

ALSTON GEOTECHNICAL CONSULTANTS INC.



**PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED BUILDING DEVELOPMENT
12563 HWY 50 AND 2 INDUSTRIAL ROAD
BOLTON, ONTARIO**

Project No. 20.032
4 March, 2021

Prepared For:

**Watters Environmental Group Inc.
9135 Keele Street
Unit A1
Vaughan, Ontario
L4K 0J4**

1 Copy - Watters Environmental Group Inc.
1 Copy - Alston Geotechnical Consultants Inc.

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1.0 INTRODUCTION

Alston Geotechnical Consultants Inc. has been retained by Watters Environmental Group Inc. to carry out a geotechnical investigation evaluation at a site located at 12563, 12585 and 12599 Hwy 50 and 2 Industrial Road, in Bolton, Ontario. Authorization to proceed with this study was given by Rob Watters, Ph.D, P.Geo on behalf of their client, 12599 Hwy 50 Ltd.

The purpose of this study was to view the results of a few exploratory boreholes which were put down at the site to provide sufficient information to make a preliminary evaluation of subsurface conditions in order to assess requirements for the design of building substructures and foundations.

2.0 FIELDWORK

The fieldwork for this study consisted of advancing a total of six sampled boreholes (BHs 20-101 through 20-106) which were put down at the locations shown on Drawing No. 1 by Watters Environmental Group. The depths of the exploratory boreholes range from 15.8 m to 27.5 m.

Standard penetration tests were carried out at frequent intervals of the depth in the boreholes to take representative soil samples and to measure penetration index values (N-values). The in situ test results are used to evaluate the consistency (cohesive soils) or compactness condition (non-cohesive soils) of the tested soil materials. Observations were made of groundwater conditions occurring in the boreholes in the course of advancement, and water levels at completion. Monitoring wells were installed in Boreholes 20-102, 20-103 and 20-104 to provide a measure of the stabilized water table at the site.

The fieldwork for this study was supervised by an experienced soils technician from Watters Environmental Group, who laid out the positions of the boreholes in the field; effected the drilling, sampling and in situ testing, and prepared Field Borehole Log Sheets.

3.0 SITE AND SUBSURFACE CONDITIONS

The site is located in Bolton, Ontario in the North quadrant of the intersection between Highway 50 and Industrial Road. The site is relatively flat, presently it is occupied by a few single storey buildings which are surrounded by pavement.

3.1 Site Cover

As noted, outside the footprint of the site buildings, the site is used for vehicle parking and storage. There are portions of the site that are surfaced with asphaltic concrete which are located at the westerly corner and another portion in the extreme easterly section. The balance of the site is gravel surfaced. Boreholes advanced in the asphalt surfaced area indicate that the layer thickness ranges from about 50 mm to 70 mm. The thickness of the granular base ranges from about 100 mm to 380 mm. Elsewhere on the site, the surficial fill layer consists of predominantly granular materials which include recycled asphalt, some silt and clay lumps; the layer thickness ranges from about 180 mm to about 600 mm.

3.2 Silty Clay

The site cover is underlain by a deposit of silty clay soil which extends to a depth ranging from about 13.5 m to about 14.5 m below the ground surface. There is an upper sub-unit of this deposit which is fissured and is coloured brown becoming brown to grey. Typically, this sub-unit extends to depths ranging from about 3 m to 4 m below the ground surface. Below this depth, the soil is predominantly grey and is intact.

Standard penetration tests carried out in the silty clay deposit measured N-values in the range from 7 to more than 50 blows/300 mm. A review of the in situ test results indicates that mostly, the soils are of stiff to very stiff consistency.

Water content values range from 15% to 23%, which is consistent with expectations for soils of the inferred consistency. Atterberg Limits tests were carried out to evaluate the plasticity of the soils. These indicate that typically the stiff to very stiff soils are of low or low to intermediate plasticity (CL or CL/CI designation), refer to Figure 1. Grain size

distribution tests were carried out on representative soil samples and those test results are reported in Figure 2. The results show a clay fraction of typically about 50% and a relatively small (about 10%) sand fraction. The laboratory test results are reported in Appendix B.

3.3 Lower Silty Clay and Silt

Below a depth of 13.5 m to 15 m, the boreholes contacted a stratum of grey silty clay which includes interbedded seams consisting of sand and gravel and seams of non-cohesive to weakly plastic, fine to medium sand to silt with a trace of sand. The gradation and character of these soils varies with position within the site and depth. However, densities of all materials are characterized by standard penetration test N-values of more than 40 blows/300 mm which indicate a hard consistency for the cohesive portions of the stratum and a dense to very dense condition for the non-cohesive soils.

The water content of the soils contacted in this layer range from about 12% to 22%, the values are somewhat higher in the non-cohesive portions of the stratum than in the cohesive zones. The higher measured water content values may reflect that the soils have imbibed water in the course of sampling. Atterberg Limits tests show that the soils which are described as cohesive materials are of low plasticity (CL/ML designation). The results of grain size distribution tests of the cohesive soils are reported in Figure 3 and the test results of a sample of the silt in Figure 4.

3.4 Water Levels

Wells were installed in Boreholes 20-102, 20-103 and 20-104. Water levels are available from prior wells installed at the site. Discussion with regard to results of water level measurements and to permeability aspects of the soils are addressed by Palmer Environmental Group in their companion Hydrogeological Report for the site. It is inferred that the water table lies at shallow depth.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

The study site is to be developed with several high rise buildings which will be underlain by three basement level substructures. These developments will be surrounded with paved areas which will be used for both parking and deliveries. At this preliminary stage of site evaluation, no details are available with regard to structural aspects such as column loadings and layout. However, it is reasonable to assume that the loads applied to the building foundations will be heavy.

4.2 Summarized Subsurface Conditions

The borehole records show that below the current site surfacing layers, the site is underlain by a layer of stiff to very stiff silty clay which extends to depths ranging from about 13.5 m to 14.5 m below the existing ground surface. Below that depth, the boreholes contacted an interlayered stratum with seams of hard silty clay and very dense silt to fine to medium sand.

Water levels measured in monitoring wells indicate that there is a shallow water table condition at the site.

4.3 Foundations

Presuming three basement levels, it is anticipated that the foundation elevation will lie at a depth of about 10 m. At this depth, stiff to very stiff silty clay soils were contacted in all of the current borehole explorations. Based on the results of in situ testing, for site evaluation and budgeting purposes the stiff to very stiff soils can be expected to sustain a foundation bearing pressure at Serviceability Limit States (SLS) of 200 kPa and at Ultimate Limit States (ULS) of 300 kPa. The borehole data show that soils with an improved bearing capacity characteristic closely underlie the currently anticipated base of excavation. At depths of about 13.5 m to 14.5 m below the ground surface, which correspond to 3.5 to 5 m below the anticipated base of excavation, the underlying hard silty clay and dense to very dense sand to silt deposit can be expected to sustain bearing

pressures at SLS and ULS of about 500 kPa and 700 kPa, respectively.

If the foundations were to consist of drilled shafts ("Caissons") which extend from the anticipated base of substructure excavation to the underlying hard/very dense soils, the borehole data indicate that such drilled shafts which extend to a depth of 20 m below the ground surface (10 m below anticipated excavation base) shafts could be designed on the basis of an end bearing pressure of 2 MPa at SLS and 3 MPa at ULS. Adhesion values of 100 kPa and 150 kPa at SLS and ULS respectively can be assumed for preliminary evaluation of the skin friction component for drilled shaft design. If the alternative of drilled shaft foundations is to be considered, it should be noted that drilling measures such as the introduction of drilling muds will likely be required to maintain the good condition of the base of the shaft in order to maintain the suggested design values.

Site classification with regard to seismic site response is "Class C"

There is merit in considering a foundation design which involves a raft or grillage of intersecting beams. Such should be evaluated at the time when details of actual loads and load spacing are available.

4.4 Excavations

Excavations to the anticipated basement floor depth of about 10 m are expected to intersect stiff to very stiff silty clay soil materials. The borehole data indicate that such materials extend beyond the base of anticipated excavation. The borehole data indicate that layers of more permeable sandy silt and fine to medium grain sand underlie the base of excavation, such would be expected to result in basal heave unless the hydraulic pressures are reduced to an elevation which is below the base of excavation. This matter will be addressed in more detail when more details of the future development and more borehole data are available.

Based on the borehole data, a conventional soldier pile and lagging shoring wall would be appropriate to the subsurface conditions. The alternative to a secant pile wall which acts as both shoring and permanent basement wall is also feasible at the site. The design of temporary shoring would be based on the following soil parameters:

- *active earth pressure coefficient (k_a), 0.27;*
- *unit weight, 21 kN/m³,*
- *assumed depth to water table, 1.5 m.*

Basement walls would assume the same value of unit weight and water table however, an earth pressure at rest coefficient (k_0) of 0.5 would be adopted for design rather than K_a .

The basement substructures must either be enclosed within and underlain by permeable drainage layers, or must be designed as waterproof units.

4.5 Utility Trenches

It is probable that the site servicing will be installed in utility trenches which are not more than about 3 m deep. The borehole data indicate that the excavations will mostly intersect stiff silty clay soil materials which can be expected to remain stable at a side slope of 1 vertical to 1 horizontal (Type 2 soil). The excavated native soils are expected to be suitable for reuse as trench backfill, provided that allowance is made for creep settlement to occur over a period of a few months following completion of trench backfill. Trench inverts will be suitable to support utility pipelines.

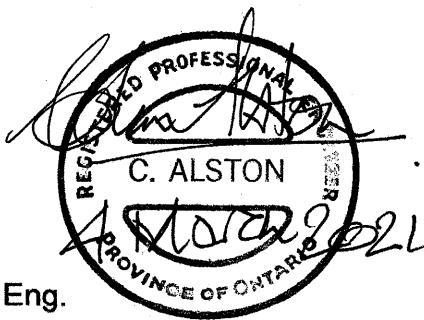
4.6 Pavements

It is expected that the generally stiff near surface zone of the upper silty clay deposit will provide a suitable subgrade for overlying pavements. Suitable pavement thickness designs will be provided when details are available.

5.0 LIMITATIONS OF REPORT

A description of Limitations which are inherent in carrying out conventional Geotechnical Investigation studies are attached to this report in Appendix 'A'. In particular it should be noted that this preliminary report is intended to provide general recommendations with regard to a preliminary evaluation of the site and subsurface conditions. It is understood that this report is to be followed by a detailed evaluation of the site, firm recommendations will be given at the next stage.

Alston Geotechnical Consultants Inc.



Colin Alston, P.Eng.

/ld

APPENDIX 'A'

Appendix 'A'

LIMITATIONS OF REPORT

The conclusions and recommendations in this report are based on information determined at the test hole locations. Soil 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 soil investigation.

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 details of alignment and elevations stated in the report. Since all details of the design may not be known to us, in our analysis certain assumptions had to be made as set out in this report. The actual conditions may, however, vary from those assumed, in which case changes and modifications may be required to our recommendations.

This report was prepared for Watters Environmental group Inc. and their client, "12599 Hwy 50 Ltd" by Alston Geotechnical Consultants Inc. The material in it reflects Alston Geotechnical Consultants Inc. judgement in light of the information available to it at the time of preparation. Any use which a Third Party makes of this report, or any reliance on decisions which the Third Party may make based on it, are the sole responsibility of such Third Parties.

We recommend, therefore, that we be retained during the final design stage to review the design drawings and to verify that they are consistent with our recommendations or the assumptions made in our analysis. We recommend also that we be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the test holes. In cases where these recommendations are not followed, the company's responsibility is limited to accurately interpreting the conditions encountered at the test holes, only.

The comments given in this report on potential construction problems and possible methods are intended for the guidance of the design engineer, only. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. 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.

APPENDIX 'B'

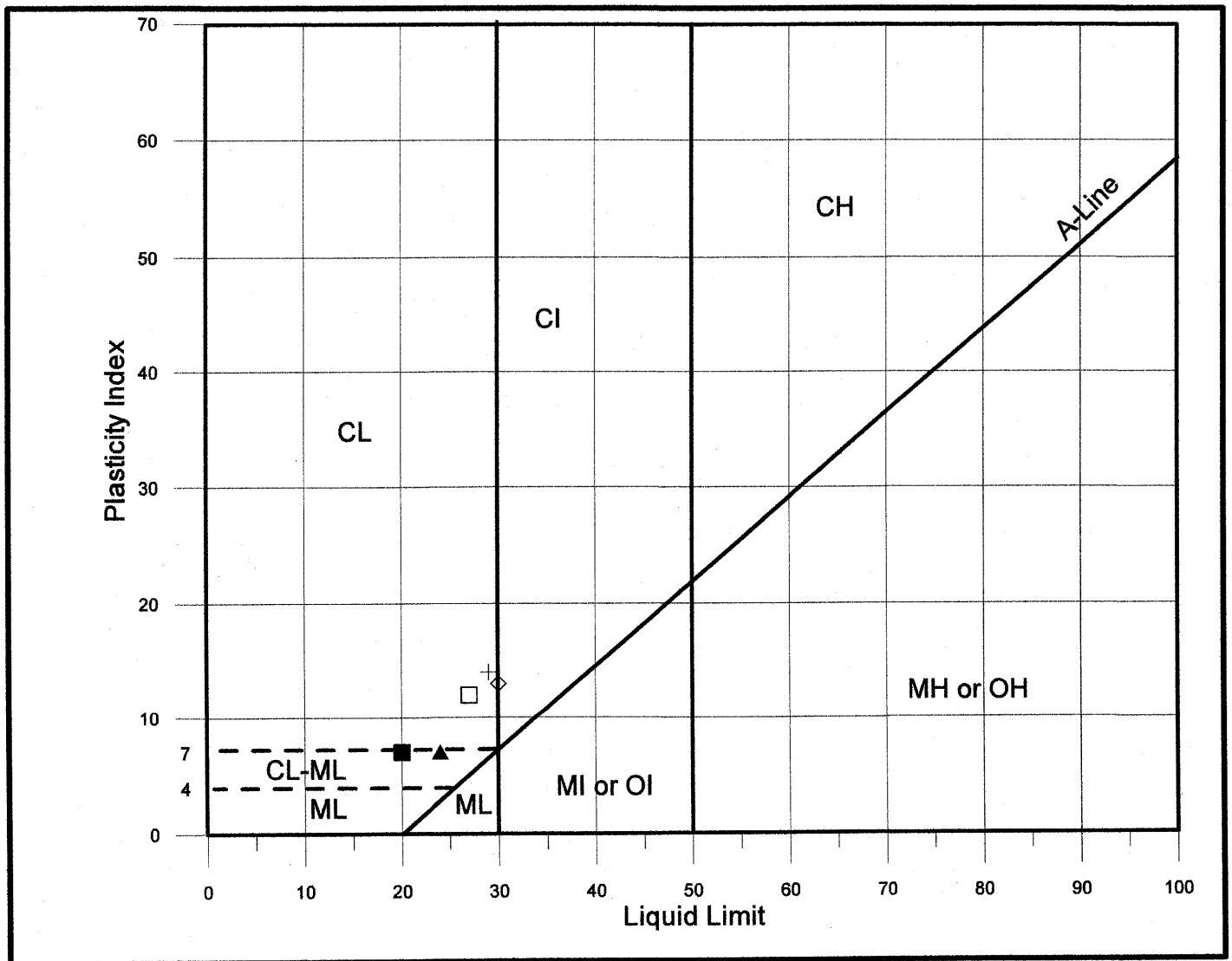
WATER CONTENT RECORD

Project: Lab 20-0132.04	Client: AGC	By:
Ref. No.: CA20085		On:

[illegible]

WATER CONTENT RECORD

PLASTICITY CHART



Client: Alston Geotechnical Consultants Inc.
 Project: Lab Testing Prj No 20-0132.04 Bolton
 Ref. No.: CA20-085

Sample

Symbol

BH106, Sample 4
 BH106, Sample 7
 BH106, Sample 11
 BH106, Sample 13
 BH106, Sample 19

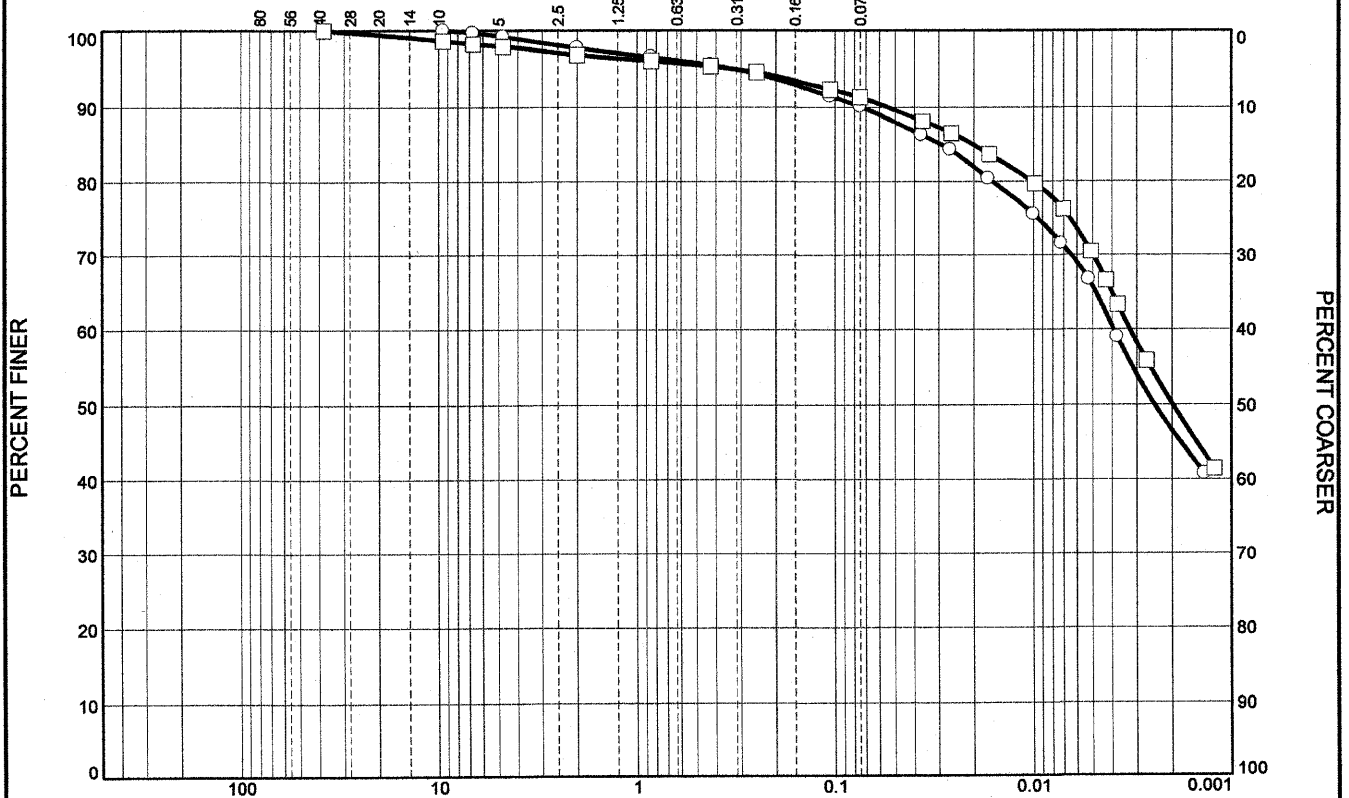
◇
 □
 +
 ■
 ▲

Remarks:



Figure No. 1

Particle Size Distribution Report



GRAIN SIZE - mm.									
	% +3"	% Gravel	% Sand		% Fines		C _c	C _u	
			Coarse	Fine	Silt	Clay			
<input type="radio"/>	0.0	2.3	2.2	5.4	43.5	46.6			
<input type="checkbox"/>	0.0	3.2	1.5	4.0	41.1	50.2			
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	
<input type="radio"/>			0.0293	0.0039	0.0024				
<input type="checkbox"/>			0.0203	0.0033	0.0020				

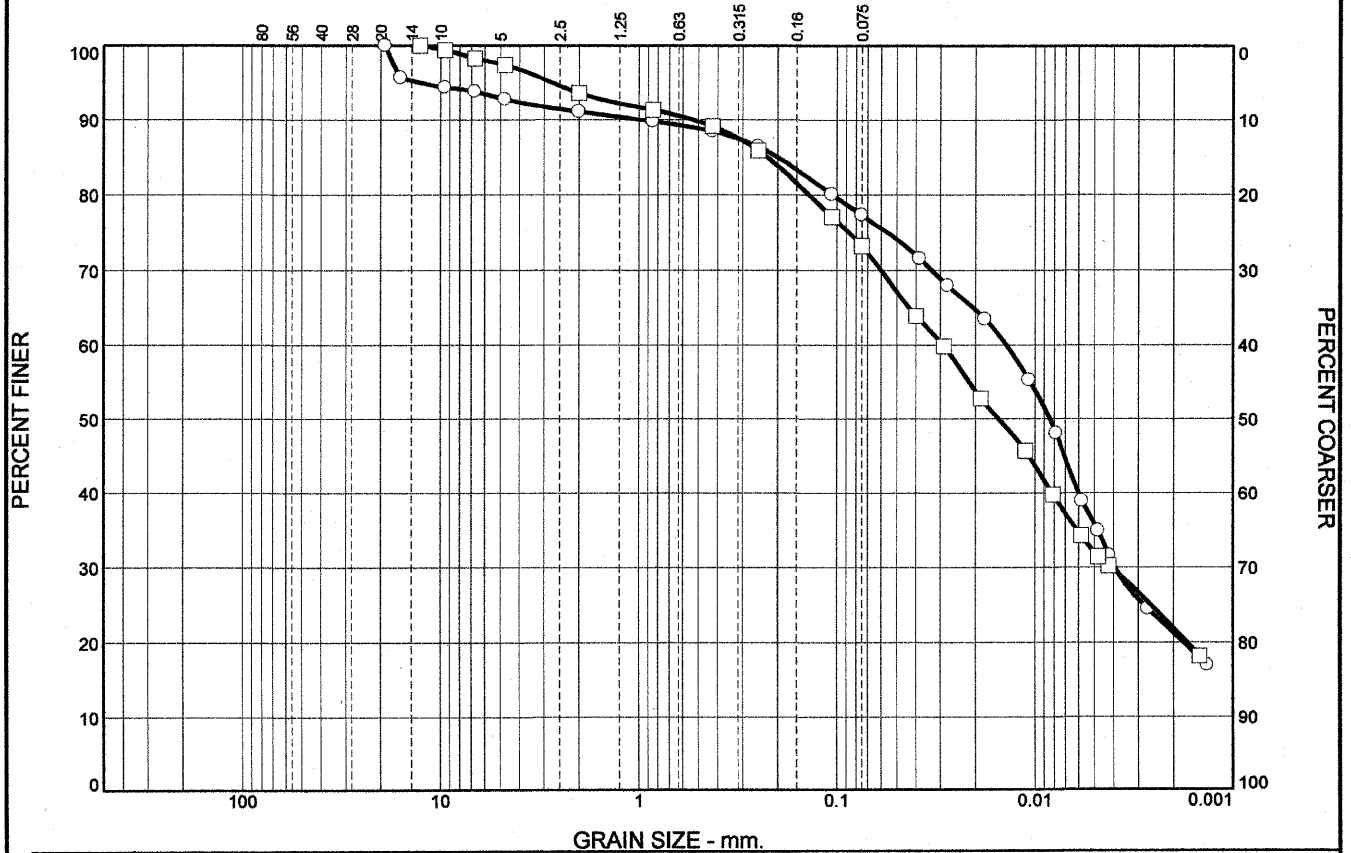
Material Description	USCS	AASHTO
<input type="radio"/> SILT and CLAY trace sand trace gravel		
<input type="checkbox"/> SILT and CLAY trace gravel trace sand		

Project No. CA20-085 Client: Alston Geotechnical Consultants Inc. (AGC) Project: Laboratory Testing for Prj No 20-0132.04 Bolton <input type="radio"/> Sample Number: BH6, Sample 16 <input type="checkbox"/> Sample Number: BH6, Sample 8	Remarks:
Terrapex	

Figure 2

Tested By: AM Checked By: DM

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand		% Fines				
				Coarse	Fine	Silt		Clay		
<input type="radio"/>	0.0	8.9		2.6	11.2	56.0		21.3		
<input type="checkbox"/>	0.0	6.4		4.5	15.8	51.3		22.0		
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>			0.1991	0.0140	0.0084	0.0039				
<input type="checkbox"/>			0.2251	0.0291	0.0153	0.0041				

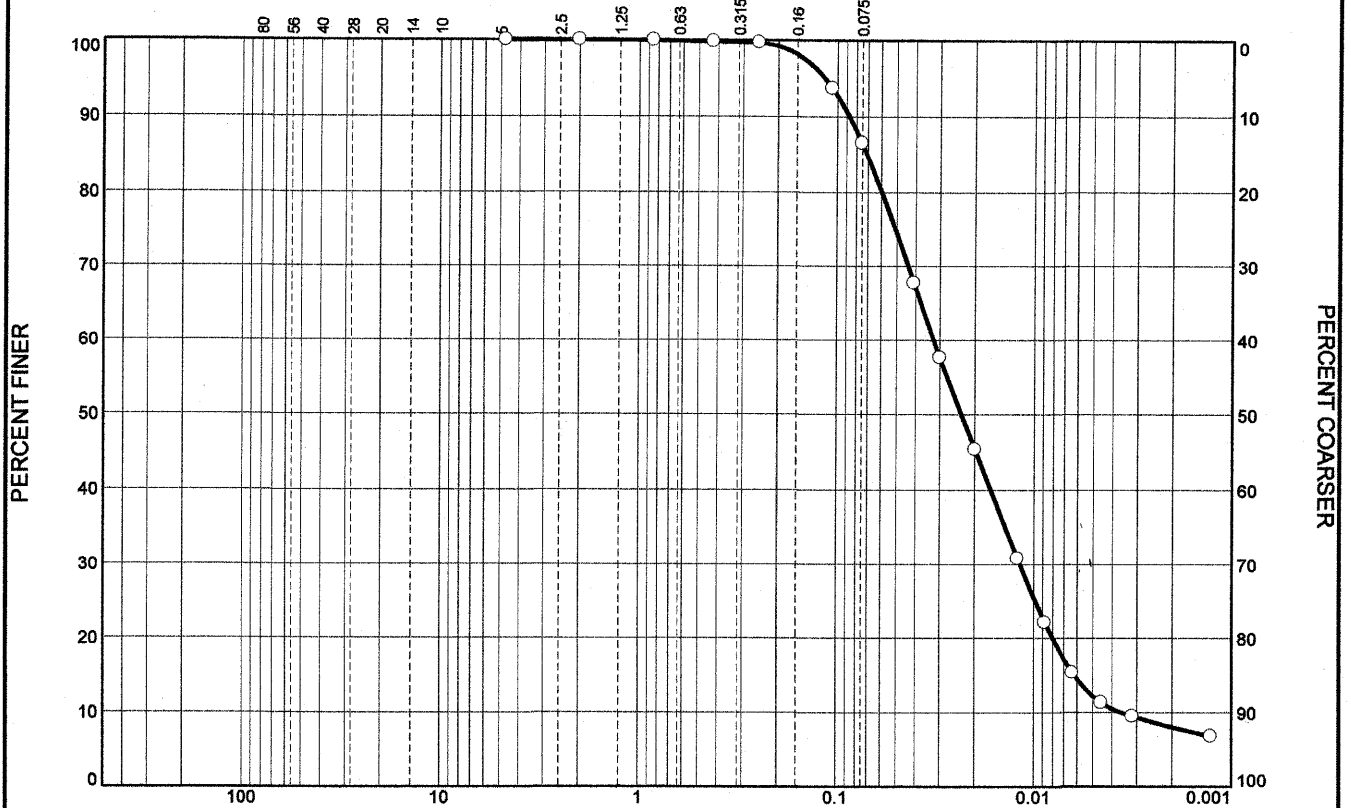
Material Description								USCS	AASHTO
<input type="radio"/> SILTY CLAY some sand trace gravel									
<input type="checkbox"/> SILTY CLAY some sand to SANDY trace gravel									

Project No. CA20-085 Client: Alston Geotechnical Consultants Inc. (AGC) Project: Laboratory Testing for Prj No 20-0132.04 Bolton <input type="radio"/> Sample Number: BH6, Sample 20 <input type="checkbox"/> Sample Number: BH6, Sample 14	Remarks:
Terrapex	

Figure 3

Tested By: AM Checked By: DM

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines		
					Coarse	Fine		Silt	Clay	
○	0.0		0.0		0.2		13.3	78.4		8.1
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.0708	0.0324	0.0233	0.0118	0.0062	0.0036	1.18	8.92

Material Description	USCS	AASHTO
SILT some sand trace clay		

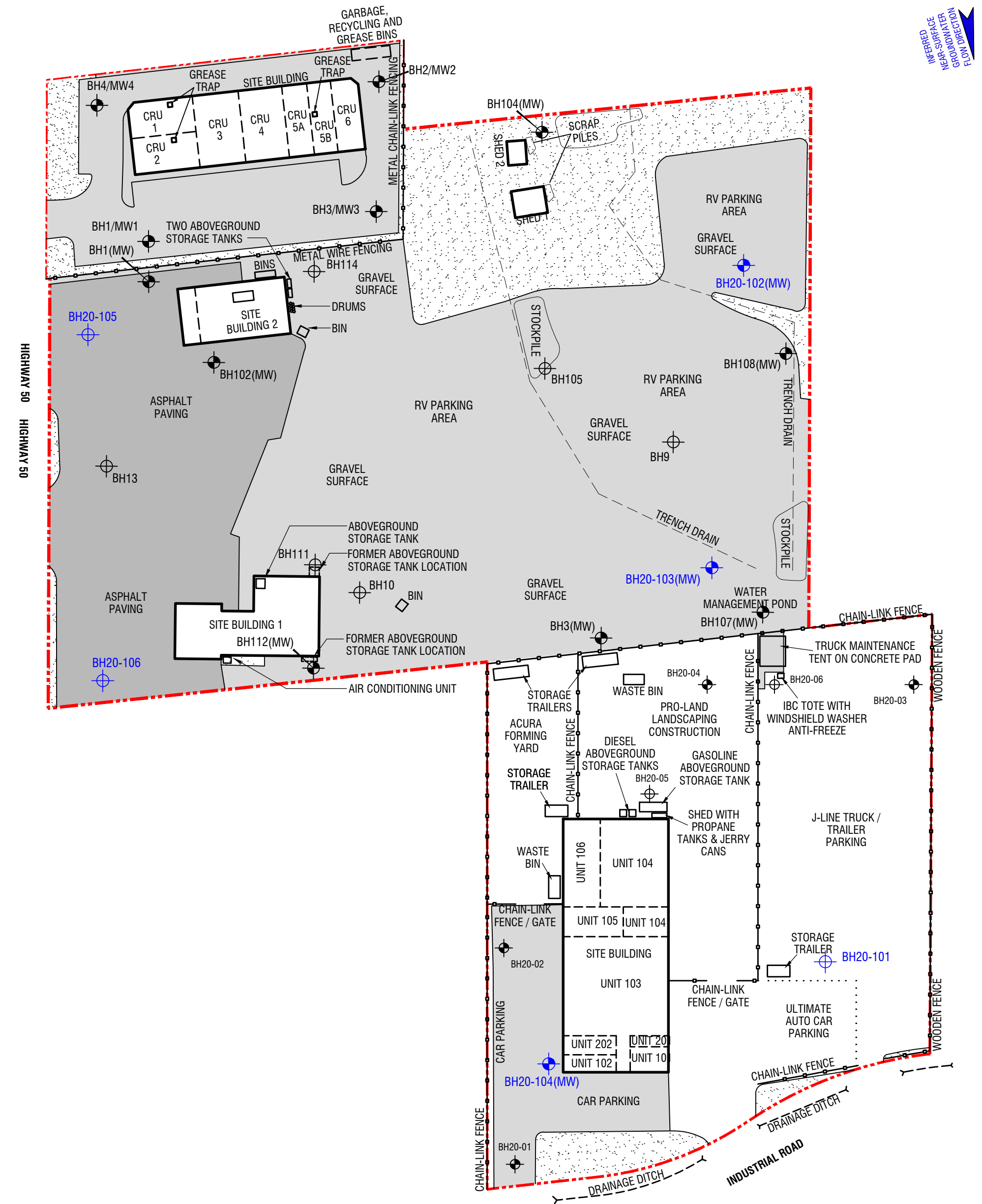
Project No. CA20-085 Client: Alston Geotechnical Consultants Inc. (AGC) Project: Laboratory Testing for Prj No 20-0132.04 Bolton <input type="checkbox"/> Sample Number: BH106, Sample 16	Remarks:
Terrapex	

Figure 4

Tested By: JR Checked By: DM

ENCLOSURES

Borehole Location Plan



0m CONFIDENTIAL 40m

APPROXIMATE SCALE

Borehole Log Sheets



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Borehole No: BH20-102(MW)

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 15.70 m/51.5 ft.

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
ft m		Ground Surface									
0 0		180 mm Sand and Angular Gravel, FILL	0.00								
2		very stiff brown to grey SILTY CLAY, some sand trace gravel, occasional oxidized fissures oxidized faces		1	SS	20	75				
4				2	SS	28	100				
6 2		very stiff SILTY CLAY trace sand trace gravel	1.40	3	SS	28	75				
8				4	SS	31	100				
10		brownish grey occasional fissures oxidized faces		5	SS	28	100				
12		----- grey		6	SS	19	100				
14 4				7	SS	20	100				
16				8	SS	19	100				
18											Bentonite
20 6				9	SS	14	100				
22											
24											
26 8				10	SS	22	100				
28											
30											
32											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12- 07 & 08

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 1 of 2



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Borehole No: BH20-102(MW)

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 15.70 m/51.5 ft.

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
10		very stiff grey SILTY CLAY trace sand trace gravel									
34											
36				11	SS	16	100				
38											
40				12	SS	13	100				
42											
44											
46		occasional sand seams		13	SS	19	100				
48											
50											
52		End of Borehole	15.70	14	SS	77	100				
54											
56											
58											
60											
62											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12- 07 & 08

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 2 of 2



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Borehole No: BH20-103(MW)

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 15.85 m/52 ft.

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
0		Ground Surface									
0		compact layered recycled asphalt, silt, clay, some sand, some gravel FILL	0.00	1	SS	25	80				
2											
2		stiff brown veined grey SILTY CLAY, some sand trace gravel, occasional oxidized fissures oxidized faces	0.70	2	SS	7	75				
4											
6				3	SS	11	75				
8											
8			2.50	4	SS	24	100				
10		very stiff SILTY CLAY trace sand trace gravel									
12				5	SS	28	100				
14		brown some grey occasional fissures oxidized faces									
16		grey occasional fissures									
16				7	SS	24	75				
18											
20											
22		grey		8	SS	19	75				
24											
26				9	SS	10	75				
28											
30				10	SS	16	75				
32											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12- 03 & 04

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 1 of 2



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Borehole No: BH20-103(MW)

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 15.85 m/52 ft.

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
10		very stiff grey SILTY CLAY trace sand trace gravel									
34											
36				11	SS	18	80				
38											
40				12	SS	28	100				
42											
44											
46				13	SS	21	100				
48											
50											
52				14	SS	47	100				
54											
56		End of Borehole	15.90								
58											
60											
62											
64											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12- 03 & 04

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 2 of 2



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Borehole No: BH20-104(MW)

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 15.70 m/51.5 ft.

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
0		Ground Surface	0.00								<div>Concrete</div> <div>Steel Casing</div>
0		70 mm Asphalt		1	SS	5	50				
2		100 mm Sand and Gravel									
2		silt, clay, sand, gravel, FILL									
4		stiff brown some grey	0.70	2	SS	12	10				
6		very stiff brown with grey patches		3	SS	22	10				
8		occasional fissures oxidized faces		4	SS	44	100				
10		SILTY CLAY trace sand trace gravel		5	SS	43	65				
12											
14		grey		6	SS	20	100				
16				7	SS	18	75				<div>Bentonite</div>
18											
20				8	SS	19	75				
22											
24											
26				9	SS	14	75				
28											
30				10	SS	17	75				
32											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12-10

Hole Size: Hollow Augers 155 mm
Screening Tool: Eagle II
Sheet: 1 of 2



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Borehole No: BH20-104(MW)

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 15.70 m/51.5 ft.

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
10		grey SILTY CLAY trace sand trace gravel									
34											
36				11	SS	16	80				
38											
40				12	SS	10	100				
42											
44											
46				13	SS	12	100				
48											
50		hard grey SILTY CLAY some embedded sand, gravel and rock fragments	15.00								
52				14	SS	61	65				
54		End of Borehole	15.70								
56											
58											
60											
62											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12-10

Hole Size: Hollow Augers 155 mm
Screening Tool: Eagle II
Sheet: 2 of 2



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Borehole No: BH20-101

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 24.66 m/80.92ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
0 ft 0 m		Ground Surface	0.00								
2		dense, silt, sand, gravel asphalt fragments, FILL		1	SS	89	100				
4			0.70	2	SS	12	80				
6				3	SS	21	100				
8				4	SS	22	80				
10				5	SS	23	100				
12				6	SS	32	100				
14				7	SS	31	100				
16				8	SS	21	80				
18				9	SS	19	20				
20				10	SS	25	100				
22											
24											
26											
28											
30											
32											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12- 08 & 09

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 1 of 3



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Borehole No: BH20-101

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 24.66 m/80.92ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
10	[Orange brick pattern]	very stiff grey SILTY CLAY trace to some sand trace gravel									
34											
36				11	SS	13	100				
38	[Orange brick pattern]										
40											
42											
44	[Yellow dotted pattern]	very dense grey fine to medium SAND trace silt	13.50								
46											
48											
50	[Yellow dotted pattern]										
52											
54											
56	[Green dotted pattern]	very dense grey SANDY SILT	16.50								
58											
60											
62	[Green dotted pattern]										
64											
	[Orange brick pattern]		19.50								

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12- 08 & 09

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 2 of 3



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Borehole No: BH20-101

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 24.66 m/80.92ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
66 20		hard grey SILTY CLAY trace gravel		17	SS	75	100				
68											
70											
72 22				18	SS	76	100				
74											
76				19	SS	89	100				
78											
80 24				20	SS	85 for 280 mm	90				
82		End of Borehole	24.70								
84											
86 26											
88											
90											
92 28											
94											
96											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12- 08 & 09

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 3 of 3



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Borehole No: BH20-105

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 24.66 m/ 80.92ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
0 ft 0 m		Ground Surface	0.00								
		50 mm Asphalt									
		230 mm Sand and Gravel		1	SS	4	30				
2			0.50								
				2	SS	13	100				
4											
		stiff									
		very stiff									
6				3	SS	23	100				
2		brown veined grey SILTY CLAY some sand, trace gravel									
8				4	SS	22	100				
10			3.00								
				5	SS	28	100				
12		brown to grey very stiff									
		grey stiff									
4				6	SS	14	80				
14											
				7	SS	13	100				
16											
		SILTY CLAY trace sand trace gravel									
18											
20				8	SS	13	100				
22											
24											
26				9	SS	18	100				
28											
30											
32				10	SS	21	100				

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12-02 & 03

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 1 of 3



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Borehole No: BH20-105

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 24.66 m/ 80.92ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
10	[Orange diagonal hatch pattern]	stiff grey SILTY CLAY trace sand trace gravel		11	SS	13	100				
34											
36											
38	[Orange diagonal hatch pattern]			12	SS	10	100				
40											
42											
44	[Orange diagonal hatch pattern]			13	SS	8	100				
46											
48											
50	[Green diagonal hatch pattern]	dense grey weakly plastic SANDY SILT trace clay trace gravel	14.90	14	SS	35	100				
52											
54											
56	[Orange diagonal hatch pattern]	hard grey faintly layered SILTY CLAY trace sand trace gravel	16.50	15	SS	50	100				
58											
60											
62	[Green diagonal hatch pattern]	very dense grey weakly plastic SANDY SILT trace gravel trace clay	18.00	16	SS	99 for 215 mm	100				
64											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12-02 & 03

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 2 of 3



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Borehole No: BH20-105

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 24.66 m/ 80.92ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
66 20		very dense grey weakly plastic SANDY SILT trace gravel trace clay		17	SS	99 for 290 mm	60				
68											
70				18	SS	92	60				
72 22											
74											
76				19	SS	81	90				
78											
80 24				20	SS	98 for 280 mm	90				
82		End of Borehole	24.70								
84											
86 26											
88											
90											
92 28											
94											
96											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-12-02 & 03

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 3 of 3



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Borehole No: BH20-106

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 27.7 m/91 ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	
0 ft 0 m		Ground Surface	0.00								
		60 mm Asphalt		1A	SS	16	70			6.0	
		380 mm Sand and Gravel		1B	SS					14.9	
2			0.50								
				2	SS	15	75			15.1	
4											
				3	SS	22	100			16.3	
6											
				4	SS	27	100			17.7	
8											
				5	SS	37	100			12.8	
10											
				6	SS	17	80			15.1	
12											
				7	SS	28	100			10.6	
14											
				8	SS	13	100			23.7	
16											
				9	SS	16	100			21.7	
18											
				10	SS	18	100			18.0	
20											
22											
24											
26											
28											
30											
32											

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-11-30, 2020-12 01 & 02

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 1 of 3



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Borehole No: BH20-106

Project No.: 20-0132.04

Client: Verdi Alliance


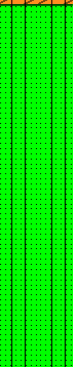
Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 27.7 m/91 ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE								Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	Lab Submitted	
10		grey SILTY CLAY trace to some sand trace gravel										
34												
36				11	SS	15	100			17.9		
38												
40				12	SS	16	100			18.0		
42												
44												
46	14	hard grey SILTY CLAY some embedded sand and gravel	13.50	13	SS	40	100			13.6		
48												
50												
52	14			SS	73	100			12.1			
54												
56	16											
58												
60												
62												
		very dense faintly layered grey SANDY SILT occasional thin silt seam	16.60	15	SS	98	100			22.0		
				16	SS	98 for 275mm	100			19.7		

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-11-30, 2020-12 01 & 02

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 2 of 3



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Borehole No: BH20-106

Project No.: 20-0132.04

Client: Verdi Alliance

Location: 1563 HWY 50 & 2 Industrial Rd, Bolton, ON **Ground Elevation:** 0

Project Manager: C.A.

Total Depth: 27.7 m/91 ft

Logged By: T.A.

Water Level:

SUBSURFACE PROFILE				SAMPLE								Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Shear KPa	Moisture %	Lab Submitted	
64												
66	20	very dense grey weakly plastic SILT trace sand trace clay	19.70	17	SS	76	100			20.5		
68												
70					18	SS	83 for 280 mm	100			11.9	
72	22											
74					19	SS	93 for 280 mm	100			18.0	
76												
78	24				20	SS	96 for 250 mm	100			14.0	
80												
82												
84												
86	26			21	SS	95 for 275 mm	100			15.0		
88												
90				22	SS	98 for 290 mm	100			15.3		
92	28	End of Borehole	27.70									
94												

Drilled By: Pontil Drilling, CME 55 Trackmount Rig
Drill Method: Hollow Augering & Mud Rotary Drilling
Drill Date: 2020-11-30, 2020-12 01 & 02

Hole Size: 100 mm Mud Rotary
Screening Tool: Eagle II
Sheet: 3 of 3