DAVROC
TESTING LABORATORIES INC.

CONSULTING ENGINEERS •

Materials Testing and Inspection

File No. L20-0249GE

July 23, 2020
Revised Date: August 6, 2020

Geotechnical Investigation
M-J-J-J Developments Inc.
Proposed 5-Storey Residential/Commercial Building
76 Bryne Drive, Barrie, Ontario

Prepared For:

Mr. Sam Di Gregorio

Prepared By:

Davroc Testing Laboratories Inc.

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1. INTRODUCTION

This report presents the results of a geotechnical investigation carried out by Davroc Testing Laboratories Inc. (Davroc) for the proposed building to be constructed at 76 Bryne Drive in Barrie, Ontario (see Figure No. 1 in Appendix A). The investigation was authorized by Mr. Sam Di Gregorio of M-J-J-J Developments Inc. on June 11, 2020.

It is understood that a 5-storey mixed use, residential and commercial, building with one underground level of parking is proposed to be constructed at the above captioned address.

The purpose of this investigation was to determine the subsurface conditions at five (5) borehole locations and from the findings in these boreholes provide geotechnical recommendations for the design and construction of the proposed building and parking areas. The five (5) boreholes that were advanced on this site were designated as Borehole No.'s 1 to 5 (BH 1 to 5).

The comments and recommendations given in this report are based on the assumption that the above-described design concept will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or the requirement of additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

2. PROCEDURE

The fieldwork was carried on July 2 and 3, 2020. At that time, five (5) boreholes were advanced to depths ranging from about 10.8m to 11.1m by a drilling subcontractor using hollow stem augers. Samples were retrieved at regular intervals with a split barrel sampler in accordance with the Standard Penetration Test procedures. The samples were logged in the field and then returned to the laboratory for testing and detailed examination. Three (3) of the boreholes, Borehole No.'s 2, 3 and 5, had a monitoring well installed. The drilling operations and fieldwork was carried out by Davroc's subcontractor partner under the direction of Davroc.

Groundwater observations were made in the open boreholes during and upon completion of the drilling operations and the results are recorded on the borehole logs. Groundwater readings were also taken on July 9, 2020 in each of the three (3) monitoring wells installed. The readings from the monitoring wells are shown below in section 3.8 titled 'Groundwater'.

Davroc was informed that a formal hydrogeological study will be undertaken by another firm specialized in hydrogeological work and that the three monitoring wells installed as part of our scope of work will be utilized for that study.

The locations of the boreholes were laid out in the field and ground surface elevations were surveyed using the top nut of fire hydrant #2452 as having an assumed local elevation of 100.0m, consequently elevations noted in this report are not geodetic. All depths mentioned in this report are referenced from the existing surface grade at the time of drilling.

As well as visual examination in the laboratory, all samples were tested for moisture content. The samples will be stored for a period of three months and then discarded, unless we are instructed differently.

3. SUBSURFACE CONDITIONS

The borehole locations, identified as Borehole No.'s 1 to 5, are shown on Figure No. 2 in Appendix A of this report and detailed subsurface conditions are presented on the borehole logs in Appendix B. It should be noted that the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The "Notes on Sample Description" preceding the borehole logs form an integral part of and should be read in conjunction with this report.

A brief description of the subsurface deposits follows.

3.1 Topsoil

An approximate 100 to 150 mm thick veneer of topsoil was encountered at the surface of Borehole No.'s 1 to 4 but was absent at Borehole No. 5

3.2 Fill

A layer of fill material was encountered under the topsoil layer in Borehole No.'s 1, 2, and 4. The fill extended to a depth of approximately 0.80m (elevations ranging from 97.0m – 101.8m) below existing grade.

The fill consisted primarily of disturbed silt, fine sand, and sand.

3.3 Sand & Silt/Fine Sand

Underlying the fill, deposits of sand and silt were encountered in Borehole No.'s 1 and 2 and extend to approximately 3.1m below existing grade.

Underlying the topsoil in Borehole No. 3, and the fill in Borehole No. 4, and on the surface in Borehole No. 5, a layer of fine sand overlying a layer of sand and silt materials was encountered in these three

boreholes. The sand and silt layer extended to varying depths ranging from approximately 4.6m to 9.1m below existing grade.

The sand and silt layer are brown in color and had moisture values ranging from 6% to 27%. This layer had very loose to dense compactness with 'N'-values ranging from 4 to 43 blows per 305mm.

The fine sand contains trace silt, is moist, and brown in color. See Grain Size Distribution, Figure No. B2 in Appendix D, carried out on sample obtained from Borehole No. 5 at 1.5m depth. The fine sand layer had moisture values ranging from 2% to 20% and had a loose to dense compactness with 'N'-values ranging from 5 to 46 blows per 305mm.

3.4 Sandy Silt

A deposit of native sandy silt was found below the sand and silt in Borehole No.'s 1, 2 and 3 and extend to depths of approximately 4.60m (BH 1 and 2) and 7.60m (BH 3) below existing grade. See Grain Size Distribution, Figure No. B3 in Appendix D, carried out on sample obtained from Borehole No. 3 at 6m depth.

The sandy silt layer contains trace clay, is moist, and brown in colour. The sandy silt had moisture values ranging from 15% to 22% and had a compact to dense compactness with 'N'-values ranging from 17 to 48 blows per 305mm.

3.5 Clayey Silt

A deposit of native clayey silt was found in Borehole No.'s 1, 3, 4 and 5 underlying the aforementioned layers (BH 1, 3, & 4) and underlying a silt layer (BH 5) and extend to depths of approximately 6.10m (BH 1), 9.10m (BH 3 and 5) and 10.7 (BH 4) below existing grade. See Grain Size Distribution, Figure No. B4 in Appendix D, carried out on sample obtained from Borehole No. 4 at 9.5m depth.

The clayey silt layer contains some sand, is moist, and is grey to brown in colour. The clayey silt had moisture values ranging from 18% to 24% and had a very stiff to hard consistency with 'N'-values ranging from 25 to 65 blows per 305mm.

3.6 Silt

Silt was encountered below the sandy silt layer in Borehole No. 2 and below the sand and silt layer in Borehole No. 5. The silt layer extended to depths of approximately 6.30m (BH 2) and 7.60m (BH 5) below existing grade.

The silt layer contains trace/some clay and sand, moist, and is grey/brown in colour. The silt had moisture values ranging from 22% to 25% and had a compact to dense compactness with 'N'-values ranging from of 30 to 45 blows per 305mm.

3.7 Sand

Sand was encountered in all of the Boreholes and extended to the borehole termination depths ranging from approximately 10.8m to 11.0m below existing grade. See Grain Size Distribution, Figure No. B1 in Appendix D, carried out on sample obtained from Borehole No. 1 at 7.5m depth.

The sand layer contains some gravel, trace silt, is damp, and brown in colour. The sand had moisture values ranging from 2% to 7% and had a very dense compactness with 'N'-values ranging from of 62 blows per 305mm to over 100 blows per 305mm.

3.8 Groundwater

Groundwater levels were monitored in the open boreholes upon completion of the drilling operations. Freestanding water was observed in Borehole No.'s 3, 4, and 5 immediately upon completion of drilling.

Monitoring wells were installed in borehole No.'s 2, 3, and 5 and readings were taken upon completion of drilling and again on July 9, 2020. Readings were recorded as follows:

Water Level Readings in Boreholes/Monitoring Wells			
Borehole No.	**Date**	**Depth Below Existing Grade**	**Elevation**
1	July 02, 2020	Dry **	-
2*	July 02, 2020	Dry **	-
	July 09, 2020	Dry	-
3*	July 02, 2020	6.70 m **	93.44 m
	July 09, 2020	Dry	-
4	July 02, 2020	6.10 m **	96.52 m
	July 09, 2020	Dry	-
5*	July 02, 2020	6.10 m **	95.17 m
	July 09, 2020	Dry	-

Table Notes:
* monitoring well installed in borehole
** reading taken immediately upon completion of borehole drilling or monitoring well installation

Water was encountered in three of the boreholes upon completion of drilling however, water level readings taken one week later in the boreholes fitted with monitoring wells showed all the wells to be dry. Encountering ground water immediately upon completion of drilling and not at later dates, is typical of having encountered water perched within the layers of permeable soils.

Davroc was informed that a formal hydrogeological study will be undertaken by another firm specialized in this type of work and that the three monitoring wells installed in Borehole No.'s 2, 3, and 5 will be utilized for that study. The hydrogeological study results were not yet available at the time of preparing this report.

4. ENGINEERING DISCUSSION AND RECOMMENDATIONS

4.1 Foundations

The design, size, and exact location of the proposed foundations was not provided to Davroc at the time of preparing this report however, we understand that the proposed building will consist of one level of basement with footing founding levels to be at approximately 4m to 5m below existing grade and the building will be located centrally on the property.

Based on the results of this investigation, the proposed structure can be supported by conventional spread footings founded below the 4m depth on the native undisturbed sandy silt, clayey silt, or sands found at this site utilizing a geotechnical resistance of 200 kPa SLS (300 kPa ULS).

Footings designed to this bearing resistance are expected to settle less than 25 mm total and 19 mm differential.

The strength of the soils on this site generally increase with depth consequently should designers require higher bearing capacities than stated above, foundations must be extended to greater depths. Davroc should be contacted to evaluate this option.

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

It should be noted that the recommended bearing capacities have been calculated by Davroc 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 Davroc to validate the information for use during the construction stage.

The site classification for seismic response for this site is Site Class 'D', Stiff soil, according to Table 4.1.8.4.A of the Ontario Building Code.

4.2 Floor Slabs and Permanent Drainage

Normal slab construction can be used on the native silty or sandy materials anticipated at the subgrade level. All underfloor fill should be compacted to at least 98 percent standard Proctor maximum dry density.

A moisture barrier consisting of at least 200 mm of clear crushed stone should be installed under the floor slab. In addition, the underfloor drains shown on Figure 3 in Appendix C are recommended. The recommendations for exterior backfill and perimeter drainage are also shown on this Figure.

4.3 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, assumed to be 0.45 for vertical walls and horizontal backfill

γ = unit weight of backfill, a value of 20.5 kN/cu.m. 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 buildup of any hydrostatic pressure behind the wall and that granular fill is used.

4.4 Excavations and Backfill

Excavation of the soil at this site can be carried out with heavy hydraulic backhoes. Perched water was encountered during borehole drilling however, significant problems with groundwater are not anticipated for the installation of foundations. It is expected that any seepage can be removed by pumping from sumps. It is recommended that the hydrogeological study being prepared for this site be reviewed once completed to confirm the assumptions concerning groundwater stated above.

It should be noted that the soils on this site are non-sorted sediment and therefore may contain boulders. Provisions must be made in the excavation contract for the removal of possible boulders.

All temporary excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the fill is classified as Type 3 soil and the compact to very dense sandy and silty soils is classified as Type 2 soil if above the water table. Where excessive seepage and sloughing of the excavation occurs in fill areas, it may be necessary to slope the excavations flatter than normal.

The silty and sandy soils are considered to be suitable for use as construction backfill provided all topsoil and any other objectionable materials are selectively removed. Loose lifts of soil, which are to be compacted, should not exceed 200 mm. The fill may require moisture content adjustment (such as drying) before it can adequately be compacted.

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.

Imported granular fill, which can be compacted with hand held equipment, should be used in confined areas.

Underfloor fill should be compacted to at least 98 percent standard Proctor maximum dry density.

The excavated soils are not considered to be free draining. Where free draining backfill is required, imported granular fill such as OPSS Granular B should be used.

4.5 Pavements

The recommended pavement structures provided in Table 1 are based upon an estimate of the subgrade soil properties determined from visual examination and textural classification of the soil samples. Consequently, the recommended pavement structures should be considered for preliminary design purposes only. A functional design life of eight to ten years has been used to establish the pavement recommendations. This represents the number of years to the first rehabilitation, assuming regular maintenance is carried out. If required, a more refined pavement structure design can be performed based on specific traffic data and design life requirements and will involve specific laboratory tests to determine frost susceptibility and strength characteristics of the subgrade soils, as well as specific data input from the client.

TABLE 1: Recommended Pavement Structure Thickness

Pavement Layer	Compaction Requirements	Light Duty Parking (Cars)	Heavy Duty Parking (Delivery Trucks)
Asphaltic Concrete	92% Minimum* 92% Minimum*	40 mm OPSS HL 3 40 mm OPSS HL 8	40 mm OPSS HL 3 80 mm OPSS HL 8
OPSS Granular A Base (Crushed Limestone)	100% SPMDD**	150 mm	150 mm
OPSS Granular B Sub-base	100% SPMDD**	150 mm	350 mm

*Denotes minimum percentage of Maximum Relative Density of the asphalt mixture

** Denotes Standard Proctor Maximum Dry Density, ASTM-D698

The upper 600 mm of any fill subgrade shall be compacted to at least 98 percent standard Proctor maximum dry density. It is also recommended that all topsoil or topsoil stained soil, which may be encountered at the subgrade level, be removed from under the pavement structure. Native subgrade should be proofrolled as outlined in item 1 below.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over-emphasized. The finished pavement surface and underlying subgrade should be free of depressions and should be sloped (preferably at a minimum grade of two percent) to provide effective surface drainage toward catch basins. Surface water should not be allowed to pond adjacent to the outside edges of pavement areas. Sub-drains should be installed to intercept excess subsurface moisture and prevent subgrade softening. This is particularly important in heavy-duty pavement areas.

Additional comments on the construction of parking areas and access roadways are as follows:

1. As part of the subgrade preparation, proposed parking areas and access roadways should be stripped of topsoil and other obvious objectionable material. Fill required to raise the grades to design elevations should conform to backfill requirements outlined in previous sections of this report. The subgrade should be properly shaped, crowned then proof-rolled in the full-time presence of a representative of this office. Soft or spongy subgrade areas should be sub-excavated and properly replaced with suitable approved backfill compacted to 98% SPMDD.

2. The locations and extent of sub-drainage required within the paved areas should be reviewed by this office in conjunction with the proposed lot grading. Assuming that satisfactory cross falls in the order of two percent have been provided, sub-drains extending from and between catch basins may be satisfactory. In the event that shallower cross falls are considered, a more extensive system of sub-drainage may be necessary and should be reviewed by Davroc Testing Laboratories Inc.

3. The most severe loading conditions on light-duty pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted access lanes, half-loads during paving, etc., may be required, especially if construction is carried out during unfavorable weather.

4. It is recommended that Davroc Testing Laboratories Inc. be retained to review the final pavement structure designs and drainage plans prior to construction to ensure that they are consistent with the recommendations of this report.

5. GENERAL COMMENTS

Davroc Testing Laboratories Inc. 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, Davroc Testing Laboratories Inc. will assume no responsibility for interpretation of the recommendations in the report.

This report has been prepared for and is intended for the exclusive use of the client and their architects and engineers. Any use which a third party makes of this report, or any part thereof, of any reliance on or decision to be made based on it, are the responsibility of such third parties. Davroc Testing Laboratories Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decision made or actions based on this report. The contents of this report should not be relied upon by any other party without the express written consent of Davroc Testing Laboratories Inc. The findings are relevant for the dates of our Site visits and should not be relied upon to represent conditions at later dates.

The information in this report in no way reflects on the environmental aspects of the soil and has not been addressed in this report, since this aspect is beyond the scope and terms of reference. Should specific information be required, additional testing may be required.

The comments given in this report are primarily intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. could be greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should make their own interpretations of the factual borehole results and draw their own conclusions as to how the subsurface conditions may affect them.

More specific information with respect to the conditions between samples, or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent; should this occur, Davroc Testing Laboratories Inc. should be contacted to assess the situation and additional testing and reporting may be required. Davroc Testing Laboratories Inc. has qualified personnel to provide assistance in regards to future geotechnical issues related to this property.

We trust that this report is satisfactory for your purposes. Should you have any questions or comments, please do not hesitate to contact this office.

Yours truly,
Davroc Testing Laboratories Inc.

Shubhagata Roy, M. Eng.
Field E.I.T.

Greg Wuisman, P.Eng.
Vice President, Materials Engineering and Testing

LICENSED PROFESSIONAL ENGINEER
Aug 6, 2020
G. W. WUISMAN
PROVINCE OF ONTARIO

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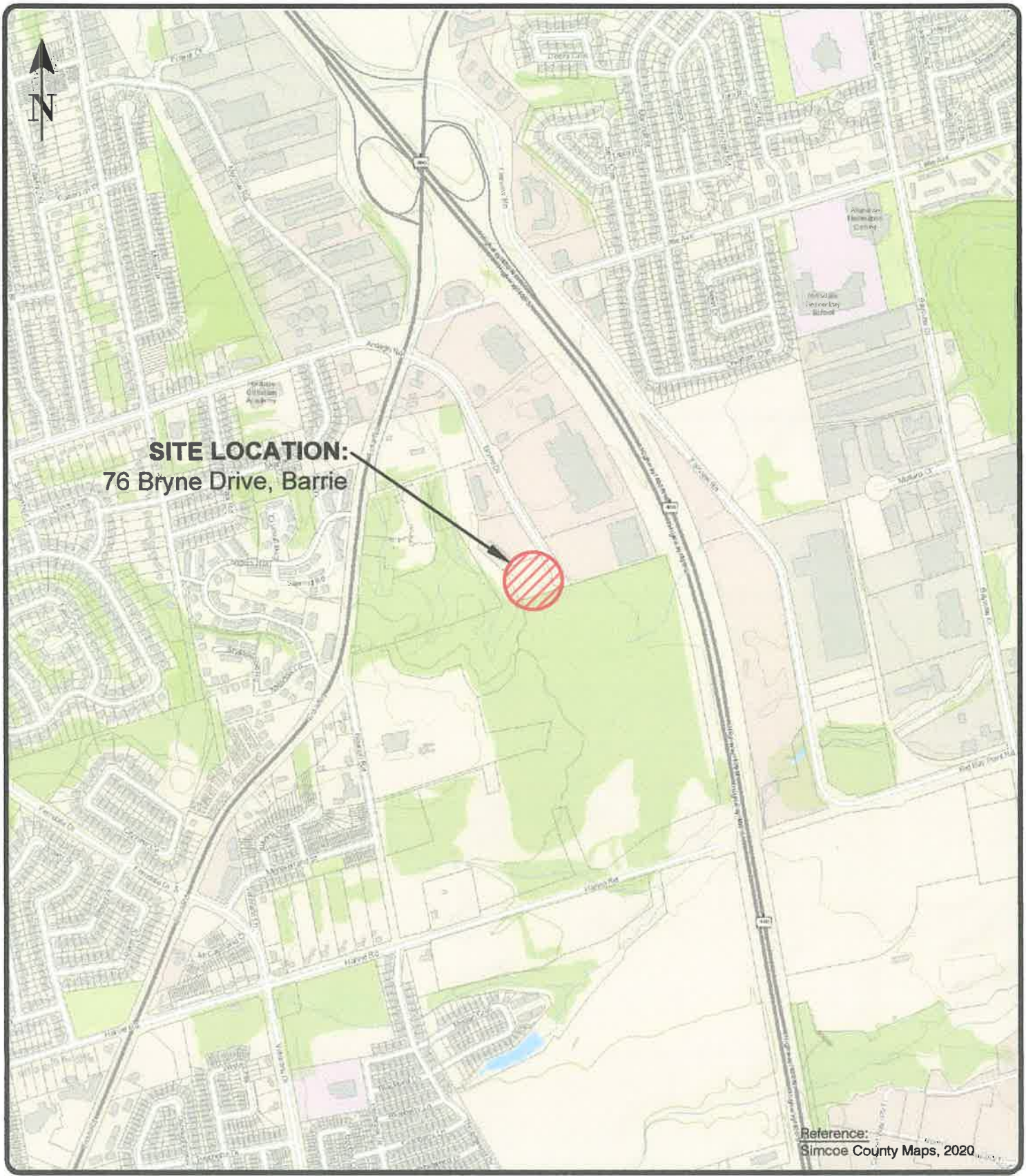
20-0249-2 Geo-Report

APPENDIX A
SITE LOCATION PLAN: FIGURE NO. 1
&
BOREHOLE LAYOUT: FIGURE NO. 2



DAVROC
TESTING LABORATORIES INC.

Project: 76 Bryne Drive, Barrie		
Title: SITE LOCATION PLAN		
Approved by:	Date: 20 July, 2020	Project No.: L20-0249GE
Drawn by:	Scale:	Figure No.: 1

DAVROC TESTING LABORATORIES INC.

Project: 76 Bryne Drive, Barrie		
Title: BOREHOLE LOCATION PLAN		
Approved by:	Date: 20 July, 2020	Project No.: L20-0249GE
Drawn by:	Scale:	Figure No.: 2

DAVROC

APPENDIX B

NOTES ON SAMPLE DESCRIPTIONS

LOGS OF BOREHOLES
(B.H. NO.'S 1, 2, 3, 4, & 5)

Notes On Sample Descriptions

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Society for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by Davroc Testing Laboratories Inc. also follow the same system. Different classification systems may be used by others; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has 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		

0.002 0.006 0.02 0.06 0.2 0.6 2.0 6.0 20 60 200

EQUIVALENT GRAIN DIAMETER IN MILLIMETERS

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 geotechnical site investigation.

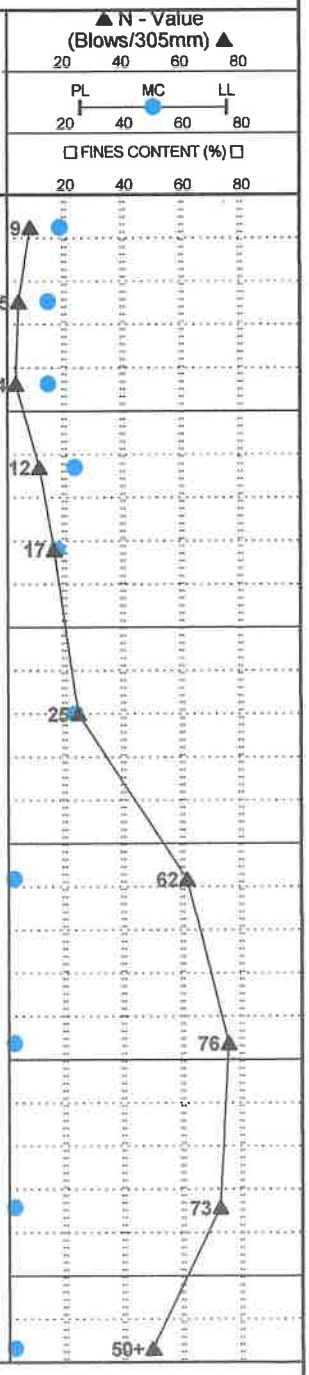
3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, 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.

BOREHOLE NUMBER BH 1

DAVROC
Unit 21, 2051 Williams Parkway
Brampton, Ontario, L6Y-3R9
Telephone:(905)792-7792

CLIENT M-J-J-J Developments Inc.
PROJECT NAME Residential/Commercial Building
PROJECT NUMBER L20-0249GE
PROJECT LOCATION 76 Bryne Drive, Barrie, Ontario
DATE STARTED (dd/mm/yy) 2-7-20 **COMPLETED** —
GROUND ELEVATION 99.92 m **HOLE SIZE** 0.15
DRILLING CONTRACTOR Central Earth Engineering
GROUND WATER LEVELS:
DRILLING METHOD Hollow stem auger
AT TIME OF DRILLING — Dry, July 02, 2020
LOGGED BY SR **CHECKED BY** GW
AT END OF DRILLING — Dry, July 02, 2020
NOTES
AFTER DRILLING —

DEPTH (m)	ELEV / DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m³)
	99.92								
0.4	99.82 0.10		TOPSOIL						
0.8	99.12		FILL -Silt -Brown		SS SS1	100	9		
1.2	0.80		-Some Clay -Some Sand -Trace Rootlets -Moist -Stiff		SS SS2	100	5		
1.6					SS SS3	100	4		
2.0			SAND & SILT -Brown -Moist -Loose to Compact						
2.4					SS SS4	100	12		
2.8									
3.2	96.82				SS SS5	100	17		
3.6	3.10		SANDY SILT -Brown -Trace Clay -Moist -Compact						
4.0									
4.4	95.32								
4.8	4.60		CLAYEY SILT -Some Sand -Grey -Moist -Very Stiff		SS SS6	100	25		
5.2									
5.6									
6.0	93.82								
6.4	6.10		SAND -Brown -Some Gravel -Trace Silt -Damp -Very Dense		SS SS7	100	62		
6.8									
7.2									
7.6									
8.0					SS SS8	100	76		
8.4									
8.8									
9.2									
9.6					SS SS9	100	73		
10.0									
10.4									
10.8	89.12				SS SS10	100	50+		
	10.80		Bottom of hole at 10.80 m.						



GEOTECH BH PLOTS L20-0249-76 BRYNE DRIVE, BARRIE.GPJ GINT STD CANADA.GDT 23-7-20

BOREHOLE NUMBER BH 2

DAVROC
Unit 21, 2051 Williams Parkway
Brampton, Ontario, L6Y-3R9
Telephone:(905)792-7792

CLIENT M-J-J-J Developments Inc.
PROJECT NAME Residential/Commercial Building
PROJECT NUMBER L20-0249GE
PROJECT LOCATION 76 Bryne Drive, Barrie, Ontario
DATE STARTED (dd/mm/yy) 2-7-20 **COMPLETED**
GROUND ELEVATION 97.8 m **HOLE SIZE** 0.15
DRILLING CONTRACTOR Central Earth Engineering
GROUND WATER LEVELS:
DRILLING METHOD Hollow stem auger
AT TIME OF DRILLING — Dry, July 02, 2020
LOGGED BY SR **CHECKED BY** GW
AT END OF DRILLING — Dry, July 02, 2020
NOTES
AFTER DRILLING — Dry, July 09, 2020

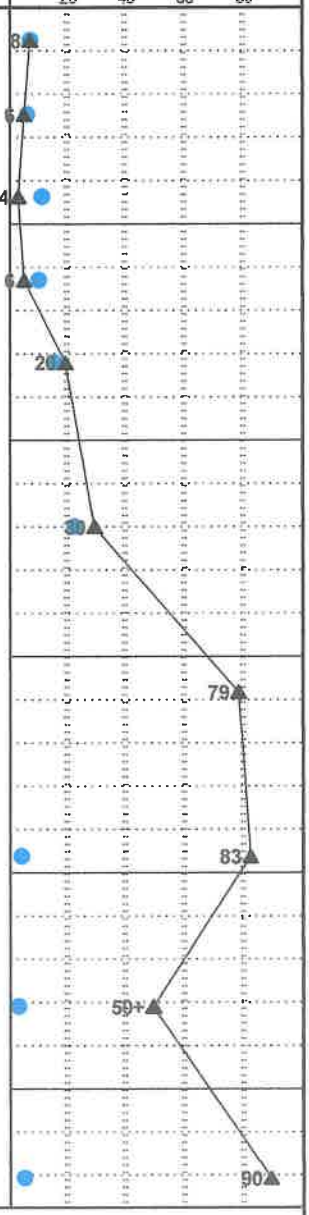
DEPTH (m)	ELEV / DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE
	97.80					
0.4	0.15		TOPSOIL	SS SS1	100	8
0.8	97.00		FILL -Sand -Dark Brown -Trace to Some Silt -Trace Gravel -Trace Organics -Moist -Loose	SS SS2	100	6
1.2	0.80					
1.6				SS SS3	100	4
2.0						
2.4			SAND & SILT -Brown -Moist -Loose	SS SS4	100	6
2.8						
3.2	94.70					
3.6	3.10		SANDY SILT -Brown -Trace Clay -Moist -Compact	SS SS5	100	20
4.0						
4.4	93.20					
4.8	4.60		SILT -Grey to Mottlen Brown -Trace Clay -Trace Sand -Moist -Very Stiff	SS SS6	100	30
5.2						
5.6						
6.0						
6.4	91.50			SS SS7	100	79
6.8	6.30		SAND -Brown -Some Gravel -Damp -Very Dense			
7.2						
7.6						
8.0				SS SS8	100	83
8.4						
8.8						
9.2				SS SS9	100	50+
9.6						
10.0						
10.4						
10.8				SS SS10	100	90
	86.70					
	11.10		Bottom of hole at 11.10 m.			

WELL DIAGRAM

POCKET PEN. (kPa)

DRY UNIT WT. (Mg/m³)

▲ N - Value (Blows/305mm) ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



GEOTECH BH PLOTS L20-0249-76 BRYNE DRIVE, BARRIE.GPJ GINT STD CANADA.GDT 23-7-20

BOREHOLE NUMBER BH 3

DAVROC
Unit 21, 2051 Williams Parkway
Brampton, Ontario, L6Y-3R9
Telephone:(905)792-7792

CLIENT M-J-J-J Developments Inc.
PROJECT NAME Residential/Commercial Building
PROJECT NUMBER L20-0249GE
PROJECT LOCATION 76 Bryne Drive, Barrie, Ontario
DATE STARTED (dd/mm/yy) 2-7-20 **COMPLETED**
GROUND ELEVATION 100.14 m **HOLE SIZE** 0.15
DRILLING CONTRACTOR Central Earth Engineering
GROUND WATER LEVELS:
DRILLING METHOD Hollow stem auger
AT TIME OF DRILLING — Dry, July 02, 2020
LOGGED BY SR **CHECKED BY** GW
AT END OF DRILLING 6.70 m / Elev 93.44 m July 02, 2020
NOTES
AFTER DRILLING — Dry, July 09, 2020

DEPTH (m)	ELEV / DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE
	100.14					
	~~99.99~~		TOPSOIL			
0.4	0.15		FINE SAND -Brown -Trace Silt -Trace Rootlets -Moist -Wet at 3m depth -Compact to Dense	SS SS1	100	15
0.8						
1.2				SS SS2	100	30
1.6						
2.0				SS SS3	100	35
2.4						
2.8				SS SS4	100	36
3.2						
3.6				SS SS5	100	46
4.0						
4.4	95.54					
4.8	4.60		SAND & SILT -Brown -Wet -Dense	SS SS6	100	30
5.2						
5.6						
6.0	94.04					
6.4	6.10		SANDY SILT -Brown -Trace Clay -Wet -Dense	SS SS7	100	48
6.8						
7.2						
7.6	92.54					
8.0	7.60		CLAYEY SILT -Mottled Brown & Grey -Some Sand -Moist -Hard	SS SS8	100	65
8.4						
8.8						
9.2	91.04					
9.6	9.10		SAND -Brown -Some Gravel -Trace Silt -Damp -Very Dense	SS SS9	100	50+
10.0						
10.4						
10.8	89.34			SS SS10	100	50+
	10.80		Bottom of hole at 10.80 m.			

WELL DIAGRAM

POCKET PEN. (kPa)

DRY UNIT WT. (Mg/m^3)

▲ N - Value (Blows/305mm) ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

GEOTECH BH PLOTS L20-0249-76 BRYNE DRIVE, BARRIE.GPJ GINT STD CANADA.GDT 23-7-20

BOREHOLE NUMBER BH 4

DAVROC
Unit 21, 2051 Williams Parkway
Brampton, Ontario, L6Y-3R9
Telephone:(905)792-7792

CLIENT M-J-J-J Developments Inc.
PROJECT NAME Residential/Commercial Building
PROJECT NUMBER L20-0249GE
PROJECT LOCATION 76 Bryne Drive, Barrie, Ontario
DATE STARTED (dd/mm/yy) 2-7-20 **COMPLETED** ---
GROUND ELEVATION 102.62 m **HOLE SIZE** 0.15
DRILLING CONTRACTOR Central Earth Engineering
GROUND WATER LEVELS:
DRILLING METHOD Hollow stem auger
AT TIME OF DRILLING --- Dry, July 02, 2020
LOGGED BY SR **CHECKED BY** GW
AT END OF DRILLING 6.10 m / Elev 96.52 m July 02, 2020
NOTES
AFTER DRILLING ---

DEPTH (m)	ELEV / DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m³)
	102.62								
0.4	102.47 0.15		TOPSOIL						
0.8	101.82		FILL -Fine Sand -Dark Brown -Some Silt -Trace Organic -Moist -Loose		SS SS1	100	4		
1.2	0.80				SS SS2	100	9		
1.6									
2.0			FINE SAND -Brown -Trace Silt -Trace Gravel at 1.9m depth -Moist -Loose to Dense		SS SS3	100	5		
2.4									
2.8					SS SS4	100	31		
3.2									
3.6					SS SS5	100	41		
4.0									
4.4	98.02								
4.8	4.60		SAND & SILT -Brown -Wet -Dense to Compact to Dense		SS SS6	100	35		
5.2									
5.6									
6.0				▼					
6.4					SS SS7	100	25		
6.8									
7.2									
7.6									
8.0					SS SS8	100	43		
8.4									
8.8									
9.2	93.52								
9.6	9.10		CLAYEY SILT -Mottled Brown & Grey -Some Sand -Wet -Hard		SS SS9	100	33		
10.0									
10.4									
10.8	91.92								
	91.82 10.70				SS SS10	100	50+		
	10.80		SAND -Brown -Some Gravel -Trace Silt -Damp -Very Dense						

▲ N - Value (Blows/305mm) ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of hole at 10.80 m.

GEOTECH BH PLOTS L20-0249-76 BRYNE DRIVE, BARRIE.GPJ GINT STD CANADA.GDT 23-7-20

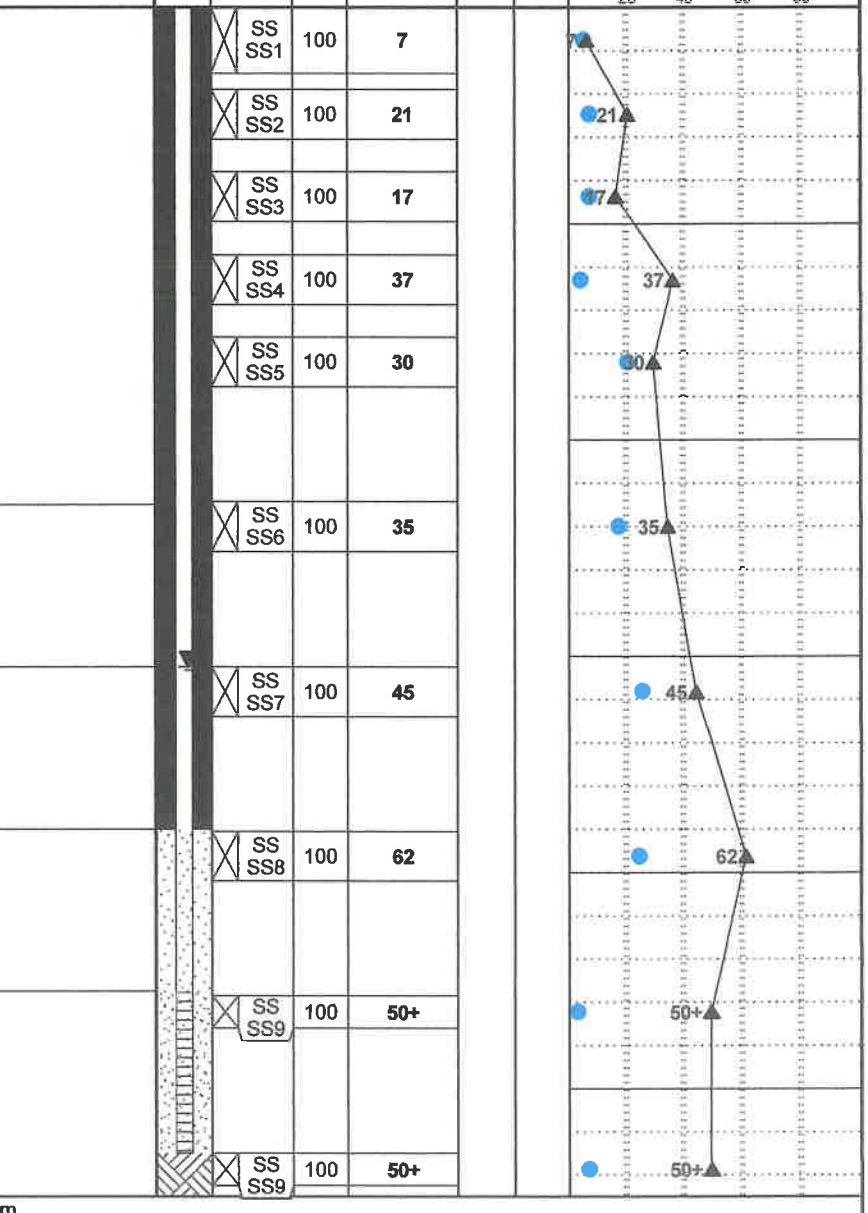
BOREHOLE NUMBER BH 5

DAVROC
Unit 21, 2051 Williams Parkway
Brampton, Ontario, L6Y-3R9
Telephone:(905)792-7792

CLIENT M-J-J-J Developments Inc.
PROJECT NAME Residential/Commercial Building
PROJECT NUMBER L20-0249GE
PROJECT LOCATION 76 Bryne Drive, Barrie, Ontario
DATE STARTED (dd/mm/yy) 2-7-20 **COMPLETED**
GROUND ELEVATION 101.27 m **HOLE SIZE** 0.15
DRILLING CONTRACTOR Central Earth Engineering
GROUND WATER LEVELS:
DRILLING METHOD Hollow stem auger
AT TIME OF DRILLING — Dry, July 02, 2020
LOGGED BY SR **CHECKED BY** GW
AT END OF DRILLING 6.10 m / Elev 95.17 m July 02, 2020
NOTES
AFTER DRILLING — Dry, July 09, 2020

DEPTH (m)	ELEV / DEPTH	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	N VALUE	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m³)
	101.27								
0.4	0.00		FINE SAND -Brown -Trace Silt -Trace Rootlets at 0.2m depth -Some Silt at 3.0m depth -Moist to Wet -Loose to Compact/Dense		SS SS1	100	7		
0.8									
1.2					SS SS2	100	21		
1.6									
2.0					SS SS3	100	17		
2.4									
2.8					SS SS4	100	37		
3.2									
3.6					SS SS5	100	30		
4.0									
4.4	96.67								
4.8	4.60		SAND & SILT -Brown -Wet -Dense		SS SS6	100	35		
5.2									
5.6									
6.0	95.17								
6.4	6.10		SILT -Brown -Trace to Some Clay -Trace Sand -Moist -Hard		SS SS7	100	45		
6.8									
7.2									
7.6	93.67								
8.0	7.60		CLAYEY SILT -Grey -Some Sand -Moist -Hard		SS SS8	100	62		
8.4									
8.8									
9.2	92.17								
9.6	9.10		SAND -Brown -Some Gravel -Trace Silt -Damp -Very Dense		SS SS9	100	50+		
10.0									
10.4									
10.8	90.27				SS SS9	100	50+		
	11.00		Bottom of hole at 11.00 m.						

▲ N - Value (Blows/305mm) ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80



GEOTECH BH PLOTS L20-0249-76 BRYNE DRIVE, BARRIE.GPJ GINT STD CANADA.GDT 23-7-20

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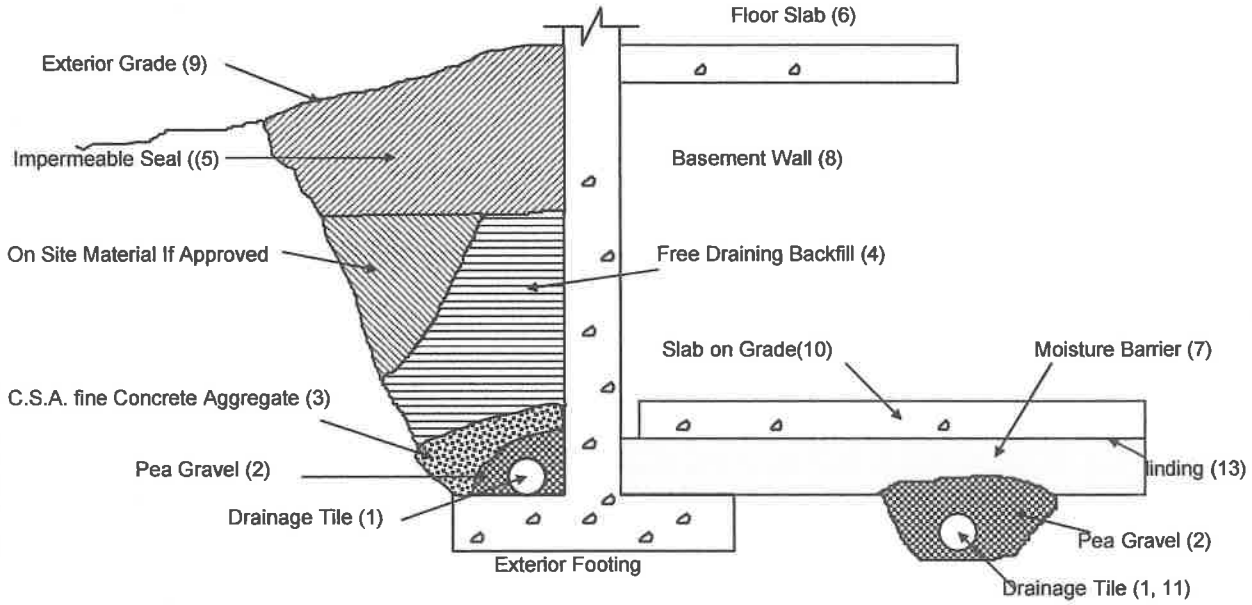
APPENDIX C
DRAINAGE AND BACKFILL RECOMMENDATIONS DRAWING

Project: L20-0249GE

Figure No. 3



Notes

1. Drainage tile to consist of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be a minimum of 150 mm (6") below underside of floor slab.
2. Pea gravel - 150 mm (6") top and side of drain. If drain is not on footing, place 100 mm (4 inches) of pea gravel below drain . 20 mm (3/4") clear stone is an alternative provided it is surrounded by an approved porous plastic membrane (Terrafix 360R or equivalent).
3. C.S.A. fine concrete aggregate to act as filter material. Minimum 300 mm (12") top and side of tile drain. This may be replaced by an approved porous plastic membrane as indicated in (2).
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.
5. Impermeable backfill seal - compacted clay, clayey silt or equivalent. If original soil is free-draining, seal may be omitted.
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.
8. Basement wall to be damp-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. Drainage tile placed in parallel rows 6 to 8 m (20 to 25') centres one way. Place drain on 100 m (4") pea gravel with 150 mm(6") of pea gravel on top and sides. Provide filter material as noted in (3) if moisture barrier is not clear crushed stone.
12. Do not connect the underfloor drains to perimeter drains.
13. If the 20 mm (3/4") stone requires surface blinding, use 6 mm (1/4") clear stone chips.

DRAINAGE AND BACKFILL RECOMMENDATIONS

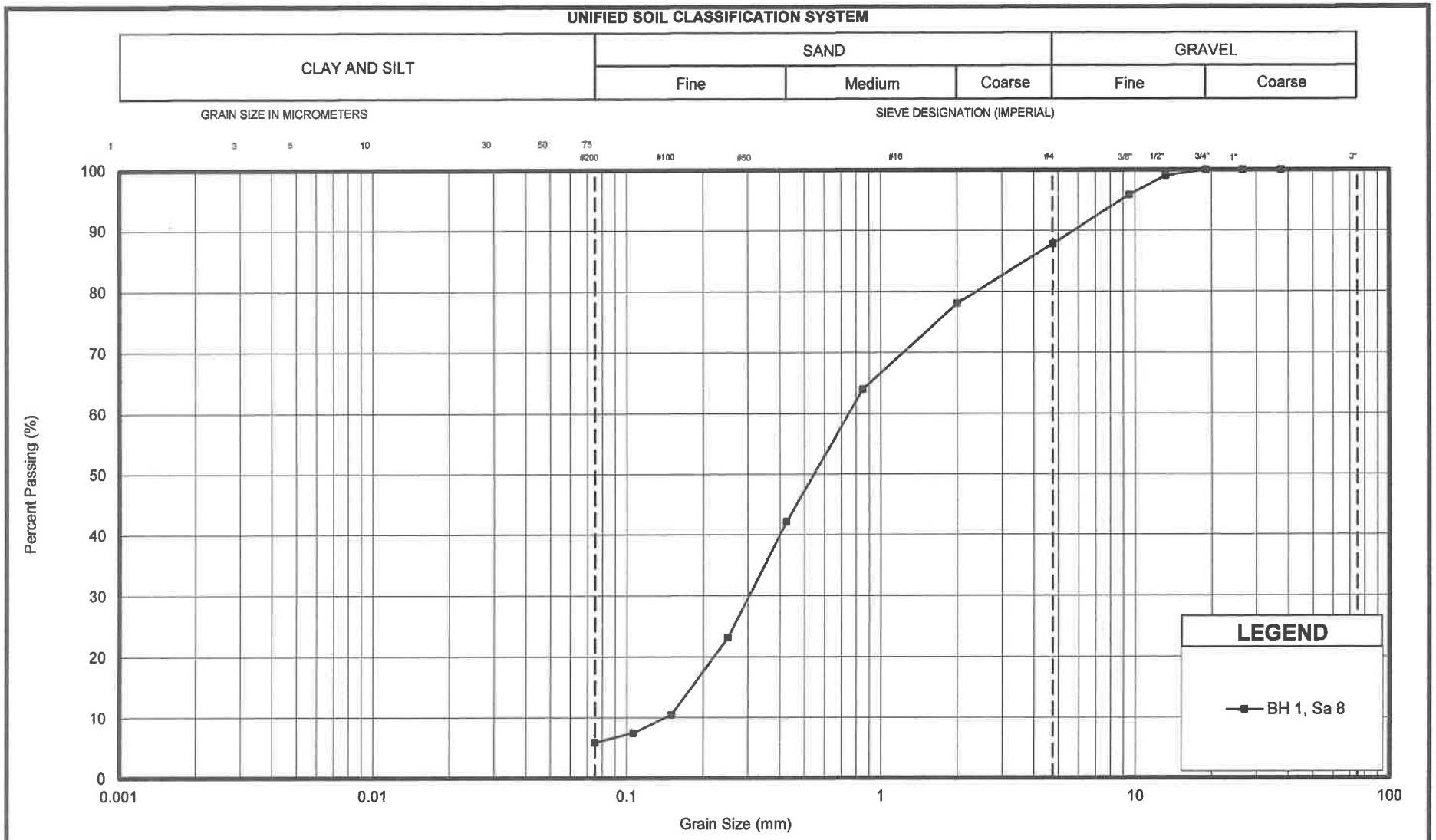
(not to scale)

DAVROC

APPENDIX D

GRAIN SIZE DISTRIBUTION

Figure No.'s B1 to B4



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH 1, Sa 8	SAND, Some Gravel, Trace Silt	12	82		6	0.142	0.30	0.748	5.3	0.87

DAVROC
TESTING LABORATORIES INC.

GRAIN SIZE DISTRIBUTION

SAND

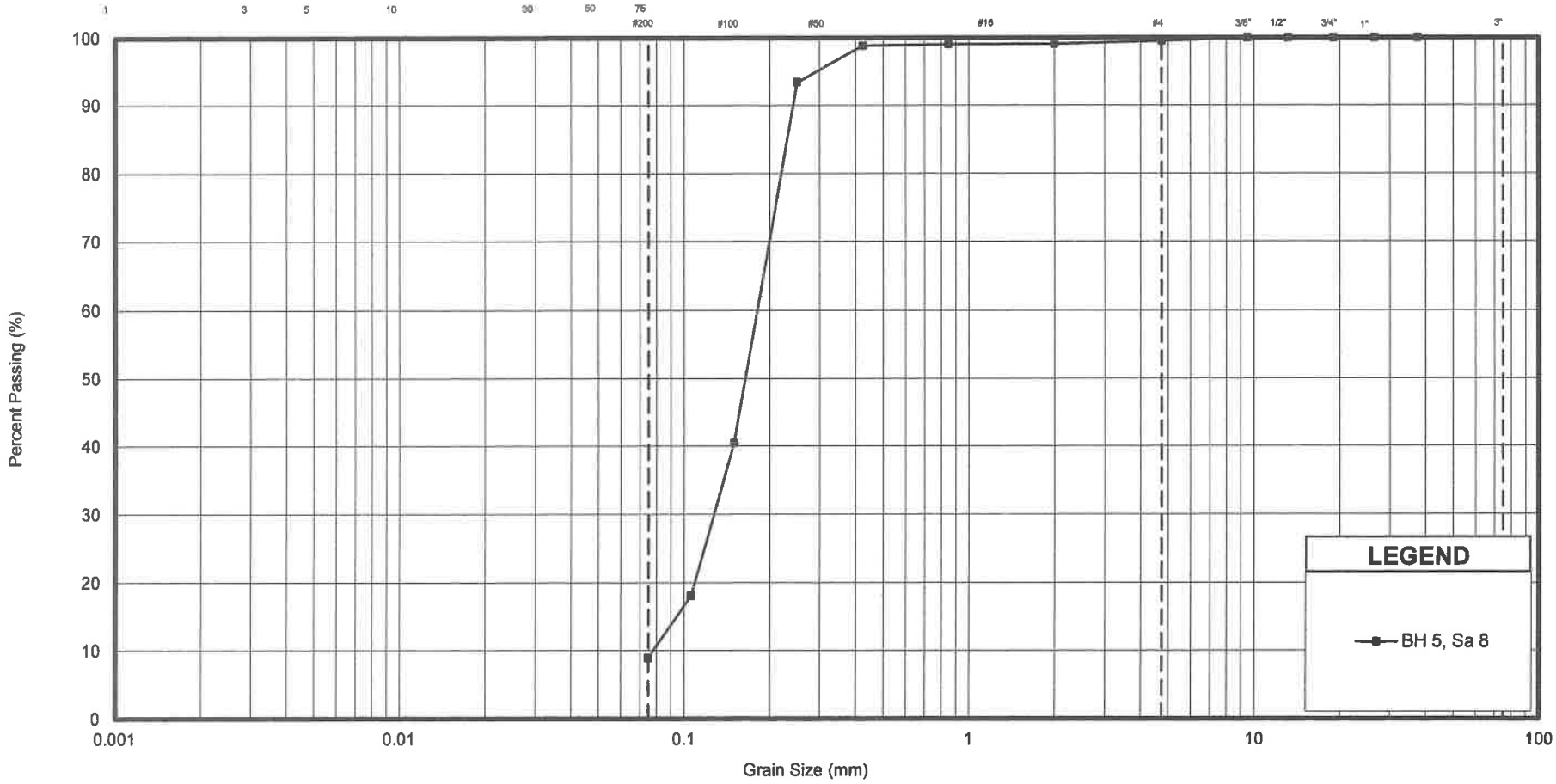
FIGURE No. B1
REF. No. L20-0249GE
DATE July 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS

SIEVE DESIGNATION (IMPERIAL)



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH 5, Sa 3	SAND, Trace Silt	0	91		9	0.078	0.127	0.181	2.32	1.15

DAVROC TESTING LABORATORIES INC.

GRAIN SIZE DISTRIBUTION

FINE SAND

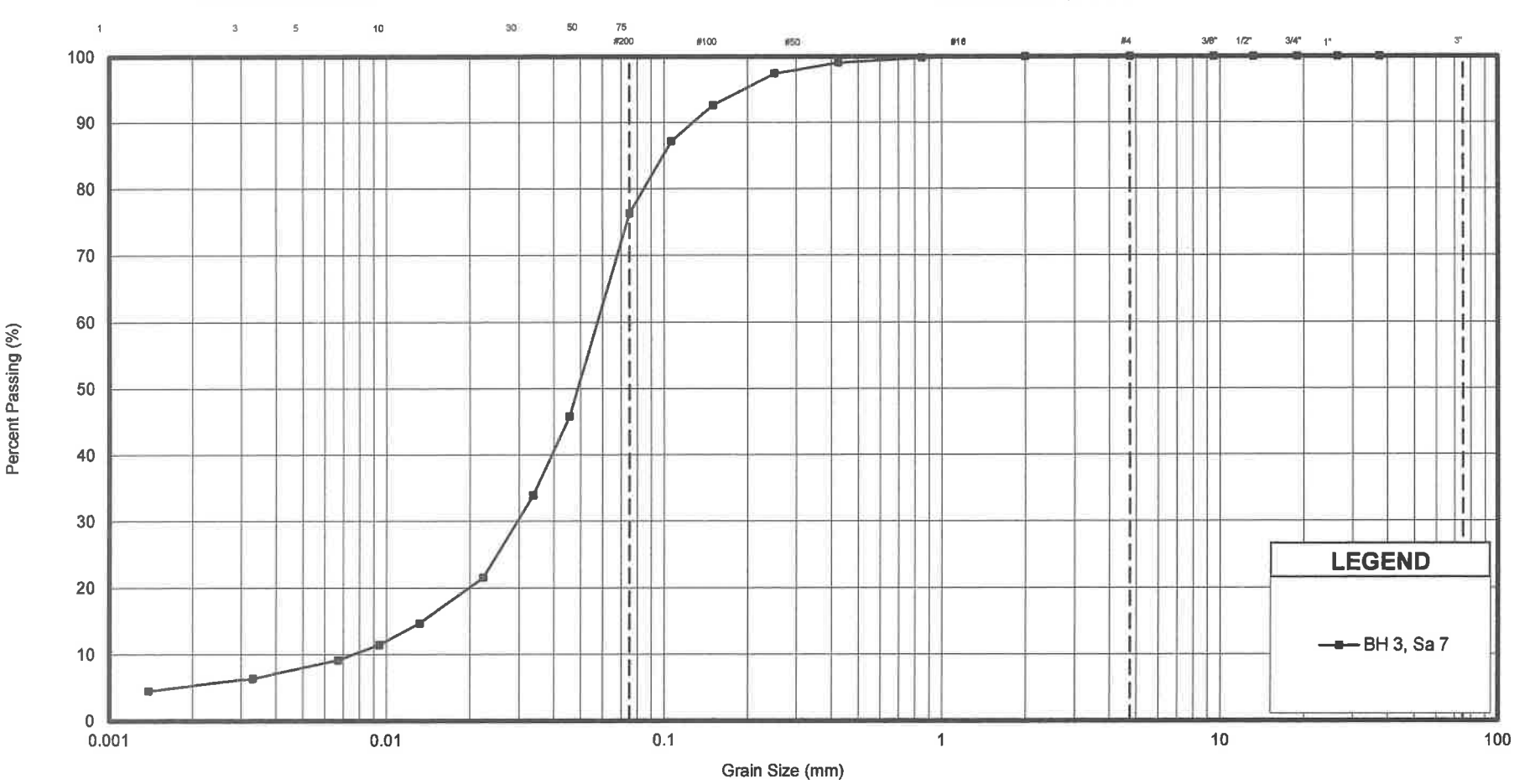
FIGURE No. B2

REF. No. L20-0249GE

DATE July 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH 3, Sa 7	SANDY SILT, Trace Clay	0	24	71	5	0.008	0.030	0.057	7.58	2.01

DAVROC TESTING LABORATORIES INC.

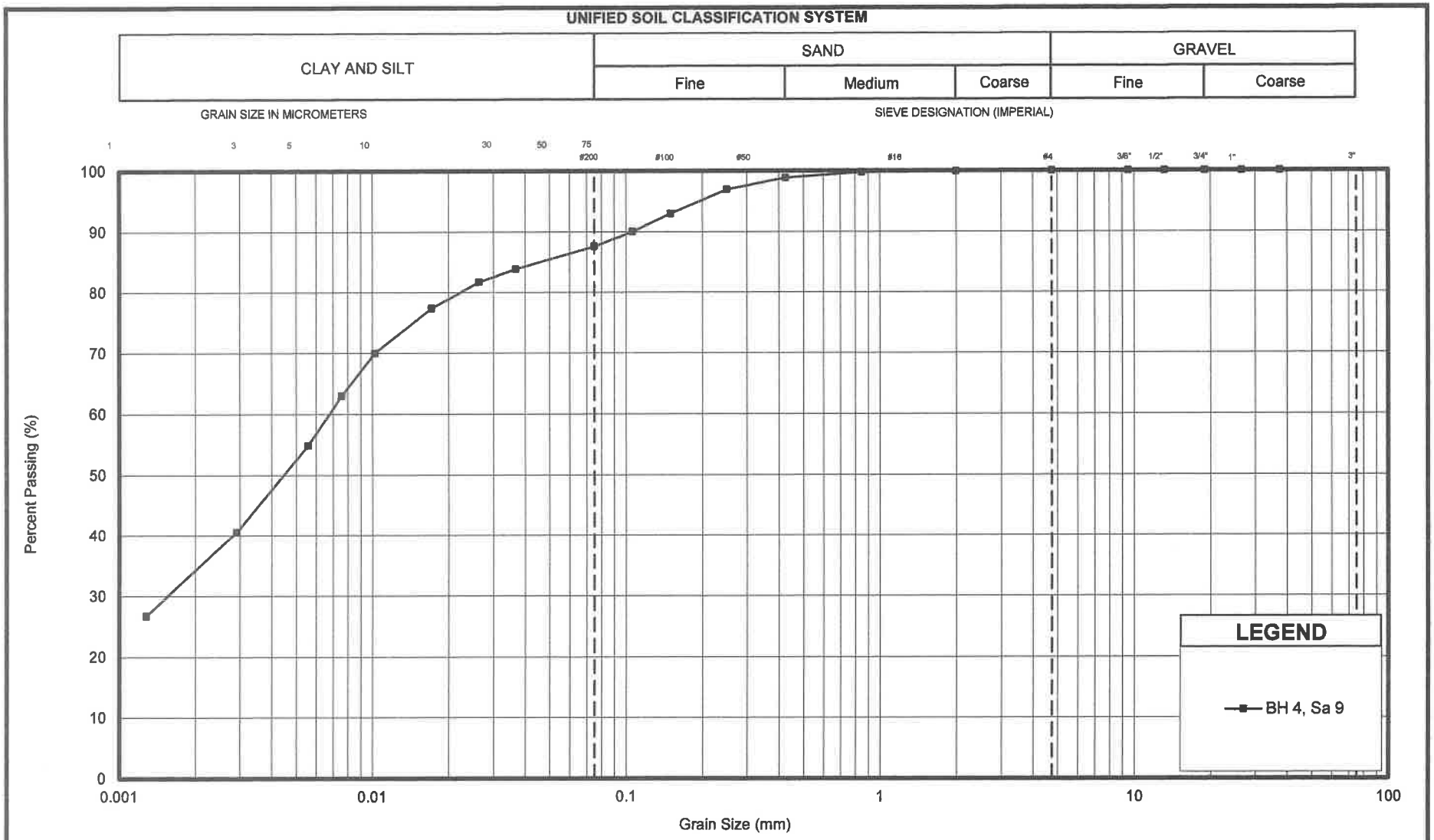
GRAIN SIZE DISTRIBUTION

SANDY SILT

FIGURE No. B3

REF. No. L20-0249GE

DATE July 2020



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH 4, Sa 9	CLAYEY SILT, Some Sand	0	13	53	34	-	0.002	0.007	-	-

DAVROC TESTING LABORATORIES INC.

GRAIN SIZE DISTRIBUTION

CLAYEY SILT

FIGURE No. B4

REF. No. L20-0249GE

DATE July 2020