PROJECT NO: 2020-161-G

DECEMBER 22, 2020

GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
353 TOWNLINE ROAD
NIAGARA-ON-THE-LAKE, ONTARIO

PREPARED FOR:

CAPITAL CONTRACTING GROUP

BY

BENDIGO CONSULTING INC.
666 ARDLEIGH CRESCENT
BURLINGTON, ONTARIO
L7L 4K8

Bendigo Consulting Inc.
Geotechnical and Geo-Environmental Consultants

PROJECT NO.: 2020-161-G December 22, 2020

Capital Contracting Group
c/o 1872283 Ontario Inc.
3976 Portage Road Unit 2
Niagara Falls, Ontario
L2J 2K9

Attention: Mr. Mitch Williams

GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
353 TOWNLINE ROAD, NIAGARA-ON-THE-LAKE, ONTARIO

Dear Mr. Williams,

We have completed the review of the fieldwork and laboratory testing and the report preparation in connection with the above noted project. Our comments and recommendations, based on the findings at the fifteen borehole and one dynamic cone penetration test locations are presented in the following paragraphs.

1. INTRODUCTION

We understand that the project will consist of the construction of four commercial buildings development on a single asphaltic concrete paved roadway. The commercial buildings will be one to two storey structures with slab-on-ground construction. At the time of this report the final site grades had not been finalised, therefore once finalised this information will need to be reviewed to assess if any changes in the report will need to be completed prior to tendering and construction, particularly should the site grades be raised by more than one metre. Construction will include the installation of the associated underground services, and concrete curbs and sidewalks. The purpose of this geotechnical investigation was to determine the subsurface conditions at the fifteen borehole locations and to interpret these findings with respect to the design and construction of the underground services, foundations and related earthworks for this project from a geotechnical point-of-view.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, then this office must be consulted to review the new

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design with respect to the results of this investigation. The information contained in this report does not reflect upon the environmental aspects of the site and therefore have not been addressed in this document.

2. PROCEDURE

A total of fifteen [15] sampled boreholes and one dynamic cone penetration test were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The borings were put down cased using solid stem continuous flight auger equipment on November 5 and 6, 2020 under the direction and supervision of a staff member of Hallex Environmental Ltd. The boreholes were advanced to depths of between about 3.5 and 6.55 metres below the existing grade. On completion of drilling all of the boreholes were backfilled in general accordance with Ontario Regulation 903.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the soil laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on the soil samples recovered from the borings.

The boreholes were located in the field by a representative of Hallex Environmental Ltd. The ground surface elevation at the fifteen borehole and one dynamic cone penetration test locations were referenced to geodetic datum by representatives of J.D. Barnes Limited as shown on Reference No. 20-16-376-00 dated December 11, 2020.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Borehole Log Nos. 1 to 15, inclusive and Borehole No. 16 [Dyna mic Cone Penetration Test] following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed as the exact plans of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject site is located on the east side of Townline Road in Niagara-on-the-Lake, Ontario. The site consists of vacant lands, with high grasses, scrub vegetation and a

number of shallow ponded areas to the west and central area of the property. There is an existing stormwater management pond found in the southwest portion of the site. The southern and eastern limits of the subject site area covered with mature trees, together with a number of pathways. The subject site is bounded with residential properties to the north, commercial properties [and Townline Road] to the east and south and a slope to a stream to the east [running north to south] and vacant lands beyond.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil ranging approximately 50 to 150 millimetres in thickness was encountered at Borehole Nos, 1, 2, 3, 4, 6 and 9 to 15, inclusive. It should be noted that the depth of topsoil must be expected to vary across the subject property, particularly in the area of the mature trees and shrub vegetation, from the depths encountered at the borehole locations. In this report the term "topsoil" has been used from a geotechnical point of view and does not necessarily reflect the suitability of the material to support plant growth. If it is to be used for landscaping or agricultural purposes, its suitability should be confirmed by tests on representative samples for organic and nutrient content and therefore its ability to support plant growth.

Fill Material

A silty clay fill [or possible fill] was found in Borehole Nos. 5, 6, 7, 8 and 15. The silty clay fill was found to contain rootlets, brick rubble and organic inclusions. The fill material was found to be in a firm to very stiff state. It should be noted that the depth of fill material may vary across the subject property from the depths encountered at the borehole locations.

Silty Clay

A native silty clay was encountered beneath the topsoil veneer and the fill material in the boreholes. The native, brown to greyish brown silty clay was found to contain brown/grey mottling, described as having a 'till-like' structure, with a 'reworked' appearance and trace of rootlets in upper level, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams. The silty clay was found to be stiff to hard in consistency. The silty clay was proven to the termination of each borehole.

Groundwater Observations

All of the boreholes were recorded to be 'dry' on completion of drilling. Given the low permeability of the cohesive overburden soils, insufficient time would have passed for water to infiltrate into the open boreholes during the course of drilling. Based on the observed soil conditions, natural moisture contents, etc., the static water level is estimated to be below the maximum depth of excavation. Nevertheless, some minor infiltration of groundwater through more permeable seams and from surface runoff should be anticipated.

4. FOUNDATION CONSIDERATIONS

The soil conditions encountered in the boreholes are generally considered suitable for supporting the proposed commercial buildings on conventional spread footings founded on the native silty clay. Spread footings founded in the native silty clay may be designed using a factored Ultimate Limit State [ULS] bearing capacity of 300 kPa [~6,000 psf] and a Serviceability Limit State [SLS] bearing capacity of 200 kPa [~4,000 psf], based on total and differential settlements not exceeding 25 and 20 millimetres, respectively. Foundations wider than 2.0 metres will need to be reviewed by this office.

Alternatively, in the fill material areas and the lower areas [such as nearby Borehole No. 5] the foundations may be supported on an engineered fill mat and designed using a factored Ultimate Limit State [ULS] bearing capacity of 225 kPa [~4,500 psf] and a Serviceability Limit State [SLS] bearing capacity of 150 kPa [~3,000 psf], based on total and differential settlements not exceeding 25 and 20 millimetres, respectively. This will reduce the depth of foundations to the required 1.2 metres of frost cover. Following the removal of all of the topsoil and the existing fill materials the exposed subgrade must be well compacted [proofrolled] prior to placement [in uniform lifts] and compaction of the engineered fill material to 100 percent of its standard Proctor density. The engineered fill material may consist of either native soil 'borrowed' from elsewhere on the subject site or an Ontario Provincial Standard Specification [OPSS 1010 Type II] Granular 'B' [50 millimetre minus] product. The engineered fill material would need to extend beyond the exterior of the proposed building a distance equal to the depth of subexcavation from below the footing plus one metre. We note that one of the proposed commercial buildings in the southwest corner of the property will be constructed over the existing stormwater management pond. We would recommend that the ponded water be removed and any silt/organic material be removed from the pond area and replaced with an engineered fill material, as described above.

It is noted that the SLS value represents the Serviceability Limit State, which is governed by the tolerable deflection [settlement] based on the proposed building type, using unfactored load combinations. The ULS value represents the Ultimate Limit State and is intended to reflect an upper limit of the available bearing capacity of the founding soils in terms of geotechnical design, using factored load combinations. There is no direct relationship between ULS and SLS, rather they are a function of the soil type and the tolerable deflections for serviceability, respectively. The above dissertation assumes a typical building. Evidently, the bearing capacity values would be lower for very settlement sensitive structures and larger for more flexible buildings.

The footings beds in the native silty clay soils will be prone to disturbance from construction and foot traffic. It would be prudent to consider the placement of a 50 millimetre concrete 'mud' slab over the footing bases once evaluated. This will protect the footing beds from disturbance and provide a clean working surface for the placement of formwork and reinforcing steel.

In areas where it will be necessary to provide adjacent footings at different founding elevations, the lower footing should be constructed before the higher footing, if possible. To limit stress transfer from higher footings to lower footings, the higher footing should be set below an imaginary line drawn up from the edge of the lower footing at 10 horizontal to 7 vertical.

All footings exposed to the environment must be provided with a minimum of 1.2 metres of earth cover or equivalent insulation to protect against frost damage. This frost protection would also be required if construction were undertaken during the winter months. All footings and foundations should be designed and constructed in accordance with the current Ontario Building Code. We would recommend the placement of a 50 millimetre thick high-density sheet of Styrofoam insulation against the exterior of the foundation walls, which protrude from the main foundation walls followed by the placement of a 10-mil sheet of 'double' polyethylene ['fold' placed at 'top'] to prevent frost heaving/adfreezing action.

With foundations designed as outlined above and as required by the current Ontario Building Code, and with careful attention paid to construction detail, total and differential settlements should be within normally tolerated limits of 25 and 20 millimetres respectively. However, as is typical in most commercial construction, 'cosmetic' cracking of plasterboard, foundation walls, etc. may occur within the first year of construction as a result of shrinkage, minor settlement, etc. Subsequent to repair, additional cracking should be minimal.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations of this report and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

5. SEISMIC DESIGN CONSIDERATIONS

The structure shall be designed according to Section 4.1.8 of the Ontario Building Code, Ontario Regulation 332/12. Based on the subsurface soil conditions encountered in this investigation the applicable Site Classification for the seismic design is Site Class D – Stiff Soil, based on the average soil characteristics for the site. The conducting of site specific shear wave velocity testing may allow for the property to be classified as a Class C - Very Dense Soil and Soft Rock site.

The seismic data, from Supplementary Standard SB-1 of the Ontario Building Code, for the Niagara-on-the-Lake area [St. Catharines] as follows.

S_a[0.2]	S_a[0.5]	S_a[1.0]	S_a[2.0]	S_a[5.0]	S_a[10.0]	PGA	PGV
0.319	0.155	0.071	0.0320	0.0076	0.0028	0.206	0.121

The structural engineer responsible for the project should review should review the earthquake loads and effects.

7. FLOOR SLAB CONSIDERATIONS

The floor slab may be constructed using conventional slab-on-grade techniques on a prepared subgrade. The surficial grass/topsoil and tree trunks/roots must be removed from within the building areas. The exposed subgrade surface should then be well compacted [proofrolled] in the presence of a representative of Bendigo Consulting Inc. Any soft 'spots' delineated during this work must be sub-excavated and replaced with quality backfill material compacted to 100 percent of its standard Proctor maximum dry density. Imported granular fill is preferred due to its relative insensitivity to weather conditions, its relative ease in achieving the required degree of compaction and its quick response to applied stresses.

As with all concrete floor slabs, there is a tendency for the floor slabs to crack. The slab thickness, concrete mix design, amount of steel and/or fibre reinforcement and/or wire mesh placed into the concrete slab, if any, will there be a function of the owner's

tolerance for cracks in, and movements of, the slabs-on-grade, etc. The 'saw-cuts' in the concrete floors, for crack control, should extend a minimum of 1/3 the thickness of the slab.

A moisture barrier will be required under the floor slabs such as the placement of at least 200 millimetres of well-compacted 20 millimetre clear crushed stone. At a minimum the moisture barrier material should contain no more than 10 percent passing the No. 4 sieve.

Curing of the slab-on-grade must be carefully specified to ensure that slab curl is minimised. This is especially critical during the hot summer months of the year when the surface of the slab tends to dry out quickly while high moisture conditions in the moisture barrier or water trapped on top of any 'poly' sheet at the saw cut joints and cracks, and at the edges of the slabs, maintains the underside of the slab in a moist condition.

It is also important that the concrete mix design provide a limiting water/cement ratio and total cement content, which will mitigate moisture related problems with low permeance floor coverings, such as debonding of vinyl and ceramic tile. It is equally important that excess free water not be added to the concrete during its placement as this could increase the potential for shrinkage cracking and curling of the slab.

8. PERIMETER DRAINAGE

We would recommend that the perimeter drainage system extend in all areas where the floor slab level is less than 0.3 metres above the final exterior grade. As a minimum it is recommended that the perimeter weeping tile consist of a 150 millimetres diameter perforated pipe with a geofabric 'sock', surrounded with 200 millimetres of 20 millimetre clear stone, with the stone in turn encased by a heavy geotextile filter fabric. The suppliers of the geotextile filter fabric should be consulted as to the type best suited for this project. The perimeter drainage system should outlet to a gravity drainage connection, fitted with a suitable back-flow prevention valve.

This office should examine the installation of the perimeter drains. Even a small break in the filtering materials could result in loss of 'fines' into the drains with attendant performance difficulties, including settlements of the ground surface. The exterior grade around the structure should be sloped away from the structure to prevent the ponding of water against the foundation walls.

Additional well graded granular material should be placed and compacted in exterior sidewalk and accessibility ramp areas to reduce the effects of frost heaving. Alternatively, insulation could be placed in these areas or a structural 'frost' slab should be constructed at the doorways.

4. EXCAVATIONS

It is anticipated that the excavations for the proposed foundations, sewers and other underground services will extend to depths of up to 3.0 metres below the present grade through upper fill material and into the native silty clay. The side slope in the fill material should remain stable at slopes of 45 degrees. The side slopes of excavations into the native soils should remain stable for the short period of construction at slopes of up to 60 degrees to the horizontal, or steeper. Nevertheless, all excavations must comply with the current Occupations Health and Safety Act and Regulations for Construction Projects. Excavations slopes steeper than those required in the Safety Act must be supported or a trench box must be provided, and a senior Geotechnical Engineer from this office should supervise the work.

Some infiltration of groundwater through more permeable seams in the fill material and native soils and surface runoff should be anticipated. Any water that may seep into the excavations could be removed using conventional construction 'dewatering' techniques, such as pumping from sumps and ditches. More water should be expected when connections are made with existing services. Surface water should be directed away from the excavations.

The base of the excavations in the native silty clay soils encountered in the boreholes should remain firm and stable. Therefore, standard pipe bedding, as typically specified by the City of Niagara-on-the-Lake, should suffice. The bedding material should be uniformly compact to at least 95 percent standard Proctor density, with special attention paid to compaction under the pipe haunches.

5. BACKFILL CONSIDERATIONS

The majority of the excavated material will consist of limited portions of fill material and the native silty clay, which is considered to be suitable for use as service trench backfill and as engineered fill provided that the moisture content can be controlled to within 3 percent of the standard Proctor optimum value. Select portions of the fill material are considered suitable for trench backfill. This is best assessed in the field during

construction. Some moisture content conditioning of the excavated material may be required, depending upon the weather conditions experienced at the time of construction to achieve acceptable compaction densities and minimise long-term settlements. The native soils are generally considered to be near their standard Proctor optimum moisture content. Dusting could be a problem in the 'dry' summer months.

We note that where backfill material is placed near or slightly above its optimum content, the potential for long-term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly, the shear strength of 'wet' backfill material is also lowered, thereby reducing its ability to support construction traffic and therefore impacting roadway construction. If the soil is well 'dry' of its optimum value, it will appear to be very strong when compacted, but will tend to settle with time as the moisture content in the fill increases to equilibrium condition. The silty slay soils may require high compaction energy to achieve acceptable densities if the moisture content is not close to their standard Proctor optimum value. It is therefore very important that the placement moisture content of the backfill soils be within 3 percent of its standard Proctor optimum moisture content during placement and compaction.

The silty clay encountered in the borings is sensitive to moisture absorption and will become practically impossible to compact using conventional compaction equipment if it becomes 'wet' during extended periods of precipitation. After a period of heavy precipitation, any near-surface softened material should be allowed to dry or be removed from the fill surface and discarded.

Any imported fill required in service trenches or to raise the subgrade elevation should have its moisture content within 3 percent of its optimum moisture content and meet the necessary environmental guidelines.

The backfilling and compaction operations should be monitored by a representative of Bendigo Consulting Inc. to monitor uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs', and around the foundation walls. Any engineered fill should be compacted to 100 percent standard Proctor maximum dry density. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials during construction.

6. MANHOLES, CATCH BASINS AND THRUST BLOCKS

With the manholes, catch basins, valve chambers, etc. founded on the native silty clay, assuming all founding surfaces are carefully prepared to remove all loose and disturbed material, the bearing surfaces will be practically non-yielding under the anticipated loads. Proper preparation of the founding soils will therefore accentuate the protrusion of these structures above the pavement surface if compaction of the fill around these structures is not adequate, causing settlement of the surrounding paved surfaces. Conversely, the pavement surfaces may rise above the valve chambers under frost action. To alleviate the potential for these types of differential movements, free-draining, non-frost susceptible material should be provided as backfill around the structures located within any paved roadway limits, and compacted to 100 percent of its standard Proctor maximum dry density. A geofabric separator should be provided between the free draining material and the on-site fine-grained soils to prevent to intrusion of fines.

The thrust blocks in the native silty clay soils may be sized as recommended by the applicable Ontario Provincial Standard Specification [OPSS]. A design allowable bearing pressure of 200 kPa [~4000 psf] may conservatively be used in the design of thrust blocks in the native silty clay. Any backfill required behind the blocks should be granular and should be compacted to 100 percent of their standard Proctor density.

7. PAVEMENT CONSIDERATIONS

The roadway areas should be stripped of all topsoil, organic and other unsuitable materials. The exposed subgrade should be proofrolled with 3 to 4 passes of a loaded tandem truck in the presence of a representative of Bendigo Consulting Inc., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or any other means must be subexcavated and replaced with suitable backfill material. Alternatively, the soft areas may be repaired by the placement of coarse aggregate, such as 50 millimetre clear crushed stone. The need for subexcavations of a softened subgrade will be reduced if construction is undertaken during periods of dry weather and careful attention is paid to the compaction operations. The fill placed over shallow utilities cuts into or across the street must also be compacted to 100 percent of its standard Proctor maximum dry density.

Good draining provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface

water and to prevent softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved area.

The most severe loading conditions on the subgrade typically occur during the course of construction, therefore precautionary measures may have to be taken to ensure that the subgrade is not unduly disturbed by construction traffic. These measures would include minimising the amount of heavy traffic travelling over the subgrade, such as during the placement of granular base layers.

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as typically experienced during the Fall and Spring months, it should be anticipated that the additional subgrade preparation would be required, such as the provision of an additional depth of Granular B sub-base coarse material. It is also important that the sub-base and base coarse granular layers of the pavement structure be placed as soon after exposure and preparation of the subgrade level as practical.

The proposed pavement structure would be required to adequately support light-duty cars and trucks, intermittent delivery and garbage trucks and commercial traffic. For this project, we would recommend a minimum pavement structure of 350 millimetres of OPSS Granular B [50 millimetre minus Type II] sub-base course, 150 millimetres of OPSS Granular A base course, 90 millimetres of HL8 HS binder course and 40 millimetres of HL3 surface course asphaltic concrete. This design is considered adequate, provided that the subgrade has been prepared as specified and is good and firm before the sub-base course material is placed. If the subgrade is soft, remedial measures as discussed above may have to be implemented and/or the sub-base thickness may have to be increased. The granular sub-base and base courses and asphaltic concrete layers should be compacted to OPSS or the City of Niagara-on-the-Lake's requirements. A programme of in-place density testing must be carried out to monitor that compaction requirements are being met. If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. We note that this pavement structure is not to be considered as a construction roadway design.

Building Pavement Structures

The suggested pavement structures, for the interior building lot pavement areas, outlined in Table A [following page] are based on subgrade parameters estimated on the basis of visual and tactile examinations of the on-site soils and past experience. The outlined pavement structures may be expected to have an approximate ten-year life, assuming that regular maintenance is performed. Should a more detailed pavement structure

design be required, site specific traffic information would be needed, together with detailed laboratory testing of the subgrade soils.

TABLE A
SUGGESTED PAVEMENT STRUCTURE

LAYER DESCRIPTION	COMPACTION REQUIREMENTS	LIGHT DUTY SECTIONS	HEAVY DUTY [TRUCK ROUTE]
Asphaltic Concrete Wearing course OPSS HL 3 or HL 3A	97 percent Marshall	65 millimetres	40 millimetres
Binder Course OPSS HL 8	97 percent Marshall		65 millimetres
Base Course OPSS Granular A	100% SPMDD	150 millimetres	150 millimetres
Sub-base Course OPSS Granular B Type II	100% SPMDD	200 millimetres	350 millimetres

* SPMDD denotes Standard Proctor Maximum Dry Density, ASTM-D698.

Depending on the arrangement of light duty and heavy duty pavement sections, the transition between sections may present some difficulty for contractors. In this regard, consideration might be given to a slightly increased light duty pavement structure consisting of 50 millimetres of HL8 binder course and 40 millimetres of HL3 surface course asphaltic concrete. This structure will provide for a continuous depth of surface course asphalt allowing for ease of construction. As well such a structure would have an improved performance over an increased design life. Such an arrangement of asphalt layers would also allow for future rehabilitation with a 'mill and pave' type operation.

9. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The subsoil descriptions and borehole information are only intended to describe conditions at the fifteen borehole and one dynamic cone penetration test locations. Contractors placing bids of undertaking this project should carry out due diligence in order to verify the results of this investigation and to determine how the subsurface conditions will effect their operations.

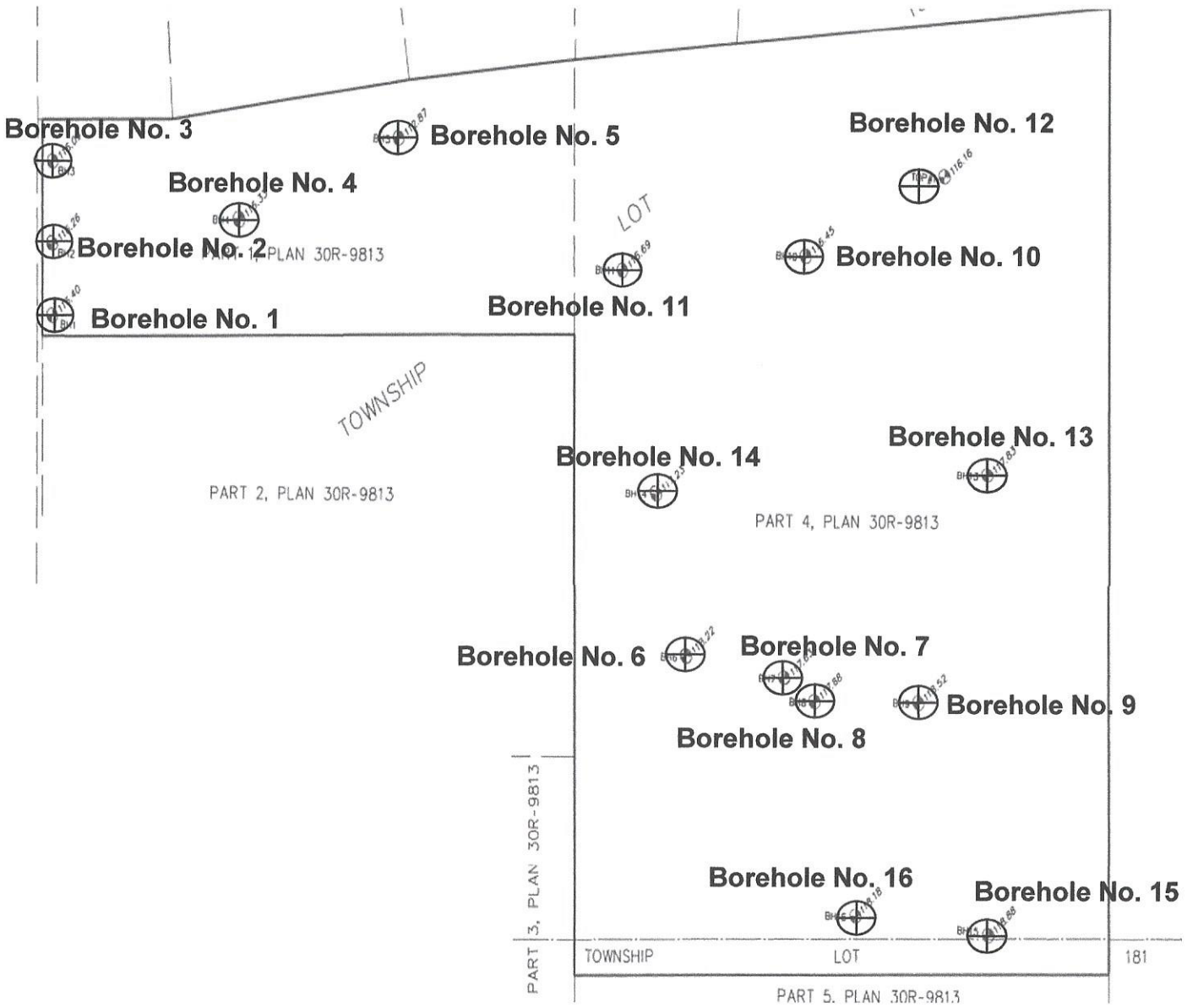
We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarifications as to the contents of this document, then please do not hesitate to contact the undersigned.

Yours very truly,
Bendigo Consulting Inc.

John Monkman, P. Eng.
Project Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Borehole Log Nos. 1 to 15, inclusive
Borehole No. 16 [Dynamic Cone Penetration Test]

Distribution: Capital Contracting Group c/o 1872283 Ontario Inc. [1, plus pdf copy]
Hallex Environmental Ltd. [one pdf copy]



LEGEND

⊕ Borehole

NOTES:

1. This report must be read in conjunction with Bendigo Consulting Inc. Report No.: 2020-161-G.
2. Soil samples will be discarded after three months unless directed otherwise by client.
3. The borehole locations were selected by a representative of Hallex Environmental Ltd.
4. The locations and geodetic elevations of the fifteen borehole and one dynamic cone penetration test were established by representatives of J.D. Barnes Limited.

5. Image obtained from J.D. Barnes Limited Sketch Showing Borehole Locations [Reference 20-16-376-00] dated December 11, 2020.

Bendigo Consulting Inc.

Client

Capital Contracting Group

Project Description

Geotechnical Investigation
Proposed Commercial Development
353 Townline Road, Niagara-on-the-Lake, Ontario

Borehole Location Plan

Project No.: 2020-161-G

Scale: NTS

Date: December 2020

Drawing No. 1

Log of Borehole No. 1

Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	116.40						Ground Surface				
	116.27						Topsoil - About 125 millimetres in thickness				
		SS	1	2,4,6,6	10	85	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance and trace of rootlets in upper level, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to hard.		18.2	10, 425	
1		SS	2	8,11,12	23	100			18.2	23, >450	
		SS	3	8,15,18	33	100			18.5	33, >450	
2		SS	4	10,12,17	29	100			21.1	29, >450	
3		SS	5	8,11,13	24	100			19.8	24, 375	
	112.89						End of Borehole				
4							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 3.5 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.				
5											

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 2

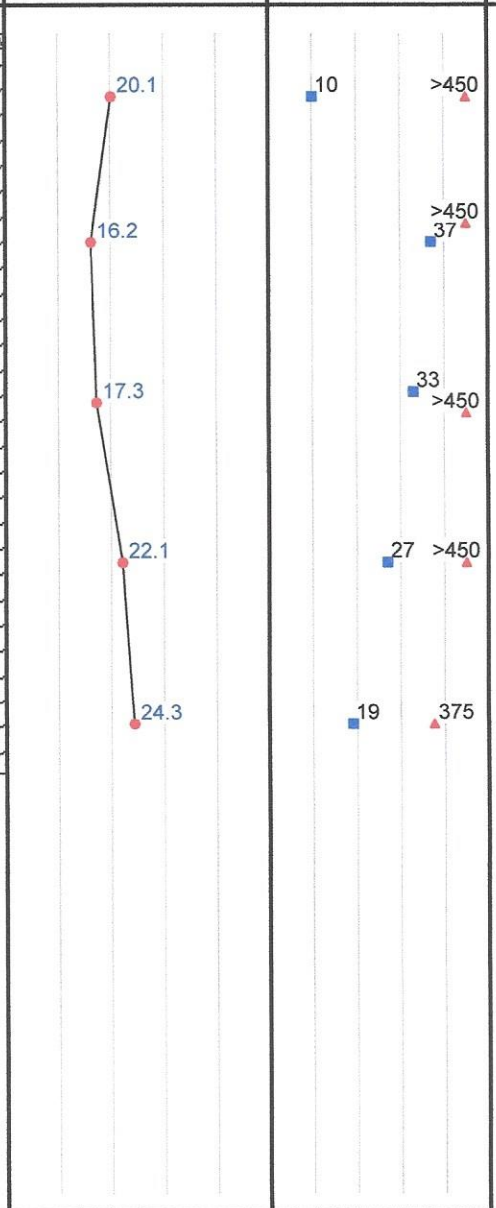
Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION
0	116.26						Ground Surface
	116.11						Topsoil - About 150 millimetres in thickness
		SS	1	5,5,5,5	10	80	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance and trace of rootlets in upper level, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to hard.
1		SS	2	10,17,20	37	100	
		SS	3	9,16,17	33	100	
2		SS	4	10,13,14	27	90	
3		SS	5	5,8,11	19	100	
	112.75						End of Borehole
4							
5							

Notes:
1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 3.5 metres.
2] Borehole 'open' and 'dry' and backfilled on completion.
3] Soil samples will be discarded after three months unless directed otherwise by client.



Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 3

Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	116.09						Ground Surface				
	115.99						Topsoil - About 100 millimetres in thickness				
		SS	1	1,2,8,7	10	95	Silty Clay - Brown to greyish brown, brown/grey mottling, till-like appearance, 'reworked' appearance and trace of rootlets in upper level, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff.		18.2	10 >450	
1		SS	2	9,11,12	23	60			19.2	23 >450	
		SS	3	8,10,11	21	90			19.9	21 >450	
2		SS	4	8,11,16	27	100			21.5	27 >450	
3		SS	5	7,7,13	20	100			24.3	20 375	
	112.58						End of Borehole				
4							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 3.5 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.				
5											

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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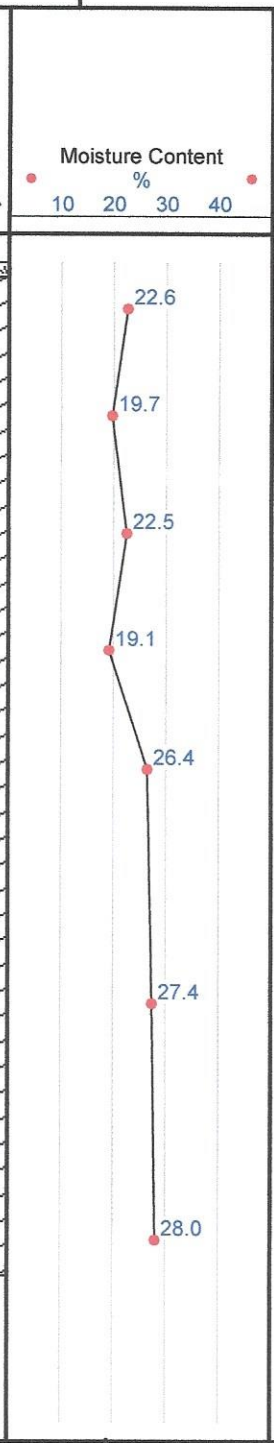
Log of Borehole No. 4

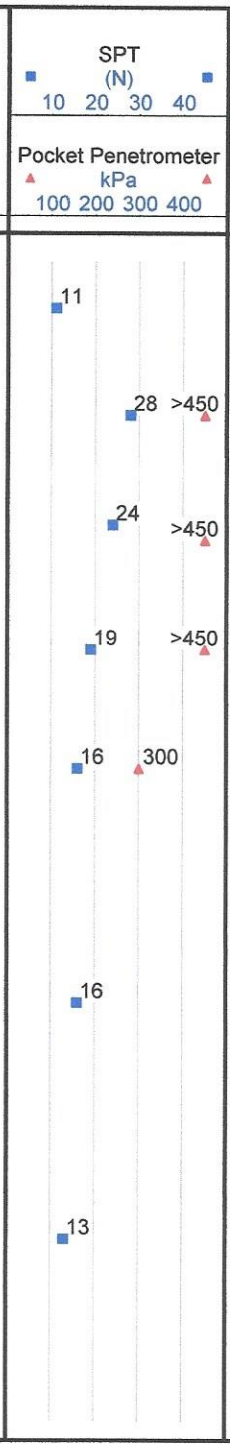
Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol
0	116.33						Ground Surface	
							Topsoil - About 75 millimetres in thickness	
		SS	1	2,4,7,7	11	100	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance and trace of rootlets in upper level, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, stiff to very stiff.	
1		SS	2	8,12,16	28	100		
		SS	3	6,11,13	24	100		
2		SS	4	7,9,10	19	100		
3		SS	5	4,6,10	16	100		
4		SS	6	5,7,9	16	100	Notes: 1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 6.55 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.	
5								
6	109.78	SS	7	4,5,8	13	100		
							End of Borehole	
7								





Well Installation

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 5

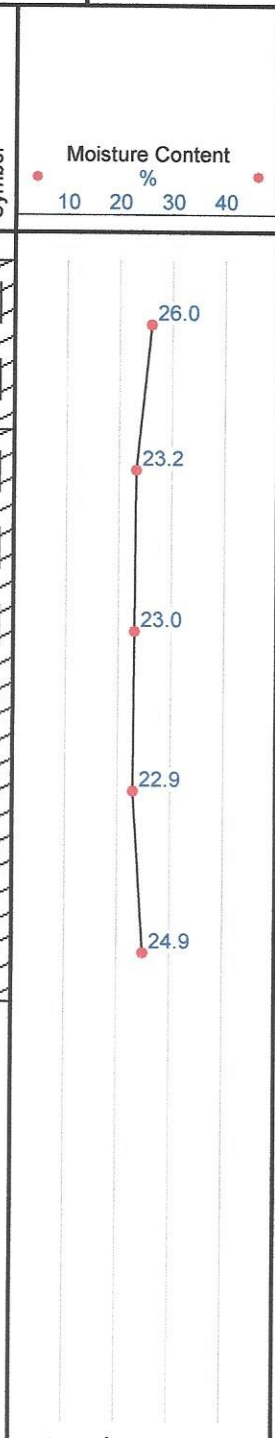
Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

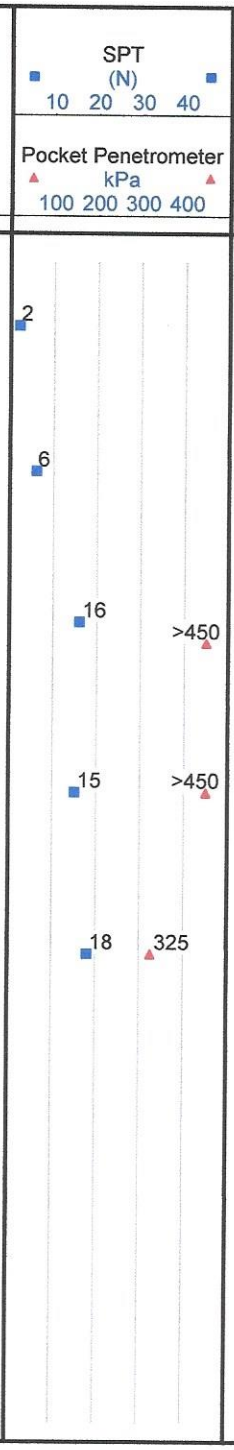
Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

Project No.: 2020-161-G

Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol
0	112.87						Ground Surface	
		SS	1	0,0,2,2	2	100	Silty Clay - Brown, possible fill, 'reworked' appearance, trace of rootlets, firm.	
	112.07							
1		SS	2	2,2,4	6	100	Silty Clay - Greyish brown, brown/grey mottling, 'till-like' structure, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff.	
		SS	3	6,7,9	16	100		
2		SS	4	6,7,8	15	100		
3		SS	5	6,7,11	18	100		
	109.36						End of Borehole	
4							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 3.5 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.	
5								





Well Installation

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 6

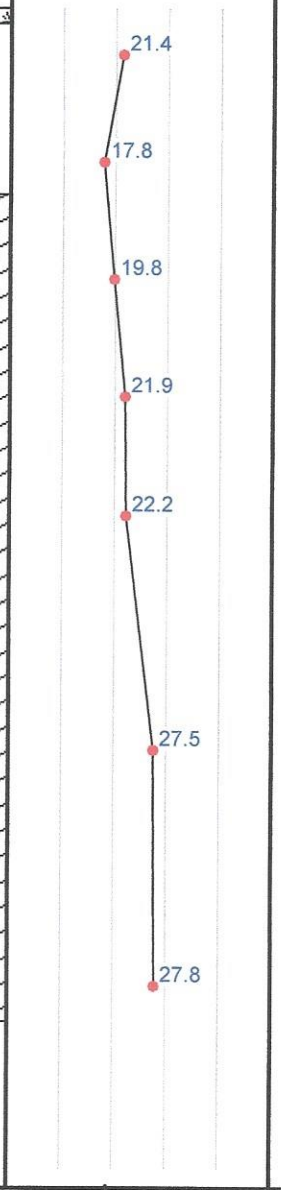
Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

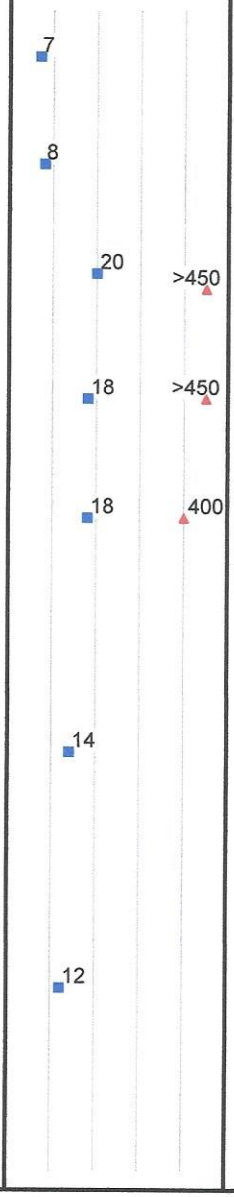
Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

Project No.: 2020-161-G

Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol
0	116.69						Ground Surface	
							Topsoil - About 100 millimetres in thickness	
		SS	1	0,3,4,6	7	90	Silty Clay - Brown to greyish brown, 'reworked' appearance, possible fill material, trace of roolets, firm	
1	115.49	SS	2	4,3,5	8	90		
							Silty Clay - Greyish brown, 'till-like' structure, brown/grey mottling, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.	
2		SS	3	4,7,13	20	100		
		SS	4	8,8,10	18	100		
3		SS	5	5,8,10	18	100		
4								
		SS	6	5,6,8	14	100	Notes: 1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 6.55 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.	
5								
6	110.14	SS	7	3,5,7	12	100		
							End of Borehole	
7								





Well Installation

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 7

Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

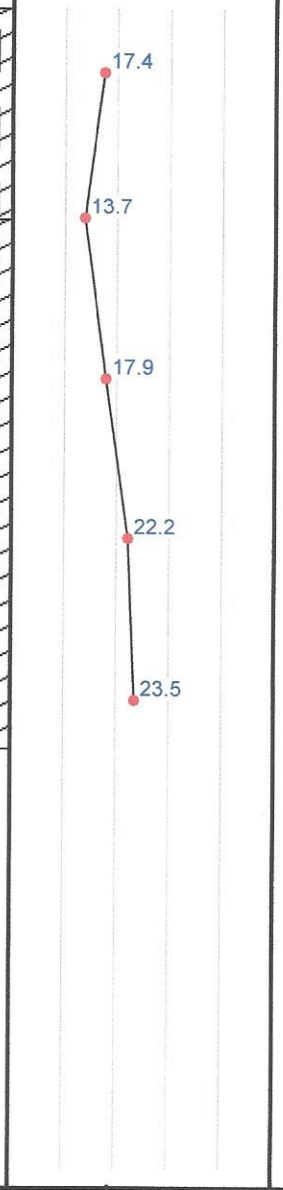
Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

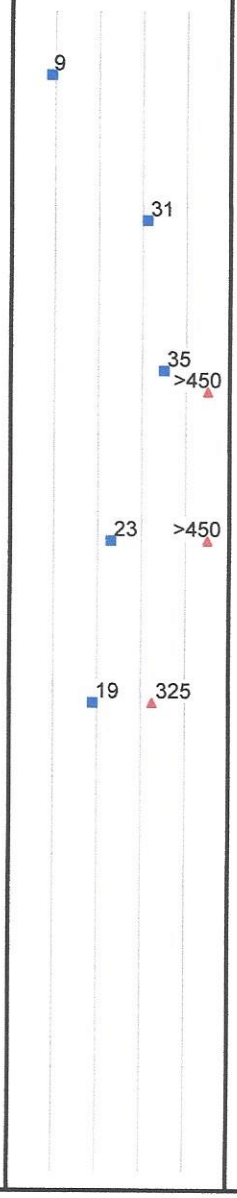
Project No.: 2020-161-G

Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION
0	117.63						Ground Surface
		SS	1	1,2,7,9	9	80	Silty Clay Fill - Brown, trace of brick rubble, very stiff.
1	116.63	SS	2	5,14,17	31	95	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, hard to very stiff.
2		SS	3	12,14,2	35	100	
		SS	4	8,12,11	23	95	
3		SS	5	4,9,10	19	100	
	114.12						End of Borehole
4							
5							

Notes:
1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 3.5 metres.
2] Borehole 'open' and 'dry' and backfilled on completion.
3] Soil samples will be discarded after three months unless directed otherwise by client.





Well Installation

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 8

Date Drilled: November 5, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake, Ontario
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	117.88						Ground Surface				
	117.78						Topsoil - About 100 millimetres in thickness				
		SS	1	1,3,5,6	8	100	Clayey Silt Fill - Brown, trace of sandy silt, loose.		24.7	8	
	117.08										
1		SS	2	7,13,15	28	100	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, increased silt content in upper level, trace of rootlets, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.		14.5	28 / >450	
		SS	3	8,10,16	26	100			17.8	26 / >450	
2		SS	4	7,7,10	17	100			22.9	17 / >450	
3		SS	5	4,6,8	14	100			24.4	14	
	114.37						End of Borehole				
4											
5											

Notes:
1] Borehole advanced using solid stem auger stem equipment on November 5, 2020 to depth of about 3.5 metres.
2] Borehole 'open' and 'dry' and backfilled on completion.
3] Soil samples will be discarded after three months unless directed otherwise by client.

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 9

Date Drilled: November 6, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	118.52						Ground Surface				
							Topsoil - About 100 millimetres in thickness				
		SS	1	0,1,4,12	5	95	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance in upper level, trace of rootlets, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.		19.5	5	
1		SS	2	7,14,15	29	80			16.4	29 >450	
		SS	3	8,11,16	27	95			17.4	27 >450	
2		SS	4	7,13,15	28	95			18.4	28 >450	
3		SS	5	5,7,10	17	100			22.6	17 250	
4		SS	6	5,7,9	16	55			25.7	16	
5							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 6, 2020 to depth of about 6.55 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.				
6	111.97	SS	7	6,6,8	14	50			20.3	14	
							End of Borehole				
7											

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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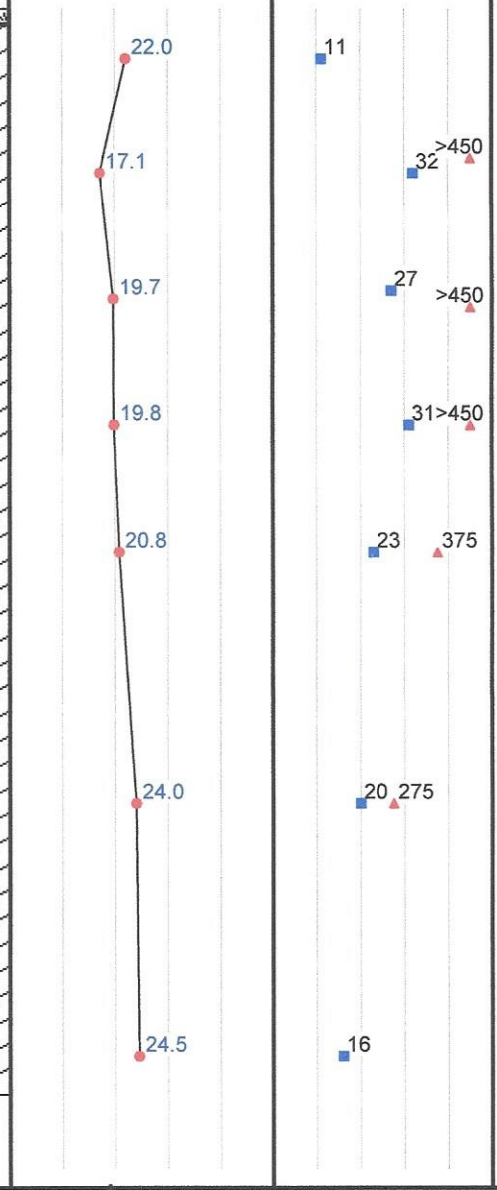
Log of Borehole No. 10

Date Drilled: November 6, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION
0	116.45						Ground Surface
							Topsoil - About 100 millimetres in thickness
		SS	1	3,4,7,8	11	100	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance in upper level, trace of rootlets, increased silt content in upper level, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to hard.
1		SS	2	7,12,20	32	100	
		SS	3	8,10,17	27	100	
2		SS	4	9,11,20	31	100	
3		SS	5	8,10,13	23	100	
4		SS	6	7,9,11	20	100	
5							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 6, 2020 to depth of about 6.55 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.
6		SS	7	5,7,9	16	100	
7	109.90						End of Borehole



Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 11

Date Drilled: November 6, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	116.69						Ground Surface				
	116.59						Topsoil - About 100 millimetres in thickness				
		SS	1	2,5,8,10	6	100	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance in upper level, increased silt content in upper level, trace of rootlets, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.		19.5	13	
1		SS	2	8,10,15	25	90			18.4	25 >450	
		SS	3	7,12,17	29	95			19.5	29 >450	
2		SS	4	6,11,13	24	100			21.0	24 >450	
3		SS	5	6,7,11	18	100			22.3	18 400	
	113.18						End of Borehole				
4							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 6, 2020 to depth of about 3.5 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.				
5											

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 12

Date Drilled: November 6, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	115.97						Ground Surface				
	115.87						Topsoil - About 100 millimetres in thickness				
		SS	1	4,6,8,6	14	90	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance in upper level, increased silt content in upper level, trace of rootlets, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.		13.9	14	
1		SS	2	8,12,18	30	100			14.3	30 >450	
		SS	3	9,13,15	28	100			18.6	28 >450	
2		SS	4	7,13,16	29	100			19.7	29 >450	
3		SS	5	7,8,13	21	90			23.1	21 400	
	112.46						End of Borehole				
4							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 6, 2020 to depth of about 3.5 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.				
5											

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 13

Date Drilled: November 6, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	117.83						Ground Surface				
	117.73						Topsoil - About 100 millimetres in thickness				
		SS	1	4,5,5,7	10	60	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance in upper level, increased silt content in upper level, trace of rootlets, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.		17.4	10	
1		SS	2	8,9,9	18	90			17.2	18 / >450	
		SS	3	8,12,19	31	95			17.6	31 / >450	
2		SS	4	7,12,13	25	80			20.7	25 / >450	
3		SS	5	6,9,12	21	100				21	
	114.32						End of Borehole				
4							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 6, 2020 to depth of about 3.5 metres. Dynamic Cone Penetration Test carried out from about 3.66 metres to 6.10 metres with results of 20, 29, 44, 55, 66, 71, 68 and 75. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three				
5											

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 14

Date Drilled: November 6, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION	Symbol	Moisture Content % (10 20 30 40)	SPT (N) (10 20 30 40) / Pocket Penetrometer kPa (100 200 300 400)	Well Installation
0	117.23						Ground Surface				
	117.13						Topsoil - About 100 millimetres in thickness				
		SS	1	3,3,6,6	9	85	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance in upper level, increased silt content in upper level, trace of rootlets, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.		19.7	9	
1		SS	2	9,12,17	29	95			18.3	29 >450	
		SS	3	6,13,14	27	100			15.6	27 >450	
2		SS	4	6,9,15	24	90			22.4	24 >450	
3		SS	5	5,7,10	17	100			26.5	17 350	
	113.72						End of Borehole				
4							Notes: 1] Borehole advanced using solid stem auger stem equipment on November 6, 2020 to depth of about 3.5 metres. 2] Borehole 'open' and 'dry' and backfilled on completion. 3] Soil samples will be discarded after three months unless directed otherwise by client.				
5											

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No. 15

Date Drilled: November 6, 2020
Drill Method: Solid Stem
Drilling Company: Kodiak Drilling
Hole Size: 100mm
Hammer Type: Mechanical

Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the-Lake
Datum: Geodetic

Project No.: 2020-161-G
Client: Capital Contracting Group

Depth (m)	Elev. [m]	Sample Type	Number	Blows/0.15 m	Blows/300 mm	Recovery	DESCRIPTION
0	118.88						Ground Surface
							Topsoil - About 50 millimetres in thickness
		SS	1	3,3,4,5	7	65	Clayey Silt Fill - Brown with organic staining and topsoil seam at about 0.8 metres.
	117.98						
1		SS	2	4,5,7	12	80	Silty Clay - Brown to greyish brown, brown/grey mottling, 'till-like' structure, 'reworked' appearance in upper level, increased silt content in upper level, trace of rootlets, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to stiff.
		SS	3	7,10,10	20	95	
2		SS	4	6,7,10	17	100	
3		SS	5	6,6,8	14	100	
	115.37						End of Borehole
4							
5							

Notes:
1] Borehole advanced using solid stem auger stem equipment on November 6, 2020 to depth of about 3.5 metres. Dynamic Cone Penetration Test carried out from about 3.66 metres to 6.10 metres with results of 17, 23, 25, 28, 37, 32, 36 and 37.
2] Borehole 'open' and 'dry' and backfilled on completion.
3] Soil samples will be discarded after three

Symbol

Moisture Content (%): 10 20 30 40
17.4
17.2
17.6
20.7

SPT (N): 10 20 30 40
Pocket Penetrometer (kPa): 100 200 300 400
7
12
>450
20
>450
17
>450
14

Well Installation

Note: This borehole log has been prepared for geotechnical purposes and does not necessarily contain information suitable for an environmental assessment of the subsurface conditions.

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Log of Borehole No.: 16

Date Drilled: November 6, 2020
Drill Method: Dynamic Cone Test
Drilling Company: Kodiak Drilling
Hole Size: 50mm
Hammer Type: Mechanical

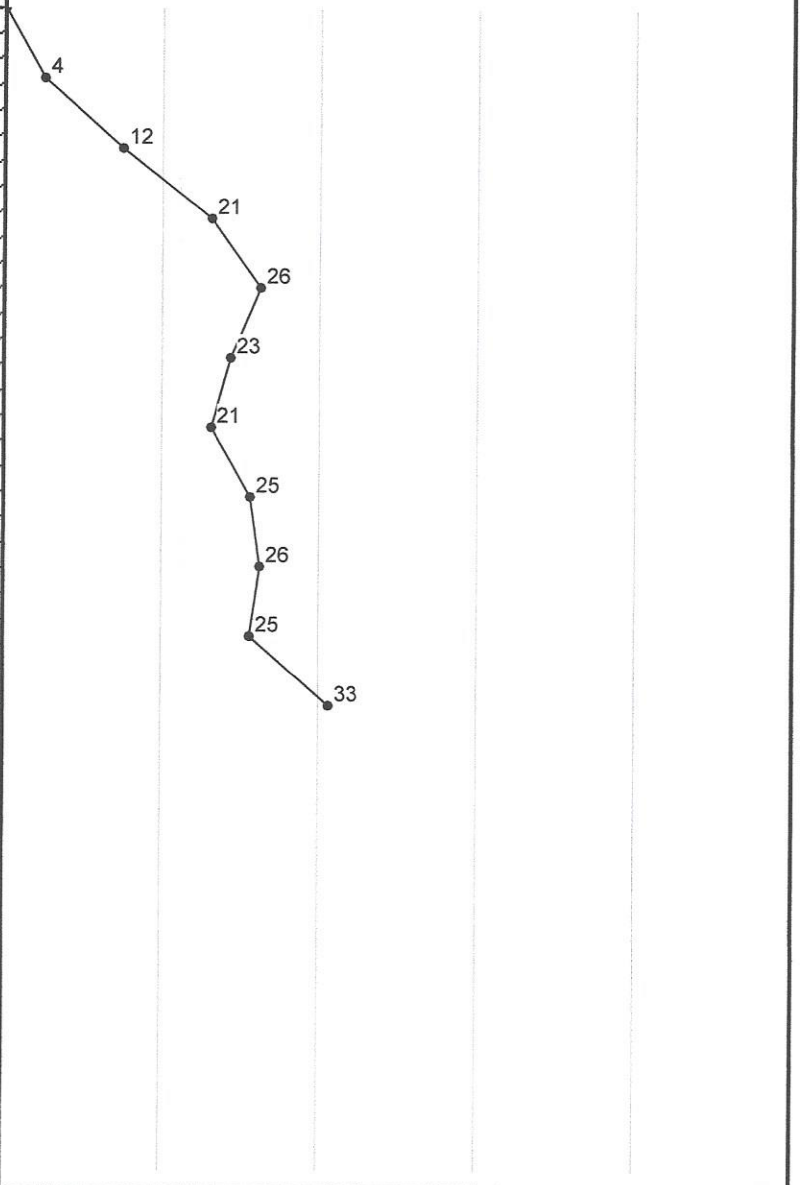
Project: Proposed Commercial Development
Location: 353 Townline Road
City: Niagara-on-the Lake
Datum: Geodetic

Project No.: 2020-161-G

Client: Capital Contracting Group

Depth (m)	Elev. [m]	DESCRIPTION	Symbol
0	118.18	Ground Surface	
		From Borehole No. 15 About 50 Millimetres of Topsoil over Clayey Silt Fill to depth of about 0.9 metres over Silty Clay - Brown to greyish brown, brown/grey mottling, 'reworked' appearance in upper level, trace of rootlets, trace of shale fragments and gravel, occasional grey silt partings and thin vertical and oxidized seams, very stiff to hard.	
3	115.18	End of Borehole	

Dynamic Cone Penetration Test Results
Blows per 0.3 metres



Notes:
1. Dynamic Cone Penetration test driven from ground surface to depth of 3.0 metres.

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