granular base, 20 cm thick, consisting of 20-mm Crusher-Run Limestone, or equivalent, compacted to its maximum Standard Proctor dry density.



- 7. A Class 'B' bedding, consisting of compacted 20-mm Crusher-Run Limestone, is recommended for the construction of the underground services. Where water-bearing sands or silts are present, the pipe joints should be leak-proof, or wrapped with an appropriate waterproof membrane. Where extensive dewatering is required, a Class 'A' bedding should be considered.
- 8. Where underground services or building foundations are to be placed into the shale bedrock, the trench sides should be slightly sloped rather than vertical due to the residual stress relief and the swelling characteristics of the shale. The side slopes should be lined with a cushioning layer such as compressible Styrofoam.
- Excavation should be carried out in accordance with Ontario Regulation 213/91.
- 10. In general, open-cut excavation can be carried out in the weathered shale by using a backhoe equipped with a rock-ripper; however, where deep excavation is required, pneumatic hammering with chisel points and/or rock blasting may be necessary for efficient rock removal.

The recommendations appropriate for the project described in Section 2.0 are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should subsurface variances become apparent during construction, a geotechnical engineer must be consulted to determine whether the following recommendations require revision.

#### 6.1 Foundations

For the proposed development, it is recommended that the normal spread and strip footings be placed below the topsoil and weathered soil onto the sound natural soils, engineered fill and/or shale bedrock. As a general guide, the recommended soil

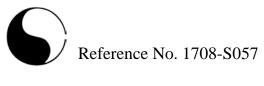


pressures for use in the design, together with the corresponding suitable founding levels, are presented in Table 5.

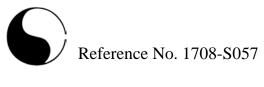
	Recommended Maximum Allowable Soil Pressure (SLS)/ Factored Ultimate Soil Bearing Pressure (ULS) and Suitable Founding Level		
Borehole	150 kPa (SLS) 250 kPa (ULS)		
No.	Depth (m)	Elevation (m)	
1	1.0 or +	259.4 or -	
2	1.0 or +	258.5 or -	
4	1.0 or + <sup>A</sup>	258.6 or -	
5	1.0 or +	259.6 or -	
6	1.0 or +	258.3 or -	
7	1.0 or +	258.3 or -	
8	1.0 or +	257.4 or -	
9	1.0 or +	256.9 or -	
10	1.5 or +	256.6 or -	
11	1.8 or +	256.9 or -	
12	0.8 or +	257.2 or -	
13	1.0 or +	257.5 or -	
14	1.0 or +	256.0 or -	
15	0.6 or +	257.2 or -	
16	1.0 or +	256.6 or -	
17	1.0 or +	255.5 or -	
19	1.0 or +	256.2 or -	
20	1.0 or +	256.9 or -	
21	1.0 or +	255.8 or -	

Table 5 - Founding Levels
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	Factored Ultimate So	Allowable Soil Pressure (SLS)/ bil Bearing Pressure (ULS) e Founding Level	
Borehole	150 kPa (SLS) 250 kPa (ULS)		
No.	Depth (m)	<b>Elevation</b> (m)	
22	1.0 or +	255.9 or -	
23	1.0 or +	255.7 or -	
24	1.0 or +	255.8 or -	
25	1.0 or +	255.1 or -	
26	1.8 or +	254.0 or -	
27	2.0 or +	254.6 or -	
28	1.0 or +	254.9 or -	
29	1.0 or +	255.2 or -	
30	0.6 or +	255.9 or -	
31	1.5 or +	254.3 or -	
32	1.8 or +	253.8 or -	
33	1.8 or +	254.1 or -	
34D	1.0 or +	258.5 or -	
35	1.0 or +	259.5 or -	
36	1.0 or +	257.8 or -	
37	1.0 or +	259.0 or -	
38	1.5 or +	258.5 or -	
39	1.0 or +	259.2 or -	
40	1.0 or +	257.9 or -	
41	1.0 or +	258.0 or -	
42	1.0 or +	258.1 or -	



	Recommended Maximum Allowable Soil Pressure (SLS)/ Factored Ultimate Soil Bearing Pressure (ULS) and Suitable Founding Level 150 kPa (SLS) 250 kPa (ULS)	
Borehole		
No.	Depth (m)	Elevation (m)
43	1.0 or +	258.0 or -
44	1.2 or +	257.2 or -
45	1.0 or +	257.5 or -
46	1.5 or +	256.9 or -
47	1.0 or +	257.8 or -
48	1.0 or +	257.9 or -
49	1.0 or +	257.7 or -
50	1.0 or +	256.7 or -
51	1.0 or +	257.2 or -
52	1.2 or +	256.6 or -
53	1.0 or +	256.7 or -
54	1.0 or +	256.7 or -
55	1.0 or +	256.5 or -
56	1.8 or +	254.9 or -
57	1.5 or +	255.9 or -
58	1.0 or +	256.0 or -
16-1	$1.3 \text{ or } +^{\text{B}}$	258.0 or -
16-2	1.8 or +	254.6 or -
16-3	1.2 or +	254.7 or -
16-4	1.2 or +	254.9 or -
16-5	1.8 or +	254.6 or -



	Recommended Maximum Allowable Soil Pressure (SLS)/ Factored Ultimate Soil Bearing Pressure (ULS) and Suitable Founding Level 150 kPa (SLS) 250 kPa (ULS)	
Borehole		
No.	Depth (m)	Elevation (m)
16-6	1.3 or $+^{\rm C}$	256.2 or -
16-8	1.9 or $+^{\rm C}$	257.4 or -
16-24	1.8 or +	256.1 or -
16-25	1.9 or +	256.4 or -
16-26	1.5 or +	257.2 or -
16-36	1.8 or +	257.4 or -

#### **Table 5** - Founding Levels (cont'd 3)

Due to the decrease in 'N' values with depth, the Maximum Allowable Soil Pressure (SLS) of 150 kPa must be reduced to:

<sup>A</sup> 75 kPa (SLS) from a depth of 3.3 to 6.1 m from the prevailing ground surface.

<sup>B</sup> 100 kPa (SLS) from a depth of 5.2 to 7.6 m from the prevailing ground surface.

<sup>c</sup> 100 kPa (SLS) from a depth of 3.7 to 6.1 m from the prevailing ground surface.

In areas where foundations are to be extended, it may be more cost effective to subexcavate to a size 30% larger than the designed footing width and fill with lean concrete up to the normal footing elevation immediately after the suitable founding soil is exposed.

The weathered soil can be subexcavated and replaced with engineered fill. Furthermore, where fill is required to raise the grade, or if extended footings and/or cut and fill is required for the site grading, engineered fill suitable for normal footing construction can be considered. A Maximum Allowable Soil Pressure (SLS) of 150 kPa and a Factored Ultimate Soil Bearing Pressure (ULS) of 250 kPa is recommended for footings founded on engineered fill. The fill must be certified by the geotechnical consultant that supervised and inspected the fill placement. Details of engineered fill are provided in Section 6.2 of this report.



The recommended bearing pressures (SLS) for normal footings incorporate a safety factor of 3. The total and differential settlements of the footings are estimated to be 25 mm and 15 mm, respectively.

The foundation subgrade must be inspected by a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer, to assess its suitability for bearing the designed foundations.

Footings exposed to weathering, and in unheated areas, should have at least 1.2 m of earth cover for protection against frost action.

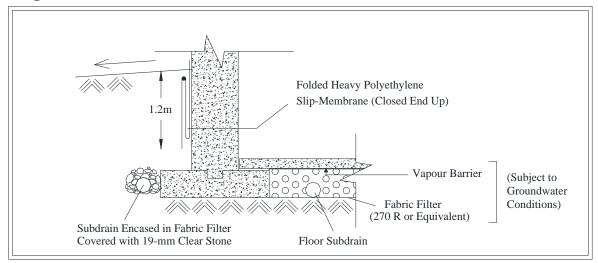
If excavation into the shale is to be carried out close to the foundation walls, the sides of excavation into sound shale should be shielded by compressible Styrofoam (or equivalent). This will provide a cushioning layer against movement of the shale that may damage the basement walls.

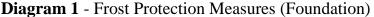
Perimeter subdrains and dampproofing of the foundation walls will be required. All the subdrains should be encased in a fabric filter to protect them against blockage by silting.

It should be noted that if groundwater seepage is encountered during the footing excavations, or where the subgrade of the normal foundations is found to be wet, the subgrade should be protected by a concrete mud-slab immediately after exposure. This will prevent construction disturbance and costly rectification.

Some of the in situ soils have high soil-adfreezing potential. Where these material are used to backfill against foundations, the foundation walls must be constructed of concrete and either backfilled with non-frost-susceptible pit-run granular, or should

be properly shielded with a polyethylene slip-membrane extending below the frost depth to alleviate the risk of frost damage. If the proposed structures have a basement and groundwater seepage is detected at the time of foundation excavation, under-floor subdrains may be installed and they must be connected to sump-wells, or to the drains which have a positive outlet. Also, a vapour barrier should be installed to prevent upfiltration of soil moisture that may wet the floor. The recommended measures are schematically presented in Diagram 1.





The necessity to implement the above measures should be assessed at the time of construction.

The foundations should meet the requirements specified in the latest Ontario Building Code, and the structure should be designed to resist an earthquake force using Site Classification 'D' (stiff soil).



#### 6.2 Engineered Fill

The weathered soil can be upgraded to or replaced with engineered fill, and where earth fill is required to raise the site or extended footings are required, it is generally more economical to place engineered fill for normal footing, underground services and pavement construction. The engineering requirements for a certifiable fill for pavement construction, municipal services, slab-on-grade, and footings designed with a Maximum Allowable Soil Pressure (SLS) of 150 kPa and a Factored Ultimate Soil Bearing Pressure (ULS) of 250 kPa are presented below:

- 1. All the existing topsoil and organics must be removed, and the subgrade must be inspected and proof-rolled prior to any fill placement. The badly weathered soil must be subexcavated, sorted free of topsoil inclusions and deleterious materials, if any, aerated and properly compacted.
- 2. Inorganic soils must be used, and they must be uniformly compacted in lifts of 20 cm thick to 98% or + of their maximum Standard Proctor dry density, up to the proposed finished grade and/or slab-on-grade subgrade. The soil moisture must be properly controlled on the wet side of the optimum. If the foundations are to be built soon after the fill placement, the densification process for the engineered fill must be increased to 100% of the maximum Standard Proctor compaction.
- 3. If imported fill is to be used, it should be inorganic soils, free of deleterious or any material with environmental issue (contamination). Any potential imported earth fill from off site must be reviewed for geotechnical and environmental quality by the appropriate personnel as authorized by the developer or agency, before it is hauled to the site.
- 4. If the engineered fill is to be left over the winter months, adequate earth cover, or equivalent, must be provided for protection against frost action.

- 5. The engineered fill must extend over the entire graded area; the engineered fill envelope and finished elevations must be clearly and accurately defined in the field, and they must be precisely documented by qualified surveyors. Foundations partially on engineered fill must be reinforced by two 15-mm steel reinforcing bars in the footings and upper section of the foundation and basement walls, or be designed by a structural engineer, to properly distribute the stress induced by the abrupt differential settlement (estimated to be 15± mm) between the natural soils and engineered fill.
- 6. The engineered fill must not be placed during the period from late November to early April, when freezing ambient temperatures occur either persistently or intermittently. This is to ensure that the fill is free of frozen soils, ice and snow.
- 7. Where the ground is wet due to subsurface water seepage, an appropriate subdrain scheme must be implemented prior to the fill placement, particularly if it is to be carried out on sloping ground or a bank.
- 8. Where fill is to be placed on a bank steeper than 1 vertical:3 horizontal, the face of the bank must flattened to 3+ so that it is suitable for safe operation of the compactor and the required compaction can be obtained.
- 9. The fill operation must be inspected on a full-time basis by a technician under the direction of a geotechnical engineer.
- 10. The footing and underground services subgrade must be inspected by the geotechnical consulting firm that inspected the engineered fill placement. This is to ensure that the foundations are placed within the engineered fill envelope, and the integrity of the fill has not been compromised by interim construction, environmental degradation and/or disturbance by the footing excavation.
- 11. Any excavation carried out in certified engineered fill must be reported to the geotechnical consultant who inspected the fill placement in order to document the locations of the excavation and/or to inspect reinstatement of the excavated



areas to engineered fill status. If construction on the engineered fill does not commence within a period of 2 years from the date of certification, the condition of the engineered fill must be assessed for re-certification.

12. Despite stringent control in the placement of the engineered fill, variations in soil type and density may occur in the engineered fill. Therefore, the strip footings and the upper section of the foundation walls constructed on the engineered fill may require continuous reinforcement with steel bars, depending on the uniformity of the soils in the engineered fill and the thickness of the engineered fill underlying the foundations. Should the footings and/or walls require reinforcement, the required number and size of reinforcing bars must be assessed by considering the uniformity as well as the thickness of the engineered fill beneath the foundations. In sewer construction, the engineered fill is considered to have the same structural proficiency as a natural inorganic soil.

If the shale spoil is intended for use as structural fill, it must be piled thinly on the ground for optimum exposure to weathering. Any remaining hard limy or sandy slabs must be pulverized to sizes less than 15 cm or must not be used for structural backfill and/or construction of engineered fill. It should be noted that if the shale spoil is to be left on the ground surface for weathering, it will swell and result in a significant increase in soil volume. This phenomenon must be considered in the cut and fill calculations.

#### 6.3 Slab-On-Grade

The subgrade for the slab-on-grade must consist of sound natural soils, shale bedrock or properly compacted inorganic fill. In preparation of the subgrade, it must be inspected and assessed by proof-rolling. The topsoil must be removed; the badly weathered soil or any soft or loose soils should be subexcavated, sorted free of any



deleterious material, aerated and uniformly compacted to 98% or + of its maximum Standard Proctor dry density. If the deleterious materials cannot be sorted, the soils should be replaced by properly compacted, organic-free earth fill.

Any new material for raising the grade should consist of organic-free soil compacted to at least 98% of its maximum Standard Proctor dry density.

If the subgrade has been loosened due to construction traffic, it must be proof-rolled before placement of the granular base.

The slab should be constructed on a granular base, 20 cm thick, consisting of 20-mm Crusher-Run Limestone, or equivalent, compacted to its maximum Standard Proctor dry density.

A Modulus of Subgrade Reaction of 25 MPa/m can be used for the design of the floor slab.

The slab-on-grade in open areas should be designed to tolerate frost heave, and the grading around the slab-on-grade and building structures must be such that it directs runoff away from the structures.

#### 6.4 Underground Services

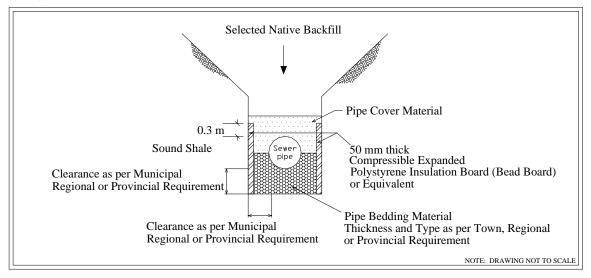
The subgrade for the underground services should consist of sound natural soils or properly compacted organic-free earth fill. Where topsoil, organic earth fill or badly weathered soil is encountered, it should be subexcavated and replaced with bedding material compacted to at least 95% or + of its Standard Proctor compaction.



A Class 'B' bedding is recommended for the underground services construction. The bedding material should consist of compacted 20-mm Crusher-Run Limestone, or equivalent. In the areas where extensive dewatering is required, a Class 'A' bedding will be required.

Where wet or water-bearing sands or silts occur, the pipe joints should be leak-proof, or the joints should be wrapped with a waterproof membrane, to prevent subgrade upfiltration through the joints.

Where underground services are to be placed in sound shale, the trench sides should be sloped rather than vertical, due to the residual stress relief and the swelling characteristics of the shale. The side slopes should be no steeper than 2 vertical: 1 horizontal. The rock face can be lined with a cushioning layer such as Styrofoam, to reduce the residual stress exerted on the buried structure, and then backfilled with sand up to 0.3 m above the crown of the pipe and flooded. The recommended scheme is illustrated in Diagram 2.



#### **Diagram 2** - Sewer Installation in Sound Shale



In order to prevent pipe floatation when the sewer trench is deluged with water, a soil cover at least equal in thickness to the diameter of the pipe should be in place at all times after completion of the pipe installation.

Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.

Since the silty clay till and silty clay have moderately high corrosivities to buried metal, all metal fittings for the underground services should be protected against soil corrosion. In determining the mode of protection, an electrical resistivity of 2500 ohm cm should be used. This, however, should be confirmed by testing the soil along the water main alignment at the time of services construction.

#### 6.5 Backfilling in Trenches and Excavated Areas

The on-site inorganic soils are generally suitable for use as trench backfill. However, the soils should be sorted free of any topsoil inclusions and other deleterious materials prior to the backfilling. The soils should be sorted free of any large pieces (over 15 cm in size) of limestone bands and shale fragments, or the large pieces must be broken into sizes suitable for structural compaction.

The excavated shale can be pulverized to sizes less than 15 cm and thoroughly mixed with the overburden soils. The trench can then be backfilled by levelling the debris using a bulldozer with lifts no more than 20 cm (loose) in thickness. Compaction should be carried out by a vibratory sheepsfoot roller, with water constantly sprayed on each lift.



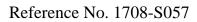
The backfill in trenches and excavated areas should be compacted to at least 95% of its maximum Standard Proctor dry density. In the zone within 1.0 m below the pavement subgrade, the materials should be compacted with the water content 2% to 3% drier than the optimum, and the compaction should be increased to at least 98% of the respective maximum Standard Proctor dry density. This is to provide the required stiffness for pavement construction. In the lower zone, the compaction should be carried out on the wet side of the optimum; this allows a wider latitude of lift thickness. Backfill below any floor slab which is sensitive to settlement must be compacted to at least 98% of its maximum Standard Proctor dry density.

In normal underground services construction practice, the problem areas of settlement largely occur adjacent to manholes, catch basins, services crossings, foundation walls and columns. The lumpy clays and broken shale are generally difficult to compact in these close quarters, and it is recommended that a sand backfill should be used. Imported sand backfill should also be used in areas which are inaccessible to a heavy compactor. Unless compaction of the backfill is carefully performed, the interface of the native soils and the sand backfill will have to be flooded for a period of several days.

The narrow trenches for services crossings should be cut at 1 vertical: 2 or + horizontal so that the backfill can be effectively compacted. Otherwise, soil arching will prevent the achievement of proper compaction. The lift of each backfill layer should either be limited to a thickness of 20 cm, or the thickness should be determined by test strips.

One must be aware of the possible consequences during trench backfilling and exercise caution as described below:

- When construction is carried out in freezing winter weather, allowance should be made for these following conditions. Despite stringent backfill monitoring, frozen soil layers may inadvertently be mixed with the structural trench backfill. Should the in situ soils have a water content on the dry side of the optimum, it would be impossible to wet the soils due to the freezing condition, rendering difficulties in obtaining uniform and proper compaction. Furthermore, the freezing condition will prevent flooding of the backfill when it is required, such as in a narrow vertical trench section, or when the trench box is removed, or when backfill consists of shale mixture. The above will invariably cause backfill settlement that may become evident within 1 to several years, depending on the depth of the trench which has been backfilled. In areas where the construction is carried out during the winter months, prolonged exposure of the trench walls will result in frost heave within the soil mantle of the walls. This may result in some settlement as the frost recedes, and repair costs will be incurred prior to final surfacing of the new pavement and the slab-on-grade construction.
- To backfill a deep trench, one must be aware that future settlement is to be expected, unless the side of the cut is flattened to at least 1 vertical:
   1.5+ horizontal, and the lifts of the fill and its moisture content are stringently controlled; i.e., lifts should be no more than 20 cm (or less if the backfilling conditions dictate) and uniformly compacted to achieve at least 95% of the maximum Standard Proctor dry density, with the moisture content on the wet side of the optimum.
- It is often difficult to achieve uniform compaction of the backfill in the lower vertical section of a trench which is an open cut or is stabilized by a trench box, particularly in the sector close to the trench walls or the sides of the box. These sectors must be backfilled with sand. In a trench stabilized by a trench box, the void left after the removal of the box will be filled by the backfill. It



is necessary to backfill this sector with sand, and the compacted backfill must be flooded for 1 day, prior to the placement of the backfill above this sector; i.e., in the upper sloped trench section. This measure is necessary in order to prevent consolidation of inadvertent voids and loose backfill which will compromise the compaction of the backfill in the upper section. In areas where groundwater movement is expected in the sand fill mantle, anti-seepage collars should be provided.

#### 6.6 Garages, Driveways, Sidewalks, Interlocking Stone Pavement and Landscaping

Due to the high frost susceptibility of some of the underlying soils, heaving of the pavement is expected to occur during the cold weather.

The driveways leading to the garages must be backfilled with non-frost susceptible granular material, with a frost taper at a slope of 1 vertical:1 horizontal.

The garage floor slab and interior garage foundation walls must be insulated with 50-mm Styrofoam, or equivalent.

Interlocking stone pavement, sidewalks and landscaping structures in areas which are sensitive to frost-induced ground movement must be constructed on a free-draining, non-frost-susceptible granular material such as Granular 'B'. The material must extend to 0.3 to 1.2 m below the sidewalk, slab or pavement surface, depending on the degree of tolerance for settlement, and be provided with positive drainage, such as weeper subdrains connected to manholes or catch basins. Alternatively, the landscaping structures, sidewalks and interlocking stone pavement should be properly insulated with 50-mm Styrofoam, or equivalent.



### 6.7 Pavement Design

The recommended pavement design is presented in Table 6.

	Thick	ness (mm)	
Course	Local Roads	<b>Collector Roads</b>	<b>OPS Specifications</b>
Asphalt Surface	40	40	HL-3
Asphalt Binder	65	90	HL-8
Granular Base	150	150	Granular 'A' or equivalent
Granular Sub-base	300	450	Granular 'B' or equivalent

 Table 6 - Pavement Design

In preparation of the subgrade, the topsoil should be removed, and the subgrade surface must be proof-rolled. The weathered soil and any soft/loose subgrade must be subexcavated, sorted free of any deleterious materials, aerated and properly compacted. If the deleterious materials cannot be sorted, the soils should be replaced by properly compacted, organic-free earth fill or granular materials. Earth fill used to raise the grade for pavement construction should consist of organic-free soil uniformly compacted to 95% or + of its maximum Standard Proctor dry density.

All the granular bases should be compacted to 100% of their maximum Standard Proctor dry density.

In the zone within 1.0 m below the road subgrade, the backfill should be compacted to at least 98% of its maximum Standard Proctor dry density, with the water content 2% to 3% drier than the optimum. In the lower zone, a 95% or + Standard Proctor compaction is considered adequate.



The road subgrade will suffer a strength regression if water is allowed to saturate the mantle. The following measures should, therefore, be incorporated into the construction procedures and pavement design:

- If the road construction does not immediately follow the trench backfilling, the subgrade should be properly crowned and smooth-rolled to allow interim precipitation to be properly drained.
- Areas adjacent to the road should be properly graded to prevent ponding of large amounts of water during the interim construction period.
- Curb subdrains will be required. The subdrains should consist of filter-sleeved weepers to prevent blockage by silting.
- If the road is to be constructed during wet seasons and extensively soft subgrade occurs, the granular sub-base should be thickened in order to compensate for the inadequate strength of the subgrade. This can be assessed during construction.

### 6.8 Stormwater Management Ponds (Boreholes 25, 26, 27, 56, 57 and 58)

The stormwater management (SWM) ponds are located in the south portion of the site, with SWM Pond 1 located in the west half of the site at the south boundary and SWM Pond 2 located at the southeast corner of the site.

#### SWM Pond 1 (Boreholes 25, 26 and 27)

According to the SWM Pond 1 detail, Drawing No. 601, dated May, 2016, prepared by Urbantech Consulting, the side slopes on the dividing berm of SWM Pond 1 range from  $2.8\pm$  to  $6.2\pm$  m in height; this includes the slopes on the dividing berm between the wet cell and forebay. The proposed elevations for the bottom of the wet



cell and the forebay are El. 250.50 m and El. 251.00 m, respectively, with the top elevation to the edge of the access road, lot lines and/or sediment drying area ranging from approximately El. 255.50 to 256.70 m. The designed permanent pool/normal water level will be at El. 253.50 m.

Based on the borehole findings, the area of the SWM Pond 1 consists of silty clay till, silty sand till and/or sandy silt till with localized layers of gravelly sand, silt or silty clay at various locations and depths. At Boreholes 25 and 26, the tills overlay shale bedrock at depths of  $9.1\pm$  m and  $8.0\pm$  m below the prevailing ground surface, respectively, or El. 247.0± m and El. 247.8± m. Groundwater was encountered at a depth of  $2.1\pm$  m below the prevailing ground surface (El. 253.7 m) in the well at Borehole 26 on February 1, 2018.

#### SWM Pond 2 (Boreholes 56, 57 and 58)

According to the SWM Pond 2 detail, Drawing No. 602, dated May, 2016, prepared by Urbantech Consulting, the side slopes of SWM Pond 2 range from  $2.3\pm$  to  $8.4\pm$  m in height; this includes the slopes on the dividing berm between the wet cell and the forebay. The proposed elevations for the bottom of the wet cell and forebay are El. 250.40 m and El. 251.40 m, respectively, with the top elevation to the edge of the roadways, trail and/or sediment drying area ranging from approximately El. 255.75 to 259.64 m. The designed permanent pool/normal water level will be at El. 253.40 m.

Based on the borehole findings, the area of SWM Pond 2 consists of silty clay till and/or silty sand till, overlying shale bedrock at depths of  $3.4\pm$  to  $4.9\pm$  m below the prevailing ground surface, or El.  $251.8\pm$  to  $253.9\pm$  m. Groundwater was encountered at a depth of  $0.9\pm$  m below the prevailing ground surface (El. 256.1 m) in the well at Borehole 58 on February 1, 2018.



The silty clay till and silty clay have an estimated coefficient of permeability of  $10^{-7}$  cm/sec with an estimated percolation time of 80+ min/cm, while the shale bedrock is considered to be relatively impermeable. As such, the seepage of groundwater into the ponds will likely be equal to or less than the amount of water lost through evaporation where these soils are encountered. The impact on the storage volume of the ponds will be minimal. The in situ silty sand till, sandy silt till and silt have an estimated coefficient of permeability of  $10^{-5}$  to  $10^{-6}$  cm/sec with an estimated percolation time of 30 to 60 min/cm, while the gravelly sand has an estimated coefficient of permeability of  $10^{-2}$  cm/sec with an estimated percolation time of 5 min/cm.

The in situ silty clay till, silty clay and shale bedrock are suitable for the pond construction. Where necessary, a clay liner, at least 1.0 m thick, compacted to at least 98% of its maximum Standard Proctor dry density, should be installed on the sides or bottom of the ponds where permeable sand or silt layers, or cracks within the shale bedrock are encountered within the pond envelope and should extend to 1.0 m (minimum) above the permanent pool level. The extent of the clay liner and its implementation can be assessed at the time of the pond construction. The in situ clay material is suitable for use as a clay liner material, if required.

The side slopes of the SWM ponds are proposed with gradients of 1 vertical: 4 and 7 horizontal both below and above the designed permanent pool elevation; this is considered to be geotechnically acceptable. The side slopes should be surface compacted. All the proposed slopes must be vegetated and/or sodded to prevent erosion.

One should be aware that minor maintenance may be required after rapid drawdown as the water recedes from a high level to a lower level.



For construction of the ponds and earth berm around the ponds, the topsoil must be removed and the subgrade must be proof-rolled. The weathered soils should be subexcavated, inspected, sorted free of any deleterious materials, aerated and properly compacted. Inorganic clay material compacted to at least 98% of its maximum Standard Proctor dry density in 20 cm lifts, must be used. The in situ silty clay is suitable for berm construction.

The footings for all control structures for the SWM ponds and associated outfall will be placed onto the sound natural soils, engineered fill or shale bedrock. The Maximum Allowable Soil Pressure (SLS) and Factored Ultimate Soil Bearing Pressure (ULS), along with the suitable founding levels for the design footings are presented in Section 6.1, Table 5.

The footings must be placed below the frost depth of 1.2 m, or below the scouring depth, whichever is deeper. The footing subgrade must be inspected by a geotechnical engineer prior to concrete pouring to ensure its conformity to the design.

#### 6.9 Soil Parameters

The recommended soil parameters for the project design are given in Table 7.



# Table 7 - Soil Parameters

Unit Weight and Bulk Factor				
		it Weight <u>kN/m<sup>3</sup>)</u>		timated <u>k Factor</u>
	Bulk	Submerged	Loose	Compacted
Silty Clay Till	22.0	12.5	1.33	1.05
Silty Clay	20.5	11.5	1.30	1.00
Silty Sand Till/Sandy Silt Till	22.5	12.5	1.33	1.03
Silty Fine Sand/Sandy Silt	20.5	10.5	1.20	1.00
Silt	21.0	10.5	1.20	1.00
Gravelly Sand	20.0	10.8	1.25	0.98
Broken Shale	24.0	14.0	1.50	1.15
Lateral Earth Pressure Coefficie	ents			
		Active K <sub>a</sub>	At Rest K <sub>0</sub>	Passive K <sub>p</sub>
Silty Clay Till		0.33	0.50	3.00
Silty Clay		0.40	0.56	2.50
Silty Sand Till, Sandy Silt Till, Sa and Silts	nds	0.32	0.48	3.12
Broken Shale		0.25	0.35	4.00
<b>Coefficients of Friction</b>				
Between Concrete and Granular B	ase			0.60
Between Concrete and Sound Natu	ural Soils			0.40
Maximum Allowable Soil Pressu <u>For Thrust Block Design (kPa)</u>	re (SLS)			
Engineered Fill				75
Sound Natural Soils				100



### 6.10 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91.

Excavations in excess of 1.2 m should be sloped at 1 vertical:1 horizontal for stability. Where weathered soil or seepage is encountered, the sides of excavations may need to be flattened to 1 vertical:1.5 or + horizontal for stability.

For excavation purposes, the types of soils are classified in Table 8.

Table 8 -	Classification	of Soils f	or Excavation
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Material	Туре
Sound Shale Bedrock	1
Sound Natural Soils and weathered Shale Bedrock	2
Weathered Soil, and dewatered Sands and Silts	3
Saturated Sands and Silts	4

Excavation into the weathered shale, or the tills containing boulders or large shale fragments, may require extra effort and the use of a heavy-duty backhoe. Boulders and shale fragments larger than 15 cm in size are not suitable for structural backfill and/or construction of engineered fill.

The groundwater yield, if any, from the silty clay till and silty clay is expected to be small and limited in quantity, due to the low permeability of the soils, and the yield from the silty sand till and sandy silt till may be slight to some, while the yield from the sands and silts will be moderate to appreciable, and likely persistent, depending on their extent and continuity.



In shale bedrock, a cut steeper than 1 vertical:1 horizontal may be allowed, provided that the bedding plane of the rock is horizontal and loose rocks protruding from the excavation are removed for safety. The weathered shale or the hard clay till containing shale fragments will require extra effort for excavation using heavy-duty mechanical equipment, and a rock-ripper will be required to facilitate the excavation. This method can generally be employed to excavate the weathered shale to a depth of  $3.0\pm$  m below the bedrock surface. Excavation into the sound shale may require the aid of pneumatic hammering and/or rock blasting.

Where excavation is to be carried out in the wet or water-bearing sands or silts, the possibility of flowing sides and bottom boiling dictates that the ground be predrained by pumping from closely spaced sump-wells or, if necessary, the use of a well-point dewatering system. This should be assessed by test pumping prior to the project construction when the intended bottom of excavation is determined. In order to provide a stable subgrade for the services or foundation construction, the groundwater should be depressed at least 1.0 m below the subgrade level.

Alternatively, sheeting structures can be installed around the excavation. The sheeting structure should be driven to a depth below the bottom of the excavation at least equal to the height of water above the bed of excavation. The sheeting structure must be properly designed to sustain the earth pressure, hydrostatic pressure and applicable surcharge loads.

Prospective contractors must be asked to assess the in situ subsurface conditions for soil cuts by digging test pits to at least 0.5 m below the intended bottom of excavation. These test pits should be allowed to remain open for a period of at least 4 hours to assess the trenching conditions.



#### 7.0 **LIMITATIONS OF REPORT**

This report was prepared by Soil Engineers Ltd. for the account of Mayfield McLaughlin Developments Inc. and for review by its designated consultants and government agencies. Use of the report is subject to the conditions and limitations of the contractual agreement. The material in it reflects the judgement of Mumta Mistry, B.A.Sc., and Bernard Lee, P.Eng., 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 decisions to be made based on it, are the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

#### SOIL ENGINEERS LTD.

Mumta Mistry, B.A.Sc.

Bernard Lee, P.Eng. MM/BL:dd



# LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

### **SAMPLE TYPES**

- AS Auger sample
- CS Chunk sample
- DO Drive open (split spoon)
- DS Denison type sample
- FS Foil sample
- RC Rock core (with size and percentage recovery)
- ST Slotted tube
- TO Thin-walled, open
- TP Thin-walled, piston
- WS Wash sample

# PENETRATION RESISTANCE

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter, 90° point cone driven by a 140-pound hammer falling 30 inches. Plotted as '—•—'

Standard Penetration Resistance or 'N' Value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil. Plotted as ' $\bigcirc$ '

- WH Sampler advanced by static weight
- PH Sampler advanced by hydraulic pressure
- PM Sampler advanced by manual pressure
- NP No penetration

# SOIL DESCRIPTION

**Cohesionless Soils:** 

<u>'N' (blov</u>	ws/ft)	Relative Density
0 to	4	very loose
4 to	10	loose
10 to	30	compact
30 to	50	dense
over	50	very dense

Cohesive Soils:

Undrai <u>Streng</u> t			<u>'N' (</u>	blov	vs/ft)	<u>Consistency</u>
less t		00	0	to	_	very soft
0.25	to	0.50	2	to	4	soft
0.50	to	1.0	4	to	8	firm
1.0	to	2.0	8	to	16	stiff
2.0	to	4.0	16	to	32	very stiff
0	ver	4.0	0	ver	32	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

- x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding
- $\triangle$  Laboratory vane test
- □ Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength

# METRIC CONVERSION FACTORS

1 ft = 0.3048 metres11b = 0.454 kg 1 inch = 25.4 mm1 ksf = 47.88 kPa



Soil Engineers Ltd.

CONSULTING ENGINEERS GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

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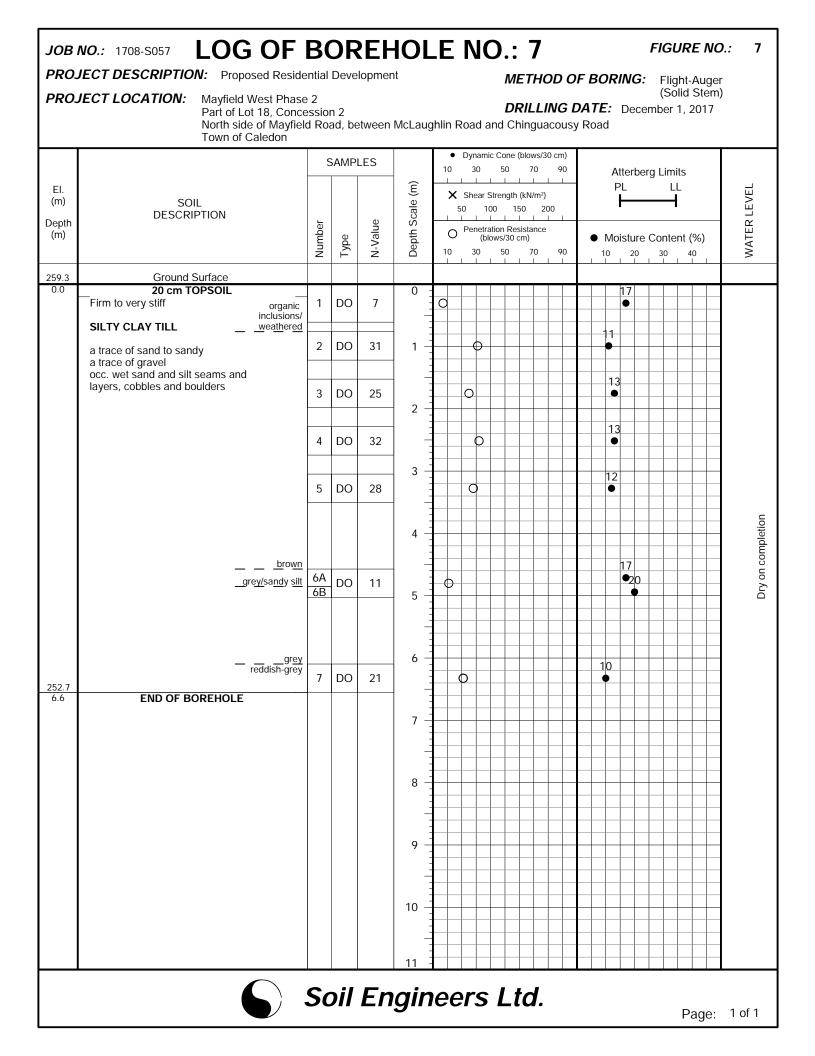
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		ے ا	 Dil	En	ngin		ers	5 L	.td	<u> </u>							
				•	3					-					Page	<b>}:</b>	1 of 1

						<b>_E NO.: 3</b> FIGURE NO.:	3
	JECT DESCRIPTION: Proposed Resid		Deve	elopmer	nt	METHOD OF BORING:	
PRO	JECT LOCATION: Mayfield West Phas Part of Lot 18, Conc North side of Mayfie Town of Caledon	essio	n 2 ad, be	etween	McLauç	<b>DRILLING DATE:</b> ghlin Road and Chinguacousy Road	
			SAMP	LES		Dynamic Cone (blows/30 cm)     30 50 70 90     Atterberg Limits	
El. (m)	SOIL				ile (m)	X         Shear Strength (kN/m²)         PL         LL           50         100         150         200         Image: Line strength (kn/m²)         Image: Line strengt (kn/m²)         Image: Line strength (kn/m²)<	EVEL
Depth (m)	DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	O         Penetration Resistance (blows/30 cm)         ● Moisture Content (%)           10         30         50         70         90         10         20         40	WATER LEVEL
259.0	Ground Surface	2		2		10     30     50     70     90     10     20     30     40	>
0.0					0		
					1 -		
	CANCELLED BOREHOLE				2 -		
					3 -		
					4 -		
					-		
					5 -		
					-		
					6 -		
252.4 6.6	END OF BOREHOLE	_			-		
					7 -		
					-		
					8 -		
					-		
					9 -		
					10 -		
					11		
		Sc	oil	En	gin	neers Ltd. Page: 10	ıf 1

205	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, be	etween	McLauç	ghlin	Ro	bad	L	ORIL	LINC	G DA	TE:		(	Solid	Auger Stem) 2017	)
		ç	SAMP	LES		10		ynan 30	nic Cor 50	ne (blow 70		1) O						
I. า) oth า)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)		× s 50 0	Shear Penet	Streng 100 I I I ration F blows/3	gth (kN/r 150 L Resistan 0 cm)	n²) 200 L	· · · · · · · · · · · · · · · · · · ·	F • Mo	PL ┣─── bisture		LL 		
_		Z	É	Z	Δ	10 		30	50	70	9	0	10	20	30	0 4	0	
9.6 0	Ground Surface 20 cm TOPSOIL				0 -			_						17				
Ŭ	Firm to very stiff	1	DO	11		c	)							•				
	SILTY CLAY TILLweathered																$\rightarrow$	
	a trace of sand to sandy	2	DO	24	1 -		- C							<b>5</b> ●				
	a trace of gravel				-				+						+			
	occ. wet sand and silt seams and layers, cobbles and boulders <u>silt seams</u>													16	$\square$			
		3	DO	24	2 -		C											:
								-	++		_		1	5	+			
		4	DO	32	-			þ						•	$\square$			
	<u>brown</u>				3 -													
	grey	5	DO	15	J .		0						1	<b>5</b> ●	$\square$			
			20	10	-													i
							_	_	++		_				+	_		
					4 -													
					-									17				7
	sil <u>ty</u> fin <u>e_sand</u>	<u>6A</u> 6B	DO	6	-	0		_	+		_			• 22		_	-+-	
		00			5 —													
					-			-	+						+	_	-	
					6 -								1	5				
3.3 3	Grey, compact	7	DO	18	_		0	_	$\left  \right $					•  -	+			
	SANDY SILT TILL traces of clay and gravel																	
	occ. wet sand and silt seams and layers, cobbles and boulders				7 -										++		$\rightarrow$	
													12					
2.0 6	Grey, very dense	8	DO	50/5	-							φ	•					
	SILT				8 -	$\vdash$		-	++		_				++	_	$\rightarrow$	
	a trace of clay				-													
	a trace to some sand				-													
).5					9 —		_	+	++		_		7		++		$\rightarrow$	
1 ).2	Grey, very dense SILTY SAND TILL	9	DO	50/10	-							φ	•					
4	traces of clay and gravel				-			-	+		_				+		-	
	occ. wet sand and silt seams and layers, cobbles and boulders				10 -						_				$\square$		$\rightarrow$	
	END OF BOREHOLE				-													
					-				+					$\left  \right $	+	$ \rightarrow $	+	
					11													

PRO.	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, be	etween	McLaug	Ihlin	Ro	ad a	DR	ILLIN	IG Di	<b>BORIN</b> ATE: No Road		(Solic	d Ste	m)	
El.		9	SAMP	LES	(u	10 		30	c Cone (t 50	70	cm) 90 I	Atte PL	rberg	Limits	;		
(m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)		50 	10 enetra (bl	Strength ( 00 15 1 1 1 ation Resi ows/30 cr 50	0 200 stance m)	90	Moist					WATER LEVEL
260.6	Ground Surface	~		2									20	30	40	_	
0.0	25 cm TOPSOIL Brown, stiff, weathered SILTY CLAY TILL	1	DO	10	0	0						13 •					
259.8 0.8	traces of sand and gravel occ. wet sand and silt seams and layers, cobbles and boulders Brown, compact to dense	2	DO	33				0				9					
	SANDY SILT TILL traces to some clay and gravel occ. wet sand and silt seams and	3	DO	23			С	)				12					
258.1	layers, cobbles and boulders	4						C				13	$\vdash$				
2.5	Stiff to very stiff SILTY CLAY TILL brown	4	DO	27	3 –												
	grey a trace of sand to sandy a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	5	DO	21			0					15 • 12					Dry on completion February 1, 2018
254.0		7	DO	16	6		0					15					
6.6	END OF BOREHOLE Installed 50 mm Ø PVC monitoring well to 6.1 m (3.0 m screen) Sand backfill from 2.4 to 6.1 m Bentonite holeplug from 0.3 to 2.4 m Provided with an aboveground steel monument casing with top and bottom caps and a lock				7 - 8 - 9 - 10 - 11												

JOB	<b>NO</b> .: 1708-S057 <b>LOG OF</b>	B	OF	REF	IOL	ENO.: 6 FIGURE NO.: 6
	IECT DESCRIPTION: Proposed Resident IECT LOCATION: Mayfield West Phase Part of Lot 18, Conc North side of Mayfie Town of Caledon	e 2 essio	n 2			<i>METHOD OF BORING:</i> Flight-Auger (Solid Stem) <i>DRILLING DATE:</i> December 1, 2017 Jhlin Road and Chinguacousy Road
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	AMP	N-Value	Depth Scale (m)	● Dynamic Cone (blows/30 cm)       Atterberg Limits         10       30       50       70       90         ▲ Shear Strength (kN/m²)       Atterberg Limits       PL       LL         ▲ Shear Strength (kN/m²)       ▲ Herberg Limits       ■         50       100       150       200         ▲ Herberg Limits       ■       ■         O Penetration Resistance (blows/30 cm)       ● Moisture Content (%)         10       30       50       70       90         10       20       30       40       ■
259.3 0.0 252.7 6.6	Stiff to very stiff	2 3 4	DO DO DO DO DO DO DO	9 31 24 28 19 16 16		
		Sa	oil	En	ngin	Peers Ltd. Page: 1 of 1



	<b>NO</b> .: 1708-S057 <b>LOG OF</b>					_E	Ν	10	.: 8	8			FIG	URE N	<i>IO.:</i> 8
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	e 2 essio	n 2			ghlin	Roa		DRIL	.LING	DA	BORING TE: Nov pad	(Se	olid Ste	m)
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	10     	3 She 50 Per	0 5 ear Strei 100 l l netration (blows	50 7 I I ngth (kN. 150 I I n Resista /30 cm)	200		Atterb PL Moistur	e Conte	_L <b>1</b>	WATER LEVEL
258.4 0.0	Ground Surface    Brown, loose to compact  SANDY SILT TILL  a trace to some clay a trace of gravel occ. wet sand and silt seams and	1	DO	7	0	0	C					10	1		
256.9 1.5	Very stiff to hard SILTY CLAY TILL a trace to some sand	3	DO	24	- 2 -		0					12 • 15			
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders <u>brown</u> <u>grey</u> <u>sand seams</u>	4	DO	37 21	3		0					• 15			
		6	DO	19	4 -		0					16			Dry on completion
251.0	<u>clay layers</u>	7	DO	28	6		C	>				19			
<u>251.8</u> 6.6	END OF BOREHOLE				7 -										
					9 -										
					10 -										
		Sa	oil	Er	ngin	100	er	s I	Lta	<b>1</b> .				Page	e: 1 of 1

	NO.: 1708-S057 LOG OF					.E	. N	10	•	9				Fl	GUF	RE NO	D.: 9
	IECT DESCRIPTION: Proposed Resid IECT LOCATION: Mayfield West Phas		Deve	lopme	nt				MET	ТНО	DO	F BC	ORING	G: F (	-light Solic	t-Auge d Stem	:r ι)
	Part of Lot 18, Conc North side of Mayfie Town of Caledon	cessio	n 2 ad, be	etweer	ı McLauç	ghlin	Roa						E: No d	vemb	er 30	), 2017	,
			SAMP	LES		Dynamic Cone (blows/30 cm)     10 30 50 70 90     Atterber								oerg L	rg Limits		
El. (m)	SOIL	SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL SOIL						PL	EVEL								
Depth (m)	DESCRIPTION		Number Type	N-Value	Depth Scale (m)			netratior		ance	, 	•	Moistu	re Cor	ntent	(%)	WATER LEVEL
		Nur	Type	/- Z	Der	10	3			70	90 I		10 20			40	W A
257.9 0.0	Ground Surface 23 cm TOPSOIL	1	DO	7	0	a					_		19	)			-
	Firm to very stiff topsoil inclusions SILTY CLAY TILLweathered	/		/									16				-
	a trace to some sand a trace of gravel	2	DO	26	1 -		0				_		•				-
	occ. wet sand and silt seams and layers, cobbles and boulders    brown grey sand seams	3	DO	27			С						14				-
					2 -								17				-
		4	DO	31			(	D					•				
		/	DO	16	3 -		0						14				-
		-															- u
					4 -												mpleti
		6	DO	21			0						13 ●				Dry on completion
					- 5 -						_						- Ğ
		7	DO	24	6 -		0						9				
<u>251.3</u> 6.6	END OF BOREHOLE																-
					7 -												-
																	-
					8 -												-
																	-
					9 -												-
																	-
					10 -												-
					11												
		So	oil	Er	ngin	ie	er	s I	Lto	d.					F	Page:	1 of 1
L																~	

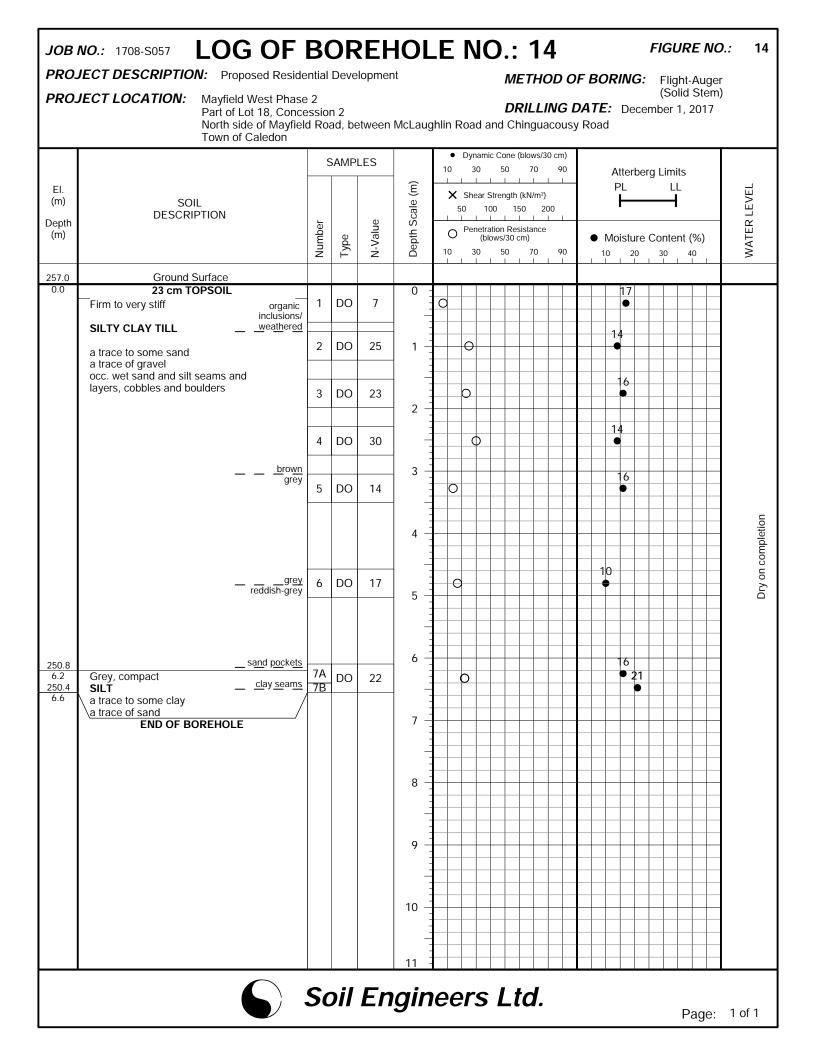
PRO.	JECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, be	etween	McLau	ghlin Road ar	DRILLING L	DATE: Novembe	Solid Stem)	)
		ç	SAMPI	LES		<ul> <li>Dynamic</li> <li>10 30</li> </ul>	Cone (blows/30 cm) 50 70 90			
EI. (m) Depth (m)	SOIL DESCRIPTION		Type	N-Value	Depth Scale (m)	Shear Stu 50 100 Penetrati (blow 10 30	rength (kN/m <sup>2</sup> )	Atterberg Li PL Moisture Con 10 20 30	LL 	WATER LEVEL
258.1	Ground Surface									
0.0	28 cm TOPSOIL	1	DO	8	0	0		16		
	Brown, loose to compact	I		0	_					
	SILTY SAND TILL topsoilinclusions	2	DO	15	1 -	0		15		
	traces of clay and gravel occ. wet sand and silt seams and									
	layers, cobbles and boulders — weathered	3	DO	21				11		
		3		21	2 -					
255.8 2.3	Stiff to very stiff				-			16		
210	giey	4	DO	20	-	φ				
	SILTY CLAY TILL				3 -					
	a trace to some sandsilt/clay_layers a trace of gravel	5	DO	18				13		l l l ≃
	occ. wet sand and silt seams and									on completion
	layers, cobbles and boulders									tion
					4 -					
								17		
		6	DO	16		0		17		
					5 -					Dry o
										- H
					6 -			10		
251.5	reddish-grey	7	DO	24		0		•		5
6.6	END OF BOREHOLE									
	Installed 50 mm Ø PVC monitoring well to				7 -					
	6.1 m (3.0 m screen) Sand backfill from 2.4 to 6.1 m									
	Bentonite holeplug from 0.3 to 2.4 m									
	Provided with an aboveground steel monument casing with top and bottom caps				8 -					
	and a lock									
					_					
					9 -					
					-					
					10					
					10 -					
					-					
					11					

	NO.: 1708-S057 LOG OF					_E	ΞI	N	Э.	• *	11				F	IGUF	RE N	0.:	11
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	2 essio	n 2			ghli	n Ro	bad a	I	DRII		IG E	<b>F BO</b> DATE: y Road			(Solic	d Ster	n)	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)		0 × 50	30 Shear 1 Penetr (b 30	50 Streng 00 1 1 ation I lows/3	) gth (kN 150  Resista 30 cm) )	1/m²) 200 1 1 ance 70	90		PL	re Co	Limits LL 	(%)	_	WATER LEVEL
258.7 0.0	Ground Surface 18 cm TOPSOIL Firm to hard	1	DO	8	0	C	>							16					
	SILTY CLAY TILL a trace of sand to sandy <u>coarse sand</u> a trace of gravel occ. wet sand and silt seams and <u>weathered</u> layers, cobbles and boulders	2	DO	5	1 -	0								15					
		3	DO	32	- 2 -			0						14					
		4	DO	34	3 -			0						15 • 16					
	grey	5	DO	17			0							•					tion
		6	DO	16	_ 4 -		0						10						Dry on completion
252.1 6.6	grey reddish-grey ilt/ <u>sa</u> nd layers END OF BOREHOLE	7	DO	20	6 -		0												
					8 -														
					9 -														
					10 -														
		Sc	oil	En	ngin	10	<i>e</i>	rs		.tc	1.	1				F	Page	: 1	of 1

PRO.	<b>IECT LOCATION:</b> Mayfield West F Part of Lot 18, C North side of Ma Town of Caledo	Concessio Ayfield Ro		etween	McLaug	hlin Ro	I	ORILLI	NG D	F BORIN DATE: De Road	(Sc	olid Stem	i)	
			SAMP	LES			-	ne (blows/3					Π	
EI. (m) Depth	SOIL DESCRIPTION			lue	Depth Scale (m)	50	hear Streng 100 enetration	gth (kN/m²) 150 20	90 	PL F		L <b>1</b>	_	WATER LEVEL
(m)		Number	Type	N-Value	Dept	-	30 50	so cm)	90		ure Conte	ent (%)		WAT
258.0	Ground Surface													
0.0	inclus		DO	15	0	0				11				
	SILTY CLAY TILLweath a trace of sand to sandy a trace of gravel	2	DO	33			0			10			-	
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	25	2	C				12			-	
		4	DO	25		C				12				Ţ
255.0 3.0	Brown, dense	5	DO	42	3		0			11				v 1. 2018
	a trace of clay, some gravel occ. wet sand and silt seams and layers, cobbles and boulders				4									Dry on completion 255 5 m on February 1, 2018
253.4 4.6	Stiff to hard	6	DO	16		0					22 ●		-           -           -	Dry on 0 255.5 m
	traces of sand and gravel occ. wet sand and silt seams and layers, cobbles and boulders												- - - - - - - -	W.L.@ FL
251.4		gr <u>ey</u> -grey aye <u>rs</u> 7	DO	43	6		0			15				
6.6	END OF BOREHOLE	D			7								-	
	6.1 m (3.0 m screen) Sand backfill from 2.4 to 6.1 m Bentonite holeplug from 0.3 to 2.4 m Provided with an aboveground steel												-	
	monument casing with top and bottom ca and a lock	ps			8								-	
					9 -								-	
													-	
					10								-	
					11								-	

Page: 1 of 1

JOB	NO.: 1708-S057 LOG OF	B	OR	REF	IOL	E	r	١C	).:	1	3			FIC	GURE I	V <i>O</i> .	: 13
	IECT DESCRIPTION: Proposed Reside		Deve	lopme	nt				М	ETH	OD (	OF B	ORIN	<b>G:</b> ғ	light-Au	ger em)	
PRO.	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	essio	n 2 ad, be	etween	McLauç	ghlin	Roa	ad ar							er 1, 201		
		Ś	SAMPLES			10	-	namic 30	Cone ( 50	blows) 70	(30 cm) 90		Atter	berg Li	imits		
El. (m)	SOIL				le (m)	<b> </b>		near Str	•				PL	0			EVEL
Depth (m)	DESCRIPTION	Number	a)	N-Value	Depth Scale (m)		50 	enetrati	) 15 on Res	istanc	200     e		Moist		ntent (%)	_	WATER LEVEL
		Nun	Type	N-V	Dep	10		30	50	70	90						WA
258.5 0.0	Ground Surface 28 cm TOPSOIL				0								17				
	Firm to very stiff	1	DO	6		0							•				
	SILTY CLAY TILL <u>weathered</u>	2	DO	28			(	>					15				
	a trace to some sand a trace of gravel occ. wet sand and silt seams and												45				
	layers, cobbles and boulders	3	DO	32	2 -			0	-				15				
													15				
		4	DO	25			С	)					•				
	<u>brown</u> grey	5	DO	16	3 -		0						16				
				10													c
					4 -		-		-								Dry on completion
													14	<b>,</b>			lmoo r
		6	DO	11	5 -	0							•				Dry oi
252.2	0	7	DO	14	6 -		2		-					27 ●			
2813.9 6.6	Grey, stiff SILTY CLAY a trace of sand																
	END OF BOREHOLE				7 -												
					-												
					8 -				-								
					9 -												
							+		+								
					10 -				-								
		Sc	<b>oil</b>	En	ngin	e	er	۲S	Lt	d.	, ,		<u> </u>				1 of 1
															Page	9:	1 of 1



JOB	NO.: 1708-S057 LOG OF	B	ЭF	REF	IOL	E NO.: 15 FIGURE NO.:	15
	IECT DESCRIPTION: Proposed Reside		Deve	lopme	nt	METHOD OF BORING: Flight-Auger (Solid Stem)	
PRO.	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	essio	n 2 ad, be	etween	McLaug	<b>DRILLING DATE:</b> December 1, 2017 hlin Road and Chinguacousy Road	
		ļ	SAMP	LES		Dynamic Cone (blows/30 cm)     30 50 70 90     Atterberg Limits	
El. (m)	SOIL				e (m)	Shear Strength (kN/m <sup>2</sup> )	VEL
Depth	DESCRIPTION	ber		ne	Depth Scale (m)	50 100 150 200 Penetration Resistance	WATER LEVEL
(m)		Number	Type	N-Value	Depth	O         Penetration Resistance (blows/30 cm)         ● Moisture Content (%)           10         30         50         70         90         10         20         30         40	WATI
257.8	Ground Surface						
0.0	20 cm TOPSOIL topsoil inclusions/ topsoil weathered	1	DO	20	0	Φ	
	SILTY CLAY TILL					12	
	a trace to some sand a trace of gravel	2	DO	26	1 -		
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	21		D 115	
					2 -		
		4	DO	27		0	
	<u>brown</u>				3	17	
	grey	5	DO	19			
					4 –		letion
							Dry on completion
		6	AS	12		$\begin{array}{c c} & 12 \\ \hline \\ $	Jry on
					- 5 -		
		7	DO	19	6 -	□ 13 □ 13	
251.2 6.6	END OF BOREHOLE	/		17			
					7 -		
					8 –		
					9 –		
					10 -		
		ے ا	 Sil	En	ain	eers Ltd.	
					з	Page:	1 of 1

	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	2 essio	n 2			Jhlin	Road	1	DRI	LIN	G D	ATE	: De	(	Flight-Au Solid Str er 5, 201	em)	
		ç	SAMP	LES		• 10	Dynar 30	nic Co 5(			m) 90		Atter	oerg L	imits		
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)			100	gth (kN 150 I Resista 30 cm)	//m²) 200 1	↓ ↓ 90 ↓	• N 10	PL 	re Co	LL 		WATER LEVEL
257.6 0.0	Ground Surface 28 cm TOPSOIL										_		14				
0.0	Brown, stiff to hard weathered	1	DO	11	0	0							19				
	SILTY CLAY TILL a trace to some sand	2	DO	27			0						14				
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	29	- 2 -		0						16 •				Ę
		4	DO	39				0					14 •				EI. 252.4 m on completion
254.6 3.0	Brown, compact				3 -								17				
	SANDY SILT	5	DO	27			0		_				•	_			2.4 m
	traces of clay and gravel				4 -												
253.0																	e-in (
4.6	Stiffsilt seams SILTY CLAY TILLgrey a trace of sand to sandy a trace of gravel	6	DO	16	- 5 -								2 ●				I Cave-in @
	acc. wet sand and silt seams and layers, cobbles and boulders																- [ - E
251.5 6.1 251.0	Reddish-grey, very dense SANDY SILT TILL traces of clay and gravel	7	DO	67	6 -				C	>		8					WI @ EI 2530 W
6.6	acc. wet sand and silt seams and layers, cobbles and boulders END OF BOREHOLE				7 -												
	Installed 50 mm Ø PVC monitoring well to 6.1 m (3.0 m screen) Sand backfill from 2.4 to 6.1 m																
	Bentonite holeplug from 0.3 to 2.4 m Provided with an aboveground steel monument casing with top and bottom caps				8												
	and a lock				9 -												
					10 -												
					11											<u> </u>	

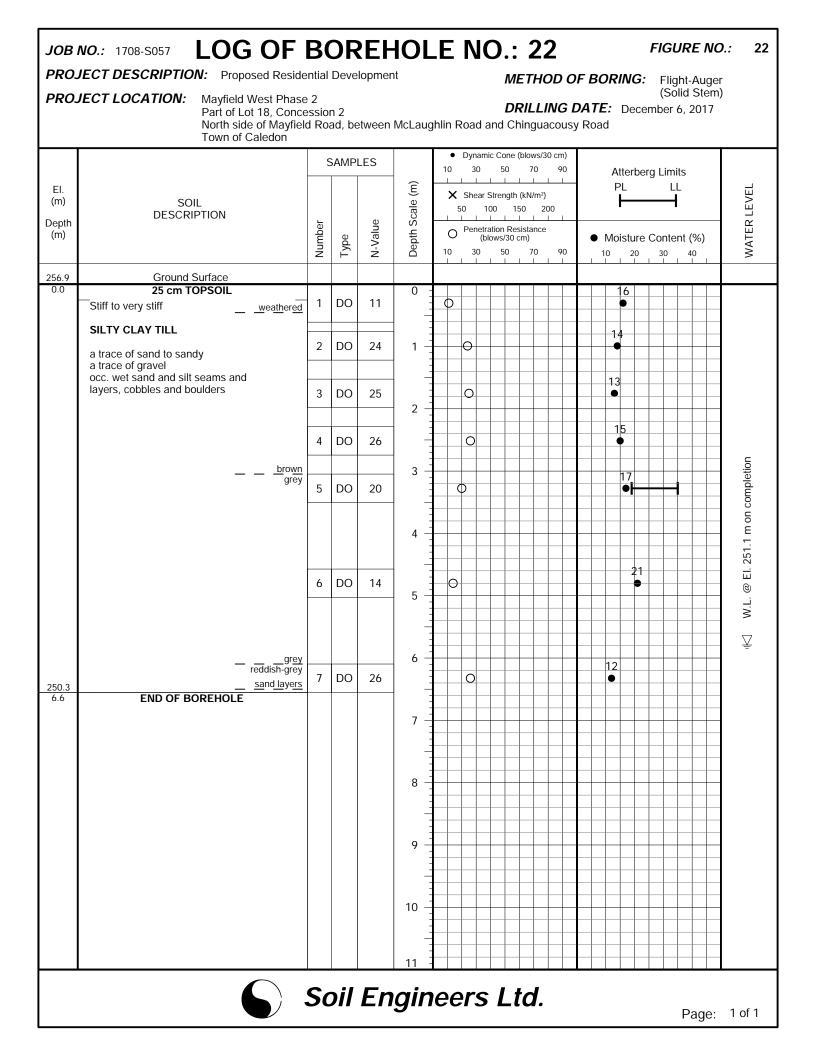
	<b>NO</b> .: 1708-S057 <b>LOG OF</b>					_E	Ν	IO.	•••	17			FIG	URE	NO	) <i>.:</i> 17
	IECT DESCRIPTION: Proposed Reside		Deve	lopme	nt							BORIN	(S	olid St	tem)	
	Part of Lot 18, Conc North side of Mayfiel Town of Caledon	essio	n 2 ad, be	etween	i McLauç	ghlin I	Roa					<b>A<i>TE:</i> De</b> Road	ecembe	r 5, 20	17	
			SAMP	LES		10	Dyn 3		0 7	ws/30 cn 70 9	n) 10		rberg Lir			
El. (m)	SOIL DESCRIPTION				cale (m)		She	ar Stren 100	ngth (kN 150	/m²) 200		PL		⊔∟ ┫		LEVEL
Depth (m)		Number	Type	N-Value	Depth Scale (m)	0 10	Per 3		'30 cm)		0	Moistu     10	ure Cont		)	WATER LEVEI
256.5 0.0	Ground Surface 25 cm TOPSOIL				0 -							16				
	Firm to very stiff organic inclusions/ SILTY CLAY TILL weathered	1	DO	8		0						•				
	a trace to some sand	2	DO	18			þ					10				
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	25			0					15				
	<u>brown</u>	4	DO	19	2 -		0					14				
	grey				3 -							18	3			pletion
	silt_layers	5	DO	18			с С									on com
					4 -											El. 250.7 m on completion
		6	DO	18			>					10				n @ El.
					- 5 -											Cave-in @
250.4	De difeterementaria				6 -							9				च्
6.1 249.9 6.6	Reddish-grey, dense SILTY SAND TILL traces of clay and gravel	7	DO	40				0								
	occ. wet sand and silt seams and layers, cobbles and boulders END OF BOREHOLE				7 -											
					8 -											
					9 -											
					10 -											
					11											
		S	 Dil	En	ngin		<b>e</b> r:	s I		<u>.</u> 1.						
				•	3									Pag	ge:	1 of 1

	<b>NO</b> .: 1708-S057 <b>LOG OF</b>					_E	N	JC	).:	: 1	8	8				ŀ	FIGL	JRE	E NC	D.: 18
	IECT DESCRIPTION: Proposed Reside	e 2		elopmer	nt								DF E		?IN(	G:				
	Part of Lot 18, Conce North side of Mayfiel Town of Caledon	essio Id Roa	n 2 ad, bi	etween	McLau	ghlin	Roa	nd ar												-
			SAMP	LES	Ê	10		namic 30	Cone 50	70	)	cm) 90 I			Atter PL	berg	ı Limi Li			
EI. (m) Depth	SOIL DESCRIPTION	2		Ð	Depth Scale (m)		50		) 1	50	200	)								WATER LEVEL
(m)		Number	Type	N-Value	Depth	10		netrati (blov 30	on Re vs/30 50	esistar cm) 7(		90 I		• M		ure C	onte	nt (%		WATE
257.2 0.0	Ground Surface				0															
					1 -															
					2 -															
	CANCELLED BOREHOLE					-														
					3 -															
					_															
					4 -															
					-															
					5 -															
					6 -															
250.6 6.6	END OF BOREHOLE				_															
					7 -															
					_															
					8 -															
					9 -	-														
					9 -															
					10 -															
					11															
		50	)//	En	ngin	<u>e</u>	er	S	<b>L</b> i	ta								Pa	ige:	1 of 1

JOB	NO.: 1708-S057 LOG OF	B	OF	REF	HOL	_E	: <b>r</b>	<b>NO</b>	).:	19	)			F	IGUI	RE NO	D.: 19
	IECT DESCRIPTION: Proposed Resid		Deve	lopme	nt				ME	тно	DO	F B	ORIN	G:	Fligh (Solid	t-Auge d Stem	r )
PRO.	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Com North side of Mayfie Town of Caledon	cessio	on 2 oad, be	etween	McLaug	ghlin	Roa	ad an					<b>E:</b> D∈ ad				,
			SAMP	LES		10	-	namic ( 30	50	lows/30 70	cm) 90		Atter	berg	Limits	5	
El. (m)	SOIL				le (m)			near Stre	-				PL				EVEL
Depth (m)	DESCRIPTION	ber		N-Value	Depth Scale (m)		50 	100 netratic		stance	,		Moistu		ntont	(0/)	WATER LEVEI
(,		Number	Type	N-V	Dep	10			50	70	90 I				30	40	LAW
257.2 0.0	Ground Surface 30 cm TOPSOIL				0 -								15				
	Firm to very stiff sand layer	<u>s</u> 1	DO	8		0							•				
	SILTY CLAY TILLweathered	<u>d</u> 2	DO	20			0						14				
	a trace of sand to sandy a trace of gravel																-
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	25			С						14				-
					2 -								16				
		4	DO	29			(						•				-
	<u>brow</u> gre		DO	16	3 -		0				_		10				
				10							_		T				
					4 -												Dry on completion
													14				n com
		6	DO	18	5 -		0						•				Dry o
																	-
251.0 6.2		y y 7	DO	45	6 -			C					12 ●				
250.6 6.6	SILT traces of clay and sand																
	END OF BOREHOLE				7 -												
																	-
					8 -												-
					9 —												
																	2 -
					10 -												
				<b>F</b> =			~~~	<u> </u>		 ~				1			<u> </u>
		3(	JI	Eſ	ngin	ie(	eľ	5	LT	u.					F	Page:	1 of 1
L																	

JOB	NO.: 1708-S057 LOG OF	B	OR	REF	HOL	E	N	<b>D</b> .:	20	FI	IGURE NO	D.: 20
	IECT DESCRIPTION: Proposed Reside		Deve	lopme	nt			ME	THOD C	OF BORING:	Flight-Auger (Solid Stem)	)
	Part of Lot 18, Conce North side of Mayfield Town of Caledon	essio	n 2 ad, be	etween	McLaug	hlin	Road a			<b>DATE:</b> Decemb y Road	er 5, 2017	
			SAMP	LES		• 10	Dynami 30	c Cone (bl 50	ows/30 cm) 70 90	Atterberg I	∟imits	
El. (m)	SOIL				ale (m)			Strength (k		PL		EVEL
Depth (m)	DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	C 10		ation Resis ows/30 cm		Moisture Co	ontent (%) 30 40	WATER LEVEL
257.9	Ground Surface											
0.0	25 cm TOPSOIL	1	DO	12	0	0				1 5 •		
	SILTY CLAY TILL									11		
	a trace to some sand a trace of gravel	2	DO	33			P					
	occ. wet sand and silt seams and layers, cobbles and boulders <u>sand layers</u>	3	DO	30			0			13		
					2 -							
		4	DO	17		(				14 •		
					3					1 5		letion
	<u>brown</u> grey/ silt layers	5	DO	25			0			•		El. 252.1 m on completion
					4							uo m
												252.1
		6	DO	14		С	,			15		@ El.
					- 5 -							W.L.
												Ţ
	gr <u>ey</u> reddish-grey			24	6 -					12		
251.3 6.6	END OF BOREHOLE	7	DO	24			0					
					7 -							
					8 —							
					9 —							
					10 -							
				<b>Г</b>								
		30	)	En	ngin	<i>e</i> e	ers		a.		Page:	1 of 1

PRO.	JECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, be	etween	McLauç	ghlin	Roa	ad and	DRI	LLIN	G D	F <b>BORING:</b> <b>ATE:</b> Decem Road	Flight-Auger (Solid Stem) ber 6, 2017	)
		ç	SAMP	LES	6	10		30	50	ows/30 cr 70 4	n) 90 1	Atterberg PL	Limits LL	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)		50     	enetratio (blow:	150 I Resist s/30 cm)	200 ance	90	Moisture C     10 20		WATER LEVEL
256.8	Ground Surface													
0.0	Is cm TOPSOIL Firm to hard	1	DO	8	0 -	0						19 •		
	a trace of sand to sandy a trace of gravel occ. wet sand and silt seams and	2	DO	21			0					13		
	layers, cobbles and boulders	3	DO	28	2 -		(					15 •		
	sand seams	4	DO	35				0				14		
	<u>brown</u> grey	5	DO	19	3 -		0					14 •		EI. 250.9 m on completion
					4 -									9 m on cc
	gr <u>ev</u> reddish-grey	6	DO	16			0					10		@ El. 250.
		7	DO	18	6 -		0					10		Į ∎Į¥
<u>250.2</u> 6.6	END OF BOREHOLE				7 -									-
	6.1 m (3.0 m screen) Sand backfill from 2.4 to 6.1 m Bentonite holeplug from 0.3 to 2.4 m Provided with an aboveground steel													-
	monument casing with top and bottom caps and a lock				8 -									-
					9 –									
														-
					10 -									
					11									-



						E NO.: 23 FIGURE NO.:	23
	JECT DESCRIPTION: Proposed Reside		Deve	elopme	nt	METHOD OF BORING: Flight-Auger (Solid Stem)	
PRO.	JECT LOCATION: Mayfield West Phas Part of Lot 18, Conc North side of Mayfie Town of Caledon	essio		etweer	n McLau	<b>DRILLING DATE:</b> December 6, 2017 hlin Road and Chinguacousy Road	
			SAMP	LES		Dynamic Cone (blows/30 cm)     30 50 70 90     Atterberg Limits	
EI. (m)	SOIL				e (m)		EVEL
Depth (m)	DESCRIPTION	ber		alue	Depth Scale (m)	50     100     150     200       Penetration Resistance (blows (20 cm)     Moisture Content (%)	WATER LEVEL
		Number	Type	N-Value	Dept	O         Image: Non-Structure Content (%)           10         30         50         70         90         10         20         30         40	WAT
256.7 0.0	Ground Surface 28 cm TOPSOIL				0		
	Stiff to very stiff to very stiff to very stiff to very stiff inclusions/	1	DO	9			
	SILTY CLAY TILL <u>weathered</u>	2	DO	23	1 -		
	a trace to some sand a trace of gravel occ. wet sand and silt seams and						
	layers, cobbles and boulders	3	DO	32	2 -		
		4	DO	21			
	<u>brown</u> grey	-		21	3 -		
		5	DO	15		O	
							tion
					4 -		Dry on completion
	gr <u>ey</u> reddish-grey	6	DO	18			ry on c
					- 5 -		Ō
		7	DO	25	6 -	O	
250.1 6.6	END OF BOREHOLE	,		23	-		
					7 -		
					-		
					8 -		
					-		
					9 -		
					10 -		
					11		
		Sa	oil	Er	ngin	eers Ltd. Page: 10	of 1

JOB	<b>VO</b> .: 1708-S057 <b>LOG OF</b>	B	ЭF	REF	IOL	.E	Ν	0	.: 2	24			F	IGUR	PE NC	) <i>.:</i> 24
	ECT DESCRIPTION: Proposed Reside Part of Lot 18, Conce North side of Mayfield Town of Caledon	2 essio	n 2			ghlin	Road		DRIL	HOD ( LING Juacous	DAT	<b>E:</b> D		(Solid	Stem)	
EI. (m) Depth (m) 256.8	SOIL DESCRIPTION Ground Surface	Number	Type	N-Value	Depth Scale (m)	10 <b>X</b>	30 She 50 Pen	9 50 ar Stren 100 1 1 etration (blows/3	0 7( gth (kN/r 150 L 1 Resistar 30 cm)	m²) 200 1	-	PL 	ture Co	Limits LL ontent (	(%) 40 1 1	WATER LEVEL
0.0 <u>256.0</u> 0.8	20 cm TOPSOIL Brown, loose, weathered SILTY SAND TILL traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders Stiff to very stiff SILTY CLAY TILL	1 2 3	DO DO DO	8 23 22			0					15 • 13 • 12 •				
	a trace of sand to sandy a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders <u>brown</u> grey	4	DO	29 18			0					11 • 10 •				etion
250.7	<u>grey</u> reddish-grey	6	DO	16	5 -		>					11				Dry on completion
<u>230.7</u> 6.1 <u>250.2</u> 6.6	Grey, very stiff SILTY CLAY a trace of sand occ. gravel END OF BOREHOLE	7	DO	20	7 - 7 - 8 - 9 - 10 -											
		Sc	oil	En	ngin	100	ers	s L	.ta					P	age:	1 of 1

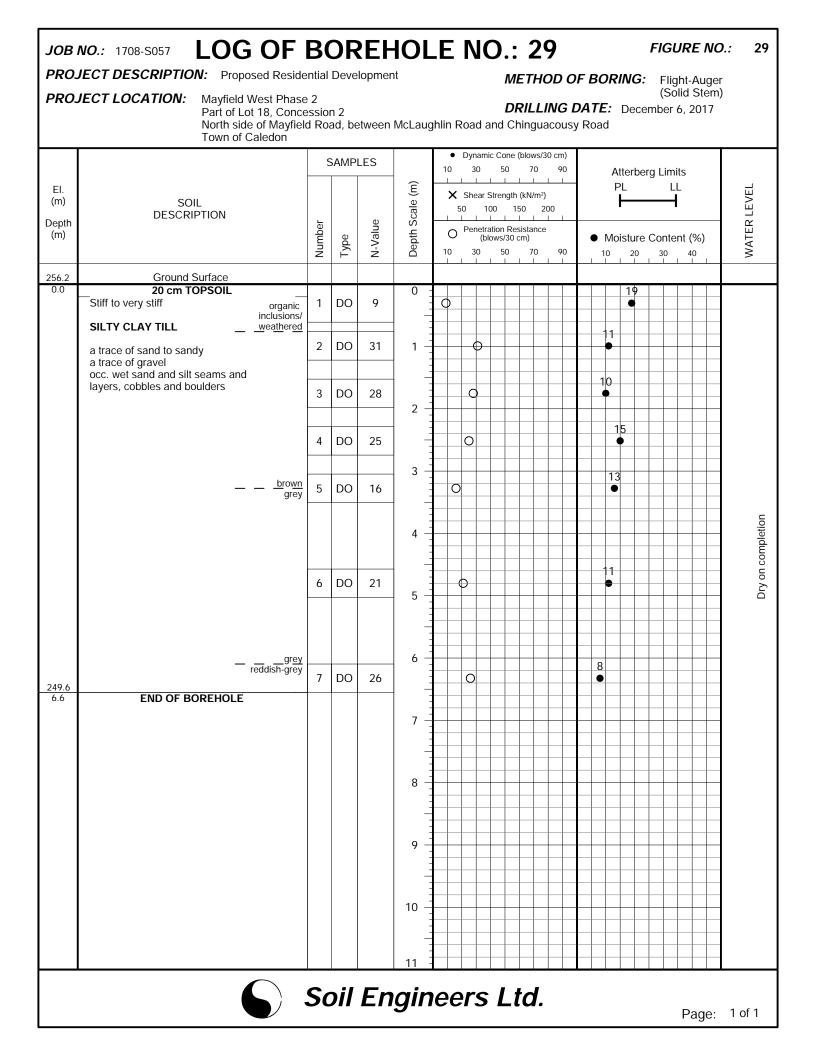
PRO.	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio		etween l	McLauç	ghlir	n R	oad		DR	RILI	LIN	GL	)A7	E:			(Sol	nt-Au id Ste 8, 201	em)	
EI. (m)	SOIL	ç	SAMP	LES	(m) e	1	0	Dynar 30 I Shear		50 I I	70	I	:m) 90 I			.tterb PL	erg	Limit LL			VEL
)epth (m)	DESCRIPTION	Number	Type	N-Value	Depth Scale (m)		50 0	l Pene	UIUWS E	ו Res	istan m) 70	ce	90	• -		∎ pistur 20			it (%) 40		WATER LEVEL
56.1	Ground Surface							•											·		
0.0	23 cm TOPSOIL Brown, loose to compact SILTY SAND TILL	1	DO	7	0	0									1	4					
54.6	a trace to some clay <u>weathered</u> a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	2	DO	20	1 -		-C	>							8						
1.5	Stiff to very stiff SILTY CLAY TILL	3	DO	20	2 -		C	)								18 ●					
	a trace to some sand <u>brown</u> a trace of gravel grey occ. wet sand and silt seams and	4	DO	26	-			0							1	5 •					
	layers, cobbles and boulders	5	DO	15	3 -		0								11 ●						
					4 —																Drv on completion
	gr <u>ey</u> reddish-grey	6	DO	21	5 -		- (	>							10 ●						
50.0 6.1	Grey, very dense	7	DO	50/15	6 -								0		•						
	SILTY SAND TILL traces of clay and gravel occ. wet sand and silt seams and				7 —																
48.5 7.6	layers, cobbles and boulders Red, hard SILTY CLAY TILL	8	DO	50/10											7						
	a trace to some sand a trace of gravel occ. wet sand and silt seams and layers, cobbles, boulders and																				
47.0 46.9 9.2	shale fragments Red, weathered SHALE BEDROCK	9	DO	50/10	9 -										10 ●						
	With limestone layers				10 -																
					 11																

ROJ	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio		etween	McLauç	ghlir	۱ Roa	ad a	D	RILL	ING	; DA	BORING	(So	Jht-Auger Ilid Stem) 8, 2017	i)
		0	SAMP	LES		10		/nami 30	ic Cone 50	(blows) 70	30 cm 90		A tt o sh		140	
1.					(L)		-	1			1 1		Allerb PL	erg Limi Ll		
n)	SOIL				ale (I		X Sh 50		Strengtl 00	n (kN/m <sup>:</sup> 150	') 200		⊢	———————————————————————————————————————		EVE
pth	DESCRIPTION	er		ne	Sci	<u> </u>	1	1		esistanc	1 1					- 2
n)		Number	Type	N-Value	Depth Scale	10	•	(bl) 30	ows/30 50	cm) 70	90	)	<ul> <li>Moistur</li> <li>10 20</li> </ul>		nt (%) 40	WATER LEVEI
5.8	Ground Surface															
.0	15 cm TOPSOIL Firm to hard	1	DO	5	0	0		_						24		
		I	00	5	-											
	SILTY CLAY TILL	2		11				+				_	16	+		
	a trace to some sand a trace of gravel	2	DO	11	1 -		1	+								
	occ. wet sand and silt seams and <u>weathered</u> layers, cobbles and boulders												14			
	layers, coddles and boulders	3	DO	21	-		φ					_				-
					2 -			$\pm$								
	<u>brown</u>	4	DO	22	-		0	-					12			
	grey				-			1								_
					3 –			-					14			
	gr <u>ey</u> reddish-grey	5	DO	14	_		0					_				-
					-											
					4 –			+				_				
					-			1					11			
		6	DO	50/5									╞			-
					5 -			+			$\square$					╡║
					-											
								+			+	_				
9.7					6 -			+								<u></u> ╡╟╏ <sub>⊆</sub>
9.4	Grey, dense GRAVELLY SAND	7A	DO	45			-	+	0		+		8	++		246.8 m on completion
4	\some silt	7B			-		_	1								
	Dense to very dense SANDY SILT TILL				7 -											
	a trace of clay a trace to some gravel						-	+				-				
	occ. wet sand and silt seams andgrey							1					9			246.8
7.8	layers, cobbles and boulders red	8	DO	71	0			+	$\left  \cdot \right $	0	+	+		+		┨║┓╗
0	Red, weathered				8 -		—	+								
	SHALE BEDROCK				-											
	with limestone layers				-							_				
5.5		9		50/13	9 -			<u> </u>					8			╡Ш <sup>┻</sup> ╧
3	END OF BOREHOLE						-+	+		+	+	Ť				-
	Installed 50 mm Ø PVC monitoring well to							+								-
	9.1 m (3.0 m screen) Sand backfill from 5.5 to 9.1 m				10 -	₽	+	+	$\vdash$	+	+	+	+	++		-
	Bentonite holeplug from 0.3 to 5.5 m				-		_	1								-
	Provided with an aboveground steel monument casing with top and bottom caps							-								-
	and a lock				11											

Page: 1 of 1

PROJ	<b>ECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, be	etween	McLauç	ghlin	Roa	d ar	DR	RILI	LIN	G E	DATE:			(Soli	t-Auge d Stem , 2017	) )
		ç	SAMP	LES		• 10	-	namic 10	Cone (I 50	blows 70		m) 90		Atte	rbera	Limits		
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	×	She	ear St 100	rength ( ) 15  on Res vs/30 c 50 	(kN/m 50 sistan	1²) 200 ce	↓ ↓ 90 ↓		PL 				WATER LEVEL
56.6	Ground Surface						_					_			1			
0.0	28 cm TOPSOIL	1	DO	7	0	0									22 ●			
	SILT	2	DO	8	1 -	0								2	20			
55.1	traces to some clay and sand				-													-
1.5	Brown, compact SILTY SAND TILL	3	DO	12	2 -	0								17				
	a trace to some clay a trace of gravel	4	DO	23	-		0							14				-
	occ. wet sand and silt seams and layers, cobbles and boulders				3 —									1				-
		5	DO	25	-		0							)				
					4 -													Drv on completion
52.0 4.6	Grey, stiff	6	DO	14	-	C	>								23 ●			
	SILTY CLAY a trace of sand				5 -													-
	occ. gravel																	
50.5 6.1	Dense to very dense	7	DO	48	6 -				0				8					-
	SANDY SILT TILL				-													-
	traces to some clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders				7 -													-
	r <u>ed</u> di <u>sh-grey</u> red	8	DO	75						(	S		6 ●					-
					-													-
					9 -								6					
47.3 9.3	END OF BOREHOLE	9	DO	50/15	-							0						-
																		-
					10 -							-						-
																		-

						E NO.: 28 FIGURE NO	.: 28
	ECT DESCRIPTION: Proposed Reside ECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	e 2 essio	n 2			METHOD OF BORING: Flight-Auger (Solid Stem) DRILLING DATE: December 6, 2017 lin Road and Chinguacousy Road	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	<ul> <li>Dynamic Cone (blows/30 cm)</li> <li>10 30 50 70 90</li> <li>X Shear Strength (kN/m<sup>2</sup>)</li> <li>50 100 150 200</li> <li>Penetration Resistance (blows/30 cm)</li> <li>Moisture Content (%)</li> <li>10 30 50 70 90</li> <li>10 20 30 40</li> </ul>	WATER LEVEL
255.9 0.0	Ground Surface 25 cm TOPSOIL organic inclusions- weathered SILTY CLAY TILL	1	DO	10	0 -	↓         16           ↓         ↓           ↓         ↓           ↓         ↓           ↓         ↓           ↓         ↓           ↓         ↓           ↓         ↓           ↓         ↓	
254.0	a trace to some sand a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	2	DO DO	20 19	1 -	↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓     ↓       ↓ </td <td></td>	
1.9	Compact SILT brown grey a trace to some clay a trace of sand	4	DO	20		↓         21           ↓         ↓	
		5	DO	19	4		Dry on completion
	<u>clay layers</u>	6	DO	20	5		Dry on co
249.8 6.1 249.3 6.6	Grey, stiff SILTY CLAY TILL traces of sand and gravel	7	AS	15	6 -	0 13 0	
0.0	occ. wet sand and silt seams and layers, cobbles and boulders END OF BOREHOLE				7		
					8		
					10		
		Sc	oil	En	gin	eers Ltd.	1 of 1



	NO.: 1708-S057 LOG OF					E	NC	<b>)</b> .: 30			FIGU	IRE N	<i>O.:</i> 30
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	e 2 essio	n 2			Jhlin Ro	oad ar	METHOD DRILLING nd Chinguaco	G DAT	TE: Dec	(Sol	ht-Auge id Sten 7, 2017	n)
EI.			SAMP	LES	(m)	10	30		n) 90 ⊥	Atterb PL	erg Limit LL		/EL
(m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	50	0 100	0 150 200 ion Resistance ws/30 cm) 50 70 9		<ul> <li>Moistur</li> <li>10 20</li> </ul>		nt (%) 40	WATER LEVEL
256.5	Ground Surface												
0.0	28 cm TOPSOIL Brown, compact SILTY SAND TILL	1	DO	14	0 -	0				12			-
255.0	traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders	2	DO	20		¢	,			12			-
1.5	Brown, stiff SILTY CLAY TILL some sand to sandy a trace of gravel	3	DO	16	- 2 -	0				11			-
254.2 2.3	occ. wet sand and silt seams and layers, cobbles and boulders Brown, compact	4	DO	16		0				14			-
<u>253.2</u> 3.3	SANDY SILT TILL a trace to some clay a trace of gravel occ. wet sand and silt seams and grey	5A 5B	DO	26	_ 3 _		0			12 1•			-
	\layers, cobbles and boulders / Stiff to very stiff				4 –								mpletion
	a trace to some sand a trace of gravel occ. wet sand and silt seams and	6	DO	16	- 5 -	0				16			Dry on completion
	layers, cobbles and boulders												-
249.9	grey reddish-grey <u>cobble</u>	7	DO	25	6		0			12 ●			
6.6	END OF BOREHOLE				7 -								-
													-
					8 -								-
					9 _								-
					10								-
					11								-
		Sc	oil	Er		ee	rs	Ltd.				Page:	1 of 1

PROJ	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	essio		etween	McLaug	Jhlin	Roa	ad ar					Decer	(Solid nber 7,	Stem) 2017		
EI. (m) Depth (m)	SOIL DESCRIPTION		SAMP		Depth Scale (m)	10 	< Sh 50	30 ear St 100	50 I I trength ( 0 15 I I ion Resi	(kN/m²) 0 200 istance	90	F	>∟ ┣───	g Limits LL 			WATER LEVEL
(11)		Number	Type	N-Value	Dept	10	-	(blo <sup>.</sup> 30	WS/30 CI		90 I			30 4	(%) ₄0 └──└──		MAI
255.8 0.0	Ground Surface 25 cm TOPSOIL Brown, firm, weathered	1	DO	5	0 -	0							16 ●			Π	
255.0 0.8	SILTY CLAY TILL a trace to some sand a trace of gravel	2	DO	12	 -   1 _	C	<b>,</b>						18			I	
<u>254.3</u> 1.5	occ. wet sand and silt seams and layers, cobbles and boulders with organic inclusions Brown, compact SILTY SAND TILL	3	DO	17			0						5			I	
	traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders Very stiff to hard	4	DO	29	2		(	2				12 ●				I	
	SILTY CLAY TILL brown grey	5	DO	22	3 -		0						17 ●			I	
	a trace of sand to sandy a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders				4											I	mnletion
		6	DO	20	- 5 -		0					11				I	Drv on completion
					6								18			I	
		7	DO	24			0						•			I	
		8A			7							11 7 ●				I	
	silt_layers red	8B	DO	54	8				0			•					
<u>246.7</u> 9.1	Red	9	DO	50/13	9 -						•	7					
	SHALE BEDROCK with limestone layers				10 -											- <b>•</b> - <b>•</b> - <b>•</b>	
244.8	weathered (Continued on next page)	10	AS	-								10					

PROJECT LOCATION:     Mayfield West Phase 2 Part of Lot 18, concession 2 North side of Mayfield Road, between McLaughin Road and Chinguacousy Road Town of Caledon     DRLLING DATE:     Descender 7.       Image: Control of Caledon     SAMPLES     Image: Control of Caledon     Image: Control of Caledon     Atterberg Linits       Image: Control of Caledon     SOIL     SOIL     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon       Image: Control of Caledon     SOIL     SOIL     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon       Image: Control of Caledon     SOIL     SOIL     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon       Image: Control of Caledon     SOIL     Image: Control of Caledon       Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon       Image: Control Caledon     Image: Control of Caledon       Image: Control Caledon     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon     Image: Control of Caledon       Ima	JOB	NO.: 1708-S057 LOG OF	B	OF	REF	IOL	<b>_E NO.: 31</b> FIGURE NO.: 31
Drift Lot 18, Concession 2 Town of Caledon         Difference           Fil.         SAMPLES         Image: Concession 2 Town of Caledon         Image: Concession 2 Town of Caledon         Attractory of Solit         Attractory of Solit         Attractory of Solit         Image: Concession 2 Town of Caledon         Image: Co				Deve	lopmer	nt	METHOD OF BORING: Flight-Auger (Solid Stem)
SAMPLES         Image: Construction of the second seco		North side of Mayfie			etween	McLau	
110       (Continued) Red         SHALE BEDROCK         243.6       With limestone layers         112.2       END OF BOREHOLE         12.2       END OF BOREHOLE         12.2       END OF BOREHOLE         13       13         14       14         15       14         16       17         17       18         18       19         20       10				SAMP	LES		10 30 50 70 90 Atterberg Limits
11.0       (Continued) Red         11.0       (Continued) Red         SHALE BEDROCK       11         12.2       END OF BOREHOLE         12.2       END OF BOREHOLE         12.2       END OF BOREHOLE         13.3       11         14       14         15.5       11         16       14         17       14         18       16         19       10         20       10	(m)					cale (m	×         Shear Strength (kN/m²)         PL         LL         III           50         100         150         200         III         III         III
Red         SHALE BEDROCK         uith limestone layers         12.2         Installed 50 mm 0 PVC monitoring well to 12.2 m (3.0 m screen)         Sand backfill from 8.5 to 12.2 m         Bentonite holeplug from 0.3 to 8.5 m         Provided with an aboveground steel monument casing with top and bottom caps and a lock         14         15         16         17         18         19         20			Number	Type	N-Value	Depth S	O (blows/30 cm) ● Moisture Content (%)
223.6       with limestone layers       11       AS       -       12         Installed 50 nm Ø PVC monitoring well to 12.2 m (3.0 m screen)       Image: Constraint of the state of	11.0	<i>(Continued)</i> Red				11	
2413       THU NOF BOREHOLE         122       END OF BOREHOLE         Installed 50 mm Ø PVC monitoring well to 12.2 m (3.0 m screen)       13         Sand backfill from 0.3 to 8.5 m         Provided with an aboveground steel monument casing with top and bottom caps and a lock         14         15         16         17         18         19         20							
12.2 m (3.0 m screen) Bentontle holeplug from 0.3 to 8.5 m Provided with an aboveground steel monument casing with top and bottom caps and a lock 14 15 16 16 17 18 18 19 20			11	AS	-		
monument casing with top and bottom caps and a lock		12.2 m (3.0 m screen) Sand backfill from 8.5 to 12.2 m Bentonite holeplug from 0.3 to 8.5 m				13 –	
		monument casing with top and bottom caps				14 -	
						_	
						15 -	
						16 -	
						17 -	
						18 -	
						19 -	
						20 -	
						21 -	
						22	
Soil Engineers Ltd.			Sc	oil	En	gin	Page: 2 of 2

	NO.: 1708-S057 LOG OF					_E	<b>[</b>	<b>N</b> C									RE N		: 32
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	e 2 essio	n 2			ghlin	Roa	ad ai	D	RIL	LIN	G D	F BOR ATE: Road		(	(Soli	d Ste	m)	
			SAMP	LES		10	-	30	Cone 50	7		m) 90 I		Atterb PL	oerg L	_imits	6		
El. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	1	50 	near S 10 1 enetrat (blo 30	0	150 I esista ) cm)	200 	90	• Mo	<b> </b> Distur		nten			WATER LEVEL
255.6	Ground Surface	z	⊢ 	z			, 					90	10	20	) 3	30 	40		
0.0	28 cm TOPSOIL	1	DO	8	0										28				
	Firm to very stiffinclusions	Ľ				H													
	SILTY CLAY TILL a trace of sand to sandy a trace of gravel	2	DO	7	1 -	0								18					
	occ. wet sand and silt seams and <u>weathered</u> layers, cobbles and boulders	3	DO	17	2 -		0							17 ●					
		4	DO	19			0												
	brown				3 -					-				17					
	grey	5A 5B	DO	16			0							1 <b>5</b>					-
					4 -														mpletior
		6	DO	15			0						1	4					Dry on completion
					-														
249.5 6.1	Very dense	7A			6 -								9						
249.1 6.5	SANDY SILT TILL reddish-grey a trace to some clay a trace of gravel	7B	DO	68	. –					C			6 •						
	occ. wet sand and silt seams and       layers, cobbles and boulders       Red, weathered				7 -														
247.8 7.8	SHALE BEDROCK with limestone layers END OF BOREHOLE	8	DO	50/15	8 -							¢	7						
					_														
					9 -														
					-														
					10 -														
					-														
I			_ = #	<b></b>		1													
		30	)	En	gin	10	el	S	L	<i>I</i> a						I	Page	):	1 of 1

PRO.	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conc North side of Mayfie Town of Caledon	essio	n 2 ad, be	etween	McLau	ghlin	Road	d and	DRILL	.ING D	F <b>BORII</b> P <b>ATE:</b> [ Road		(Solid	Stem)	
			SAMP	LES	_	10	30		one (blows 50 70	90	Atte	erberg	Limits		
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)		She	ar Stre 100 etratio (blows	ngth (kN/m	<sup>2</sup> ) 200	PL ┣ ● Mois	sture Co	LL 		WATER LEVEL
255.9	Ground Surface														
0.0 255.1	25 cm TOPSOIL Brown, firm, weathered <u>sand seams</u> SILTY CLAY a trace of sand	1	DO	7	0	0						20			
0.8	Brown, loose, weathered <u>clay layers</u> SILTY FINE SAND a trace of clay	2	DO	6	1 -	0						5			l
1.5	Brown, compact SANDY SILT	3	DO	26	2 -		0					19			l
	a trace of clay occ. gravel	4	DO	26			0					7			l
252.9 3.0	Dense SILTY SAND TILL brown a trace to some clay grey	5A 5B	DO	41	3 -			0			11 8● ●				1
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders				4 -										ц
<u>251.3</u> 4.6	Grey, very stiff SILTY CLAY TILL	6	DO	27	5 -		0				10				m on completion
	sandy, a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders														
<u>249.8</u> 6.1	Dense to very dense SANDY SILT TILL	7	DO	38	6 -			0			8				W.L. @ El. 248.6
	traces to some clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders				7 -										
<u>247.8</u> 8.1	reddish-greyred 	8	DO	54	8 -				0		8				l
					9 -										l
															l
					10 -										l
					11										I

ROJ	<b>ECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, be	etween	McLauç	ghlir	ו R	oad	l an	D	RIL	LIN	G D	ATE	: No		(Solid	t-Auge I Stem 9, 2017	I)	
EI.		S	SAMP	LES	(m)	1	0	30	1	50	70		m) 90 I		Atteri PL	berg I	Limits LL			/EL
(m) epth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	1	0	Pene	(blov	) 1 on Re vs/30 50	50 sistan cm) 70	ice	90	• N 10			ontent	(%) 40		WATER LEVEL
59.5	Ground Surface																			
0.0	Brown, firm to hard	1	DO	7	0	0									2	21 ●				
	SILTY CLAY TILL <u>weathered</u> a trace to some sand a trace of gravel	2	DO	18	1 -		0								16					
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	23	2 -			С							15 •					
		4	DO	34				(	C						13 ●				-	
6.1		5A	DO	50	3 -					0				10	15 ) ●					
.4 <u>4.9</u> .6	Brown, dense SILTY SAND TILL a trace of clay a trace to some gravel occ. wet sand and silt seams and layers, cobbles and boulders Very stiff SILTY CLAY TILL a trace of sand to sandy - reddish-grey grey	5B 6	DO	19	4 -		C	)						10	)				· · · · · · ·	
3.4	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders				6 -									8						
3.3 2	Grey, very dense SILTY SAND TILL traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders END OF BOREHOLE	_7_	DO	50/8	7 -															
	Installed 50 mm Ø PVC monitoring well to 6.1 m (1.5 m screen) Sand backfill from 4.0 to 6.1 m Bentonite holeplug from 0.3 to 4.0 m Provided with an aboveground steel				8 -															
	monument casing with top and bottom caps and a lock				9 -														- - -	
					10 -														-	
					11														-	

JOB	<b>NO</b> .: 1708-S057 <b>LOG OF</b>	B	C	REF	101	_E	Ν	IC	).:	3	34	S				FIG	UR	E No	0.:	34E
	JECT DESCRIPTION: Proposed Reside JECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	e 2 essioi	n 2			ghlin	Roa	d an	DI	RIL	LIN	G E	DAT	Έ: Ι		Fli (S ember	olid	Sterr	ו)	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	10     	3 Shi 50 Pei	namic   30   ear Str 100   netratio (blow 30 	50 L ength	70 (kN/r 50	) m²) 200 L	2m) 90 - - 90 -	•	PI F	L	rg Lin	∟∟ <b>- </b>		_	WATER LEVEL
259.5 0.0 255.5 4.0	END OF BOREHOLE END OF BOREHOLE Installed 50 mm Ø PVC nested monitoring well to 4.0 m (1.5 m screen) Sand backfill from 1.8 to 4.0 m Bentonite holeplug from 0.3 to 1.8 m Provided with an aboveground steel monument casing with top and bottom caps and a lock				0 - 1 - 2 - - 3 - - 4 - - - - - - - - - - - - - -															Dry on completion W.L. @ EL 258.7 m on February 1. 2018 I
		Sc	oil	En	ngir	l	er	S		td							Pa	age:	1 (	of 1

PRO.	JECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	essio	n 2 ad, bi	etween	McLaug	hlin R	oad an	DRILLII	IG DA		Flight-Aug (Solid Ster mber 27, 201	m)
		ç	SAMP	LES		• I 10	Dynamic 30	Cone (blows/30 50 70	cm) 90	Atterber	rg Limits	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	× 50	Shear Str ) 100 Penetratio	ength (kN/m <sup>2</sup> ) 150 200 1 1 1 1 on Resistance <i>rs</i> /30 cm) 50 70 1 1 1		PL 	Content (%)	WATER LEVEL
260.5 0.0	Ground Surface				0							<b>↓</b>
0.0	15 cm TOPSOIL Stiff to hard clayey SILTY CLAY TILL	1	DO	12	0 -	0				18 •		
	traces to some sand and gravel occ. wet sand and silt seams and layers, cobbles and boulders	2	DO	38	1 -		0			15		
		3	DO	30	2 –		0			15		_
		4	DO	26	-		0			13		
	<u>brown</u> grey	5	DO	25	3 -		0			12		
					4 —							
		6	DO	17	5 –	0				12		
254.1	grey reddish-grey	7	DO	50/13	6 —				•	10		
6.4	END OF BOREHOLE Installed 50 mm Ø PVC monitoring well to 6.1 m (3.0 m screen)											
	Sand backfill from 2.4 to 6.1 m Bentonite holeplug from 0.3 to 2.4 m Provided with an aboveground steel monument casing with top and bottom caps				-							_
	and a lock				8 —							_
					9 —							
					10 _							_
					11							

PROJECT DESCRIPTION:     Proposed Residential Development     METHOD OF BORING:     Flight-August (Sidi Stern)       PROJECT LOCATION:     May and the these 2 part of Unit 8, Consense 2 town of Caledon     DRILLING DATE:     November 27, 2017       Prime     SAMPLES     Image: Stern Ste		NO.: 1708-S057 LOG OF						10.	: 36	)		FIGUR	RE NC	D.: 36
El. (m) (m) (m)         SOIL DESCRIPTION         SOIL (m) (m)         SOIL (m) (m)         SOIL (m) (m)         SOIL (m)         Attacharg Limits (m)         Matcharg Limits (m)		<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield	e 2 essio	n 2			ghlin Roa	I	DRILLIN	IG D	ATE: N	(Solid	Stem	)
258.8         Ground Surface         Image: Construction of the second se	(m)			SAMP		cale (m)	10 : X Sh	30 50 IIII ear Strenç	) 70         gth (kN/m²)	90 I				LEVEL
0.0       Stiff to very stiff       1       DO       10       0       14         SILTY CLAY TILL      weathered       4       1       14       14         a trace to some sand       2       DO       18       1       14         a trace of gravel       3       DO       20       1       14         a trace of gravel       3       DO       20       1       1         25.6      wethered       5       DO       20       1       1         25.6      wethered       5       DO       20       1       12         4       DO       30      wethered       1       1       12         4       DO       30      wethered       12       12       12         4       DO       30      wethered       12       12       12         25.6      wethered       5       DO       20       4       12       12         25.4      wethered       5       DO       50       5       12       14       14       14         25.4      wethered       6       DO       50/8       5       12			Number	Type	N-Value	Depth S		(blows/3	30 cm)	90 I				WATER LEVEI
a trace to some sand a trace of gravel occ. wet sand and sill seams and layers, cobbles and boulders 2 DO 18 3 DO 20 4 DO 30 255.6 255.6 255.6 255.6 255.6 255.6 255.6 255.6 255.6 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 267.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 27.9 2 2 2 2 2 2 2 2 2 2 2 2		15 cm TOPSOIL Stiff to very stiff	1	DO	10	0	0							
layers, cobbles and boulders       3       DO       20         4       DO       30         255.6		a trace to some sand a trace of gravel	2	DO	18		0				14			
255.6		layers, cobbles and boulders	3	DO	20	2 -	•				11			
25.6		brown	4	DO	30			<b>D</b>						
a trace to Gray       a trace to Some sand         254.2       4.6       Very dense       6       DO       50/8         SANDY SILT TILL       traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders       7       7         252.6      red       7      red       7         6.2       END OF BOREHOLE       red       7      red         7      red      red      red      red         8      red      red      red      red         9      red      red      red      red		Grey, compact	5	DO	20		0							u u
SANDY SILT TILL traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders 6.2 END OF BOREHOLE 6.2 END OF BOREHOLE 9 9 1 1 1 1 1 1 1 1 1 1 1 1 1		a trace to some sand	6		E0/9	4 -								Dry on completion
252.6		SANDY SILT TILL traces of clay and gravel occ. wet sand and silt seams and	0		50/8	5 -								Dry c
			7	DO	50/8					0				
						-								
						9 -								
						10 -								
Soil Engineers Ltd.			Sc	oil	En	gin	neer	s L	.td.			<u>       </u>	) 906.	1 of 1

JOB	NO.: 1708-S057 LOG OF	B	OF	REF	IOL	_E	. N	10	•	37	7		FIGL	IRE N	<i>O.:</i> 37
	IECT DESCRIPTION: Proposed Reside		Deve	elopmer	nt				ME	тно	DO	F BORING	G: Flig (So	ht-Auge lid Sten	er n)
	Part of Lot 18, Conce North side of Mayfiel Town of Caledon	essio	n 2 ad, be	etween	McLau	ghlin	Roa					DATE: Nov y Road	vember 2	27, 201	7
			SAMP	LES		10	-			ows/30 70	cm) 90		oerg Limi		
El. (m)	SOIL DESCRIPTION				cale (m)	>	<b>〈</b> She 50	ear Stre 100	ngth (kl 150		0	PL F	LI <b> </b>	-	LEVEL
Depth (m)		Number	Type	N-Value	Depth Scale (m)	10	)		/30 cm	tance ) 70	90	<ul> <li>Moistur</li> <li>10 20</li> </ul>		nt (%)	MATER LEVEI
260.0 0.0	Ground Surface 23 cm TOPSOIL				0										
0.0	Firm to hard	1	DO	8	0	0						15 •			_
	SILTY CLAY TILLweathered											12			_
	a trace of sand to sandy a trace of gravel	2	DO	28	1 -		C					•			_
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	24			0					13			-
	-	3		24	2 -										-
		4	DO	25			0					14			_
					3 -										_
	<u>brown</u> red	5	DO	36				0				14			_
															– u
					4 -										Dry on completion
	r <u>ed</u> redgrey											10			
	33	6	DO	27	5 -		C					•			Dry 6
					· ·										_
												4			_
253.9 253.8 6.2	Grey, very dense SANDY SILT TILL	7	DO	50/13	6 -						- (				_
	traces of clay and gravel occ. wet sand and silt seams and														_
	layers, cobbles and boulders END OF BOREHOLE				7 -										-
					· · ·										-
					8 -										_
															_
					9 -										_
															_
					10 -										
															_
					11										_
		Sa	oil	En	gin	e	er	s	Lto	d.				Page	: 1 of 1
	•													i aye	

PRO.	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio		etween	McLauç	ghlin	Road		DRII	LLIN	IG D	ATE: N	(	Flight-Aug (Solid Ster per 27, 201	m)
		ç	SAMP	LES		10			0	70	cm) 90		erberg L	_imits	
EI. (m) epth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)		Shea	ar Strer 100 l etration (blows)	ngth (kN 150 I Resista /30 cm)	I/m²) 200  ance	90		ture Co	LL 	WATER LEVEL
60.0	Ground Surface														
0.0	25 cm TOPSOIL	1	DO	6	0	0							21 ●		
	SILTY CLAY TILL <u>weathered</u>	2	DO	12			,					13			
	a trace to some sand a trace of gravel occ. wet sand and silt seams and	2		12								10			
	layers, cobbles and boulders <u>sand layers</u>	3	DO	22	2 -		0					13			-
		4	DO	29			0	· ·				13			
					3 -										_
	<u>brown</u> red	5	DO	49				C				10			
					4 -										
55.4	clay seams/				-							13			etion
4.6	Grey, very dense <u>cobble</u> SILT	6	DO	76/25	5 -						+ \$				m on completion
	a trace of clay a trace to some sand				-										
53.9	occ. gravel				6 -							8			252.
0.1	Red, hard SILTY CLAY TILL a trace to some sand	7	DO	50/13	_						¢				() () () () () () () () () () () () () (
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders				7 -										
52.4	layers, cobbles and boulders				-							8			<u> </u>
52.3 7.7	Red, weathered SHALE BEDROCK with limestone layers	8	DO	50/13	8 -						0				
	END OF BOREHOLE				-										_
	Installed 50 mm Ø PVC monitoring well to 7.6 m (3.0 m screen)				-										_
	Sand backfill from 4.0 to 7.6 m Bentonite holeplug from 0.3 to 4.0 m Provided with an aboveground steel				9 —										
	monument casing with top and bottom caps and a lock				10 -										
															_
					11										

Part of Lo	Vest Phase t 18, Conce e of Mayfield	2 ssio		lopmei	nt		I	METHOD C	F BORING	G: Flight-Auge	۶r
Part of Lo North side	t 18, Conce e of Mayfield	ssio	_							(Solid Sten	1)
				etween	McLau	ghlin Roa		<b>DRILLING</b> Chinguacous		vember 27, 201	
		Ś	SAMP	LES		-	30 50		Attert	perg Limits	
EI. (m) SOIL					le (m)			gth (kN/m <sup>2</sup> )	PL		EVEL
Depth (m)		Number	Type	N-Value	Depth Scale (m)		100 netration (blows/3 30 50 1 1 1		Moistur     10 20	re Content (%)	WATER LEVEL
260.2         Ground Surface           0.0         20 cm TOPSOIL					0				12		
Firm to hard		1	DO	7		0			•		
SILTY CLAY TILL	weathered								12		-
a trace of sand to sandy a trace of gravel	<u></u>	2	DO	20	1 -						_
occ. wet sand and silt seams and layers, cobbles and boulders									13		-
		3	DO	21	2 -				•		-
					-				10		-
		4	DO	32	-		0				
-	<u>brown</u> grey	5	DO	23	3 -				10		-
		5		23	-						
					4 -						etion
											Idmo
_	_silt_seams	6	DO	41			0		11		Dry on completion
					- 5 -						- <u> </u>
											_
254.1					6 -	-					
6.1 Reddish-grey, compact		7	DO	29			>		8		_
253.6 6.6 c. wet sand and silt seams and	/				-						
layers, cobbles and boulders END OF BOREHOLE	/				7 -						_
					_						-
					8 -						_
											_
					-	-					_
					9 -	-					-
					-						-
					10 -						-
											-
											_
			_ : /	<b></b>	11			••••			]
		50	)   	EN	gin	neer	5 L	.10.		Page	1 of 1

JOB	<b>NO</b> .: 1708-S057 <b>LOG OF</b>	B	OF	REF	IOL	_E		١O	.:	40	)			F	IGUI	RE NO	0.: 40
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	e 2 essio	n 2			ghlin	Ro	ad and	DRI	LLIN	IG L	DATE	E: No		(Solic	t-Auge d Sten 3, 201 <sup>-</sup>	ר)
			SAMP	LES		10				ows/30 70	cm) 90			rberg	Limits		
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	> ( 10	50     		150 I Resist s/30 cm)	200	90				ontent	<b>(%)</b> 40	WATER LEVEL
258.9	Ground Surface																
0.0	23 cm TOPSOIL Firm to hard topsoil/organic inclusions/	1	DO	8	0	0							1	9			_
	SILTY CLAY TILL    weathered       a trace of sand to sandy	2	DO	24	1 -		С	,					13 ●				_
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	16			0						13 ●				-
					2 -								13				-
		4	DO	30	3 -			0					•				-
	<u>brown</u> red	5	DO	37				0					16 •				
					4 -												npletion
	r <u>ed</u> grey	6	DO	40				0					11 ●				Dry on completion
					5 -												- 0
252.8	Dedessed				6 -							7					-
<u>252.5</u> 6.4	Red, very dense SANDY SILT TILL traces of clay and gravel occ. wet sand and silt seams and	7	DO	50/10													-
	layers, cobbles and boulders END OF BOREHOLE				7 -												-
					8 -												_
																	-
					9 -												-
																	-
					10 -												-
					11												-
		Sc	oil	En	gin	10	eı	rs I	Lto	<b>d</b> .					F	Page:	1 of 1

JOB	NO.: 1708-S057 LOG OF	B	OF	REF	HOL	.E	I N	10	).:	4	1				FIG	UR	'E NG	<i>D.:</i> 41
	IECT DESCRIPTION: Proposed Reside		Deve	lopme	nt						DD O				(S	olid	Stem	ı)
	Part of Lot 18, Conce North side of Mayfiel Town of Caledon	essio	n 2 ad, be	etween	McLauç	ghlin	Roa	id and			ING I			Nove	embe	r 28,	, 2017	!
		ļ	SAMP	LES		10	-	namic C 30	Cone (b 50	lows/3 70	0 cm) 90				erg Lir			
El. (m)	SOIL DESCRIPTION				cale (m	;	≺ Sh 50	ear Stre 100	ength (H 150		00		PI F			⊔∟ −┨		LEVEL
Depth (m)		Number	Type	N-Value	Depth Scale (m)	( 10	)		n Resis s/30 cn 50	stance n) 70	90	•	Moi:	sture	Cont		(%) 10	WATER LEVEI
259.0 0.0	Ground Surface 23 cm TOPSOIL				0								15	5				
	Firm to hard organic inclusions/ SILTY CLAY TILL weathered	1	DO	7		0							10	)				
	a trace of sand to sandy a trace of gravel	2	DO	30	1 -			<b>&gt;</b>					12 ●					-
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	23	2 -		0						14					-
		4	DO	34				0					12 ●					-
		5	DO	32	3 -			0					12 ●					-
					4 -													letion
	brown												14					Dry on completion
	reddish-grey	6	DO	24	- 5 -		0						•					Dry 6
																		-
252.8 6.2 252.4	Grey, compact	7	DO	27	6 -		С							17 ●				
6.6	traces of clay and sand END OF BOREHOLE				7 -													-
																		-
					8 -													-
																		-
					9 -													-
					10 -													-
																		-
		<u> </u>	<u>ו</u> זר		igin		or	<u>с</u>	+									<u> </u>
		<u> </u>	<i>)</i>		'ym			31		u.						Ρ	age:	1 of 1

	<b>NO.:</b> 1708-S057 <b>LOG OF</b>					.E	Ν	10	).:	42	2				FIG	URE	NC	) <i>.:</i> 42
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	e 2 essio	n 2			Ihlin	Roa	id and	DR	ILLI	NG	DAT	SORII TE: N ad		(Sc	olid S	stem)	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	10  X	50 Pei	80 ear Stre 100 L L netratio (blow	Cone (b 50 ength (k 150 n Resis s/30 cn 50	70 (N/m <sup>2</sup> ) ) 20 stance	90 I		Atte PL • Mois		L	.L <b> </b>	6)	WATER LEVEL
259.1 0.0	Ground Surface 25 cm TOPSOIL Stiff to very s	1	DO DO	11 23	0 -	0	0						13	24				
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	25	2		0						14 • 12					1
		4	DO	30 21	3		0						15					uo
	brown reddish-grey grey/ silt layers	6	DO	20	4		0							24				Dry on completion
253.0 2 <u>\$2</u> .7 6.4	Grey, very dense SILTY SAND TILL a trace of clay, some gravel to gravelly occ. wet sand and silt seams and layers, cobbles and boulders END OF BOREHOLE	7	DO	50/10	6													
		Sc	Dil	En	gin	<i>e</i> e	er	'S	Lt	d.						Pa	ge:	1 of 1

	<b>NO.:</b> 1708-S057 <b>LOG OF</b>					NO.: 43	FIGURE NO.: 43
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	e 2 essio	n 2			METHOD OF BORIN DRILLING DATE: N Road and Chinguacousy Road	(Solid Stem)
		,	SAMP	LES	-	Dynamic Cone (blows/30 cm)     30 50 70 90     Atte	berg Limits
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	Shear Strength (kN/m²) 50 100 150 200 Penetration Resistance (blows/30 cm) ● Moist	LL J J J J J J J J J J J J J J J J J J
259.0 0.0	Ground Surface 23 cm TOPSOIL				0 -		
0.0	Brown, stiff to very stiff	1	DO	12			ompletion
	a trace to some sand a trace of gravel	2	DO	19			
05/ 7	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	22	2 -	0	@ El. 255.6 m on completion
256.7 2.3 256.0	Brown, dense <u>silt/sand layers</u> SILTY SAND TILL traces of clay and gravel occ. wet sand and silt seams and	4	DO	38		0 12 0	M.L. 6 Cave-in © 1
3.0	layers, cobbles and boulders Brown, dense	5	DO	32	3	O 14	ŢŢŢŢ
	SILTY FINE SAND				4 -		
254.4	a trace of clay						
4.6	Grey, very stiff to hard SILTY CLAY TILL	6	DO	19	5 -	0 14 •	
	traces of sand and gravel occ. wet sand and silt seams and layers, cobbles and boulders				6		
252.6 6.4		7	DO	50/13		• • • • •	
					7 -		
					8		
					9 -		
					10 -		
		Sa	oil	En	gin	ers Ltd.	Page: 1 of 1

PROJ	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, be	etween	McLauç	Jhlin∣	Road	1	DRIL	.LING	DA	<b>TE:</b> N	(	Flight-Au (Solid Str per 28, 20	em)	
El. (m)	SOIL	Č	SAMP	LES	e (m)	10     	30	ar Stren	) 7	/m²)		Atte PL	erberg L	_imits LL ──┫		.VEL
epth (m)	DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	C	50 Pene 30	etration (blows/		nce 0 90				ntent (%)	)	WATER LEVEL
58.4	Ground Surface															
0.0	Stiff to very stiff	1	DO	9	0 -	0							21 ●			
	SILTY CLAY TILLweathered											14				I
	a trace of sand to sandy a trace of gravel occ. wet sand and silt seams and	2	DO	13	1-	-0	)					•				
	layers, cobbles and boulders	3	DO	25	2 -		0					13 ●				Du on comeletion
		4	DO	29			0					14				
					3 –							14				
	<u>brown</u> grey	5	DO	27	-		0					•				
					4 -											
	gr <u>ey</u> gr <u>ey</u> reddish-grey	6A			-							11				
53.5 1.9	Grey, compact	6B	DO	24	- 5 -		0						++			
	SANDY SILT				-											
52.3	a trace of clay occ. gravel				6 -											
5.1 51.8	Grey, dense <u>clay layers</u>	7	DO	36				0				17				
5.6	traces of clay and sand END OF BOREHOLE				7 -											
	Installed 50 mm Ø PVC monitoring well to 6.1 m (3.0 m screen) Sand backfill from 2.4 to 6.1 m															
	Bentonite holeplug from 0.3 to 2.4 m Provided with an aboveground steel				8 -											
	monument casing with top and bottom caps and a lock				-											
					-											
					9											
					10 -								+			
					11											

						<b>E NO.: 45</b> FIGURE NO.: 4
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	e 2 essio	n 2			METHOD OF BORING: Flight-Auger (Solid Stem) DRILLING DATE: November 24, 2017 ghlin Road and Chinguacousy Road
EI. (m) Depth (m) 258.5	SOIL DESCRIPTION Ground Surface	Number	Type	N-Value	Depth Scale (m)	● Dynamic Cone (blows/30 cm)       10       30       50       70       90         10       30       50       70       90       Atterberg Limits         ★ Shear Strength (kN/m²)       50       100       150       200         ● Penetration Resistance (blows/30 cm)       ● Moisture Content (%)       10       20       30       40
0.0	20 cm TOPSOIL     Firm to very stiff  SILTY CLAY TILLweathered a trace to some sand a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	1	DO DO DO	6 28 24	0	
		4	DO	31	- 3 -	
<u>252.4</u> 6.1	<u>brown</u> grey	6	DO	22	- 5 - - 5 - - 6 -	
<u>251.9</u> 6.6	SILT LACES OF Clay and sand END OF BOREHOLE			27		
		Sa	oil	En	ngir.	eers Ltd. Page: 1 of 1

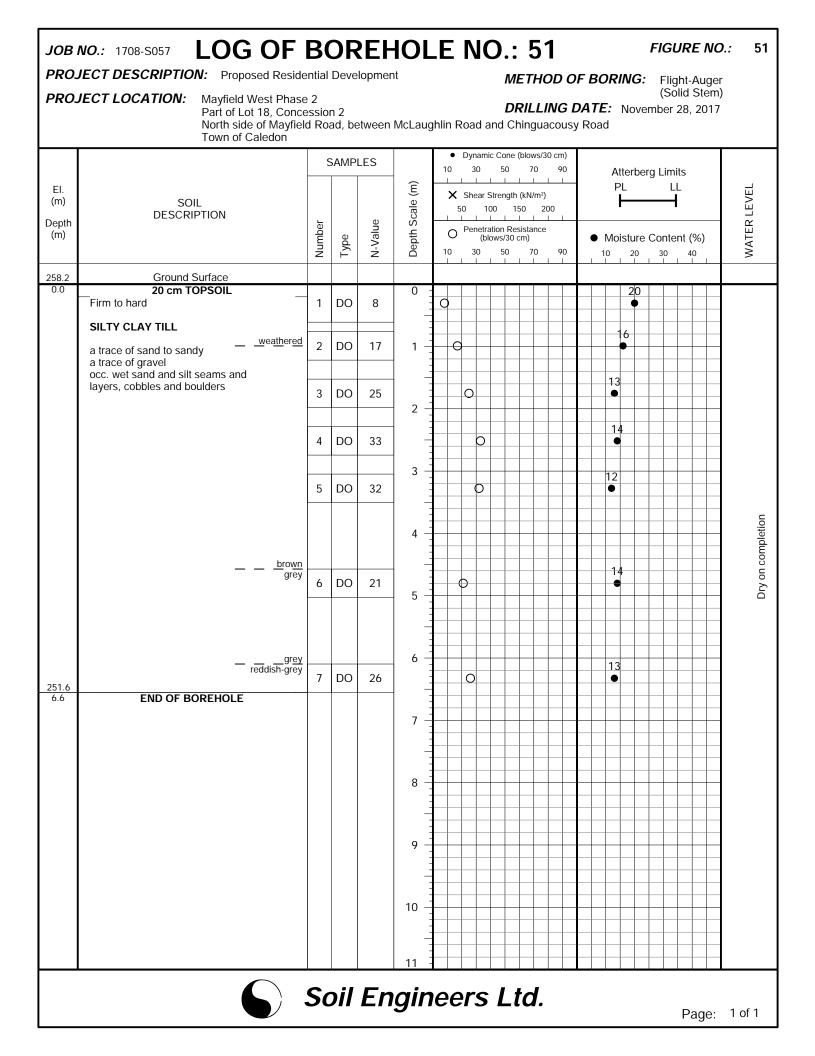
PRO.	<b>JECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	ssio	n 2 ad, b	etween	McLauç	ghlin	ı Ro	ad a	Ľ	ORIL	LLI	NG	DA	BORING TE: Nov oad	(Soli	id Ster	n)	
		ç	SAMP	LES		10		ynami 30	c Con 50		ws/30 70	0 cm) 90		Attorb	ora Limit			
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	 	× s 50 	hear S	Streng 00 L L ows/3 50	th (kN 150 Resista 0 cm)	1/m²) 20 1 ance			PL Moistur	re Conten	-	_	WATER LEVEL
258.4	Ground Surface																	
0.0	20 cm TOPSOIL Firm to hard	1	DO	6	0	0								15 •				
	SILTY CLAY TILL												_	12				
	a trace of sand to sandy organic a trace of gravel inclusions/ occ. wet sand and silt seams and weathered	2	DO	21	1 -		-0							13			_	
	layers, cobbles and boulders <u>silty</u> <u>san</u> d <u>till</u>	3A 3B	DO	18	2 -		0							178 1 1 1			-	
		4	DO	33	-			0						14			╡┫	
	brown				3 —									11				1
	reddish-grey/ sandy silt layer	5	DO	60/18									6	•				•
					4 -													Dry on completion
253.8					-									9				l com
4.6	Reddish-grey, very dense SILTY SAND TILL	6	DO	50/5	5 -								0					Dry of
	traces of clay and gravel				-													
	occ. wet sand and silt seams and layers, cobbles and boulders				-								_					2
252.3 252.1	Red, weathered	7	DO	50/5	6 —								0	9			-  Ш	
6.3	SHALE BEDROCK with clay and limestone layers																_	
	END OF BOREHOLE				7 —												_	
	Installed 50 mm Ø PVC monitoring well to 6.1 m (3.0 m screen) Sand backfill from 2.4 to 6.1 m												-				_	
	Bentonite holeplug from 0.3 to 2.4 m Provided with an aboveground steel				-												_	
	monument casing with top and bottom caps and a lock				8 -												_	
					-												_	
					9 —								_				_	
					-											+	_	
					-											++	_	
					10 -											$\mp$	_	
					-											++	_	
					11													

JOB	<b>VO</b> .: 1708-S057 <b>LOG OF</b>	B	OF	REF	IOL	_E	: <b>r</b>	JC	).:	4	ŀ7				F	IGUI	RE N	0.:	47
	ECT DESCRIPTION: Proposed Reside ECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	e 2 essio	n 2			ghlin	Roa	ad an	D	RIL	LIN	G D	F <b>BO</b> ATE: Road			(Solie	d Ster	n)	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	10  	Sr 50 C	namic 30 L L 100 L L .netrati (blov 30 L L	50 I rength ) 1	70 (kN/r 50 sistan	n²) 200 ice	m) 90 1 1 90		PL 	re Co	Limits LL 		_	WATER LEVEL
258.8 0.0 254.2 4.6 254.2	Ground Surface         20 cm TOPSOIL         Firm to hard       organic inclusions/         SILTY CLAY TILL         a trace of sand to sandy         a trace of gravel         occ. wet sand and silt seams and         layers, cobbles and boulders	1 2 3 4 5	DO DO DO DO DO DO	7 26 30 33 19 59	0									19 13 13 14 0 14 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 0 13 13 0 13 13 0 13 13 0 13 13 13 0 13 13 13 13 13 13 13 13 13 13					W.L. @ EI. 253.0 m on completion
<u>253.9</u> 4.9 <u>252.6</u> 6.2	SILTY SAND TILL traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders Red, weathered SHALE BEDROCK with limestone layers END OF BOREHOLE			59	5 - 6 - 7 - 8 - 9 - 10 - 11														®
		Sc	oil	En	gin	le	er	S	Li	td	•					[	Dage	: 1	1 of 1

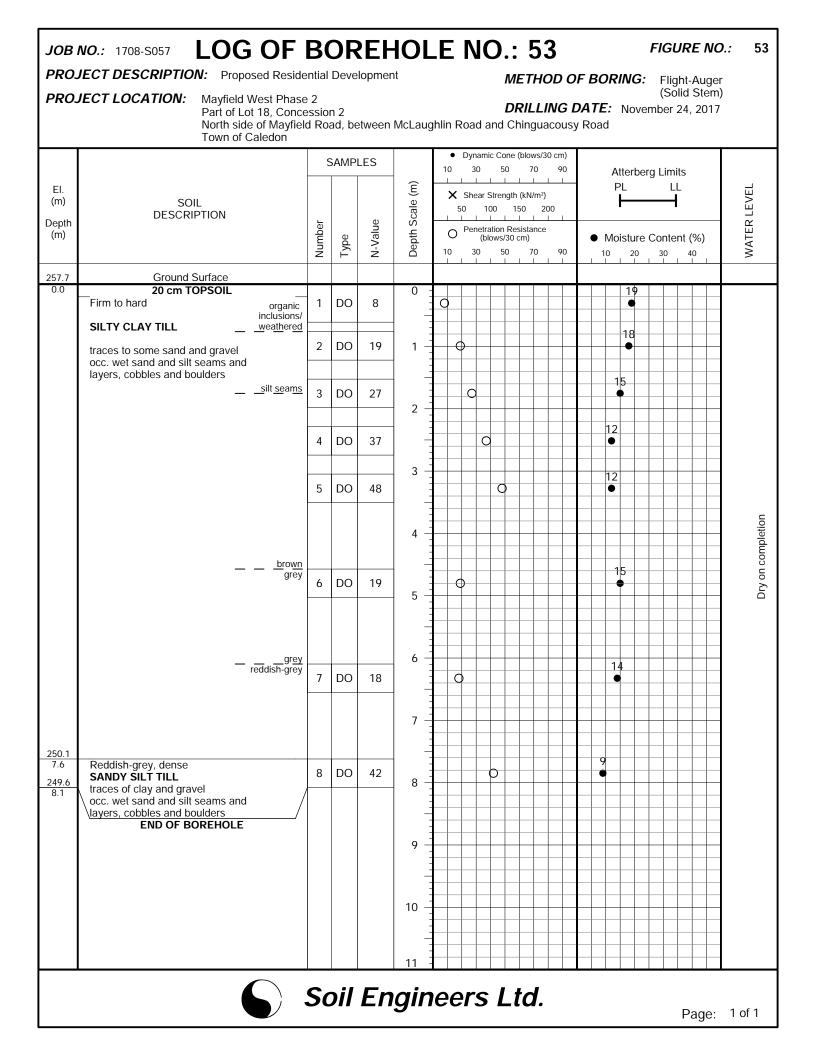
RO.	<b>ECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	essio		etween	McLauç	jhlin Road a			) A <b>TE:</b> Novemb	Flight-Auger Solid Stem) er 27, 2017	)
		ç	SAMP	LES		<ul> <li>Dynam</li> <li>10 30</li> </ul>	nic Cone (blows 50 70		Atterberg L	imite	
EI. m)	SOIL DESCRIPTION				ale (m)	X Shear	Strength (kN/m 100 150	1 1	PL		LEVEL
epth m)	DESCRIPTION	Number	Type	N-Value	Depth Scale	O Penetr (b 10 30	ration Resistant blows/30 cm) 50 70		<ul> <li>Moisture Cor</li> <li>10 20 3</li> </ul>	ntent (%)	WATER LEVEL
58.9	Ground Surface										
).0	20 cm TOPSOIL Firm to hard clayey topsoil inclusions/ weathered	1	DO	6	0	0			13 •		
	a trace of sand to sandy a trace of gravel	2	DO	16	1 -	0			10		
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	18	2 -	0			13		
		4	DO	26	-	0			13		
	<u>brown</u> grey	5	DO	20	3 -				19		
54.3	<u>clay layers</u>				4 -				12		
.6	Red	0		50/3	-						
	SHALE BEDROCK				5 -						
	with limestone layers										
					6 -						etion
					_						@ El. 250.1 m on completion
					7 -						
					-						EI 26
					8 -						
					-						
					9 -						Ì ∳Ī
9.8 .1	END OF BOREHOLE				7			_			
	Installed 50 mm $\emptyset$ PVC monitoring well to				-						
	9.1 m (3.0 m screen) Sand backfill from 5.5 to 9.1 m Bentonite holeplug from 0.3 to 5.5 m				10 -						
	Provided with an aboveground steel monument casing with top and bottom caps										
	and a lock				11						

JOB	<b>NO</b> .: 1708-S057 <b>LOG OF</b>	BO	ЭF	REF	101	_E	N	0.	: 4	19				FIG	URE	NO	9.: 49
	IECT DESCRIPTION: Proposed Reside		Deve	lopmer	nt			1	ИЕТ	HOD	OF E	BORI	NG:	: Fli (S	ght-A olid S	uger item)	
PRO.	JECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	essio	n 2 ad, be	etween	McLau	ghlin	Road			LING juacou			Nove				
			SAMP	LES		• 10	Dynan 30	50	7	0 90	С	At	terbe	erg Lin	nits		
El. (m)	SOIL				lle (m)	×	<b>〈</b> Shear	Streng	 gth (kN/ 150			P	L		∟∟ ┫		EVEL
Depth (m)	DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	10	) Penet		Resista 10 cm)	nce		• Moi	sture	e Cont	ent (%	5)	WATER LEVEI
258.7 0.0	Ground Surface Brown, soft, weathered				0							1	5				
257.9	SILTY CLAY TILL some sand to sandy a trace of gravel	1	DO	4		0						•					
0.8	occ. wet sand and silt seams and layers, cobbles and boulders	2	DO	21	1 -		0					13 ●					
257.2 1.5	Brown, compact SILTY SAND TILL a trace to some clay		5.0									1	6				
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	28	2 -		0										
	Very stiff to hard SILTY CLAY TILL	4	DO	32	] -		0					1!	5			_	
	a trace to some sand	5	DO	28	3 -							11					pletion
	a trace of gravel <u>brown</u> occ. wet sand and silt seams and layers, cobbles and boulders	5		20			0									_	El. 252.9 m on completion
					4 -												2.9 m c
254.0 4.7	red sandy silt		DO	60	-				0			9 8					, El. 25
4.7	Red, weathered SHALE BEDROCK	6B			5 -				-			•				_	W.L. @
	with limestone layers				-							_					Ţ
252.6 6.1	END OF BOREHOLE	7	DO	50/3	6 -							7					
					-												
					7 -												
					-												
					8 -												
					9 -												
					10 -												
					11												
		Sc	oil	En	gir	iee	ers	; L	.ta						Pa	ge:	1 of 1
																5	

	NO.: 1708-S057 LOG OF					_E	ľ	10	.:	5(	)			F	IGU	IRE I	VO.	: 50
	IECT DESCRIPTION: Proposed Resid IECT LOCATION: Mayfield West Phas Part of Lot 18, Com North side of Mayfie Town of Caledon	se 2 cessio	n 2			ghlin	Roa	ad and	DRI	ILLI	NG	DAT	<b>ORIN</b> E: N ad		(Sol	id Ste	em)	
EI. (m) Depth (m)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	10 	Sh 50 Pe	ear Stre 100 netratio (blows	50 ength (k 150 I I n Resis s/30 cm	70 N/m²) 20	90    00 	•	PL H Moist	ure C		- nt (%)	_	WATER LEVEL
257.7 0.0	Ground Surface 15 cm TOPSOIL Brown, stiff to hard SILTY CLAY TILL	1	DO	10											30	40		>
	a trace to some sand a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders	2	DO	18			0						13 • 14					
		3	DO DO	20 36	2		0	0					15					
		5	DO	21	3 -		0						13					F
<u>253.1</u> 4.6	Grey, compact to very dense	6	DO	18	4 -		0						10					Dry on completion
	SANDY SILT TILL traces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders	0	DO	10	5													Dry
<u>251.5</u> 6.2	END OF BOREHOLE	7	DO	50/8	6 -													
					7													
					8 -													
					9													
					10 -													
		Sa	oil	En	gin	10	er	'S I	Lto	d.						Page	e:	1 of 1



<text>         Reddeh-breev were demendent         Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were demendent       Reddeh-breev were</text>	JOB	<b>NO</b> .: 1708-S057 <b>LOG OF</b>	B	OF	REF	101	_E		V	Э.	•	52	2				FIC	GUR	RE N	VO.	: 52
Image: Control Surface         SAMPLES         Image: Control Surface         Image: Control Surface <t< td=""><td></td><td><b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel</td><td>e 2 essio</td><td>n 2</td><td></td><td></td><td>ghlir</td><td>n Ro</td><td>ad a</td><td>Ľ</td><td>DRI</td><td>LLI</td><td>NG</td><td>; DA</td><td>: N</td><td></td><td>(</td><td>Solic</td><td>Ste</td><td>m)</td><td></td></t<>		<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel	e 2 essio	n 2			ghlir	n Ro	ad a	Ľ	DRI	LLI	NG	; DA	: N		(	Solic	Ste	m)	
257.8       Gound Surface       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0		Town of Caledon		SAMP	LES				-								rg Li			T	
00       3cm TOPSOL       1       1       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 <td< td=""><td>(m) Depth</td><td></td><td>Number</td><td>Type</td><td>N-Value</td><td>Depth Scale (m</td><td></td><td>50        </td><td>10 enetra (bl</td><td>00 L L ation F ows/3</td><td>150 I Resist 0 cm)</td><td>20 ance</td><td></td><td>)</td><td><b>⊢</b> ∕lois</td><td>ture</td><td></td><td>-<b>I</b></td><td></td><td></td><td>WATER LEVEL</td></td<>	(m) Depth		Number	Type	N-Value	Depth Scale (m		50       	10 enetra (bl	00 L L ation F ows/3	150 I Resist 0 cm)	20 ance		)	<b>⊢</b> ∕lois	ture		- <b>I</b>			WATER LEVEL
Firm to vary stift       1       DO       6       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1		Ground Surface 23 cm TOPSOIL				0										20					
a trace to some sand a trace of gravel out some sand a trace of gravel systers, cobbles and boulders       3 DO 21 4 DO 30 5 DO 29 6 DO 17 5 DO 29 6 DO 17 5 DO 508 6 DO 177 5 DO 508 6 DO 177 5 DO 508 6 DO 177 5 DO 508 6 DO 177 7 DO 508 6 DO 177 7 DO 508 7 DO 5		Firm to very stiff	1	DO	6		0									•					
251.7     Reddish-grey, very dense     7     0     508     0     7     0     0     7       6     0     17     0     508     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0<		a trace to some sand	2	DO	13	1 -		Э							14						
2517        100       21       2        12       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14       14		occ. wet sand and silt seams and													15					_	
2517         2517         2517         2517         200         6         0         4         6         0         4         4         6         0         6         0         0         0         21         6         0         0         0         210         6         0         0         0         0         0         0         0         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10		layers, cobbles and boulders	3	DO	21	- 2 -		0							•						
251.7         251.6         6       DO         251.7         251.6         6       DO         6       DO         7       DO         9       0         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10			4	DO	30				0												
251.7       Reddish-grey, very dense       7       0       0       7       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 <td< td=""><td></td><td></td><td>5</td><td>DO</td><td>29</td><td>3 -</td><td></td><td></td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>			5	DO	29	3 -			0												
251.7       Reddish-grey, very dense       7       0       0       7       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>ц</td></td<>																					ц
251.7       Reddish-grey, very dense       7       0       0       7       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td>4 -</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>mpletic</td></td<>						4 -															mpletic
251.7       Reddish-grey, very dense       7       0       0       7       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 <td< td=""><td></td><td></td><td>6</td><td></td><td>17</td><td>-</td><td>-</td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>21</td><td></td><td></td><td></td><td></td><td>/ on co</td></td<>			6		17	-	-	0								21					/ on co
231.6       Reddish-grey, very dense       7       DO<					.,	- 5 -															Dry
231.6       Reddish-grey, very dense       7       DO<						-															
Utaces of clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders       7         END OF BOREHOLE       7         9       10         10       10         11       10         10       10         11       10         11       10         11       10         11       10         11       10         11       10         11       10         11       10         11       10         11       10	251.6	Reddish-grey, very dense	7	DO	50/8	6 -								0							
Image: Cobbles and boulders       Image: Cobbles and boulders         END OF BOREHOLE       Image: Cobbles and boulders         Image: Cobbles and boulders	6.2	traces of clay and gravel	ſ																		
$\int Soil Engineers Ltd.$		layers, cobbles and boulders				7 -										-					
$\int Soil Engineers Ltd.$																					
						8 -										-					
Soil Engineers Ltd.						9 -															
Soil Engineers Ltd.																					
Soil Engineers Ltd.						10 -		+								+					
Soil Engineers Ltd.						11															
Page: 1 of 1			<u> </u>	ייי <i>וו</i> ר	Fr	1			rc		+/	-	<u>                                      </u>				<u>                                     </u>				
				<i>)</i>		yırı			3			<i>.</i>						F	Page	e:	1 of 1



El. (m)         SQL DESCRIPTION         SAMPLES         0         0. pyratric correspondence) (n. 3 = 90 = 70 = 70 = 70 = 70 = 70 = 70 = 70		IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	e 2 essio	n 2			hlin	Ro	ad a	Ľ	ORIL	.LIN	IG E	F BORIN DATE: No Road	(S	olid Ster	m)	
EL (m) DESCRIPTION B B B B B B B B B B B B B			9	SAMP	LES									0.44		. 11 .	Τ	
0.0       20 cm TOPSOL       arganic       1       DO       11         SHIT to hard	(m) Depth		Number	Type	N-Value	Depth Scale (m)	:	× s 50 0	hear : 1 enetra (bl	Streng 00 1 1 ation F ows/3 50	th (kN 150 Resista 0 cm) 7	/m²) 200  ince		PL Moistu	l ure Conte	LL <b>- </b> ent (%)	_	WATER LEVEL
Stiff to hard organic granic g		Ground Surface														<del></del>	╇	
a trace of sand to sandy a trace of gravel correction at solutions and layers, cobbles and boulders       2       D0       17       1       Image: Cobbles and boulders         3       DO       20       Image: Cobbles and boulders       1       Image: Cobbles and boulders       1       Image: Cobbles and boulders         -       Sand Iayers       5       DO       49       Image: Cobbles and boulders       10       Image: Cobbles and boulders         -       Sand Iayers       5       DO       19       Image: Cobbles and boulders       11       Image: Cobbles and boulders         -       Sand Iayers       5       DO       19       Image: Cobbles and boulders       Image:	0.0	Stiff to hard organic inclusions/	1	DO	11		C	>										
layers, cobbles and boulders       3       DO       20         4       DO       35         -       sand layers       5       DO       49         -       -       box       -       10         -       -       -       -       -       -         -       -       -       -       -       -         -       -       -       -       -       -         -       -       -       -       -       -         -       -       -       -       -       -         -       -       -       -       -       -       -         -       -       -       -       -       -       -         -       -       -       -       -       -       -         -       -       -       -       -       -       -       -         -       -       -       -       -       -       -       -       -         -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - </td <td></td> <td>a trace of sand to sandy a trace of gravel</td> <td>2</td> <td>DO</td> <td>17</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td></td> <td></td> <td></td> <td></td>		a trace of sand to sandy a trace of gravel	2	DO	17			0						•				
251.5		layers, cobbles and boulders	3	DO	20	2 –		0						13 •				
251.5			4	DO	35				0					10				Dry on completion
251.5		<u>sand layers</u>	5	DO	49	3				0				10				
251.5						4 —											_	ompletion
251.5			6	DO	19	5		0										Dry on c
251.5																		* - -
249.6       Installed 50 mm Ø PVC monitoring well to 7.6 m Bentonite holeplug from 0.3 to 4.0 m Provided with an aboveground steel monument casing with top and bottom caps and a lock       Image: Comparison of the c			7A 7B	DO	50/15	6 –								_				
249.6       8       DO       65         8.1       END OF BOREHOLE       8       O       O       O       O       O         Installed 50 mm Ø PVC monitoring well to 7.6 m       8       Installed 50 mm 0.3 to 4.0 m       9       Installed 50 mm 0.3 to 4.0 m       Installed 50 mm 0.3 to 4.0 m       9       Installed 50 mm 0.3 to 4.0 m       Installed						7 –												
249.6     8.1     END OF BOREHOLE       Installed 50 mm Ø PVC monitoring well to 7.6 m (3.0 m screen)     8       Sand backfill from 4.0 to 7.6 m       Bentonite holeplug from 0.3 to 4.0 m       Provided with an aboveground steel monument casing with top and bottom caps and a lock		occ. wet sand and silt seams and												7				- -
7.6 m (3.0 m screen) Sand backfill from 4.0 to 7.6 m Bentonite holeplug from 0.3 to 4.0 m Provided with an aboveground steel monument casing with top and bottom caps and a lock		END OF BOREHOLE	8	DO	65	8 –					0						_	
Provided with an aboveground steel monument casing with top and bottom caps and a lock		7.6 m (3.0 m screen) Sand backfill from 4.0 to 7.6 m				9 -												
		Provided with an aboveground steel monument casing with top and bottom caps				10												
																	_	

JOB	NO.: 1708-S057 LOG OF	B	OF	REF	IOL	.E	Ν	10	• •	55				F	IGU	REI	VO.	: 55
	IECT DESCRIPTION: Proposed Reside		Deve	elopmen	t				ME1	THOI	D OF	во	RIN	G:	Fligh (Soli	nt-Auថ id Ste	ger	
PROJ	<b>IECT LOCATION:</b> Mayfield West Phase Part of Lot 18, Conce North side of Mayfiel Town of Caledon	essio	n 2 ad, be	etween	McLauç	ghlin	Roa					<b>ATE</b> . Road		ovem				
		Ś	SAMP	PLES		• 10	-	iamic Co 0 5			:m) 90		Atter	berg	Limit	s		
El. (m)	SOIL				e (m)	×		ear Strer					PL	5				.VEL
Depth	DESCRIPTION	Der		lue	Depth Scale (m)		50 Per	netration	Resista	200  ance	_		-		-			WATER LEVEL
(m)		Number	Type	N-Value	Depth	10	, ,	(blows/	'30 cm)		90	• N 10			onten	40		WAT
257.5 0.0	Ground Surface 28 cm TOPSOIL				0 -								2	0				
	Firm to hard topsoil/organic	1	DO	8	-	0							(	•				
	SILTY CLAY TILL inclusions/ weathered	2	DO	25	1 -		0						13					
	a trace of sand to sandy a trace of gravel			25	-													
	occ. wet sand and silt seams and layers, cobbles and boulders	3	DO	25			0						2 •					
					2 -		-					1	2					
		4	DO	39				0										
			<b>D</b> 0		3 —								2					
		5	DO	44				0					•					
					4 —													letion
	brown				-													comp
	grey reddish-grey/	6	DO	22	5 —		0					10	)					Dry on completion
	silt layers																	
					-													
251.1		7	DO	71/18	6 —							10	)					
6.4	END OF BOREHOLE				-													
					7 -													
					-													
					8 -													
					-													
					9 —													
					-													
					10 -													
<b> </b>			••		<u> </u>							[						
		50	Dil	En	gin	<i>ee</i>	er	s L	_tc	1.						Page	e:	1 of 1
																-9		

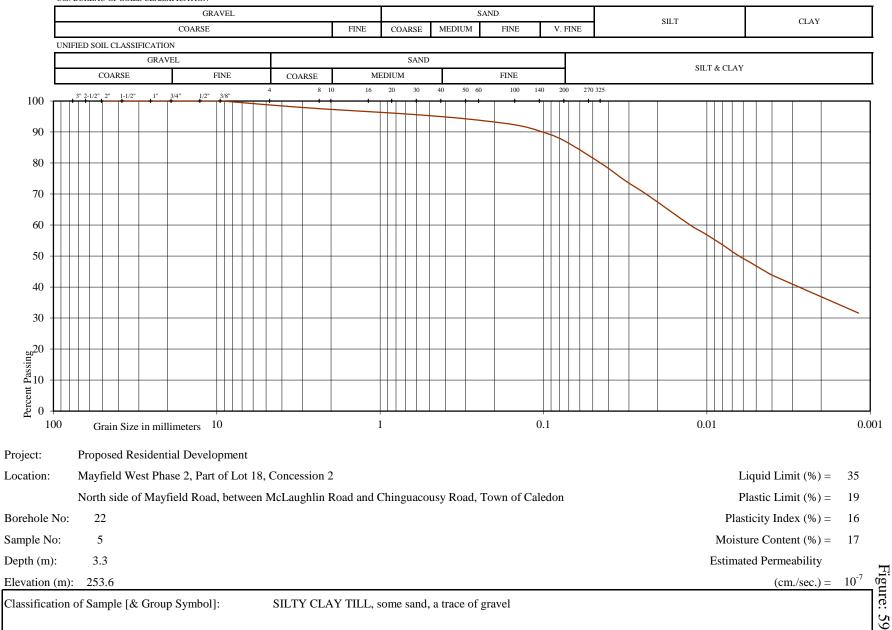
	<b>NO.:</b> 1708-S057 <b>LOG OF</b>					_E	EN	10	•	56	)			FIG	URE I	NO.	: 56
	IECT DESCRIPTION: Proposed Reside IECT LOCATION: Mayfield West Phase Part of Lot 18, Conce	e 2		elopmer	nt							F BOR		(So	olid Ste	em)	
	North side of Mayfiel Town of Caledon	d Ro	ad, b	etween	McLau	ghlin	I Roa								20720		
			SAMF	PLES		10	) :	namic C 30 !	50	ows/30 ( 70	cm) 90			erg Lim		Τ	
El. (m)	SOIL DESCRIPTION				Depth Scale (m)		★ Sh 50	ear Stre 100	ngth (kN 150	-	1	F	י∟ ┣───	L	┨		LEVEL
Depth (m)		Number	Type	N-Value	Depth S	10	9	30 !	s/30 cm) 50	ance ) 70	90	Mo 10	isture		ent (%) 40		WATER LEVEL
256.7	Ground Surface																
0.0	28 cm TOPSOIL			_	0									27			
	Firm to hard clayey —	1	DO	8													
	a trace of sand to sandy topsoil/organic	2	DO	10	1 -	¢	)						22	2 • • • •			
	a trace of gravel inclusions/ occ. wet sand and silt seams and weathered layers, cobbles and boulders	3	DO	26	-		С					13					
					2 -							11					Ľ
		4	DO	66/18							¢						npleti
	brown				3 -							12					on cor
		5	DO	23			0					•					El. 251.5 m on completion
					4 -												EI. 25
	r <u>ed</u> dis <u>h-grey</u> red				-							9					W.L. @
251.8 4.9	Red	6	DO	63/23	5 -												$\overline{\nabla}$
	SHALE BEDROCK				_												Ŧ
	with limestone layers				4									31			
	<u>weathered</u>	-7-	DO	50/3	6 -						C	)		•			
					-												
					7 -												
					8 -												
					-												
247.6 9.1	END OF BOREHOLE				9 -												
7.1	LID OF BOREHOLE																
					10 -												
					-												
					11												
		Sa	oil	En	gir	<b>i</b> e	er	S	Lto	<b>d</b> .					Page	e.	1 of 1
	<b>~</b>														. ug	<u>.</u>	

ROJ	ECT LOCATION: Mayfield West Phase Part of Lot 18, Conce North side of Mayfield Town of Caledon	essio	n 2 ad, be	etween	McLaug	Jhlin	Roa	ad a							ovem	(Soli ber 2		
El.	221		SAMP	LES	(m)	10	)	30	50 I	e (blow 7( 1 1	)	90		Atte PL	•	Limits LL		/EL
n) epth n)	SOIL DESCRIPTION	Number	Type	N-Value	Depth Scale (m)	( 10	)	enetra			nce	90				onten	t (%)	 WATER LEVEL
7.4	Ground Surface								-									
.0	18 cm TOPSOIL Brown, firm to very stiff SILTY CLAY TILL	1	DO	8	0	0								18				
	a trace to some sand topsoil/organic inclusions/	2	DO	15	1 -		0								23 ●			 E
	occ. wet sand and silt seams and weathered layers, cobbles and boulders	3	DO	20			0							1	9			 ompletio
		4	DO	25	2 –		С							14				W.L. @ El. 253.1 m on completion
	silt	- 5A			3									-14				El. 253.1
1.0 3.9 5	Red, dense SILTY SAND TILL	5A 5B	DO	41				¢	) 				8					 N.L. @ F
	some clay and gravel occ. wet sand and silt seams and layers, cobbles and boulders Red				4 –								9					> ¥
	SHALE BEDROCK	6	DO	50/5	5													
	with limestone layers																	
	weathered	7	AS	-	6									•				
					7 -													
													9					
		8	AS	-	8													
<u>8.3</u> 1	END OF BOREHOLE				9 _													
					10 —													
					2													
					11 -													

	JECT DESCRIPTION: Proposed Reside		Deve	elopmen	ι				ME	ТНО	D O	F B	ORIN		Flight- (Solid	Auge Stem	r .)
- NO.	Part of Lot 18, Conce North side of Mayfiel Town of Caledon	essio	n 2 ad, b	etween	McLaug	ghlin	Roa							ovemt	ber 23,	2017	i.
			SAMF	PLES		10	-		one (blo 50	ows/30 70	cm) 90		Atte	erberg I	l imits		
El. (m)	SOIL DESCRIPTION				ale (m)	>	<b>〈</b> She 50	ar Stre	ngth (kl 150		0		PL	-			LEVEL
epth (m)		Number	Type	N-Value	Depth Scale (m)	10	)	(blows	n Resist 30 cm	ance ) 70	90	•			ontent ( 30 4	(% <b>)</b>	WATER LEVEL
57.0	Ground Surface																
0.0	18 cm TOPSOIL Stiff to hardweathered	1	DO	9	0 -	0							15				
	SILTY CLAY TILL a trace to some sand	2	DO	14	1 -		>						1	8			pletion
	a trace of gravel occ. wet sand and silt seams and layers, cobbles and boulders			20	-								13				253.3 m on completion
		3	DO	29	2 -			,					•				53.3 m
		4	DO	19	-		0						13 ●				@ El. 2
53.6	brown red	5A 5B	DO	56/25	3 —						(		12 1●				W.L.
3.4	Red SHALE BEDROCK																Ţ
	with limestone layers				4 —								11				
	weathered	6	DO	50/3								₽	•				
					6 —												
					-												
					7 —												
					-												
					8 —												
47.9 9.1	END OF BOREHOLE				9 —						_						
	Installed 50 mm Ø PVC monitoring well to 9.1 m (3.0 m screen)																
	Sand backfill from 5.5 to 9.1 m Bentonite holeplug from 0.3 to 5.5 m Provided with an aboveground steel				10 -												
	monument casing with top and bottom caps and a lock				11 -												

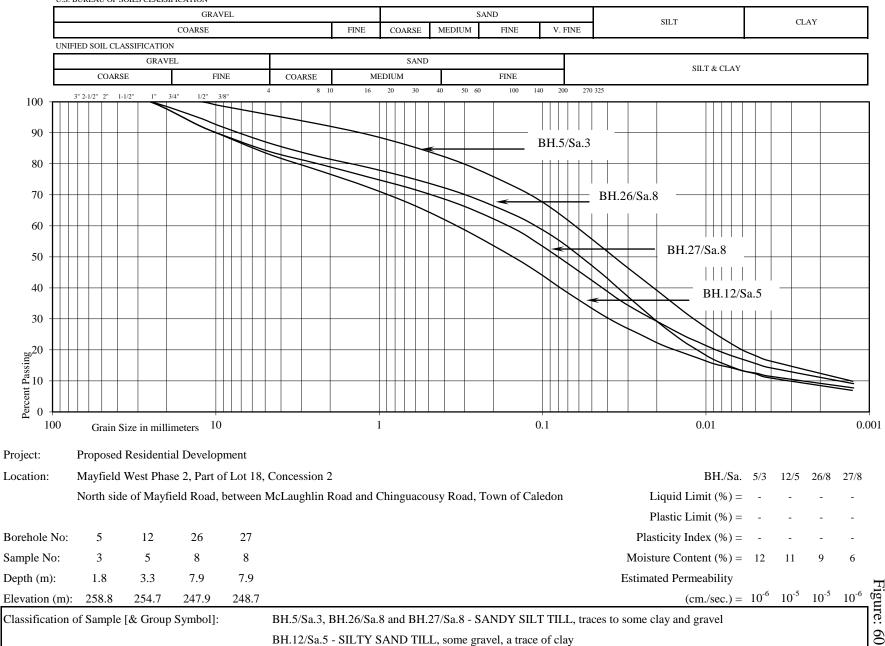
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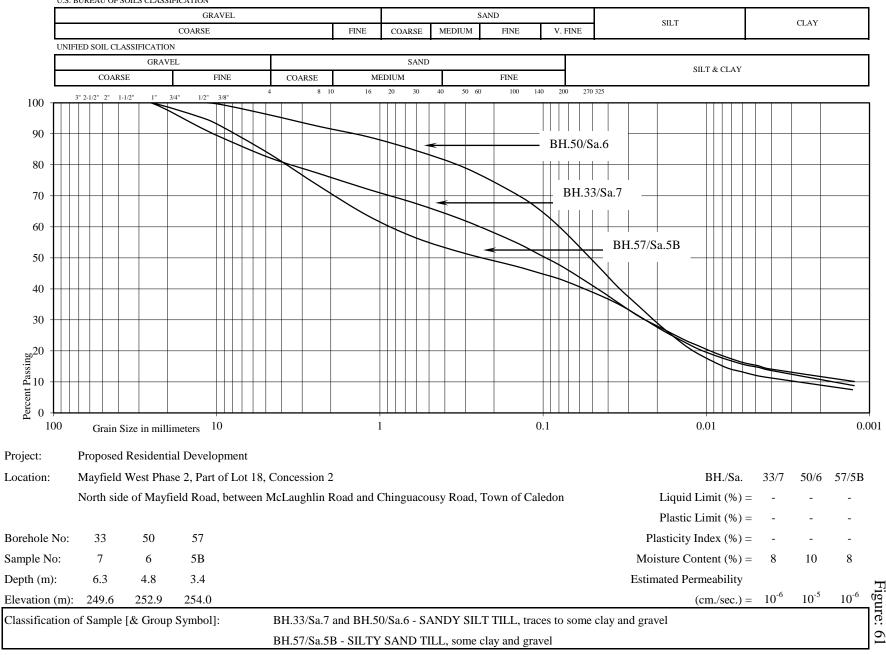


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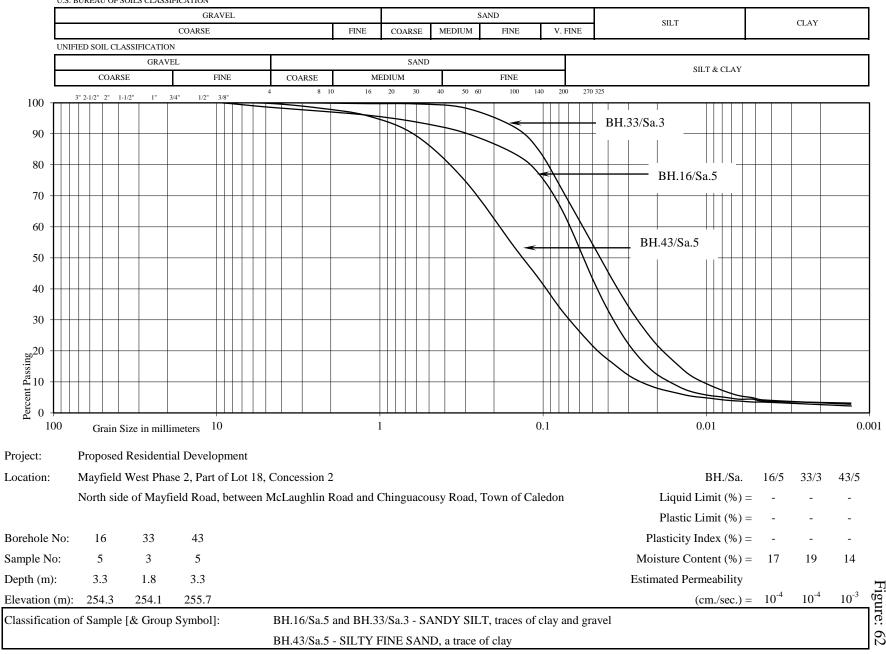


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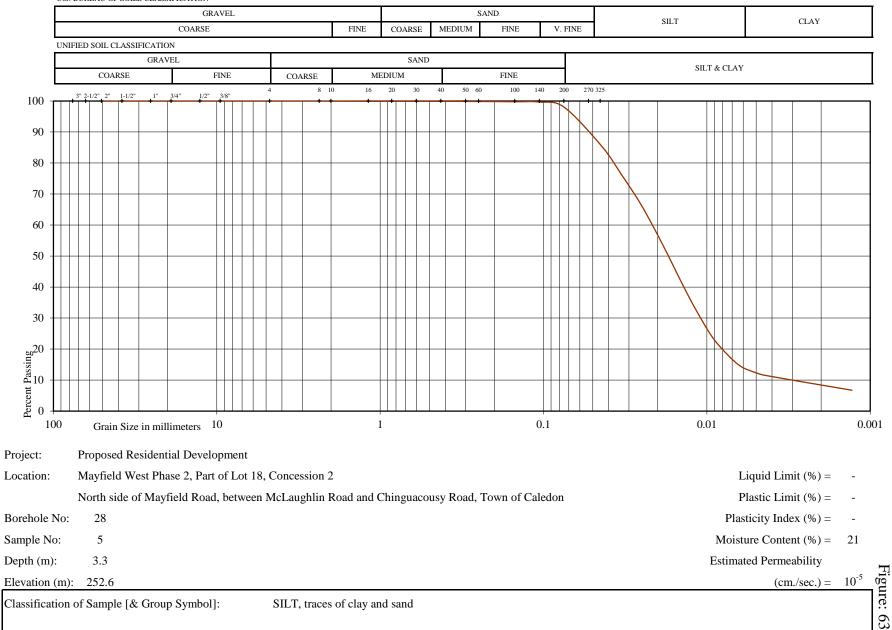


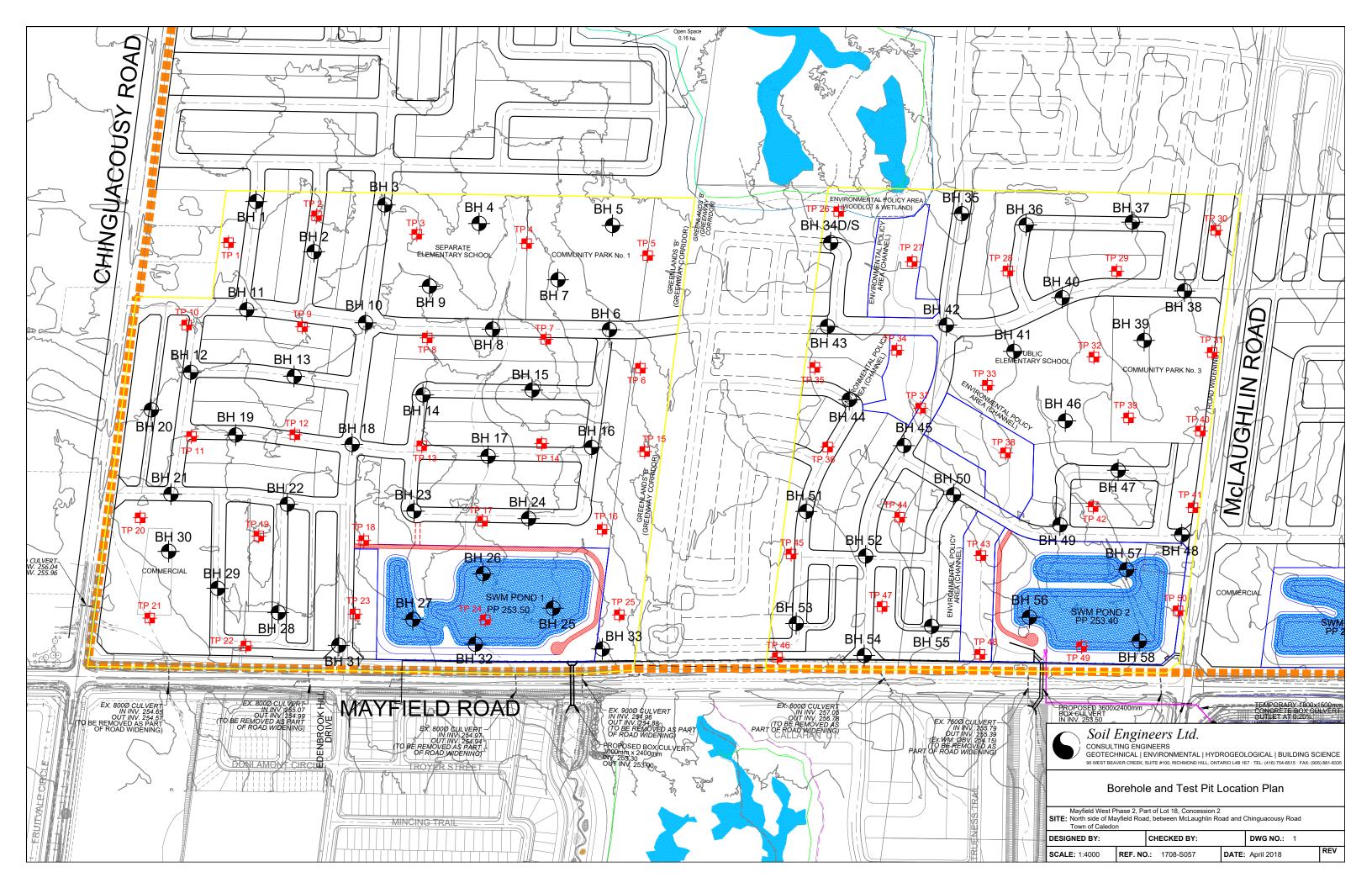


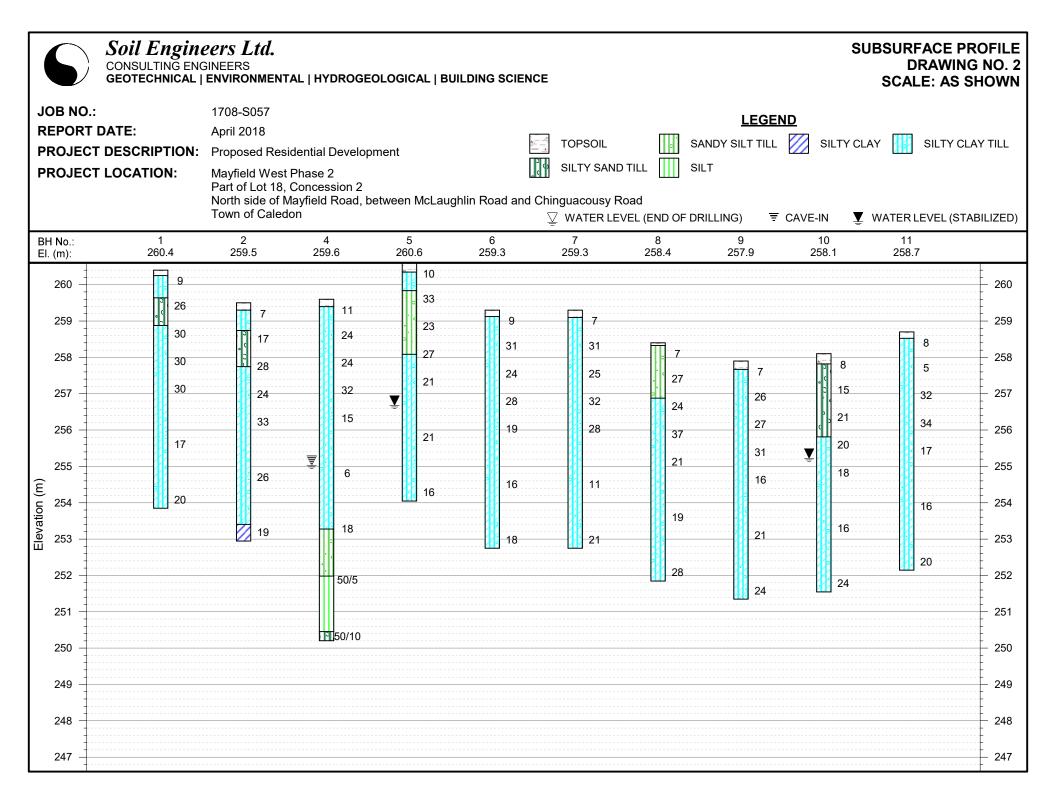
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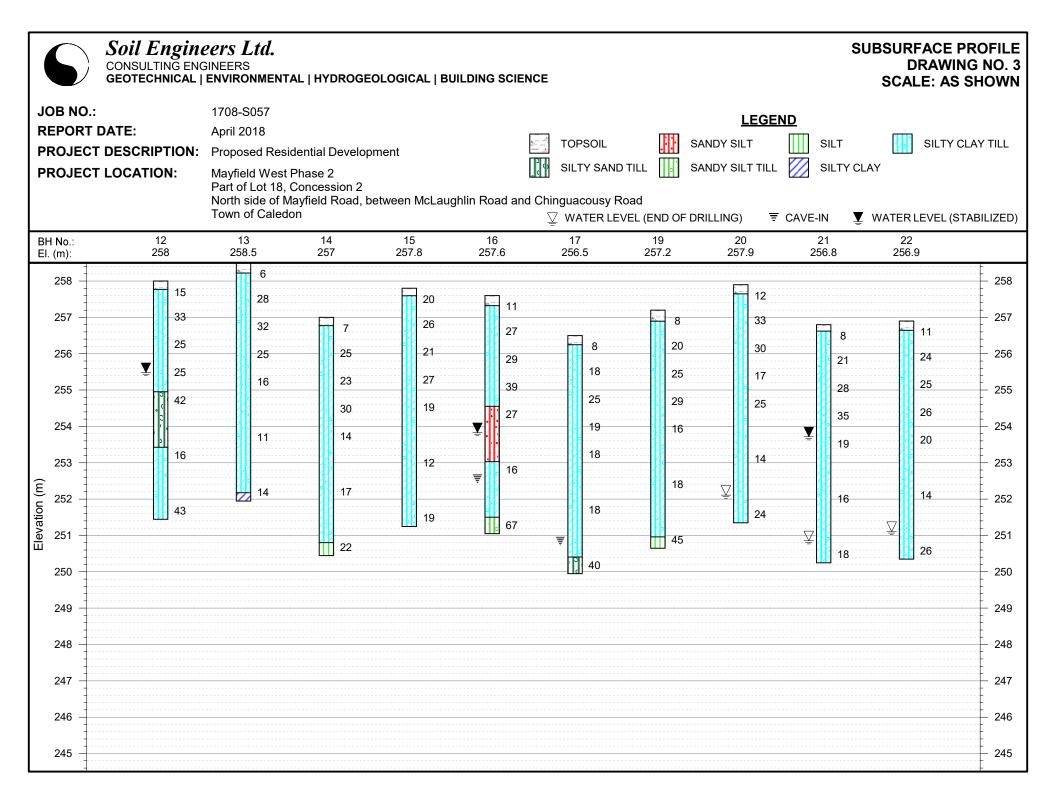


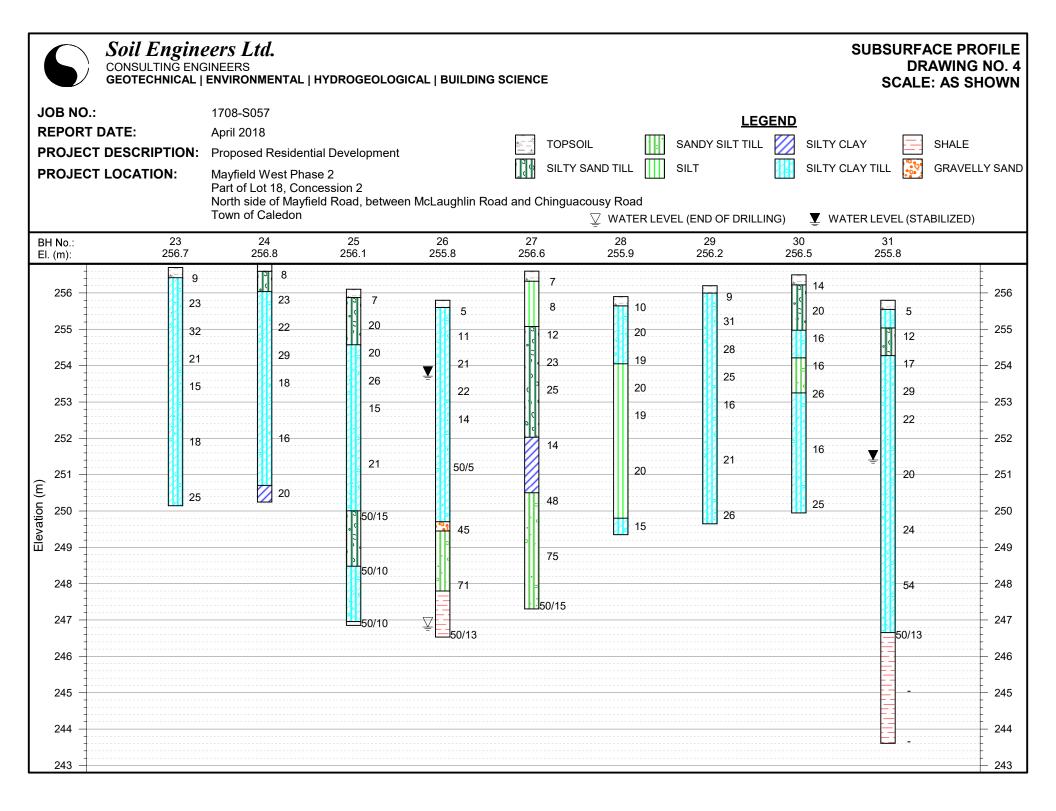


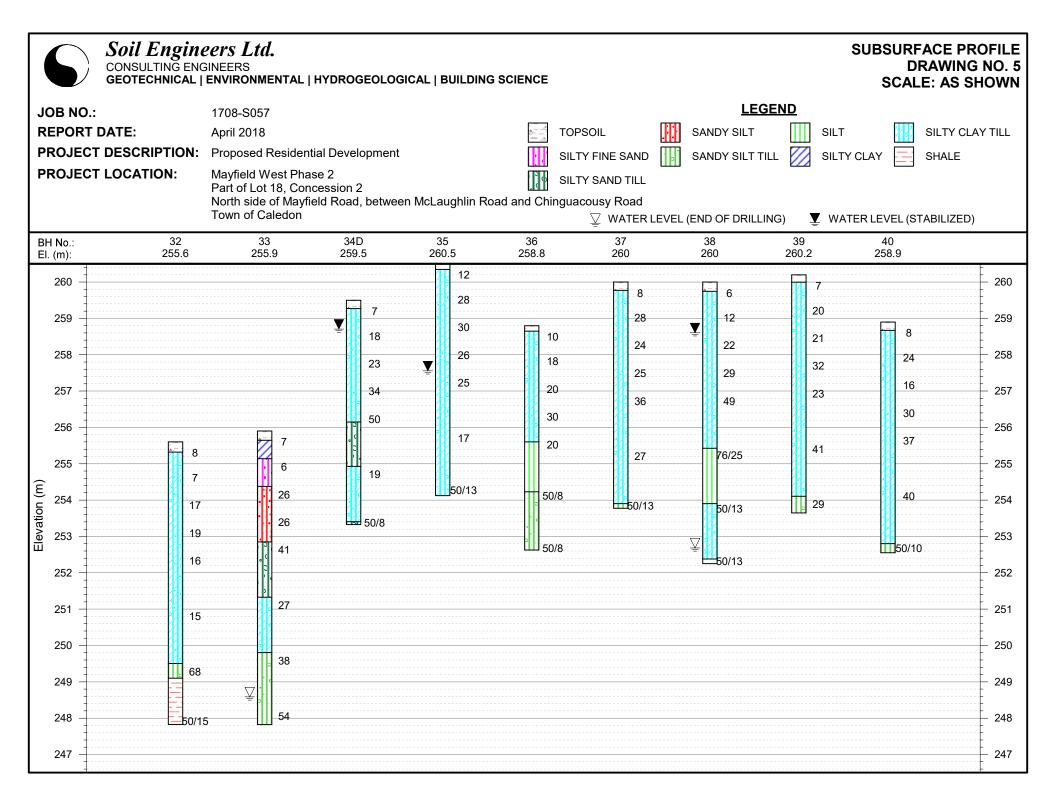


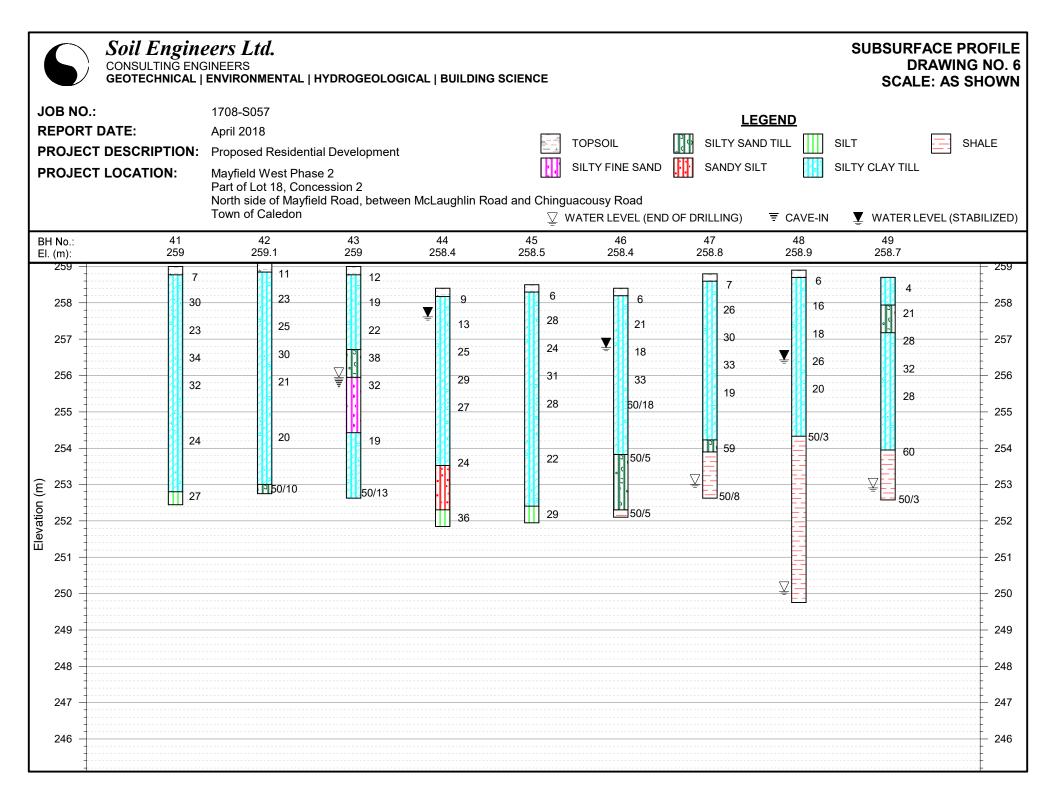


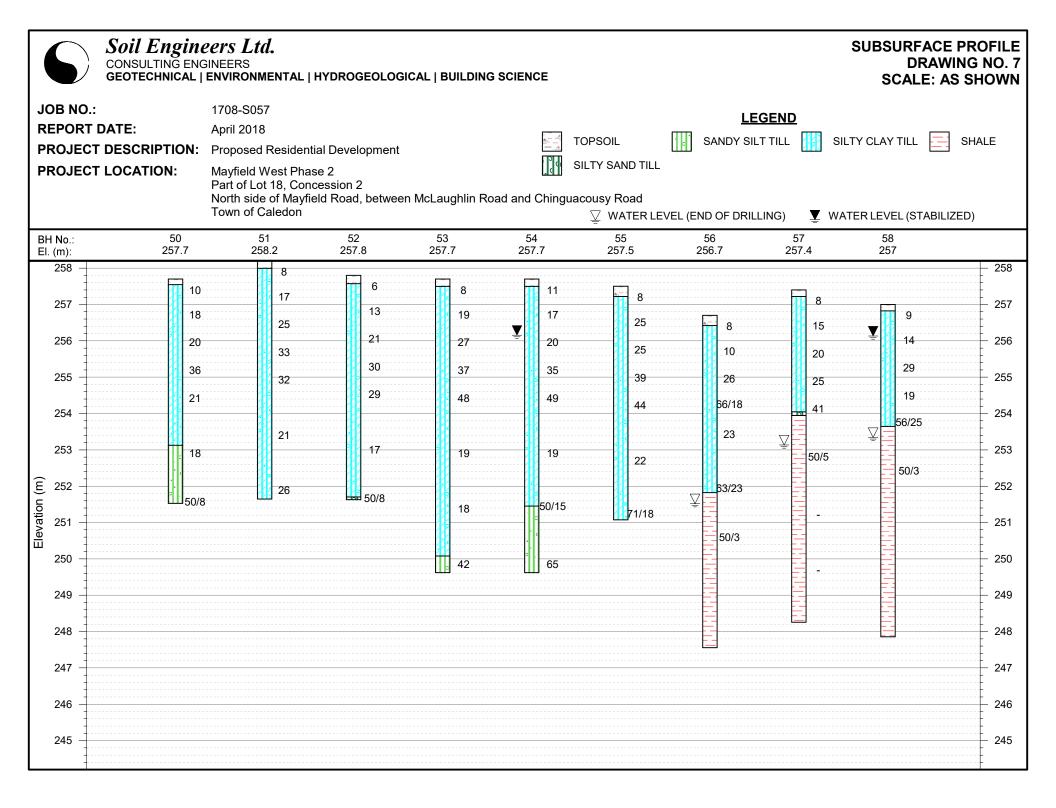














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PETERBOROUGH TEL: (905) 440-2040

HAMILTON TEL: (905) 777-7956 FAX: (905) 542-2769

#### APPENDIX

#### SELECT BOREHOLE LOGS AND BOREHOLE LOCATION PLAN FROM

#### **REPORT ON GEOTECHNICAL INVESTIGATION** SANITARY TRUNK SEWER ON MAYFIELD WEST PHASE 2 **CALEDON, ONTARIO**

#### PREPARED BY WSP CANADA INC. PREPARED FOR MAYFIELD STATION LANDOWNERS GROUP INC.

#### PROJECT NO. 161-01403-00, DATED JULY 11, 2017

**REFERENCE NO. 1708-S057** 



Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/28/2016

REF. NO.: 161-01403-00

ENCL NO.: 1

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841118.71 E 592627.42

	SOIL PROFILE		s	SAMPL	.ES	~		RESIS	MIC CO TANCE	NE PEI PLOT		- IION		PLASTI	NAT	JRAL	LIQUID		5	REMARKS
(m)		۲				GROUND WATER CONDITIONS		2	:0 4	06	i0 8	30 1	00		CON	TENT	LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	AND GRAIN SIZE
ELEV	DESCRIPTION	A PLO	~		BLOWS 0.3 m	NOI	NOI		AR ST		TH (k	Pa) FIELD V		W <sub>P</sub>		м Э———	WL	CKET Su) (kF	(kN/m)	DISTRIBUTION
DEPTH		STRATA PLOT	NUMBER	ТҮРЕ			ELEVATION		NCONF			& Sensit		WA	TER CO	ONTEN	T (%)	0 Q 0 Q	NATU	(%)
	Ground Surface	ST	R	F	ŗ	88			1	0 6	30 0	30 1	00	1	0 2	20 3	30			GR SA SI C
0.00	FILL: silty clay, trace sand, trace gravel, trace rootlets, trace organics,	$\bigotimes$					Rising	l Up Ci F	asing											
	dark grey to brown, moist, firm to very stiff.	$\bigotimes$	1	SS	5		- 209	-									•			
	vory still.	$\bigotimes$						-												
		$\bigotimes$						-												
58.07		$\bigotimes$	2	SS	18			-							0					
1.22	SILTY CLAY TILL: some sand, trace gravel, oxidized, brown, moist,						258	-												
	very stiff.							-												
			3	SS	21			E							0					
2								-												
							257													
			4	SS	24			-							0			>225		
					-··			-												
56.24								-												
3.05	SILT: some clay to clayey, trace sand, grey, moist, compact.		5	SS	20		256	-							0					
55.63			5	33	20			-												
3.66	SILTY CLAY TILL: some sand,	191						Ē												
4	trace gravel, grey, moist, stiff.					$\nabla$		-												
						ž	W. L. 2 Mar 21													
			1				iviai z	, 2010 F												
								-												
5			6	SS	11			-							0			60		
							-Holep	L lug												
							254	F												
53.65	SILTY CLAY : trace sand, trace	8.						[												
, J.O-	gravel, grey, moist, firm to stiff.		1					-												
-		H.	-					-												
			7	SS	8		253	-								0		60		
								-												
								E												
z 52.13								ŀ												
7.16	SILTY CLAY TILL: some sand, trace gravel, contain silty clay		]				252													
	layers, grey, moist, very stiff.							-												
			1					-												
8			8	SS	22			-							0			>225		
							251													
								-												
		H.	}					[												
9			}					-												
	contain silt seams below 9.1m		╞──				250	-												
			9	SS	25		250	-							o			>225		
		F.						ŀ												
0								-												
	Continued Next Page DWATER ELEVATIONS					GRAPH NOTES	+ 3	× 3. I	Number	s refer	- -	8=3%	Strain	at Failur	·0					-
	$\frac{1}{2} \frac{1}{2} \frac{1}$					NOTES	. ,	· · · •	o Sensi	tivitv	C	-	Juant	arranul	-					

|--|

Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/28/2016

REF. NO.: 161-01403-00

ENCL NO.: 1

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841118.71 E 592627.42

	SOIL PROFILE		s	AMPL	ES			DYNAI RESIS	MIC CO TANCE	NE PEN PLOT		TION		PLASTI	_ NAT	URAL			F	RE	EMAF	RKS	
(m)		эт				GROUND WATER CONDITIONS		2	0 4	0 6	0 8	30 1	00	LINIT	CON	TENT	LIQUID LIMIT	PEN. a)	NATURAL UNIT WT (kN/m <sup>3</sup> )	CP	ANE AIN S		
ELEV DEPTH	DESCRIPTION	STRATA PLOT	К		BLOWS 0.3 m	VD W TION	ELEVATION		AR STI		TH (kf	Pa) FIELD V. & Sensiti	ANE	W <sub>P</sub>		<i>N</i> 0	WL	OCKET Cu) (KF	URAL ( (kN/m	DIST	RIBL	JTIO	
DEPIR		FRAT	NUMBER	түре		NDN	EVA	• QI	JICK TF	RIAXIAL	×	LAB VA	ANE			ONTEN		9 O			(%)		
	Continued	S S	ž	F	ż	ΟÖ	Ш	- 2	0 4	0 6	8 0	30 10	00	1	0 2	20 :	30			GR S	SA S	SI (	CL
<u>249.08</u> - 10.21	SILT: trace clay, trace sand,						- Sand	-										-					
-	dilatant, grey, saturated, very dense.						Sanu																
-								-															
<u>11</u> -			10	SS	51			-							0					0	98	34	7
-							248																
- 247.56 - 11.73								-															
11.73 <u>-</u>	SANDY SILT TILL: trace clay, trace																						
<u>12</u>	gravel, grey, moist, very dense.							ļ															
-		•     •					Scree	n F															
-		. . .  . .	11	SS	67			-							0								
- - <u>13</u>								-															
		. ф																					
2 <u>46.03</u> 13.26	CLAYEY SILT TILL: sandy, some gravel, reddish brown, moist, hard.						246	-															
-	gravel, reduisit brown, moist, nard.						1																
- - 14			12	SS	79		Sand	-						0	н					15 3	31 4	11 ·	13
14 245.12 14.17	cobbles/boulders (inferred) END OF BOREHOLE							-															
14.17	Notes:																						
	1) Borehole was open upon completion.																						
	2) 50mm dia. monitoring well was installed upon completion.																						
	3) Water Level Readings: Date W. L. Depth (m)																						
	Mar. 21, 2016 4.07																						
					I	GRAPH	I		L			<b>8</b> =3%	L	I	l	L	1	I					



Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/27/2016

REF. NO.: 161-01403-00

ENCL NO.: 2

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4840946.6 E 592800.61

	SOIL PROFILE		S	ampl	ES	۲.		DYNAI RESIS	TANCE					PLAST	IC NAT	URAL	LIQUID		Υ	REMARKS
(m) LEV EPTH	DESCRIPTION	STRATA PLOT	NUMBER	түре	"N" <u>BLOWS</u> 0.3 m	GROUND WATER CONDITIONS	ELEVATION	SHEA 0 UN • QI	AR ST NCONF JICK TI	I RENG INED RIAXIAL	- TH (F + - ×	KPa) FIELD & Sens LAB V	VANE itivity VANE 100	W <sub>P</sub>	TER C	W O ONTEN <sup>-</sup>	LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT V (kN/m <sup>3</sup> )	AND GRAIN SIZI DISTRIBUTIO (%)
6.37 0.00	Ground Surface FILL: silty clay, some sand, trace gravel, trace rootlets, brown, moist, firm to very stiff.	s	2	ss	7	00	ш 256	-								0				GR SA SI
		$\approx$	2	SS	13		255	-							0					
4.69 1.68	SILTY CLAY TILL: some sand, trace gravel, brown, moist, hard to stiff. oxidized between 1.7m to 3.7m		3	SS	17			-							0			>225		
	cobbles/boulders (inferred)		4	SS	63/ 225mn	n	254	-							0					
	brown to grey below 3.0m		5	SS	17		253	- - - - -							0			175		
	grey below 4.6m						252	- - - - - - - - - - -												
			6	SS	13		251	-							0			100		
0.73 5.64	CLAYEY SILT TO SILT: trace sand, trace gravel, contain clayey silt till layers, grey, dilatant, moist to saturated, very stiff.							-												spoon wet
			7	SS	27		250	-							0					
9.21 7.16	SILTY CLAY TILL: sandy, trace gravel, grey, moist, hard.						249	-												
	cobbles/boulders at 8.1m		8	SS	48		248	-							0					
7.68 8.69	CLAYEY SILT TILL: sandy, trace gravel, reddish brown, moist, very stiff.						240	-												
			9	SS	23		247	-						0						





Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/27/2016

REF. NO.: 161-01403-00

ENCL NO.: 2

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4840946.6 E 592800.61

	SOIL PROFILE		s	AMPL	ES			DYNAI RESIS	VIC CO TANCE	NE PEN PLOT		TION		DIAGTI	_ NAT	URAL			μ	REMA	RKS
(m)		5			(0)	'ATEF S			ľ	06			00	PLASTI LIMIT		STURE ITENT W	LIQUID LIMIT	PEN.	UNIT M	ANI GRAIN	
ELEV DEPTH	DESCRIPTION	A PL	Я		BLOWS 0.3 m	ND W TION	TION		AR STI		TH (kl +	Pa) FIELD V & Sensit	ANE	W <sub>P</sub>		o	WL	OCKET (Cu) (kl	NATURAL UNIT WT (kN/m <sup>3</sup> )	DISTRIB	UTION
		STRATA PLOT	NUMBER	ТҮРЕ	۳ ۳	GROUND WATER CONDITIONS	ELEVATION	• QI	JICK TF	RIAXIAL 10 6	. ×	LAB VA	ANE 00			ONTEN 20	T (%) 30	ē.			
246 16	Continued		2	+	F	00	ш	-												GR SA	SICL
<u>246.16</u> - 10.21	SANDY SILT TILL: trace to some clay, trace gravel, contain clayey silt						246	-													
-	till layers, grey, moist, very dense.																				
- <u>11</u> -		• <b>0</b>     	10	SS	68			-						0							
-		· · · · · · · · · · · · · · · · · · ·		33	00			-													
-							245	-													
244.64								-													
- <u>244.64</u> - 11.73 - 12 -	CLAYEY SILT TILL: sandy, trace gravel, contain sandy silt till layers,							-													
-	grey, moist, hard.		-																		
-			11	SS	34		244	-						0							
-			<b> </b>					-													
<u>13</u>								-													
2 <u>43.11</u> 13.26	SILTY CLAY : trace sand,						243														
-	occasional gravel, contain silt layers, grey, moist, stiff.							-													
_ 								-													
- 242.04			12	SS	13			-							0						
14.33	END OF BOREHOLE Notes:																				
	1) Borehole was open upon completion.																				
	2) Water level was at 12.2m during drilling.																				
	uning.																				
						GRAPH				s refer		<b>8</b> =3%									

WSP
PROJECT: Mayfield West Phase
OUENT MA CALLOLATING LAND

Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/28/2016

REF. NO.: 161-01403-00

ENCL NO.: 3

ase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4840823.21 E 592950.32

	OCATION: See Borehole Location Plan SOIL PROFILE			AMPL				DYN RES	AMIC CO STANCE	DNE PEI E PLOT		TION		рі лет		URAL	LIQUID		5	REMARKS
(m) ELEV	DESCRIPTION	STRATA PLOT	н		BLOWS 0.3 m	GROUND WATER		SHE		10 6   RENG		30 1 Pa)	00 I	PLAST LIMIT W <sub>P</sub>		TURE TENT W	LIQUID LIMIT WL	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	AND GRAIN SIZE DISTRIBUTION
DEPTH 255.89	Ground Surface	STRAT.	NUMBER	ЗЧҮГ	0 "N"	GROUN		• (	20 CK T	RIAXIAL		FIELD V & Sensit LAB V 30 1	ivity ANE 00		TER CC		T (%) 30	P C C	NATU	(%) GR SA SI C
0.00	FILL: silty clay, some sand, trace gravel, trace rootlets, brown, moist, stiff to very stiff.	$\bigotimes$	1	SS	9		∷ <del>-</del> Risi _ <del>_</del> Sar	ng Up ( Id [ - - -	Casing						с					
2 <u>54.82</u> 1.07	SILTY CLAY TILL: some sand, trace gravel, brown, moist, very stiff		2	SS	21		25	55							0					
- 2	to stiff. oxidized between 1.1m to 3.6m		3	SS	17		2	- - - 54 - -							0			>225		
<u>3</u>			4	SS	30	-	25	53							0					
-	brown to grey below 3.0m		5	SS	21	-		-							0			>225		
<u>4</u>	grey below 4.6m					⊻	W. L	52 - - - 251.6 21, 20'	0 m											
5	gicy below 4.011		6	SS	14	-	2t -Hole	51							o			140		
5.64 <u>•</u>	CLAYEY SILT TILL: sandy, trace gravel, grey to reddish brown, moist, very stiff to hard.						28	50												
<u> </u>			7	SS	26	-	24	19							0			>225		
	reddish brown below 7.6m contain sandy silt till layers between 7.6m to 8.2m		8	SS	30		24	- - - - 18						0						
<u>9</u> -	cobbles/boulders at 9.4m		9	SS	88		24	+/						c	>					
	Continued Next Page						24	16			<u> </u>			<b> </b>						



Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/28/2016

REF. NO.: 161-01403-00

ENCL NO.: 3

PROJECT: Mayfield West Phase 2, Caledon, ON

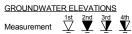
CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4840823.21 E 592950.32

	SOIL PROFILE		s	AMPL	ES			DYNAI RESIS	MIC CO TANCE	NE PEI PLOT		TION			ΝΔΤΙ				_	REMA	RKS
(m)		F				GROUND WATER CONDITIONS					~		00	PLASTI LIMIT	C MOIS	TURE	LIQUID LIMIT	Ľ "	NATURAL UNIT WT (kN/m <sup>3</sup> )	AN	D
ELEV	RECORDINAL	PLO	~		BLOWS 0.3 m	4W C ONS	No	SHEA	R STI	RENG	TH (ki	Pa)		W <sub>P</sub>	\	N 0	WL	(KPa	KAL UI	GRAIN DISTRIB	
DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	ш	<u>BLO</u>	DUNE	ELEVATION				+	Pa) FIELD V & Sensiti LAB VA	ANE vity	wa <sup>-</sup>	TER CO		Г (%)	00 00	AUTA AUTA	(%	
	Continued	STR	NUN	ТҮРЕ	ż	GRC	ELE	2	0 4	0 6	ι ο ε	10 10	00				30		2	GR SA	SI CL
-	CLAYEY SILT TILL: sandy, trace gravel, grey to reddish brown, moist,	1						-													
	very stiff to hard.(Continued)						Sand	-													
-		jø,				 		-													
-	grey below 10.7m						0.45	-													
11			10	SS	41		245	-						0							
						· · · · ·		E													
-								-													
244.16 - 11.73								-													
- 11.73 12	SILTY CLAY TILL: sandy, trace gravel, grey, moist, very stiff.						244	-													
-	g, g, ,,,						Saraa	ļ													
			1				Scree	Ë													
-			11	SS	26			-							0						
-								-													
13							243	-													
242.63 13.26	SILTY CLAY : trace sand, contain							-													
- 13.20	silt seams/layers, grey, moist to wet,							-													
-	very stiff.							-													
- 14				~~			242														
-			12	SS	17		Sand	-								o					
2 <u>41.56</u> 14.33	END OF BOREHOLE	r.r.				·· · · ·		-													
	Notes:																				
	1) Borehole was open upon completion.																				
	2) 50mm dia. monitoring well was installed upon completion.																				
	<ol><li>Water Level Readings:</li></ol>																				
	Date W. L. Depth (m) Mar. 21, 2016 4.29																				
		_	_	_	_	GRAPH	_		–		_	<b>8</b> =3%	_			_			_		_



O <sup>€=3%</sup> Strain at Failure



Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/27/2016

REF. NO.: 161-01403-00

ENCL NO.: 4

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4840925.62 E 593030.48

	SOIL PROFILE		s	ampl	ES	~		RESIS	TANCE	NE PEI PLOT	$\geq$	TION		PLAST	IC NAT MOIS CON	URAL	LIQUID		ΛT	REMARKS
(m) <u>ELEV</u> DEPTH	DESCRIPTION Ground Surface	STRATA PLOT	NUMBER	түре	"N" <u>BLOWS</u> 0.3 m	GROUND WATER CONDITIONS	ELEVATION	0 UN • QI	AR ST NCONF JICK TI	L RENG INED RIAXIAL	L TH (ki + ×	FIELD V & Sensit	00 I ANE ivity ANE 00	W <sub>P</sub>	TER CO	W O ONTEN	LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	AND GRAIN SIZE DISTRIBUTION (%) GR SA SI C
0.00	FILL: silty clay, trace sand, trace gravel, trace rootlets, trace organics, dark grey to brown, moist, stiff to very stiff.		1	SS	14	-	256	-								0		-		
5 <u>5.04</u> 1.07	SILTY CLAY TILL: some sand, trace gravel, brown, moist, very stiff. oxidized between 1.1m to 3.6m		2	SS	22	-	255	-							0			-		
			3	SS	20	-	254	-							0			>225		
1			4	SS	40	-		-							0					
-	brownish grey to grey below 3.0m		5	SS	27		253	-							0			>225		
Ŀ							252	-										-		
<u>i</u>	grey below 4.6m		6	SS	13		251	-							0			100		
<u>i</u>	sandy below 6.1m						250	-										-		
48.95			7	SS	18	-	249								0					
7.16	CLAYEY SILT: trace sand, trace gravel, contain sandy silt till layers, grey, moist to wet, hard.						249	-												spoon wet
			8	SS	39	-	248	-								0				
47.42 8.69	SANDY SILT TILL: trace to some clay, trace gravel, contain clayey silt till layers, reddish brown, moist, dense.	0					247	-												
		•	. 9	SS	40	-		- - - -						c						





Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/27/2016

REF. NO.: 161-01403-00

ENCL NO.: 4

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4840925.62 E 593030.48

	SOIL PROFILE		s	AMPL	.ES			DYNA RESIS	MIC CO TANCE	NE PEI PLOT		TION			ΝΔΤ				_	REMA	RKS
(m)		F				GROUND WATER CONDITIONS							00	PLASTI LIMIT	C MOIS	TURE	LIQUID LIMIT WL T (%)	Ë.	IT WI	ANI	D
ELEV		STRATA PLOT	~		BLOWS 0.3 m	AW C ONS	NO			I RENG	I TH (kF	Pa)		W <sub>P</sub>	1	w 0	WL	KET F (KPa	RAL UN	GRAIN DISTRIBI	
DEPTH	DESCRIPTION	ATA	NUMBER	ш	BLC 0.3	DUNE	ELEVATION			INED RIAXIAL	+	FIELD V & Sensiti LAB VA	ANE	WA	TER CO	- DNTEN	T (%)	00 00	IATUR (F	(%)	
	Continued	STR	NUN	ТҮРЕ	ż	GRO	ELE						00			20 3	30			GR SA	SI CL
245.90		•					246														
10.21	CLAYEY SILT TILL: sandy, trace gravel, reddish brown, moist, very							_													
-	stiff.							-													
-								-													
11	~	11	10	SS	16		245	-						0				100			
-	:	9.					240														
-		11						-													
244.38								-													
- 11.73 12	SILTY CLAY : trace sand, trace gravel, contain sandy silt till layers,							-													
-	grey, moist, very stiff.						244	_													
-			11	~~~	01			-													
			11	SS	21			_								ο					
-								-													
1 <u>3</u> - 242.85							243														
13.26	SANDY SILT TILL: trace to some							-													
-	clay, trace gravel, reddish brown, moist, dense.							-													
-		·•						-													
<u>14</u>			12	SS	33		242	-						0							
241.78		<b>•</b>					272	-													
14.33	END OF BOREHOLE Notes:																				
	1) Borehole was open upon completion.																				
	2) Water level was at 12.5m during																				
	drilling.																				
							L														
						GRAPH			Number			<b>8</b> =3%									





Method: Hollow Stem Auger

Date: Jan/26/2016 to Jan/27/2016

Diameter: 203 mm

REF. NO.: 161-01403-00

ENCL NO.: 5

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841129.66 E 593028.26

	SOIL PROFILE	11 40	í –	SAMPL				DYN		ONE PEN E PLOT	ETRA	TION								
()		L				GROUND WATER CONDITIONS		RES		E PLOT 40 6	$\sim$		100	PLAST LIMIT	IC NAT MOIS	URAL STURE ITENT	LIQUIE LIMIT		NATURAL UNIT WT (kN/m <sup>3</sup> )	REMARKS AND
(m) ELEV		STRATA PLOT			SNE	-AW -	Z	SHE	1	RENG	TH (ki	Pa)		W <sub>P</sub>		w	WL	KET PEN. ) (kPa)	AL UN N/m <sup>3</sup> )	GRAIN SIZE
DEPTH	DESCRIPTION	ATA	NUMBER	ш	BLOWS 0.3 m		ELEVATION	0 1	JNCONF		÷	FIÉLD & Sens		WA	TER CO		Г (%)	POCKET (Cu) (kP	ATUR (k	(%)
256.35	Ground Surface	STR	NUN	ТҮРЕ	z.	GRO	ELE	•		40 6		LAB \ 30	100				30		2	GR SA SI CL
- 0.00	FILL: silty clay, some sand, trace	$\boxtimes$					Risir		Casing											
	gravel, trace rootlets, trace organics, dark grey to brown, moist, firm to	$\bigotimes$	1	SS	7		Sano 25	1 - 6								0		-		
-	stiff.	$\bigotimes$						E												
-		$\bigotimes$						Ł												
1		$\bigotimes$	2	SS	8			-								0				
-		$\bigotimes$					25	5												
<u>254.83</u> - 1.52	SILTY CLAY TILL: some sand,	X					25	-												
- 1.52	trace gravel, oxidized, brown, moist,		3	~~~	10	$\nabla$		È.							0			>225		
2	very stiff.		3	SS	19		W. L Mar 3	254.5 21, 201	5 m 6									>22		
-			$\vdash$				-Hole	plug	Ĩ											
							25	4												
-			4	SS	27			Ē							0			>225	5	
- - 3								F												
	brown to grey below 3.0m	FF.						È.												
-		1 1 1 1	5	SS	15		25	3						_	0			125		
-								E												
-								F												
2 <sup>4</sup> 52.24								Ē												
- 4.11 -	SILTY SAND TILL: trace clay, trace gravel, contain silt seams,	<del> </del>						J[												
-	grey, wet to saturated, compact.							1												
-						日日	· . · .	F												spoon wet
5		<sub> </sub>      <sub>0</sub>	6	SS	20	∶₿	:	E							o					
								ŀ												
-							25													
250.71 - 5.64	SILTY CLAY TILL: sandy, trace	i i Igr				ΙĒ	·.	E												
6	gravel, contain wet coarse sand layers, grey, moist, very stiff.							F												
-			$\vdash$				Scre	en L												
-			7	SS	27		25	0							0					
-								F												
-								F												
249.19		ŔŔ					•	È.												
7.16	sand, contain silty clay layers,					日日	24	9[										-		
-	dilatant, grey, saturated, compact .					日		ł												
-			8	SS	20		:+San	1								0				
-			°	33	20			E												
-							24	8	_				_							
_ 247.66																				
8.69								Ē												
9	gravel, trace limestone fragments, reddish brown, moist, hard.	11						È.												
			9	SS	99/		<u>.</u>	ļ										1		
F		ΗIJ	Ľ	33	225mn		24	'E						Τ				1		
E	a a la la anti-se de la composition de la comp							ŀ										1		an a
10	cobbles/boulders (inferred)	ŔŔ	1					-												auger grinding
GROUN	Continued Next Page					GRAPH NOTES	1 + <sup>3</sup>	<sup>3</sup> ,× <sup>3</sup> :	Numbe to Sens	rs refer sitivity	С	<b>8</b> =39	<sup>%</sup> Strain	ı at Failu	re					





PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841129.66 E 593028.26

Method: Hollow Stem Auger
---------------------------

Diameter: 203 mm

Date: Jan/26/2016 to Jan/27/2016

REF. NO.: 161-01403-00 ENCL NO.: 5

	SOIL PROFILE		S	SAMPL	ES			RESIS	MIC CO	NE PER		TION			_ NATI	URAL			⊢	REMARKS
(m)		ЪТ				GROUND WATER CONDITIONS		2	20 4	0 6	50 E	30 1	00	PLASTI LIMIT			LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	AND GRAIN SIZE
ELEV	DESCRIPTION	STRATA PLOT	щ		BLOWS 0.3 m		ELEVATION		AR ST		TH (kl	Pa) FIELD V	ANE	W <sub>P</sub>	· · · · ·	м Э———	WL	CKET (KF	JRAL L (kN/m	DISTRIBUTION
DEPTH		RAT/	NUMBER	ТҮРЕ			EVAT		NCONF UICK TF		+ . ×	FIELD V & Sensit LAB V	ivity	WA	TER CC	ONTEN	T (%)	0 <sup>0</sup> 0	NATU	(%)
	Continued		P	F	ż	R C C R			20 4	0 6	60 E	80 1	00	1	0 2	0	30			GR SA SI CL
246.14							-Holep	L												
- 10.21 -	CLAYEY SILT TILL /SHALE COMPLEX: sandy, trace gravel,						246	-												
E	trace limestone/shale fragments, reddish brown, moist, hard.				50/			-												
- 11		μü	10	SS	75mm	L .		-												
Ē	cobbles/boulders (inferred)							-												hammer bouncing
E		H!	1				245													/auger
-		r f	11	SS	50/			-							0					grinding
-		Hł	<u> </u>		initial			L							, in the second					
12	cobbles/boulders (inferred)				1 <u>25mr</u>	ſ		ŀ												auger grinding
244.11	END OF BOREHOLE	11:1	12/	ss ,	100/			-						<u> </u>						hammer bouncing
	Notes: 1) Borehole was open upon				initial 50mm															
	completion.																			
	2) 50mm dia. monitoring well was installed upon completion.																			
	3) Water Level Readings: Date W. L. Depth (m)																			
	Mar. 21, 2016 1.80																			
																			1	
	I	-	•		1				1	1	1		1			1	1	-		



Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/26/2016

1 OF 2

REF. NO.: 161-01403-00

ENCL NO.: 6

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841226.15 E 592912.85

	SOIL PROFILE	-	S	SAMPL	.ES	Ř		DYNAI RESIS	TANCE	PLOT				PLASTI LIMIT		URAL	LIQUID LIMIT		ΜT	REMARKS
(m)		LOT			S c	GROUND WATER CONDITIONS	Z	2 SHEA		ĺ	1	1	00	LIMIT W <sub>P</sub>	CON	TENT	LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	AND GRAIN SIZE
<u>ELEV</u> DEPTH	DESCRIPTION	STRATA PLOT	äER		BLOWS 0.3 m		ELEVATION	O UN	CONF	INED	тн (кі +	Pa) FIELD V & Sensit LAB V	'ANE ivity					POCKE (Cu)	(FURAL (KN	DISTRIBUTIOI (%)
57 15	Ground Surface	STRA	NUMBER	TYPE	z.	GROI	ELEV			RIAXIAL 0 6			ANE 00		TER CC 0 2		I (%) 80		Ž	GR SA SI C
0.00	FILL: silty clay, some sand, trace	$\boxtimes$																		
	gravel, trace rootlets, trace organics, dark grey to brown, moist, stiff to	$\bigotimes$	1	SS	14			-								0				
	very stiff.	$\bigotimes$					257	-												
		$\bowtie$	}					-												
1 56.23		$\bowtie$	2	SS	20			-							0					
1.22	SILTY CLAY TILL: some sand,	Ĩ.	1					-												
	trace gravel, brown, moist, very stiff to stiff.						256	-												
	oxidized between 1.2m to 3.6m		3	SS	23			-							0			>225		
2								-												
	brownish grey below 2.3m		—					-												
	brownish grey below 2.5m		14	SS	25		255	-							0			>225		
			1					-							-					
<u>3</u>	brownish grey to grey below 3.0m		1					-												
			5	SS	20										0			200		
				33	20		254	-							0			200		
								-												
			1					-												
			1					-												
							253	-										-		
	sandy, grey below 4.6m							-												
5			6	SS	10			_							o					
			├──					-												
							252	_												
								-												
<u>è</u>								_												
		1.1						-												
			7	SS	19		251							0				>225		
			1					-												
			1					-												
			1					-												
			1				250	-												
								-												
			8	SS	18			-							0			>225		
			1																	
			1				249	-												
48.76 8.69	SANDY SILT TILL: trace to some							_												
0.09	clay, trace gravel, contain silt layers,	[   [						-												
	grey, moist, very dense.	 	<u> </u>																	
			9	SS	51		248	_												
		 	Ľ																	
	Continued Next Page								_	_	_									





Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/26/2016

REF. NO.: 161-01403-00

ENCL NO.: 6

PROJECT: Mayfield West Phase 2, Caledon, ON

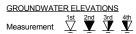
CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841226.15 E 592912.85

	SOIL PROFILE		S	SAMPL	ES			DYNA RESIS	VIC CO TANCE	NE PEN PLOT		TION			NATI	JRAI			F	REN	IARKS
(m)		υT				GROUND WATER CONDITIONS		2	0 4	0 6	0 8	30 1	00	2	C NATU MOIS CON	TENT	LIQUID LIMIT	a) EN	NATURAL UNIT WT (kN/m <sup>3</sup> )	A	ND
ELEV	DESCRIPTION	STRATA PLOT	~		BLOWS 0.3 m	NOI	NOI			RENG	TH (kl	Pa)		W <sub>P</sub>	\ (	м 5————	WL	POCKET PEN. (Cu) (kPa)	RN/m <sup>3</sup>		IN SIZE
DEPTH	DESCRIPTION	RATA	NUMBER	щ		NUC	ELEVATION		ICK TE	INED RIAXIAL	+ ×	FIELD V. & Sensiti LAB VA	ANE vity ANF	WA	TER CC		「 <b>(%)</b>	90 00	NATU NATU		(%)
	Continued		NN	ТҮРЕ	"z	GR GR	ELE			0 6			00				0		[-	GR SA	SI CL
<u>2</u> 47.24		•						-													
- 10.21	SILTY CLAY TILL: with sand and gravel layers, some sand, trace						247	-													
-	gravel, grey, wet, hard.						247	-													
								-												spoon	wet
<u>11</u>			10	SS	62			-								0					
-								_													
-							246	-													
245.72 - 11.73	SAND AND SILT TILL: some clay,							-													
12	trace gravel, reddish brown, moist, compact.							-													
	compact.							-													
-			11	SS	22		245							0	H					6 37	46 11
- 244.65								-													
12.80	END OF BOREHOLE Notes:																				
	1) Borehole was open upon																				
	completion. 2) Water level was at 11.1m during																				
	drilling.																				
		1																			



0.00 FiLL: silty clay, trace sand, trace gravel, trace organics, dark grey to brown, moist, firm to very stiff.	CLIEN PROJ DATU	IECT: Mayfield West Phase 2, Caledon, NT: Mayfield Station Landowners Group IECT LOCATION: Caledon, ON JM: Geodetic	Inc.						Method: Hollo Diameter: 203 Date: Jan/26	8 mm	n Auger					F. NC CL NC		1-01	403-00
Image: contain salt layers between 3 5m or contain salt layers between 3 5m or contain salt layers between 3 5m or 5m or contain salt layers between 3 5m or 5m or contain salt layers between 3 5m or	BHLO		N 484				97.12		DYNAMIC CON		TRATION		1						
202.22         Cound Surface         5         Z         Z         Z         Z         Q         4         0         1         S3         5         Thising Up Caring         0         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         00         10         20         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10 </td <td>ELEV</td> <td></td> <td>ATA PLOT</td> <td></td> <td></td> <td></td> <td>UND WATER DITIONS</td> <td>ATION</td> <td>20 40 SHEAR STR O UNCONFIN</td> <td></td> <td>80 10 I (kPa) + <sup>FIELD V</sup> &amp; Sensiti</td> <td>ANE vity</td> <td>- W<sub>P</sub></td> <td>CON' V</td> <td>TENT V D</td> <td></td> <td>POCKET PEN. (Cu) (kPa)</td> <td>ATURAL UNIT WT (kN/m<sup>3</sup>)</td> <td>AND GRAIN SIZE DISTRIBUTION</td>	ELEV		ATA PLOT				UND WATER DITIONS	ATION	20 40 SHEAR STR O UNCONFIN		80 10 I (kPa) + <sup>FIELD V</sup> & Sensiti	ANE vity	- W <sub>P</sub>	CON' V	TENT V D		POCKET PEN. (Cu) (kPa)	ATURAL UNIT WT (kN/m <sup>3</sup> )	AND GRAIN SIZE DISTRIBUTION
0.00       PLL: sity clay, taxe sand, trace prevent, incomposition of the second state accordance and species contain frame to the second state accordance and species contain sit seams between 4 min to the second state accordance and species between 4 min to the second state accordance acc	259.29	Ground Surface	STR/	NUM	ТҮРЕ		GRO CON	ELEV	20 40							(%) D		Ż	GR SA SI CL
257.46       SILTY CLAY TILL: some sand, tsuff to hard.       3       SS       20       Mar 21, 2016       o       o         1.103       SILTY CLAY TILL: some sand, tsuff to hard.       4       SS       27       o       >225         1.103       Silty of clay clay clay clay clay clay clay clay		FILL: silty clay, trace sand, trace gravel, trace rootlets, trace organics, dark grey to brown, moist, firm to	$\times$	1	SS	5		Rising	Up Casing							0			
257.46 race gravel, codized, brown, moist, saft to hard.       3       SS       20       Mar 21, 2016       0         4       SS       27       4       SS       27         4       SS       27       0       0       -222         and balt seams between 3.0m to 5.2m       5       SS       16       0       0       -222         and silt seams between 4.0m to 5.2m       6       SS       10       -       -       -       0       -         and silt seams between 4.0m to 5.2m       6       SS       10       -       -       -       -       0       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <t< td=""><td>- - - - -</td><td></td><td><math>\bigotimes</math></td><td>2</td><td>SS</td><td>7</td><td>-</td><td>258</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td>0</td><td></td><td></td><td></td><td></td></t<>	- - - - -		$\bigotimes$	2	SS	7	-	258	-						0				
a       4       SS       27         brown to grey below 3.0m 5.2m       5       SS       16       256         grey below 4.6m 5.2m       6       SS       10         grey below 7.6m 6.1m to 6.7m       6       SS       10         grey below 7.6m 8.2m       7       SS       18         grey below 7.6m 8.2m       8       SS       31         grey below 7.6m 9.1m       8       SS       31         grey below 7.6m 8.2m       8       SS       31         grey below 7.6m 8.2m       8       SS       31         grey below 7.6m 8.2m       9       9       9         grey below 7.6m 8.2m       9       9       9         grey below 7.6m 8.2m       9       9 <td>- <u>257.46</u> -<sub>2</sub> 1.83 -</td> <td>trace gravel, oxidized, brown, moist,</td> <td></td> <td>3</td> <td>SS</td> <td>20</td> <td>- ⊻ -</td> <td>Mar 2′ -Holep</td> <td>1, 2016 - lug</td> <td></td> <td></td> <td></td> <td></td> <td>o</td> <td></td> <td></td> <td></td> <td></td> <td></td>	- <u>257.46</u> - <sub>2</sub> 1.83 -	trace gravel, oxidized, brown, moist,		3	SS	20	- ⊻ -	Mar 2′ -Holep	1, 2016 - lug					o					
brown to grey below 3.0 m 5.2 m grey below 4.6 m contain saturated sandy sill layers between 6.1 m to 6.7 m grey below 7.6 m 6.1 m to 6.7 m contain sandy sill layers between 9.1 m to 9.7 m contain sandy sill layers between 9.1 m to 9.7 m 250 contain sandy sill layers between 250 contain sandy sill layers between 9.1 m to 9.7 m 250 contain sandy sill layers between 250 contain sandy sill layers	-			4	SS	27		257						0			>225		
sandy, reddish brown below 6.1m contain silty sand til layers between 6.1m to 6.7m contain silt layers between 6.1m to 6.7m contain silt layers between 8.2m contain sandy silt layers between contain sand	2 - - -	contain silt seams between 3.0m to		5	SS	16		256	-						0				
sandy, reddish brown below 6.1m contain silty sand till layers between 6.1m to 6.7m grey below 7.6m contain silt layers between 7.6m to 8.2m contain sandy silt layers between 9.1m to 9.7m	-	contain saturated sandy silt layers and silt seams between 4.6m to		6	SS	10		· · ·	- - - - - - - -					0			110		
grey below 7.6m contain silt layers between 7.6m to 8.2m contain sandy silt layers between 9.1m to 9.7m	- - - - - -	contain silty sand till layers between		7	SS	18			F I					0			>225		
8.2m 8.2m 251 251 251 250 250	- - - - -	grey below 7.6m						· ·	- - - - - -										
contain sandy silt layers between 9.1m to 9.7m	- - - - - -	contain silt layers between 7.6m to 8.2m		8	SS	31							, 	<b>•</b>					
	- - - - - - - -	contain sandy silt layers between 9.1m to 9.7m		9	SS	39		250						þ					
Image: continued Next Page     GRAPH     + 3, × 3:     Numbers refer     Continued Next Page       GROUNDWATER ELEVATIONS     NOTES     + 3, × 3:     Numbers refer     C \$=3%	10	Continued Next Page							2 Number	rofo-	<b>a</b> . 001								

**WSP** 

1 OF 2



Method: Hollow Stem Auger

Diameter: 203 mm

Date: Jan/26/2016

REF. NO.: 161-01403-00

ENCL NO.: 8

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841430.85 E 592697.12

(m) ELEV DEPTH         DESCRIPTION         is and bit bit bit bit bit bit bit bit bit bit		SOIL PROFILE			AMPL				DYNA RESIS	VIC CO	NE PEN PLOT		TION			ΝΑΤΙ					DEMA	DKS
LLV DECRIPTION         DESCRIPTION         OP End Participation         March Partipation         March Participation         Ma	(m)		⊢				TER							00	PLAST LIMIT	C MOIS	TURE	LIQUID	л.	IT WI	AN	D
Optimude         5         Z         F         Ø 3 3         di         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         10         20         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         <			PLO.	~		SM E	o WA	ĸ			RENG	TH (kf	Pa)		W <sub>P</sub>	\	N 0	WL	KET F (kPa	AL UN KN/m <sup>3</sup> )		
Optimude         5         Z         F         Ø 3 3         di         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         00         10         20         00         10         20         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         <	DEPTH	DESCRIPTION	ATA	1BER	ш	BLO 0.3	IDITIO	VATI	OUN	CONF	INED	+	FIELD V. & Sensiti	ANE	WA	TER CC		Г (%)	20 20	IATUR (k		
11     SS     27       10     SS     27       10     SS     27       11     SS     23       12     SS     29       1325     QAVEY SHI, THL: sandy, trace       12     SS     29       14.3     ND OF BOREHOLE       100 official, contrastion     12       12     SS     29       24.00     0       14.3     ND OF BOREHOLE       15.000000     1.58° (m)		Continued	STR	NUN	TΥΡ	ŗ	GRO	ĒLĒ										80			GR SA	SI CL
stiff to hard (Continued)     10     SS     27	-	SILTY CLAY TILL: some sand.	is.						_													
244 00         248         0         0         -222           11         SS         23         247         0         0         -222           112         SS         23         0         0         -222         -224           120         CLAYEY SILT TILL: sandy, trace         248         0         0         -222           1433         ENO OF BOREHOLE         12         SS         29         0         0         -245           1433         Miscinghole was appen upon completion.         12         SS         29         0         0         -245           1433         Miscinghole was appen upon completion.         12         SS         0         0         -245           1433         Miscinghole was appen upon completion.         0         0         -0         -0         -0           1433         Miscinghole was appen upon completion.         0         0         0         0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0         -0	_	stiff to hard.(Continued)						249														
248     248     0     0     >222       11     SS     23     247     0     0     >222       12     SS     248     0     0     >222       132     CLAYEY SILT TILL: sandy. trace gravel. grav	-								-													
248     248     0     0     >222       11     SS     23     247     0     0     >222       12     SS     248     0     0     >222       132     CLAYEY SILT TILL: sandy. trace gravel. grav	-								-													
240 247 247 247 246 247 246 246 246 246 246 246 246 246	<u>11</u>			10	SS	27			-							0			>225			
24.05 1.22 GLAVEY SILT TILL: samty, trace gravel; grav, molal, very stiff. 44.5 1.22 SS 29 7.26 1.22 SS 29 7.26 1.2 SS 29 7.26 1.2 SS 29 7.26 1.2 SS 29 7.26 1.2 SS 29 7.26 1.2 SS 29 7.26 1.3 Solution of BoreHoLe Nete: 1.2 Solution of BoreHoLe 1.2 Solution of BoreHoL	-							-Holep	ug													
248.05     CLAYEY SILT TILL: sandy, trace     247     0     0     -228       13.26     GLAYEY SILT TILL: sandy, trace     12     25     29       14.33     CLAYEY SILT TILL: sandy, trace     0     0     0       12     SS     29     0     0       2486     0     0     0     0       14.33     NoteS:     0     0     0       14.34     NoteS:     0     0     0       14.33     0     0     0     0       14.33     0     0     0     0       15.8     0     0     0     0	-							240	_													
248.05     CLAYEY SILT TILL: sandy, trace     247     0     0     -228       13.26     GLAYEY SILT TILL: sandy, trace     12     25     29       14.33     CLAYEY SILT TILL: sandy, trace     0     0     0       12     SS     29     0     0       2486     0     0     0     0       14.33     NoteS:     0     0     0       14.34     NoteS:     0     0     0       14.33     0     0     0     0       14.33     0     0     0     0       15.8     0     0     0     0	-								-													
248.05     CLAYEY SILT TILL: sandy, trace     247     0     0     -228       13.26     GLAYEY SILT TILL: sandy, trace     12     25     29       14.33     CLAYEY SILT TILL: sandy, trace     0     0     0       12     SS     29     0     0       2486     0     0     0     0       14.33     NoteS:     0     0     0       14.34     NoteS:     0     0     0       14.33     0     0     0     0       14.33     0     0     0     0       15.8     0     0     0     0	-								-													
248.03     CLAYEY SILT TILL: sandy, trace gravel, grey, moist, very stift.     11     SS     23       13.26     CLAYEY SILT TILL: sandy, trace gravel, grey, moist, very stift.     12     SS     29       14.33     END OF BOREHOLE Notes: 1) Borehole was open upon composition.     0     0       249.55     END OF BOREHOLE Notes: 1) Borehole was open upon composition.     0     0       249.55     END OF BOREHOLE Notes: 1) Borehole was open upon composition.     0     0       23.50mm de. monophilition: 1) Borehole was open upon composition.     1     1     1       24.95     END OF BOREHOLE Notes: 1) Borehole was open upon composition.     1     1       23.50mm de. monophilition: 1) Borehole was open upon composition.     1     1     1       24.95     END OF BOREHOLE Notes: 1) Borehole was open upon composition.     1     1       23.50mm de. monophilition: 1) Borehole was open upon composition.     1     1     1       24.95     I     I     I     I     I       14.33     I     I     I<	-																					
248.03 (1.226)     CLAVEY SULT TILL: sandy, trace gravel, grey, molst, very stiff.     246       12     5S     29       244.96     0       14.33     END OF BOREHOLE Notes: 1) Borehole was open upon completion. 2) Solar Low KWL Depth (m) Mar. 21, 2016     0       14.34     END OF BOREHOLE Notes: 1) Borehole was open upon completion. 2) Solar Low KWL Depth (m) Mar. 21, 2016     1								247	_													
Default         CLAYEY SILT TILL: sandy, trace         Particular	-			11	SS	23			-							0			>225			
Default         CLAYEY SILT TILL: sandy, trace         Particular									-													
gravel, grey, molst, very stiff.	13								-													
gravel, grey, molst, very stiff.	246.03							246	_													
244.96         245           14.33         Notes:           1) Borehole was open upon completion.         2) 50mm dia. monitoring well was installed upon completion.           3) Water Level Readings:         3) Water Level Readings:           21.01         1.38	- 13.20	gravel, grey, moist, very stiff.						210	-													
244.96         245           14.33         Notes:           1) Borehole was open upon completion.         2) 50mm dia. monitoring well was installed upon completion.           3) Water Level Readings:         3) Water Level Readings:           21.01         1.38	-								-													
244.96         245           14.33         Notes:           1) Borehole was open upon completion.         2) 50mm dia. monitoring well was installed upon completion.           3) Water Level Readings:         3) Water Level Readings:           21.01         1.38	- 14				~~				_													
14.33 END OF BOREHOLE Notes: 1) Borehole was open upon completion. 2) Somm dia. monitoring well was installed upon completion. 3) Water Level Readings: Date W. L. Depth (m) Mar. 21, 2016 1.58	-			12	SS	29			-							0						
Notes: 1) Borehole was open upon completion. 2) Somm dia: monitoring well was installed upon completion. 3) Water Level Readings: Date W. L. Depth (m) Mar. 21, 2016 1.58	244.96 14.33	END OF BOREHOLE	1%.L					245	-													
completion. 2) 50mm dia. monitoring well was installed upon completion. 3) Water Level Readings: Date W. L. Depth (m) Mar. 21, 2016 1.58		Notes:																				
3) Water Level Readings: Date W. L. Depth (m) Mar. 21, 2016 1.58		completion.																				
3) Water Level Readings: Date W. L. Depth (m) Mar. 21, 2016 1.58		2) 50mm dia. monitoring well was installed upon completion.																				
Mar. 21, 2016 1.58		<ol><li>Water Level Readings:</li></ol>																				
		Mar. 21, 2016 1.58																				



WS	SP

L	0	G	OF	B	O	RE	HC	)LE	1	6-24	1
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Method: Solid Stem Auger

Diameter: 150 mm

Date: Feb/12/2016

REF. NO.: 161-01403-00

ENCL NO.: 22

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841681.88 E 593375.95

	SOIL PROFILE	SAM			.ES	~		DYNAI RESIS	MIC CO TANCE	NE PEN PLOT		TION			NAT	URAL	LIQUID		5	REMARKS
(m) <u>ELEV</u> DEPTH 257.93	DESCRIPTION Ground Surface	STRATA PLOT	NUMBER	ТҮРЕ	"N" <u>BLOWS</u> 0.3 m	GROUND WATER CONDITIONS	ELEVATION	0 UN • QI 2	AR STI NCONF JICK TF 0 4	RENG	<sup>-</sup> H (k + ×	FIELD V & Sensit	00 ANE ivity ANE 00		TER CO	W O ONTEN	LIMIT W <sub>L</sub>	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (KN/m <sup>3</sup> )	AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.00	FILL: silty clay, some sand, trace gravel, trace rootlets, trace organics, dark grey to brown, moist, firm to stiff.		1	SS	6		-Rising -Sand W. L. 2	- - - 257.33	m								0			
256.71 1.22	SILTY CLAY TILL: some sand, trace gravel, brown, moist, very stiff		2	SS	11		Mar 21 257 -Holep	-	,						c	þ				
<u>2</u>	to hard. oxidized between 1.2m to 2.9m		3	SS	22		256	- - - - -							0			>225		
- - - -			4	SS	31		Sand 255	- - - - -							0					
<u>-</u>	grey below 4.6m		5	SS	24			- - - - -							o			>225	23.1	
<u>4.11</u> <u>5</u>	SAND AND SILT TILL: some clay, trace gravel, grey, moist to saturated, compact to very dense.	0	6	SS	15		254 Scree 253	È .						c						3 38 48 11
<u>6</u> 251.38	contain saturated sand seams below 6.1m	0	7	SS	90/ 300mr		252 	-						0						spoon wet
6.55	END OF BOREHOLE Notes: 1) Borehole was open upon completion. 2) Water level was at 6.0m during drilling. 3) 50mm dia. monitoring well was installed upon completion. 4) Water Level Readings: Date W. L. Depth (m) Mar. 21, 2016 0.60																			



Method: Solid Stem Auger

Diameter: 150 mm

Date: Feb/16/2016

REF. NO.: 161-01403-00

ENCL NO.: 23

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841831.93 E 593253.47

	SOIL PROFILE		5	SAMPL	ES	~		DYNAI RESIS	TANCE	PLOT		HON			_ NAT	URAL	LIQUID		F	REMARKS
(m)		۲	1			GROUND WATER CONDITIONS		2	0 4	06	50 E	30 1	00	PLASTI LIMIT	MOIS CON	STURE	LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m <sup>3</sup> )	
ELEV	DECODIDITION	STRATA PLOT	~		BLOWS 0.3 m		NO				TH (kl	Pa)		W <sub>P</sub>		w o	WL	KET (kP.	SAL U SAL U	GRAIN SIZE
DEPTH	DESCRIPTION	ATA	18 EF	ш	BLO		ELEVATION		VCONF		+	FIELD V & Sensit	ANE tivity	WA	TER CO	ONTEN	T (%)	POC DO	NTUF ()	(%)
58 26	Ground Surface	STR	NUMBER	TYPE	ż	GR CON CON	ĒL						ANE 00				30		2	GR SA SI C
0.00	FILL: silty clay, some sand, trace gravel, trace rootlets, trace organics,	$\boxtimes$		-	-			-												
	gravel, trace rootlets, trace organics, dark grey to brown, moist, firm to	$\mathbb{X}$	1	SS	7		258										0	-		
.	very stiff.	$\bigotimes$						-												
		$\bigotimes$						-												
1		$\mathbb{X}$						-												
		$\bigotimes$	2	SS	7			-								0				
		$\bigotimes$	<u>}</u>				257	-												
-		$\bigotimes$						-												
256.43		$\bigotimes$	3	SS	21			-							0			>225		
2 1.83	SILTY CLAY TILL: some sand, trace gravel, oxidized, brown, moist,		]					-							-					
	very stiff.	1X					256	-												
		1×1					200	-												
			4	SS	27			-							0			>225		
		191						-												
3	greyish brown below 3.0m	12				-		-												
	greyish brown below 5.0m			SS	04		255								-					
.		K.	5	55	24			-							0					
		i fr				-		E												
4								-												
4.11 4.11	CLAYEY SILT TILL: sandy, trace		1					-												
4.11	gravel, grey, moist, very stiff.		1				254	-												
.		ł.K						-												
		Hij	1					-												
5			6	SS	23			-						c	1			>225		
		19	_			-	253	-												
		Υk	1				255	E												
52.62		ľ.						-												
5.64	CLAYEY SILT: trace sand, contain silty clay layers, grey, moist, very							-												
6	stiff.		1					-												
			1				252	-												
_			7	SS	24			-							0					
251.55			1					-												
6.71	END OF BOREHOLE Notes:																			
	1) Borehole was open upon																			
	completion.																			
			1																	
			1																	
		1	1			1								1		1				

WS	SP

Method: Solid Stem Auger

Diameter: 150 mm

Date: Feb/16/2016

REF. NO.: 161-01403-00

ENCL NO.: 24

PROJECT: Mayfield West Phase 2, Caledon, ON

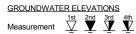
CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4841858.93 E 593212.44

	SOIL PROFILE		s	ampl	.ES			DYNAMIC COI RESISTANCE	NE PEN PLOT		TION	PLASTI	_ NATI	URAL	LIQUID		F	REMARKS
(m) <u>ELEV</u> DEPTH 258.74	DESCRIPTION Ground Surface	STRATA PLOT	NUMBER	ТҮРЕ	"N" <u>BLOWS</u> 0.3 m	GROUND WATER CONDITIONS	ELEVATION	20 4 SHEAR STF O UNCONFI O QUICK TR 20 4		TH (kf + ×	L Pa) FIELD V. & Sensiti LAB VA	W <sub>P</sub>		TENT w o ONTENT	цоло LIMIT w <sub>L</sub> Т (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT M (kN/m³)	AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
- 0.00 	FILL: silty clay, some sand, trace gravel, trace rootlets, trace organics, dark grey to brown, moist, firm to stiff.	$\bigotimes$	1	SS	5	¥	-Sand W. L. 2	258.31 m , 2016						0				
<u>1</u> 257.52 1.22	SILTY CLAY TILL: some sand, trace gravel, oxidized, brown, moist,		2	SS	13		-Holep	-						0				
- - - - - 2	stiff to very stiff.		3	SS	16		257						0			>225		
256.45 2.29	SAND AND SILT TILL: some clay, trace gravel, contain silty clay till layers, brown, wet, compact to dense.	0	4	SS	21		-Sandi	-					0					spoon wet
- - - -	contain dilatant silty sand layers below 3.0m	0	5	SS	30		0.55	-					0					5 46 38 11 Non-plasticity
2 <u>54.63</u> - 4.11 -	CLAYEY SILT TILL: sandy, trace gravel, grey, moist, very stiff.						255 Scree											
- - - 5 - -			6	SS	21		254					0				>225		
2 <u>53.10</u> 5.64	SANDY SILT TILL: trace clay, trace gravel, contain clayey silt till layers and sandy silt seams, grey, moist to wet, very dense.	0			50/		253											
<u>252.42</u> 6.32	END OF BOREHOLE Notes: 1) Borehole was open upon completion. 2) Water level was at 5.5m during drilling. 3) 50mm dia. monitoring well was installed upon completion. 4) Water Level Readings: Date W. L. Depth (m) Mar. 21, 2016 0.43		7	SS	<del>Z Smm</del>		-Sand						2					



 $\bigcirc$   $^{\textbf{8}=3\%}$  Strain at Failure



Method: Solid Stem Auger

Diameter: 150 mm

Date: Feb/16/2016

REF. NO.: 161-01403-00

ENCL NO.: 34

PROJECT: Mayfield West Phase 2, Caledon, ON

CLIENT: Mayfield Station Landowners Group Inc.

PROJECT LOCATION: Caledon, ON

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan N 4842103.37 E 593544.05

- grav	L: silty clay, some sand, trace vel, trace rootlets, trace organics, < grey to brown, moist, firm to	STRATA PLOT	NUMBER		S E	VATER VS				NE PEN PLOT	_	0 10	10	PLASTI LIMIT	C MOIS	TURE	LIQUID LIMIT	ż	IT WI	REMAF AND	
- 0.00 <b>FILL</b> grav	L: silty clay, some sand, trace vel, trace rootlets, trace organics, < grey to brown, moist, firm to	s.	5	ТҮРЕ	l" <u>BLOWS</u> 0.3 m	GROUND WATER CONDITIONS	ELEVATION	0 UN • QI	NCONF	RENG INED RIAXIAL	L TH (kf + . ×	L Pa) FIELD V/ & Sensiti LAB V/	ANE vity ANE	W <sub>P</sub>	TER CC	W O ONTEN <sup>-</sup>	w <sub>L</sub> ——– T (%)	POCKET PEN. (Cu) (kPa)	NATURAL UN (kN/m <sup>3</sup> )	GRAIN DISTRIBU (%)	JTION
dark	k grey to brown, moist, firm to	$K \times X$	ž	È	ž	50	Ш	2	0 4	0 6	8 0	0 10	00	1	0 2	20 3	30			GR SA	SI CL
- - _1		$\bigotimes$	1	SS	6		259	-								0					
-		$\bigotimes$	2	SS	8		258	-								0					
trace	TY CLAY TILL: some sand, e gravel, oxidized, brown, moist, / stiff.		3	SS	19										0			>225			
- laye	AYEY SILT TILL: with sandy silt rs, sandy, trace gravel, brown, st, hard.		4	SS	35		257	-							0						
som som	ND AND SILT TILL: trace to ne clay, trace to some gravel, dish brown, moist, very dense.		5	SS	65/ 150mm		256	-						0						10 36 4	14 10
	TY SAND TILL /SHALE MPLEX: sandy, some gravel, to a shall importance for month						255	-													
- redd	tain shale/limestone fragments, dish brown, moist to saturated, y dense.		6	SS	35			-						¢	▶ ⊢	-1			23.0	25 31 3	33 11
253.13							254														
6.17 edd 6.17 edd bedd ENL Note 1) B com	Borehole was open upon npletion. Vater level was at 6.0m during		7		<u>100/</u> ∖initial/ ₹5mm			-												auger ref	iusal



