Report on

Geotechnical Investigation
Proposed Mid-Rise Building
1354 Bronte Road
Oakville, Ontario

Prepared For:

Eaglewood Communities Inc.

Project No. 21-347-100
Date: November 25, 2021

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DRAWINGS

1. INTRODUCTION

DS Consultants Ltd. (DS) was retained by Eaglewood Communities Inc. to undertake a geotechnical investigation for the proposed development located at 1354 Bronte Road, Oakville, Ontario.

It is understood that the proposed development will consist of a midrise (4-Storey) building with one level of basement with finished basement floor at elevation 127.5m.

The purpose of this geotechnical investigation was to determine the subsurface conditions at four (4) borehole locations and from the findings at the boreholes make geotechnical recommendations for the following:

1) Foundations
2) Floor slabs and permanent drainage
3) Excavations and groundwater control
4) Earth pressures
5) Earthquake considerations

This report is provided on the basis of the terms of reference presented above and, on the assumption, that the design will be in accordance with applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning the geotechnical aspects of the codes and standards, this office should be contacted to review the design. It may then be necessary to carry out additional borings and reporting before the recommendations can cater to the changed design.

The site investigation and recommendations follow generally accepted practice for geotechnical consultants in Ontario. The format and contents are guided by client specific needs and economics. Laboratory testing for most part follows ASTM or CSA Standards or modifications of these standards that have become standard practice.

This report has been prepared for Eaglewood Communities Inc., its architects, and designers. Use of this report by third party without DS consent is prohibited.

2. FIELD AND LABORATORY WORK

Four (4) boreholes (BH21-1 to BH21-4, see **Drawing 1** for borehole locations) were drilled at the subject site to depths ranging from 8.2 to 9.7m below the existing ground surface. Boreholes were drilled using solid stem continuous flight augers equipment by a drilling sub-contractor under the direction and supervision of DS personnel. Samples were retrieved at regular intervals

with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and returned to the DS laboratory for detailed examination by the project engineer and for laboratory testing.

As well as visual examination in the laboratory, all soil samples from geotechnical boreholes were tested for moisture contents. Selected three (3) soil samples were subject to grain size analyses and results are presented on Drawing 7.

Water level observations were made during and upon completion of drilling. Monitoring wells of 50mm diameter were installed in boreholes BH21-1, BH21-2 and BH21-3 for the long-term groundwater levels measurements.

The surface elevations at the borehole locations were surveyed by DS, using differential GPS system.

3. SITE AND SUBSURFACE CONDITIONS

The borehole location plan is shown on **Drawing 1**. General notes on sample description are provided on **Drawing 1A**. The subsurface conditions at borehole locations are presented in the individual borehole logs presented on **Drawings 2 to 5**. A generalized sub-surface profile is presented on **Drawing 6**. The subsurface conditions in the boreholes are summarized in the following paragraphs.

3.1 Soil Conditions

Pavement Structure/Topsoil/Fill/Weathered/disturbed Soils: One borehole (BH21-1) was drilled on the paved area and encountered a pavement structure consisting of 130 mm of asphaltic concrete, overlying about 230 mm of the granular base/sub-base. A layer of topsoil, varying in thickness from 180 to 200 mm, was present at the surface of all the boreholes except BH21-1.

It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative for the site and should not be relied on to calculate the amount of topsoil at the site. Shallow test pits should be carried out to explore the thickness of topsoil across the site.

Fill material and upper weathered/disturbed soils consisting of silty clay till, sandy silt to silty sand, sand and clayey silt to silty clay were encountered in all the boreholes, extending to depths varying from 1.1 to 1.5m. The fill material was found to have a soft to very stiff or very loose to compact state, with measured SPT 'N' values ranging from 2 to 19 blows per 300 mm penetration. Inclusions of topsoil, rootlets and organics were also found in fill material.

Silty Clay Till: Below the fill material, upper native soil consisting of silty clay till was encountered in boreholes, extending to depths of 3.1 to 4.6m below the existing grade. Silty clay till deposit was found to have a firm to hard consistency, with measured SPT 'N' values ranging from 7 to more than 30 blows per 300mm of penetration.

Grain size analysis of one (1) silty clay till sample (BH21-4/SS4) was conducted and the results are presented in Drawing 7, with the following fractions:

Clay:	18%
Silt:	53%
Sand:	26%
Gravel:	3%

Atterberg Limits test was conducted on the same silty clay till sample (BH21-4/SS4) and the results are presented on the respective borehole logs, with the following values:

Liquid Limit:	23%
Plastic Limit:	15%
Plasticity Index:	8

Sandy Silt to Silty Sand Till: Below the upper silty clay till deposits, sandy silt to silty sand till deposits were encountered in the boreholes, extending to the depths of 6.1 to 7.6 m and overlying sand and gravel deposits. Sandy silt to silty sand till was present in a very dense state, with measured SPT 'N' values of over 50 blows per 300 mm of penetration. Occasional seams/layers of sand and cobble/boulder were present within the till deposit.

Grain size analysis of two (2) sandy silt to silty sand till sample (BH21-1/SS6 and BH21-2/SS7) were conducted and the results are presented in Drawing 7, with the following fractions:

Clay:	6 to 11%
Silt:	19 to 39%
Sand:	31 to 58%
Gravel:	17 to 19%

Sand and Gravel Deposits: A water bearing sand and gravel deposit was encountered in all the boreholes below a depth of 6.1 to 7.6 m, below the sandy silt to silty sand till deposits and extended to the maximum explored depth of boreholes. Sand and Gravel was present in a wet condition. The measured SPT 'N' value in this deposit was 44 to over 50 blows per 300 mm of penetration, indicating its dense to very dense state.

3.2 Groundwater Conditions

During drilling, short-term (unstabilized) water was found in borehole BH21-4 at a depth of about 4.6 m below the existing grade. The groundwater levels measured in the monitoring wells installed in BH21-1, BH21-2 and BH21-3 on November 3, 2021 were found below the depths

ranging from 5.6 to 7.7 m below ground surface, corresponding to Elevations 122.6 to 122.7 m, as summarized in **Table 1**.

Table 1: Summary of Groundwater Level Measurements in Monitoring Wells

Borehole No.	Ground Surface Elev. (m)	Date of Observation	Depth of Groundwater (m)	Elevation of Groundwater (m)
BH21-1	130.3	November 3, 2021	7.7	122.6
BH21-2	129.8	November 3, 2021	7.1	122.6
BH21-3	128.3	November 3, 2021	5.6	122.7

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

4. FOUNDATIONS

It is understood that the proposed development will consist of a midrise building with one level of basement with finished basement floor (P1 slab) at Elevation 127.5 m. Footings will be 1 to 2m below the P1 slab.

Based on the information from boreholes, the proposed building with one level of basement can be supported by conventional spread and strip footings founded on the undisturbed native soils.

Footings founded on undisturbed native soils can be designed for bearing capacity value of 300 to 400 kPa at SLS (Serviceability Limit States), and for a factored geotechnical resistance of 450 to 600 kPa at ULS (Ultimate Limit States). The bearing values and the corresponding founding elevations at the borehole locations are summarized on **Table 2**.

Table 2: Bearing Values and Founding Levels of Footings

BH No.	Founding Soils	Bearing Capacity at SLS (kPa)	Factored Geotechnical Resistance at ULS (kPa)	Minimum Depth below Existing Ground (m)	Founding Level at or Below Elevation (m)
BH21-1	Silty Clay Till	300	450	2.0	128.3
	Sandy Silt to Silty Sand Till	400	600	4.6	125.7
BH21-2	Silty Clay Till	300	450	2.0	127.8
	Sandy Silt to Silty Sand Till	400	600	4.6	125.2

BH21-3	Silty Clay Till	300 400	450 600	1.5 2.3	126.8 126.0
BH21-4	Silty Clay Till Sandy Silt to Silty Sand Till	300 400	450 600	1.8 4.6	127.5 124.7

Foundations designed to the specified bearing capacity at the Serviceability Limit States (SLS) are expected to settle less than 25 mm total and 19 mm differential.

All footings exposed to seasonal freezing conditions must have at least 1.2 m of soil cover for frost protection.

All footing bases must be inspected by this office prior to pouring concrete.

Where it is necessary to place footings at different levels, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line drawn up from the base of the lower footing. The lower footing must be installed first to help minimize the risk of undermining the upper footing.

It should be noted that the recommended bearing capacities have been calculated by DS Consultants Ltd. from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of the underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by DS Consultants Ltd to validate the information for use during the construction stage.

5. FLOOR SLAB AND PERMANENT DRAINAGE

The basement floor can be supported on grade provided all existing fill/weathered disturbed material and surficially loose/softened soils are removed and the base thoroughly proof rolled. Any backfill required to raise the grade can consists of inorganic soil, placed in shallow lifts and compacted to 98 percent of Standard Proctor Maximum Dry Density (SPMDD).

A moisture barrier consisting of at least 200mm of 19mm clear crushed stone should be installed under the floor slab.

A perimeter and underfloor drainage system will be required around the exterior basement walls. Typical drainage and backfill recommendations are illustrated on **Drawings 8** for the open cut excavations.

6. EARTH PRESSURES

The lateral earth pressures acting on basement walls may be calculated from the following expression:

$$p = K(\gamma h + q)$$

where p = Lateral earth pressure in kPa acting at depth h

K = Earth pressure coefficient equal to 0.40 for vertical walls and horizontal backfill used for permanent construction. Water pressure must be considered, if continuous wall drains are not used.

γ = Unit weight of backfill, a value of 21 kN/m^3 may be assumed

h = Depth to point of interest in metres

q = Equivalent value of surcharge on the ground surface in kPa

The above expression assumes that the perimeter drainage system prevents the build-up of any hydrostatic pressure behind the wall.

7. EXCAVATION AND GROUNDWATER CONTROL

Excavations can be carried out with heavy hydraulic backhoe. Due to the low permeability of the glacial till deposits, it is expected that the water seepage through the till deposits can be controlled by conventional pumping methods for excavations above elevation 126.0 m. Groundwater table in the monitoring wells was recorded at depths ranging from 5.6 to 7.7m, corresponding to Elevations 122.6 to 122.7 m. Positive dewatering will be required prior to any excavation in sandy silt to silty sand till, sand and gravel below the groundwater table, otherwise it will result in an unstable base and flowing sides.

DS is currently completing a hydrogeological assessment at the subject site. More comments regarding the type and extent of groundwater control required during construction and permanent drainage will be addressed in our hydrogeological report.

It should be noted that the till is a non-sorted sediment and therefore may contain boulders. Provisions must be made in the excavation contract for the removal of possible boulders in the till or obstructions in the fill material.

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the fill can be classified as Type 3 Soil above

groundwater table. The very stiff to hard silty clay till can be classified as Type 2 Soil above the groundwater table and Type 3 Soil below groundwater table. Firm clayey soils and sandy silt to silty sand till and cohesionless soils (sand and gravel) can be classified as Type 3 Soil above groundwater table and Type 4 Soil below the groundwater table.

The select inorganic fill and native soils free from topsoil and organics can be used as general construction backfill where it can be compacted with sheep's foot type compactors. Loose lifts of soil, which are to be compacted, should not exceed 200 mm.

Imported Granular 'B' fill is recommended in areas where free draining material is required, i.e. backfill behind foundation walls and in footing trenches. Imported granular fill, which can be compacted with handheld equipment, should be used in confined areas.

It should be noted that the excavated soils are subject to moisture content increase during wet weather which would make these materials too wet for adequate compaction. Stockpiles should therefore be compacted at the surface or be covered with tarpaulins to help minimize moisture uptake.

8. EARTHQUAKE CONSIDERATIONS

Based on the borehole information and according to Table 4.1.8.4.A of OBC 2012, the subject site for the proposed building with one level of basement can be classified as “Class C” for seismic site response.

9. GENERAL COMMENTS AND LIMITATIONS OF REPORT

DS Consultants Ltd. (DS) should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, DS will assume no responsibility for interpretation of the recommendations in the report.

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to DS at the time of preparation. Unless otherwise agreed in writing by DS, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole

locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the test hole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. DS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

DS Consultants Ltd.

Simerjeet Singh Gill, M. Eng., P. Eng.

Shabbir Bandukwala, M. Eng., P.Eng.

Fanyu Zhu, Ph. D., P.Eng.

Drawings

Legend

- Monitoring Well Locations
- Borehole Locations

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Project: Geotechnical Investigation -1354 Bronte Road, Oakville, ON

Title: **Borehole Location Plan**

N

Client: Eaglewood Communities Inc.

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	FZ	SG	November, 2021
Rev: 0	Scale: As Shown	Project No.: 21-347-100	Drawing No.: 1

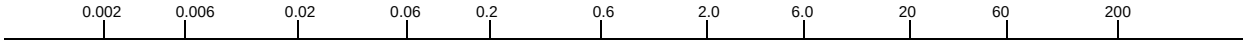
Image/Map Source: *Google Satellite Image*

Drawing 1A: Notes On Sample Descriptions

1. All sample descriptions included in this report generally follow the Unified Soil Classification. Laboratory grain size analyses provided by DSCL also follow the same system. Different classification systems may be used by others, such as the system by the International Society for Soil Mechanics and Foundation Engineering (ISSMFE). Please note that, with the exception of those samples where a grain size analysis and/or Atterberg Limits testing have been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional preliminary geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

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LOG OF BOREHOLE BH21-1

PROJECT: Geotechnical Investigation- Proposed Mid- rise Building
CLIENT: Eaglewood Communities Inc.
PROJECT LOCATION: 1354 Bronte Road, Oakville, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4807982.335 E 600951.347

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-08-2021

REF. NO.: 21-347-100
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"
130.3				
130.0 / 0.0	**ASPHALT:** 130mm			
129.9 / 0.1	**GRANULAR BASE:** sand and gravel, 230mm	1	SS	5
129.2 / 0.4	**FILL:** sandy silt to silty sand, some clay, trace organics/topsoil, brown, moist, loose	2	SS	7
1.1	**SILTY CLAY TILL:** sandy, trace gravel, trace shale fragments, brown, moist, stiff to very stiff sand seams	3	SS	18
	greyish brown below 2.3m	4	SS	26
	grey below 3.1m	5	SS	21
125.7				
4.6	**SANDY SILT TO SILTY SAND TILL:** some clay, some gravel, occasional cobble, reddish brown, moist, very dense	6	SS	50/ 50mm
	greyish brown and wet below 6.1 m	7	SS	50/ 50mm
122.7				
7.6	**SAND AND GRAVEL:** trace silt, brown, wet, dense to very dense	8	SS	51
		9	SS	44
120.6				
9.7	**END OF BOREHOLE:**			

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 03, 2021	7.73

GROUND WATER CONDITIONS: W. L. 122.6 m Nov 03, 2021

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

METHANE AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
19	31	39	11

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG 21-347-100-GEO COPY.GPJ DS.GDT 21-11-29

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LOG OF BOREHOLE BH21-2

PROJECT: Geotechnical Investigation- Proposed Mid- rise Building
CLIENT: Eaglewood Communities Inc.
PROJECT LOCATION: 1354 Bronte Road, Oakville, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4808005.125 E 600921.387

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-08-2021

REF. NO.: 21-347-100
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS / 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
129.8							
129.6 0.2	**TOPSOIL:** 180mm						
129.5 0.3	**FILL:** clayey silt, trace sand, trace rootlets, some organics, brown, moist, soft		1	SS	2		
128.7 1.1	**FILL:** sandy silt, trace organics/topsoil, some clay, brown, wet, very loose to compact		2	SS	19		129
	SILTY CLAY TILL: sandy, trace gravel, trace shale fragments, brown, moist, very stiff to hard trace cobble, sand seams below 1.5 m		3	SS	26		128
			4	SS	35		127
	grey below 3.1m		5	SS	38		126
125.2							
4.6	**SANDY SILT TO SILTY SAND TILL:** trace clay, some gravel, occasional cobble, greyish brown, moist, very dense		6	SS	50/ 50mm		125
			7	SS	50/ 130mm		124
						W. L. 122.6 m Nov 03, 2021	123
122.2							
7.6	**SAND AND GRAVEL:** trace silt, brown, wet, very dense		8	SS	56		122
121.6							
8.2	**END OF BOREHOLE:**						

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 03, 2021	7.14

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

METHANE AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
17	58	19	6

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG 21-347-100-GEO COPY.GPJ DS.GDT 21-11-29

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LOG OF BOREHOLE BH21-3

PROJECT: Geotechnical Investigation- Proposed Mid- rise Building
CLIENT: Eaglewood Communities Inc.
PROJECT LOCATION: 1354 Bronte Road, Oakville, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4808038.131 E 600946.877

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-08-2021

REF. NO.: 21-347-100
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
128.3							
128.0 0.0	**TOPSOIL:** 180mm						
0.2	**FILL:** silty clay, trace rootlets/organics, trace sand, trace gravel, brown, very moist, soft		1	SS	3		
127.5 0.8	**FILL:** silty clay till, sandy, trace gravel, occasional cobble, brown, moist, very stiff, weathered/disturbed		2	SS	19		
127.2 1.1	**SILTY CLAY TILL:** sandy, trace gravel, trace shale fragments, occasional cobble, brown, moist, very stiff to hard		3	SS	27		
2	greyish brown		4	SS	47		
125.2 3.1	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel/ shale fragments, brown to reddish brown, wet, very dense		5	SS	63		
4							
5			6	SS	50/ 25mm		
122.2 6.1	**SAND AND GRAVEL:** trace silt, brown, wet, very dense		7	SS	55		
7							
120.1 8.2	**END OF BOREHOLE:**		8	SS	62		

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 03, 2021	5.67

W. L. 122.7 m
Nov 03, 2021

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
METHANE AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG 21-347-100-GEO COPY.GPJ DS.GDT 21-11-29

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LOG OF BOREHOLE BH21-4

PROJECT: Geotechnical Investigation- Proposed Mid- rise Building
CLIENT: Eaglewood Communities Inc.
PROJECT LOCATION: 1354 Bronte Road, Oakville, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4808021.236 E 600972.34

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-08-2021

REF. NO.: 21-347-100
ENCL NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS / 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
129.3							
129.0 0.0	**TOPSOIL:** 200mm						129
0.2	**FILL:** sand, trace silt, trace rootlets, trace cobble, brown, moist, loose		1	SS	5		
128.5							
1 0.8	**FILL:** sandy silt, trace rootlets, trace clay, brown, wet, loose		2	SS	5		128
127.8							
1.5	**SILTY CLAY TILL:** sandy, trace gravel/ shale fragments, occasional cobble, brown, moist, very stiff		3	SS	20		
2	sand seams at 2.3m		4	SS	25		127
3			5	SS	28		126
4							125
124.7							
4.6	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel, greyish brown, wet, very dense		6	SS	50/ 75mm		
5 6 123.2							124
6.1	**SAND AND GRAVEL:** trace silt, brown, wet, very dense		7	SS	50/ 130mm		123
7							122
8 121.1			8	SS	50		
8.2	**END OF BOREHOLE:** Notes: 1) Water depth at 4.6 m during drilling.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

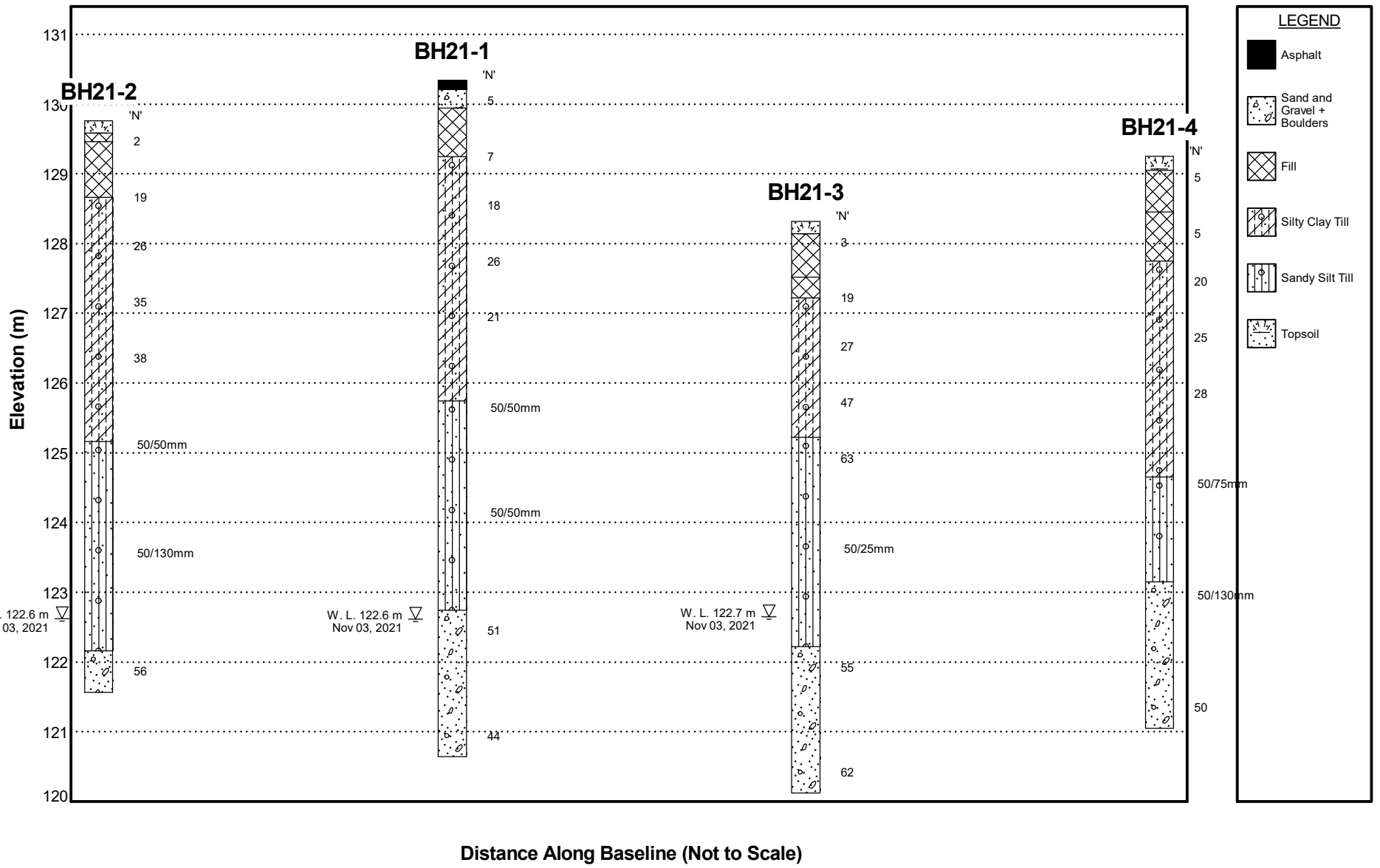
METHANE AND GRAIN SIZE DISTRIBUTION (%)

	GR	SA	SI	CL
3	26	53	18	

DS SOIL LOG 21-347-100-GEO COPY.GPJ DS.GDT 21-11-29

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure



DS FENCE (M) 21-347-100-GEO COPY.GPJ DS.GDT 21-11-2

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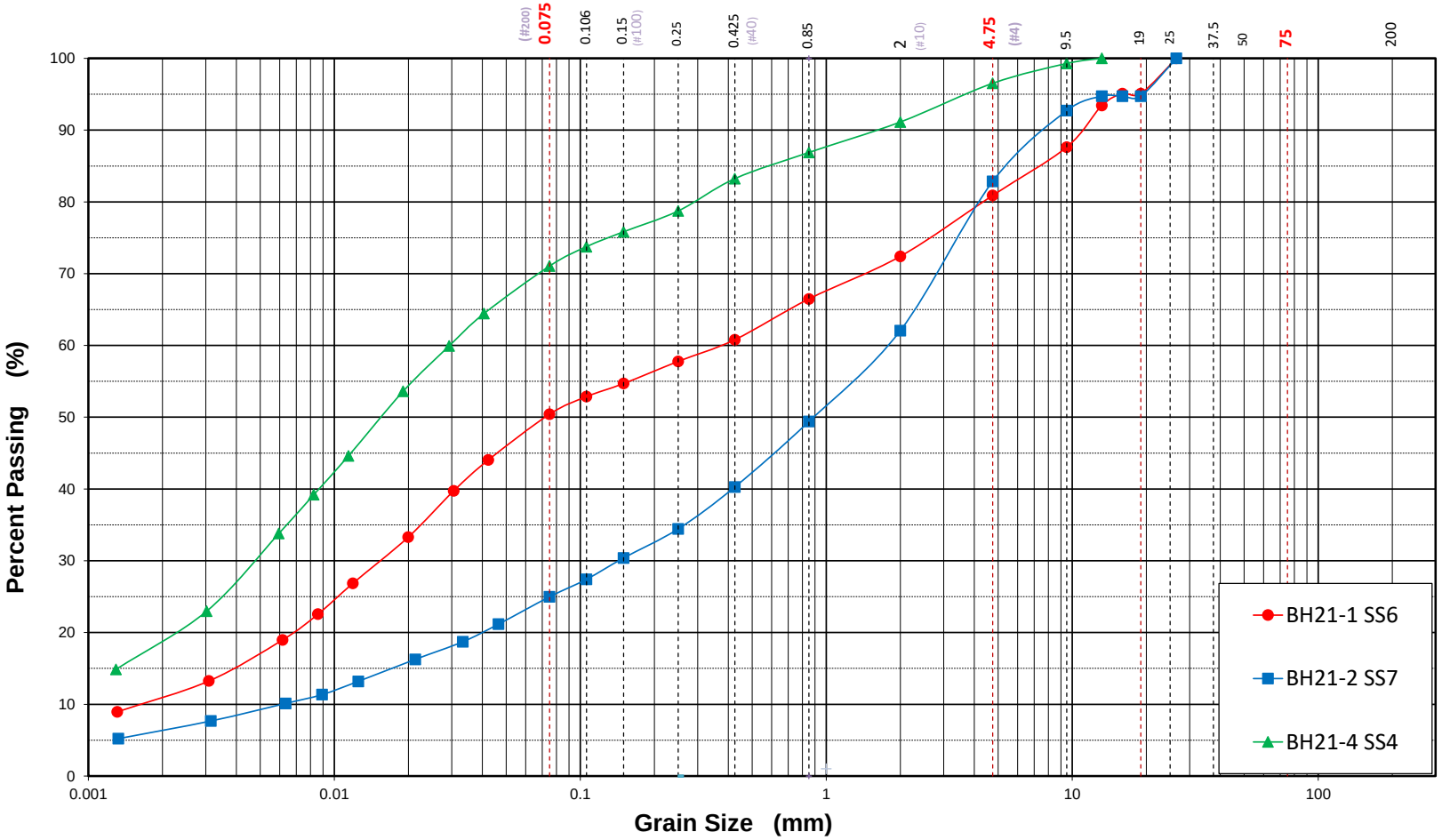
Generalized Sub-surface Profile

DRAWING NO.	6
JOB NO.	21-347-100
DATE	November, 2021

Particle Size Distribution (ASTM-D421/D422)



Silt and Clay		Sand			Gravel		Cobble +
Clay	Silt	Fine	Medium	Coarse	Fine	Coarse	

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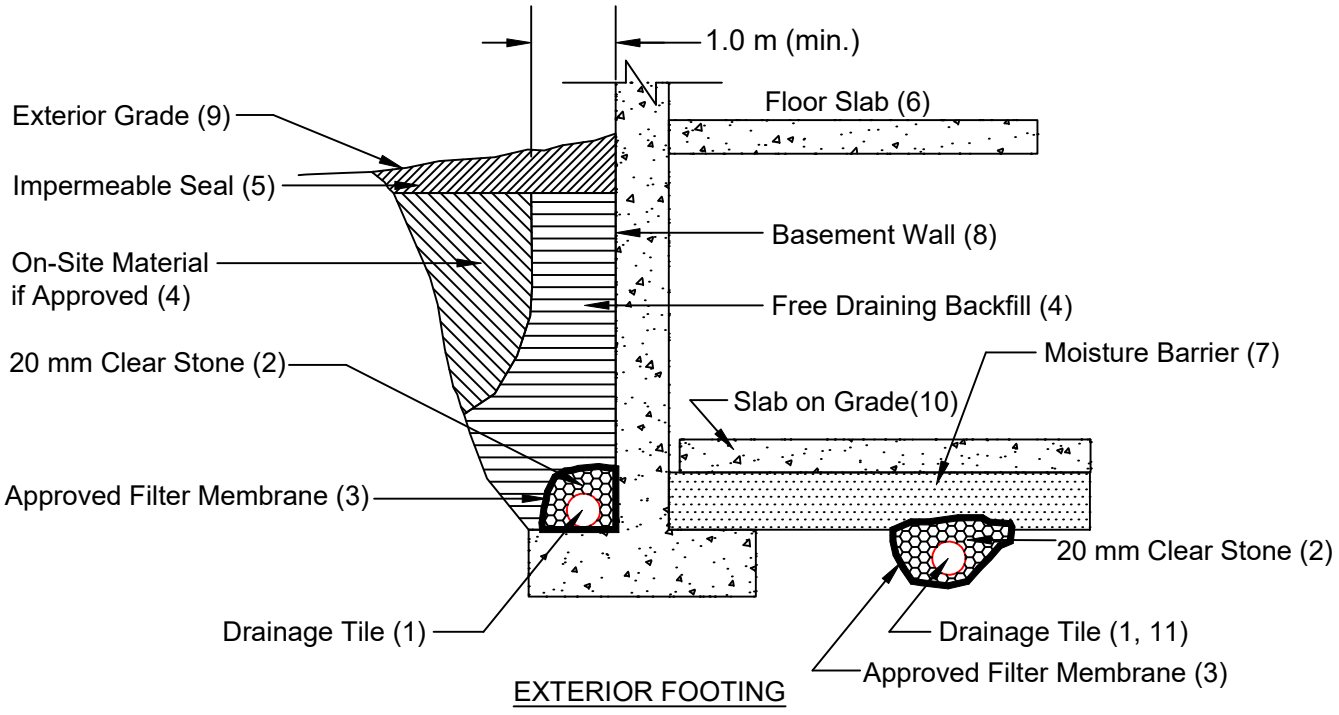
Project	**Geotechnical Investigation**	Project No	**21-347-100**
Location	**1354 Bronte Road, Oakville**	Date	**Oct-14-2021**
Client	**Eaglewood Communities Inc.**	Figure No	7



EXTERIOR FOOTING

Notes

1. Drainage tile to consist of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet.
2. 20 mm (3/4") clear stone - 150 mm (6") top and side of drain. If drain is not on footing, place100 mm (4 inches) of stone below drain .
3. Wrap the clear stone with an approved filter membrane (Terrafix 270R or equivalent).
4. Free Draining backfill - OPSS Granular B or equivalent compacted to the specified density. Do not use heavy compaction equipment within 450 mm (18") of the wall. Use hand controlled light compaction equipment within 1.8 m (6') of wall. The minimum width of the Granular 'B' backfill must be 1.0 m.
5. Impermeable backfill seal - compacted clay, clayey silt or equivalent. If original soil is free-draining, seal may be omitted. Maximum thickness of seal to be 0.5 m.
6. Do not backfill until wall is supported by basement and floor slabs or adequate bracing.
7. Moisture barrier to be at least 200 mm (8") of compacted clear 20 mm (3/4") stone or equivalent free draining material. A vapour barrier may be required for specialty floors.
8. Basement wall to be damp proofed /water proofed.
9. Exterior grade to slope away from building.
10. Slab on grade should not be structurally connected to the wall or footing.
11. Underfloor drain invert to be at least 300 mm (12") below underside of floor slab.
12. Drainage tile placed in parallel rows 6 to 8 m (20 to 25') centers one way. Place drain on 100 mm (4") clear stone with 150 mm (6") of clear stone on top and sides. Enclose stone with filter fabric as noted in (3).
13. The entire subgrade to be sealed with approved filter fabric (Terrafix 270R or equivalent) if non-cohesive (sandy) soils below ground water table encountered.
14. Do not connect the underfloor drains to perimeter drains.
15. Review the geotechnical report for specific details.

DRAINAGE AND BACKFILL RECOMMENDATIONS
Basement with Underfloor Drainage

(not to scale)