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Geotechnical Investigation
Property Rezoning Application
Part Lots 13 and 14, Concession 3, Blocks 10 and 12, Plan 4M-1511
Ottawa, Ontario

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Submitted to:

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Geotechnical Investigation
Property Rezoning Application
Part Lots 13 and 14, Concession 3, Blocks 10 and 12, Plan 4M-1511
Ottawa, Ontario

July 10, 2020
Project: 64853.01

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the purposes of a rezoning application for a portion of the property located at Part Lots 13 and 14, Concession 3, Blocks 10 and 12 (1500 Thomas Argue Road) in the City of Ottawa (Carp), Ontario.

Based on the factual information obtained from a borehole investigation, we were to demonstrate the suitability of the site for future development.

2.0 PROJECT DESCRIPTION AND BACKGROUND

2.1 Project Description

An application is being prepared to change the zoning of the property located at Part Lots 13 and 14, Concession 3, Blocks 10 and 12 (1500 Thomas Argue Road) in the City of Ottawa (Carp), Ontario (refer to Borehole Location Plan, Figure 1). The property is currently vacant and has been used as agricultural land in the past.

The results of the Phase 1 Environmental Site Assessment (ESA), a limited Phase 2 ESA, and a hydrogeological investigation for the property are provided in separate reports.

2.2 Geological Description

Surficial geology maps of the Ottawa area indicate that the site is underlain by sand and silt. Bedrock geology maps of the Ottawa area show that interbedded limestone and shale bedrock of the Verulam formation is present at depths ranging from about 25 to 50 metres below ground surface.

2.2.1 Knowledge of Local Conditions

Based on previous geotechnical investigations in the area, it is anticipated that silty clay may be encountered within the overburden material at the site. Glacial till may also be present near the bedrock level.

3.0 SUBSURFACE INVESTIGATION

The fieldwork for this investigation was carried out December 21, 2018 and January 4, 2019, and consisted of advancing five (5) boreholes (numbered 18-1 through 18-5) to depths ranging from about 6.0 to 31.7 metres below surface grade. The boreholes were advanced using a track mounted drill rig and a Geoprobe drill rig, both owned and operated by Georges Downing Estate Drilling of Grenville-sur-la-Rouge, Quebec.

Standard penetration tests were carried out in the boreholes and samples of the soils encountered were recovered using a 50 millimetre diameter split barrel sampler. In situ vane shear testing was carried out in the clayey deposits to measure the undrained shear strength. All of the fieldwork

was observed by a member of our engineering staff who logged the samples and boreholes, and observed the in-situ testing.

Standpipe piezometers were installed in three (3) of the boreholes (18-1, 18-3, and 18-5) to measure the stabilized groundwater conditions.

Following the field work, the soil samples were returned to our laboratory for examination by a geotechnical engineer. Select samples were tested for moisture, grain size distribution, and Atterberg limits.

The borehole locations were selected and positioned in the field by GEMTEC and are shown on the attached Borehole Location Plan (Figure 1). Descriptions of the subsurface conditions logged in the boreholes are provided on the Record of Borehole sheets in Appendix A. The laboratory results of the soil classification testing are provided in Appendix B.

The ground surface elevations at the borehole locations were determined using our Trimble R10 GPS survey instrument. The elevations are referenced to geodetic datum.

4.0 SUBSURFACE CONDITIONS

4.1 General

As previously indicated, the soil and groundwater conditions identified in the boreholes are given on the Record of Borehole sheets in Appendix A. The borehole logs indicate the subsurface conditions at the specific test locations only. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted. The precision with which subsurface conditions are indicated depends on the method of drilling, the frequency and recovery of samples, the method of sampling, and the uniformity of the subsurface conditions. Subsurface conditions at other than the test locations may vary from the conditions encountered in the boreholes. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties.

The groundwater conditions described in this report refer only to those observed at the place and time of observation noted in the report. These conditions may vary seasonally or as a consequence of construction activities in the area.

The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil involves judgement and GEMTEC does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice.

The following presents an overview of the subsurface conditions encountered in the boreholes advanced during this investigation.

4.2 Topsoil

A layer of topsoil was encountered from surface at all borehole locations. The topsoil generally consists of dark brown silty sand with trace to some clay and organic material. The thickness of the topsoil ranges from about 150 to 410 millimetres.

4.3 Sandy Silt

A sandy silt deposit was encountered below the topsoil at all of the borehole locations. The sandy silt can be described as brown to grey brown, becoming grey with depth with varying amounts of clay and shells. Where fully penetrated, the thickness of the sandy silt deposit ranges from about 2.2 to 5.2 metres below ground surface. Borehole 18-5 was terminated within the sandy silt deposit at a depth of about 6 metres below ground surface (elevation 106.4 metres, geodetic).

The SPT N values recorded within the sandy silt generally range from WH (static weight of hammer and drill rods) to 13 blows per 0.3 metres of penetration which reflects a very loose to compact relative density.

A grain size distribution test was undertaken on a sample of the sandy silt from borehole 18-2. The results are provided on the Soils Grading Chart in Appendix B and summarized in Table 4.1.

Table 4.1 – Summary of Grain Size Distribution Testing –Sandy Silt

Location	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
18-2	5	3.1 – 3.7	0	34	53	13

The moisture content of the sandy silt samples from borehole 18-2 range from about 21 to 31 percent.

4.4 Layered Sandy Silt and Clayey Silt

Layered deposits of grey sandy silt and clayey silt were encountered below the sandy silt deposits at boreholes 18-1 to 18-4 inclusive, at depths ranging from 2.6 to 5.3 metres below ground surface (elevations 106.9 to 109.3 metres).

Standard penetration testing carried out in the layered sandy silt and clayey silt gave N values of ‘static weight of hammer (WH) to 3 blows per 0.3 metres of penetration. The undrained shear strength measured in the layered sandy silt and clayey silt ranges from 34 to 120 kilopascals, with an average of 51 kilopascals, which represents a general firm to stiff consistency. The corresponding remoulded values range from 5 to 72 kilopascals (where tests were possible). The ratio of the undrained shear strength to the remoulded shear strength ranges from 2 to 9, and indicates that the sensitivity of the grey silty is medium to extra-sensitive.

All of the boreholes, with the exception of borehole 18-5, were terminated within the layered sandy silt and clayey silt at depths ranging from about 6.1 to 16.1 metres below ground surface (elevations 96.1 to 106.1 metres).

A dynamic cone penetration test was undertaken at borehole 18-2 starting at a depth of about 16.1 metres below ground surface. The penetration resistance of the dynamic cone ranged from about WH to 9 blows per 0.3 metres of displacement, but did not increase with depth. The dynamic cone was terminated within the layered sandy silt and clayey silt at a depth of about 31.7 metres below ground surface (elevation 80.5 metres, geodetic).

Representative samples of the layered sandy silt and clayey silt were tested for:

- Moisture content;
- Grain size distribution; and,
- Atterberg limits.

At borehole 18-2, the moisture content of the layered sandy silt and clayey silt ranges from about 26 to 37 percent.

A grain size distribution test was undertaken on a sample of the layered sandy silt and clayey silt from borehole 18-2. The results are provided on the Soils Grading Chart in Appendix B and summarized in Table 4.2.

Table 4.2 – Summary of Grain Size Distribution Testing – Layered Sandy Silt and Clayey Silt

Location	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
18-2	10	6.9 – 7.5	0	16	60	24

Three (3) Atterberg limits test were undertaken on samples of the layered sandy silt and clayey silt from borehole 18-2. The results are provided on the Plasticity Chart in Appendix B and on the Record of Borehole sheets in Appendix A, and are summarized in Table 4.3.

Table 4.3 – Summary of Atterberg Limits Testing

Location	Sample Number	Sample Depth (metres)	Moisture (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
18-2	7	4.6 – 5.2	25.7	20.2	15.6	4.6
18-2	10	6.9 – 7.5	26.8	20.4	15.1	5.3
18-2	13	10.7 – 11.3	37.3	26.0	15.6	10.4

As indicated from the results of the classification testing, the layered sandy silt and clayey silt has a low plasticity. It should be noted that the moisture contents of the samples are above the respective liquid limit values.

4.5 Groundwater

A summary of the stabilized groundwater levels measured in the piezometers are presented in Table 4.4.

Table 4.4 – Summary of Groundwater Levels in Piezometers

Borehole	Measurement Date	Depth below ground surface (metres)	Groundwater Elevation (metres)
18-3	December 27, 2018	0.9	112.5
18-5	December 27, 2018	0.1*	112.2

*Groundwater frozen in piezometer at time of measurement.

It should be noted that the groundwater levels may be higher during wet periods of the year such as the early spring or following periods of precipitation.

5.0 GEOTECHNICAL RECOMMENDATIONS

5.1 General

The information in the following sections is provided for the guidance of the design engineers and is intended for the design of this project only. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety and equipment capabilities.

The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at this site. The presence or implications of possible surface and/or subsurface contamination resulting from previous uses or activities of this site or adjacent properties, and/or resulting from the introduction onto the site from materials from off site sources are provided in the Phase Two ESA report.

5.2 Excavation

The excavations for the foundations should be taken through any topsoil, organic soils, or otherwise deleterious material to expose undisturbed native soil. The sides of the excavations should be sloped in accordance with the requirements in Ontario Regulation 213/91 under the Occupational Health and Safety Act. According to the Act, the native overburden deposits can

be classified as Type 3 and, accordingly, allowance should be made for excavation side slopes of 1 horizontal to 1 vertical above the groundwater level.

Below the groundwater level, sloughing of the sandy silt into the excavation should be anticipated along with disturbance to the soils in the bottom of the excavation. Sloughing of the excavation side slopes below the groundwater level could be reduced, where necessary, by flattening the excavation side slope to 3 horizontal to 1 vertical, by placing a 0.5 metre thick granular layer on the excavation side slope, and/or dewatering the overburden deposit in advance of excavation.

5.3 Groundwater Management

It is recommended that the underside of basement floor slabs be a minimum of 0.3 metres above the groundwater level.

The groundwater levels observed at the time of our investigation are representative of pre-construction conditions and may be somewhat lower following proper site grading and the implementation of the stormwater management.

The groundwater levels should be assessed at the time of construction and the underside of footing elevation/basement slab levels be adjusted increased as necessary.

5.4 Frost Protection of Foundations

All exterior footings and those in any unheated parts of the structures should be provided with at least 1.5 metres of earth cover for frost protection purposes. Isolated footings located outside of the building footprint or footings located within unheated areas of the buildings (i.e. garages) should be provided with at least 1.8 metres of frost cover. If the required depth of earth cover for foundations is not practicable, a combination of earth cover and extruded polystyrene insulation could be considered.

If the foundation and\or basement floor slab is insulated in a way which reduces heat loss towards the surrounding soil, the required depth of earth cover over the footings should conform to that of an unheated structure (i.e. 1.8 metres).

5.5 Site Specific Geotechnical Guidelines

The native sandy silt soil is generally very loose to loose, and overlies layered sandy silt and clayey silt of medium sensitivity to extra-sensitive. Groundwater was observed within 1 metre of the ground surface, between elevation 112.2 and 112.5 metres, geodetic datum. Development has been completed successfully on sites with similar subsurface conditions in the City of Ottawa, however, these conditions present some geotechnical constraints, including:

- Potential site grade raise restrictions;
- Limited bearing values for conventional foundations;

- Potentially liquefiable soils; and,
- Dewatering and/or construction above the groundwater level.

As such, a supplementary geotechnical investigation is recommended to collect additional subsurface information at this site prior to proceeding with detailed design. The supplemental investigation should consist of advancing a minimum of two (2) seismic cone penetration test (SCPTu) holes. The SCPTu holes will provide a continuous profile of soil strength parameters and seismic data, which, in our experience, allows for a less conservative assessment of the settlement response to foundation loads (i.e. bearing value determination) and the potential for liquefaction. This is particularly the case where sands and silts exist below the groundwater level, such as the subject site.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

Luc Bouchard, P.Eng., ing.
Geotechnical Engineer

Brent Wiebe, P.Eng.
Senior Geotechnical Engineer
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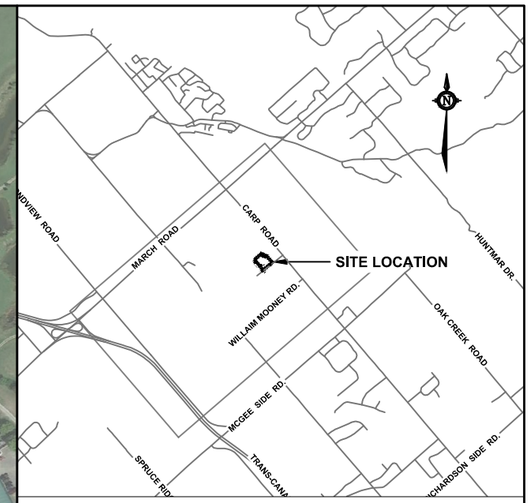

LEGEND

SUBJECT SITE

BOREHOLE LOCATION IN PLAN
(current investigation by GEMTEC)

BH # — BOREHOLE LOCATION
XX.XX — GROUND SURFACE ELEVATION, IN METRES GEODETIC DATUM

Scale
1:4000

0 80 160 240m

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Drawing
BOREHOLE LOCATION PLAN

Client
CannaGenetics Inc.

Project
64853.01

1500 THOMAS ARGUE ROAD
CARP, ONTARIO

Drwn by
P.C.

Chkd by
N.S.

Date
July 2020

Rev.
0

FIGURE 1

APPENDIX A

List of Abbreviations and Terminology
Record of Borehole Sheets

RECORD OF BOREHOLE 18-1

CLIENT: CannaGenetics
PROJECT:
JOB#: 6485301
LOCATION: See Borehole Location Plan, Figure 1

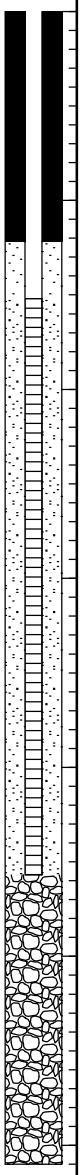
SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jan 4 2019

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m
0		Ground Surface		111.88				
		Dark brown sandy silt, with organic material (TOPSOIL)		111.47 / 0.41	1	SS	508	4
1		Brown to grey brown SANDY SILT, trace shells			2	SS	330	13
					3	SS	330	13
2					4	SS	330	13
				109.29 / 2.59	5	SS	457	3
3	Vibratory Hammer 98 mm Diamerter (OD) casing	Grey, layered SANDY SILT and CLAYEY SILT			6	SS	356	NA
					7	SS	610	W.H.
4					8	SS	406	NA
					9	SS	610	W.H.
5								
				105.78 / 6.10				
6		End of borehole						
7								
8								

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, % W_P W W_L
10 20 30 40 50 60 70 80 90

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



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LOGGED: A.N.
CHECKED: L.B.

GEO - BOREHOLE LOG GINT LOGS BOREHOLES.GPJ GEMTEC 2018.GDT 17/1/19

RECORD OF BOREHOLE 18-2

CLIENT: CannaGenetics
PROJECT:
JOB#: 6485301
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 2
DATUM: CGVD28
BORING DATE: Dec 21 2018

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		112.22						Backfilled with soil cuttings
		Dark brown sandy silt, some clay (TOPSOIL)		112.07 / 0.15	1	SS	300	3		
1		Brown to grey brown, SANDY SILT, trace to some clay, trace shells			2	SS	355	9		
2					3	SS	406	7		
					4	SS	0	4		
3				109.17 / 3.05						
		Grey SANDY SILT, trace to some clay, trace shells			5	SS	500	4	MH	
4					6	SS	450	4		
				107.65 / 4.57						
5		Grey, layered SANDY SILT AND CLAYEY SILT			7	SS	450	3		
					8	SS	600	WH for 300 mm		
6										
					9	SS	600	WH for 300 mm		
7					10	SS	600	WH for 300 mm	MH	
8					11	SS	600	WH for 300 mm		
9										
					12	SS	600	WH for 300 mm		
10										
					13	SS	600	WH for 300 mm		
11										
12										
13										
14										
15										
16										

SAMPLES

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, % W_P W W_L
10 20 30 40 50 60 70 80 90

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RECORD OF BOREHOLE 18-2

CLIENT: CannaGenetics
PROJECT:
JOB#: 6485301
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 2 OF 2
DATUM: CGVD28
BORING DATE: Dec 21 2018

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY, mm	SAMPLES: BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32		End of Borehole		80.51 / 31.71							

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL, ⊕ REMOULDED
WATER CONTENT, %: W_P — W — W_L
10 20 30 40 50 60 70 80 90

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CHECKED: L.B.

GEO - BOREHOLE LOG GINT LOGS BOREHOLES.GPJ GEMTEC 2018.GDT 17/1/19

RECORD OF BOREHOLE 18-3

CLIENT: CannaGenetics
PROJECT:
JOB#: 6485301
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Dec 21 2018

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		113.43							
		Dark brown sandy silt, some clay (TOPSOIL)		113.28 / 0.15	1	SS	250	1			Bentonite seal
		Brown to grey brown, SANDY SILT, trace shells			2	SS	406	6			
1											
					3	SS	450	13			Filter sand
2											51 mm diameter, 3.05 metres long well screen
					4	SS	300	5			
3				110.38 / 3.05							
	Power Auger 200 mm Diameter Hollow Stem	Grey SANDY SILT, trace clay and shells			5	SS	450	3			
4					6	SS	450	2			
					7	SS	600	1			Sand bedding
5				108.09 / 5.34							
		Grey, layered SANDY SILT AND CLAYEY SILT			8	SS	600	WH for 300 mm			
6											
7				106.11 / 7.32							
		End of Borehole									
8											

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL, ⊕ REMOULDED
WATER CONTENT, %: W_P — W — W_L
10 20 30 40 50 60 70 80 90

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
18/12/27	0.90 ▽	112.53

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CHECKED: L.B.

GEO - BOREHOLE LOG GINT LOGS BOREHOLES.GPJ GEMTEC 2018.GDT 17/1/19

RECORD OF BOREHOLE 18-4

CLIENT: CannaGenetics
PROJECT:
JOB#: 6485301
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Jan 4 2019

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m
0		Ground Surface		110.60				
		Dark brown silty sand, with organic material (TOPSOIL)		110.29 / 0.31	1	SS	457	5
1		Brown to grey brown SANDY SILT			2	SS	584	7
					3	SS	508	12
2					4	SS	406	7
				108.16 / 2.44				
	Vibratory Hammer 98 mm Diamerter (OD) casing	Grey SANDY SILT, trace to some clay			5	SS	432	3
3					6	SS	310	3
				106.94 / 3.66				
4		Grey, layered SANDY SILT AND CLAYEY SILT			7	SS	610	W.H.
5					8	SS	610	W.H.
				104.50 / 6.10				
6		End of borehole						
7								
8								

SAMPLES

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, % W_P W W_L
10 20 30 40 50 60 70 80 90

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

Borehole backfilled with sand

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CHECKED: L.B.

GEO - BOREHOLE LOG GINT LOGS BOREHOLES.GPJ GEMTEC 2018.GDT 17/1/19

RECORD OF BOREHOLE 18-5

CLIENT: CannaGenetics
PROJECT:
JOB#: 6485301
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Dec 21 2018

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE (N), BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		112.31							
		Turned Dark brown silty clayey TOPSOIL		112.16 / 0.15	1	SS	355	3			Bentonite seal
1		Brown to grey brown SANDY SILT, trace to some clay			2	SS	450	8			
2					3	SS	406	13			Filter sand; 51 mm diameter, 3.05 metres long well screen
		Grey SANDY SILT, trace to some clay		110.18 / 2.13	4	SS	450	7			
3					5	SS	450	7			
4					6	SS	500	4			
5					7	SS	500	2			Sand bedding
6					8	SS	600	WH for 300 mm			
		End of Borehole		106.36 / 5.95							
7											
8											

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
18/12/27	0.11 ▽	112.20

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CHECKED: L.B.

GEO - BOREHOLE LOG GINT LOGS BOREHOLES.GPJ GEMTEC 2018.GDT 17/1/19

LIST OF ABBREVIATIONS AND TERMINOLOGY

SAMPLE TYPES

AS auger sample
CA casing sample
CS chunk sample
BS Borros piston sample
DO drive open
MS manual sample
RC rock core
ST slotted tube
TO thin-walled open Shelby tube
TP thin-walled piston Shelby tube
WS wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance, N

The number of blows by a 63.5 kg hammer dropped 760 millimetre required to drive a 50 mm drive open sampler for a distance of 300 mm. For split spoon samples where less than 300 mm of penetration was achieved, the number of blows is reported over the sampler penetration in mm.

Dynamic Penetration Resistance

The number of blows by a 63.5 kg hammer dropped 760 mm to drive a 50 mm diameter, 60° cone attached to 'A' size drill rods for a distance of 300 mm.

WH

Sampler advanced by static weight of hammer and drill rods.

WR

Sampler advanced by static weight of drill rods.

PH

Sampler advanced by hydraulic pressure from drill rig.

PM

Sampler advanced by manual pressure.

SOIL TESTS

C consolidation test
H hydrometer analysis
M sieve analysis
MH sieve and hydrometer analysis
U unconfined compression test
Q undrained triaxial test
V field vane, undisturbed and remoulded shear strength

SOIL DESCRIPTIONS

Relative Density	'N' Value
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Consistency	Undrained Shear Strength (kPa)
Very soft	0 to 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very Stiff	over 100

LIST OF COMMON SYMBOLS

c_u undrained shear strength
e void ratio
C_c compression index
c_v coefficient of consolidation
k coefficient of permeability
I_p plasticity index
n porosity
u pore pressure
w moisture content
w_L liquid limit
w_P plastic limit
ϕ^1 effective angle of friction
γ unit weight of soil
γ^1 unit weight of submerged soil
σ normal stress

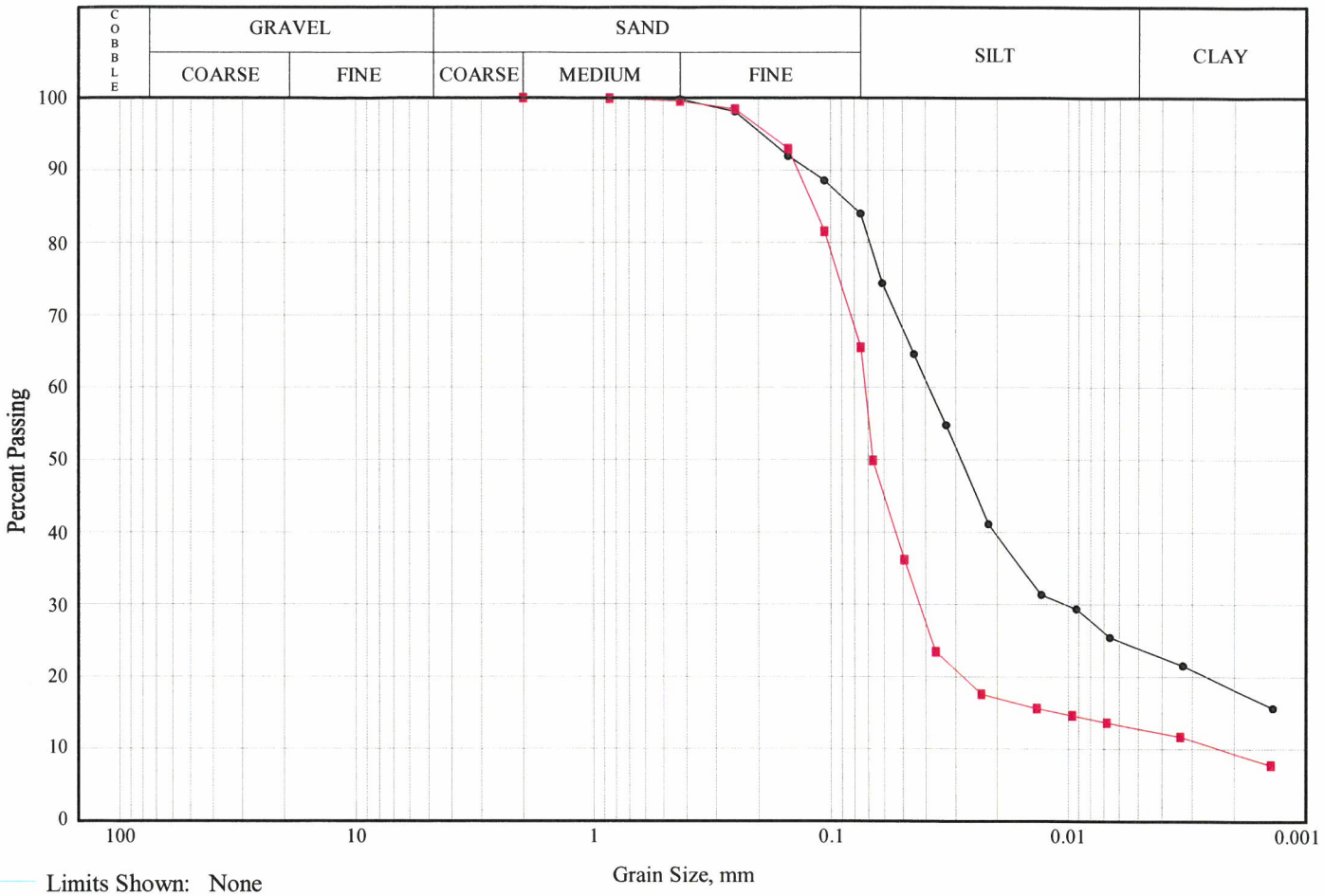
APPENDIX B

Soil Classification Testing Results

GEMTEC
Consulting Engineers and Scientists

Client: CannaGenetics Inc.
Project: Property Rezoning Application
Project #: 6485301

Soils Grading Chart



Limits Shown: None

Line Symbol	Sample	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay
●		18-2	10	6.86-7.47	0.0	16.0	60.1	23.9
■		18-2	5	3.05-3.66	0.0	34.5	52.7	12.8

Line Symbol	CanFEM Classification	USCS Symbol	D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	% 5-75µm
●	Clayey silt , some sand	CL-ML	---	---	0.01	0.03	0.04	0.08	60.1
■	Sandy silt , some clay	N/A	0.00	0.01	0.04	0.07	0.07	0.12	52.7

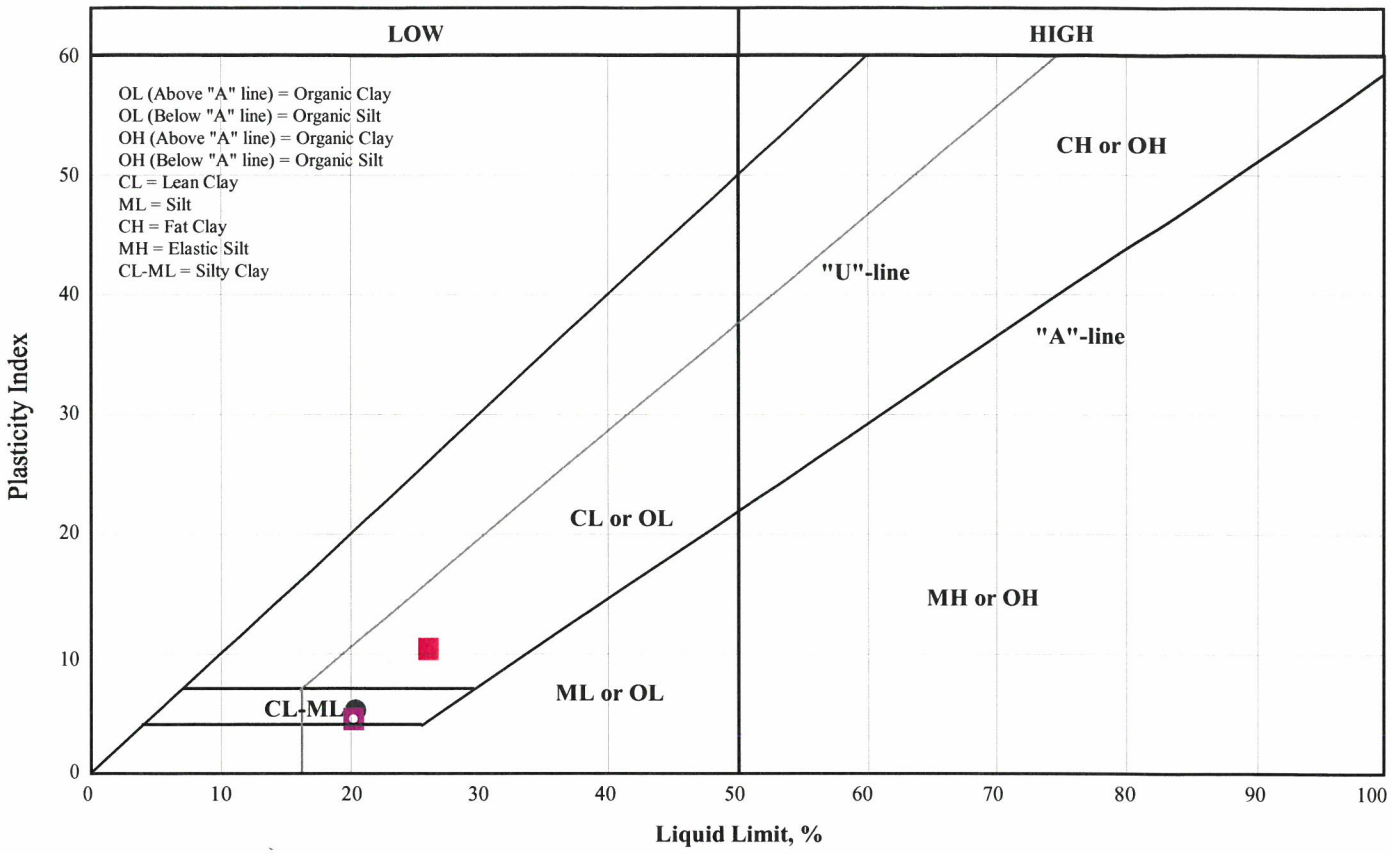
GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

Client: CannaGenetics Inc.

Project: Property Rezoning Application

Project #: 6485301

Plasticity Chart



Symbol	Borehole /Test Pit	Sample Number	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Non-Plastic	Moisture Content, %
●	18-2	10	6.86-7.47	20.4	15.1	5.3	☐	26.82
■	18-2	13	10.67-11.28	26.0	15.6	10.4	☐	37.25
○	18-2	5	3.05-3.66				☑	20.51
▣	18-2	7	4.57-5.18	20.2	15.6	4.6	☐	25.70

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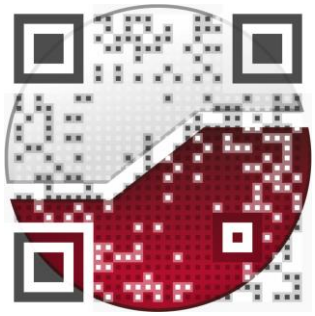

civil	civil
geotechnical	géotechnique
environmental	environnementale
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

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