Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Buildings Science

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Geotechnical Investigation

Proposed Commercial Buildings
3020 Hawthorne Road
Ottawa, Ontario

Prepared For

Controlex Corporation

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December 30, 2014

Report: PG3229-1

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APPENDICES

1.0 INTRODUCTION

Paterson Group (Paterson) was commissioned by Controlex Corporation (Controlex) to conduct a geotechnical investigation for the proposed commercial buildings to be located at 3020 Hawthorne Road, in the City of Ottawa, Ontario (refer to Figure 1 - Key Plan in Appendix 2).

The objective of the current investigation was to:

- ❑ Determine the subsoil and groundwater conditions at this site by means of boreholes.
- ❑ provide geotechnical recommendations pertaining to 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. This report contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as understood at the time of writing this report.

Investigating the presence or potential presence of contamination on the subject property was not part of the scope of work of this present investigation. Therefore, the present report does not address environmental issues.

Paterson carried out a Phase I - Environmental Site Assessment (ESA) for the subject site. The results of these investigations are presented under separate cover.

2.0 PROPOSED DEVELOPMENT

It is understood that the current phase of the proposed development consists of two (2) commercial buildings of slab-on-grade construction along with the associated parking areas and access lanes.

3.0 METHOD OF INVESTIGATION

3.1 Field Investigation

The field program for the geotechnical investigation was conducted between May 16, 2014 and May 20, 2014. A total of eight (8) boreholes were placed across the subject site. The boreholes were advanced to maximum depth of 11.8 m below ground surface. It should be noted that a previous investigation was conducted within this area in 2004 with a total of 37 boreholes. The locations of the test holes are shown on Drawing PG3229-1 - Test Hole Location Plan in Appendix 2.

The boreholes were drilled using a track-mounted auger drill rig operated by a two person crew. All fieldwork was conducted under the full-time supervision of Paterson's geotechnical division under the direction of a senior engineer. The drilling procedure consisted of augering to the required depths at the selected locations and sampling the overburden.

Sampling and In Situ Testing

Soil samples from the boreholes were recovered from the auger flights or using a 50 mm diameter split-spoon sampler. All soil samples were visually inspected and initially classified on site. The auger and split spoon samples were placed in sealed plastic bags. All samples were transported to our laboratory for further examination and classification. The depths at which the auger and split spoon samples were recovered from the test holes are shown as, AU and SS, respectively, on the Soil Profile and Test Data sheets presented in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split spoon samples. The SPT results are recorded as "N" values on the Soil Profile and 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 testing, using a vane apparatus, was conducted in cohesive soils.

The subsurface conditions observed in the boreholes were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data sheets presented in Appendix 1.

Groundwater

Flexible standpipes were installed in all boreholes to permit monitoring of the groundwater levels subsequent to the completion of the sampling program.

Sample Storage

All samples were stored in the laboratory for a period of one month and then discarded.

3.2 Field Survey

The test hole locations completed during the present geotechnical investigation were selected Paterson taking into consideration site features and underground utilities. The ground surface elevations at the test hole locations were provided by Annis, O'Sullivan, Vollebekk Ltd. It is understood that the ground surface elevations at the test hole locations were referenced to a geodetic datum. The location of the test holes and the ground surface elevation at each test hole location are presented on Drawing PG3229-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

All soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. 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.

All samples will be stored in the laboratory for a period of one month after issuance of this report. They will then be discarded unless we are otherwise directed.

3.4 Analytical Testing

Two (2) soil samples were submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The samples were submitted to determine the concentration of sulphate and chloride, the resistivity and the pH of the samples. The results are presented in Appendix 1 and are discussed further in Subsection 6.7.

4.0 OBSERVATIONS

4.1 Surface Conditions

Generally, the site is occupied by existing commercial buildings within northern and eastern sections. The ground surface within the proposed commercial buildings (Buildings 500 and 600) was noted to be in-filled with a silty sand with gravel fill. Additionally, the ground surface across the site is relatively flat and slightly lower than Hawthorne Road.

4.2 Subsurface Profile

Generally, the subsurface profile at the borehole locations consists primarily of the brown silty sand fill mixed with gravel followed by a very stiff to stiff, brown silty clay crust. A stiff grey silty clay layer was noted below the silty clay crust at each borehole location. Practical refusal to DCPT was encountered at BH 1-14, BH 5-14 and BH 8-14 at 10.3, 8.9, and 7.8 m depth, respectively. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profiles encountered at each test hole location.

Based on available geological mapping, the drift thickness in the area ranges in thickness between 10 and 15 m and the bedrock consists of interbedded shale, siltstone and limestone of the Carlsbad Formation.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the soil profiles encountered at each test hole location.

4.3 Groundwater

On June 16, 2014, groundwater levels were measured in the standpipes installed in the boreholes. The measured groundwater levels ranged from 0.99 to 7.51 m below existing ground surface. It should be noted the standpipe groundwater readings can be influenced by surface water becoming trapped within the backfilled borehole. The measured groundwater level (GWL) readings are presented in Table 1.

Based on the recovered soil samples' colouring, consistency and moisture content levels, the long-term groundwater level is anticipated at 5 m depth. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater level could be higher at the time of construction.

Table 1 - Measured Groundwater Levels

Borehole Number	Ground Surface Elevation (m)	Water Levels		Recording Date
		Depth (m)	Elevation (m)	
BH 1-14	76.10	0.99	75.11	June 16, 2014
BH 2-14	76.60	3.81	72.79	June 16, 2014
BH 3-14	76.00	5.66	70.34	June 16, 2014
BH 4-14	75.52	2.95	72.57	June 16, 2014
BH 5-14	75.43	3.55	71.88	June 16, 2014
BH 6-14	75.64	1.14	74.50	June 16, 2014
BH 7-14	75.53	1.62	73.91	June 16, 2014
BH 8-14	75.58	7.51	68.07	June 16, 2014

Notes: The ground surface elevation at each borehole location was provided by AOV and was referenced to a geodetic datum.

5.0 DISCUSSION

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is adequate for the proposed commercial buildings. It is anticipated that the proposed buildings will be founded on conventional shallow footings placed on an undisturbed, stiff silty clay bearing surface. Alternatively, where the native silty clay is at a significant depth, the subgrade can be raised using engineered fill placed in accordance with Subsection 5.2. It should be further noted that the existing fill below the building pad is suitable for placement of the proposed buildings' floor slab provided it is reviewed and approved by the geotechnical consultant at the time of construction. The placement and compaction of the existing fill material below the proposed building footprint was reviewed by Paterson at the time of placement. Based on our observations, the existing fill material was suitable for placement below the building pad and adequately compacted. However, an additional inspection of the fill surface is recommended to ensure that no deleterious fill or poor performing areas are present before slab placement.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing organic materials, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures.

Fill Placement

Engineered fill used for grading beneath the proposed building footings, unless otherwise specified, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The fill should be tested and approved prior to delivery to the site. The granular material should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the buildings should be compacted to at least 98% of the standard Proctor maximum dry density (SPMDD).

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. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If these materials are to be used to build up the subgrade level for areas to be paved, the material should be compacted in thin lifts to a minimum density of 95% of the respective SPMDD. Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls.

5.3 Foundation Design

Bearing Resistance Values

Strip footings, up to 3 m wide, and pad footings, up to 6 m wide, placed on an undisturbed, stiff silty clay or engineered fill 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 **225 kPa**. A geotechnical resistance factor of 0.5 was applied to the above-noted bearing resistance value at ULS.

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.

The total and differential settlements associated with the footing loading conditions using the bearing resistance value at SLS provided are estimated to be 25 and 20 mm, respectively.

Permissible Grade Raise Restriction

A permissible grade raise restriction of 1.5 m above the existing ground surface within the proposed building footprints is recommended. A permissible grade raise restriction of 2.5 m is recommended for the parking areas and access lanes.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for the foundations considered at this site. Reference should be made to the latest revision of the 2012 Ontario Buildings Code for a full discussion of the earthquake design requirements. The soils underlying the subject site are not susceptible to liquefaction.

5.5 Slab-on-Grade Construction

With the removal of all topsoil and deleterious fill, such as those containing organic materials, the existing fill surface approved by the geotechnical consultant at the time of construction will be considered to be an acceptable subgrade on which to commence backfilling for floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular B Type I or II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. It is recommended that the upper 200 mm of sub-floor fill consists of OPSS Granular A crushed stone for slab on grade construction. All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of the SPMDD.

5.6 Pavement Structure

For design purposes, the pavement structures presented in the following tables could be used for the design of car only parking areas, heavy truck parking areas and access lanes.

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
300	**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 fill	

Table 3 - Recommended Pavement Structure Access Lanes 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
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 fill	

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 I or 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 SPMDD using suitable compaction 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 the load bearing capacity.

Due to the impervious nature of the subgrade materials consideration should be given to installing subdrains during the pavement construction. These drains should extend in four orthogonal directions or longitudinally when placed along a curb. The clear stone surrounding the drainage lines or the pipe, should be wrapped with suitable filter cloth. 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.

6.0 DESIGN AND CONSTRUCTION PRECAUTIONS

6.1 Foundation Drainage and Backfill

A perimeter drainage system is recommended to be provided for the proposed structures. The system should consist of a 100 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.

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 are not recommended for re-use as backfill against the foundation walls.

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 cut back at acceptable slopes or should be retained by shoring systems from the start 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 undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required 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 be kept away 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

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 95% of the SPMDD. The bedding material should extend at least to the spring line of the pipe.

The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to at least 300 mm above the obvert of the pipe. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 95% of the SPMDD.

Generally, it should be possible to re-use the moist, not wet, silty clay above the cover material if the excavation and filling operations are conducted in dry weather conditions. The wet silty clay should be given a sufficient drying period to decrease the moisture content to an acceptable level to make compaction possible prior to being re-used.

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) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the SPMDD.

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 MOE permit to take water (PTTW) will be required for this project if more than 50,000 L/day is to be pumped during the construction phase. At least 3 to 4 months should be allowed for completion of the application and issuance of the permit by the MOE.

6.6 Winter Construction

Precautions must be taken if winter construction is considered. The subsurface soil conditions consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

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 buildings and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be completed during 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 - Corrosion Potential

Parameter	Laboratory Results		Threshold	Commentary
	BH9 SS2	BH27 SS2		
Chloride	10 µg/g	10 µg/g	Chloride content less than 400 mg/g	Negligible concern
pH	8.13	8.24	pH value less than 5.0	Neutral Soil
Resistivity	5700 ohm.cm	6300 ohm.cm	Resistivity greater than 1,500 ohm.cm	Moderate Corrosion Potential
Sulphate	65 µg/g	30 µg/g	Sulphate value greater than 1 mg/g	Negligible Concern

7.0 RECOMMENDATIONS

The following material testing and observation program be performed by a geotechnical consultant is required for the foundation design data provided herein to be applicable:

- ❑ Review of the 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 and follow-up 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 the completion of a satisfactory inspection program by the geotechnical consultant.

8.0 STATEMENT OF LIMITATIONS

The recommendations made in this report are in accordance with our present understanding of the project. We request that we be permitted to review the grading plan once available. Also, our recommendations should be reviewed when the project drawings and specifications are complete.

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 that we be notified immediately in order 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 Controlex Corporation or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Faisal Abou-Seido, P.Eng.

David J. Gilbert, P.Eng.

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Report Distribution:

- ❑ Controlex Corporation (3 copies)
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APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TESTING RESULTS

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Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Commercial Buildings - 3020 Hawthorne Road
Ottawa, Ontario

DATUM Ground surface elevations at borehole locations provided by Annis, O'Sullivan, Vollebekk Ltd.

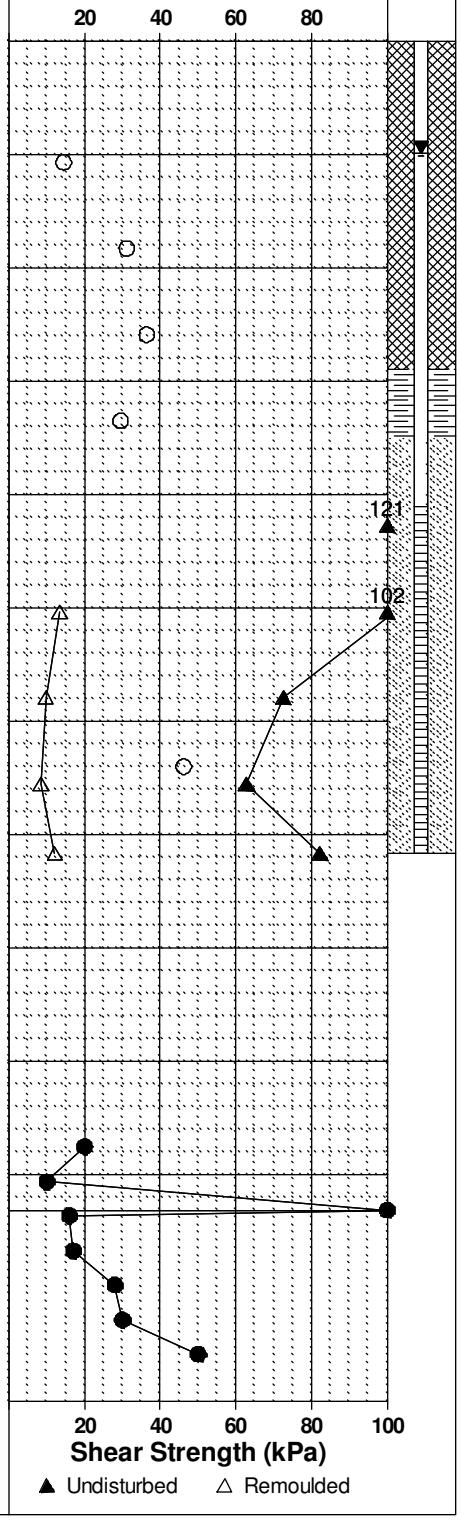
REMARKS

BORINGS BY CME 55 Power Auger **DATE** May 16, 2014

FILE NO. PG3229

HOLE NO. BH 1-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.01
FILL: Brown silty sand with gravel, trace cobbles		AU	1				
		SS	2	67	6	1	75.01
1.45							
		SS	3	100	10	2	74.01
		SS	4	10	7		
		SS	5	100	4	3	73.01
Very stiff to stiff, brown **SILTY CLAY**						4	72.01
- grey by 5.2m depth						5	71.01
						6	70.01
7.16						7	69.01
Dynamic Cone Penetration Test commenced at 7.16m depth. Cone pushed to 9.4m depth.						8	68.01
						9	67.01
						10	66.01
10.31							
End of Borehole Practical DCPT refusal at 10.31m depth (GWL @ 0.99m-June 16, 2014)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Commercial Buildings - 3020 Hawthorne Road
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DATUM Ground surface elevations at borehole locations provided by Annis, O'Sullivan, Vollebekk Ltd.

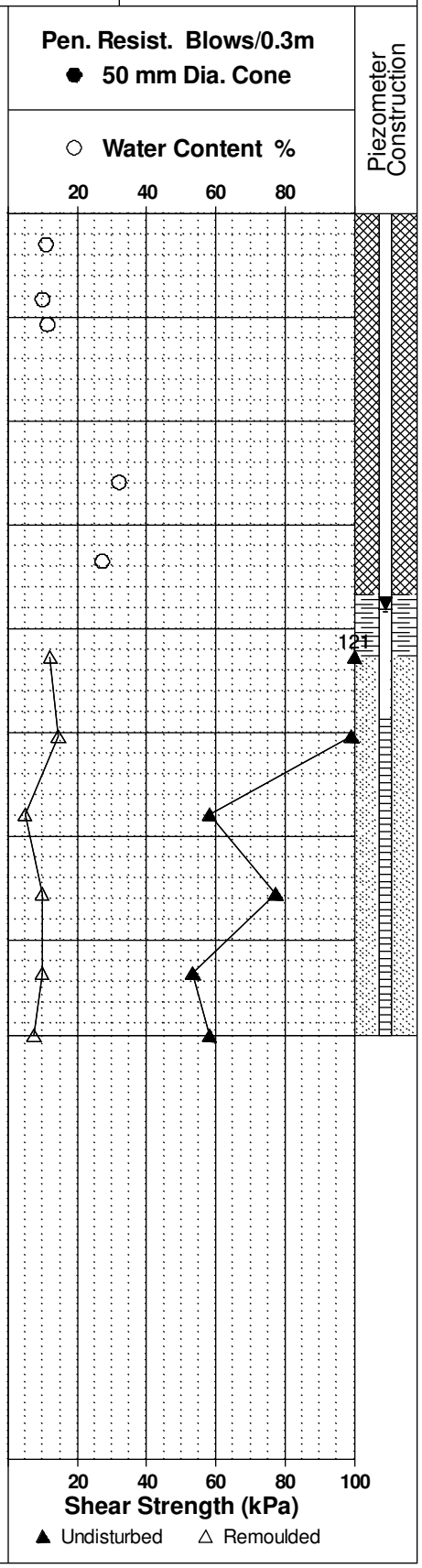
REMARKS

BORINGS BY CME 55 Power Auger **DATE** May 16, 2014

FILE NO. PG3229

HOLE NO. BH 2-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.06
FILL: Brown silty sand with gravel, trace cobbles		AU	1				
		SS	2		15	1	75.06
		SS	3		13	2	74.06
2.21							
		SS	4	100	8	3	73.06
		SS	5	100	4		
Very stiff to stiff, brown **SILTY CLAY**						4	72.06
						5	71.06
						6	70.06
						7	69.06
7.92							
End of Borehole							
(GWL @ 3.81m-June 16, 2014)							



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DATUM Ground surface elevations at borehole locations provided by Annis, O'Sullivan, Vollebekk Ltd.

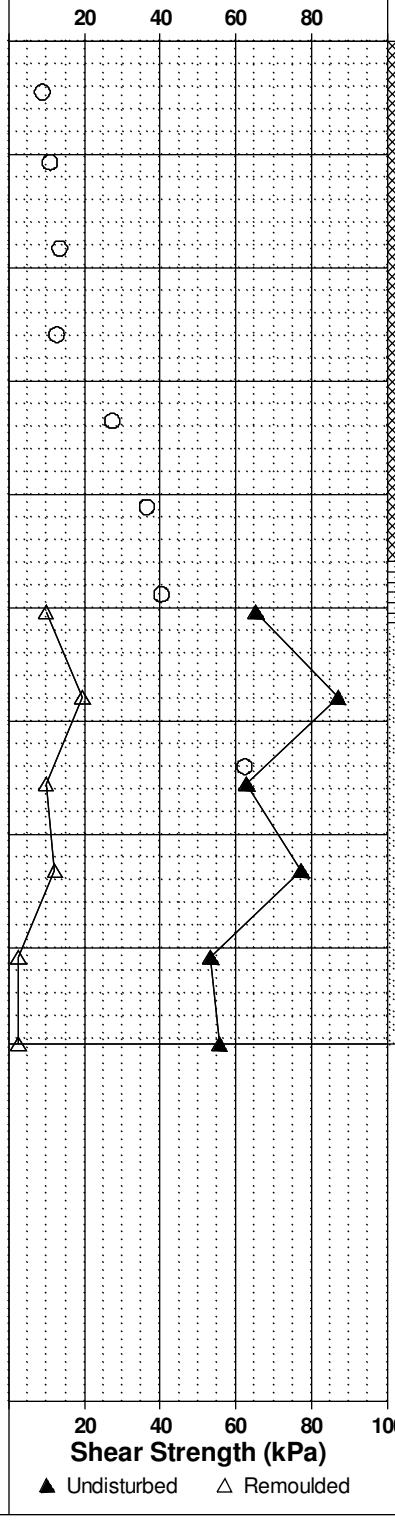
REMARKS

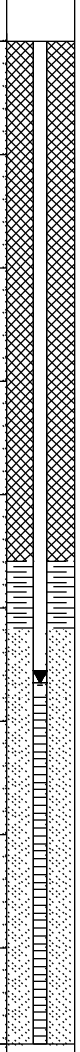
BORINGS BY CME 55 Power Auger **DATE** May 16, 2014

FILE NO. PG3229

HOLE NO. BH 3-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.00
		AU	1				
		AU	2				
		SS	3	71	10	1	75.00
FILL: Brown silty sand with gravel, trace cobbles		SS	4	75	16	2	74.00
		SS	5	8	11		
2.97						3	73.00
		SS	6	100	5		
Very stiff to stiff, brown **SILTY CLAY**		SS	7	100	3	4	72.00
- grey by 4.5m depth						5	71.00
						6	70.00
						7	69.00
						8	68.00
8.84							
End of Borehole							
(GWL @ 5.66m-June 16, 2014)							





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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Commercial Buildings - 3020 Hawthorne Road
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DATUM Ground surface elevations at borehole locations provided by Annis, O'Sullivan, Vollebekk Ltd.

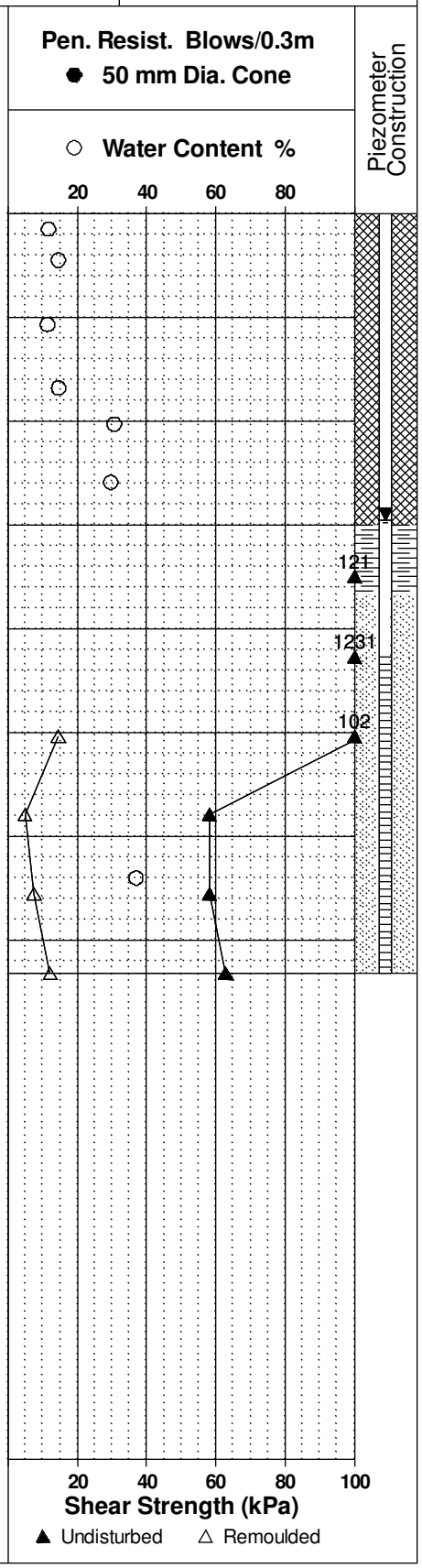
REMARKS

BORINGS BY CME 55 Power Auger **DATE** May 16, 2014

FILE NO. PG3229

HOLE NO. BH 4-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.52
		AU	1				
		AU	2				
FILL: Brown silty sand with gravel, trace cobbles		SS	4	71	10	1	74.52
		SS	3	67	12		
1.90						2	73.52
		SS	5	100	5		
						3	72.52
Very stiff to stiff, brown **SILTY CLAY**						4	71.52
- grey by 5.2m depth						5	70.52
						6	69.52
						7	68.52
7.32							
End of Borehole							
(GWL @ 2.95m-June 16, 2014)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Commercial Buildings - 3020 Hawthorne Road
Ottawa, Ontario

DATUM Ground surface elevations at borehole locations provided by Annis, O'Sullivan, Vollebekk Ltd.

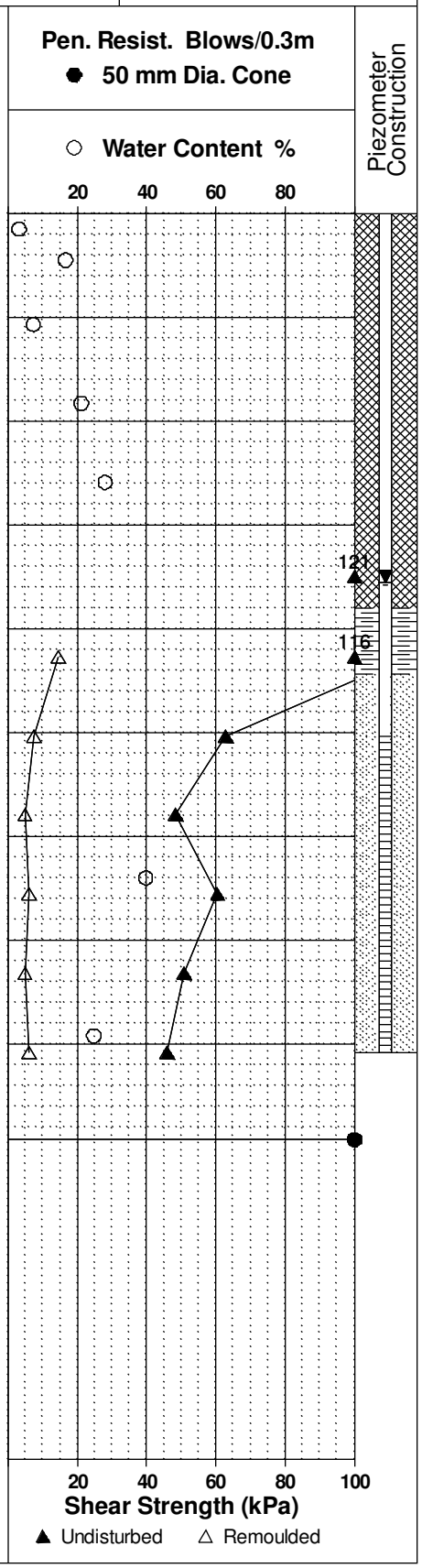
REMARKS

BORINGS BY CME 55 Power Auger **DATE** May 20, 2014

FILE NO. PG3229

HOLE NO. BH 5-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.43
FILL: Brown silty sand with gravel, trace cobbles		AU	1				
		AU	2				
		SS	3	67	12	1	74.43
1.45							
		SS	4	33	10	2	73.43
		SS	5	100	5	3	72.43
Very stiff to stiff, brown **SILTY CLAY**						4	71.43
						5	70.43
						6	69.43
						7	68.43
8.08						8	67.43
Dynamic Cone Penetration Test commenced at 8.08m depth.							
8.92							
End of Borehole							
Practical DCPT refusal at 8.92m depth							
(GWL @ 3.55m-June 16, 2014)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Commercial Buildings - 3020 Hawthorne Road
Ottawa, Ontario

DATUM Ground surface elevations at borehole locations provided by Annis, O'Sullivan, Vollebekk Ltd.

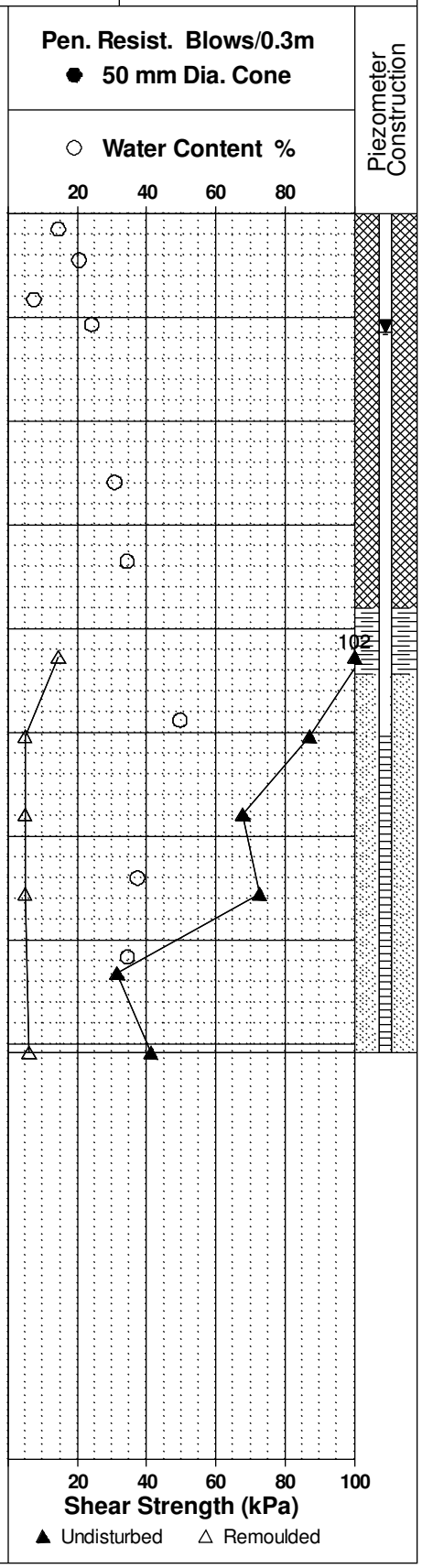
REMARKS

BORINGS BY CME 55 Power Auger **DATE** May 20, 2014

FILE NO. PG3229

HOLE NO. BH 6-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.64
FILL: Brown silty sand with gravel, trace clay and cobbles		AU	1				
		AU	2				
		SS	3	38	14	1	74.64
1.52							
		SS	4	83	14	2	73.64
		SS	5	100	3		
		SS	6	100	3	3	72.64
Very stiff to stiff, brown **SILTY CLAY**						4	71.64
						5	70.64
						6	69.64
- firm and grey by 6.7m depth						7	68.64
8.08						8	67.64
End of Borehole							
(GWL @ 1.14m-June 16, 2014)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Commercial Buildings - 3020 Hawthorne Road
Ottawa, Ontario

DATUM Ground surface elevations at borehole locations provided by Annis, O'Sullivan, Vollebekk Ltd.

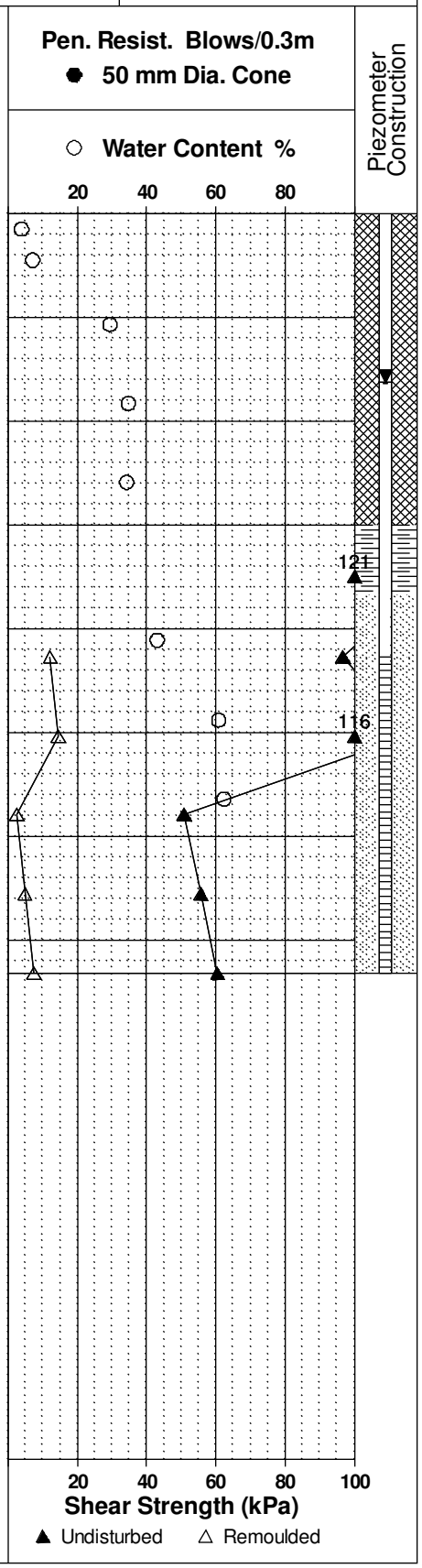
REMARKS

BORINGS BY CME 55 Power Auger **DATE** May 20, 2014

FILE NO. PG3229

HOLE NO. BH 7-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.53
FILL: Brown silty sand with gravel, trace cobbles and clay (0.50)		AU	1				
		AU	2				
		SS	3	46	7	1	74.53
		SS	4	100	8	2	73.53
		SS	5	100	4	3	72.53
Very stiff to stiff, brown **SILTY CLAY**						4	71.53
						5	70.53
						6	69.53
						7	68.53
(7.32) End of Borehole							
(GWL @ 1.62m-June 16, 2014)							



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SOIL PROFILE AND TEST DATA

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Prop. Commercial Buildings - 3020 Hawthorne Road
Ottawa, Ontario

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** May 20, 2014

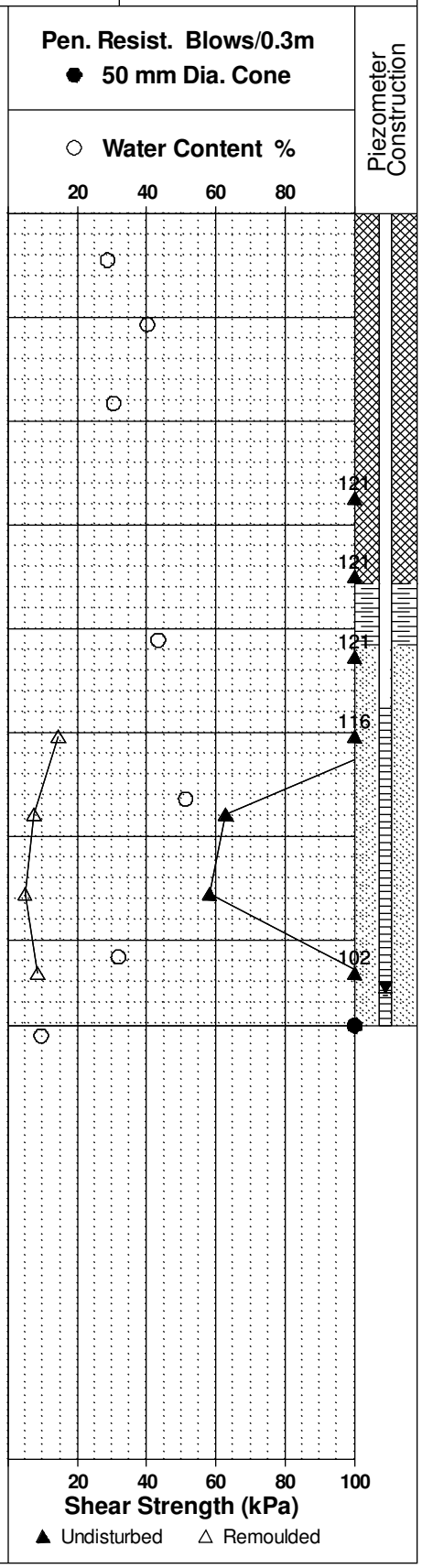
FILE NO. PG3229

HOLE NO. BH 8-14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.58
FILL: Brown silty sand with gravel and cobbles 0.30		AU	1				
		AU	2				
		SS	3	67	8	1	74.58
		SS	4	100	5	2	73.58
Very stiff to stiff, brown **SILTY CLAY**						3	72.58
						4	71.58
						5	70.58
						6	69.58
						7	68.58
7.32							
Dynamic Cone Penetration Test commenced at 7.32m depth. 7.82		SS	5		50+		
End of Borehole							

Practical DCPT refusal at 7.82m depth.

(GWL @ 7.51m-June 16, 2014)



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

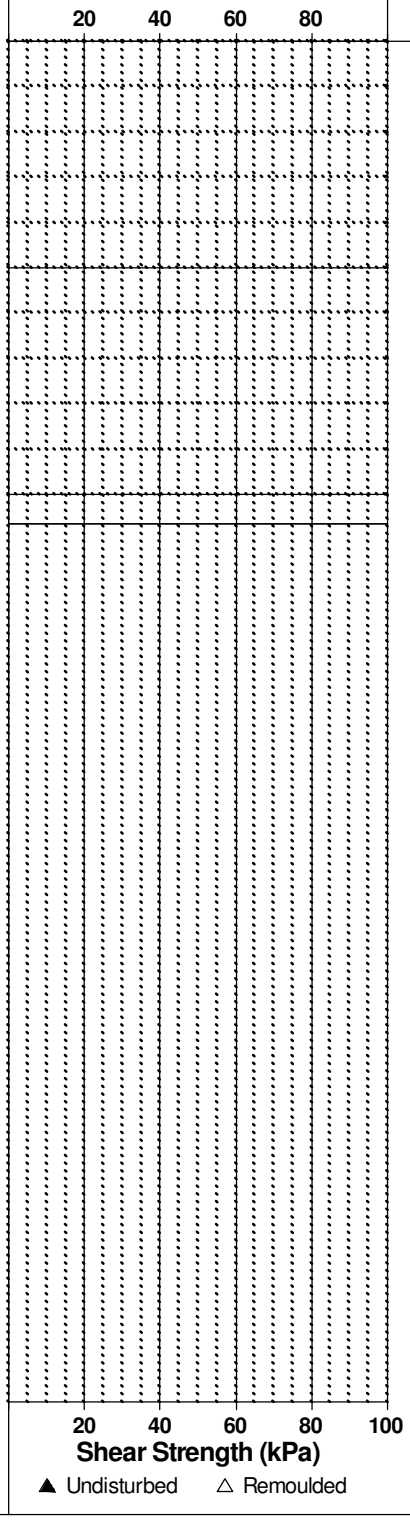
FILE NO. PG0345

REMARKS

HOLE NO. BH 1

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	73.85		
FILL: Dark grey silty fine sand with shale fragments and organic matter		SS	1	29	55	1	72.85		
1.42									
Very stiff, brown **SILTY CLAY**		SS	2	58	16	2	71.85		
2.13									
End of Borehole									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

FILE NO. PG0345

REMARKS

HOLE NO. BH 2

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	74.97		
TOPSOIL 0.56									
Compact, brown fine **SAND**		SS	1	33	17	1	73.97		
		SS	2	25	18				
2.13						2	72.97		
End of Borehole									

Water Content % scale: 20, 40, 60, 80

Shear Strength (kPa): 20, 40, 60, 80, 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

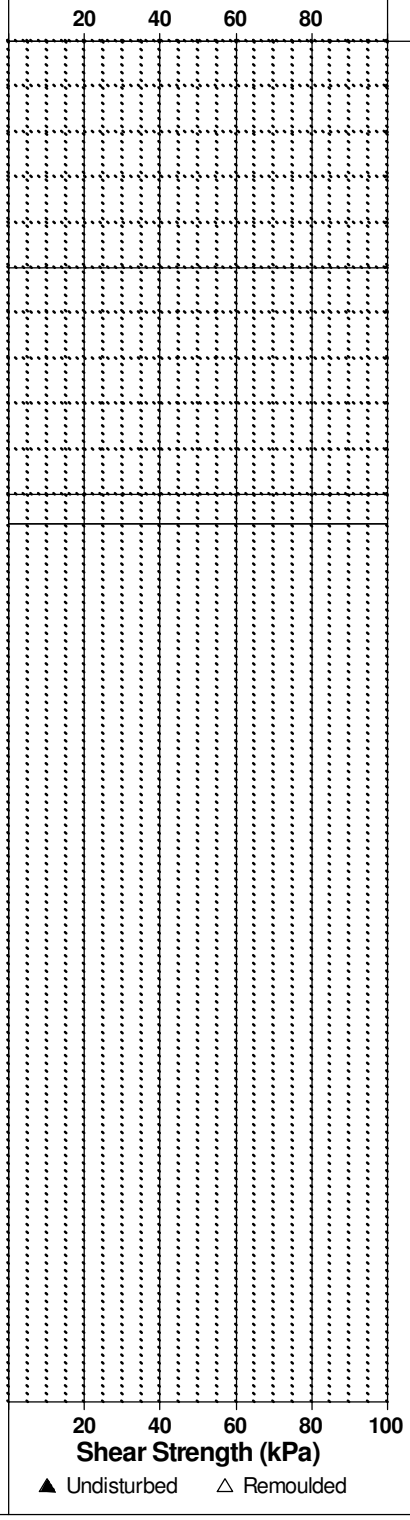
FILE NO. PG0345

REMARKS

HOLE NO. BH 3

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	74.11		
TOPSOIL 0.10									
FILL: Dark brown silty clay with sand and organic matter 0.48		AU	A						
Stiff, brown-grey **SILTY CLAY**, trace sand		SS	1	50	13	1	73.11		
		SS	2	62	8				
2.13						2	72.11		
End of Borehole									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

FILE NO. PG0345

HOLE NO. BH 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	76.10		
FILL: Dark brown silty fine sand with topsoil (0.18)		AU	1						
Stiff, brown **SILTY CLAY**		SS	2	79	19	1	75.10		
		SS	3	83	11				
(2.13)						2	74.10		
End of Borehole									

Pen. Resist. Blows/0.3m: 20, 40, 60, 80

Shear Strength (kPa): 20, 40, 60, 80, 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 30 Jul 04

FILE NO. PG0345

HOLE NO. BH 5

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	77.41		
TOPSOIL 0.15									
FILL: Brown sand with crushed stone and brick pieces 0.46									
Stiff, brown **SILTY CLAY**		SS	1	71	16	1	76.41		
		SS	2	67	14				
2.13						2	75.41		
End of Borehole									

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

FILE NO. PG0345

HOLE NO. BH 6

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.13						0	74.55
FILL: Dark brown silty fine to medium sand with shale fragments and organic matter		SS	1	58	42	1	73.55
1.32							
Very stiff, brown **SILTY CLAY**, trace sand		SS	2	67	11	2	72.55
		SS	3	75	12	3	71.55
		SS	4	100	6		
		SS	5	100	5	4	70.55
4.42							
End of Borehole							
(GWL @ 3.73m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

FILE NO. PG0345

HOLE NO. BH 7

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.02
25mm Topsoil over reddish brown **SAND** 0.33							
		SS	1	67	17	1	74.02
		SS	2	83	6	2	73.02
Very stiff to stiff, brown **SILTY CLAY**, trace sand		SS	3	100	5	3	72.02
		SS	4	100	4		
		SS	5	100	5	4	71.02
- grey by 4.3m depth 4.42							
End of Borehole							
(GWL @ 3.38m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 8 Aug 04

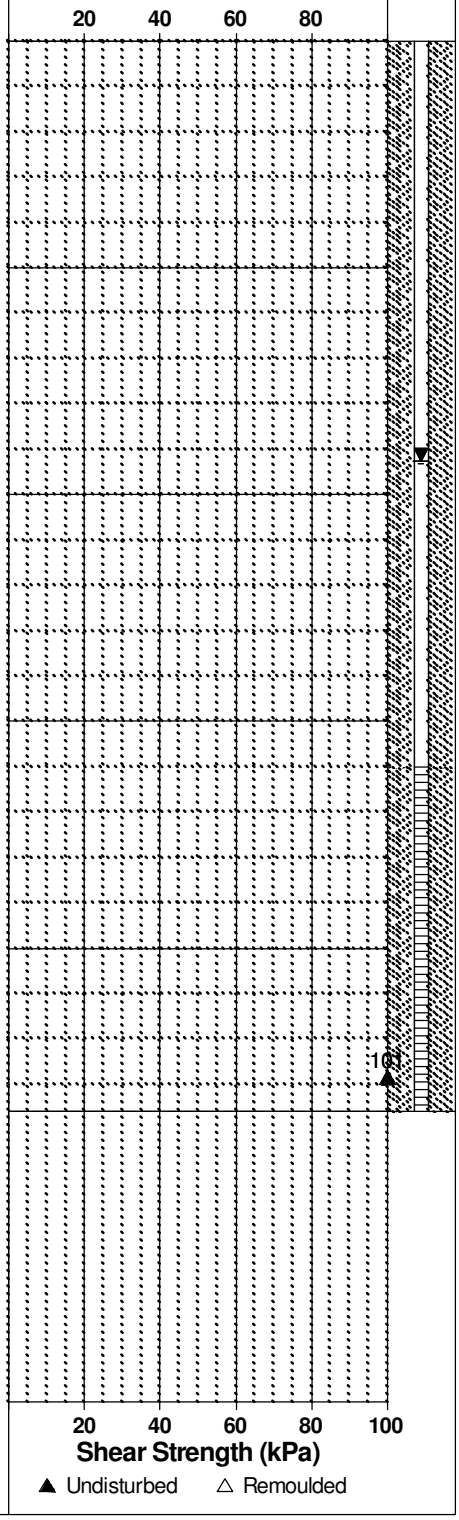
FILE NO. PG0345

HOLE NO. BH 8

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.18						0	75.07
Compact, brown fine **SAND**		SS	1	25	23	1	74.07
		SS	2	21	18	2	73.07
2.23							
Very stiff, brown-grey **SILTY CLAY**		SS	3	67	4		
- grey by 2.9m depth						3	72.07
		SS	4	79	4		
		SS	5	100	2	4	71.07
4.72							
End of Borehole							
(GWL @ 1.85m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

REMARKS

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

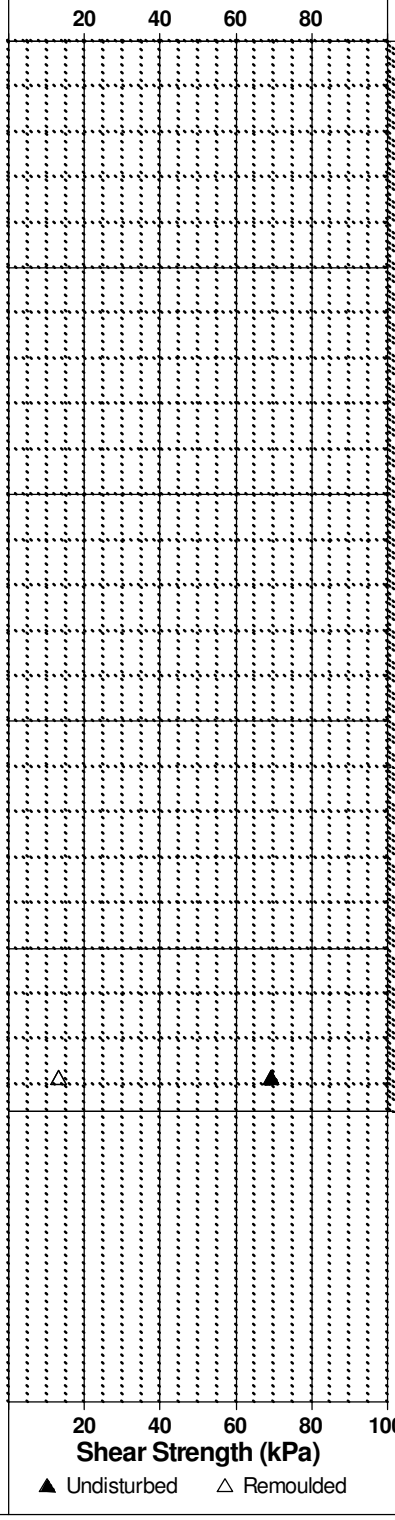
FILE NO. PG0345

HOLE NO. BH 9

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.15						0	74.68
Very stiff to stiff, brown **SILTY CLAY**, trace sand		SS	1	58	15	1	73.68
		SS	2	100	11	2	72.68
- grey by 2.2m depth		SS	3	100	7	3	71.68
		SS	4	100	4	4	70.68
		SS	5	100	2		
4.72 End of Borehole							
(GWL @ 1.69m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ **Water Content %**



Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

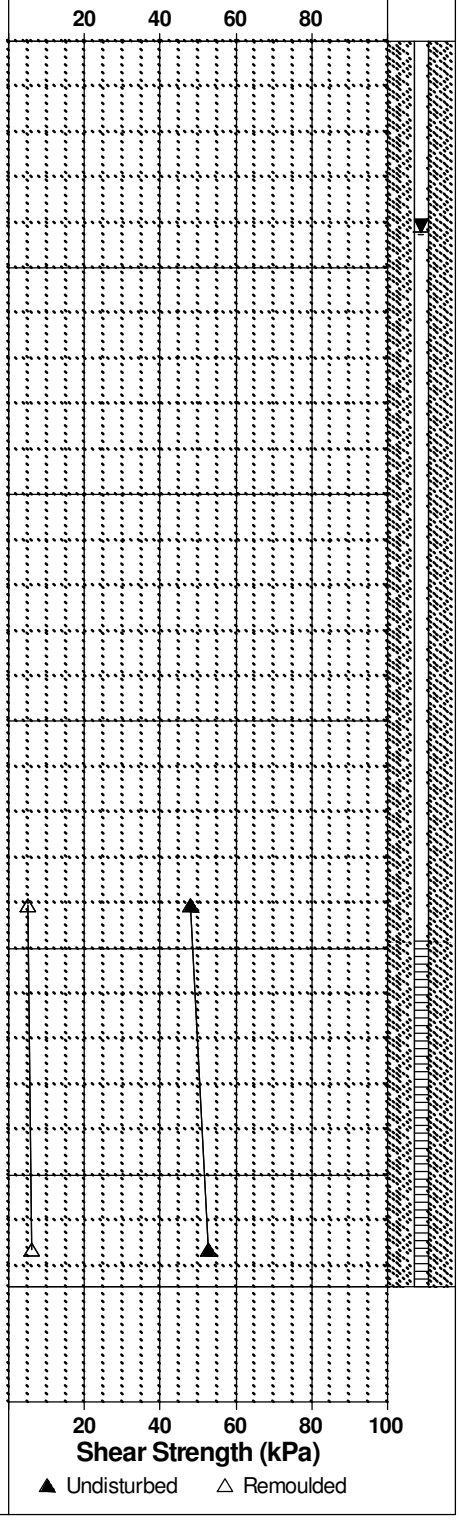
FILE NO. PG0345

REMARKS

HOLE NO. BH10

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	73.37
TOPSOIL 0.18							
Loose, orange-brown **SILTY** fine **SAND** 0.89							
Firm, brown-grey **SILTY CLAY**, trace sand		SS	1	83	5	1	72.37
- grey by 1.8m depth		SS	2	54	4	2	71.37
		SS	3	100	4	3	70.37
		SS	4	100	2	4	69.37
		SS	5	100	3	5	68.37
5.49 End of Borehole							
(GWL @ 0.84m-Aug. 16/04)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

FILE NO. PG0345

HOLE NO. BH11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	74.42
TOPSOIL 0.23							
		SS	1	58	23	1	73.42
		SS	2	100	12		
Very stiff, brown **SILTY CLAY**, trace sand						2	72.42
		SS	3	100	5		
- grey-brown by 3.0m depth						3	71.42
		SS	4	100	4		
						4	70.42
4.57							
End of Borehole							
(BH dry - Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

115

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

FILE NO. PG0345

HOLE NO. BH12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.24
Compact, orange-brown fine **SAND**							
0.81							
		SS	1	58	17	1	74.24
		SS	2	100	8		
Stiff, brown **SILTY CLAY**, trace sand						2	73.24
		SS	3	100	5		
						3	72.24
		SS	4	100	5		
- grey by 3.7m depth						4	71.24
		SS	5	100	4		
4.42							
End of Borehole							
(BH dry - Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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Ottawa, Ontario

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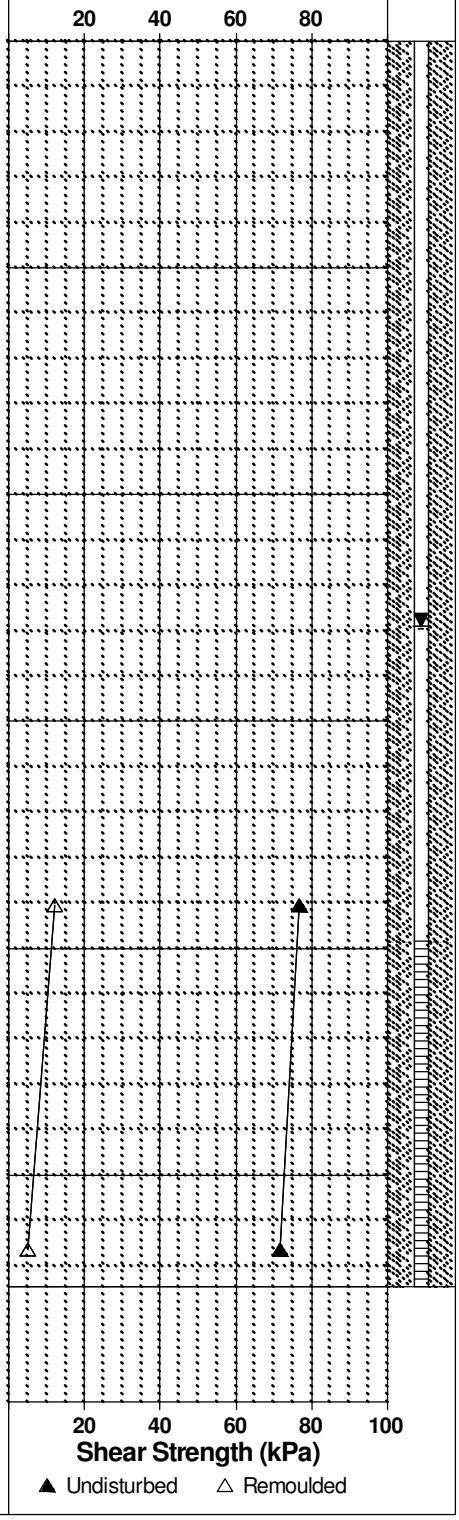
REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

FILE NO. PG0345

HOLE NO. BH13

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	75.48
TOPSOIL 0.23							
Compact, orange-brown to light brown fine **SAND**		SS	1	42	12	1	74.48
		SS	2	62	12	2	73.48
2.23							
Stiff, brown-grey **SILTY CLAY**		SS	3	62	7	3	72.48
- grey by 3.4m depth		SS	4	100	3	4	71.48
		SS	5	100	1	5	70.48
5.49							
End of Borehole (GWL @ 2.58m-Aug. 16/04)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

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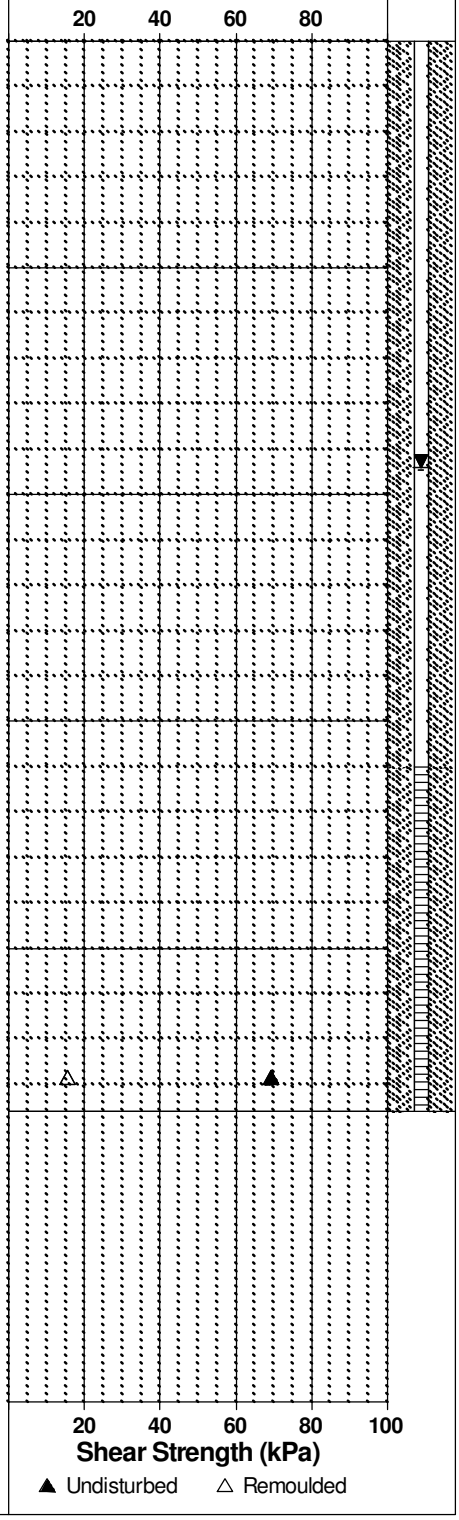
REMARKS

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

FILE NO. PG0345

HOLE NO. BH14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.18						0	74.34
Stiff, brown **SILTY CLAY**		SS	1	88	14	1	73.34
		SS	2	100	9	2	72.34
- grey by 2.3m depth		SS	3	100	3	3	71.34
		SS	4	79	6	4	70.34
		SS	5	100	2		
4.72 End of Borehole							
(GWL @ 1.88m-Aug. 16/04)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
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DATUM Ground surface elevations provided by David McManus Engineering Limited.

REMARKS

BORINGS BY CME 55 Power Auger **DATE** 4 Aug 04

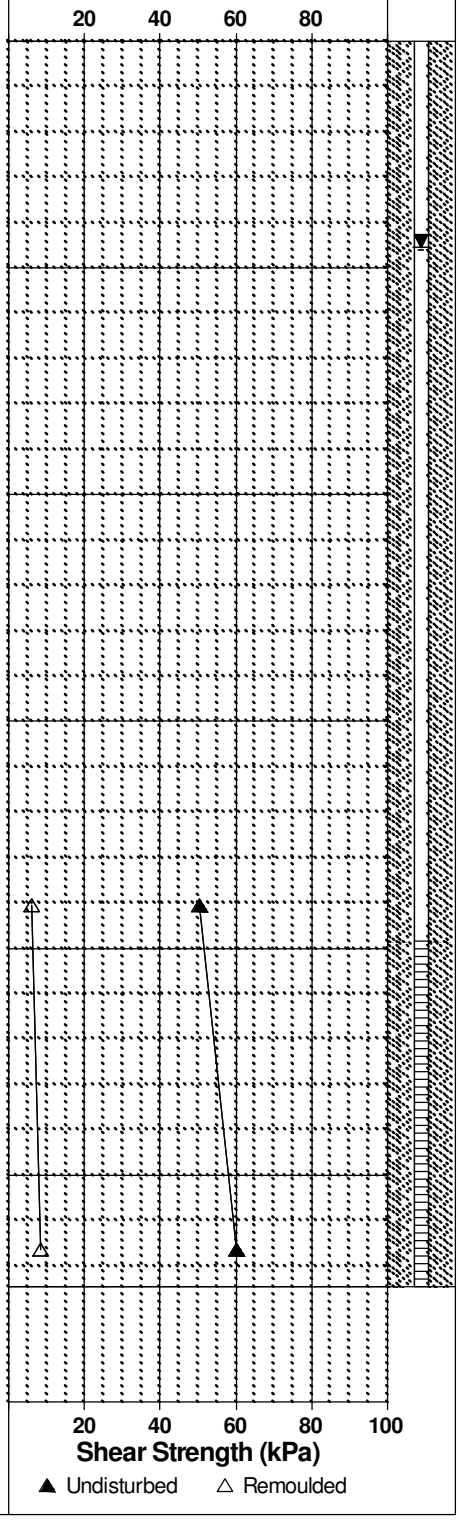
FILE NO. PG0345

HOLE NO. BH15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	73.44
TOPSOIL 0.18							
		SS	1	100	5	1	72.44
Stiff, brown **SILTY CLAY**							
		SS	2	54	3	2	71.44
- grey by 2.3m depth							
		SS	3	100	2	3	70.44
		SS	4	100	2	4	69.44
		SS	5	100	2	5	68.44
5.49							
End of Borehole							
(GWL @ 0.91m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %



Piezometer Construction

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28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

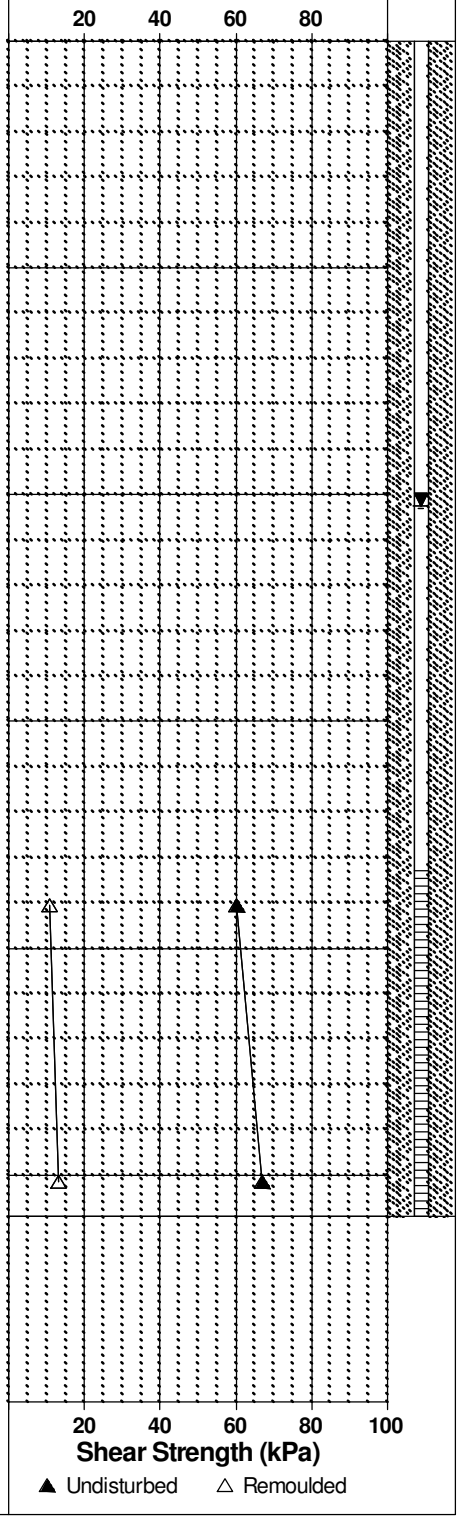
REMARKS

BORINGS BY CME 55 Power Auger **DATE** 3 Aug 04

FILE NO. PG0345

HOLE NO. BH16

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	74.36
		SS	1	58	28	1	73.36
		SS	2	100	8	2	72.36
Very stiff, brown **SILTY CLAY**, trace sand							
		SS	3	100	5	3	71.36
- stiff and grey by 3.0m depth							
		SS	4	100	3	4	70.36
		SS	5	100	2	5	69.36
5.18							
End of Borehole							
(GWL @ 2.05m-Aug. 16/04)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

FILE NO. PG0345

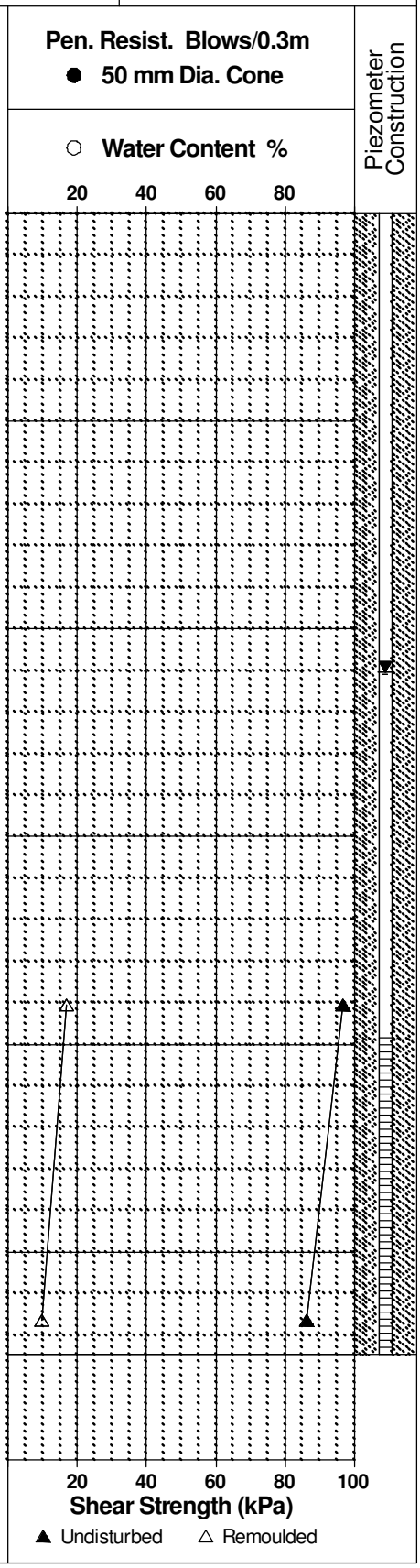
REMARKS

HOLE NO. BH17

BORINGS BY CME 55 Power Auger **DATE** 3 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.20						0	74.66
Very stiff, brown **SILTY CLAY**, trace sand		SS	1	100	15	1	73.66
		SS	2	100	7	2	72.66
- stiff and grey by 2.4m depth		SS	3	100	4	3	71.66
		SS	4	100	3	4	70.66
		SS	5	100	2	5	69.66
5.49 End of Borehole							

(GWL @ 2.21m-Aug. 16/04)



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

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FILE NO. PG0345

REMARKS

HOLE NO. BH18

BORINGS BY CME 55 Power Auger **DATE** 3 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.03
FILL: Brown silty sand with crushed stone, cobbles, boulders and organic matter (0.23)		AU	1				
		SS	2	38	18	1	75.03
Very stiff, brown **SILTY CLAY**		SS	3	100	15	2	74.03
		SS	4	100	10		
- grey by 2.9m depth						3	73.03
		SS	6	100	4	4	72.03
(4.72) End of Borehole							
(BH dry - Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

120 ▲

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 3 Aug 04

FILE NO. PG0345

HOLE NO. BH19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.05						0	76.06
FILL: Silty sand with crushed stone, shale fragments and organic matter 0.28		AU	A				
		SS	1	100	22	1	75.06
		SS	2	100	14		
Stiff, brown **SILTY CLAY**						2	74.06
		SS	3	100	12		
- grey by 3.0m depth						3	73.06
		SS	4	100	8		
		SS	5	100	6	4	72.06
4.42							
End of Borehole							
(GWL @ 2.80m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 3 Aug 04

FILE NO. PG0345

HOLE NO. BH20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.88
TOPSOIL 0.05							
FILL: Silty sand with crushed stone 0.25							
FILL: Brown sandy silty clay 1.12		SS	1	71	23	1	75.88
Stiff, brown **SILTY CLAY**		SS	2	75	12	2	74.88
		SS	3	100	14		
- grey by 3.0m depth		SS	4	100	8	3	73.88
		SS	5	100	7	4	72.88
4.42 End of Borehole (BH dry - Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 30 Jul 04

FILE NO. PG0345

HOLE NO. BH21

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.18						0	76.75
		SS	1	54	15	1	75.75
Very stiff, brown **SILTY CLAY**		SS	2	100	15	2	74.75
		SS	3	100	11		
- stiff and grey by 2.9m depth						3	73.75
		SS	4	100	8		
		SS	5	100	5	4	72.75
4.42							
End of Borehole							
(GWL @ 2.81m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 30 Jul 04

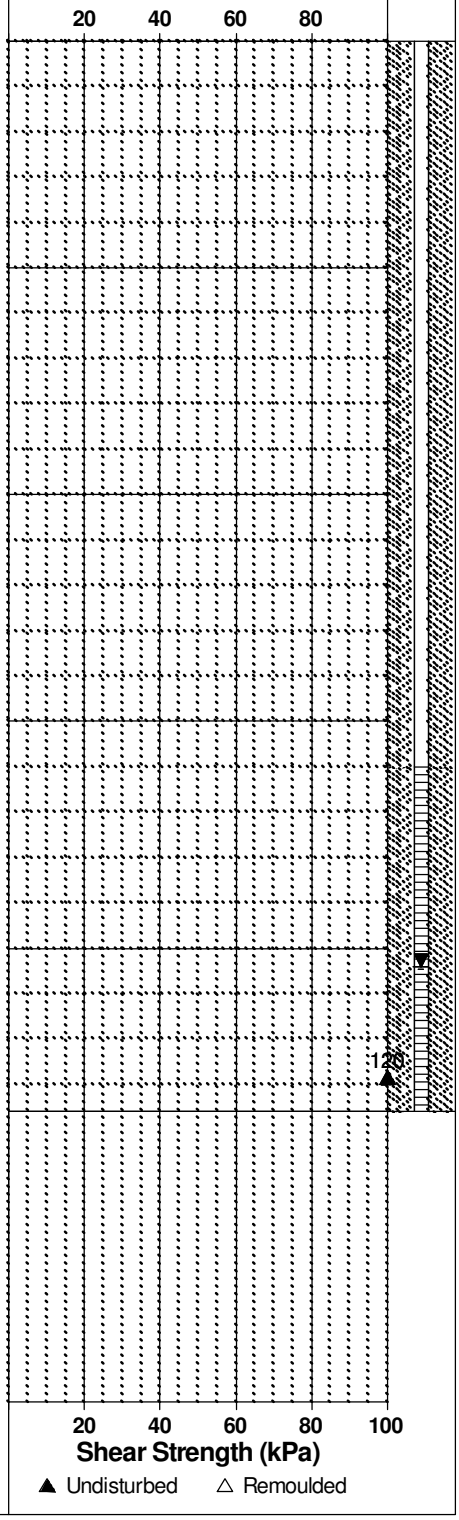
FILE NO. PG0345

HOLE NO. BH22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.93
TOPSOIL 0.18							
Very stiff, brown **SILTY CLAY**		SS	1	75	29	1	75.93
- grey-brown by 1.4m depth		SS	2	100	12	2	74.93
		SS	3	100	12		
- grey by 3.0m depth		SS	4	100	6	3	73.93
		SS	5	100	4	4	72.93
4.72							
End of Borehole							
(GWL @ 4.08m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 30 Jul 04

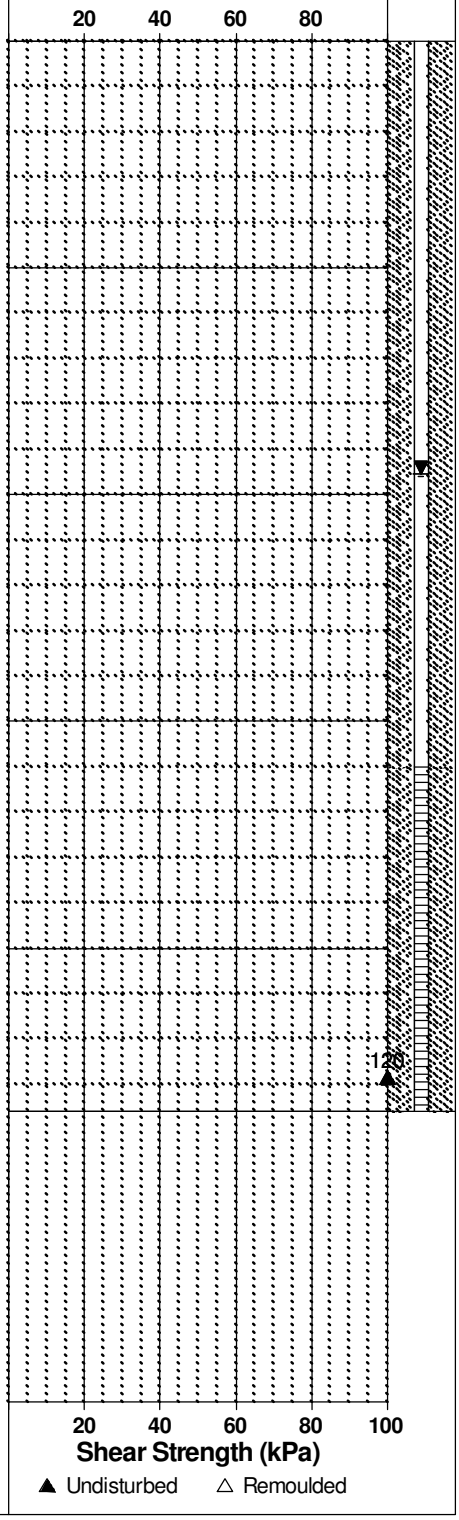
FILE NO. PG0345

HOLE NO. BH23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	77.11
TOPSOIL 0.23							
		SS	1	58	21	1	76.11
Very stiff, brown **SILTY CLAY**		SS	2	100	18	2	75.11
- brown-grey by 2.2m depth		SS	3	100	10		
- grey by 3.0m depth						3	74.11
		SS	4	100	6		
		SS	5	100	3	4	73.11
4.72 End of Borehole							
(GWL @ 1.91m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %



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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

FILE NO. PG0345

HOLE NO. BH24

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % (20 40 60 80)	Piezometer Construction
GROUND SURFACE						0	75.15		
TOPSOIL 0.41									
Compact, orange-brown fine **SAND**		SS	1	50	11	1	74.15		
		SS	2	54	7				
1.93 Stiff, brown **SILTY CLAY**, trace sand 2.13						2	73.15		
End of Borehole									

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

FILE NO. PG0345

HOLE NO. BH25

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % (20 40 60 80)	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.23						0	73.98		
Stiff to firm, brown **SILTY CLAY**, trace sand		SS	1	92	8	1	72.98		
- brown-grey by 1.6m depth		SS	2		5				
2.13						2	71.98		
End of Borehole									

Shear Strength (kPa) 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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FILE NO. PG0345

REMARKS

HOLE NO. BH26

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	73.51
TOPSOIL 0.38							
Stiff, brown **SILTY CLAY**, trace sand		SS	1	79	8	1	72.51
		SS	2	100	4	2	71.51
- grey by 2.0m depth						3	70.51
		SS	3	100	2		
						4	69.51
		SS	4	100	5		
4.57 End of Borehole							
(GWL @ 1.20m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ **Water Content %**

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

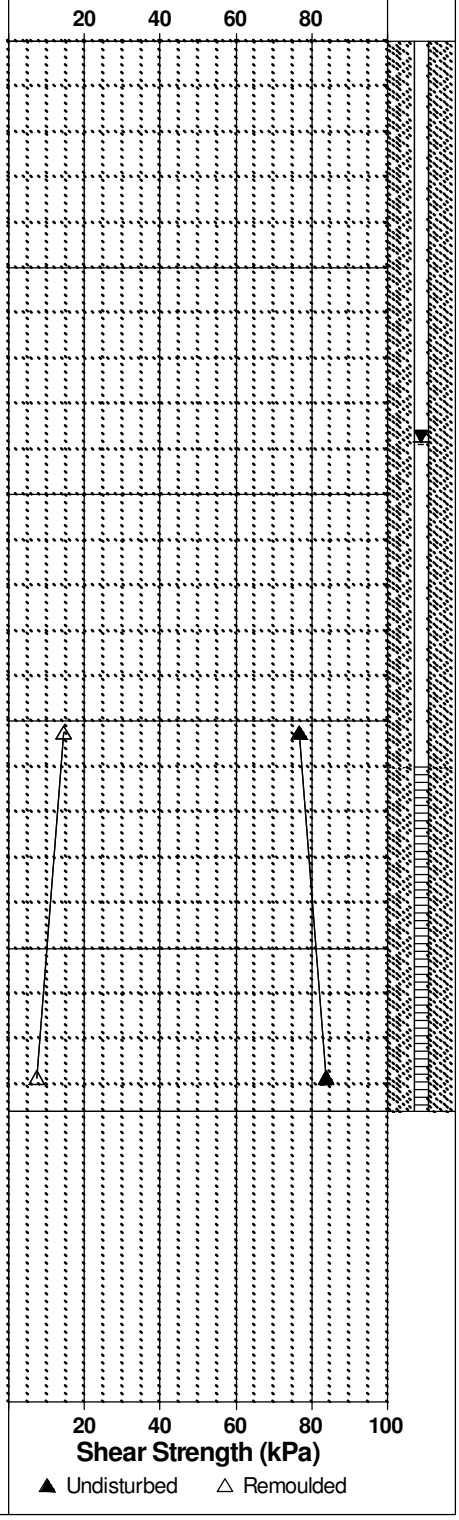
FILE NO. PG0345

HOLE NO. BH27

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	73.65
Stiff, brown **SILTY CLAY**, trace sand		SS	1	83	6	1	72.65
		SS	2	88	2	2	71.65
- brown-grey by 2.3m depth		SS	3	100	2	3	70.65
- grey by 3.0m depth		SS	4	100	2	4	69.65
4.72 End of Borehole (GWL @ 1.77m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %



Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
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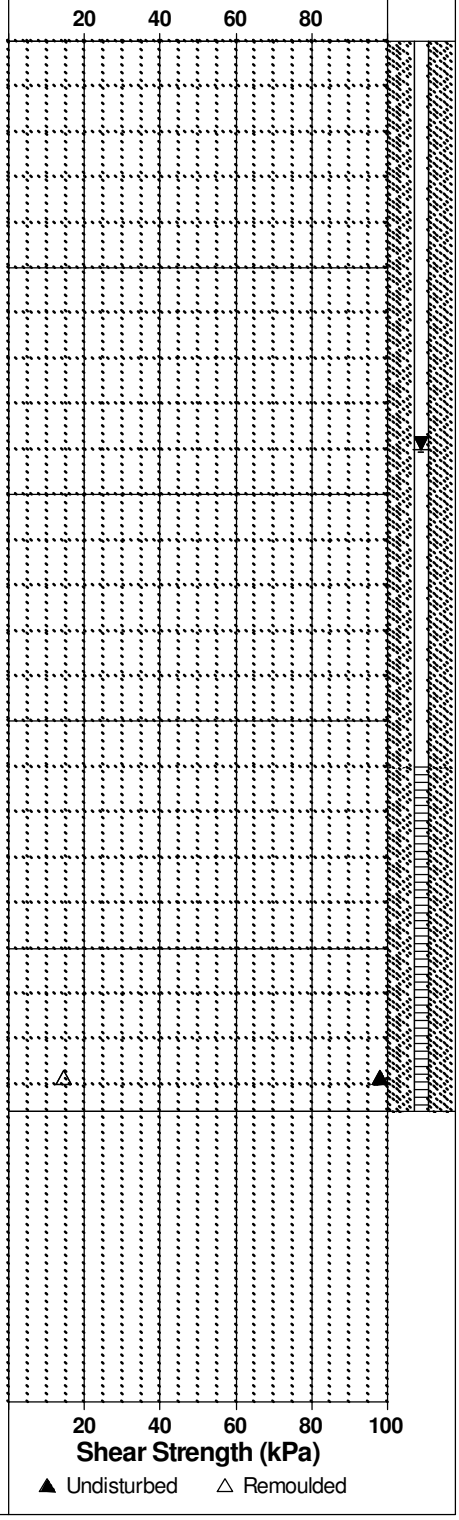
REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

FILE NO. PG0345

HOLE NO. BH28

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.25						0	75.04
Very stiff, brown **SILTY CLAY**, trace sand		SS	1	96	14	1	74.04
		SS	2	100	10	2	73.04
- grey-brown by 2.3m depth							
		SS	3	100	6		
- grey by 2.7m depth						3	72.04
		SS	4	100	4	4	71.04
4.72 End of Borehole							
(GWL @ 1.80m-Aug. 16/04)							



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SOIL PROFILE AND TEST DATA

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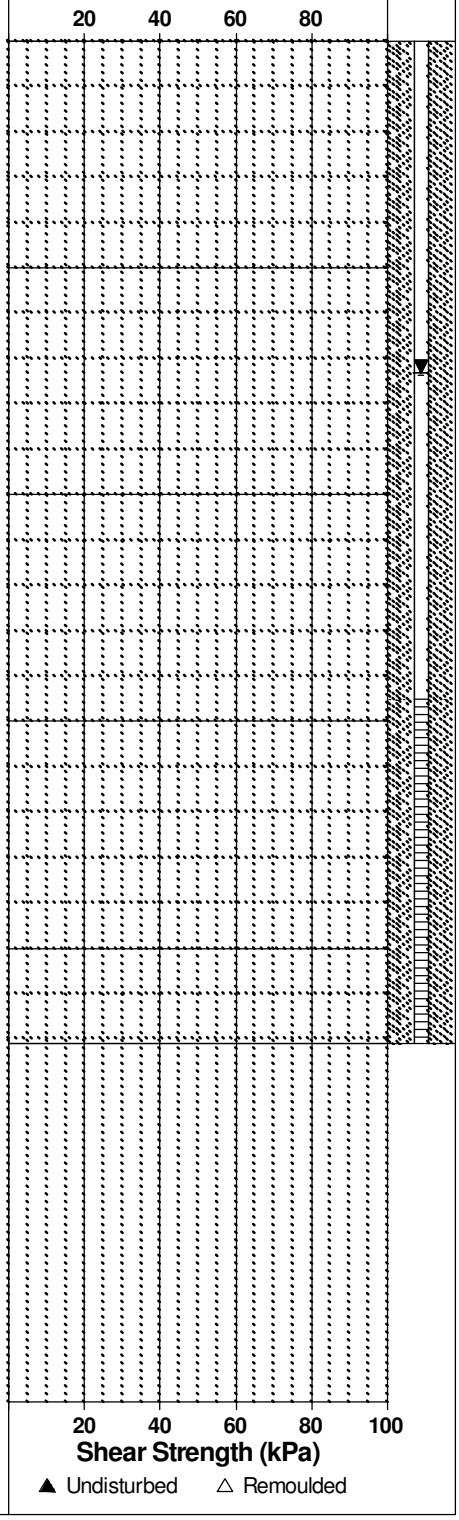
REMARKS

BORINGS BY CME 55 Power Auger **DATE** 30 Jul 04

FILE NO. PG0345

HOLE NO. BH29

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.50
Very stiff, brown **SILTY CLAY**		SS	1	88	23	1	75.50
		SS	2	100	15	2	74.50
- stiff and brown-grey by 2.3m depth		SS	3	100	12	3	73.50
- grey by 3.2m depth		SS	4	100	8	4	72.50
		SS	5	100	6		
4.42 End of Borehole							
(GWL @ 1.46m-Aug. 16/04)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 3 Aug 04

FILE NO. PG0345

HOLE NO. BH30

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.83
TOPSOIL 0.15							
FILL: Brown silty clay with crushed stone and sand		SS	1	62	10	1	75.83
1.37							
Very stiff, brown **SILTY CLAY**		SS	2	100	11	2	74.83
		SS	3	100	17		
- grey-brown by 3.0m depth		SS	4	100	7	3	73.83
- grey by 3.8m depth		SS	5	100	3	4	72.83
4.72							
End of Borehole							
(GWL @ 3.03m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

120

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 6 Aug 04

FILE NO. PG0345

HOLE NO. BH31

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	76.46		
TOPSOIL 0.25									
FILL: Brown silty sand 0.81									
FILL: Brown sandy silty clay		SS	1	50	18	1	75.46		
		SS	2	50	17				
2.13						2	74.46		
End of Borehole									

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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FILE NO. PG0345

REMARKS

HOLE NO. BH32

BORINGS BY CME 55 Power Auger **DATE** 3 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content % (20 40 60 80)	Piezometer Construction
GROUND SURFACE						0	76.71		
Very stiff, brown **SILTY CLAY**		SS	1	92	19	1	75.71		
		SS	2	100	12	2	74.71		
2.13 End of Borehole									

Shear Strength (kPa) 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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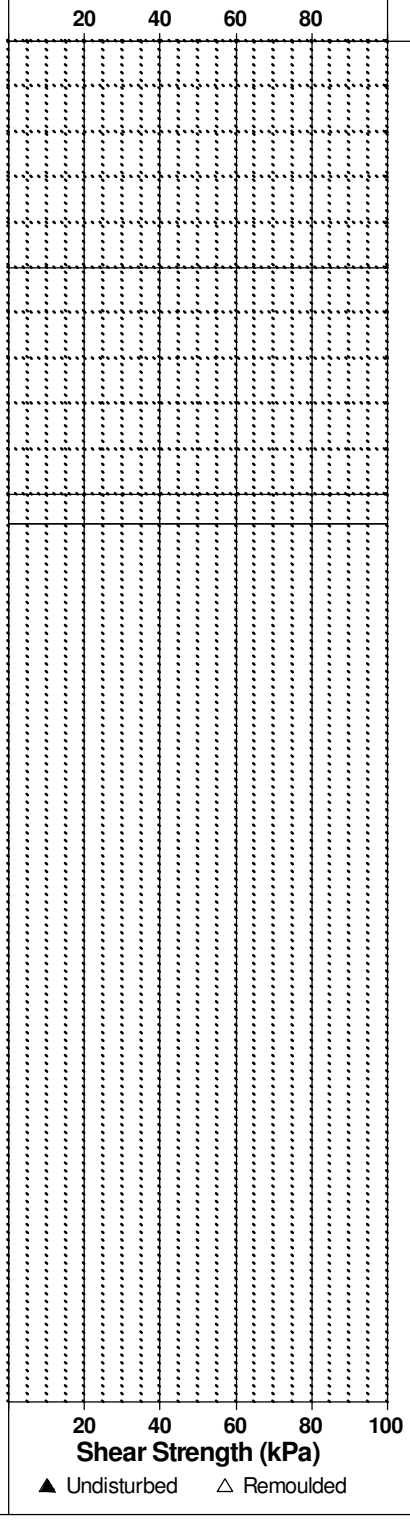
FILE NO. PG0345

REMARKS

HOLE NO. BH33

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.08						0	74.64		
Compact, orange-brown fine **SAND** 1.32		SS	1	46	14	1	73.64		
Firm, brown **SILTY CLAY**, trace sand 2.13		SS	2	33	4	2	72.64		
End of Borehole									



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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY CME 55 Power Auger **DATE** 5 Aug 04

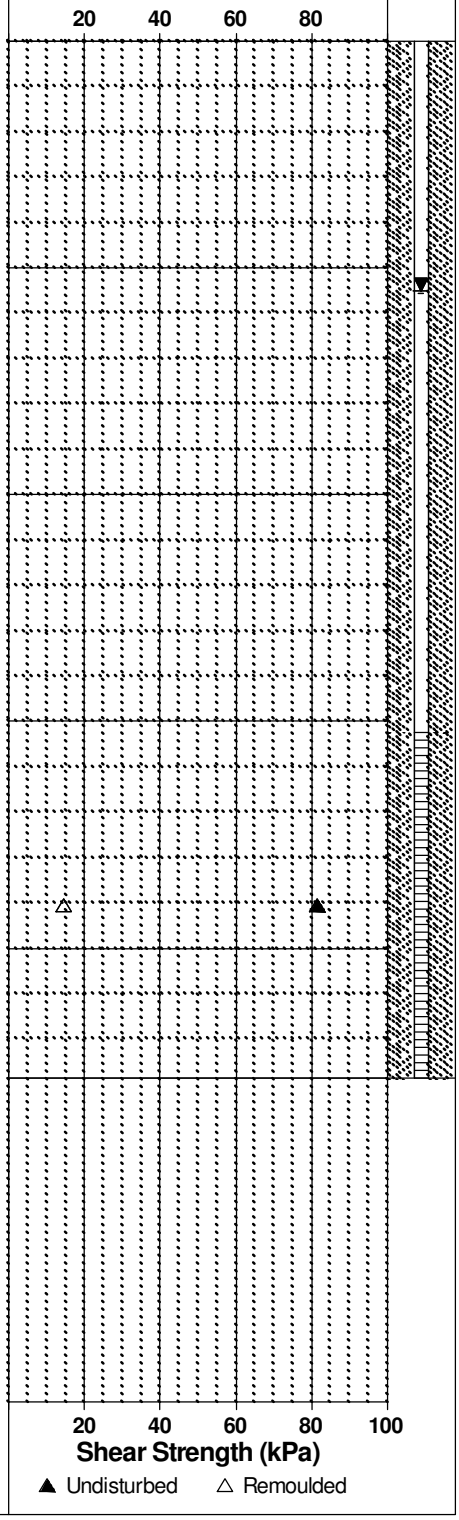
FILE NO. PG0345

HOLE NO. BH34

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	74.10
Stiff, brown **SILTY CLAY**, trace sand		SS	1	100	7	1	73.10
		SS	2	100	6	2	72.10
- grey by 2.2m depth		SS	3	100	4	3	71.10
		SS	4	100	2	4	70.10
		SS	5	100	2		
4.57 End of Borehole (GWL @ 1.10m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %



Piezometer Construction

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Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

REMARKS

BORINGS BY CME 55 Power Auger **DATE** 6 Aug 04

FILE NO. PG0345

HOLE NO. BH35

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	76.42
TOPSOIL 0.25							
Compact, brown **SILTY** fine **SAND** 1.50		SS	1	12	14	1	75.42
Very stiff to stiff, brown **SILTY CLAY**		SS	2	75	13	2	74.42
- grey-brown by 2.3m depth		SS	3	100	11	3	73.42
		SS	4	100	8		
- grey by 3.8m depth		SS	5	100	7	4	72.42
4.42 End of Borehole							
(GWL @ 3.11m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup

Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

REMARKS

BORINGS BY CME 55 Power Auger **DATE** 6 Aug 04

FILE NO. PG0345

HOLE NO. BH36

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.20						0	75.73
Very stiff to stiff, brown **SILTY CLAY**		SS	1	88	22	1	74.73
		SS	2	100	15	2	73.73
- grey by 2.3m depth		SS	3	100	9	3	72.73
		SS	4	100	5	4	71.73
4.42		SS	5	100	6		
End of Borehole							
(GWL @ 3.15m-Aug. 16/04)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup

Consulting Engineers

28 Concourse Gate, Unit 1, Ottawa, ON K2E 7T7

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Hawthorne Industrial Buildings, 3020 Hawthorne Rd.
Ottawa, Ontario

DATUM Ground surface elevations provided by David McManus Engineering Limited.

REMARKS

BORINGS BY CME 55 Power Auger **DATE** 30 Jul 04

FILE NO. PG0345

HOLE NO. BH37

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % (20 40 60 80)	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.20						0	76.13		
Very stiff, brown **SILTY CLAY**		SS	1	88	18	1	75.13		
		SS	2	100	14				
2.13						2	74.13		
End of Borehole									

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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, %
LL	-	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 x 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

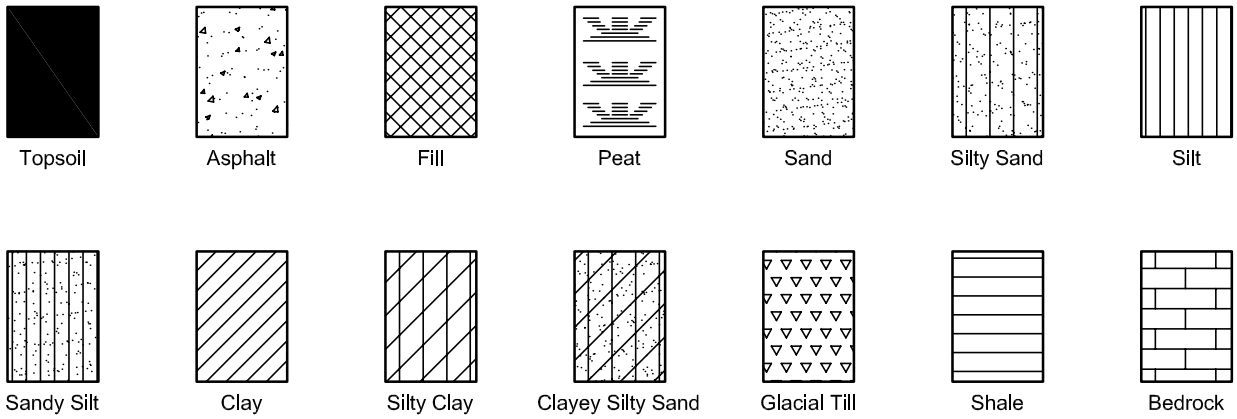
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	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.

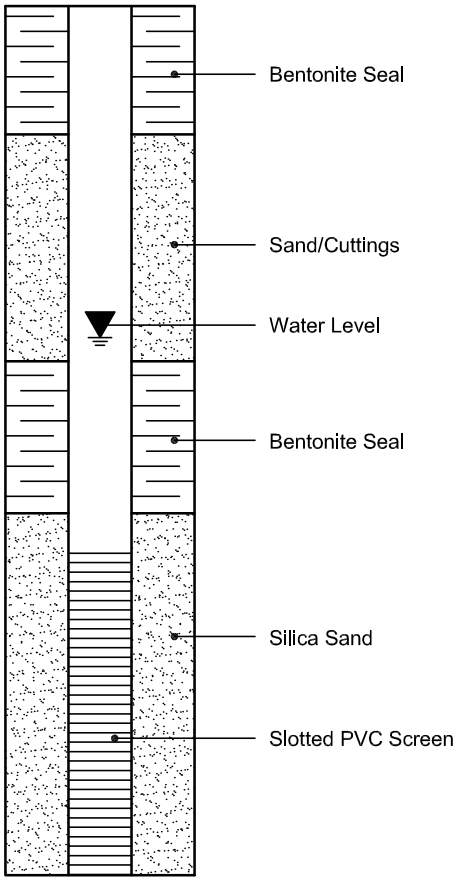
SYMBOLS AND TERMS (continued)

STRATA PLOT

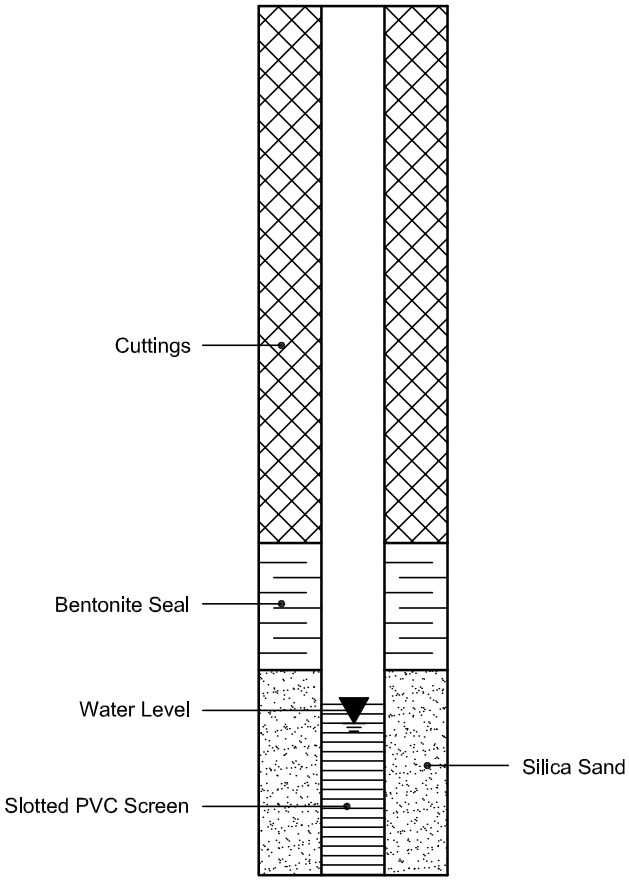


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Report Date: 16-Aug-2004
Order Date: 10-Aug-2004

Client: **Paterson Group Inc.**
Client PO: **1583** Project: **PG0345**

Matrix: Soil

	Sample ID:	BH9 SS2	BH27 SS2
	Sample Date:	04/08/2004	05/08/2004
Parameter	MDL/Units	J3136.1	J3136.2
Chloride	5 ug/g	10	10
Sulphate	5 ug/g	65	30
pH	0.05 pH units	8.13	8.24
Resistivity	0.1 ohm.m	57	63

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG3229-1 - TEST HOLE LOCATION PLAN

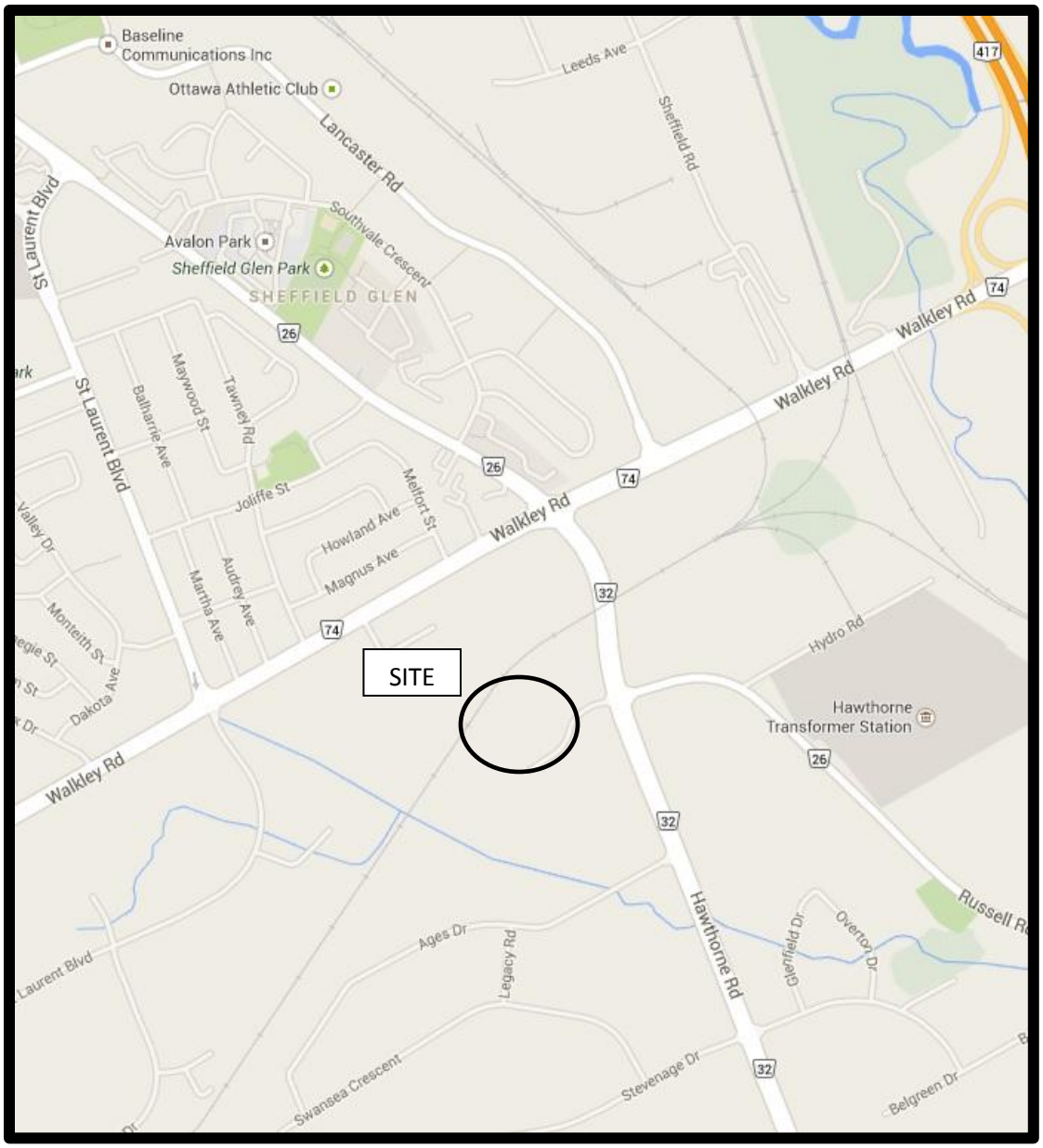
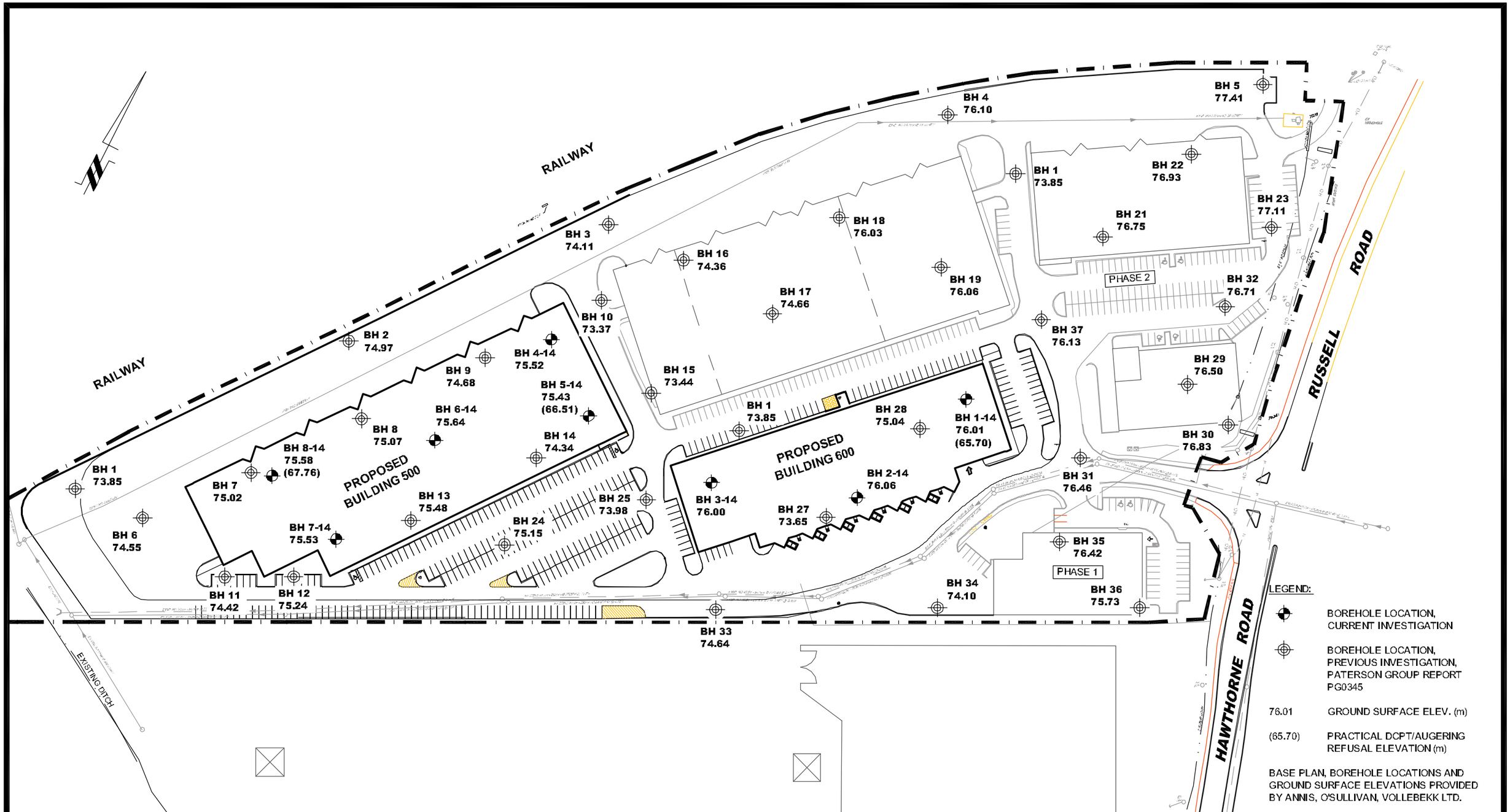


FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG0345
- 76.01 GROUND SURFACE ELEV. (m)
- (65.70) PRACTICAL DCPT/AUGERING REFUSAL ELEVATION (m)

BASE PLAN, BOREHOLE LOCATIONS AND GROUND SURFACE ELEVATIONS PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

paterson group
consulting engineers

154 Colonnade Road South
Ottawa, Ontario, K2E 7J5
Tel: (613)226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

CONTROLEX CORPORATION

GEOTECHNICAL INVESTIGATION
PROP. COMMERCIAL BUILDINGS - 3020 HAWTHORNE ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Drawn by:	Checked by:	Date:
MPG	DJG	06/2014
Scale: 1:1500		Drawing No.: PG3229-1
Report No.: PG3229-1		

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