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Geotechnical Investigation
Proposed Storage Yard and Parking Lot
400 Hunt Club Road
Ottawa, Ontario

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Submitted to:

Novatech
240 Michael Cowpland Drive, Suite 200
Ottawa, Ontario
K2M 1P6

Geotechnical Investigation
Proposed Storage Yard and Parking Lot
400 Hunt Club Road
Ottawa, Ontario

May 3, 2021
Project: 65134.09

experience • knowledge • integrity

GEMTEC Consulting Engineers and Scientists Limited
32 Steacie Drive
Ottawa, ON, Canada
K2K 2A9

May 3, 2021 File: 65134.09

Novatech
240 Michael Cowpland Drive, Suite 200
Ottawa, Ontario
K2M 1P6

Attention: Ryan Poulton, P.P.I., Planner

Re: Geotechnical Investigation
Proposed Storage Yard and Parking Lot
400 Hunt Club Road
Ottawa, Ontario

Please find enclosed our geotechnical investigation report for the above noted project, in accordance with our proposal dated February 25, 2021. This report was prepared by Mr. Alex Meacoe, P.Eng., and reviewed by Mr. John Cholewa, Ph.D., P.Eng.

Alex Meacoe, P.Eng.

Johnathan A. Cholewa, Ph.D., P.Eng.

WAM/JC

Enclosures
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1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out for the proposed new storage yard and parking lot to be located west of Otto's BMW at 400 Hunt Club Road in Ottawa, Ontario. The purpose of the investigation was to identify the general subsurface and groundwater conditions at the site by means of a limited number of boreholes and, based on the factual information obtained, to provide engineering guidelines on the geotechnical design aspects of the project, including construction considerations that could influence design decisions.

2.0 BACKGROUND

2.1 Project Description

Plans are being prepared for a Zoning By-law Amendment and a Site Plan Control application for a new storage yard and parking lot to be located west of Otto's BMW at 400 Hunt Club Road in Ottawa, Ontario. Based on the conceptual plan provided, the proposed new storage yard and parking lot will be a phased construction, with phase 1 measuring about 67 by 135 metres and phase 2 measuring about 30 by 104 metres in plan dimensions, and will consist of a gravel surface (i.e., no asphaltic concrete surface).

2.2 Review of Geology Maps

A review of surficial geology maps as well as previously completed geotechnical investigations in the vicinity of the site is generally underlain by deposits sand and gravel. Bedrock geology maps in the area of the site show that dolostone bedrock of the Oxford formation is present at depths ranging from about 5 to 10 metres below ground surface.

3.0 SUBSURFACE INVESITGATION

The fieldwork for the geotechnical investigation was carried out on March 31, 2021. During that time, six boreholes (numbered 21-01 to 21-06, inclusive) were advanced at the locations shown on the Borehole Location Plan, Figure 1.

The boreholes were advanced with portable drilling equipment supplied and operated by CCC Geotechnical and Environmental Drilling of Ottawa, Ontario. The boreholes were advanced to depths of about 1.8 metres below the existing ground surface.

Standard penetration tests were carried out in the borehole at regular intervals of depth and samples of the soils encountered were recovered using a 50 millimetre diameter split barrel sampler.

The fieldwork was supervised throughout by a member of our engineering staff who directed the drilling operations, logged the samples and carried out the in-situ testing. Following completion of the drilling, the soil samples were returned to our laboratory for examination by a geotechnical engineer.

The borehole locations were selected by GEMTEC and positioned on site relative to existing features. The borehole locations are approximate and the ground surface elevations at the borehole locations were not measured due to heavy tree cover at the time of surveying.

Descriptions of the subsurface conditions logged in the boreholes are provided on the Record of Borehole Sheets in Appendix A. The approximate locations of the test holes are shown on the Borehole Location Plan, Figure 1.

4.0 SUBSURFACE CONDITIONS

4.1 General

The soil conditions logged in the test holes from the current investigation 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. Subsurface conditions at locations other than the test hole locations may vary from the conditions encountered in the test holes. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site.

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 and test pits advanced as part of the current investigation.

4.2 Topsoil

A layer of topsoil was encountered at the ground surface at all the borehole locations and ranges in thickness from about 230 to 330 millimetres.

4.3 Sand and Silty Sand

Deposits of sand with some silt to silty sand were encountered below the topsoil in all borehole locations. The sand to silty sand was not fully penetrated in the boreholes, but was proven to depths of about 1.8 metres below the existing ground surface.

Standard penetration tests carried out in the sand to silty sand gave N values ranging from 3 to 12 blows for less than 0.3 metres of penetration, which indicates a very loose to compact relative density.

4.4 Groundwater Observations

No groundwater levels were observed in the boreholes during the short time they remained open.

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 GUIDELINES AND RECOMMENDATIONS

5.1 General

This section of the report provides engineering guidelines on the geotechnical design aspects of the project based on our interpretation of the test pits advanced as part of this investigation and the project requirements. It is stressed that the information in the following sections is provided for the guidance of the designers and is intended for 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 offsite sources are outside the terms of reference for this report and have not been investigated or addressed.

5.2 Pavement Access Road

5.2.1 Subgrade Preparation

In preparation for roadway construction at this site, all surficial topsoil and any soft, wet, disturbed, or deleterious materials should be removed from the proposed roadways. Any subexcavated areas could be filled with compacted earth borrow. Similarly, should it be necessary to raise the roadway grades at this site, material which meets OPSS specifications for Select Subgrade Material or earth borrow may be used. The select subgrade material or earth borrow should be placed in maximum 300 millimetre thick lifts and compacted to at least 95 percent of the standard Proctor maximum dry density value using vibratory compaction equipment. Prior to placing granular material for the roadways, the exposed subgrade should be heavily proof rolled under suitable (dry) conditions, and inspected and approved by geotechnical personnel. Any soft areas evident from the proof rolling should be subexcavated and replaced with suitable earth borrow approved by the geotechnical engineer.

The subgrade should be shaped and crowned to promote drainage of the roadway granular materials.

5.2.2 Pavement Design

The following minimum pavement structure is suggested for the access road over the creek:

- 100 millimetres of asphaltic concrete, over
  - 40 millimetres of Superpave 12.5 Traffic Level B with PG 58-34 asphalt cement
  - 60 millimetres of Superpave 19 Traffic Level B with PG 58-34 asphalt cement
- 150 millimetres of OPSS Granular A base, over
- 450 millimetres of OPSS Granular B Type II subbase.

It is our experience that a geotextile separator (OPSS Class II woven geotextile) may be required between the subgrade surface and the granular subbase material to prevent pumping and disturbance of the granular material, particularly if the construction is carried out during wet periods of the year (such as the late Fall). The requirement for a geotextile should be determined by geotechnical personnel based on subgrade conditions.

If blast rock is used as the subbase layer, a non-woven geotextile should be placed between the Granular A base layer and the blast rock subbase layer to prevent loss of material into the blast rock.

5.2.3 Effects of Soil Disturbance

The above pavement structures assume that any trench backfill is adequately compacted and that the roadway subgrade surface is prepared as described in this report. If the roadway subgrade surface is disturbed or wetted due to construction operations or precipitation, the granular thickness given above may not be adequate and it may be necessary to increase the thickness of the Granular B Type II subbase and/or to incorporate a woven geotextile separator between the roadway subgrade surface and the granular subbase material. The adequacy of the design pavement thickness should be assessed by geotechnical personnel at the time of construction. In our experience, a geotextile will likely be required in most cases where the subgrade consists of overburden, if the roadway construction is planned during the wet period of the year (such as the spring or fall).

Similarly, if the granular pavement materials are to be used by construction traffic, it may be necessary to increase the thickness of the Granular B Type II, install a woven geotextile separator between the roadway subgrade surface and the granular subbase material, or a combination of both, to prevent pumping and disturbance to the subbase material. The contractor should be made responsible for their construction access.

5.2.4 Granular Material Compaction

The pavement granular materials should be compacted in maximum 300 millimetre thick lifts to at least 98 percent of standard Proctor maximum dry density using suitable vibratory compaction equipment.

5.2.5 Transition Treatments

In areas where the new pavement structure will abut existing pavements, the depths of the granular materials should taper up or down at 5 horizontal to 1 vertical, or flatter, to match the depths of the granular material(s) exposed in the existing pavement.

5.2.6 Pavement Drainage

Adequate drainage of the pavement granular materials and subgrade is important for the long term performance of the pavement at this site. In order to provide drainage of the granular subbase, it is suggested that catch basins be provided with perforated stub drains extending about 3 metres out from the catch basins in two directions parallel to the roadway. These drains should be installed at the bottom of the subbase layer. Where ditches are used, the bottom of the OPSS Granular B Type II should be at least 0.3 metres above the bottom of the ditch and the granular material should extend to the ditch slopes.

5.3 Gravel Parking Area

5.3.1 Excavation

The excavations for the proposed parking lot will be through the topsoil and into the native silty sand to sand. 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 shallow native overburden deposits can be classified as Type 3 soils and, accordingly, for excavations extending below 1.2 metres depth, allowance should be made for excavation side slopes of 1 horizontal to 1 vertical extending upwards from the base of the excavation.

Excavations of the native soils above the groundwater should not present any excavation constraints. Based on our observations on the site, the shallow excavations for the parking lot will be carried out above the groundwater level.

5.3.2 Subgrade Preparation

Prior to placing imported granular material, all surficial topsoil or any soft, wet or deleterious should be removed to the design granular depth provided in Section 5.4.3. It is not considered necessary to remove any fill material, if encountered, provided that some settlement of the parking lot surface can be tolerated.

The subgrade surface should be proof rolled with an 8 tonne or larger steel drum roller and shaped and crowned to promote drainage of the granular materials. Any soft areas evident from the proof rolling should be subexcavated and replaced with compacted granular material, such as that meeting Ontario Provincial Standard Specification (OPSS) specifications for Granular B Type I or Granular B Type II (100 millimetre minus crushed stone), or suitable on site material. The replacement soils should be placed in maximum 200 millimetre thick lifts and compacted to at least 95 percent of the standard Proctor maximum dry density value using vibratory compaction equipment.

5.3.3 Granular Structure

Assuming that the parking area will be used mainly by cars and light trucks (pick-up trucks), with snow removal trucks in the winter and occasional heavy equipment, the parking area could be constructed using the following minimum granular base and subbase material thicknesses:

- 150 millimetres of OPSS Granular A base, over
- 450 millimetres of OPSS Granular B, Type II subbase,

It is our experience that a geotextile separator (OPSS Class II woven geotextile) may be required between the subgrade surface and the granular subbase material to prevent pumping and disturbance of the granular material, particularly if the construction is carried out during wet periods of the year (such as the late Fall). The requirement for a geotextile should be determined by geotechnical personnel based on subgrade conditions.

If blast rock is used as the subbase layer, a non-woven geotextile should be placed between the Granular A base layer and the blast rock subbase layer to prevent loss of material into the blast rock.

5.3.4 Compaction Requirements

All imported granular materials should be placed in maximum 200 millimetre thick lifts and compacted to at least 98 percent of the standard Proctor dry density value using suitable vibratory compaction equipment.

5.3.5 Drainage

Adequate drainage of the granular materials and subgrade is important for the long term performance of the parking lot. The subgrade surfaces should be crowned and shaped to drain to perimeter ditches or swales to promote drainage of the granular materials. Where possible, we recommend that the bottom of the ditches/swales be at least 0.3 metres below the bottom of the Granular B Type II. The need for additional subdrains within the granular material should be assessed as the design progresses.

If storm sewers and catch basins are installed as part of this project, the catch basins should be equipped with 3 metre long stub drains extending in at least two directions at the subgrade level.

5.3.6 Effects of Soil Disturbance and Construction

The granular structure provided above assumes that the subgrade surface is prepared as described above (i.e., the subgrade is not disturbed or wetted due to construction operations or precipitation). If the subgrade surface becomes disturbed or wetted due to construction operations or precipitation, the Granular B Type II thicknesses provided above may not be adequate and it may be necessary to increase the thickness of the Granular B Type II subbase.

The required thickness of the subbase materials will depend on a number of factors, including schedule, contractor methodology, soil types and weather conditions, and should be assessed by geotechnical personnel at the time of construction. In our opinion, the preferred approach from a geotechnical point of view is to:

- Proof roll the subgrade at the time of construction under the supervision of experienced geotechnical personnel.
- Adjust the thickness of the subbase material and include a woven geotextile separator, as required. Unit rate allowances should be made in the contract for a geotextile and subexcavation and replacement with OPSS Granular B Type II.

6.0 ADDITIONAL CONSIDERATIONS

6.1 Effects of Construction Induced Vibration

Some of the construction operations (such as excavation and granular material compaction, etc.) will cause ground vibration on and off of the site. The vibrations will attenuate with distance from the source, but may be felt at nearby structures. Assuming that any excavating is carried out in accordance with the guidelines in this report, the magnitude of the vibrations will be much less than that required to cause damage to the nearby structures or services in good condition, but may any felt at the nearby structures.

6.2 Excess Soil Management Plan

This report does not constitute an excess soil management plan. The disposal requirements for any excess soil from the site have not been assessed.

6.3 Design Review

It is recommended that the final design drawings be reviewed by the geotechnical engineer to ensure that the guidelines provided in this report have been interpreted as intended.

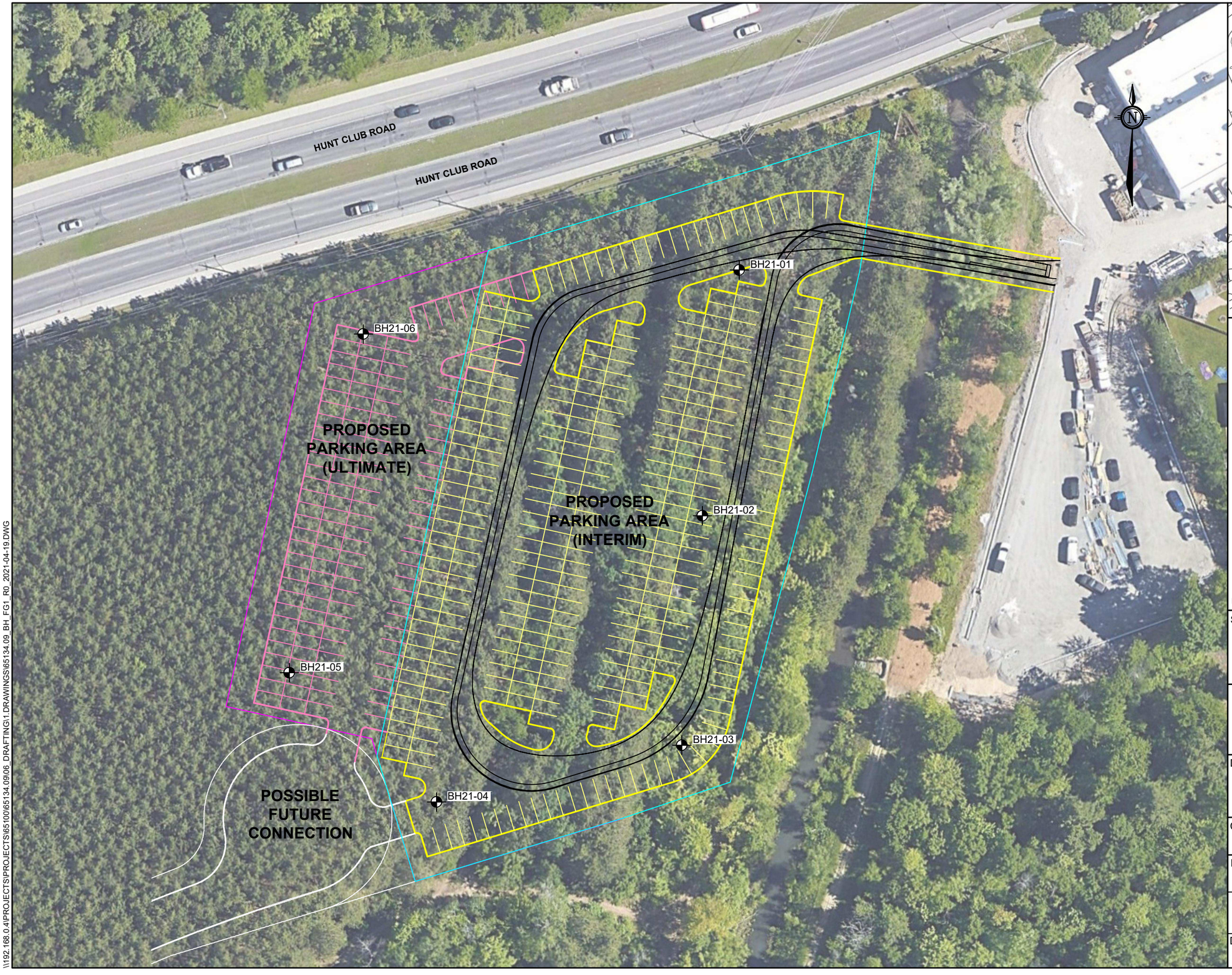
The engagement of the services of the geotechnical consultant during construction is recommended to confirm that the subsurface conditions throughout the proposed excavations do not materially differ from those given in the report and that the construction activities do not adversely affect the intent of the design. The subgrade surfaces for the proposed parking lot and culvert should be inspected by experienced geotechnical personnel to ensure that suitable materials have been reached and properly prepared. The placing and compaction of imported granular materials should be inspected to ensure that the materials used conform to the grading and compaction specifications.

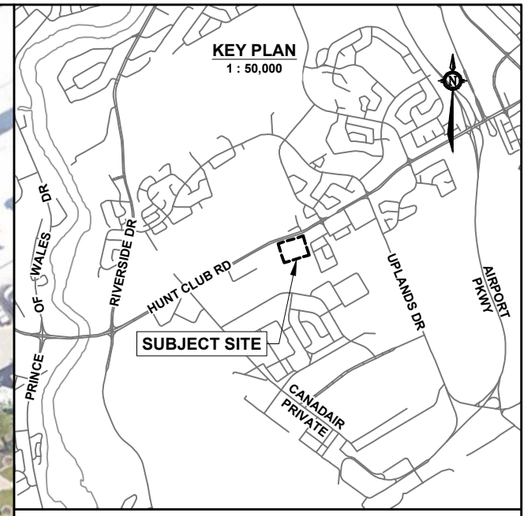
7.0 CLOSURE

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.

Alex Meacoe, P.Eng.
Geotechncial Engineer

John Cholewa, Ph.D., P.Eng.
Senior Geotechnical Engineer





LEGEND

BH # ← BOREHOLE ID

BOREHOLE LOCATION
(current investigation by GEMTEC)

REFERENCE: STORAGE YARD CONCEPT 1 PLAN PROVIDED BY NOVATECH

Scale
1:750
0 15 30 45m

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS
32 Steacie Drive
Ottawa, ON K2K 2A9
Tel: (613) 836-1422
www.gemtec.ca
ottawa@gemtec.ca

Drawing
BOREHOLE LOCATION PLAN

Client
NOVATECH

Project
65134.09

PROPOSED STORAGE YARD AND PARKING LOT
400 HUNT CLUB ROAD
OTTAWA, ONTARIO

Drwn by	Chkd by
S.L.	W.A.M.

Date
APRIL, 2021

Rev.
0

FIGURE 1

\\192.168.0.4\PROJECTS\PROJECTS\65100\65134.09\06_DRAFTING\1.DRAWINGS\65134.09_BH_FG1_R0_2021-04-19.DWG

APPENDIX A

Record of Borehole Sheets
List of Abbreviations and Symbols

ABBREVIATIONS AND TERMINOLOGY USED ON RECORDS OF BOREHOLES AND TEST PITS

SAMPLE TYPES	
AS	Auger sample
CA	Casing sample
CS	Chunk sample
BS	Borros piston sample
GS	Grab sample
MS	Manual sample
RC	Rock core
SS	Split spoon sampler
ST	Slotted tube
TO	Thin-walled open shelby tube
TP	Thin-walled piston shelby tube
WS	Wash sample

SOIL TESTS	
w	Water content
PL, w_p	Plastic limit
LL, w_L	Liquid limit
C	Consolidation (oedometer) test
D_R	Relative density
DS	Direct shear test
G_S	Specific gravity
M	Sieve analysis for particle size
MH	Combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	Organic content test
UC	Unconfined compression test
γ	Unit weight

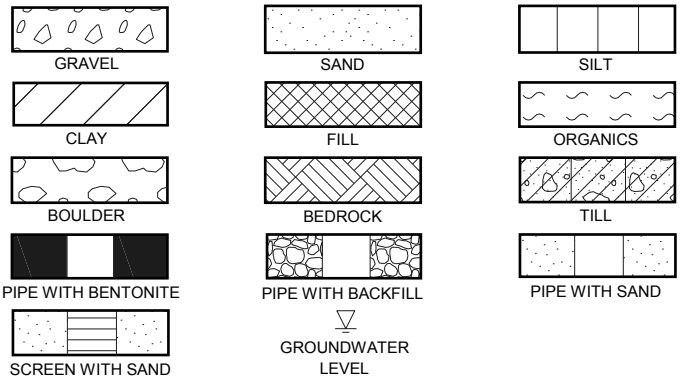
PENETRATION RESISTANCE

Standard Penetration Resistance, N
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 millimetres (30 in.) required to drive a 50 mm split spoon sampler for a distance of 300 mm (12 in.). 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.

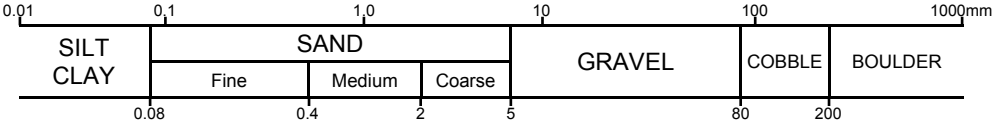
Dynamic Penetration Resistance
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive a 50 mm (2 in.) diameter 60° cone attached to 'A' size drill rods for a distance of 300 mm (12 in.).

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

COHESIONLESS SOIL Compactness		COHESIVE SOIL Consistency	
SPT N-Values	**Description**	**Cu, kPa**	**Description**
0-4	Very Loose	0-12	Very Soft
4-10	Loose	12-25	Soft
10-30	Compact	25-50	Firm
30-50	Dense	50-100	Stiff
>50	Very Dense	100-200	Very Stiff
		>200	Hard

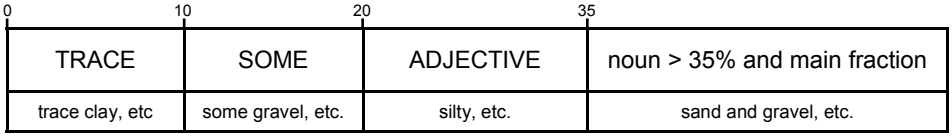


GRAIN SIZE



DESCRIPTIVE TERMINOLOGY

(Based on the CANFEM 4th Edition)



RECORD OF BOREHOLE 21-01

CLIENT: Novatech
PROJECT: Geotechnical Investigaton, Storage and Parking Lot, 400 Hunt Club Road, Ottawa, Ontario
JOB#: 65134.09
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Mar 31 2021

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, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Portable Drill Rig, Open hole	Ground Surface							10 20 30 40 50 60 70 80 90		
		TOPSOIL									
		Compact, reddish brown SAND, some silt		0.23	1	SS	380	10	●		
1		Loose, brown SILTY SAND to SAND, some silt		0.61	2	SS	430	6	●		Silicia Sand
					3	SS	330	6	●		
		End of Borehole		1.83							
2											
3											
4											
5											

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LOGGED: A.S.
CHECKED: W.A.M.

GEO - BOREHOLE LOG 65134.09_BH_HUNTCLUB_MARCH31,2021.GPJ GEMTEC 2018.GDT 19/4/21

RECORD OF BOREHOLE 21-02

CLIENT: Novatech
PROJECT: Geotechnical Investigaton, Storage and Parking Lot, 400 Hunt Club Road, Ottawa, Ontario
JOB#: 65134.09
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Mar 31 2021

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, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Portable Drill Rig, Open hole	Ground Surface							10 20 30 40 50 60 70 80 90		
		TOPSOIL									
		Very loose, dark brown SILTY SAND to SAND, some silt		0.25	1	SS	380	3	●		
1		Loose to compact, light brown SILTY SAND to SAND, some silt		0.61	2	SS	455	10	●		Silicia Sand
					3	SS	455	12	●		
2		End of Borehole		1.83							
3											
4											
5											

GEO - BOREHOLE LOG 65134.09_BH_HUNTCLUB_MARCH31,2021.GPJ GEMTEC 2018.GDT 19/4/21

GEMTEC
Consulting Engineers and Scientists

LOGGED: A.S.
CHECKED: W.A.M.

RECORD OF BOREHOLE 21-03

CLIENT: Novatech
PROJECT: Geotechnical Investigaton, Storage and Parking Lot, 400 Hunt Club Road, Ottawa, Ontario
JOB#: 65134.09
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Mar 31 2021

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, BLOWS/0.3m ▲	SHEAR STRENGTH (Cu), kPA + NATURAL ⊕ REMOULDED / WATER CONTENT, % W_P W W_L	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Portable Drill Rig, Open hole	Ground Surface										
		TOPSOIL			1	SS	510	3	●			Silicia Sand
		Very loose to loose, reddish brown SILTY SAND		0.33	2	SS	405	8	●			
1		Compact, light brown SAND, some silt		1.22	3	SS	405	12	●			
				1.83								
2												
3												
4												
5												

10 20 30 40 50 60 70 80 90

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LOGGED: A.S.
CHECKED: W.A.M.

GEO - BOREHOLE LOG 65134.09_BH_HUNTCLUB_MARCH31,2021.GPJ GEMTEC 2018.GDT 19/4/21

RECORD OF BOREHOLE 21-04

CLIENT: Novatech
PROJECT: Geotechnical Investigaton, Storage and Parking Lot, 400 Hunt Club Road, Ottawa, Ontario
JOB#: 65134.09
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Mar 31 2021

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, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, %	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Portable Drill Rig, Open hole	Ground Surface									
		TOPSOIL									
		Loose, reddish brown SILTY SAND		0.23	1	SS	380	5	●		
1					2	SS	380	7	●		Silicia Sand
					3	SS	480	8	●		
		Loose, light brown SAND, some silt		1.45							
		End of Borehole		1.83							
2											
3											
4											
5											

10 20 30 40 50 60 70 80 90

GEMTEC
Consulting Engineers and Scientists

LOGGED: A.S.
CHECKED: W.A.M.

GEO - BOREHOLE LOG 65134.09_BH_HUNTCLUB_MARCH31,2021.GPJ GEMTEC 2018.GDT 19/4/21

RECORD OF BOREHOLE 21-05

CLIENT: Novatech
PROJECT: Geotechnical Investigaton, Storage and Parking Lot, 400 Hunt Club Road, Ottawa, Ontario
JOB#: 65134.09
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Mar 31 2021

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, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, %	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface									
		TOPSOIL									
	Portable Drill Rig / Open hole	Very loose to loose, reddish brown SILTY SAND		0.25	1	SS	370	3	●		Silicia Sand
1					2	SS	405	6	●		
		Loose, light brown SAND, some silt		1.22	3	SS	405	8	●		
		End of Borehole		1.83							
2											
3											
4											
5											

PENETRATION RESISTANCE (N), BLOWS/0.3m ●
DYNAMIC PENETRATION RESISTANCE, 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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Consulting Engineers and Scientists

LOGGED: A.S.
CHECKED: W.A.M.

GEO - BOREHOLE LOG 65134.09_BH_HUNTCLUB_MARCH31,2021.GPJ GEMTEC 2018.GDT 19/4/21

RECORD OF BOREHOLE 21-06

CLIENT: Novatech
PROJECT: Geotechnical Investigaton, Storage and Parking Lot, 400 Hunt Club Road, Ottawa, Ontario
JOB#: 65134.09
LOCATION: See Borehole Location Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Mar 31 2021

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, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Portable Drill Rig, Open hole	Ground Surface							10 20 30 40 50 60 70 80 90		
		TOPSOIL									
		Very loose, reddish brown, SILTY SAND		0.25	1	SS	355	4	●		
1		Loose to compact, light brown SAND, some silt		0.61	2	SS	405	8	●		Silicia Sand
					3	SS	380	12	●		
2				1.83							
3											
4											
5											

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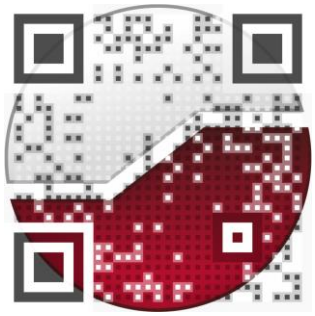
LOGGED: A.S.
CHECKED: W.A.M.

GEO - BOREHOLE LOG 65134.09_BH_HUNTCLUB_MARCH31,2021.GPJ GEMTEC 2018.GDT 19/4/21

experience • knowledge • integrity



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

expérience • connaissance • intégrité