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Geotechnical Report
Proposed Office/Receiving Building
300 Somme Street
Ottawa, Ontario

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Submitted to:

Novatech
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Geotechnical Report
Proposed Office/Receiving Building
300 Somme Street
Ottawa, Ontario

April 24, 2020
Project: 65080.01

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 INTRODUCTION

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) has carried out a geotechnical desktop review for the proposed development at 300 Somme Street in Ottawa, Ontario. The purpose of the desktop study is to summarize the general subsurface conditions at the site by reviewing available subsurface information and, based on the results of the review, to provide engineering guidelines and recommendations on the geotechnical design aspects of the project, including construction considerations that could influence design decisions.

2.0 PROJECT AND SITE DESCRIPTION

2.1 Project Description

Plans are being prepared for the construction of a storage yard for vehicles at 300 Somme Street in Ottawa. The approximate area is 17 hectares. Outdoor storage of vehicles will take up the majority of the property. An office/receiving building is proposed in the northwest corner of the property in support of the storage yard. The building will be serviced with private services including a septic system and a water supply well. The proposed building is about 1,200 square metres with a paved parking area to the south and the 3,800 L/day septic system located on the west side of the building.

The purpose of this desktop study is to provide conceptual foundation design options for the new office/receiving building as well as geotechnical guidelines for the construction of the storage yard.

2.2 Review of Available Information

The following information was provided to us for the purposes of the desktop study:

- Report prepared by INSPEC-SOL INC. titled, “Geotechnical Study Subdivision Plan, Hawthorne Industrial Park, Lots 26 & 27, Concession 6, Southeast of Hawthorne and Rideau Roads, Ottawa, Ontario”, dated May 4, 2009;
- Report prepared by Pinchin Ltd titled, “Geotechnical Investigation – Proposed Automotive Storage Yard, Somme Street, Ottawa, Ontario”, dated January 23, 2020; and,
- Concept Plan, Drawing Number 119181-CO Rev#3, prepared by Novatech, dated April 21, 2020.

INSPEC-SOL INC. (Inspec-sol) carried out a previous geotechnical investigation for the subdivision plan. In their report, Inspec-sol also referenced test pits previously advanced by Golder Associates (Golder) on the property. As such, a number of boreholes and test pits were previously advanced on, and adjacent, to the subject site. The test holes advanced by

Inspec-Sol include five (5) boreholes (B6-1 to B6-4, and RB7-03), four (4) test pits (TP3-01, TP5-01, TP6-01 and TP6-02) and one (1) groundwater monitoring well (MW8-08). The boreholes and test pits were advanced to depths ranging between about 0.6 and 8.0 metres below ground surface. Bedrock coring was not carried out in any of the boreholes. The groundwater levels were measured in wells screens installed at the site.

A total of seven (7) test pits (TP-2, TP-3, TP-8 to TP-10, TP-14, and TP-15) were advanced on the subject site by Golder in 1994 and referenced in the Inspec-Sol report (but not included in their assessment of Block 6, the subject site). The test pits were advanced to depths ranging between 0.8 and 3.5 metres below ground surface. It should be noted that no fill material was noted in any of the Golder test pits advanced on the subject site and there is the possibility that the existing fill material was placed on the site between 1994 and 2009. As such, the Golder boreholes will not be referenced within this desktop study.

Pinchin Ltd. (Pinchin) also carried out a previous geotechnical investigation for the subject site in December 2019. A total of seven (7) boreholes (BH1 to BH7) were advanced by Pinchin as part of their investigation. The boreholes were advanced to depths ranging between about 1.8 and 5.9 metres below ground surface. Bedrock coring was not carried out in any of the boreholes. The groundwater levels were measured in the open boreholes prior to backfilling.

A Test Hole Location plan showing the approximate locations of the existing test holes on the subject site is provided on Figure 1 in Appendix A. The test hole logs from the referenced reports are provided in Appendix B.

3.0 SUMMARY OF AVAILABLE INFORMATION

3.1 General

The subsurface conditions described below are based on previous test holes advanced on and in the vicinity of the site by others. The subsurface conditions at the site may vary from the conditions encountered in the previous test holes. In addition to soil variability, fill material of variable physical and chemical composition can be present over portions of the site. 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, over time, or as a consequence of construction activities in the area.

3.2 Summary of Subsurface Conditions

A total of seventeen (17) boreholes and test pits advanced within, or adjacent, to the subject site have been reviewed as part of this desktop study. The various boreholes and test pits advanced as part of the previous investigations are widely spaced across the property. A total of four (4) of the test holes (BH4 (Pinchin), B6-1 (Inspec-Sol), TP5-01 (Inspec-Sol) and RB7-03 (Inspec-Sol) are located within 100 metres of the proposed office building and septic field. We

have therefore separately summarized the available subsurface information for the proposed building and for the proposed outdoor storage area.

3.2.1 Proposed Building Area and Septic System

- Topsoil and fill material with a thickness ranging between 2.3 and 3.8 metres (where fully penetrated) was encountered from ground surface. In general, the fill material consists of varying amounts of clay, sand, and gravel with some debris (concrete, asphalt, wood). The fill has a very loose to compact relative density. TP5-01 was terminated within the fill material at a depth of about 3 metres below ground surface.

- Native deposits of very loose silt and silty sand/sandy silt are present below the fill material. At the location of B6-1, the sandy silt is underlain by a 0.8m thick layer of very stiff sandy clay from a depth of about 4.6 metres below ground surface. BH4 was terminated within the very loose silt at a depth of about 3.6 metres below ground surface.

- Two (2) of the boreholes (B6-1 and RB7-03) were terminated due to auger refusal on the inferred bedrock surface at depths of 4.7 and 5.3 metres below ground surface.

- Groundwater was noted to enter the open boreholes/test pits at depths between 2.5 and 3.0 metres below ground surface. It should be noted that the closest borehole, BH4, was noted to be dry upon completion of drilling.

3.2.2 Outdoor Storage Area

- Where fully penetrated, topsoil and fill material with a thickness ranging between 1.1 metres (BH1) and 4.5 metres (TP6-01) was encountered from ground surface. Where logged, the surficial topsoil layer thickness ranges from 50 millimetres to 200 millimetres. The underlying fill material generally consists of very loose to loose sand, gravel, and clay with some debris (concrete, asphalt, wood). Former topsoil layers are occasionally noted to underlay the fill material. It should be noted that no fill material was noted in BH6-4 and TP3-01 which are located at the east end of the site.

- Native deposits of very loose to compact layered deposits of silt, sand and clay are present below the fill material, and from ground surface in BH6-4 and TP3-01. The native deposits extend to depths of 0.6 to 8 metres below ground surface.

- The majority of the test holes encountered bedrock refusal at depths between 0.6 metres (TP3-01) and 8 metres (B6-3) below ground surface.

- Where groundwater was present, it was noted to enter the open boreholes/test pits at depths between 0.9 metres (BH6) and 4.4 metres (B6-3) below ground surface.

4.0 GEOTECHNICAL DESIGN CONSIDERATIONS

4.1 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. The information provided in the following sections is based on the available subsurface information from within and adjacent to the site boundaries.

4.2 Proposed Office/Receiving Building

4.2.1 Introduction

The area of the proposed building could be covered by 2.3 to 3.8 metres of fill material overlying loose to compact layered deposits of sand, silt and clay. The groundwater is expected to be located between 2.5 and 3 metres below ground surface and the bedrock is anticipated between 4.7 and 5.3 metres below ground surface. On this basis, the site is not currently suitable for conventional spread footings with a slab-on-grade. As a result, it is recommended that the existing fill material within the building footprint be removed to expose the native soil and replaced with compacted engineered fill to allow for the construction of conventional spread footings with a slab-on-grade.

If excavation and replacement of the fill material is not considered practicable, the following alternate foundation options could be considered:

- Steel piles driven to bedrock with a structural slab; or,
- Ground improvement methods such as rammed aggregate piers with conventional foundations and slab.

Guidelines on removal and replacement of the fill material and conventional foundations are provided below. Geotechnical guidelines for the alternate foundation options could be provided, if required.

4.2.2 Overburden Excavation

The excavation for the proposed structure will be carried out through fill material and possibly native deposits of layered sand, silt, and clay. 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 overburden soil can be classified as Type 3 and, accordingly, allowance should be made for excavation side slopes of 1 horizontal to 1 vertical extending upwards from the base of the excavation.

The native overburden deposits are sensitive to disturbance from ponded water, vibration and construction traffic. Allowance should be made to remove and replace any disturbed native soil, or areas of subexcavation, with compacted sand and gravel such as that meeting OPSS Granular A or Granular B Type II, where required.

Excavation of the overburden deposits at this site below the groundwater level within the fill material and native deposits could present some constraints. Below the groundwater level, the deposits could slough into the excavation, which could result in undermining of the side slopes. Where necessary, the side slopes could be made flatter and/or buttressed with a 0.3 to 0.6 metre thick layer of OPSS Granular B Type 2 or well graded blast rock.

As indicated above, a considerable thickness of fill material exists at this site. The fill material will need to be removed from the building footprint and the zone of influence of the foundations. This will require removal of fill material in the zone extending 0.3 metres horizontally from the edge of the footings and extending down and out at 1 horizontal to 1 vertical from that point. As such, the excavation footprint will be significantly greater than the building footprint.

4.2.3 Groundwater Pumping

In general, groundwater inflow from the overburden deposits into the excavations should be controlled by pumping from filtered sumps within the excavation. Suitable detention and filtration will be required before discharging the water to any ditches.

In order to minimize disturbance of the silty sand soils at this site, if groundwater is encountered, the level should be kept to at least 0.3 metres below the base of the excavation.

It is not expected that short term pumping during excavation will have a significant effect on nearby structures and services.

4.2.4 Foundation Design

Based on the available subsurface information, the proposed structure will likely be founded on conventional spread footings bearing on engineered fill placed on the native soil.

Following the removal of fill or otherwise unsuitable material, the grade below the proposed building should be raised to the underside of footing level using engineered fill. The engineered fill should consist of granular material meeting OPSS requirements for Granular B Type II.. Given the thickness of engineered fill that may be required, consideration could be given to using well graded blast rock for the lower portion of the fill replacement. If blast rock is used, it should consist of well graded material with a maximum particle size of about 300 millimetres. Also, the blast rock should be capped with a minimum of 450 millimetres of material meeting OPSS Granular B Type II.

It is suggested that any granular materials used beneath the proposed structure be composed of virgin material only, for environmental reasons. The OPSS Granular B Type III should be compacted in maximum 200 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value. The blast rock should be compacted using the bucket of the excavator and the hauling and spreading equipment under the supervision of geotechnical personnel.

To provide adequate spread of load below the footings, the engineered fill material, and any blast rock should extend at least 0.3 metres horizontally beyond the edge of the footings and down and out from this point at 1 horizontal to 1 vertical, or flatter. The excavation should be sizedto accommodate this fill placement.

The following table provides preliminary foundation bearing values based on the available information.

Table 4.1: Summary of Foundation Bearing Values

Footing	Subgrade Surface	Serviceability Limit State (SLS)	Ultimate Limit State (ULS)
Pad or strip	Native Soil	75 kilopascals	150 kilopascals
Pad or strip	Engineered fill (minimum 1 metre thick) overlying native soil	125 kilopascals	250 kilopascals

The above bearing values assume a maximum grade raise of 1 metre above the existing ground surface elevations.

The post construction total and differential settlement at SLS for footings bearing on the above noted deposits should be less than 25 and 20 millimetres, respectively, provided that fill material and loose or disturbed soil is removed from below the bearing surfaces and that the engineered fill is placed and prepared as described above.

4.2.5 Slab on Grade Support (Heated Areas Only)

Based on the available subsurface information, the area of the proposed building is underlain by a significant thickness of fill material overlying native soil deposits. The fill material is not considered suitable for the support of the slab on grade. To prevent long term settlement and cracking/distortion of the floor slab, all fill or disturbed material encountered should be removed from below the proposed slab.

The grade within the proposed building could be raised, where necessary, with granular material meeting OPSS Granular B Type I or II or OPSS Granular A gradation specifications. The use of OPSS Granular B Type II material is preferred under wet conditions. The granular base for the proposed slab on grade should consist of at least 150 millimetres of OPSS Granular A.

It is suggested that any granular materials used beneath the floor slab be composed of virgin material (100 percent crushed rock or natural sand and gravel deposits) only, for environmental reasons.

All imported granular materials placed below the proposed floor slab should be compacted in maximum 200 millimetre thick lifts to at least 95 percent of the standard Proctor maximum dry density value.

Underfloor drainage is not considered necessary provided that the floor slab level is above the finished exterior grade.

If any areas of the building are to remain unheated during the winter period, thermal protection of the slab on grade may be required. However, if the underside of the slab is backfilled with at least 1.8 metres of non-frost susceptible engineered fill (as required in order to remove all of the fill material), thermal protection of the concrete slab may not be required, even for an unheated condition. The requirement for thermal protection should be assessed as the design progresses.

Proper moisture protection with a vapour retarder should be used for floor slab where the floor will be covered by moisture sensitive flooring material or where moisture sensitive equipment, products or environments will exist. The “Guide for Concrete Floor and Slab Construction”, ACI 302.1R-04 should be considered for the design and construction of vapour retarders below the floor slab.

4.2.6 Seismic Design of Proposed Structures

Based on the results of the desktop study, the foundations will likely bear on compacted engineered fill material above the native deposits of very loose to compact sand, silt, and clay. The seismic Site Class at this site will be dependent on the founding depth and subgrade soil at the building location. According to the National Building Code of Canada, in the absence of shear wave velocity measurements within the upper 30 metres, the average standard penetration resistance can be used to determine the Seismic Site Class. Based on the results of BH4 and assuming a bedrock depth of 6 metres, it is anticipated that the proposed structure could be designed for Seismic Site Class D.

However, the other boreholes in proximity to the proposed building show that groundwater may be present within the very loose to compact native soils. As such, there is the potential for liquefaction of the native soils at this site. It is recommended that at least one (1) borehole be

advanced in the area of the proposed building and a well screen be installed in order to assess the potential for liquefaction of the very loose to compact native soils, and to confirm the seismic Site Class.

4.2.7 Frost Protection of Foundations

All exterior footings for heated portions of the proposed 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 building should be provided with at least 1.8 metres of earth cover. If the required depth of earth cover is not practicable, a combination of earth cover and polystyrene insulation could be considered. An insulation detail could be provided upon request. The required depth of frost protection can be reduced by the thickness of any engineered fill beneath the foundations.

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

4.2.8 Foundation Backfill

The fill and native soils at this site are frost susceptible and should not be used as backfill against foundations. To avoid frost adhesion and possible heaving, the foundations should be backfilled with imported, free-draining, non-frost susceptible granular material such as that meeting OPSS Granular B Type I or II requirements. Alternatively, a bond break such as a double layer of 6 mil polyethylene sheeting or a proprietary drainage system (e.g. System Platon) could be placed on the foundation walls and the walls backfilled with approved, on-site material.

Where the backfill will ultimately support areas of hard surfacing (pavement, sidewalks or other similar surfaces), the backfill should be placed in maximum 200 millimetre thick lifts and should be compacted to at least 95 percent of the standard Proctor maximum dry density value using suitable vibratory compaction equipment. Where future landscaped areas will exist next to the proposed structure and if some settlement of the backfill is acceptable, the backfill could be compacted to at least 90 percent of the standard Proctor maximum dry density value.

Where areas of hard surfacing (concrete, sidewalk, pavement, etc.) abut the proposed building, a gradual transition should be provided between those areas of hard surfacing underlain by non-frost susceptible granular wall backfill and those areas underlain by existing frost susceptible native materials to reduce the effects of differential frost heaving. It is suggested that granular frost tapers be constructed from 1.5 metres below finished grade to the underside of the granular base/subbase material for the hard surfaced areas. The frost tapers should be sloped at 1 horizontal to 1 vertical, or flatter.

Based on the measured groundwater elevation on this site, perimeter foundation drainage is not required provided that the finished floor elevation is above the finished exterior grade.

4.3 Proposed Septic System

Due to the variable composition of the fill material at the proposed location for the septic system, it is recommended that the fill be removed below the entire area of the leaching bed so as to expose native soil. The removal of the existing fill will help limit settlement below the leaching bed and promote drainage, therefore improving the long term performance of the leaching bed.

If raising of the grade below the proposed leaching bed is required (e.g. for site grading purposes, groundwater level), this may be accomplished by importing approved sandy soil and adequately compacting the imported material in maximum 200 millimetre lifts. Whether the leaching bed is installed on the native soil or imported grade raise fill above the native soil, it is recommended that the leaching bed be sized based on the characteristics of the native soil.

5.0 PROPOSED PARKING AREA AND OUTDOOR STORAGE AREA

5.1 Subgrade Preparation

In preparation for the construction of the new asphaltic concrete surfaced parking area and the outdoor storage area, all topsoil, organic material and any loose/soft or wet soil should be removed from the proposed subgrade surface and replaced with suitable compacted earth borrow or granular fill. The site is underlain by fill material which was likely not properly compacted during its initial placement and could compress (settle) following construction.

It is not considered necessary to remove all of the fill material from within the parking area and outdoor storage area provided that some future settlement of the surface can be tolerated. It is however suggested that any exposed fill material which contains an abundance of organic material or otherwise deleterious material be subexcavated and replaced with suitable earth borrow. Prior to placing granular fill for the parking area and outdoor storage area, the exposed subgrade should be heavily proof-rolled with a large (10 tonne) steel drum roller under dry conditions. Any soft areas evident from the proof-rolling should be subexcavated and replaced with suitable, compacted earth borrow.

In order to prevent softening and disturbance of the subgrade fill soils, consideration should be given to the construction of a temporary access road(s) to be used by the construction traffic during the construction of the building, parking area, and outdoor storage area. The temporary access road(s) could be constructed with a minimum of 1 metre of crushed granular material such as OPSS Granular B Type II. This material could be reclaimed for the construction of the parking lot or outdoor storage area.

The above guidelines will minimize the amount of disturbance of the subgrade soil, but may not completely eliminate it. It may also be required to allow the excess pore water pressure to

dissipate from the softened subgrade surface after it has been disturbed by stopping construction traffic in those affected areas for a period of time.

The subgrade surfaces should be made smooth and crowned or sloped prior to placing the granular materials to promote drainage of the pavement base and subbase materials. Additional guidelines for the drainage of the outdoor storage area is provided in Section 5.2.

5.2 Drainage (Outdoor Storage Area)

As previously noted, the subgrade surface should be shaped and crowned to promote drainage of the granular base and subbase materials.

Adequate drainage of the granular materials and subgrade is important for the long term performance of the outdoor storage area at this site. Based on the size of the outdoor storage area, additional drainage measures may be required to help promote drainage of the site. As per discussions with Novatech, consideration is currently being given to strategic cut and fill of the site coupled with the construction of French drains.

It is understood that the surface water of the outdoor storage area will be drained towards a perimeter swale around the property, where the surface water will be collected and then treated prior to releasing the water into adjacent ditches. Based on preliminary site grades, in order to minimize the amount of excavation and backfill the site will be divided into 3 sections. The north portion of the site, which will be the largest (9.1 hectares), will drain towards the north swale while the west portion (3.0 hectares) will drain towards the west, and the south and east (5.6 hectares) will drain towards the south and east. As such, the larger north portion of the site may require additional drainage measures in order to properly drain the granular material.

Therefore, consideration is currently being given to installing a system of French drains that would drain to the perimeter swale on the north portion of the site. The main trunks of the French drains will be constructed in a north-south alignment, with collector branches being constructed on an east-west alignment. The top of the pipes should be at the base of the drainage layer (i.e. in a trench with a minimum of 300-millimetre clear crushed stone on the sides and 150 millimetres underneath). It is recommended that the pipe be filter wrapped to reduce the potential for the ingress of fines into the perforations. The French drains, granular subbase and base layers should extend to the swales.

As the design progresses and the anticipated dewatering rates become known, GEMTEC could provide additional details for the design of the drainage system (i.e. pipe size, spacing, etc.).

The manufacturers of the perforated pipes should be consulted regarding depth and construction traffic (for areas where the French drains will cross the access roads) to ensure proper pipe material is selected.

5.3 Pavement Structure (Parking Area)

For the proposed car (light vehicle) parking lot, the following minimum pavement structure is suggested:

- 50 millimetres of asphaltic concrete, over
- 150 millimetres of OPSS Granular A base, over
- 300 millimetres of OPSS Granular B Type II or III subbase

The asphaltic concrete surface should consist of one layer of Superpave 12.5 (Traffic Level B) incorporating PG 58-34 asphalt cement.

For any access roadways, parking areas and loading bays which will be used by heavy trucks (including fire trucks), the following minimum pavement structure is suggested:

- 100 millimetres of asphaltic concrete comprising 40 millimetres of Superpave 12.5 incorporating PG 58-34 asphalt cement placed over 60 millimetres of Superpave 19.0 asphaltic concrete incorporating PG 58-34 asphalt cement), over
- 150 millimetres of OPSS Granular A base, over
- 450 millimetres of OPSS Granular B Type II

The granular thicknesses given above assume that the subgrade surfaces are prepared as described in this report. If the subgrade surface is disturbed or wetted due to construction operations or precipitation, the granular thicknesses given above may not be adequate and it may be necessary to increase the thickness of the Granular B Type II subbase. The contractor should be made responsible for their construction access.

5.4 Outdoor Area Granular Structure

For the proposed outdoor storage area which will be accessed primarily by heavy trucks, the following minimum granular structure is suggested:

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

The granular thicknesses given above assume that the subgrade surfaces are prepared as described in this report. If the subgrade surface is disturbed or wetted due to construction operations or precipitation, the granular thicknesses given above may not be adequate and it may be necessary to increase the thickness of the Granular B Type II subbase. The contractor should be made responsible for their construction access.

The gravel structure should be graded as required to restore the surface grading.

5.5 Granular Material Placement

The granular base and subbase materials should be compacted in maximum 200 millimetre thick lifts to at least 99 percent of the standard Proctor maximum dry density value.

6.0 ADDITIONAL CONSIDERATIONS

6.1 Subsurface Investigation

As indicated above, the summary of subsurface conditions and preliminary geotechnical comments for the office/receiving building are based on available information within about 100 metres of the proposed building location. The geotechnical guidelines provided in this report are considered suitable for the design of the proposed development. It is suggested that additional boreholes be advanced in the vicinity of the building and septic footprint prior to construction to confirm the depth of fill material at these locations.

6.2 Construction Observation

The engagement of the services of GEMTEC during construction is recommended to confirm that the subsurface conditions at the proposed structure does 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 for the proposed building and septic system should be inspected and approved by GEMTEC personnel to ensure that the subgrade is suitable. Inspection and testing should be carried out during the placement of imported, granular fill to ensure that the gradation and compaction specifications meet the guidelines provided in this report.

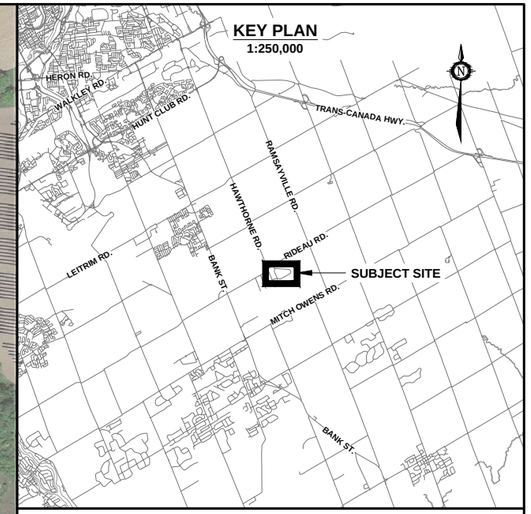
6.3 Closure

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.

Luc Bouchard, P.Eng., ing.

APPENDIX A

Test Hole Location Plan, Figure 1



LEGEND

- BH 7 — **BOREHOLE LOCATION IN PLAN** (previous investigation by PINCHIN, 2008 (File #249442))
- RB7-03 — **BOREHOLE LOCATION IN PLAN** (previous investigation by Inspec-Sol, 2008 (Ref # T020556))
- TP10-02 — **TEST PIT LOCATION IN PLAN** (previous investigation by Inspec-Sol, 2008 (Ref # T020556))
- MW8-08 — **MONITORING WELL LOCATION IN PLAN** (previous investigation by CRA, 2008 (Project # 45804))
- BH/TP — TEST HOLE ID
- (XX.XX) — GROUND SURFACE ELEVATION, IN METRES GEODETIC DATUM

Scale 1:3000

0 100 200m

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Client	Project
NOVATECH	65080.01

Location: 300 SOMME STREET OTTAWA, ON

Drwn by	Chkd by	
P.C.	L.B.	TEST HOLE LOCATION PLAN

Date	Rev.	
APRIL 2020	0	**FIGURE 1**

P:\0. Files\65000\65080.01\06_Drafting\i. Drawings\65080.01_Geotech_FG1_Rev0_2020-04-14.dwg

APPENDIX B

Record of Test Hole Sheets

REFERENCE No.: T020556-A1 ENCLOSURE No.: 4

INSPEC•SOL

BOREHOLE No.: B6-1

ELEVATION: 91.25 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: R.W.Tomlinson Ltd.

PROJECT: Geotechnical Investigation

LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario

DESCRIBED BY: B.Beveridge CHECKED BY: J.Bennett

DATE (START): October 23, 2008 DATE (FINISH): October 23, 2008

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- o Water content (%)
- Atterberg limits (%)
- • N Penetration Index based on Split Spoon sample
- • N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- □ Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA				
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Organic Vapour ppm or %LEL	Penetration Index / RQD
meters	91.25		GROUND SURFACE			%	ppm	N
1.0			FILL- silty clay, some gravel, asphalt fragments and sand, trace oxidation, very stiff, greyish brown, moist		SS1	67		17
	89.73							
2.0			FILL- silty clay, some gravel and sand, trace organics and oxidation, hard, greyish brown, moist		SS2	67		14
					SS3	67		6
3.0			-some trace of gravel to sand, becoming hard to very stiff, less organics					
			-trace to some sand, moist to wet		SS4	63		4
	87.44							
4.0			SANDY SILT- some gravel, very loose, brownish grey, wet		SS5	75		3
	86.68							
5.0			SANDY CLAY- some gravel, trace organics, oxidation, very stiff, greenish grey, moist		SS6	75		10
	85.92				SS7	0		R
	85.89		SANDY CLAY- some gravel, trace organics, very stiff, brownish grey, wet					
6.0			End of Borehole Auger Refusal Presumed Bedrock					
7.0								
8.0								
9.0								
10.0								
11.0								
12.0								
13.0								

SCALE FOR TEST RESULTS
50kPa 100kPa 150kPa 200kPa
10 20 30 40 50 60 70 80 90

NOTES:

BOREHOLE LOG T020556-A1-BH(OCT-31-08).GPJ INSPEC_SOL.GDT 5/12/09

REFERENCE No.: T020556-A1 ENCLOSURE No.: 5

INSPEC•SOL

BOREHOLE No.: B6-2

ELEVATION: 90.50 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: R.W.Tomlinson Ltd.

PROJECT: Geotechnical Investigation

LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario

DESCRIBED BY: B.Beveridge CHECKED BY: J.Bennett

DATE (START): October 27, 2008 DATE (FINISH): October 27, 2008

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- • N Penetration Index based on Split Spoon sample
- • N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- □ Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Organic Vapour ppm or %LEL	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa
meters	90.50		GROUND SURFACE			%	ppm	N	10 20 30 40 50 60 70 80 90
			FILL- silty clay, some gravel and asphalt fragments, trace organics, hard, brown, grey, moist						
1.0					SS1	67		23	
2.0			-becomes hard to very stiff		SS2	21		R	
					SS3	13		15	
3.0	87.40		SILTY CLAY- some sand and gravel, trace organics, very stiff, grey, brown moist		SS4	50		17	
	86.69								
4.0			SANDY SILT- some sand and gravel, trace oxidation, stiff, grey, brown, moist		SS5	34		11	
	85.93								
5.0			SANDY SILT- some gravel and organics, compact, grey, moist		SS6	50		12	
					SS7	0		R	
6.0	84.40		-becomes compact to dense						
	84.22		SANDY CLAY- some gravel, very stiff, brownish grey, moist		SS8	25		R	
7.0			End of borehole Auger Refusal Presumed Bedrock						
8.0									
9.0									
10.0									
11.0									
12.0									
13.0									

NOTES:

BOREHOLE LOG T020556-A1-BH(OCT-31-08).GPJ INSPEC_SOL.GDT 5/12/09

REFERENCE No.: T020556-A1 ENCLOSURE No.: 6

INSPEC·SOL

BOREHOLE No.: B6-3

ELEVATION: 91.84 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: R.W.Tomlinson Ltd.

PROJECT: Geotechnical Investigation

LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario

DESCRIBED BY: B.Beveridge CHECKED BY: J.Bennett

DATE (START): October 31, 2008 DATE (FINISH): October 31, 2008

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- o Water content (%)
- Atterberg limits (%)
- • N Penetration Index based on Split Spoon sample
- • N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- □ Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		MONITOR WELL	SAMPLE DATA				
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK		State	Type and Number	Recovery	Organic Vapour ppm or %LEL	Penetration Index / RQD
meters	91.84		GROUND SURFACE	93.06 92.96			%	ppm	N
			FILL- silty clay and sand, trace gravel, asphalt fragments and organics, very stiff, brownish grey, moist	0.00		SS1			26
1.0	90.32		FILL- silty clay, some sand and asphalt fragments, trace oxidation, green brown grey, moist			SS2			55
2.0	89.55		FILL- silty clay, some gravel, trace organics, grey brown, moist			SS3			R
3.0	88.79 88.49		FILL- silty clay, some sand trace gravel, grey, moist			SS4			7
4.0			SILTY CLAY- trace gravel and root matter, stiff, brown / green / red / black, moist	4.27 WL 4.40		SS5			5
	87.27 87.19		-becoming stiff to firm	4.88		SS6			7
5.0	87.06		SANDY SILT- loose, blackish grey, wet	5.18		SS7			7
6.0	85.74		SILTY CLAY- some sand, greenish brown, wet			SS8			10
			SILTY SAND- , trace clay, loose, blackish grey, loose, wet	6.71					
7.0	84.52		SILTY SAND- loose blackish grey, wet	7.01					
8.0	83.81		SANDY SILT- some gravel, trace clay, very dense, grey, wet	8.03		SS9			R
9.0			End of Borehole Auger Refusal Presumed Bedrock						
10.0									
11.0									
12.0									
13.0									

SCALE FOR TEST RESULTS
50kPa 100kPa 150kPa 200kPa
10 20 30 40 50 60 70 80 90

NOTES:

BOREHOLE LOG T020556-A1-BH(OCT-31-08).GPJ INSPEC_SOL.GDT 5/12/09

REFERENCE No.: T020556-A1 ENCLOSURE No.: 7

INSPEC·SOL

BOREHOLE No.: B6-4

ELEVATION: 89.06 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: R.W.Tomlinson Ltd.

PROJECT: Geotechnical Investigation

LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario

DESCRIBED BY: B.Beveridge CHECKED BY: J.Bennett

DATE (START): October 27, 2008 DATE (FINISH): October 27, 2008

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- ● N Penetration Index based on Split Spoon sample
- • N Penetration Index based on Dynamic Cone sample
- △ Cu Shear Strength based on Field Vane
- □ Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- ▲ Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Organic Vapour ppm or %LEL	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa 10 20 30 40 50 60 70 80 90
meters	89.06		GROUND SURFACE			%	ppm	N	
			SANDY SILT- some organics, trace gravel, very loose, greenish grey, moist		SS1	58		7	● ▲
1.0									
	87.35				SS2	17		6	● ▲
2.0	87.23		SILTY CLAY- some sand, gravel and organics, trace oxidation, very stiff, blackish grey, moist						
			End of Borehole Auger Refusal Assumed Bedrock						
3.0									
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									
11.0									
12.0									
13.0									

NOTES:

BOREHOLE LOG T020556-A1-BH(OCT-31-08).GPJ INSPEC_SOL.GDT 5/12/09

REFERENCE No.: T020556-A1 ENCLOSURE No.: 21

INSPEC·SOL

BOREHOLE No.: RB7-03

ELEVATION: 91.14 m

BOREHOLE LOG

Page: 1 of 1

CLIENT: R.W.Tomlinson Ltd.

PROJECT: Geotechnical Investigation

LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario

DESCRIBED BY: B.Beveridge CHECKED BY: J.Bennett

DATE (START): October 22, 2008 DATE (FINISH): October 22, 2008

LEGEND

- SS Split Spoon
- ST Shelby Tube
- RC Rock Core
- Water Level
- Water content (%)
- Atterberg limits (%)
- N Penetration Index based on Split Spoon sample
- N Penetration Index based on Dynamic Cone sample
- Cu Shear Strength based on Field Vane
- Cu Shear Strength based on Lab Vane
- S Sensitivity Value of Soil
- Shear Strength based on Pocket Penetrometer

SCALE		STRATIGRAPHY		SAMPLE DATA					
Depth BGS	Elevation (m)	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	State	Type and Number	Recovery	Organic Vapour ppm or %LEL	Penetration Index / RQD	SCALE FOR TEST RESULTS 50kPa 100kPa 150kPa 200kPa 10 20 30 40 50 60 70 80 90
meters	91.14		GROUND SURFACE			%	ppm	N	
1.0			FILL- asphalt and concrete fragments, some gravel and sand, dense, brown black, dry		SS1	55		39	
2.0					SS2	30		8	
			-seepage at 2.60m depth		SS3	42		15	
3.0	88.09		SILTY SAND- trace gravel, organics, clay, very loose, grey, wet		SS4	38		2	
4.0					SS5	0		50+	
	86.45				SS6	50		R	
5.0			End of Borehole Auger Refusal Assumed Bedrock						
6.0									
7.0									
8.0									
9.0									
10.0									
11.0									
12.0									
13.0									

NOTES:

BOREHOLE LOG T020556-A1-BH(OCT-31-08).GPJ INSPEC_SOL.GDT 5/12/09

REFERENCE No.: T020556-A1 ENCLOSURE No.: 33

INSPEC-SOL

TEST PIT No.: TP6-01
ELEVATION: 302.56 ft

TEST PIT REPORT

CLIENT: R.W.Tomlinson Ltd.
PROJECT: Geotechnical Investigation
LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario
DESCRIBED BY: B.Beveridge DATE: November 10, 2008
CHECKED BY: J.Bennett DATE:

LEGEND

GSE - GRAB SAMPLE (environmental)
GS - GRAB SAMPLE (geotechnical)
Cu - SHEAR TEST
CHEM - CHEMICAL ANALYSIS
OVC - ORGANIC VAPOR CONCENTRATION
INF - INFILTRATION
▼ - WATER LEVEL

Depth Feet	Depth Metres	Elevation (ft) 302.56	Symbol	STRATIGRAPHY	Sample Type & Number	OVC ppm	Tests Type	▼ INF
0				FILL- silty clay, some asphalt, concrete and wood fragments, brownish black, moist				
1								
	0.5							
2								
3								
	1.0							
4								
5								
	1.5							
6								
	2.0							
7								
8								
	2.5							
9								
10								
	3.0							
11								
	3.5							
12								
13								
	4.0							
14								
14.8	4.5	287.81		SILTY CLAY -trace organics, brownish green, wet				
15				-Water infiltration was observed at 4.6m BGS				
15.5		287.06		SILTY SAND- trace cobbles, trace organics, greyish black, wet				
16								
16.3	5.0	286.23		SILTY CLAY- trace cobbles, grey, wet				
16.7		285.89		End of Test Pit				
17								
18	5.5							
19								
	6.0							

TEST PIT LOG T020556-A1-TP(NOV-10-08).GPJ INSPEC_SOL.GDT 5/12/09

REFERENCE No.: T020556-A1 ENCLOSURE No.: 34

INSPEC-SOL

TEST PIT No.: TP6-02
ELEVATION: 297.11 ft

TEST PIT REPORT

CLIENT: R.W.Tomlinson Ltd.
PROJECT: Geotechnical Investigation
LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario
DESCRIBED BY: B.Beveridge DATE: November 10, 2008
CHECKED BY: J.Bennett DATE:

LEGEND

GSE - GRAB SAMPLE (environmental)
GS - GRAB SAMPLE (geotechnical)
Cu - SHEAR TEST
CHEM - CHEMICAL ANALYSIS
OVC - ORGANIC VAPOR CONCENTRATION
INF - INFILTRATION
▼ - WATER LEVEL

Depth Feet	Depth Metres	Elevation (ft) 297.11	Symbol	STRATIGRAPHY	Sample Type & Number	OVC ppm	Tests Type	▼ INF
				FILL- silty clay, some cobbles, brick, asphalt and concrete fragments, black, moist				
1								
	0.5							
2								
3								
	1.0							
4								
5	1.5							
6								
	2.0							
7								
8	2.5							
9								
9.5		287.61		TOPSOIL-some organics, black, moist				
9.8	3.0	287.28		-Water infiltration observed at 2.90m BGS				
10				SILTY SAND- some organics,blackish grey, wet				
11								
	3.5							
12								
13	4.0							
13.8		283.36		SILTY CLAY- some sand, trace organics, brownish grey, wet				
14								
13.9		283.19		End of Test Pit				
	4.5							
15								
16								
	5.0							
17								
18	5.5							
19								
	6.0							

REFERENCE No.: T020556-A1 ENCLOSURE No.: 36

INSPEC-SOL

TEST PIT No.: TP3-01
ELEVATION: 288.81 ft

TEST PIT REPORT

CLIENT: R.W.Tomlinson Ltd.
PROJECT: Geotechnical Investigation
LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario
DESCRIBED BY: B.Beveridge DATE: November 10, 2008
CHECKED BY: J.Bennett DATE:

LEGEND

GSE - GRAB SAMPLE (environmental)
GS - GRAB SAMPLE (geotechnical)
Cu - SHEAR TEST
CHEM - CHEMICAL ANALYSIS
OVC - ORGANIC VAPOR CONCENTRATION
INF - INFILTRATION
▼ - WATER LEVEL

Depth Feet	Depth Metres	Elevation (ft) 288.81	Symbol	STRATIGRAPHY	Sample Type & Number	OVC ppm	Tests Type	▼ INF
1	0.5	286.81		SILTY CLAY- some organics,brown, moist				
2				End of Test Pit Shovel Refusal Assumed Bedrock				
3	1.0							
4								
5	1.5							
6								
7	2.0							
8	2.5							
9								
10	3.0							
11	3.5							
12								
13	4.0							
14								
15	4.5							
16								
17	5.0							
18	5.5							
19								
	6.0							

REFERENCE No.: T020556-A1 ENCLOSURE No.: 40

INSPEC-SOL

TEST PIT No.: TP5-01
ELEVATION: 298.82 ft

TEST PIT REPORT

CLIENT: R.W.Tomlinson Ltd.
PROJECT: Geotechnical Investigation
LOCATION: Lot 26 and 27, concession 6, Ottawa, Ontario
DESCRIBED BY: B.Beveridge DATE: November 10, 2008
CHECKED BY: J.Bennett DATE:

LEGEND

GSE - GRAB SAMPLE (environmental)
GS - GRAB SAMPLE (geotechnical)
Cu - SHEAR TEST
CHEM - CHEMICAL ANALYSIS
OVC - ORGANIC VAPOR CONCENTRATION
INF - INFILTRATION
▼ - WATER LEVEL

Depth Feet	Depth Metres	Elevation (ft) 298.82	Symbol	STRATIGRAPHY	Sample Type & Number	OVC ppm	Tests Type	▼ INF
0	0			FILL-silty clay, some brick, asphalt, concrete, gravel, cobbles, trace organics, brownish black, moist				
1								
	0.5							
2								
3								
	1.0							
4								
5								
	1.5							
6								
	2.0							
7								
8				-Water infiltration observed at 2.5m BGS				
	2.5							
9								
9.8		288.99						
10	3.0			End of Test Pit				
11								
	3.5							
12								
13								
	4.0							
14								
15								
	4.5							
16								
	5.0							
17								
18								
	5.5							
19								
	6.0							

TEST PIT LOG T020556-A1-TP(NOV-10-08).GPJ INSPEC_SOL.GDT 5/12/09

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Orgaworld
PROJECT NUMBER: 45804
CLIENT: Orgaworld Canada Real Estate Ltd.
LOCATION: Hawthorne and Rideau Road, Ottawa, Ontario

HOLE DESIGNATION: MW8-08
DATE COMPLETED: July 15, 2008
DRILLING METHOD: HSA
FIELD PERSONNEL: T. Saunders

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	TOP OF RISER	91.69						
	GROUND SURFACE	90.69						
0	FILL - silty sand with gravel, trace asphalt, trace concrete, compact to dense, moist		Bentonite Hole Plug	SS1		25	15	48.1
1				SS2		0		
2								
3	- trace organics, loose, black, wet at 3.05m BGS		Filter Sand, Well Screen	SS3		33	39	11.7
4				SS4		17	4	4.5
				SS5		25	65	0.0
		86.12		SS6		33		0.0
5	SM - TILL - fine sand and silt with some gravel, compact, wet	85.96						
	END OF BOREHOLE @ 4.72m BGS							
6								
7								
8								
9								
10								
11								

WELL DETAILS
Screened interval:
89.47 to 86.42m
1.22 to 4.27m BGS
Length: 3.05m
Diameter: 51mm
Slot Size: 10
Material: PVC
Seal:
90.38 to 89.77m
0.30 to 0.91m BGS
Material: Bentonite
Sand Pack:
89.77 to 86.42m
0.91 to 4.27m BGS
Material: Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STATIC WATER LEVEL ▼ July 17, 2008

CHEMICAL ANALYSIS (SS1)

Log of Borehole: BH1

Project #: 249442 **Logged By:** WT

Project: Geotechnical Investigation

Client: Partner Engineering and Science, Inc.

Location: Somme Street, Ottawa, Ontario

Drill Date: December 17, 2019 **Project Manager:** WT

SUBSURFACE PROFILE					SAMPLE							
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-values	SPT N-values / Shear Strength kPa	Lab Analysis	Moisture (%)	Plasticity Index
0		Ground Surface	0.00	No Monitoring Well Installed								
		Organics ~ 200 mm	-0.20		SS	1	40	5				
		Fill Brown silt, trace sand and clay, loose, frozen	-0.76									
1		Dense	-1.07		SS	2	60	44				
		Sand Grey sand and gravel, trace silt, dense, damp	-1.52									
		Grey sand, some silt, very loose, moist			SS	3	10	3				
2			-2.29									
		Dark brown sand, wet			SS	4	5	2				
3												
					SS	5	70	4				
			-3.66									
		End of Borehole										
4		Borehole terminated at 3.66 mbgs. At drilling completion, the borehole was open to 3.66 mbgs and water was measured at 2.44 mbgs.										
5												

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Contractor: Strata Drilling Group

Grade Elevation: NA

Drilling Method: Hollow Stem Auger / Split Spoon

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1

Log of Borehole: BH2

Project #: 249442 **Logged By:** WT

Project: Geotechnical Investigation

Client: Partner Engineering and Science, Inc.

Location: Somme Street, Ottawa, Ontario

Drill Date: December 17, 2019 **Project Manager:** WT

SUBSURFACE PROFILE					SAMPLE							
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-values	SPT N-values / Shear Strength kPa	Lab Analysis	Moisture (%)	Plasticity Index
0		Ground Surface	0.00									
		Organics ~ 50 mm			SS	1	80	64				
		Fill Brown silty sand and gravel, trace clay, very dense, frozen	-0.76									
1		Brown sand, some silt, trace clay, compact, moist			SS	2	70	21				
					SS	3	60	14				
2			-2.29									
		Sand Brown sand, very loose, wet			SS	4	0	3				
3			-3.05									
		Start Dynamic Cone Penetration Test (DCPT)			SS	5	NA	4				
					SS	6	NA	11				
					SS	7	NA	9				
4					SS	8	NA	6				
					SS	9	NA	6				
					SS	10	NA	8				
5					SS	11	NA	5				
					SS	12	NA	5				
					SS	13	NA	6				
			-5.94		SS	14	NA	>50				
6		End of Borehole Borehole terminated at 5.94 mbgs due to DCPT refusal on probable bedrock. At drilling completion, the borehole was open to 5.94 mbgs and water was measured at 2.13 mbgs.										
7												

No Monitoring Well Installed

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Contractor: Strata Drilling Group

Grade Elevation: NA

Drilling Method: Hollow Stem Auger / Split Spoon

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1

Log of Borehole: BH3

Project #: 249442 **Logged By:** WT

Project: Geotechnical Investigation

Client: Partner Engineering and Science, Inc.

Location: Somme Street, Ottawa, Ontario

Drill Date: December 17, 2019 **Project Manager:** WT

SUBSURFACE PROFILE					SAMPLE							
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-values	SPT N-values / Shear Strength kPa	Lab Analysis	Moisture (%)	Plasticity Index
0		Ground Surface	0.00	No Monitoring Well Installed								
		Organics ~ 50 mm										
		Fill Brown silty sand and gravel, compact, frozen			SS	1	60	14				
			-0.76									
1		Compact			SS	2	30	11				
			-1.30									
		Organics seam (~ 50 mm)										
			-1.52									
		Silty sand, trace clay, compact, moist			SS	3	50	>50				
			-1.83									
2		End of Borehole										
		Borehole terminated at 1.83 mbgs due to auger and split spoon refusal on probable bedrock. At drilling completion, a wet cave was measured at 1.68 mbgs, and water was measured at 1.52 mbgs.										
3												

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Contractor: Strata Drilling Group

Grade Elevation: NA

Drilling Method: Hollow Stem Auger / Split Spoon

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1

Log of Borehole: BH4

Project #: 249442 **Logged By:** WT

Project: Geotechnical Investigation

Client: Partner Engineering and Science, Inc.

Location: Somme Street, Ottawa, Ontario

Drill Date: December 17, 2019 **Project Manager:** WT

Depth (m)	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-values
0	Ground Surface	0.00	No Monitoring Well Installed				
	Organics ~ 100 mm			SS	1	50	8
	Fill Brown silty sand and gravel, trace clay, loose, frozen	-0.76					
1	Compact			SS	2	80	27
				SS	3	65	11
2		-2.29					
	Silt Grey silt, some clay, trace gravel, soft, moist			SS	5	70	4
3		-3.05					
	No gravel			SS	6	70	2
		-3.66					
4	End of Borehole						
	Borehole terminated at 3.66 mbgs. At drilling completion, the borehole was open and dry.						
5							

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Lab Analysis | Moisture (%) | Plasticity Index

Contractor: Strata Drilling Group

Grade Elevation: NA

Drilling Method: Hollow Stem Auger / Split Spoon

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1

Log of Borehole: BH5

Project #: 249442 **Logged By:** WT

Project: Geotechnical Investigation

Client: Partner Engineering and Science, Inc.

Location: Somme Street, Ottawa, Ontario

Drill Date: December 17, 2019 **Project Manager:** WT

Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-values	Lab Analysis	Moisture (%)	Plasticity Index
0		Ground Surface	0.00	No Monitoring Well Installed							
		Organics ~ 150 mm	-0.15		SS	1	40	30			
		Fill Brown silty sand and gravel, dense, frozen	-0.76								
1		Trace asphalt, compact			SS	2	50	22			
			-1.52								
		Trace to some silt, loose, wet			SS	3	10	6			
2			-2.29								
		Compact			SS	5	25	13			
3			-3.05								
		Loose			SS	6	15	7			
			-3.66								
4		End of Borehole Borehole terminated at 3.66 mbgs. At drilling completion, the borehole was open to 3.66 mbgs, and water was measured at 1.98 mbgs.									
5											

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Contractor: Strata Drilling Group

Grade Elevation: NA

Drilling Method: Hollow Stem Auger / Split Spoon

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1

Log of Borehole: BH6

Project #: 249442 **Logged By:** WT

Project: Geotechnical Investigation

Client: Partner Engineering and Science, Inc.

Location: Somme Street, Ottawa, Ontario

Drill Date: December 17, 2019 **Project Manager:** WT

Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-values
0		Ground Surface	0.00	No Monitoring Well Installed				
		Organics ~ 150 mm	-0.15		SS	1	25	8
		Fill Brown silty sand and gravel, loose, frozen	-0.76					
1		Grey silt, some sand, trace gravel and clay, loose, moist	-1.52		SS	2	20	5
		Grey sand and gravel, trace silt, very loose, wet	-2.29		SS	3	20	4
2		End of Borehole						
		Borehole terminated at 2.29 mbgs due to auger and split spoon refusal on probable bedrock. At drilling completion, the borehole was open to 2.29 mbgs, and water was measured at 0.91 mbgs.						
3								

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Lab Analysis | Moisture (%) | Plasticity Index

Contractor: Strata Drilling Group

Grade Elevation: NA

Drilling Method: Hollow Stem Auger / Split Spoon

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1

Log of Borehole: BH7

Project #: 249442 **Logged By:** WT

Project: Geotechnical Investigation

Client: Partner Engineering and Science, Inc.

Location: Somme Street, Ottawa, Ontario

Drill Date: December 17, 2019 **Project Manager:** WT

Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-values	Lab Analysis	Moisture (%)	Plasticity Index
0		Ground Surface	0.00	No Monitoring Well Installed							
		Fill Brown silty sand, loose, frozen	-0.76		SS	1	60	4			
1		Grey sand and gravel, very dense, wet	-1.52		SS	2	10	>50			
2		Loose	-2.29		SS	3	30	6			
		Grey silty sand and gravel, compact, wet	-3.05		SS	4	65	19			
3		Brown sand and gravel, trace silt, very dense, wet	-3.35		SS	5	70	>50			
		End of Borehole Borehole terminated at 3.35 mbgs due to auger and split spoon refusal on probable bedrock. At drilling completion, the borehole was open to 3.35 mbgs, and water was measured at 2.29 mbgs.									
4											

SPT N-values: 20, 40, 60

Shear Strength kPa: 50, 100, 150, 200

Contractor: Strata Drilling Group

Grade Elevation: NA

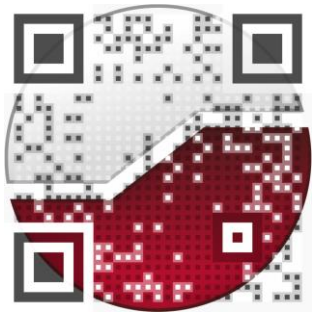
Drilling Method: Hollow Stem Auger / Split Spoon

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1

experience • knowledge • integrity



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

expérience • connaissance • intégrité