Geotechnical Engineering

Environmental Engineering

Hydrogeology

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Materials Testing

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Geotechnical Investigation

Proposed Commercial Building 3735 St. Joseph Boulevard Ottawa, Ontario

Prepared For

Blueprint Builds

Paterson Group Inc.

Consulting Engineers 154 Colonnade Road Ottawa (Nepean), Ontario Canada K2E 7J5

Tel: (613) 226-7381 Fax: (613) 226-6344 www.patersongroup.ca August 10, 2018

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1.0 Introduction

Paterson Group (Paterson) was commissioned by Blueprint Builds to conduct a geotechnical investigation for the proposed commercial building to be located at 3735 St. Joseph Boulevard in the City of Ottawa, Ontario (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objectives of the investigation were to:

Determine	the	subsoil	and	groundwater	conditions	at	this	site	by	means	of
boreholes.											

Provide geotechnical recommendations for the design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

2.0 Proposed Project

Based on the provided conceptual site plan, it is understood that the proposed development will consist of a single-storey commercial structure with a walk-out basement. Associated at-grade parking areas, access lanes, and landscaped areas are also proposed as part of the development.

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3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the investigation was carried out on April 14, 2014. At that time, three (3) boreholes were advanced to a maximum 26.5 m depth. Additionally, nine (9) test pits were excavated within the subject site as part of a fill delineation program completed by Paterson in 2014. The test hole locations were distributed in a manner to provide general coverage of the proposed development. Previous investigations, consisting of 4 boreholes and 24 test pits, were completed by others in 2008 and 2010. The location of the test holes are shown on Drawing PG3215-1 - Test Hole Location Plan included in Appendix 2. It should be noted that the test pit logs from the 2010 investigation were not provided in the reports reviewed by Paterson.

The boreholes were completed with a truck-mounted auger drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of our personnel under the direction of a senior engineer. The test hole procedure consisted of augering to the required depths at the selected locations, and sampling and testing the overburden.

Sampling and In Situ Testing

Soil samples were recovered using a 50 mm diameter split-spoon sampler or the auger flights and were initially classified on site. The depths at which the split spoon and auger samples were recovered from the boreholes are shown as SS and AU, respectively, on the Soil Profile & Test Data sheets in Appendix 1.

In conjunction with the recovery of the split spoon samples, the Standard Penetration Test (SPT) was conducted. The SPT results are recorded as "N" values on the Soil Profile & Test Data sheets. The "N" value is the number of blows required to drive the split spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

Undrained shear strength tests were completed in cohesive soils with a shear vane apparatus.

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The overburden thickness was evaluated by a dynamic cone penetration test (DCPT) at borehole BH 1. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data sheets in Appendix 1 of this report.

Groundwater

Flexible polyethylene standpipes were installed at the borehole locations to monitor the groundwater level subsequent to the completion of the sampling program.

3.2 Field Survey

The test hole locations were determined in the field by Paterson personnel with consideration of existing site features. It should be noted that the ground surface elevations are referenced to a temporary benchmark (TBM), consisting of the top of spindle of a fire hydrant located in front of the subject site along the north side of St. Joseph Boulevard. A geodetic elevation of 63.50 m was provided for the TBM. The location and ground surface elevations at the borehole locations are presented on Drawing PG3215-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples were recovered from the boreholes and visually examined in our laboratory to review the field logs. Moisture content testing was completed for the recovered soil samples. The results are presented on the Soil Profile and Test Data sheets in Appendix 1.

3.4 Analytical Testing

One (1) soil sample was submitted to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The sample was analyzed to determine the concentration of sulphate and chloride, the resistivity and the pH of the sample. The results are discussed in Subsection 6.7 and provided in Appendix 1.

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4.0 Observations

4.1 Surface Conditions

The subject site is generally vacant and is bordered by commercial properties to the north, east, and west, and by St-Joseph Boulevard to the south. The ground surface across the subject site was noted to be grass covered with several mature trees within the northeast portion of the site. The ground surface across the site is below the grade of St. Joseph Boulevard and was observed to be slightly undulating, sloping downward gradually to the north.

4.2 Subsurface Profile

The subsurface profile at the test hole locations was generally observed to consist of topsoil or fill at the ground surface. The topsoil had a thickness of 0.15 to 0.3 m, while the fill was observed to extend to approximate depths ranging from 0.6 to 3 m. The fill layer was noted to consist of a silty clay with gravel, roots and wood chips or a mixture of concrete, brick, sand and gravel. Refusal of the excavator was encountered within the fill in the current test pits TP 1, TP 2, and TP 9 at approximate depths of 1.6, 1.1, and 1.3 m, respectively, on suspected concrete slabs. Auger and/or excavator refusal was also encountered in the fill within the previous boreholes and test pits BH 1, BH 4, TP 1, TP 2, TP 3a completed by others at approximate depths ranging from 0.8 to 2.3 m.

A silty clay deposit was encountered underlying the topsoil and/or fill. The silty clay deposit was noted to have a very stiff to stiff consistency based on the undrained shear strength testing completed at the borehole locations. Practical refusal to the DCPT was encountered at borehole BH 1 at a depth of 26.5 m below the existing ground surface.

Based on available geological mapping, the bedrock in this area consists of limestone and dolomite of the Gull River formation. The overburden drift thickness is estimated to be between 15 and 25 m depth.

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4.3 Groundwater

The measured groundwater levels are summarized below in Table 1 and presented on the Soil Profile and Test Data sheets in Appendix 1. It is important to note that groundwater level readings could be influenced by surface water infiltrating the backfilled borehole, which can lead to higher water levels than noted during the investigation. However, the long-term groundwater level can also be estimated based on moisture levels and colour of the recovered soil samples. Based on these observations at the borehole locations, the long-term groundwater level is expected at a 2.5 to 3 m depth.

Table 1 - Su	mmary of Groundw	ater Level Readi	ngs	
Test Hole Number	Ground Surface Elevation (m)	Groundwater Depth (m)	Groundwater Elevation (m)	Date
BH 1	61.31	1.05	60.26	April 25, 2014
BH 2	61.70	0.40	61.30	April 25, 2014
BH 3	61.66	Ground Surface	61.66	April 25, 2014

Note: The ground surface at the test hole locations was referenced to a temporary benchmark (TBM) consisting of the top spindle of the fire hydrant located on the north side of St. Joseph Boulevard with a geodetic elevation of 64.28 m.

Groundwater is subject to seasonal fluctuations and therefore, groundwater could vary at the time of construction.

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5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered satisfactory for the proposed development. It is expected that the proposed building can be founded by conventional style shallow foundations. It is recommended that footings for the proposed building be placed over an undisturbed, very stiff to stiff silty clay bearing surface. Engineered fill may be required where existing fill is located below proposed footing level.

Due to the presence of a silty clay layer, the proposed development will be subjected to grade raise restrictions, which are discussed in Subsection 5.3. If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction total and differential settlements.

The above and other considerations are further discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and fill, such as those containing organic or deleterious materials, should be stripped from under any buildings and other settlement sensitive structures. It is anticipated that the existing fill within the proposed building footprint, free of deleterious material and significant amounts of organics, can be left in place outside of lateral support zones for the footings. However, it is recommended that the existing fill layer be proof-rolled several times and approved by the geotechnical consultant at the time of construction. Any poor performing areas noted during the proof-rolling operation should be removed and replaced with an approved fill.

Fill Placement

Fill used for grading beneath the proposed buildings, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 225 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the building and paved areas should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

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Non-specified existing fill, along with site-excavated soil, can be used as general landscaping fill where settlement of the ground surface is of minor concern. This material should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If this material is to be used to build up the subgrade level for areas to be paved, it should be compacted in thin lifts to a minimum density of 95% of its SPMDD. Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless used in conjunction with a composite drainage membrane.

5.3 Foundation Design

Bearing Resistance Values

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, placed on an undisturbed, very stiff to stiff silty clay bearing surface can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **250 kPa**.

Footings designed using the above-noted bearing resistance value at SLS will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

An undisturbed soil bearing surface consists of a surface from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete for footings.

Footings founded over a compacted engineered fill layer, as detailed in Subsection 5.2, placed over an undisturbed, very stiff to stiff silty clay bearing surface can be designed using the bearing resistance values noted above.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to the soil subgrade medium when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V, passes only through in situ soil or engineered fill of the same or higher capacity as the soil.

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Permissible Grade Raise Restriction

A permissible grade raise restriction has been determined for the subject site based on the undrained shear strength values completed within the silty clay deposit. Based on the testing results, a permissible grade raise restriction of **1.5 m** above existing ground surface is recommended for the subject site.

To reduce potential long term liabilities, consideration should be given to accounting for a larger groundwater lowering and to providing means to reduce long term groundwater lowering (e.g. clay dykes, restriction on planting around the stores, etc). It should be noted that building over silty clay deposits increases the likelihood of building movements and therefore of cracking. The use of steel reinforcement in foundations placed at key structural locations will tend to reduce foundation cracking as compared to unreinforced foundations.

5.4 Design for Earthquakes

The site class for seismic site response is a **Class D** for the foundations considered. The soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Basement Slab Construction

With the removal of all topsoil and fill, containing significant amounts of organic or deleterious materials, within the footprint of the proposed building, the native soil or approved fill surface will be considered to be an acceptable subgrade surface on which to commence backfilling for floor slab construction. Any soft areas should be removed and backfilled with appropriate backfill material. OPSS Granular B Type II is recommended for backfilling below the floor slab. It is recommended that the upper 200 mm of sub-slab fill consist of 19 mm clear crushed stone for the basement floor slab. The upper 200 mm of sub-slab fill should consist of a Granular A crushed stone for slab-on-grade construction.

In consideration of the groundwater conditions encountered at the time of the construction, a sub-slab drainage system, consisting of lines of perforated drainage pipe sub-drains connected to a positive outlet, should be provided in the clear stone under the basement floor.

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5.6 Basement Wall

There are several combinations of backfill materials and retained soils that could be applicable for the basement walls of the subject structure. However, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a bulk (drained) unit weight of 20 kN/m³.

However, undrained conditions are anticipated (i.e. below the groundwater level). Therefore, the applicable effective (undrained) unit weight of the retained soil can be taken as 13 kN/m³, where applicable. A hydrostatic pressure should be added to the total static earth pressure when using the effective unit weight.

Lateral Earth Pressures

The static horizontal earth pressure (p_o) can be calculated using a triangular earth pressure distribution equal to $K_o \cdot \gamma \cdot H$ where:

 K_o = at-rest earth pressure coefficient of the applicable retained soil, 0.5

 γ = unit weight of fill of the applicable retained soil (kN/m³)

H = height of the wall (m)

An additional pressure having a magnitude equal to $K_o \cdot q$ and acting on the entire height of the wall should be added to the above diagram for any surcharge loading, q (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case.

Actual earth pressures could be higher than the "at-rest" case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

Seismic Earth Pressures

The total seismic force (P_{AE}) includes both the earth force component (P_o) and the seismic component (ΔP_{AE}). The seismic earth force (ΔP_{AE}) can be calculated using $0.375 \cdot a_c \cdot \gamma \cdot H^2/g$ where:

 $a_c = (1.45 - a_{max}/g)a_{max}$

 γ = unit weight of fill of the applicable retained soil (kN/m³)

H = height of the wall (m)

 $g = gravity, 9.81 \text{ m/s}^2$

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The peak ground acceleration, (a_{max}) , for the Ottawa area is 0.32g according to OBC 2012. Note that the vertical seismic coefficient is assumed to be zero.

The earth force component (P_o) under seismic conditions can be calculated using $P_o = 0.5 \text{ K}_o \gamma \text{ H}^2$, where $K_o = 0.5$ for the soil conditions noted above.

The total earth force (P_{AE}) is considered to act at a height, h (m), from the base of the wall, where:

$$h = {P_o \cdot (H/3) + \Delta P_{AE} \cdot (0.6 \cdot H)}/{P_{AE}}$$

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2012.

5.7 Pavement Structure

Car only parking and heavy truck parking areas, and access lanes are anticipated at this site. The proposed pavement structures are presented in Tables 2 and 3.

Table 2 - Recommended	Pavement Structure - Car Only Parking Areas
Thickness (mm)	Material Description
50	Wear Course - HL-3 or Superpave 12.5 Asphaltic Concrete
150	BASE - OPSS Granular A Crushed Stone
400	SUBBASE - OPSS Granular B Type II
	SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or approved existing fill.

Table 3 - Recommended Access Lanes	d Pavement Structure and Heavy Truck Parking Areas
Thickness (mm)	Material Description
40	Wear Course - HL-3 or Superpave 12.5 Asphaltic Concrete
50	Binder Course - HL-8 or Superpave 19.0 Asphaltic Concrete
150	BASE - OPSS Granular A Crushed Stone
450	SUBBASE - OPSS Granular B Type II
	SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or approved existing fill.

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Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 98% of the material's SPMDD using suitable vibratory equipment.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing its load carrying capacity.

Due to the impervious nature of the subgrade materials consideration should be given to installing subdrains during the pavement construction. These drains should be installed at each catch basin, be at least 3 m long and should extend in four orthogonal directions or longitudinally when placed along a curb. The subdrain inverts should be approximately 300 mm below subgrade level. The subgrade surface should be shaped to promote water flow to the drainage lines.

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6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

It is recommended that a perimeter foundation drainage system be provided for the proposed structure. The system should consist of a 100 mm to 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The pipe should have a positive outlet, such as a gravity connection to the storm sewer or sump pit.

As noted above, a sub-slab drainage is also recommended to control water infiltration. For preliminary design purposes, we recommend that 100 or 150 mm perforated pipes be placed at approximate 6 m centres. The spacing of the sub-slab drainage system should be confirmed at the time of completing the excavation when water infiltration can be better assessed.

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geocomposite, such as Miradrain G100N or Delta Drain 6000, connected to the perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

6.2 Protection of Footings Against Frost Action

Perimeter footings, of heated structures are required to be insulated against the deleterious effect of frost action. A minimum of 1.5 m thick soil cover (or equivalent) should be provided.

A minimum of 2.1 m thick soil cover (or equivalent) should be provided for other exterior unheated footings.

6.3 Excavation Side Slopes

The side slopes of excavations in the soil and fill overburden materials should either be excavated to acceptable slopes or should be retained by shoring systems from the beginning of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be constructed by open-

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cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be excavated at 1H:1V or flatter. The flatter slope is recommended for excavation below groundwater level. The subsurface soils are considered to be a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should maintain a safe distance from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

A trench box is recommended to protect personnel working in trenches with steep or vertical sides. Services are expected to be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications & Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to 95% of the material's SPMDD.

It should generally be possible to re-use the site materials above the cover material if the operations are carried out in dry weather conditions.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material standard Proctor maximum dry density.

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To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches. The seals should be at least 1.5 m long and should extend from trench wall to trench wall. Generally, the seals should extend from the frost line and fully penetrate the bedding, subbedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the material's SPMDD. The clay seals should be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be low and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

A temporary Ministry of the Environment and Climate Change (MOECC) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum of 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MOECC.

For typical ground or surface water volumes being pumped during the construction phase, between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MOECC review of the PTTW application.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project.

The subsoil conditions at this site mostly consist of frost susceptible materials. In presence of water and freezing conditions ice could form within the soil mass. Heaving and settlement upon thawing could occur.

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In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

The trench excavations should be carried out in a manner to avoid the introduction of frozen materials, snow or ice into the trenches.

Precaution must be taken where excavations are carried in proximity of existing structures which may be adversely affected due to the freezing conditions.

6.7 Corrosion Potential and Sulphate

The analytical testing results are presented in Table 4 along with industry standards for the applicable threshold values. These results are indicative that Type 10 Portland cement (Type GU, or normal cement) would be appropriate for this site.

Table 4 - Corros	ion Potential					
Parameter	Laboratory Results	Threshold	Commentary			
	BH3 SS4	Chloride content less than Negligible concern				
Chloride	244 μg/g	Chloride content less than 400 mg/g	Negligible concern			
рН	7.24	pH value less than 5.0	Neutral Soil			
Resistivity	17.9 ohm.m	Resistivity greater than 1,500 ohm.cm	Moderate Corrosion Potential			
Sulphate	48 μg/g	Sulphate value greater than 1 mg/g	Negligible Concern			

6.8 Landscaping Considerations

The silty clay deposit encountered at the site was very stiff to stiff and is considered to be low to medium sensitivity clay and should not be considered a sensitive marine clay. Based on the above discussion, shrubs and other small plantings are permitted within 4.5 m of the perimeter foundations walls. Trees may be placed at distances greater than 4.5 m from the foundation walls.

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It is documented in the literature, and is our experience, that fast-growing trees located near buildings founded on cohesive soils which shrink on drying can result in long-term differential settlements of the structures. Tree varieties that have the most pronounced effect on foundations are seen to consist of poplars, willows and some maples (i.e. Manitoba Maples) and should not be considered in the landscaping design.



7.0 Recommendations

A materials testing and observation services program is a requirement for the provided foundation design data to be applicable. The following aspects of the program should be performed by the geotechnical consultant:

Review detailed grading plan(s) from a geotechnical perspective.
Observation of all bearing surfaces prior to the placement of concrete.
Sampling and testing of the concrete and fill materials used.
Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
Observation of all subgrades prior to backfilling.
Field density tests to determine the level of compaction achieved.
Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued, upon request, following the completion of a satisfactory materials testing and observation program by the geotechnical consultant.



8.0 Statement of Limitations

The recommendations provided in this report are in accordance with our present understanding of the project. We request permission to review the grading plan once available. We also request permission to review our recommendations when the drawings and specifications are completed.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, we request immediate notification to permit reassessment of our recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Blueprint Builds or their agents is not authorized without review by Paterson for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Scott S. Dennis, P.Eng.

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David J. Gilbert, P.Eng.

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APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

BOREHOLE AND TEST PIT LOGS BY OTHERS

ANALYTICAL TESTING RESULTS

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Commercial Development - 3735 St. Joseph Blvd. Ottawa, Ontario

DATUM

TBM - Top spindle of fire hydrant, north side of St. Joseph Boulevard, in front of

FILE NO. **PG3215**

REMARKS

subject site. Geodetic elevation of 63.50m was provided for the TBM.

BORINGS BY CME 55 Power Auger					ATE A	April 14, 2	014	HOLE NO. BH 1
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	Pen. Resist. Blows/0.3m • 50 mm Dia. Cone
	STRATA I	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m ■ 50 mm Dia. Cone ○ Water Content %
GROUND SURFACE				2	z °		-61.31	20 40 60 80
		& AU ⊗ AU	1 2				01.01	O O
FILL: Brown silty clay with sand, gravel, roots and wood chips		SS T	3	33	5	1-	-60.31	0
		∬ SS	4	21	7	2-	-59.31	0
2.97	,	ss ss	5	12	14	3-	-58.31	φ
ery stiff to stiff, brown SILTY CLAY		\ 33	6	100	13	4-	-57.31	
						5-	-56.31	4
grey-brown by 5.2m depth grey by 5.9m depth						6-	-55.31	
0.55 Dynamic Cone Penetration Test Commenced at 6.55m depth. Cone	3						-54.31	<u> </u>
bushed to 23.5m depth.							34.31	
						8-	-53.31	
						9-	-52.31	
						10-	-51.31	
						11-	-50.31	
						12-	-49.31	
						13-	-48.31	
						14-	-47.31	
								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Commercial Development - 3735 St. Joseph Blvd. Ottawa, Ontario

DATUM

TBM - Top spindle of fire hydrant, north side of St. Joseph Boulevard, in front of

FILE NO.

HOLE NO.

REMARKS

subject site. Geodetic elevation of 63.50m was provided for the TBM.

PG3215

BORINGS BY CMF 55 Power Auger

DATE April 14 2014

BH 1

BORINGS BY CME 55 Power Auger				D	ATE	April 14, 2	2014				БПІ	
SOIL DESCRIPTION			SAMPLE		I	DEPTH (m)		1			ws/0.3m . Cone	eter
	STRATA PLOT	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(111)	(m)	0	Wateı	r Cont	tent %	Piezometer
GROUND SURFACE	ي.	-	¥	REC	z ö	4.4	47.01	20	40	60	80	"
						14-	47.31					
						15-	46.31					
							40.01					
						16-	45.31					
							.0.0					
						17-	44.31					
						18-	43.31					
						19-	42.31					-
						20-	41.31					
						21-	40.31					
						22-	39.31					
						23-	-38.31					-
						24-	37.31		<u> </u>			
						25-	36.31					
											1	
26.52						26-	35.31					1
End of Borehole Practical DCPT refusal at 26.52m depth		-										
(GWL @ 1.05m-April 25, 2014)												
								20 She) 80 1 h (kPa) Remoulded	⊣ I 00

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Commercial Development - 3735 St. Joseph Blvd. Ottawa, Ontario

DATUM

TBM - Top spindle of fire hydrant, north side of St. Joseph Boulevard, in front of

FILE NO. **PG3215**

REMARKS

subject site. Geodetic elevation of 63.50m was provided for the TBM.

BORINGS BY CMF 55 Power Auger

DATE April 14 2014

HOLE NO. **BH 2**

BORINGS BY CME 55 Power Auger				D	ATE /	April 14, 2	014				DI I Z		
SOIL DESCRIPTION		SAMPLE					DEPTH ELEV.			Resist. Blows/0.3m 50 mm Dia. Cone			
3 3 3 3	STRATA P	TYPE	NUMBER	* RECOVERY	VALUE r RQD	(m)	(m)			Conter		Piezometer	
GROUND SURFACE	, S	•	E	REC	N O H			20	40	60	80	_	
		爱 AU	1			0-	61.70		.;;;	;;;;;		\bowtie	
												▓	
		∛ss	2	8	6	1-	60.70			,		▩	
FILL: Mixture of brick, concrete with		∆ ×SS	3	80	50+								
sand and gravel		<u>۵</u> 33	3	00	30+	2_	-59.70	<u> </u>				\bowtie	
		\Box					59.70						
2.97		∦ ss	4	4	14			d					
2:31		1 7	_		_	3-	58.70					▓	
		∑ ss	5	100	6					.			
		ss	6	100	4	4-	57.70						
Stiff, brown SILTY CLAY		\ 33	0	100	4								
						_	F0 70						
						5-	-56.70	7			A		
						6-	-55.70						
<u>6.55</u>													
End of Borehole													
GWL @ 0.40m-April 25, 2014)													
								20	40	60	80 1	- 00	
								She	ear Str	ength (kPa)		
								▲ Undis		△ Rei	moulded		

patersongroup

Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Commercial Development - 3735 St. Joseph Blvd. Ottawa, Ontario

DATUM

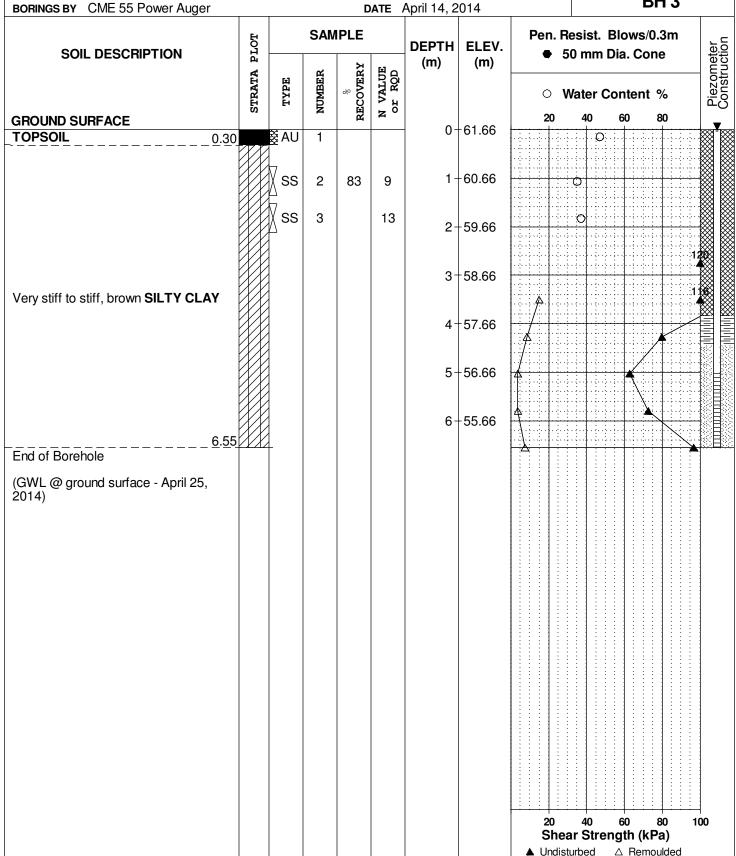
TBM - Top spindle of fire hydrant, north side of St. Joseph Boulevard, in front of subject site. Geodetic elevation of 63.50m was provided for the TBM.

FILE NO. **PG3215**

REMARKS

HOLE NO.

BH 3



SOIL PROFILE AND TEST DATA

Limited Fill Assessment Program 3735 St. Joseph Boulevard

Ottawa, Ontario

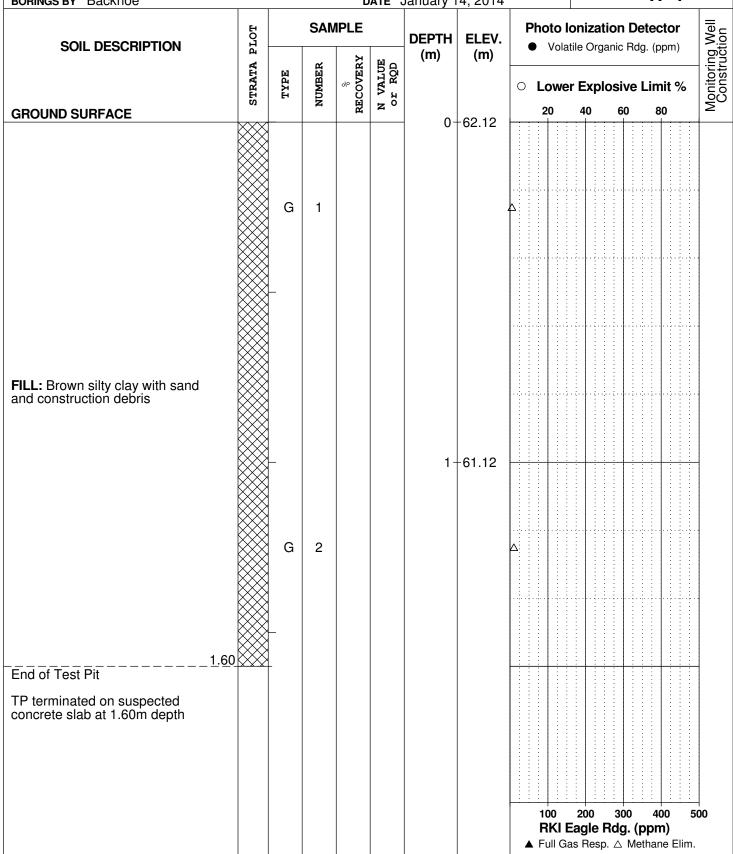
DATUM

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in

FILE NO. PE3204

front of subject site. Geodetic elevation = 63.50m. **REMARKS** HOLE NO. TP 1 **BORINGS BY** Backhoe DATE January 14, 2014



SOIL PROFILE AND TEST DATA

Limited Fill Assessment Program 3735 St. Joseph Boulevard Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM

TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in

FILE NO.

front of subject site. Geodetic elevation = 63.50m.

REMARKS

BORINGS BY Backhoe

PE3204

HOLE NO.

TP 2

BORINGS BY Backhoe				D	ATE .	January 1	4, 2014		IP	
SOIL DESCRIPTION			SAN	MPLE DEPTH			ELEV.		onization Detecto	
	STRATA PLOT	TYPE	NUMBER	% RECOVERY	VALUE r RQD	(m)	(m)		r Explosive Limit	oring
GROUND SURFACE	ß		ž	REC	NON		00.00	20	40 60 80	≥ E
FILL: Brown silty clay with sand and construction debris	S	_ _ _	1	RE			-62.30		40 60 80	M
									200 300 400 Eagle Rdg. (ppm) as Resp. △ Methane	500 Elim.

SOIL PROFILE AND TEST DATA

Limited Fill Assessment Program

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

3735 St. Joseph Boulevard Ottawa, Ontario

TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in FILE NO. DATUM PE3204 front of subject site. Geodetic elevation = 63.50m. **REMARKS** HOLE NO. TD 2

BORINGS BY Backhoe				D	ATE .	January 1	4, 2014		HOLL NO	TP 3			
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	Photo Ionization Detector Volatile Organic Rdg. (ppm)					
COL BLOOM HOW	STRATA P	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			ve Limit %	Monitoring Well		
GROUND SURFACE	STI	L	NON	RECC	N N	0-	-62.11	20		0 80	Mor		
							02.11						
		_											
Brown SILTY CLAY , trace sand													
		G	1										
		_											
0. nd of Test Pit	80 1/1/2	=											
								100 RKI E	200 30 Eagle Rdg		500		
										Methane Elim.			

front of subject site. Geodetic elevation = 63.50m.

SOIL PROFILE AND TEST DATA

Limited Fill Assessment Program 3735 St. Joseph Boulevard

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Ottawa, Ontario TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in FILE NO.

REMARKS

DATUM

PE3204

HOLE NO.

TP 4 **BORINGS BY** Backhoe DATE January 14, 2014 **Photo Ionization Detector SAMPLE** STRATA PLOT DEPTH ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) N VALUE or RQD RECOVERY NUMBER Lower Explosive Limit % 80 **GROUND SURFACE** 0+61.19FILL: Brown silty clay, trace gravel and wood G 1 0.60 2 **TOPSOIL** G 0.80 1 + 60.19**Grey SILTY CLAY** G 3 End of Test Pit 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

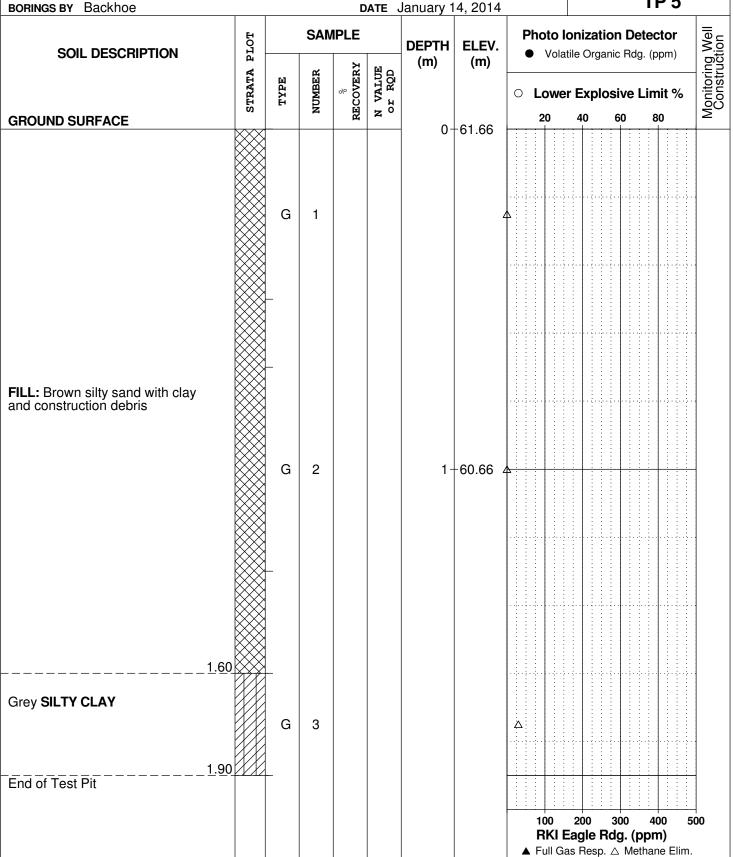
SOIL PROFILE AND TEST DATA

Limited Fill Assessment Program 3735 St. Joseph Boulevard

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Ottawa, Ontario

TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in FILE NO. **DATUM** PE3204 front of subject site. Geodetic elevation = 63.50m. **REMARKS** HOLE NO. TP₅



SOIL PROFILE AND TEST DATA

3735 St. Joseph Boulevard

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Limited Fill Assessment Program Ottawa, Ontario

TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in FILE NO. **DATUM** PE3204 front of subject site. Geodetic elevation = 63.50m. **REMARKS** HOLE NO. TP 6 **BORINGS BY** Backhoe DATE January 14, 2014 **SAMPLE Photo Ionization Detector** STRATA PLOT DEPTH ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) N VALUE or RQD RECOVERY NUMBER Lower Explosive Limit % 80 **GROUND SURFACE** 0+62.22**TOPSOIL** 0.30 G 1 Brown SILTY CLAY, trace sand 1+61.22End of Test Pit 200 300 500 RKI Eagle Rdg. (ppm) ▲ Full Gas Resp. △ Methane Elim.

front of subject site. Geodetic elevation = 63.50m.

SOIL PROFILE AND TEST DATA

Limited Fill Assessment Program 3735 St. Joseph Boulevard

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Ottawa, Ontario

REMARKS

DATUM

PE3204

TP 7

HOLE NO.

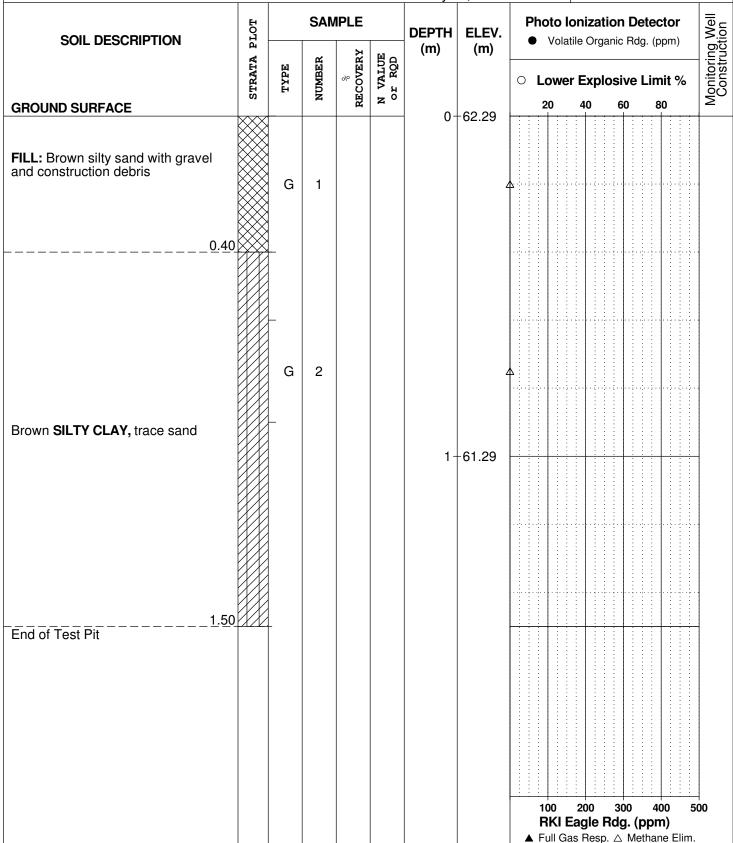
FILE NO.

BORINGS BY Backhoe

DATE January 14, 2014

TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in

Photo Ionization Detector Volatile Organic Rdg. (ppm) 80



SOIL PROFILE AND TEST DATA

RKI Eagle Rdg. (ppm)

▲ Full Gas Resp. △ Methane Elim.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Limited Fill Assessment Program 3735 St. Joseph Boulevard Ottawa, Ontario

Ottawa, Ontario TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in FILE NO. **DATUM** PE3204 front of subject site. Geodetic elevation = 63.50m. **REMARKS** HOLE NO. TP8 **BORINGS BY** Backhoe DATE January 14, 2014 **Photo Ionization Detector SAMPLE** STRATA PLOT DEPTH ELEV. **SOIL DESCRIPTION** Volatile Organic Rdg. (ppm) (m) (m) N VALUE or RQD RECOVERY NUMBER Lower Explosive Limit % 80 **GROUND SURFACE** 0+62.50**TOPSOIL** 0.15 G 1 Brown SILTY CLAY, trace sand 1 + 61.50End of Test Pit 200 300 500

SOIL PROFILE AND TEST DATA

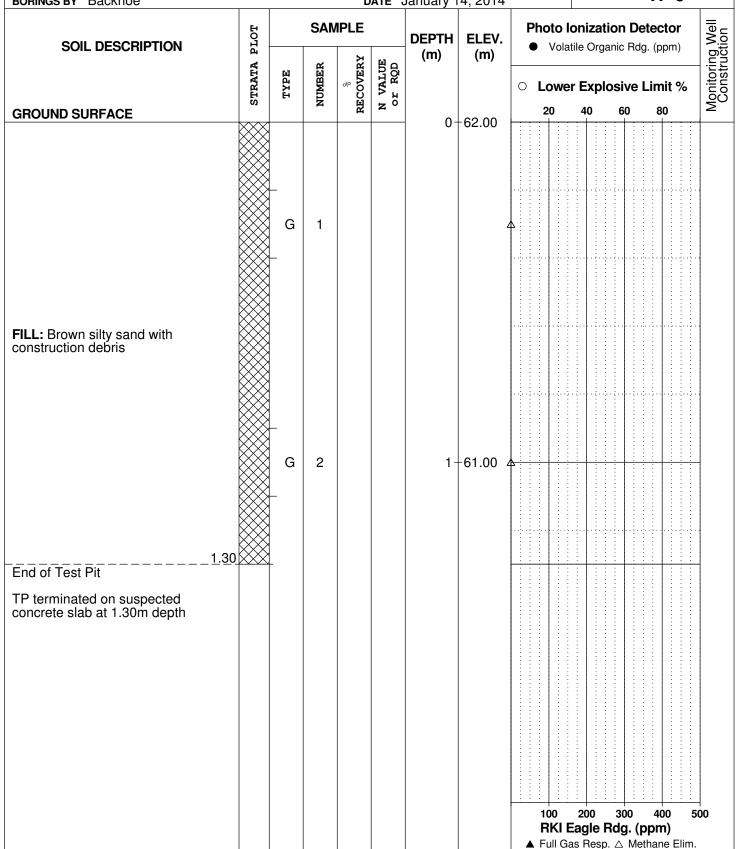
Limited Fill Assessment Program 3735 St. Joseph Boulevard

Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

TBM - Top spindle of fire hydrant located on the north side of St. Joseph Blvd., in

FILE NO. **DATUM** PE3204 front of subject site. Geodetic elevation = 63.50m. **REMARKS** HOLE NO. TP9 **BORINGS BY** Backhoe DATE January 14, 2014



SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value	
Very Soft	<12	<2	
Soft	12-25	2-4	
Firm	25-50	4-8	
Stiff	50-100	8-15	
Very Stiff	100-200	15-30	
Hard	>200	>30	

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC% - Natural moisture content or water content of sample, %

Liquid Limit, % (water content above which soil behaves as a liquid)
 PL - Plastic limit, % (water content above which soil behaves plastically)

PI - Plasticity index, % (difference between LL and PL)

Dxx - Grain size which xx% of the soil, by weight, is of finer grain sizes

These grain size descriptions are not used below 0.075 mm grain size

D10 - Grain size at which 10% of the soil is finer (effective grain size)

D60 - Grain size at which 60% of the soil is finer

Cc - Concavity coefficient = $(D30)^2 / (D10 \times D60)$

Cu - Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:

Well-graded gravels have: 1 < Cc < 3 and Cu > 4 Well-graded sands have: 1 < Cc < 3 and Cu > 6

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

Cc and Cu are not applicable for the description of soils with more than 10% silt and clay

(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

p'_o - Present effective overburden pressure at sample depth

p'c - Preconsolidation pressure of (maximum past pressure on) sample

Ccr - Recompression index (in effect at pressures below p'c)
Cc - Compression index (in effect at pressures above p'c)

OC Ratio Overconsolidaton ratio = p'_c/p'_o

Void Ratio Initial sample void ratio = volume of voids / volume of solids

Wo - Initial water content (at start of consolidation test)

PERMEABILITY TEST

Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

SYMBOLS AND TERMS (continued)

STRATA PLOT



MONITORING WELL AND PIEZOMETER CONSTRUCTION





W B SOIL DESCRIPTION Solution	Orgeouo19/96A Contachnical Investigation Pro	anacad Cammara	ial Davala	nmont			ı	Figure I	No	2				
Date Drilled: 'November 11, 2008 Drill Type: Datum: Geodetic Logged by: Checked by: Shear Strength by Vane Test Soll DESCRIPTION FILL Silty clay, rootlets in upper levels, occasional rock and concrete fragments, reworked, brown, moist (loose) Auger Refusal @ 0.8 m depth on concrete slab Notes -Moved borehole 2 m south met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 2 m South met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @ 0.75 m depth			iai Develo	וושוווקי			_	Feui	ille.	of	_1_			
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Shelby Tube Shear Strength by Vane Test Shear Strength by Vane Test Shear Strength by Penetrometer Test Shear Strength	D.1				est							⊢ €		
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occasional rock and concrete fragments, reworked, brown, moist (loose) Auger Refusal @ 0.8 m depth on concrete slab Notes -Moved borehole 2 m south met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @	FILL Silty clay, rootlets in upper levels,	01	9			30 21			1::::::::::::::::::::::::::::::::::::::	40		M		
Auger Refusal @ 0.8 m depth on concrete slab Notes -Moved borehole 2 m south met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @	→ occasional rock and concrete fragme		-2-4-1-2-			n	- 1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2							
Notes -Moved borehole 2 m south met refusal @ 0.75 m depth -Moved borehole 5 m west met refusal @	Auger Refusal @ 0.8 m depth on c	oncrete												
0.75 m depth -Moved borehole 5 m west met refusal @	Notes	ucal @												
1.1 m depth	0.75 m depth													
	1.1 m depth													
IOTES: WATER LEVEL RECORDS CORE DRILLING RECORD		NA/ATEC		COPP					DE DO	T T NO D	ECOP	<u> </u>		
+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$		Elapsed	Water		Hole Ope	en		Dep	th			RQD		
2. Borehole backfilled upon completion of drilling Time Level (m) To (m) No. (m) Completion Dry 1.7	·						NO.	<u>(m</u>	,					
3. Field work supervised by a Trow representative	·	1		- 1										
4. See Notes on Sample Descriptions 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A	nole backfilled upon completion of drilling work supervised by a Trow representative													

5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WATER LEVEL RECORDS										
Elapsed Time	Water Level (m)	Hole Open To (m)								
Completion	Dry	1.7								

	CORE DRILLING RECORD													
Run No.	Depth (m)	% Rec.	RQD %											



Project Project	et No: OTGE00019796A	roposed Co	mmore	ial	Dovo	anmai	. +		-	Figure	No	3			
Locati				ilaı	Deve	Ohmei	n			Feu	ıille	of	_1_		
	Orilled: 'November 11, 2008	i, Ottawa, C	Jillano		-										
				-	Split Sp Auger S	oon San Sample	ple		X I			pour Reade Content	•		□ X
Drill Ty			***************************************		SPT (N)		-act		0		erg Limits ned Triax			 	→
Datum				-	Shelby	Tube				% Stra	in at Failu	ure			\oplus
Logge	d by: Checked by:				Shear S Vane Te		ру		+ s		Strength ometer Te				•
SYMBO G&L	SOIL DESCRIPTION		Geodetic	D e p		andard Po	enetration 40	Test N \	/alue 80	- 1 :	250	pour Readi	750	SAMPLES	Nat Unit
r g		6	m 61.1	p t h	1	Strength 50		50	kP 200	1		sture Conte ts (% Dry V 40 6	Weight) 60	LES	kN/
	FILL Silty clay, organics and topsoily in u levels, reworked, oxidized in lower l	upper levels –			-5 (-1 -5									2 1	
	brown, moist (loose)	10 (0.10)					+ 0-1-2-0 + 0-1-2-0						2 0 1 1		
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	SILTY CLAY —Brown to grey, moist (hard to stiff)			2	0			111111	<u> </u>	# 0 1 0 0 0 0 0 0 0 0	×	11111	10000	\bot	
	_				13_			-3-0-6-	216	6 + 0 + 6 + 6 + 0 + 0 + 0 + 0 + 0 + 0 +			0.000		
					0			-2-0-6-		6 - 10 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 -		*	0.000		
				3	9				216		×	6-1-0-0-		M	1:
	_	-			-2-4-1-2			12.01				+ 6+ 3+ 5+ 6+ + + 6+ 3+ 5+ 6+	0.0010	$ \wedge$	
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	_				4 O						-1-2-3-1	- 6-1-2-6-	×		
	_			7		58							-5 1	\prod	
2222	Borehole Terminated @ 7.2 m	depth 50	3.9	1		s=5									
				ı											
OTES:				L				<u> </u>	1::::	1:::::				Ц	
Borehole	e/Test Pit data requires Interpretation by Trow se by others	Elapsed	WATER		VEL RE Vater		Hole Ope	en	Run	COF		LING RE			ΩD %
.A 19 mm	slotted pipe was installed in the borehole npletion of drilling	Time		Le	vel (m) 3.0		To (m) 6.7		No.	(m)			-		

3. Field work supervised by a Trow representative

4. See Notes on Sample Descriptions

LOG OF BOREHOLE 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	RDS	
Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	3.0	6.7
1 day	3.0	-
7 days	1.4	-
23 days	1.7	-

	CORE DRILLING RECORD													
Run No.	Depth (m)	% Rec.	RQD %											
	·													



Project No:	OTGE00019796A										Figure	No	4			
Project:	Geotechnical Investigation-Pr	roposed C	ommerc	ial	Devel	opme	ent				-	_	1 of			
Location:	3735 Saint Joseph Boulevard	I, Ottawa,	Ontario								1 60	.	01			
Date Drilled:	'November 11, 2008			-	Split Spo		mpl	е	×				apour Rea	-		
Drill Type:					Auger S SPT (N)				C			l Moistu erg Limit	re Content s		<u>—</u>	× ⊕
Datum:	Geodetic				Dynamic Shelby T		Tes	st				ned Tria in at Fai				\oplus
ogged by:	Checked by:				Shear Si Vane Te	trength	by		+	-		Strength ometer				•
S Y				Ь	T Sta		Pene	etration T	Fest N Va		Combu	ustible Va	apour Read	ing (ppr	ı) Ş	
GW BOL	SOIL DESCRIPTION		Geodetic m	e p t h	Shear	20 Strengtl	40 h 10			80 kPa 200	Na Atter	250 atural Mo berg Lim 20	isture Conte nits (% Dry \	750 ent % Weight) 60) NAMP LIEW	Natu Unit \ kN/r
FILL Silty	clay, topsoil, stone fragments i	in lower	61.9	0			10		1	200		70	40	1		
level	s, reworked, grey/brown, moist	t (loose)			-2-1-1-2			**************************************		1.1.1.1.1			1 - 0 1 0 0			
		-	60.8	1	7			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				 	($ \setminus$	1
SILT	Y CLAY	_	60.5		-5-6-1-6			11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			4.1.1.1	1 1 1 1 1				X
Som oxidi	e topsoil, rootlets in upper level zed, brown to grey, moist (hard	ls, to stiff)_		2	11 O					216		×			X	20
										216					E	1
		_			6				-2-0-1-2				×	12 (11)		
		4		3	6			14	4					1.5 ()		1
		_			0	- 1 - 5 - 5 -			-3-0-1-3		4444	-1-5-6-	×	-0.0-1-	$-\!$	4
		_		4	4				-2 (-1-2			1.2.00	×			1
					0			0 1 0 0 1 1 1 1 1 1	-3-0-1-3		0000	-1-0-0	^			1
					-2-4-1-2-	1 - 2 - 3 - 3 -		0-1-2-0-	-9-0-1-9		0000	-3-0-0-		-0-0-1- -0-0-1-		
		-		5												
		4			2	- 1 - 2 - 0 -	111	0-1-3-0-1 0-1-3-0-1	13 (1.61)	1	0.000	1100	3 - <mark>- 3 - 3 - 5 - 6 -</mark> 3 - - 2 - 3 - 5 - 6 -	×	∇	1
		_		6	***		91		1 1 1 1 1	1.1.1.1.1.1	1111		1 -		\triangle	1
INFE	RRED SILTY CLAY		55.5		-3-6-1-3-	76₅	+ =5 -		-3-0-6-3	1 1 1 1 1 1 1 1 1	0010	1 1 1 1 1 1 1		0.000	Ш	
Perf	ormed Nilcon vane tests from m depth	6.4 to			-2 (-1-2-	- 1 - 2 \\ - - 1 - 2 \\ -			-3 (-6-2					2 6 1 1	2	
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-		-		8												
		_					99					111111				
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					-5 (-1 -5 -		39						6-1-2-6-	-5-6-1-0		
					19 (11 19 1	- 1 - 2 - 2 -		: : - : - : - : - : - : - : - : - : - :	-3-0-6-3		0.000	-1-0-1-		-5 (-1-)		
		-		10								1 2 3 3 3		12 (11)		
	Continued Next Page					1117.5	39 - =15-	1-1-1-1-1	-3-6-6-3		0.640	-3-0-3-1		-26-14		
OTES: .Borehole/Test Pi before use by otl	t data requires Interpretation by Trow	<u> </u>			EVEL RE		DS	-1- 0		D			ILLING R			OD 0/
•	pipe was installed in the borehole	Elapse Time Complet			Water evel (m) 3.8	_		ole Ope <u>To (m)</u> 6.1	en	Run No.	Dep (m		% Re	3.		QD %
	vised by a Trow representative	1 day	,		4.4			-								
•	ample Descriptions	7 day	1		0.9 1.1			-								
This Figure is to OTGE00019796	read with Trow Associates Inc. report															

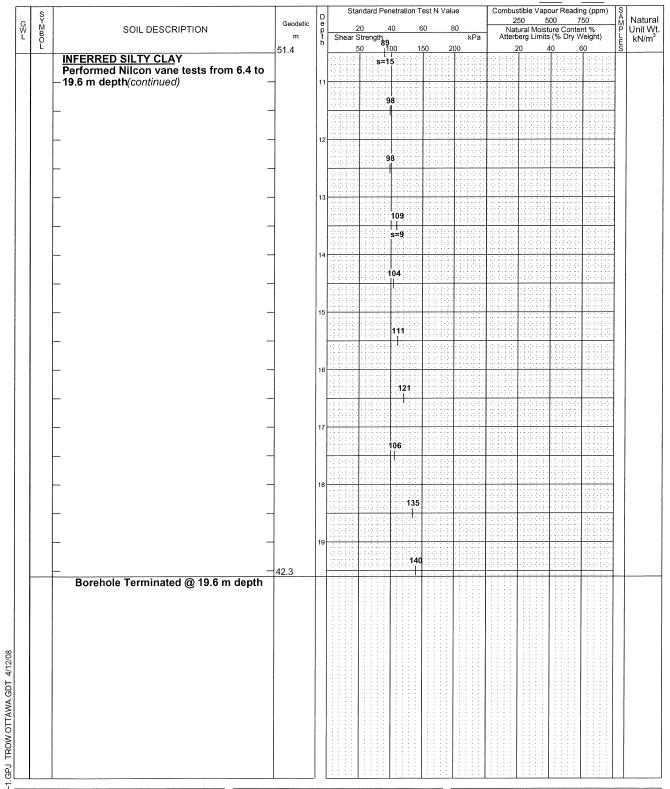
5. This Figure is to read with Trow Associates Inc. report OTGE00019796A



Project No: OTGE00019796A

Project: Geotechnical Investigation-Proposed Commercial Development Figure No.

2 Feuille. of



NOTES:
1. Borehole/Test Pit data requires Interpretation by Trow before use by others

2. A 19 mm slotted pine was installed in the horsehole.

2.A 19 mm slotted pipe was installed in the borehole upon completion of drilling

3. Field work supervised by a Trow representative

4. See Notes on Sample Descriptions

Я 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WATER LEVEL RECORDS												
Elapsed Time	Water Level (m)	Hole Open To (m)										
Completion	3.8	6.1										
1 day	4.4	-										
7 days	0.9	-										
23 days	1.1	-										

	CORE DRILLING RECORD												
Run No.	Depth (m)	% Rec.	RQD %										



Ρ	rojec	t No:	OTGE00019796A										Ciaura	Na	5			
Ρ	rojec	t:	Geotechnical Investigation-Proposed	Comme	ercia	al	Devel	opme	nt				Figure					
L	ocatio	on:	3735 Saint Joseph Boulevard, Ottawa	a, Ontar	io								reu	ille	<u>1</u> of			
D	ate D	rilled:	'November 11, 2008			;	Split Sp	oon Sar	nple		\boxtimes		Combu	stible Va	oour Rea	ding		
Di	rill Ty	pe:					Auger S SPT (N)							Moisture	Content			X -€)
D	atum:		Geodetic			ı	Dynami	c Cone	Гest				Undrain	ed Triax			•	Φ
Lc	ogged	l by:	Checked by:				Shelby ⁻ Shear S	trength	by		+ s		Shear S	n at Failu Strength t imeter Te	ру			<u> </u>
	, ,					١	Vane Te											
G W L	S Y M		SOIL DESCRIPTION	Geode	tic	D e p t		andard F 20	enetration 40	on T 6	est N Val	ue 30	2	50 5	our Read	750	SAMP.	Natural Unit Wt
L	М В О L			m 61.6		t h o	Shear	Strength 50		15		kPa 00			ture Conte s (% Dry \ 40	Weight) 60	LES	kN/m³
		FILL Silty	clay to silty sand, topsoil, occasional								-2 (-1.5							
Y 2	\bowtie		ets, brown, moist (loose)	60.8		ĺ	-2 (-1-2			3 44					1 1 1 1 1			
		TOPS	Y CLAY	60.7		1	9							×			$-\bigvee$	
		Oxidi: -	zed, brown to grey, moist (hard to stiff)) 61	0.3								0.000				\parallel	
		_				2	14 O				- 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2	216 A		×		1.5 (-1.	X	18.6
													0.1.1.1			-2-2-1-	7	
		-				f	-2 (-1-2	11.2.2.			-3-4-4-3-	- 1 - 2 - 3 - 3	0.			0 (
				-		3	6			144								
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		-	-			-				::	-3-0-1-3-		0.000			×	Λ	
		-	-	54.4		7		57										
		В	prehole Terminated @ 7.2 m depth					s=5										
		Note	harahala diillad @ 0.5 va yazida saat															
		refusa	borehole drilled @ 2.5 m north met al @ 0.76 m depth															

NOTES:
1. Borehole/Test Pit data requires Interpretation by Trow before use by others
2. A 19 mm slotted pine was installed in the borehole

2.A 19 mm slotted pipe was installed in the borehole upon completion of drilling

3. Field work supervised by a Trow representative

4. See Notes on Sample Descriptions

.GPJ TROW OTTAWA.GDT 4/12/08

LOG OF BOREHOLE 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	ER LEVEL RECO	RDS
Elapsed Time	Water Level (m)	Hole Open To (m)
completion	3.0	6.1
1 day	2.9	-
7 days	1.1	-
23 days	1.3	-

	CORE DR	RILLING RECO	RD
Run No.	Depth (m)	% Rec.	RQD %



Project No: OTGE00019796A Project: Geotechnical Investigation-Prop	osed Commerc	cia	l Develo	pmen	t		í		_	6			
Location: 3735 Saint Joseph, Ottawa, Oni	tario							Feui	lle.	of			
		-	Split Spo	mple	ple]	Natural	Moistu	apour Read re Content	ding		□ X
Datum: Geodetic		_	SPT (N) Dynamic		est		- -	Atterber Undrain	ed Tria	xial at		1	—⊖ ⊕
Logged by: Checked by:		_	Shelby T Shear St Vane Tes	rength b	у	+ S	-	% Strair Shear S Penetro	trength	by			▲
G Y M B SOIL DESCRIPTION O L	Geodetic m	P	Shear S	0	netration 40		80 kPa	2	50	apour Readi 500 7 isture Conte iits (% Dry V	50	SAMPLES	Natu Unit \ kN/r
FILL Silty clay, asphalt, rail track ties, conc blocks, steel pipes, burnt wood, some	61.1 rete	h o	1 5	0 1	00 1	50	200		20		30	S	
organics, occasional voids, brown to brown/grey, moist		1		- 1 - 2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		-3 -3 -3 -3				*	-5 (-1)	m	7
-Water @ 1.1 m depth over possible s concrete	lab _		10.000	- 1 - 2 - 2 - 1		- 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2						
SILTY CLAY Organics, grey, moist	59.1 58.8	2											
NOTES: 1. Borehole/Test Pit data requires Interpretation by Trow before use by others	WATE	_I R L	EVEL RE		Hole Op		Run	COI		ILLING R			QD %
2.Test Pit backfilled upon completion of excavtion	Time Completion	L	.evel (m) 1.5	-	To (m)		No.	(m)					

3. Field work supervised by a Trow representative

4. See Notes on Sample Descriptions

LOG OF BOREHOLE 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	ER LEVEL RECC	RDS
Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	1.5	-

	CORE DR	RILLING RECO	RD
Run No.	Depth (m)	% Rec.	RQD %



_	ject No 										Figure	No.	7			
	ject:	Geotechnical Investigation-F		mmerc	cial	Devel	opmer	nt					1_ of			
	ation:	3735 Saint Joseph, Ottawa,	Ontario									_				
Date	e Drille	d: 'November 14, 2008			-	Split Sp		ple		3			apour Rea	•		
Drill	Туре:				-	Auger S SPT (N)					Natural Atterbe		re Content s		-	X ⊕
Datı	um:	Geodetic			-	Dynamic Shelby		est		- I	Undrair % Strair					\oplus
Log	ged by:	Checked by				Shear S Vane Te	trength I	ру	- - - -	_	Shear S Penetro					•
	9				_	Sta		enetration			Combu	stible Va	pour Read	ing (ppm	ı İs	т -
G W L	S Y M B O L	SOIL DESCRIPTION		Geodetic m	Depth	Cheer	20 Strength	40	60	80 kPa	2	50		750) SAMPLES	Natu Unit
	₽ FIL	1	61	1.3	h o	Silear	-	100	150	200		20 1		60	ES	kN/i
X	\bowtie \overline{w}	bod, concrete blocks, steel pipes acrete and stone rubbles, blue 4	S,			-0-0-1-0	- 1 - 2 - 2 - 1				0.000	-3-5-6-	1			
×	XX ste	el drums, glass, plastic over 0.1 k x 1.4 m x1.5 m concrete slab	5 m			-3-(-1-)					0110	×	1		m	2
×	m	hick oragines mixed with gravel	over 0.3		1						0.000					
\aleph	X -		4			-2-6-1-2			1.3 (0.4.)		10000000	444	1	10.011		-
		TY CLAY	59 59	9.5	2											
	Bro	own, moist ackhoe Bucket Refusal @ 2.1			Ť											
OTES					L			: : : :			::::		1::::		Ш	
Bore		Pit data requires Interpretation by Trow others	Elapsed	WATER		VEL RE		S Hole Ope	20	Run	COP		LLING RI			۰۷ مار
.Test	Pit backfill	ed upon completion of excavtion	Time Completion	n		valer vel (m) 1.5		To (m)		No.	Dept (m)		70 KeC	··		QD %
Eiwi-	work	anicod by a Tray and a second	Joinplettol	'		1.0		-								
	•	ervised by a Trow representative Sample Descriptions														
		o read with Trow Associates Inc. report														

WAT	ER LEVEL RECC	RDS
Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	1.5	-

	CORE DF	RILLING RECO	RD
Run No.	Depth (m)	% Rec.	RQD %
	!		



Project	No:	OTGE00019796A	•						F	igure l	Nο		8	. –		
Project	i:	Geotechnical Investigation-Proposed	Commerc	cial	Develo	opmen	t		_ '		ille.					
Locatio	n:	3735 Saint Joseph, Ottawa, Ontario								i cui			. 01			
Date D	rilled:	'November 14, 2008		-		oon Samp	ole	\boxtimes		Combus				ling		
Drill Ty	pe:			-	Auger Sa SPT (N)					Natural Atterber			ntent	F		× ⊕
Datum:		Geodetic		_	Dynamic Shelby T	: Cone Te ube	est			Undrain % Strair			t			\oplus
Logged	l by:	Checked by:			Shear St Vane Te	rength by	у	+ s		Shear S Penetro						•
SYMBO.		SOIL DESCRIPTION	Geodetic	D e p t	1			Γest N Vali	ue 0	2	250	500	75	ng (ppm) 50	J⋒I	Natural Unit Wt.
ř B			m _61.1	h h	-	Strength		50 20	kPa		tural Mo berg Lim 20	its (%		Veight)	LES	kN/m ³
	FILL Silty	clay, reworked brown/grey, moist		ľ												
	-	-			-2-0-1-2-			-2-0-1-2-		2112	×		1		100	
	_	-	-	1												
	TOP	SOPIL	59.6		-5 (-1-5			-5 -6 -5 -5		0000			1		\perp	
	Occa	isional red brick er @ 1.8 m along old foundation block	59.3	2								×			m	
3333	∖\wall/f	ooting Y CLAY	00.0	Ť											П	
	Brow	n, moist Test Pit @ 2.1 m depth														
												1::			LL -	
NOTES: 1. Borehole before us	Test Pit	data requires Interpretation by Trow			EVEL RE		S dala One		Dun					CORD		D 0/

LOG OF BOREHOLE TPLOGS~1.GPJ TROW OTTAWA.GDT 26/11/08 2. Test Pit backfilled upon completion of excavtion 3. Field work supervised by a Trow representative 4. See Notes on Sample Descriptions 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	ER LEVEL RECC	RDS
Elapsed	Water	Hole Open
Time	Level (m)	To (m)
Completion	1.8	-

	CORE DF	RILLING RECO	RD
Run No.	Depth (m)	% Rec.	RQD %



		t No:	OTGE00019796A									F	-igure	No.		ç)						
	rojec		Geotechnical Investigation-Propo	sed Commercia	al De	evel	opı	men	t				_	uille.	1			1					
Lo	ocatio	on:	3735 Saint Joseph, Ottawa, Onta	rio												_							
Da	ate D	rilled:	'November 14, 2008					Sam	ole		3			ustible \				g					
Dr	ill Ty	pe:				ger S T (N)						Natural Moisture Content Atterberg Limits								X -——⊕			
Da	atum	:	Geodetic		Dynamic Cone Test —— Shelby Tube				-			ined Tri ain at Fa						\oplus					
Lo	gged	d by:	Checked by:		She	-	tren	ength by			 - S		Shear Penet	Strengt rometer	h by Test	:				•			
								ard Pe	netration				Comb	oustible \	Vapour Readin		ading (ppi		Ş				
G W L	SYMBOL		SOIL DESCRIPTION	Geodetic	D e p t S	hear	20 Stre		10	60	80	kPa	Atte	250 latural M erberg Li	500 oistur mits (e Cor % Dry	750 Itent Wei	% ght)	SAMPL	Natura Unit W kN/m³			
-	Ľ	FILL		61.2	h O		50	1	00	150	200			20	40		60		E S				
		Silty	clay, concrete and wood rubbles, v	vet	-2											2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -							
	\bowtie	_			1									×									
	\bowtie																						
		-Con	crete slab @ 1.5 m depth Backhoe Bucket Refusal @ 1.6	59.6	+		- ·											1 1 1	+				
			Backfloe Bucket Neiusal (@ 1.0																				
																				I			
																				l			
							1																
	TES:	/Tost D'	data requires Interpretation by Taxwall	WATER I	FVF	I RF	=C:C	ORD	3				C(ORE DI	 	ING	REC	ORI)				
í b∈ :	efore u	se by oth		Elapsed	Wa	ter			Hole Op		Ru		De	pth		% R				ΩD %			
2. To	est Pit I	oackfilled	upon completion of excavtion	Time Completion	<u>Leve</u> Dr				<u>To (m</u>		No).	(r	11)	T								
3. Fi	eld wo	rk superv	ised by a Trow representative																				
)			nple Descriptions																				
5. TI 0	nis Figu TGE00	ure is to r 019796A	ead with Trow Associates Inc. report																				

WATER LEVEL RECORDS										
Elapsed Time	Water Level (m)	Hole Open To (m)								
Completion	Dry	-								

CORE DRILLING RECORD									
Run No.	Depth (m)	% Rec.	RQD %						



Project No:	OTGE00019796A	•				_			C:	N.I	10		-	
Project:	Geotechnical Investigation-Pr	oposed Commerc	cial	Develo	opmen	t			Figure I		10			
Location:	3735 Saint Joseph, Ottawa, C	Ontario							Feui	ile	<u>1</u> of			
Date Drilled:	'November 14, 2008		_	Split Spo	oon Samp	ole	\boxtimes		Combus	stible Var	pour Read	ling		
Drill Type:			Auger Sample — SPT (N) Value					Natural Moisture Content Atterberg Limits					X ①	
Datum:	Geodetic		_	Dynamic	Cone Te	est			Undrain	ed Triaxi		,		Φ
Logged by:	Checked by:			Shelby T Shear St	Γube trength by	y	+ s		Shear S	n at Failu Strength b	ру			•
				Vane Te						meter Te				
SYMBO.	SOIL DESCRIPTION	Geodetic	Standard Penetration Test N Value						Combustible Vapour Reading (p 250 500 750 Natural Moisture Content % Atterberg Limits (% Dry Weigh				A N	Natural Unit Wt.
L		60.7	h 0		Strength			kPa 00	1			Veight)	L E S	kN/m³
FILL Silty	clay, reworked brown/grey, mo		ľ											
		-		.2 (-1.2			-3 -5 -5 -5		0.000	×	4-1-2-6-	-3-4-1-3-	m	
		4	1										\mathbb{I}	
		59.2		-2-4-1-2-			12 (2 (2 (2)	- 1 - 2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	0.000					
	SOPIL Y CLAY	58.9		12 (112)			-3-0-0-3-		0.646.0					
Brow		58.6	2										\mathbb{H}	
'	cot i it reminated @ 2.1 m c	acptii												
NOTES:											1			
Borehole/Test Pit before use by other	data requires Interpretation by Trow ers	WATER Elapsed		VEL RE Water	Н	lole Ope	n	Run	COR		LING RE % Rec.		RQ	D %
2 Toot Dit bookfilled	upon completion of execution	Time	16	evel (m)		To (m)		No	(m)	i		1		

3. Field work supervised by a Trow representative
 4. See Notes on Sample Descriptions
 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

LOG OF BOREHOLE TPLOGS~1.GPJ TROW OTTAWA.GDT 26/11/08

Elapsed	Water	Hole Open					
Time	Level (m)	To (m)					
Completion	Dry	-					

	CORE DRILLING RECORD										
Run No.	Depth (m)	% Rec.	RQD %								



Projec	t No:	OTGE00019796A										Nla	1.				
Projec	:t:	Geotechnical Investigation-Proposed	Commerc	cial	Deve	lopm	ent				Figure	ille					
Locati	on:	3735 Saint Joseph, Ottawa, Ontario									reu	ille	1 01				
Date D	rilled:	'November 14, 2008		Split Spoon Sample						Combustible Vapour Reading							
Drill Ty	/pe:			Auger Sample SPT (N) Value							Moisture rg Limits		t F		× ⊸		
Datum: Geodetic				-	Dynam Shelby		e Te	st				ned Triax n at Failu				\oplus	
Logged by: Checked by:					Shear S Vane T	Strengt	:h by		+ s		Shear S	Strength I ometer Te	by		•		
G N M M SOIL DESCRIPTION		Geodetic						80	Combustible Vapour R 250 500 Natural Moisture C Atterberg Limits (% [750		Natural Unit Wt.			
r Š	FII 1		61.1	h o	Shear	Streng	th 10	00 1	50 2	kPa			ts (% Dry 40	Weight)	SAZP-IIIO	kN/m³	
	FILL Silty	clay, reworked brown/grey, moist			0.0010												
		•			-2-(-1-)			- 6- 6- 3- 6-	-2-0-6-2	1 - 5 - 3 - 3 - 5		-1-0-0-1	×	1 2 5 1 2	83		
	_	-		1	-0.0-1-1				-5 -5 -5 -5								
<u> </u>	TOP	SOPIL	59.6		-5-6-1-		:::: ::::::	- 0- 1- 3- 0- - 0- 1- 3- 0-	-3-0-1-3	1-1-1-1-1		1.100.11			\mathbb{H}		
	SILT	Y CLAY n, dry	59.3 59.0	2										-2.5-1-2			
		Test Pit Terminated @ 2.1 m depth															
NOTES: 1. Borehole	e/Test Pit	data requires Interpretation by Trow	WATER	R LE	EVEL R	ECOF	 RDS				COF	RE DRII	LING F	ECORD			

2 Eiold	work	aupania ad	h a	Trou	ronronant	a #i a
J.I ICIU	WUIK	supervised	υуа	HOW	represent	auve

OG OF BOREHOLE TPLOGS~1.GPJ TROW OTTAWA.GDT 26/11/08			
7	- NO	TES:	
SPOR	1.E	Boreho	le/Test Pit data requires Interpretation by Trow use by others
JE TE	2.1	est Pit	backfilled upon completion of excavtion
표			
30R	3.F	ield w	ork supervised by a Trow representative
OF E	4.5	See No	tes on Sample Descriptions
000	5. T		gure is to read with Trow Associates Inc. report 0019796A

WATER LEVEL RECORDS										
Elapsed Time	Water Level (m)	Hole Open To (m)								
Completion	Dry	-								

CORE DRILLING RECORD									
Run No.	Depth (m)	% Rec.	RQD %						



Projec								ı	Figure I	No	12	_					
Projec	:t:	Geotechnical Investigation-Proposed	Commerc	cia	l Deve	lopn	nent	:					1 of				
Locati	on:	3735 Saint Joseph, Ottawa, Ontario									i c ui						
Date D	Orilled:	'November 14, 2008		_	Split Sp			le					oour Read	-			
Drill Ty	/pe:			Auger Sample SPT (N) Value						Natural Atterber		Content	F		× ⊕		
Datum	:	Geodetic		_	Dynam Shelby			est				ed Triaxi n at Failu				\oplus	
Logge	d by:	Checked by:			Shear S Vane T	Streng		′	+ s			trength b			A		
S Y M B O L		SOIL DESCRIPTION	Geodetic m	tic e p	Standard Penetration Test N V e					ue 30 kPa	Combustible Vapour Reading (ppi 250 500 750 Natural Moisture Content % Atterberg Limits (% Dry Weight)			50		Natural Unit Wt. kN/m³	
K	FILL		61.6	0	1	50	10	00 1	50 2	00	1			60 	S	IXI VIII	
	⊢ parts	clay, silty sand, steel pipes, wood barn , wires, concrete blocks, 0.15 x0.15 m - d ties, rubber tires, concrete block	_		2011						21112			-5-6-1-5	FF2		
	found	dation wall	-	1	100000							N 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2			4		
		_			0.0010				-3-0-6-3	- (-) -(- (-	0.0.0.0	-1-0-0-1		0010			
	-Con	crete slab @ 1.7 m depth	59.6		2 6 1 2						0.000			2010			
	SILT	Y CLAY n, moist	59.3	2			1.1.		-3 -3 - 3 - 3			- 3 - 3 - 3 - 3 -					
NOTES: 1. Borehole	OTES: Borehole/Test Pit data requires Interpretation by Trow WATER LEVEL RECORDS CORE DRILLING RECORD																

2. Test Pit backfilled upon completion of excavtion

3. Field work supervised by a Trow representative

LOG OF BOREHOLE TPLOGS~1.GPJ TROW OTTAWA.GDT 4/12/08 4. See Notes on Sample Descriptions 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	ER LEVEL RECC	VEL RECORDS									
Elapsed Time	Water Level (m)	Hole Open To (m)									
Completion	1.8	<u>-</u>									

CORE DRILLING RECORD									
Run No.	Depth (m)	% Rec.	RQD %						



Projec Projec	t No: OTGE00019796A t: Geotechnical Investigation-Pro	oosed Commerc	cial	Devel	opmei	nt -		-	Figure I					
Location					- до	- *			Feui	lle.	of	_1_		
	rilled: 'November 14, 2008			Split Spo	on Con	anla	<u> </u>	 ZI	Combus	tible \/c	nour Boo	dina		
Drill Ty				Auger S	ample	ipie	0	0	Natural	Moistur	pour Rea e Content	-		×
Datum	Candatia		_	SPT (N) Dynamic		Гest		-	Atterber Undrain	-			<u> </u>	→
Logged			-	Shelby 7	ube		•	_	% Strair Shear S	at Faile	ure			⊕
Logget	a by Checked by			Shear S Vane Te	trength st	by	-	 	Penetro					•
s S Y		Geodetic	D e			enetration			2	50	pour Read 500	750	I A	Natu
GWL SYMBOL	SOIL DESCRIPTION	m	p t h	Shear	20 Strength 50		60	kPa		ural Moi: erg Limi 0	sture Cont ts (% Dry		PLL	Unit \ kN/n
	FILL Silty clay, rubber tires, truck steel dur	61.2	0			100	150	200			40	60	3	
	 garbage bags, wood, steel pipes, ligh brown/grey, moist 			-3-3-1-3	-1-5-5-				-0-1-1-0-	-1-0-0-1				
	brown/grey, moist _		1								*			
		59.7		-5-5-5-5 -5-5-5-5										
<u>~~</u>	Concrete slab @ 1.4 m depth TOPSOIL			-2-6-1-2			1.2.2.2.			-1-1-1-1	4 1 1 1 1			
	Silty clay, organics, dark brown SILTY CLAY	59.2	2											
	Brown, moist Test Pit Terminated @ 2.3 m de	58.9	+	11111	1 1 1		1 1 1 1				1 1 1 1 1	1 1 1 1		
	G	•												
		:												
NOTES:	e/Test Pit data requires Interpretation by Trow	WATER	R LE	EVEL RE	CORE	s			COF	E DRI	LLING R	ECOR	D	
before u	se by others	Elapsed	,	Water		Hole Op		Run	Dept		% Re			QD %
2.Test Pit	backfilled upon completion of excavtion	Time Completion	L€	evel (m) 1.8		To (m		No.	(m)			_		
3. Field wo	rk supervised by a Trow representative													
	es on Sample Descriptions													
5. This Fig	ure is to read with Trow Associates Inc. report 0019796A													

WAT	ER LEVEL RECORDS								
Elapsed Time	Water Level (m)	Hole Open To (m)							
Completion	1.8	<u>-</u>							

CORE DRILLING RECORD									
Run No.	Depth (m)	% Rec.	RQD %						



	rojec rojec	t No: OTGE00019796A t: Geotechnical Investigation-Proposed	l Commer	cia	l De	evel	ор	men	t			Figure						
L	ocatio	on: 3735 Saint Joseph, Ottawa, Ontario										reu	ш е .		of			
Da	ate D	rilled: 'November 14, 2008			Spl	lit Sp	oon	Samı	ole	۵	3	Combu	stible \	√apo	our Read	ding		
Dı	rill Ty	pe:		_		ger S T (N)						Natural Atterbe			Content		<u> </u>	X →
Da	atum	Geodetic			Dyr	nami	c C	one Te	est		-	Undrair	ned Tri	axia				Φ
Lo	ogged	I by: Checked by:		_		elby ī ear S		e ngth b	y	-	■ -	% Strai Shear S	Strengt	h by	,			•
						ne Te				\$	6	Penetro	ometer	res	it			_
G& L	S Y M	CON DESCRIPTION	Geodetic	D			anda 20		netration	Test N V 60	alue 80	1 2	250	50	ur Readi	50	1) S A N P	Natura
Ľ	SYMBOL	SOIL DESCRIPTION	m 61.4	e p t		hear:	Stre 50	ength			kPa 200		turai ivi berg Lir 20	oistu mits 4(re Conte (% Dry V	veight)	LLES	Unit W
		FILL Silty clay, rubber tires, truck steel dumper,	01.4	0		: : : : : : : : : : : : : : : : : : :	Ī											
		-garbage bags, wood, steel pipes, light brown to dark brown, moist	-		-5-	0-1-2		-3-6-6-	+ 6+ 1+3+6+ + 6+ 1+3+6+	1000	2	0-6-2-0- 0-6-2-0-	1:3:0:0		- 	10.01		
	\bowtie	-		1			#	-	0.1.3.0	1:2:0:1:			1:1:1:1	×		201	· · · · · ·	
	\bowtie		59.9							1000		1888	1.1.0.0			0.00		
	\cong	Concrete slab @ 1.4 m depth TOPSOIL	7 00.0		10.				0.1.2.0	19 0 0			1101			-9-6-1		
		Silty clay, organics, dark brown SILTY CLAY	59.4	2	-		H					1						
		Brown, moist Test Pit Terminated @ 2.3 m depth	59.1	\dagger	1		1:						1 1 1 1					
							:											
					1													
							:											
							1:											
							1:											
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						- :												
NO 1.E	TES: Borehole	7/Test Pit data requires Interpretation by Trow	WATE	R L	EVE	L RE	EC	ORDS	3			СО	RE DF	RILL	ING R	ECOR	D	
b	efore u	se by others Ela	psed ime	L	Wa eve	ter I (m)			Hole Ope		Run No.	Dep (m			% Red	c.	R	QD %
- 1	oot rit		pletion		1.				-			,						
3.F	ield wo	rk supervised by a Trow representative																
4		es on Sample Descriptions																
5.T C	his Figu TGE00	ure is to read with Trow Associates Inc. report 019796A																

2	5. This Figure is to read with Trow Associates Inc. OTGE00019796A	repor
7	OTGE00019796A	

WATER LEVEL RECORDS									
Elapsed Time	Water Level (m)	Hole Open To (m)							
Completion	1.8	-							

CORE DRILLING RECORD									
Run No.	Depth (m)	% Rec.	RQD %						



Project	No: <u>OTGE00019796A</u>									Figure	No	15			
Project:	Geotechnical Investigation-Propo	sed Commerc	cial	l Devel	opr	nen	t					1_ of			
Location	n: 3735 Saint Joseph, Ottawa, Onta	ario								1 60	aine.				
Date Dri	lled: 'November 14, 2008		_	Split Sp	oon	Samp	ole	٥		Combi	ustible V	/apour Rea	ding		
Drill Typ	e:		_	Auger S SPT (N)							ıl Moistu erg Limi	ire Content ts		<u> </u>	X —⊖
Datum:	Geodetic		_	Dynamic Shelby			est		-		ined Tria				\oplus
Logged	by: Checked by:			Shear S Vane Te	tren		у	- - -			Strengti				•
S S			Т	Sta		rd Pei	netration	Test N V				apour Read		n) Ş	
G M B O L	SOIL DESCRIPTION	Geodetic m	e p t h	Shear	20 Strei	ngth	10	60	80 kPa	N: Atte	250 atural Mo rberg Lir	500 7 pisture Conte nits (% Dry \	750 ent % Weight)	SAMPLES	Natura Unit W kN/m
<u> </u>	TOPSOIL	62.1 61.8	0		50	1	00	150	200		20	40	60	<u> </u>	
1 <i>1888</i> 881-1	Silty clay, plant fibres, swampy odour, black, moist			-2-4-1-5		1									
	SILTY CLAY Brown, moist	61.2	-	-5-4-1-5			4-1-5-0	1 1 1 1 1							
	Test Pit Terminated @ 0.9 m dep	th													
NOTES:]						T::::	1::::	1:::	11::::			
	Fest Pit data requires Interpretation by Trow by others	WATER		EVEL RE Water	ECC		Hole Op	en	Run	CC		ILLING R % Red			QD %
2.Test Pit ba	ackfilled upon completion of excavtion	Time Completion		evel (m) Dry			To (m		No.	(m			-		-
3.Field work	supervised by a Trow representative														
4. See Notes	on Sample Descriptions														
5. This Figure OTGE000	e is to read with Trow Associates Inc. report														

5. This Figure is to read with Trow Associates Inc. report OTGE00019796A
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WATER LEVEL RECORDS								
Elapsed Time	Water Level (m)	Hole Open To (m)						
Completion	Dry	-						

CORE DRILLING RECORD									
Run No.	Depth (m)	% Rec.	RQD %						



Project No:	OTGE00019796A							•		,	Figure I	vlo.	16			
Project:	Geotechnical Investigation-Proposed	Commerc	cial	Deve	elop	omen	t				-	lle				
Location:	3735 Saint Joseph, Ottawa, Ontario										reui	пе. —	01			
Date Drilled:	'November 14, 2008		_	Split S			ole					stible Vap				□ ×
Drill Type:			-	Auger SPT (N					0		Atterber	Moisture g Limits	Content	F		~
Datum:	Geodetic		-	Dynam Shelby			est					ed Triaxia at Failui				\oplus
Logged by:	Checked by:			Shear Vane 1	Stre	ength b	у		+ s			trength b meter Te				•
G W B O L	SOIL DESCRIPTION	Geodetic	Depth		20		netratio	on T	est N Va	30	2		00 7	ing (ppm) 750 ent %		Natural Unit Wt.
1 1		61.6	h 0	Shea	r Str 50	ength	00	15	50 2	kPa				Weight) 60	E S	kN/m³
WW black	clay, plant fibres, swampy odour,	61.3		-3-6-1-					-9 (0 6 - 9		6.6.2.6					
Brow	Y CLAY /n, moist	60.7		-5-4-1-					-3 -0 - 6 - 3		5015				Ш	
	Fest Pit Terminated @ 0.9 m depth															
NOTES:	t data requires Interpretation by Trow	WATER	RLF	EVELE	REC	ORDS	3		7		COF	RE DRII	LING R	ECORD		

before use by others

2. Test Pit backfilled upon completion of excavtion

3. Field work supervised by a Trow representative

4. See Notes on Sample Descriptions

LOG OF BOREHOLE TPLOGS~1.GPJ TROW OTTAWA,GDT 26/11/08 5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	ER LEVEL RECC	RDS
Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	Dry	-

CORE DRILLING RECORD									
Run No.	Depth (m)	RQD %							



	roject No: roject:	OTGE00019796A Geotechnical Investigation-Pr	ronosed Commo	roi	al Dow	مام	mee				Figu	ıre N	lo		17			
	ocation:	3735 Saint Joseph, Ottawa, O		,ı Ulc	ai DEVI	GIU	ZITI GIT				F	euill	e	1	of	_1_		
		: 'November 14, 2008	Jillano				_											_
	ill Type:	. November 14, 2006			Split S Auger		n Samp nple	ole		⊠ N			ible Va Ioisture			•		×
	atum:	Condatio			SPT (I		alue Cone Te	est) _			Limits d Triax				<u> </u>	—
		Geodetic			Shelb	y Tu	be		_		% \$	Strain	at Failu ength l	ıre	ι			\oplus
LO	ogged by:	Checked by:			Shear Vane		ength by	У	-	 S			neter Te					A
	S		Geodeti		D	Stand	dard Per	netration	Test N V	'alue	Co	mbust	ible Var	oour 500		ng (ppr	n) S	Natur
GŞ⊥	SYM BOL	SOIL DESCRIPTION	m		D e p t Shea		ength		60	80 kPa	,	Natu Atterbe	ral Mois irg Limit	ture ts (%	Conte Dry V	nt % Veight)	E LIES	Unit W
	MA TOP	PSOIL clay, plant fibres, swampy odo	61.9 61.6		0	50	: : : : : : : : : : : : : : : : : : :	00	150	200		20	1 - 1 - 1	40		80	S	
	√blac	k, moist TY CLAY			10.018		1 - 2 - 4 - 1 - 1 - 2 - 4 - 1 -	0.0000	12 (2.4)		(- - (- (- (- (- (- (- (- (-		3 -0- 6 - 3	1 4	1-0-6-	-0-6-1	-:-	
	Brov	vn, moist Test Pit Terminated @ 0.9 m o	61.0	+	1000	: 1			-3-0-1-			: : :	1 1 1 1	1.1	100	1 1 1	:	
		rest i it reminated @ 0.5 iii t	черш															
														1				
				İ														
ĺ																		
NOT	TES:			_							1::				::			
1. Bo		it data requires Interpretation by Trow hers	WATE	ER L	EVEL F Water			lole Op	en	Run		CORE	E DRIL		G RE			QD %
2. T€	est Pit backfille	d upon completion of excavtion	Time Completion	L	_evel (m Dry			To (m)		No.		(m)						/0
3.Fi	ield work super	vised by a Trow representative	·		•													
		ample Descriptions																
5. Th	his Figure is to TGE00019796	read with Trow Associates Inc. report																

50	5. This Figure is to read with Trow Associates Inc. report OTGE00019796A
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	WATER LEVEL RECORDS										
	Elapsed Time	Water Level (m)	Hole Open To (m)								
	Completion	Dry	-								

CORE DRILLING RECORD								
Run No.	Depth (m)	% Rec.	RQD %					



Ρ	rojec	et No: OTGE00019796A								Eiguro	NIo	1Ω		
Ρ	rojec	t: Geotechnical Investigation-Proposed	Commerc	cial	Devel	opme	nt				_	18	 1	
Lo	ocati	on: 3735 Saint Joseph, Ottawa, Ontario								Feu	ille. ₋	_1_ of	<u> </u>	
Da	ate D	Orilled: 'November 14, 2008		_	Split Spo	oon Sai	mple		₃	Combu	ıstible V	apour Reading	3	
Di	ill Ty	/pe:			Auger Sa						l Moistui erg Limit	re Content	L	X
Da	atum	: Geodetic			Dynamic	Cone	Test		_	Undrai	ned Tria	ixial at	'	Φ
Lo	gge	d by: Checked by:		_	Shelby T Shear St		by	-	_	Shear	in at Fai Strength	ı by		•
	•				Vane Te						ometer 7			
G W L	SYMBOL	SOIL DESCRIPTION	Geodetic m	Depth	Shear S	20 Strength		60	80 kPa	Na Atter	250 itural Mo berg Lim	apour Reading (500 750 isture Content 9 nits (% Dry Weig		S A M Natura P Unit W L kN/m
	711/	TOPSOIL ¬ Silty clay, plant fibres, swampy odour,	62 61.7	0		0	100	150	200		20	40 60		S
		black, moist SILTY CLAY	H		-2-6-6-2-	- 1 - 2 - 2 -	1)				6+1+5 6+1+5	
		Brown, moist Test Pit Terminated @ 0.9 m depth	61.1	1	-5-6-1-5-	1111	1-1-0-1-2-0 1 1 1 1	1::::		1 0 1 0 0	1111	3 3 - 3 - 3 - 3 - 4 - 3 - 3 - 3 - 3	<u> </u>	
		root it rommatou @ olo in dopin												
	i i													
NO.	TES:			. I		::::	1::::	1::::	1::::	Liiii	1::::			
1.B	orehole	e/Test Pit data requires Interpretation by Trow se by others	WATER psed		VEL RE	CORE	S Hole Op	en	Run	CO Dep		% Rec.	ORD	RQD %
2.T	est Pit	backfilled upon completion of excavtion	me pletion		evel (m) Dry		To (m)		No.	(m			+	
3.Fi	eld wo	rk supervised by a Trow representative												
4. S	ee Note	es on Sample Descriptions												
3.Fii 4.Se 5.Ti	nis Figu TGE00	ure is to read with Trow Associates Inc. report												

Borehole/Test Pit data requires Interpretation by Trow before use by others
2.Test Pit backfilled upon completion of excavtion

3. Field work supervised by a Trow representative					
4. See Notes on Sample Descriptions					
5. This Figure is to read with Trow Associates Inc. r OTGE00019796A	eport				

	WATER LEVEL RECORDS								
	Elapsed	Water	Hole Open To (m)						
Į	rime	Time Level (m)							
	Completion	Dry	-						
l									

CORE DRILLING RECORD								
Run No.	Depth (m)	RQD %						



Project No: Project:	OTGE00019796A Geotechnical Investigation-Propo	osed Commerci	ial Deve	elopr	nent	:				No	19 1 of			
Location: Date Drilled	3735 Saint Joseph, Ottawa, Onta	ario	Split S	Spoon	Samp	ole					apour Read			
Drill Type:			Auger SPT (I	Samp N) Val	le ue]	Natura Atterbe	l Moistur erg Limits	e Content	-	17-11-11	× ⊸
Datum: Logged by:	Geodetic Checked by:		Dynan Shelby Shear Vane	/ Tube	•		+		% Stra	ned Triax in at Fail Strength ometer T	ure by			⊕ ▲
S Y M BO L	SOIL DESCRIPTION	Geodetic m	D e p t Shea		4 ngth		60	80 kPa	Na Atter	250	sture Conte its (% Dry V	50	SAMP LIES	Natu Unit \ kN/r
FIL Silty	<u>L</u> y clay, brown/grey, moist	02	0 0 0 0											
Old	PSOIL water line TY CLAY	61.1	1							- 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2	*	10000000	3	
	wn, dry Test Pit Terminated @ 1.5 m dept													
before use by o	ed upon completion of excavtion	WATER Elapsed Time Completion	LEVEL F Water Level (m			lole Ope To (m)	en	Run No.	CO Dep (m	th	LLING RE			ΩD %
4. See Notes on S	rvised by a Trow representative ample Descriptions read with Trow Associates Inc. report		,											

5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	ER LEVEL RECC	RDS
Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	Dry	-

CORE DRILLING RECORD											
Run No.	Depth (m)	RQD %									



			OTGE00019796A										Figure	No.	20			
	ojec		Geotechnical Investigation-Proposed Commercial Development 6735 Saint Joseph, Ottawa, Ontario										Feu	euille. 1 of 1				
	ocatio		3735 Saint Joseph, Ottawa, O	Ontario								and the same of th						
			'November 14, 2008		Split Spoon Sample Auger Sample								ling		□ X			
	ill Ty				SPT (N) Value O Dynamic Cone Test								Atterbe	rg Limits		ŀ		→
	atum:		Geodetic						one I	est		•	% Strai	ned Triax n at Fail	ure			\oplus
Lo	gged	l by:	Checked by:				Shear S Vane Te		ngth b	y	+	- ;		Strength ometer T				A
G W L	SYMBOL		SOIL DESCRIPTION		Geodetic	D e p t h		20			Test N V	80	1 2	250	pour Readii 500 7 sture Conte its (% Dry W	50	SAMPLES	Nat Unit
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		SILT' Brown	CLAY		59.4				1111	11111		1 1 1 1 1	1 1 1 1 1	1::::::	1 1 1 1 1	1111	╁	-
		T	est Pit Terminated @ 1.9 m	depth														
	TES:	/Toot Dir	data raquiras Interpretation bu Ta		WATER	115	VEL RE		OBD	3				RE DRI	LLING RE	COBD		
be	efore us	e by othe		Elapse Time	d		Water evel (m)			Hole Op To (m		Run	Dep (m	th	% Rec			QD %
2.Τ∈	est Pit b	ackfilled	upon completion of excavtion	Complet		LE	Dry	V		10 (M	-	No.	(m	-				
3.Fi	eld wor	k supervi	sed by a Trow representative															
			nple Descriptions															
o. Th O	nis Figu TGE00	re is to re 019796A	ead with Trow Associates Inc. report															

)	
2	5. This Figure is to read with Trow Associates Inc. repor OTGE00019796A
7	OTGE00019796A

WAT	ER LEVEL RECC	ORDS										
Elapsed Time	Water Level (m)	Hole Open To (m)										
Completion	Dry	<u>-</u>										

	CORE DR	ILLING RECO	RD
Run No.	Depth (m)	% Rec.	RQD %



Proje		d Commerc	cial	Devel	opmen	t		I			21 1_ of			
Locat	· · · · · · · · · · · · · · · · · · ·													
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Datum			-	Shelby	Γube		-		% Strai	in at Fai	lure			\oplus
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ş			D	Sta	andard Pe	netration	Test N Val	ue			apour Read		1) S A	Not
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							-3-0-6-3		0.000		1 - 6 - 1 - 2 - 5			
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	Brown, dry Test Pit Terminated @ 1.7 m depth													
80/														
26/11														
GDI														
GPJ TROW OTTAWA, GDT 26/11/08														
MO N														

NOTES:
1. Borehole/Test Pit data requires Interpretation by Trow before use by others
2. Test Pit backfilled upon completion of excavtion

3. Field work supervised by a Trow representative
4. See Notes on Sample Descriptions
5. This Figure is to read with Trow Associates Inc. report OTGE00019796A

WAT	ER LEVEL RECC	RDS
Elapsed Time	Water Level (m)	Hole Open To (m)
Completion	Dry	-

	CORE DR	ILLING RECO	RD
Run No.	Depth (m)	RQD %	



Project No:	OTGE00019796A												_			Na			22				
Project:	Geotechnical Investigation-Propose	ed Commer	cia	ΙDε	evel	lopr	nen	t					Г			No.		22 1 of 1					
Location:	3735 Saint Joseph, Ottawa, Ontario	0												-	eui	iie.		<u></u>	or		_		
Date Drilled:	'November 14, 2008			Spl	it Sp	oon	Sam	ple			\boxtimes			Com	nbus	stible	Var	our	Read	gnib			
Drill Type:					ger S T (N											Moisi g Lin		Con	tent		_		X ⊕
Datum:	Geodetic		_	Dyr	nami	ic Co	ne T	est						Und	rain	ed Tr	riaxia				•		⊕
Logged by:	Checked by:			She		Stren	e gth b	у			+ s			Shea	ar S	treng	gth b	у					A
				Var	ne Te											mete							
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SILT	Y CLAY	59.0																	9.6	10.0			
	/n, dry	58.4	2																	100			
7	Test Pit Terminated @ 2.3 m depth																						
										:													
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1 1		ı	1	100	: :	1 : :	1.1	100	1.1	1 : :	1111	1 1 1	: 1	: : :	: 1	1 1 1	. : 1	. 1.1	1 1 1		: : 1	- 1	

NOTES: 1.Borehole/Test Pit data requires Interpretation by Trow before use by others
2. Test Pit backfilled upon completion of excavtion

3	Field work	supervised	hy a	Trow	renrecents	ativa

OG OF BORFHOLE TPLOGS~1 GP.LTROW OTTAWA GDT 26/11/08			
7			
SEO	NC 1.E		le/Test Pit data requires Interpretation by Trow use by others
I I	2.1	est Pit	backfilled upon completion of excavtion
ORFH	3.F	ield w	ork supervised by a Trow representative
Ä	4.5	See No	tes on Sample Descriptions
109	5.1		gure is to read with Trow Associates Inc. report 0019796A

WATER LEVEL RECORDS										
Elapsed Time	Water Level (m)	Hole Open To (m)								
Completion	Dry	-								

	CORE DRILLING RECORD										
Run	Depth	RQD %									
No.	(m)										



Project No. Project: Location: Date Drilled Drill Type: Datum:	Geotechnical Investigation-Pro 3735 Saint Joseph, Ottawa, Or 'November 14, 2008	ntario	-	Split Sp Auger S SPT (N Dynami	oool Sam) Vi	n Samp nple alue Cone To	ole]		Cr Na At	ombu atura terbe ndrai	uille ustib il Mo erg L ned	le Va	ipou e Co	_ O ur Re	eadii			□ × •
Logged by:	Checked by:			Shelby Shear S Vane Te	Stre	ngth b				+ s			Sh Pe	near enetr	Stre ome	ngth ter T	by est					A
S Y M B O L	SOIL DESCRIPTION	Geodetic m 61.8	Depth	Shear	20	ength	netrati 40 00	on T 6 15	0		lue 80 200	kPa	C		250	le Va I Mois I Limi	500		750	t % eight)	16	Natu Unit '
Silt	PSOIL y clay, plant fibres, swampy odour ck, moist .TY CLAY	04.5	0	-2 4- 1-2 -2 4- 1-2 -2 4- 1-2		-2-0-1-	10.1	2 (3) 2 (3) 2 (3)	-3-0-	- (-)						-0- 0- 3 -0- 0- 3		- 1 - 1				
BIO	wn, moist Test Pit Terminated @ 0.9 m de	/																				
NOTES: 1.Borehole/Test F before use by o	Pit data requires Interpretation by Trow thers	WATER			EC			\			_	T				DRII				COR		00.27
2.Test Pit backfille 3.Field work supe 4.See Notes on S	ed upon completion of excavtion rvised by a Trow representative ample Descriptions	Elapsed Time Completion	Le	Vater vel (m) Dry		F	Hole C To (I		1		Ru No			Dep (m				6 R	ec.		R	QD %

3[.This Figure is to read with Trow Associates Inc. report OTGE00019796A

WATER LEVEL RECORDS									
Elapsed	Water	Hole Open							
Time	Level (m)	To (m)							
Completion	Dry	-							

CORE DRILLING RECORD										
Run No.	Depth (m)	% Rec.	RQD %							



Order #: 1416129

Certificate of Analysis

Client: Paterson Group Consulting Engineers Client PO: 15228 Project Description: PG3215 Report Date: 22-Apr-2014 Order Date:15-Apr-2014

Client PO: 15228	t PO: 15228 Project Description: PG3215								
	Client ID:	BH3-SS4	-	-	-				
	Sample Date:	14-Apr-14	-	-	-				
	Sample ID:	1416129-01	-	-	-				
	MDL/Units	Soil	-	-	-				
Physical Characteristics									
% Solids	0.1 % by Wt.	73.2	-	-	-				
General Inorganics									
рН	0.05 pH Units	7.24	-	-	-				
Resistivity	0.10 Ohm.m	17.9	-	-	-				
Anions									
Chloride	5 ug/g dry	244	-	-	-				
Sulphate	5 ug/g dry	48	-	-	-				

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG3215-1 - TEST HOLE LOCATION PLAN

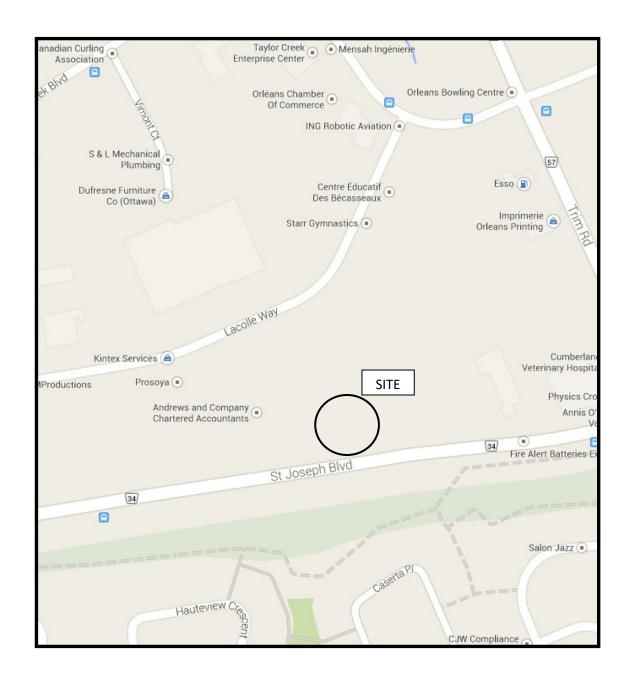


FIGURE 1 KEY PLAN

