SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT NO.: SM 200098-G April 8, 2022

COLETARA DEVELOPMENT
966 Pantera Drive, Suite 22
Mississauga, Ontario
L4W 2S1

Attention: Mr. Michael Krasic, MREI, BBA
Senior Director of Development

GEOTECHNICAL CONSIDERATIONS
PROPOSED MID-RISE RESIDENTIAL BUILDINGS
1010 DOWNSVIEW DRIVE AND 355 PLAINS ROAD EAST
BURLINGTON, ONTARIO

Dear Mr. Krasic,

Further to our recent discussions and email correspondence, Soil-Mat Engineers & Consultants Ltd. is pleased to provide the following updated Geotechnical Considerations for the above noted development. These comments are provided further to our site specific geotechnical investigation work previously conducted on the properties, considering the change in scope of the proposed development.

INTRODUCTION

We understand that it is proposed to redevelop the properties at 1010 Downsview Drive and 355 Plains Road East in Burlington, Ontario. The properties are located on the northeast and northwest corners of Plains Road East and Downsview Drive and are presently occupied by existing commercial plazas. Our office previously conducted a geotechnical investigation of the properties [SM 156175-G, dated September 25, 2015] for a contemplated townhouse development, as well as preliminary Foundation Considerations [SM 200098-G, dated February 25, 2020] based on a revised development concept of 6 and 8 storey residential buildings, with a single basement level. We understand that the present development plan involves 4 to 11 storey buildings with 2 underground parking levels.

Our preliminary comments and recommendations with respect to the design and construction of foundations for the proposed buildings, from a geotechnical point of view, are presented in the following paragraphs. These comments are based on the information presented in our referenced prior reports, to support the initial planning stages of the project.

This report is based on the above summarised project, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation. It is further noted that additional more detailed borehole investigation, with boreholes extending to greater depths, is warranted to confirm conditions for detailed design of the proposed mid-rise buildings.

SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The study area encompasses two neighbouring properties in Burlington, Ontario: 1010 Downsview Drive and 355 Plains Road East. 355 Plains Road East is a rectangular parcel of land bound to the north by private residences, to the east by East Plains United Church, to the south by Plains Road East, and to the west by Downsview Drive. This property is occupied by an L-shaped single-storey commercial building surrounded on all sides by a paved parking lot. 1010 Downsview Drive is an L-shaped parcel of land bound to the north by private residences, to the east by Downsview Drive, to the south by Plains Road East, and to the west by private residences. This property is occupied by a rectangular single storey commercial building surrounded on the north and east by a paved parking lot. Both properties are relatively flat and even with the adjacent roadways, with a slight overall fall from north to south.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Pavement Structure

All fourteen boreholes were advanced through the existing asphaltic concrete pavement. The pavement structure was found to generally consist of approximately 50 to 75 millimetres of asphaltic concrete, overlying approximately 150 to 250 millimetres of a compact granular base.

Sand Fill

In all borehole locations, except Borehole Nos. 1 and 8, brown sand fill was encountered beneath the pavement structure to depths of approximately 1.1 to 3.0 metres below the present grade. This granular fill soil contains trace to some silt and gravel, with trace clay and rootlets, and is generally in a very loose to compact condition. It is likely that the fill material is associated with grading activities during the original development of the properties and/or surrounding lands. Other areas of fill material, possibly deeper, may be present at other locations within the proposed construction area.

Sand

Native sand was encountered directly beneath the pavement structure in Borehole Nos, 1 and 8, and beneath the sand fill material in all other borehole locations. This granular soil is brown, contains traces of silt and fine gravel, is fine to medium in gradation, and generally in a loose to very dense condition. The native sand was encountered to approximate depths of 4.9 to 6.8 metres below the present grade.

Clayey Silt

Native clayey silt was encountered beneath the sand at all borehole locations. This cohesive soil is grey, contains traces of gravel and shale fragments, and is generally stiff to hard in consistency. The native clayey silt was proven to termination in all boreholes at depths of approximately 6.7 to 7.6 metres.

Groundwater Observations

Free groundwater was encountered at the completion of drilling at all borehole locations at depths of approximately 4.4 and 6.5 metres. It should be noted that insufficient time would have passed for the static groundwater level to stabilise in the open borehole after drilling. Based on our observations in the borehole during drilling, and our past experience in the area the static groundwater level is estimated to be at a depth of approximately 4 to 5 metres below grade.

As noted above monitoring wells were installed in Borehole Nos. 10, 11, 12, and 13 in part to allow for measurement of the stabilised groundwater level. The groundwater level measurements in the monitoring well are summarised in Table A.

TABLE A
SUMMARY OF GROUNDWATER MEASUREMENTS

Monitoring Well No.		10	11	12	13
Surface Elevation [m]		99.20	98.98	98.73	99.29
MW	Depth [m]	6.10	6.10	6.87	7.62
Details	Elev. [m]	93.10	92.88	91.86	91.67
July 21/15	Depth [m]	4.89	4.80	-	-
	Elev. [m]	94.31	94.18	-	-
Aug. 13/15	Depth [m]	4.90	4.82	4.68	5.27
	Elev. [m]	94.30	94.16	94.05	94.02
Aug. 14/15	Depth [m]	4.91	4.82	4.70	5.27
	Elev. [m]	94.29	94.16	94.03	94.02

FOUNDATION CONSIDERATIONS

With the current building proposed to have 2 underground basement levels, this would result in a founding level on the order of perhaps 7 metres deep. This is essentially at the limit of the boreholes advanced on the site, and as such would only allow for preliminary recommendations for foundation design. A founding level on the order of 7 metres would be within the very stiff clayey silt/silty clay deposit. Based on experience on other projects in the area this clayey silt deposit is generally very stiff to hard, extend to Queenston Shale bedrock at a depth of approximately 15 to 20 metres. Further investigation to confirm the subsurface conditions to greater depth would be required to establish the final design recommendations. On a preliminary basis the following foundation design considerations are noted.

Spread footings within the very stiff clayey silt may be conservatively design on the basis of bearing values of 200 kPa [~5,000 psf] SLS and 300 kPa [~6,000 psf] ULS. A raft slab utilising the same design bearing values may also be considered. A raft slab may be preferred to better accommodate construction below the groundwater level for the proposed 2 underground levels.

Where higher loading capacity is required, deep caisson foundations extending to the underlying shale bedrock may be considered. On a preliminary basis these may be designed for end bearing using a value of 1,500 kPa [~30,000 psf] SLS equal to ULS.

It is noted that the SLS value represents the Serviceability Limit State, which is governed by the tolerable deflection [settlement] based on the proposed building type, using unfactored load combinations. The ULS value represents the Ultimate Limit State and is intended to reflect an upper limit of the available bearing capacity of the founding soils in terms of geotechnical design, using factored load combinations. There is no direct relationship between ULS and SLS; rather they are a function of the soil type and the tolerable deflections for serviceability, respectively.

As noted above the static groundwater level is at approximately elevation 94.0 to 94.3 metres. Allowing for potential seasonal fluctuation, this may be as much as 94.5 to 94.8 metres. Two basement levels would extend as much as about 2 to 3 metres below the groundwater level. As such it is recommended that the basement levels be designed to be fully water tight. This would eliminate the need for permanent dewatering systems, with continuous discharge to the municipal sewer system.

All footings exposed to the environment must be provided with a minimum of 1.2 metres of earth cover of equivalent insulation to protect against frost penetration. This frost protection would also be required in construction were undertaken during the winter months. All footings must be proportioned to satisfy the requirements of the Ontario Provincial Building Code.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the detailed design and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations of this geotechnical investigation report, and to allow changes to the made in the event that subsurface condition differ from the conditions identified at the test pit locations.

SEISMIC DESIGN CONSIDERATIONS

The structure shall be designed according to Section 4.1.8 of the Ontario Building Code, Ontario Regulation 332/12. Based on the subsurface soil conditions encountered in this investigation the applicable Site Classification for the seismic design is Site Class D, Stiff Soil, based on the average soil characteristics for the site. It is noted that a seismic site class of C may be available, however would need to be confirmed via site specific shear wave velocity testing. Given the nature of the site subsurface conditions, it is likely that 'down hole' shear wave testing would be required to best assess the feasibility of an increased seismic site class.

The seismic data from Table 3 of Supplementary Standard SB-1 of the Ontario Building Code for Burlington are as follows:

$S_a(0.2)$	$S_a(0.5)$	$S_a(1.0)$	$S_a(2.0)$	$S_a(5.0)$	$S_a(10.0)$	PGA	PGV
0.266	0.131	0.062	0.0290	0.0068	0.0027	0.172	0.102

EXCAVATION CONSIDERATIONS

Excavations for the installation of foundations for two basement levels are anticipated to extend to depths of up to about 7 to 8 metres. This would be on the order of about 92 metres elevation. As noted above the static groundwater level is at approximately elevation 94.5 to 94.8 metres, allowing for potential seasonal fluctuation. Two basement levels would extend as much as about 2 to 3 metres below the groundwater level.

The rate of infiltration of groundwater through the permeable sand deposit above the clayey silt would be expected to be relatively high, and significant construction dewatering will be anticipated. This would be likely to exceed 400,000 L/day and thus require a Permit to Take Water. Further assessment will be required to establish the expected dewatering volumes, and support the PTTW application.

The side of excavations through the fine-grained granular soils above the static groundwater level should remain stable for the short construction period at slopes of 45 degrees to the horizontal. Where 'wet' seams are encountered or during wet weather the sides may have a tendency to 'slump-in' to slopes as flat as 3 horizontal to 1 vertical. Below the groundwater, the sides of excavations will have a tendency to become unstable, slumping in to 3 to 1 or flatter.

Notwithstanding the foregoing, all excavations must be made in compliance with the current Occupational Health and Safety Act, Regulations for Construction Projects. Excavation slopes steeper than those required in the Safety Act must be supported or a trench box must be provided, and a senior geotechnical engineer from this office should inspect the work.

For the proposed buildings, it is anticipated that excavations will be required to extend close to the property lines, such that open cut excavations may not be feasible. As well, given the depth of excavation extending below the static groundwater level, it would be necessary to provide shoring for stable excavations. Shoring systems consisting of soldier pile timber lagging are not recommended for excavations in the saturated sand soils extending below the water level, as the sand will readily 'wash' through the lagging boards resulting in significant, and potentially catastrophic, ground settlements. More robust shoring systems, such as a caisson wall or steel sheet piling, would be recommended to support excavations below the groundwater level. Such systems would also help to restrict the rate of groundwater infiltration and reduce the volume of construction dewatering.

A specialty shoring consultant should be retained for the design of shoring for the project. On a preliminary basis, caissons may be designed for end bearing in the very stiff clayey silt using the bearing capacities noted above. Where small movements are tolerable an active earth pressure coefficient of Ka = 0.33 may be considered, while an at rest value of Ko = 0.5 should be considered where no movement can be tolerated.

As noted above the static groundwater level is estimated at approximately 94.5 metres elevation. Excavations above this level would be expected to experience some minor infiltration of groundwater through more permeable seams and from surface runoff should be anticipated. Any such infiltration should be readily controlled with typical construction dewatering methods, i.e. pumping from sumps in the base of excavations. The base of excavations sand soil above the water level will generally remain firm and stable for the installation of site services.

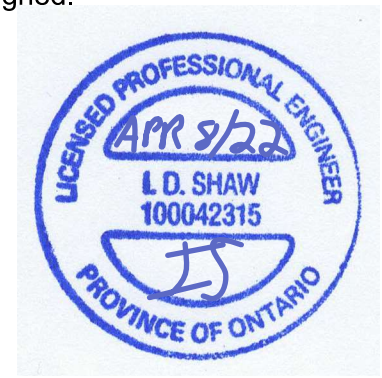
Where excavations are required, such as for the proposed basement levels, extending below the static groundwater level, difficulties should be anticipated with base and side slope stability, groundwater control, etc. The sides and base of excavations will have a tendency to become unstable, requiring the placement of coarse ballast stone material, additional bedding material, etc. Additional pumping, or more sophisticated dewatering methods, will be required to control groundwater infiltration. This will warrant further detailed hydrogeological assessment to establish estimated construction dewatering volumes, support permit to take water, and discharge to City sewer.

GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The subsoil descriptions and borehole information are only intended to describe conditions at the borehole locations. Contractors placing bids or undertaking this project should carry out due diligence in order to verify the results of this investigation and to determine how the subsurface conditions will effect their operations.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

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



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

Enclosures: Drawing No. 1, Borehole Location Plan [SM 156175-G]
Borehole Log Nos. 1 to 14, Inclusive [SM 156175-G]

Distribution: Coletara Development [pdf by email]



LEGEND

BH-# Borehole

TBM Temporary Benchmark
[Top of northern catch basin in rear of 355 Plains Road East, geodetic elevation of 98.84 metres.]

NOTES:

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. report number SM 156175-G.
2. Soil samples will be discarded after 3 months unless directed otherwise by client.
3. Borehole locations are approximate.

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Engineers & Consultants Ltd.

CLIENT

My Way Investments

PROJECT TITLE

Geotechnical Investigation
Proposed Residential Development
355 Plains Road East & 1010 Downsview Drive
Burlington, Ontario

DRAWING TITLE

Borehole Location Plan

PROJECT No.	SM 156175-G
SCALE	N.T.S.
DATE	July 2015
CHECKED	KG
DRAWN	MB
FILENAME	156175-E Borehole Location Plan.kcw

DRAWING No. 1

Project No: SM 156175-G

Log of Borehole No. 1

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 1010 Downsview Dr., Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

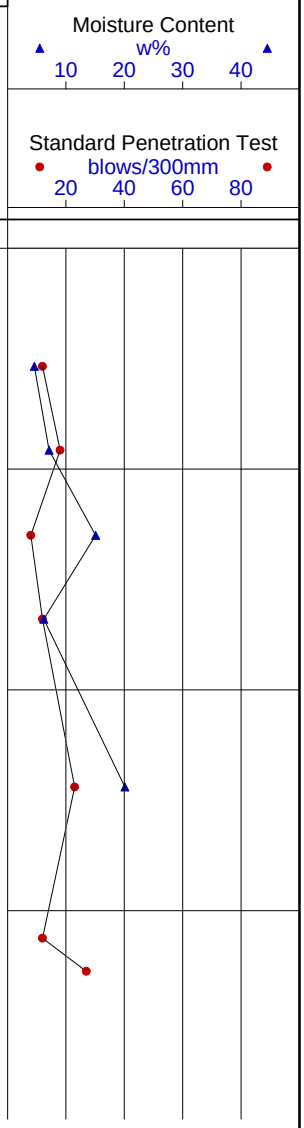
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SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description
0	0	99.18	Ground Surface
		98.88	**Pavement Structure** — Approximately 50 millimetres of asphaltic concrete over approximately 250 millimetres of compact granular base
			Sand — Brown, trace silt and fine gravel, fine to medium in gradation, loose to compact
		94.30	
		94.08	**Clayey Silt** — Brown, trace of fine gravel and shale fragments, very stiff
			Transition in colour to grey
		92.47	End of Borehole

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	3,4,8,8	12			
SS	2	6,7,11,9	18			
SS	3	3,4,4,6 Wet Spoon	8			
SS	4	5,6,6,6 Wet Spoon	12			
SS	5	5,14,9,10 Wet Spoon	23			
DC			12			
DC			27			



NOTES:

1. Borehole was advanced using solid stem auger equipment onJuly 13, 2015 to termination at a depth of 6.1 metres. A dynamic cone was then driven from a depth of 6.1 metres to a depth of approximately 6.7 metres.

2. Free groundwater was encountered at a depth of 4.6 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

Drill Method: Solid-Stem Auger
Drill Date: July 13, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Datum: Geodetic Benchmark
Field Logged by: M. Brown
Checked by: IS
Sheet: 1 of 1

Project No: SM 156175-G

Log of Borehole No. 2

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 1010 Downsview Dr., Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

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SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description
0	0	99.63	Ground Surface
		99.37	**Pavement Structure** — Approximately 60 millimetres of asphaltic concrete over approximately 200 millimetres of compact granular base
			Sand Fill — Brown, trace to some silt, trace clay and fine gravel, very loose to loose
	2	97.03	
			Sand — Brown, trace silt and fine gravel, fine to medium in gradation, loose to compact
	4	94.75	
			Clayey Silt — Grey, trace of fine gravel and shale fragments, stiff
	6	92.92	
			End of Borehole
	8		

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	2,3,1,1	4			
SS	2	1,2,1,1	3			
SS	3	1,2,6,7	8			
SS	4	4,6,9,9	15			
SS	5	5,7,6,10 Wet Spoon	13			
SS	6	4,4,7,9 Wet Spoon	11			19.0

Moisture Content w% (10, 20, 30, 40)

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

NOTES:

1. Borehole was advanced using solid stem auger equipment onJuly 13, 2015 to termination at a depth of 6.7 metres.
2. Free groundwater was encountered at a depth of 6.5 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid-Stem Auger
Drill Date: July 13, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 3

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 1010 Downsview Dr., Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

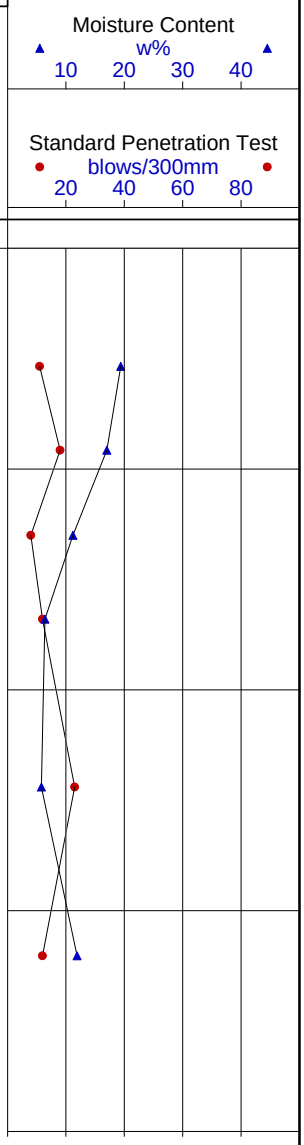
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SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description
0	0	99.50	Ground Surface
		99.25	**Pavement Structure** — Approximately 50 millimetres of asphaltic concrete over approximately 200 millimetres of compact granular base
			Sand Fill — Brown, trace to some silt, trace clay and rootlets in the upper level, trace slag in the lower levels, very loose to loose
		96.50	
			Sand — Brown, trace silt and fine gravel, fine to medium in gradation, compact
		93.09	
		92.79	**Clayey Silt** — Grey, trace of fine gravel and shale fragments, stiff
			End of Borehole

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	1,1,2,2	3			
SS	2	1,1,2,2	3			
SS	3	2,2,3,3	5			
SS	4	4,6,7,8	13			
SS	5	5,7,8,10	15			
SS	6	6,5,1,4 Wet Spoon	12		18.5	



NOTES:

1. Borehole was advanced using solid stem auger equipment on July 13, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 6.0 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

Drill Method: Solid-Stem Auger
Drill Date: July 13, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 4

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 1010 Downsview Dr., Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

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SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description
0	0	99.09	Ground Surface
		98.87	**Pavement Structure** — Approximately 50 millimetres of asphaltic concrete over approximately 200 millimetres of compact granular base
			Sand Fill — Brown, trace to some silt, trace clay and fine gravel, loose
		97.26	
	2		**Sand** — Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, loose to compact
	4		
	6		
		93.59	
			Clayey Silt — Grey, trace of fine gravel and shale fragments, stiff
	8	92.38	
			End of Borehole

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	2,2,2,3	4			
SS	2	1,2,2,1	4			
SS	3	4,4,6,8	10			
SS	4	4,7,9,11	16			
SS	5	5,6,6,6	12			
SS	6	3,5,9,13 Wet Spoon	14		4.0	20.3

Moisture Content w% (10, 20, 30, 40)

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

NOTES:

1. Borehole was advanced using solid stem auger equipment onJuly 13, 2015 to termination at a depth of 6.7 metres.
2. Free groundwater was encountered at a depth of 5.2 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid-Stem Auger
Drill Date: July 13, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 5

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 1010 Downsview Dr., Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

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SUBSURFACE PROFILE

SAMPLE

Depth (ft)	Depth (m)	Elevation [m]	Symbol	Description	Well Data	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0	0	99.25		Ground Surface								
0		98.97		**Pavement Structure** Approximately 50 millimetres of asphaltic concrete over approximately 225 millimetres of compact granular base								
2				**Sand Fill** Brown, trace to some silt, trace clay and fine gravel, very loose		SS	1	3,1,2,2	3			
4						SS	2	1,1,1,1	2			
6	2					SS	3	0,1,1,1	2			
8		96.25										
10				**Sand** Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, compact		SS	4	4,6,7,8	13			
12	4											
14												
16						SS	5	5,6,7,50/3"	13			
18		93.75										
20	6			**Clayey Silt** Grey, trace of fine gravel and shale fragments, stiff								
22		92.54				SS	6	4,4,6,9 Wet Spoon	10		3.25	19.5
24				End of Borehole								
26	8											
28												
30												
32												

Moisture Content w% (10, 20, 30, 40)

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

NOTES:

1. Borehole was advanced using solid stem auger equipment onJuly 13, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 5.9 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

Drill Method: Solid-Stem Auger

Drill Date: July 13, 2015

Hole Size: 200mm

Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 6

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

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SUBSURFACE PROFILE

SAMPLE

Depth (ft)	Depth (m)	Elevation [m]	Symbol	Description	Well Data	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		99.32		Ground Surface								
0	0	99.09		**Pavement Structure** Approximately 50 millimetres of asphaltic concrete over approximately 175 millimetres of compact granular base								
		97.82		**Sand Fill** Brown, trace to some silt, trace clay and fine gravel, loose		SS	1	2,4,3,7	7			
6	2			**Sand** Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, loose to compact		SS	2	3,4,4,2	8			
						SS	3	2,3,5,6	8			
						SS	4	5,5,7,10	12			
16	4					SS	5	6,5,5,6 Wet Spoon	10			
		93.82		**Clayey Silt** Grey, trace of fine gravel and shale fragments, very stiff								
20	6	92.61				SS	6	5,9,10,14 Wet Spoon	19		>4.5	20.8
				End of Borehole								
26	8											
32												

Moisture Content w% (10, 20, 30, 40)

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

NOTES:

1. Borehole was advanced using solid stem auger equipment onJuly 13, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 4.9 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

Drill Method: Solid-Stem Auger

Drill Date: July 13, 2015

Hole Size: 200mm

Drill Contractor: Davis Drilling

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e-mail: info@soil-mat.on.ca

Datum: Geodetic Benchmark

Field Logged by: M. Brown

Checked by: IS

Sheet: 1 of 1

Project No: SM 156175-G

Log of Borehole No. 7

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

Soil-Mat

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Symbol	Description	Well Data
0	0	99.33		Ground Surface	
		99.03		**Pavement Structure** Approximately 50 millimetres of asphaltic concrete over approximately 250 millimetres of compact granular base	
		98.26		**Sand Fill** Brown, trace to some silt, trace clay and fine gravel, loose	
				Sand Brown, trace silt and fine gravel, occasional silt seams, fine to medium in gradation, loose to compact	
		93.83		**Clayey Silt** Grey, trace of fine gravel and shale fragments, hard	
		92.62		End of Borehole	

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	3,3,4,4	7			
SS	2	1,2,4,8	6			
SS	3	2,3,5,9	8			
SS	4	5,9,7,7	16			
SS	5	3,4,6,8 Wet Spoon	10			
SS	6	9,15,17,16 Wet Spoon	32		>4.5	20.4

Moisture Content
w%
10 20 30 40

Standard Penetration Test
blows/300mm
20 40 60 80

NOTES:

1. Borehole was advanced using solid stem auger equipment onJuly 13, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 4.9 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

Drill Method: Solid-Stem Auger
Drill Date: July 13, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 8

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

Soil-Mat

SUBSURFACE PROFILE

SAMPLE

Depth (ft)	Depth (m)	Elevation [m]	Symbol	Description	Well Data	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		99.21		Ground Surface								
0	0	98.98		**Pavement Structure** Approximately 50 millimetres of asphaltic concrete over approximately 175 millimetres of compact granular base								
				Sand Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, cemented in the upper level, compact to dense		SS	1	6,9,14,18	23			
						SS	2	14,18,18, 17	36			
						SS	3	8,10,12, 11	22			
						SS	4	7,10,14, 13	24			
						SS	5	3,4,6,6 Wet Spoon	10			
		93.71		**Clayey Silt** Grey, trace of fine gravel and shale fragments, hard								
		92.50		End of Borehole		SS	6	14,22,25, 17 Wet Spoon	47		>4.5	19.8

Moisture Content w% (10, 20, 30, 40)

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

NOTES:

1. Borehole was advanced using solid stem auger equipment onJuly 13, 2015 to termination at a depth of 6.7 metres.
2. Free groundwater was encountered at a depth of 4.4 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid-Stem Auger
Drill Date: July 13, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 9

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

Soil-Mat

SUBSURFACE PROFILE

SAMPLE

Depth (ft)	Depth (m)	Elevation [m]	Symbol	Description	Well Data	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0	0	99.09		Ground Surface								
0	0	98.79		**Pavement Structure** Approximately 75 millimetres of asphaltic concrete over approximately 225 millimetres of compact granular base								
2				**Sand Fill** Brown, trace to some silt, trace clay and fine gravel, very loose to loose		SS	1	2,3,2,2	5			
4						SS	2	1,1,1,1	2			
6	2	96.89										
8				**Sand** Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, loose to compact		SS	3	2,4,6,7	10			
10						SS	4	4,6,8,6	14			
12												
14	4											
16						SS	5	3,4,4,6 Wet Spoon	8			
18		93.59										
20	6			**Clayey Silt** Grey, trace of fine gravel and shale fragments, very stiff		SS	6	4,7,11,15 Wet Spoon	18		>4.5	20.4
22		92.38										
24				End of Borehole								
26	8											
28												
30												
32												

Moisture Content
w%
10 20 30 40

Standard Penetration Test
blows/300mm
20 40 60 80

NOTES:

1. Borehole was advanced using solid stem auger equipment on July 13, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 4.6 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

Drill Method: Solid-Stem Auger
Drill Date: July 13, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 10

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

Soil-Mat

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description	Well Data
0	0	99.20	Ground Surface	
		98.90	**Pavement Structure** Approximately 50 millimetres of asphaltic concrete over approximately 250 millimetres of compact granular base	
			Sand Fill Brown, trace to some silt, trace clay and fine gravel, compact to very loose.	
	2	96.60		
			Sand Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, very loose to compact	
	4	93.20		
	6		**Clayey Silt** Grey, trace of fine gravel and shale fragments, very stiff	
		92.49	End of Borehole	

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	7,10,5,10	15			
SS	2	14,13,6,5	19			
SS	3	2,1,1,1	2			
SS	4	2,2,1,3	3			
SS	5	4,5,4,4	9			
SS	6	3,5,5,5	10			
SS	7	6,4,6,6 Wet Spoon	10			
SS	8	6,7,23,17 Wet Spoon	30			
SS	9	4,4,11,8 Wet Spoon	15		>4.5	

Moisture Content
w%
10 20 30 40

Standard Penetration Test
blows/300mm
20 40 60 80

NOTES:

1. Borehole was advanced using hollow stem auger equipment on July 14, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 5.5 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

4. A monitoring well was installed upon the completion of drilling and the following free groundwater levels have been measured:

July 21, 2015- 4.89m
August 13, 2015- 4.90m
August 14, 2015- 4.91m

Drill Method: Hollow-Stem Auger
Drill Date: July 14, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 11

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

Soil-Mat

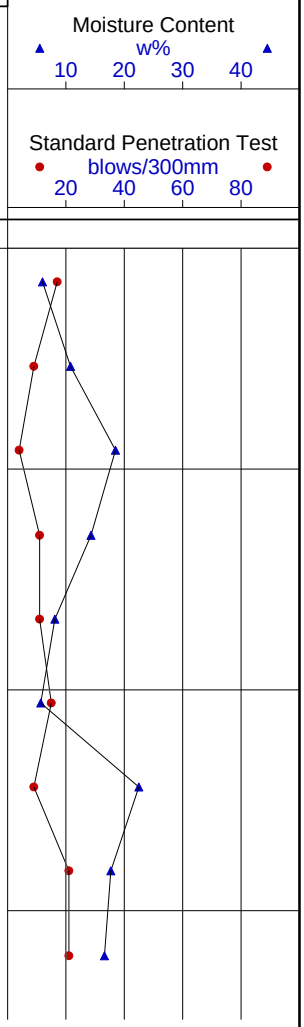
SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description
0	0	98.98	Ground Surface
		98.76	**Pavement Structure** — Approximately 50 millimetres of asphaltic concrete over approximately 175 millimetres of compact granular base
			Sand Fill — Brown, trace to some silt and gravel, loose to compact
6	2	96.78	
			Sand — Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, loose to compact
18		93.34	
			Clayey Silt — Grey, trace of fine gravel and shale fragments, very stiff
22	6.7	92.27	
			End of Borehole

Well Data: standpipe installed to 6.7 m

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	8,6,11,8	17			
SS	2	6,5,4,4	9			
SS	3	2,2,1,5	4			
SS	4	4,5,6,7	11			
SS	5	5,5,6,6	11			
SS	6	6,6,9,10	15			
SS	7	5,4,5,6 Wet Spoon	9			
SS	8	7,7,14,25 Wet Spoon	21			
SS	9	8,8,13,16 Wet Spoon	21		>4.5	



NOTES:

1. Borehole was advanced using hollow stem auger equipment on July 14, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 5.9 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

4. A monitoring well was installed upon the completion of drilling and the following free groundwater levels have been measured:

   July 21, 2015- 4.80m
   August 13, 2015- 4.82m
   August 14, 2015- 4.82m

Drill Method: Hollow-Stem Auger
Drill Date: July 14, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 12

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

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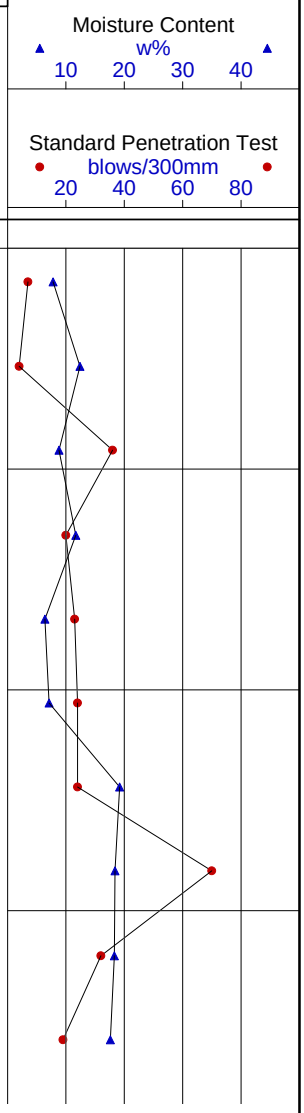
SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description
0	0	98.73	Ground Surface
		98.51	**Pavement Structure** — Approximately 75 millimetres of asphaltic concrete over approximately 150 millimetres of compact granular base
		97.23	**Sand Fill** — Brown, trace to some silt and gravel, trace organics in the upper level, loose to dense
	2		**Sand** — Brown, trace silt and fine gravel, with occasional silt seams, fine to medium in gradation, compact to very dense
	4		
	6	92.32	
			Clayey Silt — Grey, trace of fine gravel and shale fragments, very stiff to hard
	8	91.26	End of Borehole

Well Data

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	5,4,3,4	7			
SS	2	2,2,2,2	4			
SS	3	8,16,20, 22	36			
SS	4	5,9,11,12	20			
SS	5	7,11,12,13	23			
SS	6	6,8,16,18	24			
SS	7	14,13,11, 9 Wet Spoon	24			
SS	8	9,10, 50/5" Wet Spoon	70			
SS	9	7,13,19, 25 Wet Spoon	32			
SS	10	7,9,10,14 Wet Spoon	19			



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 5, 2015 to termination at a depth of 6.7 metres.
2. Free groundwater was encountered at a depth of 5.7 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed upon the completion of drilling and the following free groundwater levels have been measured:

   August 13, 2015- 4.68m
   August 14, 2015- 4.70m

Drill Method: Hollow-Stem Auger
Drill Date: August 5, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 13

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

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SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Elevation [m]	Description
0	0	99.29	Ground Surface
		99.07	**Pavement Structure** — Approximately 75 millimetres of asphaltic concrete over approximately 150 millimetres of compact granular base
			Sand Fill — Brown, trace to some silt and gravel, trace organics in the lower level, compact
8	2	96.69	
			Sand — Brown, trace of silt and fine gravel, with occasional silt seams, fine to medium in gradation, compact
22	6	92.49	
			Clayey Silt — Grey, trace of fine gravel and shale fragments, very stiff
24		91.67	
26	8		End of Borehole

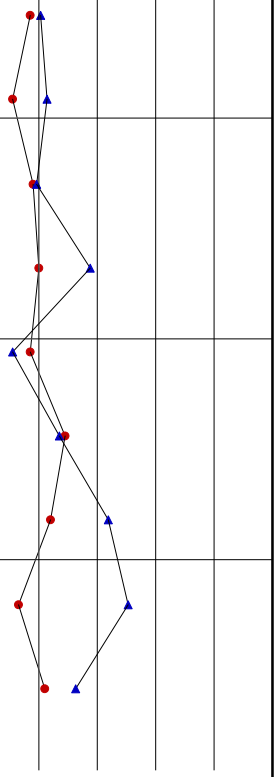
Well Data

SAMPLE

Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
SS	1	3,8,9,8	17			
SS	2	4,7,4,5	11			
SS	3	2,6,12,12	18			
SS	4	5,9,11,10	20			
SS	5	6,8,9,13	17			
SS	6	6,12,17, 18 Wet Spoon	29			
SS	7	7,10,14, 14 Wet Spoon	24			
SS	8	2,3,10,32 Wet Spoon	13			
SS	9	6,9,13,18 Wet Spoon	22			

Moisture Content w% (10, 20, 30, 40)

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



NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 5, 2015 to termination at a depth of 6.7 metres.
2. Free groundwater was encountered at a depth of 5.7 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.
4. A monitoring well was installed upon the completion of drilling and the following free groundwater levels have been measured:
   August 13, 2015- 5.27m
   August 14, 2015- 5.27m

Drill Method: Hollow-Stem Auger
Drill Date: August 5, 2015
Hole Size: 200mm
Drill Contractor: Davis Drilling

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Project No: SM 156175-G

Log of Borehole No. 14

Project: Proposed Residential Development

Project Manager: Ian Shaw, P.Eng.

Location: 355 Plains Rd. E, Burlington, ON

Borehole Location: See Drawing No. 1

Client: Downsview Drive Development Ltd. c/o Myway Investments Limited

Soil-Mat

SUBSURFACE PROFILE

SAMPLE

Depth (ft)	Depth (m)	Elevation [m]	Symbol	Description	Well Data	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0	0	98.79		Ground Surface								
		98.54		**Pavement Structure** Approximately 50 millimetres of asphaltic concrete over approximately 200 millimetres of compact granular base								
				Sand Fill Brown, trace to some silt, trace gravel and clay, very loose to compact		SS	1	2,2,2,2	4			
6	2					SS	2	1,1,1,2	2			
		96.59		**Sand** Brown, trace of silt and fine gravel, with occasional silt seams, fine to medium in gradation, compact		SS	3	2,6,9,14	15			
10						SS	4	5,8,10,13	18			
12	4											
16						SS	5	5,6,7,8 Wet Spoon	13			
		93.29		**Clayey Silt** Grey, trace of fine gravel and shale fragments, very stiff								
20	6					SS	6	6,10,14, 21 Wet Spoon	24		>4.5	
		92.08		End of Borehole								
26	8											
32												

Moisture Content w% (10, 20, 30, 40)

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

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 5, 2015 to termination at a depth of 6.7 metres.

2. Free groundwater was encountered at a depth of 5.2 metres upon completion of drilling. Borehole was backfilled as per Ontario Regulation 903.

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

Drill Method: Solid-Stem Auger

Drill Date: August 5, 2015

Hole Size: 200mm

Drill Contractor: Davis Drilling

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