Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

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# Hydrogeological Report

Proposed Residential Development
Eagleson Road at Ottawa Street - Richmond

Prepared For

Taggart Group of Companies

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February 19, 2021

Report: PG4216-1 Revision 1

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# Appendices

# 1.0 Introduction

Paterson Group (Paterson) was commissioned by Taggart Group of Companies to provide a hydrogeological report by means of a sump pump feasibility analysis for the proposed residential development to be located at the southwest corner of Eagleson Road and Ottawa Street, in the City of Ottawa (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objective of the geotechnical investigation was to:

- Analyze the findings of the geotechnical investigation completed for the subject site for the feasibility of using sump pumps for the proposed residential dwellings.
- Identify where sump pumps can be used based on site conditions and existing subsurface profile.
- Provide geotechnical recommendations pertaining to design of the proposed drainage system including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our analysis of the findings of the geotechnical investigation with respect to the use of sump pumps within the subject site.

Reference should be made to the geotechnical investigation Report PG4216-1 Revision 2 dated December 18, 2020 for the full geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

# 2.0 Proposed Development

Detailed plans of the proposed development were not available at the time of writing this report. However, it is understood that a residential development is proposed consisting of residential dwellings with the associated driveways, local roadways, parking and landscaping areas. It is also understood that the proposed development will be municipally serviced.

# 3.0 Summary of Geotechnical Investigation Findings

## 3.1 Field Investigation

### Field Program

The field program for the current investigation was conducted between December 14 and December 18, 2018. At that time, a total of ten (10) boreholes were advanced to a maximum depth of 9.8 m or auger refusal. Additionally, a supplemental investigation was completed on February 27, 2019 consisting of excavating 12 test pits to a maximum depth of 3.8 m below existing grade to collect samples for lab testing to determine tree planting restrictions within the clay areas. The test holes were distributed in a manner to provide general coverage of the subject site taking into considerations site features. The locations of the test holes are shown on Drawing PG4216-2 - Test Hole Location Plan included in Appendix 2.

The boreholes were completed using a track-mounted auger drill rig operated by a two person crew while the test pits were excavated using a hydraulic shovel. All fieldwork was conducted under the full-time supervision of personnel from our geotechnical division under the direction of a senior engineer. The testing procedure consisted of augering to the required depths and at the selected locations sampling the overburden.

### Field Survey

The borehole and test pit locations were determined by Paterson personnel taking into consideration the presence of underground and aboveground services. The location and ground surface elevation at each borehole and test pit location were provided by Stantec Geomatics Ltd. It is understood that the ground surface elevations were referenced to a geodetic datum. The test hole locations and ground surface elevations at the test hole locations are presented on Drawing PG4216-2 - Test Hole Location Plan in Appendix 2.

### Groundwater

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

## 3.2 Laboratory Testing

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

A total of 5 soil samples collected during the geotechnical investigations were submitted for grain size distribution analysis and hydrometer testing. The grain size distribution and hydrometer testing results are presented in Table 1 - Grain Size Distribution and in Appendix 1 and are further discussed in Section 4.

A total of 10 representative soil samples were submitted for Atterberg limit testing during our investigations. The results of the Atterberg limit testing are presented in Table 2 - Summary of Atterberg Limits and in Appendix 1 and are further discussed in Sections 4 and 6.

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.

## 3.3 Surface and Subsurface Conditions

### Surface Conditions

The subject site is currently occupied by agricultural lands along the east portion of the site while the west portion is occupied by tree-covered lands. The ground surface across the subject site is relatively flat with a slight upward slope from northern portion to southern portion of the site. The site is approximately 0.6 m lower than the bordering roads and the adjacent properties. The north portion of the site is bordered by a shallow (2 m high) slope followed by Marlborough Creek. A ditch is located around the perimeter of the site running north-south along Eagleson road and east-west along Ottawa Street. Also, a secondary ditch was observed running in the east-west direction, connecting to the ditch along Eagleson Road. It should be noted that an existing rail corridor runs roughly in an east-west direction through the north portion of the site.

### Subsurface Profile

Generally, the subsurface profile encountered at the borehole locations consists of a layer of topsoil followed by a layer of loose to dense brown silty sand and/or a very stiff to firm silty clay to clayey silt deposit. Glacial till consisting of a silty sand with gravel, cobbles and boulders was encountered below the above noted layers. Practical refusal to augering/excavation was encountered in the majority of the test holes across the subject site.

Based on available geological mapping, the bedrock in this area mostly consists of dolomite of the Oxford Formation with an overburden drift thickness of 1 to10 m depth.

### Silty Clay Deposit

It is important to note that the majority of the eastern portion of the site is underlain by a 2 to 5 m thick deposit of very stiff to stiff silty clay. The remainder of the site is underlain by a layer of silty sand, glacial till or bedrock. 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.

## 3.4 Lab Testing Results

### Atterberg Limit Testing Results

Atterberg limits testing, as well as associated moisture content testing, was completed on the recovered silty clay samples at selected locations throughout the subject site. The results of the Atterberg limits tests are presented in Table 1 and on the Atterberg Limits Results sheet in Appendix 1.

**Table 1 - Atterberg Limits Results**

| Sample | Depth (m) | LL (%) | PL (%) | PI (%) | WC (%) | Classification |
|---|---|---|---|---|---|---|
| BH 2 | 0.76 | 35 | 21 | 14 | 37.1 | CL |
| BH 3 | 1.82 | 29 | 19 | 10 | 20.0 | CL |
| BH 8 | 1.06 | 29 | 19 | 10 | 20.7 | CL |
| TP 2 | 1.90 | 33 | 21 | 12 | 28.5 | CL |
| TP 3 | 2.20 | 33 | 21 | 12 | 33.0 | CL |
| TP 4 | 3.00 | 52 | 21 | 31 | 38.5 | CH |
| TP 5 | 3.00 | 51 | 23 | 28 | 40.7 | CH |
| TP 6 | 2.50 | 36 | 19 | 17 | 29.5 | CL |
| TP 7 | 3.00 | 27 | 21 | 6 | 25.4 | CL-ML |
| TP 8 | 2.50 | 54 | 26 | 29 | 43.1 | CH |

**Notes:** LL: Liquid Limit; PL: Plastic Limit; PI: Plasticity Index; WC: water content;
CH: Inorganic Clay of High Plasticity CL: Inorganic Clay of Low Plasticity
CL-ML: Inorganic Silt with Some Clay with Low Plasticity

## Grain Size Distribution and Hydrometer Testing Results

Grain size distribution testing (sieve and hydrometer analysis) was also completed on five (5) selected soil samples. The results of the grain size analysis are summarized in Table 2 and presented on the Grain-Size Distribution and Hydrometer Testing Results sheets in Appendix 1.

**Table 2 - Summary of Grain Size Distribution Analysis**

| Test Hole | Sample | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|
| TP 4 | G6 | 0.0 | 0.9 | 59.6 | 39.5 |
| TP 6 | G5 | 0.0 | 0.2 | 84.8 | 15.0 |
| TP 8 | G5 | 0.0 | 6.1 | 54.4 | 39.5 |
| TP 9 | G1 | 15.9 | 42.5 | 41.6 | |
| TP 11 | G4 | 6.5 | 64.5 | 29.0 | |

# 4.0 Sump Pump Feasibility Assessment

## 4.1 General Discussion

Based on our general review of the current site conditions in conjunction with the City of Ottawa guidelines for the use of sump pump systems, the eastern side of the subject site is considered acceptable to received sump pumps from both geotechnical and hydrogeological perspectives.

It should be noted that based on the Technical Bulletin ISTB-2018-04 and ISTB-2019-02 issued by the City of Ottawa regarding installation of sump pumps, for typical sites, a minimum 300 mm vertical separation is recommended between the design underside of footing elevation and the long-term groundwater level. If this condition cannot be confirmed before the finalized design drawings are completed, the development should meet the minimum requirements for the following items as per Appendix 8 of the above noted technical bulletin:

- Clay Continuity within the site
- Estimation of Seasonal High Groundwater Table
- Hydraulic Conductivity of the Underlying Silty Clay
- The Groundwater Ingress Rate

The following sections summarize our assessment of the above noted requirements and our conclusion on the feasibility of the installation of sump pumps along the eastern portion of the proposed residential development.

## 4.2 Clay Continuity

The boreholes completed within the eastern portion of the subject site are in conformance with the City of Ottawa borehole spacing guidelines. The native silty clay soils within the study area are considered to be laterally continuous. The boreholes within Phase 1 of the subject site identify a silty clay deposit at the majority of the borehole locations at similar elevations throughout. Therefore, the silty clay deposit is continuous across the proposed eastern side of the subject development. Refer to the attached Drawing PG4216-1 – Designated Silty Clay Areas.

## 4.3 Seasonal High Groundwater Table

Generally, the groundwater levels recovered from the piezometers installed at the borehole locations were measure in the field and are summarized in Table 3. It is important to note that groundwater readings at the piezometers can be influenced by surface water perched within the borehole backfill material. Long-term groundwater conditions can also be estimated based on the observed color and consistency of the recovered soil samples.

It is important to note that Marloborough Creek borders the site along the north property line. A walk along the creek was completed on multiple occasions/seasons as well as a review of topographic surveys indicated that the top of water along Marloborough Creek was measured at an elevation of approximately 92 m along the portion adjacent to the subject site. No water infiltration was noted along the side slopes of the creek. This is an indicative that the long term groundwater table is at an elevation of 92 m or below.

Based on these observations, it is estimated that long-term groundwater level can be expected between 2.5 to 3.5 m depth below existing grade (i.e. elevation of 91.5 to 92.5). Groundwater levels are subject to seasonal fluctuations and therefore could vary during time of construction. The groundwater conditions observed at the borehole and test pits were recorded in detail in the field.

**Table 3 - Summary of Groundwater Level Readings**

| Test Hole Number | Ground Elevation (m) | Groundwater Levels (m) | | Recording Date |
|---|---|---|---|---|
| | | Depth | Elevation | |
| BH1 | 93.37 | 0.61 | 92.76 | December 28, 2018 |
| BH2 | 94.23 | 0.77 | 93.46 | December 28, 2018 |
| BH3 | 94.76 | 0.62 | 94.14 | December 28, 2018 |
| BH4 | 97.71 | 1.10 | 96.61 | December 28, 2018 |
| BH5 | 97.45 | n/a | n/a | December 28, 2018 |
| BH6 | 94.70 | 0.73 | 93.97 | December 28, 2018 |
| BH7 | 94.88 | 0.83 | 94.05 | December 28, 2018 |
| BH8 | 94.03 | 1.28 | 92.75 | December 28, 2018 |
| BH9 | 93.78 | 0.70 | 93.08 | December 28, 2018 |
| BH10 | 93.37 | 0.48 | 92.89 | December 28, 2018 |

**Note:** The ground surface elevations at the borehole locations were provided by Stantec Geomatics.

As indicated above, the long-term groundwater table is anticipated at a depth ranging between 2.5 and 3.5 m below existing grade (i.e. elevation of 91.5 to 92.5 m). When considering the low permeability silty clay deposit present across the east portion of the subject site, the seasonal high groundwater table can be expected to be between 0.5 and 1 m above the long-term groundwater table in the pre-development stage.

Based on our review of the preliminary roadway grading plans of the subject site, the average underside of footing elevation for the proposed lots/blocks will be approximately 1.8 to 2.1 m below the center line of the proposed roadways. The average road elevation will range from 94.5 to 95.5 m within the eastern portion of the subject site. Assuming that each lot will be graded at an approximately 600 mm above the adjacent roadways (low point), the proposed dwellings will have an approximate underside of footing elevation ranging between 93 and 94 m which is well above the expected seasonal high groundwater table.

It is also important to note that the groundwater levels recorded for the site are considered pre-development groundwater levels. From a geotechnical perspective, the pre-development groundwater levels should not impact the design of the underside of footing elevations. Based on our experience with post-development groundwater levels at sites with similar subsoil conditions, the post-development groundwater table will be lowered based on the inverts of the proposed site servicing pipes.

## 4.4 Permeability of Soils and Groundwater Ingress Rate

Based on the silty clay crust encountered across the eastern side of the subject site and other nearby sites, the hydraulic conductivity for the clay can be conservatively estimated to be approximately $1x10^{-7}$ m/sec which meets the requirement for a low permeability soils.

Based on the subsoil profile below the proposed footings, the groundwater ingress rate was calculated to be approximately 28,000 L/day which is considered to be very low in comparison with the minimum pump capacity of 0.9 L/s as per the above noted sump pump design Bulletin. Also, due to the characteristics of the underlying silty clay, any surface water infiltrating the upper permeable layers will be perched above the silty clay layer.

Based on the above, the sump pumps are not expected to be overloaded and/or continuously running. As such, the minimum design requirements for the main sump pump system and the backup pump battery will be achieved for the estimated groundwater rate of ingress under worst case scenarios.

## 4.5 Additional Considerations

It should also be noted that the backfill used against the foundation walls should consist of workable site excavated silty clay. Any imported silty clay should be reviewed and approved by Paterson prior to placement to confirm that the material meets the characteristics of the existing silty clay within the site. All surfaces adjacent to the proposed buildings should be shaped to shed water away from the building's foundation.

All the sump pump installations should be inspected and approved by Paterson at the time of installation.

# 5.0 Conclusion

Based on the above discussion, the eastern area of the subject site is considered acceptable for the installation of sump pumps. Once the development's finalized grading plans are available, Paterson should complete a thorough review to confirm that the requirements discussed herein are in implemented in the design of the proposed residential buildings.

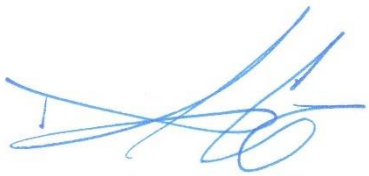
# 6.0 Statement of Limitations

The recommendations made in this report are in accordance with Paterson's present understanding of the project. Paterson requests permission to review the grading plan once available. Paterson's recommendations should be reviewed when the drawings and specifications are complete.

The client should be aware that any information pertaining to soils and the test hole log are furnished as a matter of general information only. Test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes.

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 Taggart Group of Companies 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 I. Abou-Seido, P.Eng. David J. Gilbert, P.Eng.

**Report Distribution:**

- ❑ Taggart Group of Companies (3 copies)
- ❑ Paterson Group (1 copy)

# APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

GRAIN SIZE DISTRIBUTION SHEETS

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 1

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 93.96 |
| **TOPSOIL** 0.20 | | AU | 1 | | | | |
| Loose, brown **SANDY SILT,** some clay | | SS | 2 | 54 | 5 | 1 | 92.96 |
| 1.22 | | SS | 3 | 67 | 39 | 2 | 91.96 |
| | | SS | 4 | 71 | 23 | | |
| | | SS | 5 | 58 | 14 | 3 | 90.96 |
| Dense to compact, brown **SILTY SAND,** trace gravel | | SS | 6 | 71 | 32 | 4 | 89.96 |
| | | SS | 7 | | 24 | 5 | 88.96 |
| 5.94 | | SS | 8 | 100 | 3 | | |
| | | SS | 9 | 67 | 42 | 6 | 87.96 |
| **GLACIAL TILL:** Dense to very dense, grey silty sand with gravel and clay | | SS | 10 | 91 | 82 | 7 | 86.96 |
| | | | | | | 8 | 85.96 |
| | | | | | | 9 | 84.96 |
| 9.75 | | SS | 11 | | 7 | | |
| End of Borehole | | | | | | | |
| (GWL @ 0.61m - Dec. 28, 2018) | | | | | | | |

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

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 2

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 94.23 |
| **TOPSOIL** 0.25 | | AU | 1 | | | | |
| Stiff, brown **SILTY CLAY/CLAYEY SILT,** some sand | | | | | | | |
| 1.07 | | SS | 2 | 92 | 4 | 1 | 93.23 |
| Very stiff, brown **SILTY CLAY** | | | | | | | |
| 2.13 | | | | | | 2 | 92.23 |
| | | SS | 3 | 8 | 12 | | |
| **GLACIAL TILL:** Brown silty clay with sand, gravel, cobbles and boulders | | SS | 4 | 42 | 35 | 3 | 91.23 |
| 4.32 | | | | | | 4 | 90.23 |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 4.32m depth | | | | | | | |
| (GWL @ 0.77m - Dec. 28, 2018) | | | | | | | |

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %
20 40 60 80

Piezometer Construction

122

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 3

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | |
| **TOPSOIL** 0.15 | | AU | 1 | | | 0 | 94.76 |
| Stiff to firm, brown **SILTY CLAY/CLAYEY SILT** | | SS | 2 | 92 | 6 | 1 | 93.76 |
| | | SS | 3 | 92 | 6 | 2 | 92.76 |
| 2.13 | | SS | 4 | 0 | 50+ | | |
| **GLACIAL TILL:** Brown sandy silt with clay, gravel, cobbles and boulders | | SS | 5 | 67 | 23 | 3 | 91.76 |
| 4.42 | | | | | | 4 | 90.76 |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 4.42m depth | | | | | | | |
| (GWL @ 0.62m - Dec. 28, 2018) | | | | | | | |

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**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 4

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| 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** | | | | | | | | | |
| **TOSPOIL** 0.30 | | AU | 1 | | | 0 | 97.71 | | |
| | | SS | 2 | 71 | 40 | 1 | 96.71 | | |
| | | SS | 3 | 71 | 68 | 2 | 95.71 | | |
| **GLACIAL TILL:** Very dense, brown silty sand with gravel, cobbles and boulders | | SS | 4 | 71 | 50+ | 3 | 94.71 | | |
| | | SS | 5 | 88 | 73 | 4 | 93.71 | | |
| 4.85 | | SS | 6 | 100 | 50+ | | | | |
| End of Borehole | | | | | | | | | |
| Practical refusal to augering at 4.85m depth | | | | | | | | | |
| (GWL @ 1.10m - Dec. 28, 2018) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

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**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

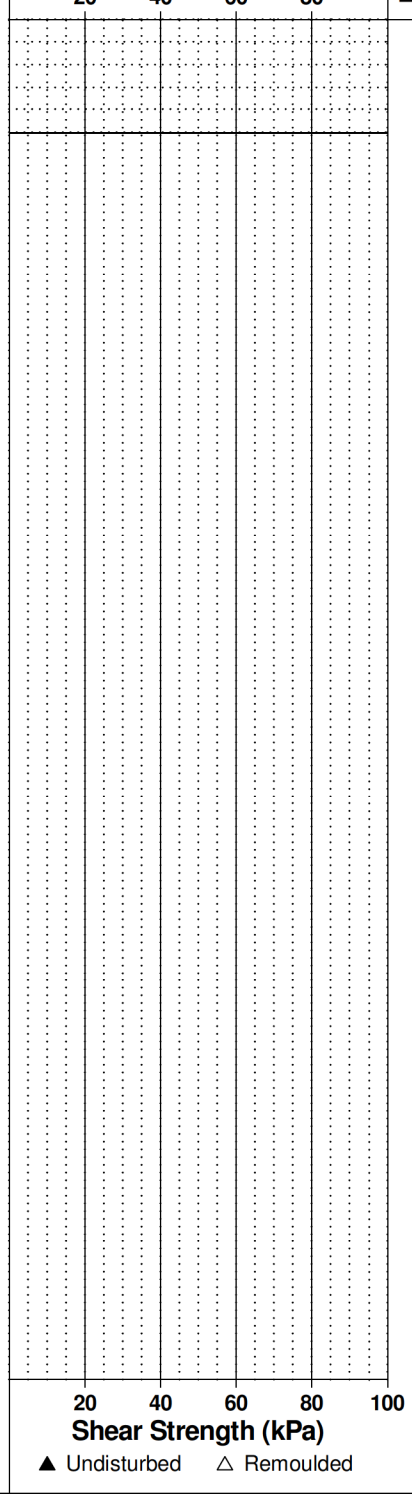
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 5

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| 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** 0.30 | | AU | 1 | | | 0 | 97.45 | | |
| Very stiff, brown **CLAYEY SILT** 1.01 | | SS | 2 | | 50+ | 1 | 96.45 | | |
| End of Borehole | | | | | | | | | |
| Practical refusal to augering at 1.01m depth | | | | | | | | | |
| (BH dry upon completion) | | | | | | | | | |



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# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
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**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

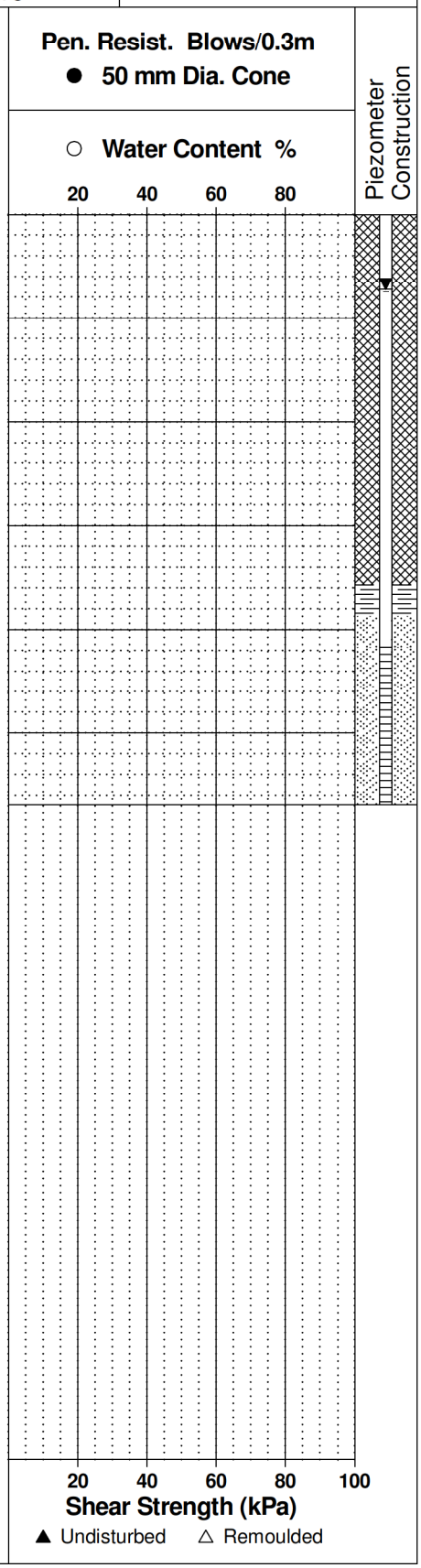
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 6

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 94.70 |
| **TOPSOIL** 0.30 | | AU | 1 | | | | |
| Compact to loose, brown **SANDY SILT,** trace clay | | SS | 2 | 67 | 12 | 1 | 93.70 |
| 1.93 | | SS | 3 | 92 | 5 | 2 | 92.70 |
| Brown **SILTY CLAY** 2.19 | | SS | 4 | 88 | 59 | | |
| **GLACIAL TILL:** Very dense, brown silty sand with gravel, cobbles and boulders | | SS | 5 | 71 | 68 | 3 | 91.70 |
| | | SS | 6 | 100 | 50 | 4 | 90.70 |
| 5.69 | | SS | 7 | 100 | 50+ | 5 | 89.70 |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 5.69m depth | | | | | | | |
| (GWL @ 0.73m - Dec. 28, 2018) | | | | | | | |



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## SOIL PROFILE AND TEST DATA

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**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 7

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | |
| **TOPSOIL** 0.25 | | AU | 1 | | | 0 | 94.88 |
| **GLACIAL TILL:** Brown silty sand with clay and gravel | | SS | 2 | 67 | 9 | 1 | 93.88 |
| 1.73 | | SS | 3 | 50 | 50+ | | |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 1.73m depth | | | | | | | |
| (GWL @ 0.83m - Dec. 28, 2018) | | | | | | | |

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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**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

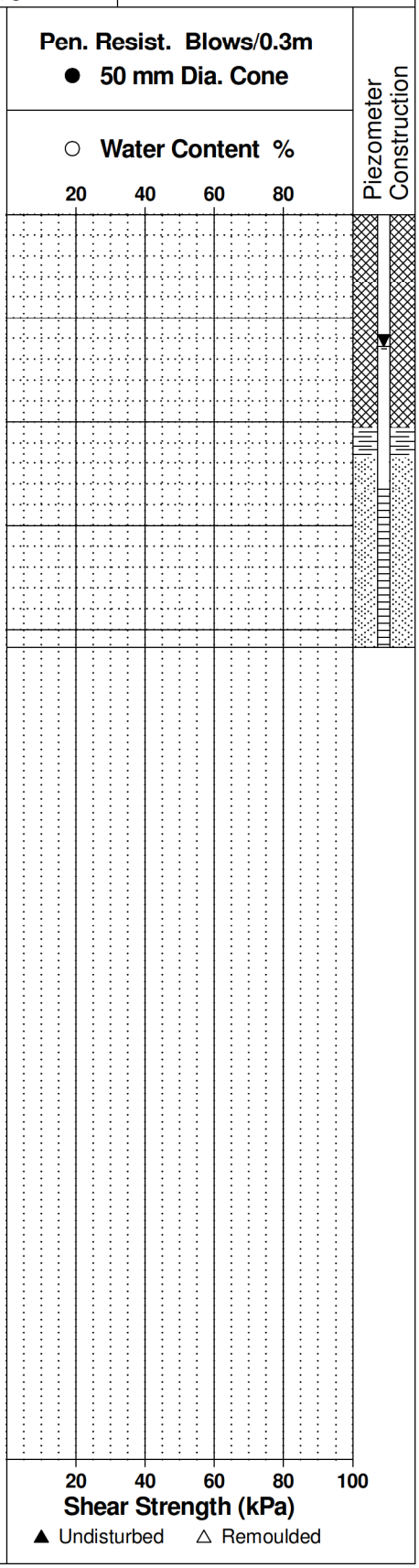
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 8

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | |
| **TOPSOIL** 0.25 | | AU | 1 | | | 0 | 94.03 |
| Very stiff, brown **CLAYEY SILT** | | SS | 2 | 79 | 13 | 1 | 93.03 |
| 1.73 | | SS | 3 | 96 | 6 | 2 | 92.03 |
| **GLACIAL TILL:** Brown silty sand with gravel, cobbles, boulders | | SS | 4 | 71 | 7 | 3 | 91.03 |
| | | SS | 5 | 50 | 36 | 4 | 90.03 |
| 4.17 | | | | | | | |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 4.17m depth | | | | | | | |
| (GWL @ 1.28m - Dec. 28, 2018) | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

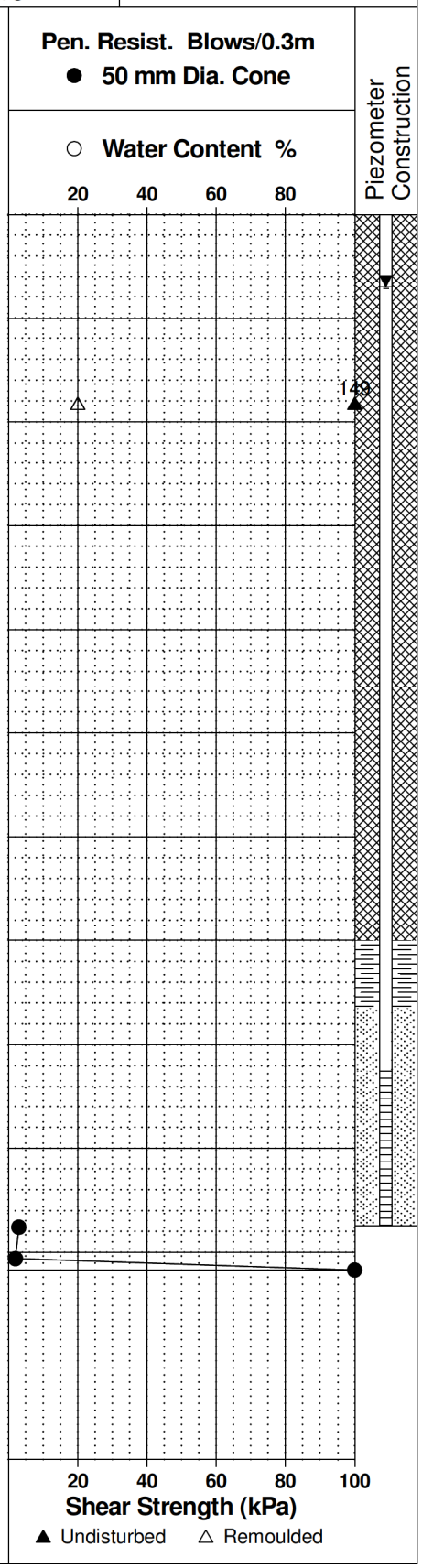
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH 9

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 93.78 |
| **TOPSOIL** 0.25 | | AU | 1 | | | | |
| Very stiff, brown **SILTY CLAY** | | SS | 2 | 96 | 4 | 1 | 92.78 |
| | | SS | 3 | 83 | P | 2 | 91.78 |
| 2.29 | | | | | | | |
| Brown **SANDY SILT,** trace clay | | SS | | 88 | P | 3 | 90.78 |
| 3.05 | | | | | | | |
| | | SS | 5 | 46 | 7 | 4 | 89.78 |
| Loose, brown **SILTY SAND** with gravel, trace clay | | SS | 6 | 79 | 9 | | |
| | | SS | 7 | 71 | 9 | 5 | 88.78 |
| 6.10 | | | | | | 6 | 87.78 |
| | | SS | 8 | 100 | 26 | | |
| | | SS | 9 | 62 | 14 | 7 | 86.78 |
| Compact to dense, grey **SILTY SAND** | | SS | 10 | 62 | 36 | 8 | 85.78 |
| | | | | | | 9 | 84.78 |
| | | SS | 11 | 42 | 31 | | |
| 9.75 | | | | | | | |
| Dynamic Cone Penetration Test commenced at 9.75m depth. 10.17 | | | | | | 10 | 83.78 |
| End of Borehole | | | | | | | |
| Practical DCPT refusal at 10.17m depth | | | | | | | |
| (GWL @ 0.70m - Dec. 28, 2018) | | | | | | | |



# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

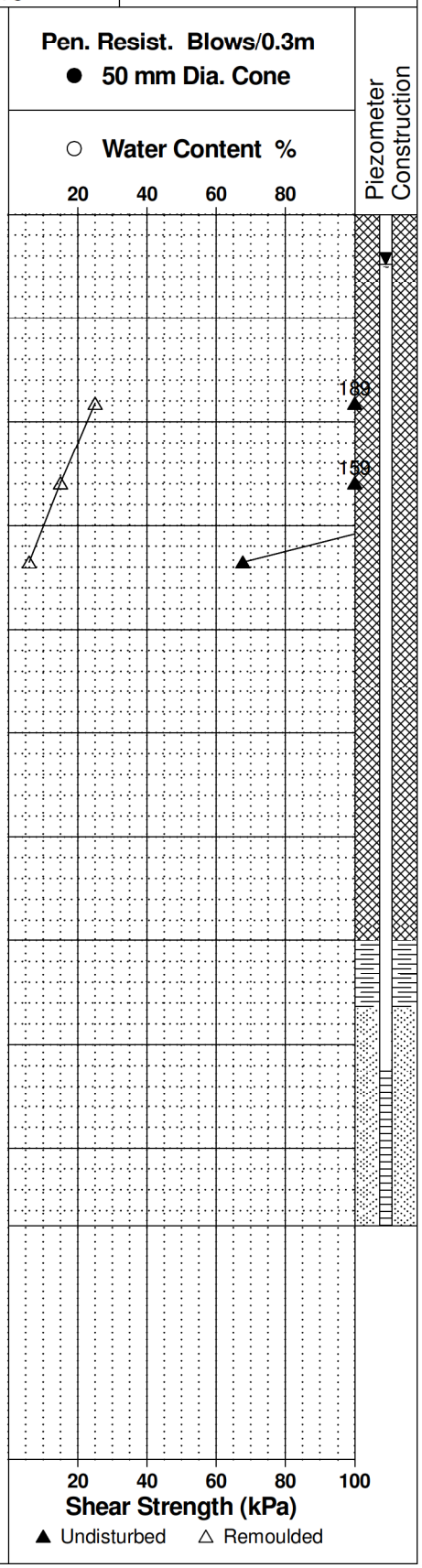
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** BH10

**BORINGS BY** CME 55 Power Auger **DATE** December 13, 2018

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 93.37 |
| **TOPSOIL** 0.30 | | AU | 1 | | | | |
| | | SS | 2 | 96 | 6 | 1 | 92.37 |
| | | SS | 3 | 54 | P | | |
| Very stiff, brown **SILTY CLAY** | | | | | | 2 | 91.37 |
| | | SS | 4 | 100 | P | | |
| - grey by 2.9m depth | | | | | | 3 | 90.37 |
| | | SS | 5 | 58 | 10 | 4 | 89.37 |
| | | SS | 6 | 83 | 37 | | |
| 5.41 | | SS | 7 | 96 | 50+ | 5 | 88.37 |
| | | SS | 8 | 83 | 75 | 6 | 87.37 |
| **GLACIAL TILL:** Very dense, grey silty sand with gravel, cobbles and boulders | | | | | | 7 | 86.37 |
| | | SS | 9 | 92 | | 8 | 85.37 |
| | | | 10 | 100 | 50+ | 9 | 84.37 |
| 9.75 | | | | | | | |
| End of Borehole | | | | | | | |
| (GWL @ 0.48m - Dec. 28, 2018) | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 1

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 94.63 | | |
| 0.30 | | | | | | | | | |
| **GLACIAL TILL:** Loose to compact, grey-brown silty sand with clay, gravel and cobbles<br>- some rootlest at upper 0.2m depth<br>- grey by 2.0m depth | | G | 1 | | | 1 | 93.63 | | |
| | | G | 2 | | | 2 | 92.63 | | |
| | | G | 3 | | | | | | |
| | | G | 4 | | | 3 | 91.63 | | |
| | | G | 5 | | | | | | ▽ |
| 3.70 | | | | | | | | | |
| End of Test Pit<br>(Groundwater infiltration at 3.5m depth) | | | | | | | | | |

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %; 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

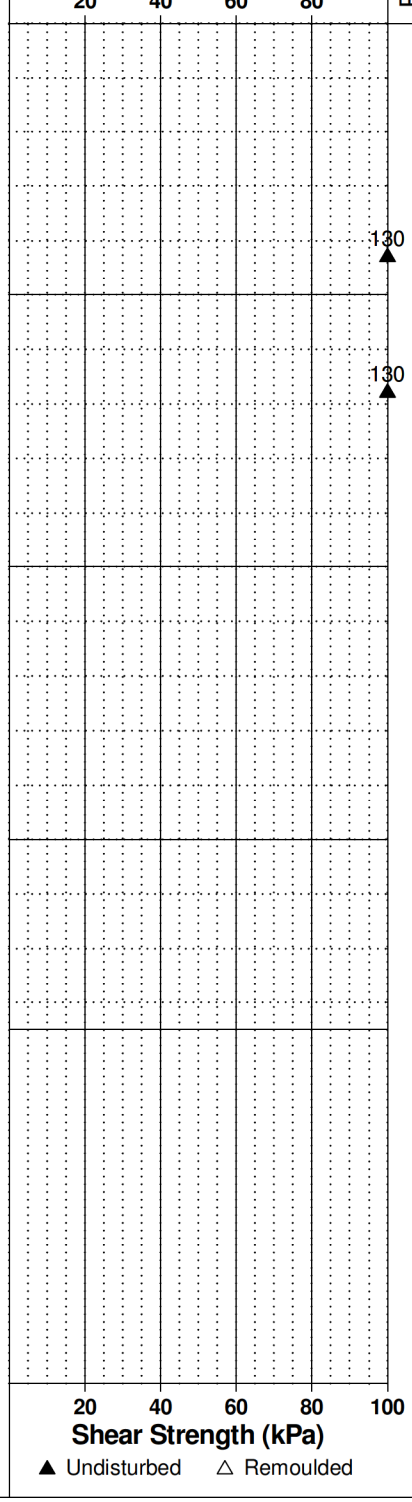
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 2

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 94.42 | | |
| **TOPSOIL** | | | | | | | | | |
| 0.30 | | | | | | | | | |
| Very stiff, grey-brown **SILTY CLAY** | | G | 1 | | | 1 | 93.42 | | |
| - some rootlets at upper 0.2m depth | | G | 2 | | | | | | |
| - grey by 1.0m depth | | | | | | | | | |
| 2.00 | | G | 3 | | | 2 | 92.42 | | |
| **GLACIAL TILL:** Grey silty clay with sand, gravel, cobbles and boulders | | G | 4 | | | | | | |
| | | G | 5 | | | 3 | 91.42 | | |
| | | G | 6 | | | | | | |
| 3.70 | | G | 7 | | | | | | |
| End of Test Pit | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

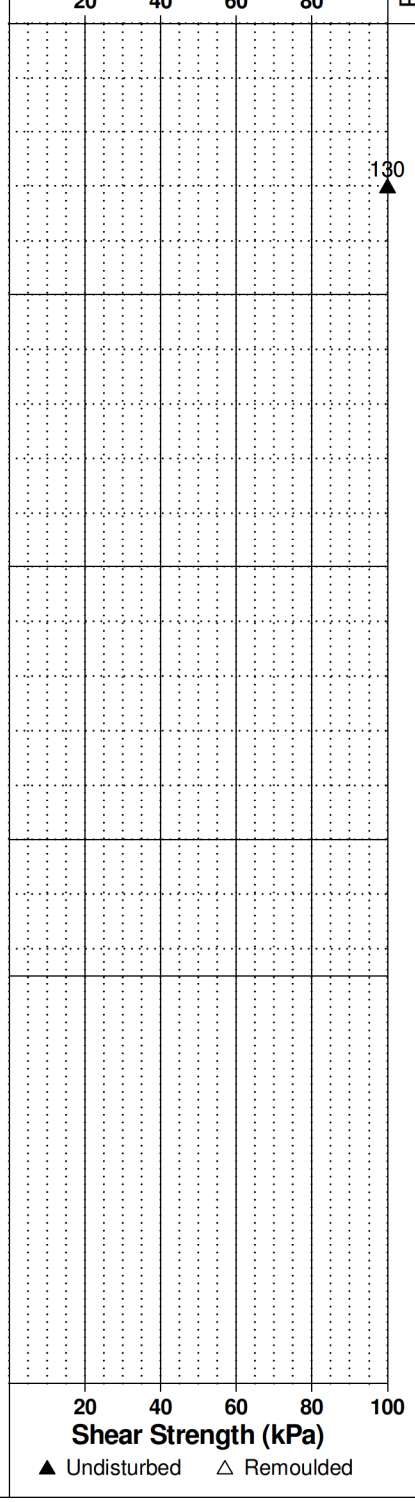
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 3

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 94.48 | | |
| 0.30 | | | | | | | | | |
| Very stiff, brown **SILTY CLAY** | | G | 1 | | | 1 | 93.48 | | |
| | | G | 2 | | | | | | |
| - grey by 1.6m depth | | G | 3 | | | 2 | 92.48 | | |
| | | G | 4 | | | | | | |
| 2.50 | | | | | | | | | |
| **GLACIAL TILL:** Grey silty clay with sand, gravel, cobbles and boulders | | G | 5 | | | 3 | 91.48 | | |
| | | G | 6 | | | | | | |
| 3.50 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| (Water infiltration at base of test pit) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

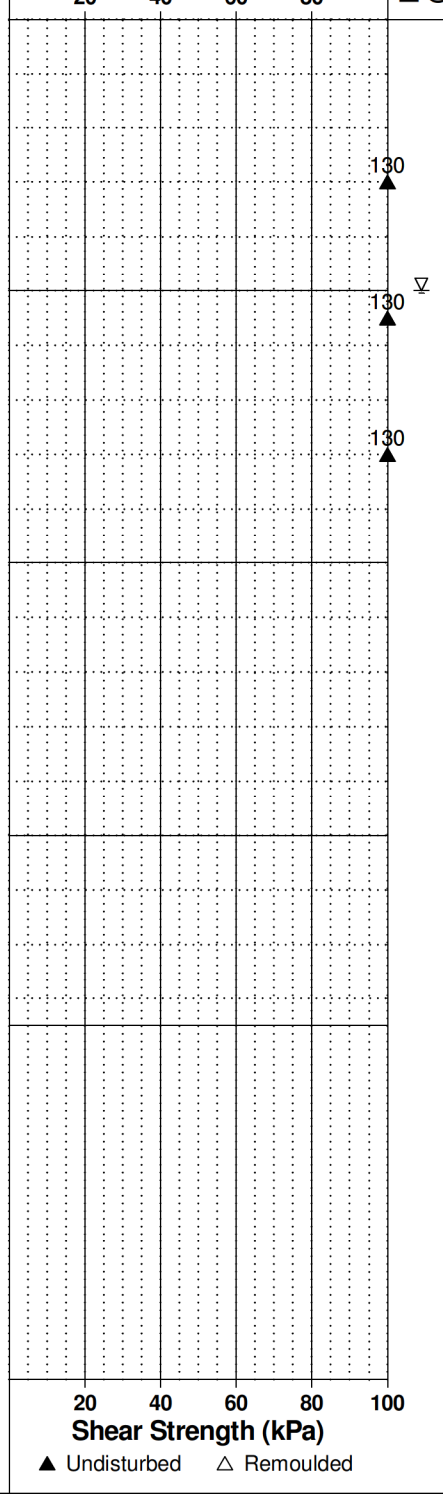
**REMARKS**

**HOLE NO.** TP 4

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 93.63 |
| **TOPSOIL** | | | | | | | |
| 0.30 | | | | | | | |
| | | G | 1 | | | | |
| | | G | 2 | | | 1 | 92.63 |
| Very stiff, brown **SILTY CLAY** | | G | 3 | | | | |
| | | G | 4 | | | 2 | 91.63 |
| | | G | 5 | | | | |
| - grey by 2.8m depth | | G | 6 | | | 3 | 90.63 |
| | | G | 7 | | | | |
| 3.70 | | | | | | | |
| End of Test Pit | | | | | | | |
| (Groundwater infiltration at 1.0m depth) | | | | | | | |

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %




Piezometer Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

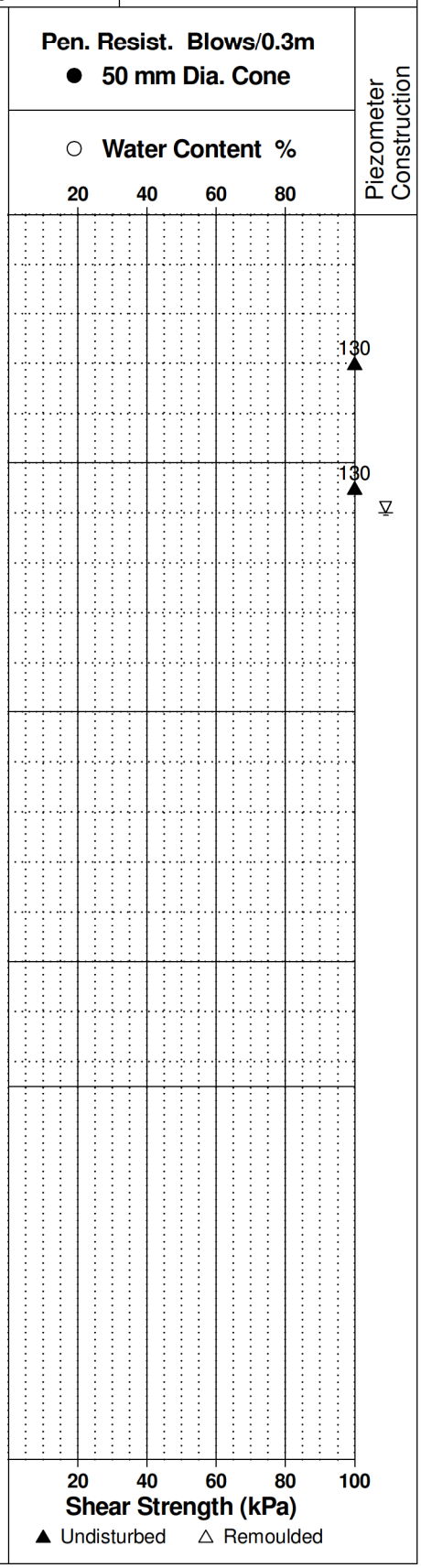
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 5

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 94.28 |
| **TOPSOIL** | | | | | | | |
| 0.30 | | | | | | | |
| | | G | 1 | | | | |
| Very stiff, brown **SILTY CLAY** | | G | 2 | | | 1 | 93.28 |
| - grey-brown by 1.0m depth | | G | 3 | | | | |
| - grey by 1.8m depth | | G | 4 | | | 2 | 92.28 |
| | | G | 5 | | | | |
| | | G | 6 | | | 3 | 91.28 |
| 3.50 | | G | 7 | | | | |
| End of Test Pit | | | | | | | |
| Practical refusal to excavation at 3.50m depth | | | | | | | |
| (Groundwater infiltration at 1.2m depth) | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

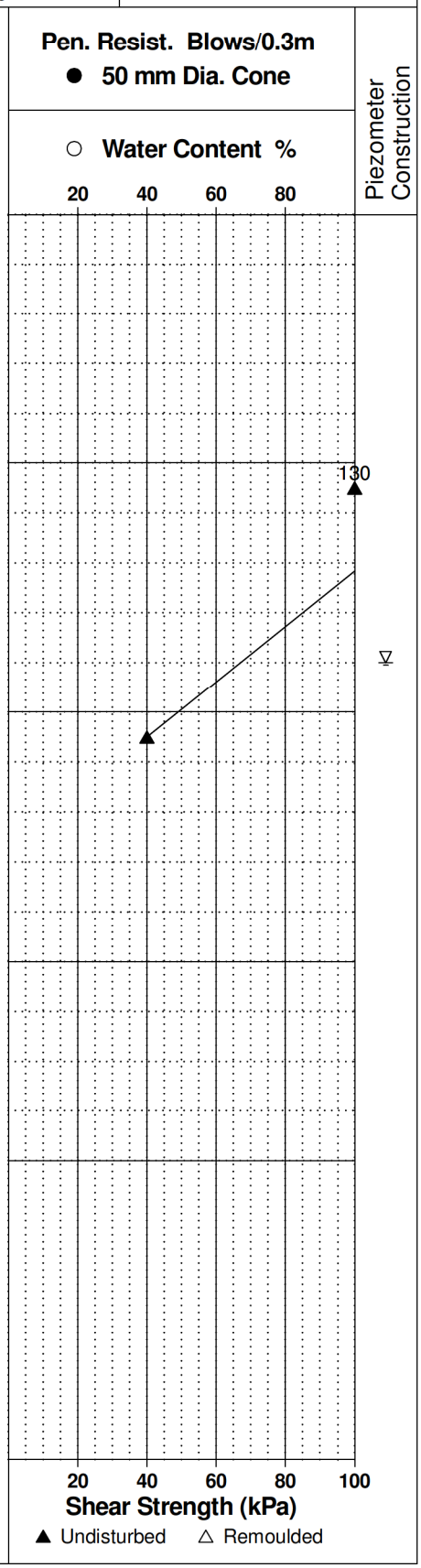
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 6

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | 94.03 |
| **TOPSOIL** | | | | | | | |
| 0.30 | | | | | | | |
| Very stiff to stiff, brown **SILTY CLAY** | | G | 1 | | | 1 | 93.03 |
| | | G | 2 | | | | |
| | | G | 3 | | | | |
| - firm and grey by 1.8m depth | | G | 4 | | | 2 | 92.03 |
| | | G | 5 | | | | |
| 2.80 | | | | | | | |
| **GLACIAL TILL:** Grey silty clay with sand, gravel, cobbles and boulders | | G | 6 | | | 3 | 91.03 |
| | | G | 7 | | | | |
| 3.80 | | | | | | | |
| End of Test Pit | | | | | | | |
| Practical refusal to excavation at 3.80m depth | | | | | | | |
| (Groundwater infiltration at 1.8m depth) | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

# SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

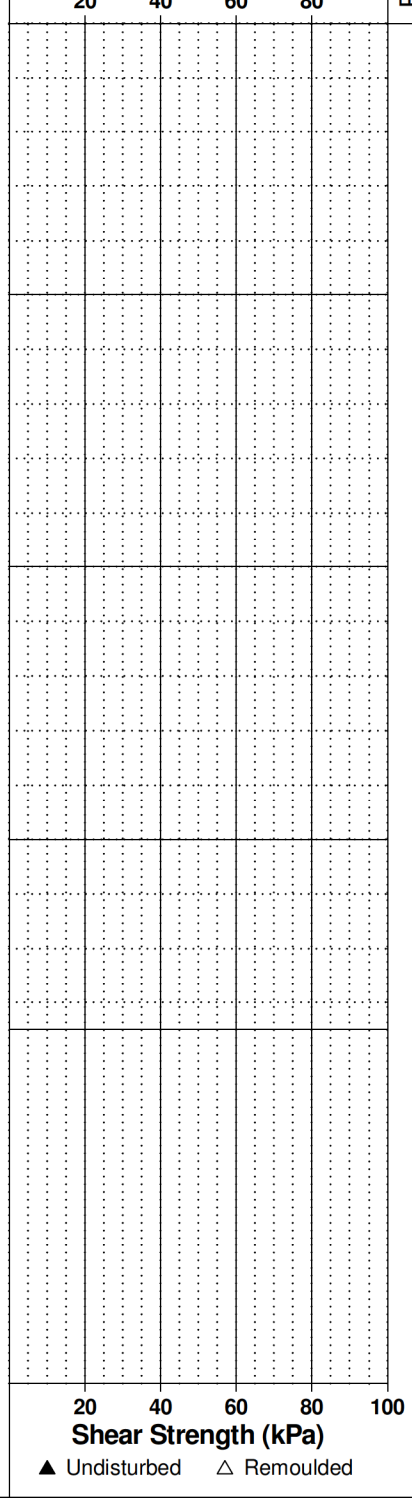
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 7

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 94.46 | | |
| **TOPSOIL** 0.30 | | | | | | | | | |
| Very stiff, brown **SILTY CLAY** | | G | 1 | | | 1 | 93.46 | | |
| | | G | 2 | | | | | | |
| | | G | 3 | | | 2 | 92.46 | | ▽ |
| - grey and with sand by 1.8m depth | | G | 4 | | | | | | |
| | | G | 5 | | | 3 | 91.46 | | |
| | | G | 6 | | | | | | |
| **GLACIAL TILL:** Grey silty clay with sand, gravel, cobbles and boulders 3.20 | | G | 7 | | | | | | |
| End of Test Pit 3.70 | | | | | | | | | |
| Practical refusal to excavation at 3.70m depth | | | | | | | | | |
| (Groundwater infiltration at 1.8m depth) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 8

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 94.53 | | |
| **TOPSOIL** 0.30 | | | | | | | | | |
| Very stiff, brown **SILTY CLAY** | | G | 1 | | | 1 | 93.53 | | |
| - grey-brown by 0.8m depth | | G | 2 | | | | | | |
| - grey by 1.4m depth | | G | 3 | | | 2 | 92.53 | | ▽ |
| | | G | 4 | | | | | | |
| | | G | 5 | | | | | | |
| 2.80 | | | | | | 3 | 91.53 | | |
| **GLACIAL TILL:** Grey silty clay with sand, gravel, cobbles and boulders | | G | 6 | | | | | | |
| | | G | 7 | | | | | | |
| 3.80 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| Practical refusal to excavation at 3.80m depth | | | | | | | | | |
| (Groundwater infiltration at 1.9m depth) | | | | | | | | | |

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

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

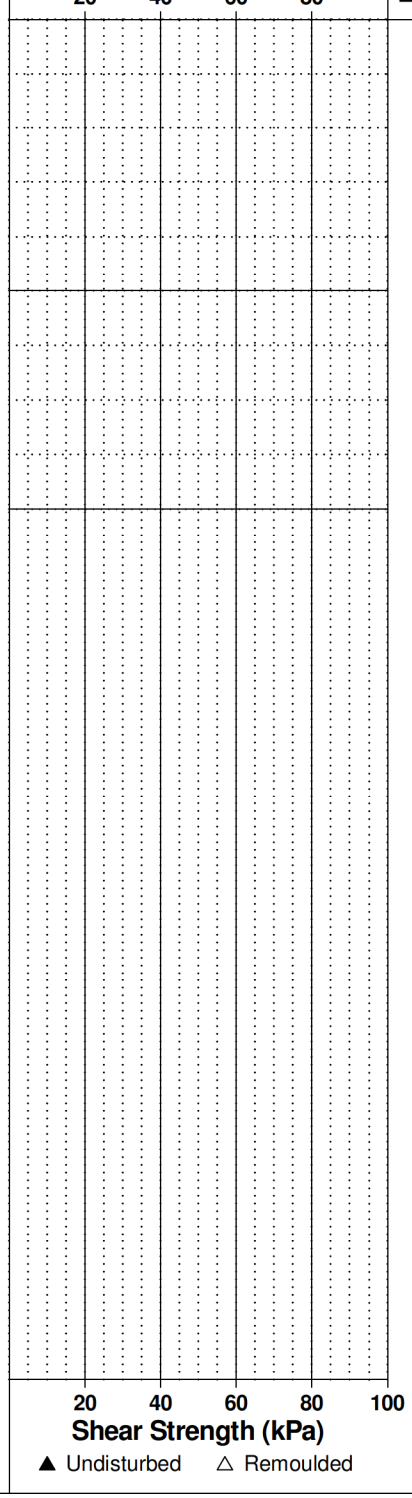
**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 9

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 97.18 | | |
| **TOPSOIL** 0.30 | | | | | | | | | |
| Brown **SILTY SAND** with rootlets 0.60 | | | | | | | | | |
| **GLACIAL TILL:** Brown silty sand with gravel, cobbles and boulders, some clay | | G | 1 | | | 1 | 96.18 | | |
| 1.80 End of Test Pit | | | | | | | | | |
| Practical refusal to excavation at 1.80m depth | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP 9A

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 97.48 | | |
| **TOPSOIL** 0.30 | | | | | | | | | |
| Brown **SILTY SAND,** trace rootlets 0.60 | | | | | | | | | |
| **GLACIAL TILL:** Light brown to grey silty sand with clay, gravel, cobbles and boulders | | | | | | 1 | 96.48 | | |
| | | | | | | 2 | 95.48 | | |
| 2.40 End of Test Pit | | | | | | | | | |
| Practical refusal to excavation at 2.40m depth | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

20 40 60 80

20 40 60 80 100

**Shear Strength (kPa)**

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP10

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 95.63 | | |
| **TOPSOIL** 0.35 | | | | | | | | | |
| Very stiff, red-brown **SILTY CLAY,** some sand, trace organics 0.65 | | G | 1 | | | | | | |
| **GLACIAL TILL:** Brown silty sand with gravel and sand 0.90 | | G | 2 | | | | | | |
| End of Test Pit | | | | | | | | | |
| Practical refusal to excavation at 0.90m depth | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation**
**Proposed Development - Eagleson Road at Ottawa St.**
**Ottawa, Ontario**

**DATUM** Ground surface elevations were referenced to a geodetic datum.

**FILE NO.** PG4216

**REMARKS**

**HOLE NO.** TP11

**BORINGS BY** Hydraulic Shovel **DATE** February 27, 2019

| 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 | 94.45 | | |
| **FILL:** Sand with cobbles | | | | | | | | | |
| 0.25 | | | | | | | | | |
| **GLACIAL TILL:** Loose to compact, grey-brown silty sand with clay, gravel, cobbles and boulders | | G | 1 | | | 1 | 93.45 | | |
| | | G | 2 | | | | | | |
| | | G | 3 | | | 2 | 92.45 | | |
| | | G | 4 | | | | | | |
| 2.80 | | | | | | | | | |
| End of Test Pit | | | | | | | | | |
| Practical refusal to excavation at 2.80m depth | | | | | | | | | |
| (TP dry upon completion) | | | | | | | | | |

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

Water Content %: 20 40 60 80

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<br>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

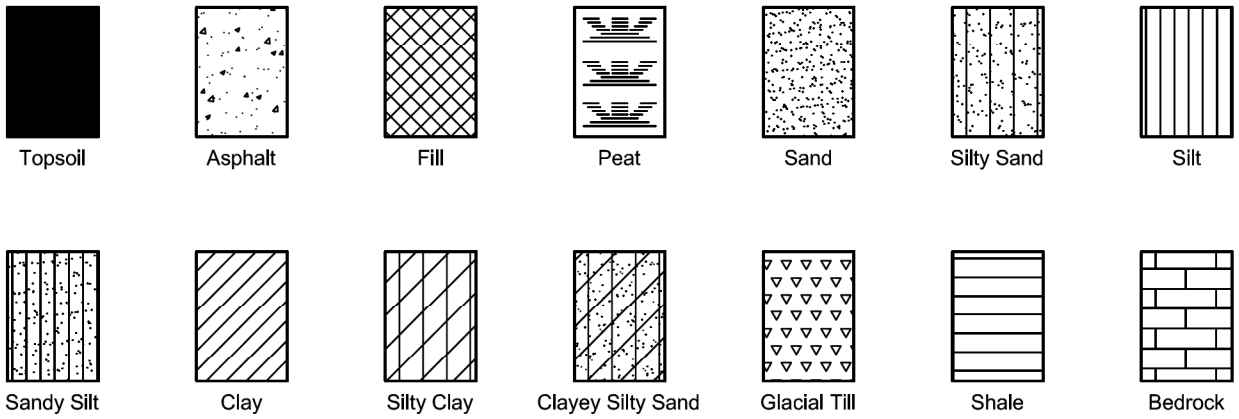
| | | |
|---|---|---|
| $p'_o$ | - | Present effective overburden pressure at sample depth |
| $p'_c$ | - | Preconsolidation pressure of (maximum past pressure on) sample |
| Ccr | - | Recompression index (in effect at pressures below $p'_c$) |
| Cc | - | Compression index (in effect at pressures above $p'_c$) |
| 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. |

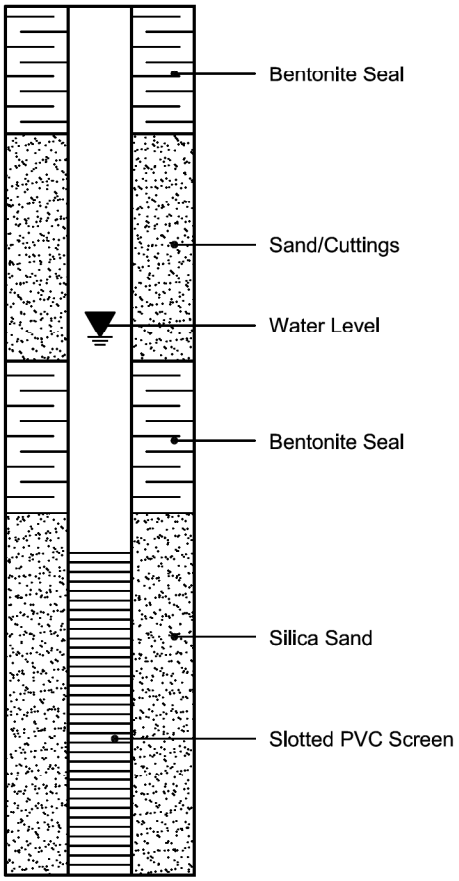
SYMBOLS AND TERMS (continued)

## STRATA PLOT

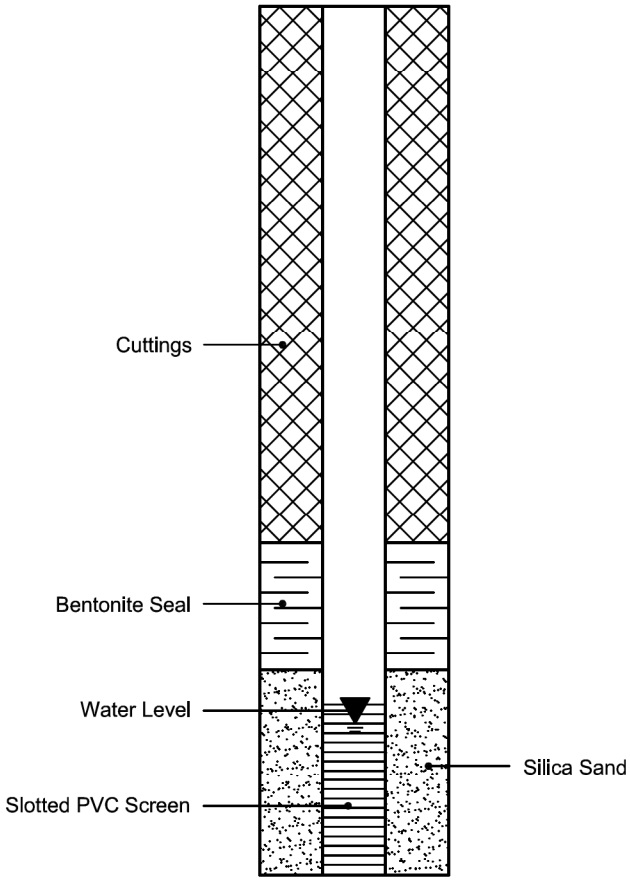



## MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION




PIEZOMETER CONSTRUCTION



Certificate of Analysis

**Client: Paterson Group Consulting Engineers**

**Client PO: 25710**

Report Date: 27-Dec-2018

Order Date: 19-Dec-2018

**Project Description: PG4216**

| | Client ID: | BH8-SS3 | - | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 12/17/2018 15:00 | - | - | - |
| | Sample ID: | 1851341-01 | - | - | - |
| | MDL/Units | Soil | - | - | - |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 89.5 | - | - | - |
| **General Inorganics** | | | | | |
| pH | 0.05 pH Units | 7.94 | - | - | - |
| Resistivity | 0.10 Ohm.m | 96.9 | - | - | - |
| **Anions** | | | | | |
| Chloride | 5 ug/g dry | 6 | - | - | - |
| Sulphate | 5 ug/g dry | <5 | - | - | - |

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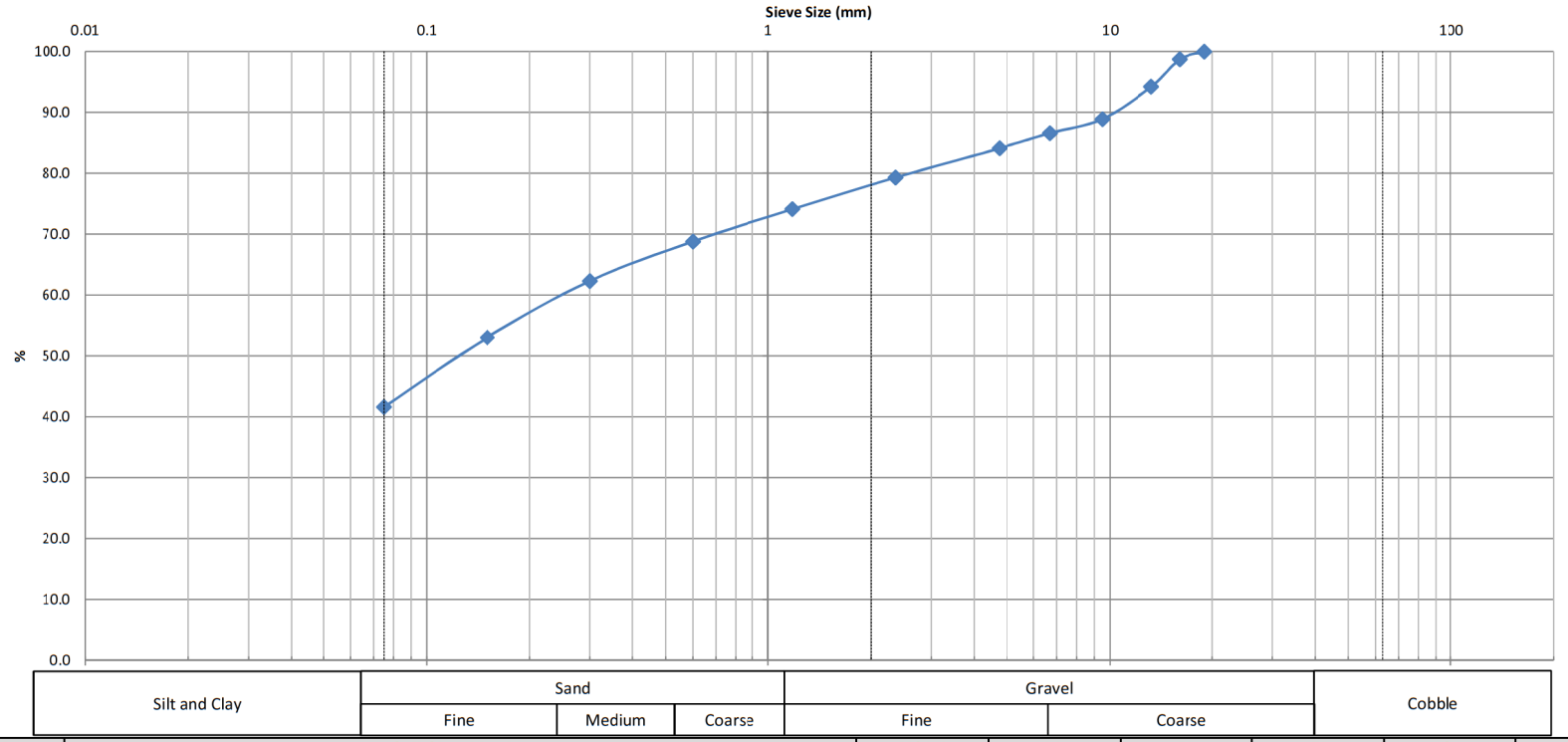
**SIEVE ANALYSIS**
**ASTM C136**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DESCRIPTION: | Sand | FILE NO: | PG4216 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 06833 |
| PROJECT: | Eagleson Rd. | INTENDED USE: | - | DATE RECEIVED: | 1-Mar-19 |
| | | PIT OR QUARRY: | 0 | DATE TESTED: | 4-Mar-19 |
| DATE SAMPLED: | 27-Feb-19 | SOURCE LOCATION: | TP9 - G1 | DATE REPORTED: | 7-Mar-19 |
| SAMPLED BY: | D.P | SAMPLE LOCATION: | - | TESTED BY: | D.K/D.B |




| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 0.23 | 23.3 |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | 19.5 | 0.35 | 0.035 | 0.015 | 15.9 | 42.5 | | 41.6 | | | |

**Comments:**

| REVIEWED BY: | Curtis Beadow | Joe Fosyth, P. Eng. |
|---|---|---|

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# SIEVE ANALYSIS
# ASTM C136

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DESCRIPTION: | Sand | FILE NO.: | PG4216 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 06833 |
| PROJECT: | Eagleson Rd. | INTENDED USE: | - | DATE REC'D: | 1-Mar-19 |
| | | PIT OR QUARRY: | | DATE TESTED: | 4-Mar-19 |
| DATE SAMPLED: | 27-Feb-19 | SOURCE LOCATION: | TP9 - G1 | DATE REP'D: | 7-Mar-19 |
| SAMPLED BY: | D.P | SAMPLE LOCATION: | - | TESTED BY: | D.K/D.B |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 719.1 |
| **WEIGHT AFTER WASH** | 442.5 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | | | | | | |
| 26.5 | | | | | | |
| 19 | **0.0** | 0.0 | **100.0** | | | |
| 16 | **9.4** | 1.3 | **98.7** | | | |
| 13.2 | **41.8** | 5.8 | **94.2** | | | |
| 9.5 | **80.0** | 11.1 | **88.9** | | | |
| 6.7 | **96.4** | 13.4 | **86.6** | | | |
| 4.75 | **114.6** | 15.9 | **84.1** | | | |
| 2.36 | **148.6** | 20.7 | **79.3** | | | |
| 1.18 | **186.5** | 25.9 | **74.1** | | | |
| 0.6 | **224.6** | 31.2 | **68.8** | | | |
| 0.3 | **270.8** | 37.7 | **62.3** | | | |
| 0.15 | **337.8** | 47.0 | **53.0** | | | |
| 0.075 | **419.8** | 58.4 | **41.6** | | | |
| PAN | **441.6** | | | | | |
| SIEVE CHECK FINE | | 0.20 | 0.3% max. | | | REFERENCE MATERIAL |

| OTHER TESTS | RESULT | LAB NO. | RESULT |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

| REVIEWED BY: | Curtis Beadow | Joe Forsyth, P. Eng. |
|---|---|---|
| |  |  |

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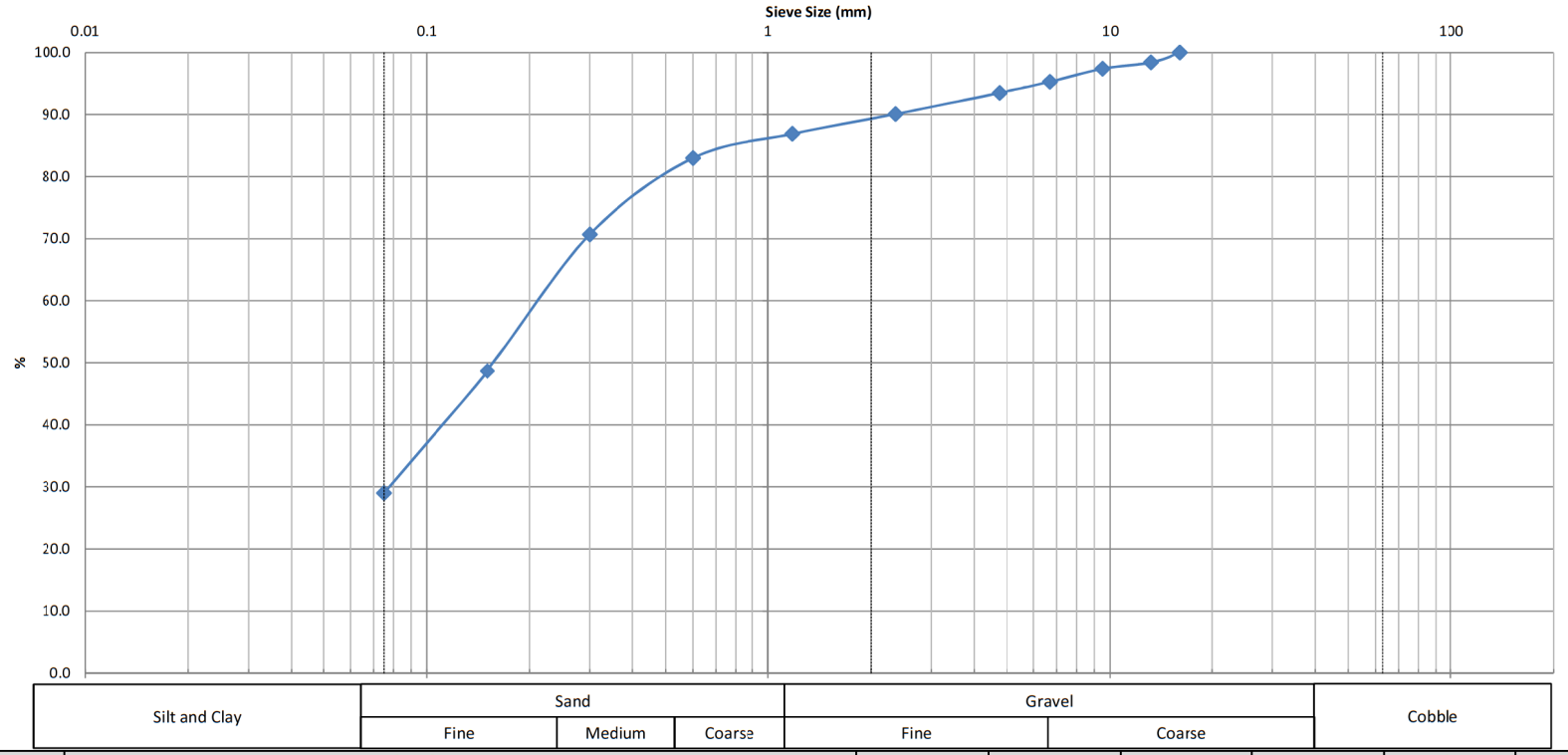
**SIEVE ANALYSIS**
**ASTM C136**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DESCRIPTION: | Sand | FILE NO: | PG4216 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 06834 |
| PROJECT: | Eagleson Rd. | INTENDED USE: | - | DATE RECEIVED: | 1-Mar-19 |
| | | PIT OR QUARRY: | 0 | DATE TESTED: | 4-Mar-19 |
| DATE SAMPLED: | 27-Feb-19 | SOURCE LOCATION: | TP11 - G4 | DATE REPORTED: | 7-Mar-19 |
| SAMPLED BY: | D.P | SAMPLE LOCATION: | - | TESTED BY: | D.K/D.B |




| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 1.27 | 4.7 |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | 17.5 | 0.15 | 0.078 | 0.032 | 6.5 | 64.5 | | 29.0 | | | |

**Comments:**

| REVIEWED BY: | Curtis Beadow | Joe Fosyth, P. Eng. |
|---|---|---|

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# SIEVE ANALYSIS
# ASTM C136

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DESCRIPTION: | Sand | FILE NO.: | PG4216 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 06834 |
| PROJECT: | Eagleson Rd. | INTENDED USE: | - | DATE REC'D: | 1-Mar-19 |
| | | PIT OR QUARRY: | | DATE TESTED: | 4-Mar-19 |
| DATE SAMPLED: | 27-Feb-19 | SOURCE LOCATION: | TP11 - G4 | DATE REP'D: | 7-Mar-19 |
| SAMPLED BY: | D.P | SAMPLE LOCATION: | - | TESTED BY: | D.K/D.B |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 846.2 |
| **WEIGHT AFTER WASH** | 644.5 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | | | | | | |
| 26.5 | | | | | | |
| 19 | | | | | | |
| 16 | **0.0** | 0.0 | **100.0** | | | |
| 13.2 | **13.8** | 1.6 | **98.4** | | | |
| 9.5 | **22.2** | 2.6 | **97.4** | | | |
| 6.7 | **39.9** | 4.7 | **95.3** | | | |
| 4.75 | **55.1** | 6.5 | **93.5** | | | |
| 2.36 | **84.0** | 9.9 | **90.1** | | | |
| 1.18 | **110.8** | 13.1 | **86.9** | | | |
| 0.6 | **144.2** | 17.0 | **83.0** | | | |
| 0.3 | **248.3** | 29.3 | **70.7** | | | |
| 0.15 | **434.4** | 51.3 | **48.7** | | | |
| 0.075 | **600.7** | 71.0 | **29.0** | | | |
| PAN | **643.6** | | | | | |

| | | | | |
|---|---|---|---|---|
| SIEVE CHECK FINE | 0.14 | 0.3% max. | **REFERENCE MATERIAL** | |
| **OTHER TESTS** | | **RESULT** | **LAB NO.** | **RESULT** |
| | | | | |
| | | | | |
| | | | | |

| | | |
|---|---|---|
| **REVIEWED BY:** | **Curtis Beadow** | **Joe Forsyth, P. Eng.** |
| |  |  |

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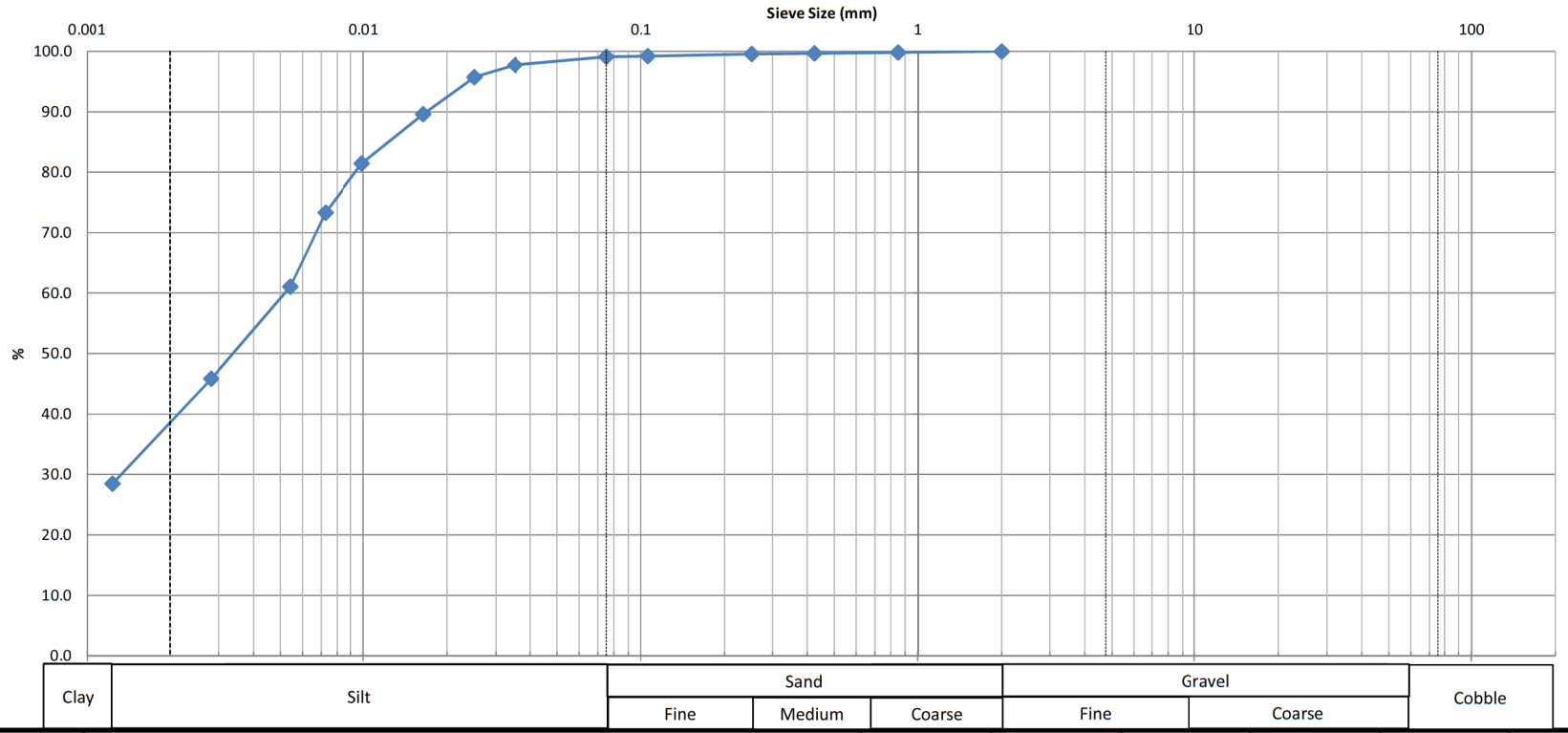
**SIEVE ANALYSIS** **ASTM C136**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DEPTH: | 3.0m | FILE NO: | PG4216 |
| CONTRACT NO.: | | BH OR TP No.: | TP4 - G6 | LAB NO: | 06830 |
| PROJECT: | Eagleson Road | | | DATE RECEIVED: | 1-Mar-19 |
| | | | | DATE TESTED: | 5-Mar-19 |
| DATE SAMPLED: | 27-Feb-19 | | | DATE REPORTED: | 7-Mar-19 |
| SAMPLED BY: | Drew | | | TESTED BY: | D. Bertrand |




| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 30.3 | | | | | |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | | | | | 0.0 | 0.9 | | 59.6 | | 39.5 | |

**Comments:**

| REVIEWED BY: | Curtis Beadow | Joe Fosyth, P. Eng. |
|---|---|---|

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**HYDROMETER**
**LS-702 ASTM-422**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DEPTH: | 3.0m | FILE NO.: | PG4216 |
| PROJECT: | Eagleson Road | BH OR TP No.: | TP4 - G6 | DATE SAMPLED | 27-Feb-19 |
| LAB No. : | 06830 | TESTED BY: | D. Bertrand | DATE RECEIVED | 01-Mar-19 |
| SAMPLED BY: | Drew | DATE REPT'D: | 07-Mar-19 | DATE TESTED: | 05-Mar-19 |

**SAMPLE INFORMATION**

| SAMPLE MASS | SPECIFIC GRAVITY |
|---|---|
| 111.7 | 2.700 |

| | | | | |
|---|---|---|---|---|
| INITIAL WEIGHT | 50.00 | **HYGROSCOPIC MOISTURE** | | |
| WEIGHT CORRECTED | 48.55 | TARE WEIGHT | 50.00 | ACTUAL WEIGHT |
| WT. AFTER WASH BACK SIEVE | 0.450 | AIR DRY | 150.00 | 100.00 |
| SOLUTION CONCENTRATION | 40 g/L | OVEN DRY | 147.10 | 97.10 |
| | | CORRECTED | 0.971 | |

**GRAIN SIZE ANALYSIS**

| SIEVE DIAMETER (mm) | WEIGHT RETAINED (g) | PERCENT RETAINED | PERCENT PASSING |
|---|---|---|---|
| 13.2 | | | |
| 9.5 | | | |
| 4.75 | | | |
| 2.0 | **0.1** | 0.0 | **100.0** |
| Pan | **111.6** | | |
| | | | |
| 0.850 | **0.08** | 0.2 | **99.8** |
| 0.425 | **0.14** | 0.3 | **99.7** |
| 0.250 | **0.21** | 0.4 | **99.6** |
| 0.106 | **0.37** | 0.8 | **99.2** |
| 0.075 | **0.42** | 0.9 | **99.1** |
| Pan | **0.45** | | |
| SIEVE CHECK 0.0 | MAX = 0.3% | | |

**HYDROMETER DATA**

| ELAPSED | TIME (24 hours) | Hs | Hc | Temp. (°C) | DIAMETER | (P) | TOTAL PERCENT PASSING |
|---|---|---|---|---|---|---|---|
| 1 | 9:53 | 54.0 | 6.0 | 22.0 | 0.0351 | 97.8 | 97.8 |
| 2 | 9:54 | 53.0 | 6.0 | 22.0 | 0.0251 | 95.7 | 95.7 |
| 5 | 9:57 | 50.0 | 6.0 | 22.0 | 0.0164 | 89.6 | 89.6 |
| 15 | 10:07 | 46.0 | 6.0 | 22.0 | 0.0099 | 81.5 | 81.5 |
| 30 | 10:22 | 42.0 | 6.0 | 22.0 | 0.0073 | 73.3 | 73.3 |
| 60 | 10:52 | 36.0 | 6.0 | 22.0 | 0.0054 | 61.1 | 61.1 |
| 250 | 14:02 | 28.5 | 6.0 | 22.0 | 0.0028 | 45.8 | 45.8 |
| 1440 | 9:52 | 20.0 | 6.0 | 22.0 | 0.0012 | 28.5 | 28.5 |

**COMMENTS:**

**Moisture Content = 30.3%**

| REVIEWED BY: | C. Beadow | Joe Forsyth, P. Eng. |
|---|---|---|

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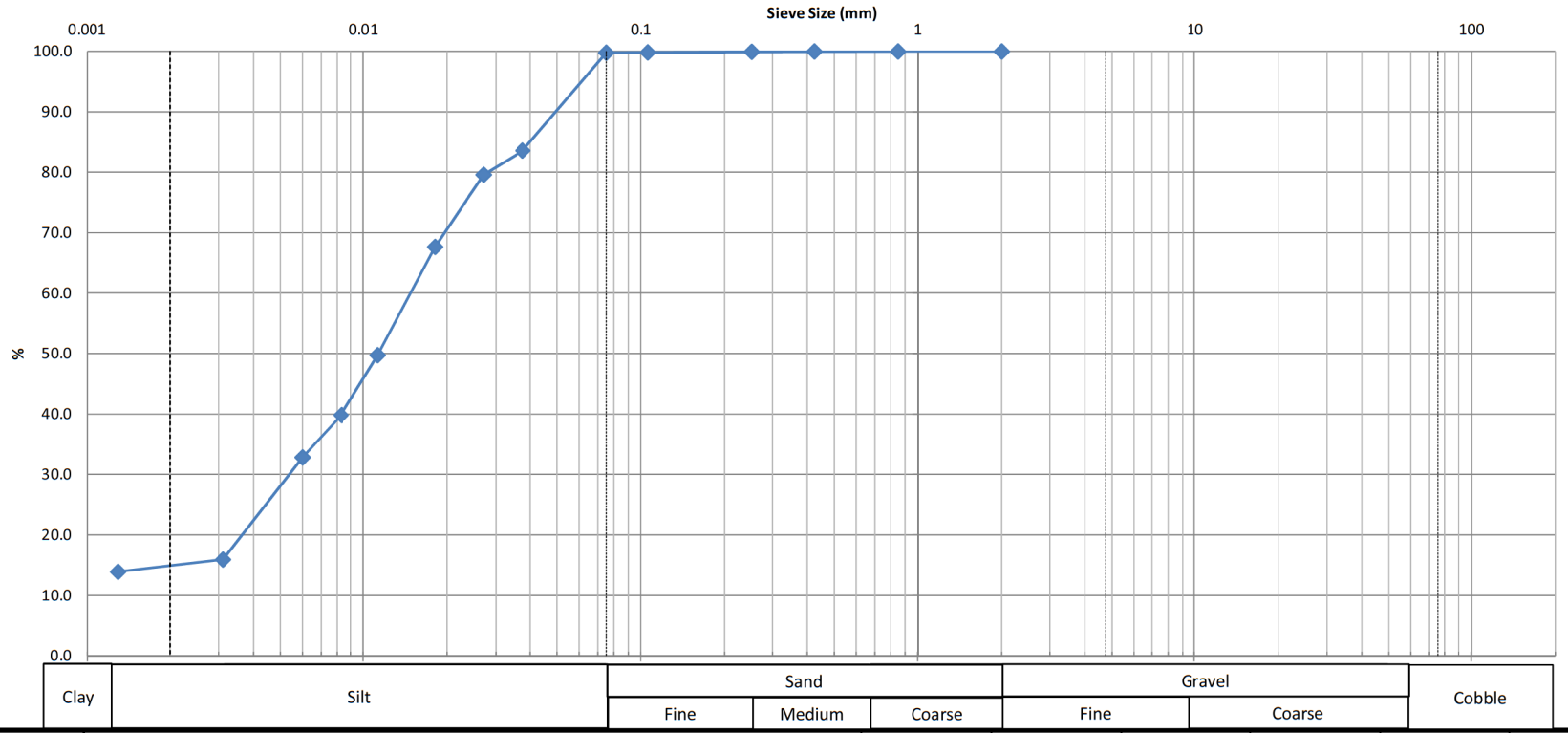
**SIEVE ANALYSIS** **ASTM C136**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DEPTH: | 2.5m | FILE NO: | PG4216 |
| CONTRACT NO.: | | BH OR TP No.: | TP6 - G5 | LAB NO: | 06831 |
| PROJECT: | Eagleson Road | | | DATE RECEIVED: | 1-Mar-19 |
| | | | | DATE TESTED: | 5-Mar-19 |
| DATE SAMPLED: | 27-Feb-19 | | | DATE REPORTED: | 7-Mar-19 |
| SAMPLED BY: | Drew | | | TESTED BY: | D. Bertrand |




| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 21.6 | | | | | |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | | | | | 0.0 | 0.2 | | 84.8 | | 15.0 | |

**Comments:**

| REVIEWED BY: | Curtis Beadow | Joe Fosyth, P. Eng. |
|---|---|---|

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consulting engineers

**HYDROMETER**
**LS-702 ASTM-422**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DEPTH: | 2.5m | FILE NO.: | PG4216 |
| PROJECT: | Eagleson Road | BH OR TP No.: | TP6 - G5 | DATE SAMPLED | 27-Feb-19 |
| LAB No. : | 06831 | TESTED BY: | D. Bertrand | DATE RECEIVED | 01-Mar-19 |
| SAMPLED BY: | Drew | DATE REPT'D: | 07-Mar-19 | DATE TESTED: | 05-Mar-19 |

**SAMPLE INFORMATION**

| SAMPLE MASS | SPECIFIC GRAVITY |
|---|---|
| 120.9 | 2.700 |

| | | | | |
|---|---|---|---|---|
| INITIAL WEIGHT | 50.00 | HYGROSCOPIC MOISTURE | | |
| WEIGHT CORRECTED | 49.68 | TARE WEIGHT | 50.00 | ACTUAL WEIGHT |
| WT. AFTER WASH BACK SIEVE | 0.120 | AIR DRY | 150.00 | 100.00 |
| SOLUTION CONCENTRATION | 40 g/L | OVEN DRY | 149.35 | 99.35 |
| | | CORRECTED | 0.994 | |

**GRAIN SIZE ANALYSIS**

| SIEVE DIAMETER (mm) | WEIGHT RETAINED (g) | PERCENT RETAINED | PERCENT PASSING |
|---|---|---|---|
| 13.2 | | | |
| 9.5 | | | |
| 4.75 | | | |
| 2.0 | **0.0** | 0.0 | **100.0** |
| Pan | **120.9** | | |
| | | | |
| 0.850 | **0.00** | 0.0 | **100.0** |
| 0.425 | **0.01** | 0.0 | **100.0** |
| 0.250 | **0.04** | 0.1 | **99.9** |
| 0.106 | **0.09** | 0.2 | **99.8** |
| 0.075 | **0.11** | 0.2 | **99.8** |
| Pan | **0.12** | | |
| SIEVE CHECK 0.0 | MAX = 0.3% | | |

**HYDROMETER DATA**

| ELAPSED | TIME (24 hours) | Hs | Hc | Temp. (°C) | DIAMETER | (P) | TOTAL PERCENT PASSING |
|---|---|---|---|---|---|---|---|
| 1 | 10:04 | 48.0 | 6.0 | 22.0 | 0.0375 | 83.6 | **83.6** |
| 2 | 10:05 | 46.0 | 6.0 | 22.0 | 0.0271 | 79.6 | **79.6** |
| 5 | 10:08 | 40.0 | 6.0 | 22.0 | 0.0181 | 67.7 | **67.7** |
| 15 | 10:18 | 31.0 | 6.0 | 22.0 | 0.0113 | 49.8 | **49.8** |
| 30 | 10:33 | 26.0 | 6.0 | 22.0 | 0.0083 | 39.8 | **39.8** |
| 60 | 11:03 | 22.5 | 6.0 | 22.0 | 0.0060 | 32.8 | **32.8** |
| 250 | 14:13 | 14.0 | 6.0 | 22.0 | 0.0031 | 15.9 | **15.9** |
| 1440 | 10:03 | 13.0 | 6.0 | 22.0 | 0.0013 | 13.9 | **13.9** |

**COMMENTS:**

**Moisture Content = 21.6%**

| REVIEWED BY: | C. Beadow | Joe Forsyth, P. Eng. |
|---|---|---|
| |  |  |

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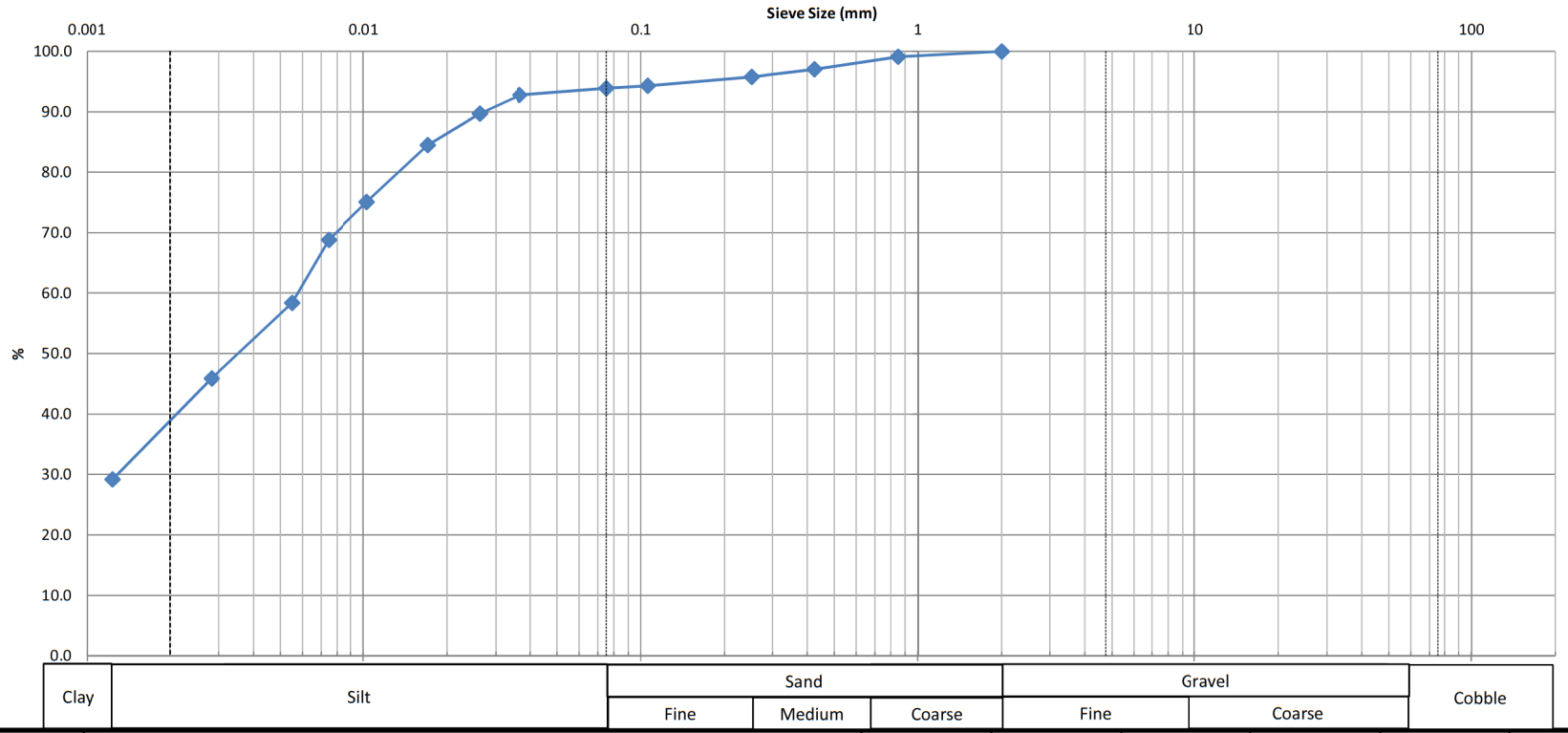
**SIEVE ANALYSIS** **ASTM C136**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DEPTH: | 2.5m | FILE NO: | PG4216 |
| CONTRACT NO.: | | BH OR TP No.: | TP8 - G5 | LAB NO: | 06832 |
| PROJECT: | Eagleson Road | | | DATE RECEIVED: | 1-Mar-19 |
| | | | | DATE TESTED: | 5-Mar-19 |
| DATE SAMPLED: | 27-Feb-19 | | | DATE REPORTED: | 7-Mar-19 |
| SAMPLED BY: | Drew | | | TESTED BY: | D. Bertrand |




| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 29.9 | | | | | |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | | | | | 0.0 | 6.1 | | 54.4 | | 39.5 | |

**Comments:**

| REVIEWED BY: | Curtis Beadow | Joe Fosyth, P. Eng. |
|---|---|---|

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**HYDROMETER**
**LS-702 ASTM-422**

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | Taggart | DEPTH: | 2.5m | FILE NO.: | PG4216 |
| PROJECT: | Eagleson Road | BH OR TP No.: | TP8 - G5 | DATE SAMPLED | 27-Feb-19 |
| LAB No. : | 06832 | TESTED BY: | D. Bertrand | DATE RECEIVED | 01-Mar-19 |
| SAMPLED BY: | Drew | DATE REPT'D: | 07-Mar-19 | DATE TESTED: | 05-Mar-19 |

**SAMPLE INFORMATION**

| SAMPLE MASS | SPECIFIC GRAVITY |
|---|---|
| 108.4 | 2.700 |

| | | | | |
|---|---|---|---|---|
| INITIAL WEIGHT | 50.00 | **HYGROSCOPIC MOISTURE** | | |
| WEIGHT CORRECTED | 47.40 | TARE WEIGHT | 50.00 | ACTUAL WEIGHT |
| WT. AFTER WASH BACK SIEVE | 2.910 | AIR DRY | 150.00 | 100.00 |
| SOLUTION CONCENTRATION | 40 g/L | OVEN DRY | 144.80 | 94.80 |
| | | CORRECTED | 0.948 | |

**GRAIN SIZE ANALYSIS**

| SIEVE DIAMETER (mm) | WEIGHT RETAINED (g) | PERCENT RETAINED | PERCENT PASSING |
|---|---|---|---|
| 13.2 | | | |
| 9.5 | | | |
| 4.75 | | | |
| 2.0 | **0.0** | 0.0 | **100.0** |
| Pan | **108.4** | | |
| | | | |
| 0.850 | **0.42** | 0.9 | **99.1** |
| 0.425 | **1.39** | 2.9 | **97.1** |
| 0.250 | **2.00** | 4.2 | **95.8** |
| 0.106 | **2.69** | 5.7 | **94.3** |
| 0.075 | **2.87** | 6.1 | **93.9** |
| Pan | **2.91** | | |
| SIEVE CHECK 0.0 | MAX = 0.3% | | |

**HYDROMETER DATA**

| ELAPSED | TIME (24 hours) | Hs | Hc | Temp. (°C) | DIAMETER | (P) | TOTAL PERCENT PASSING |
|---|---|---|---|---|---|---|---|
| 1 | 10:16 | 50.5 | 6.0 | 22.0 | 0.0365 | 92.8 | **92.8** |
| 2 | 10:17 | 49.0 | 6.0 | 22.0 | 0.0262 | 89.7 | **89.7** |
| 5 | 10:20 | 46.5 | 6.0 | 22.0 | 0.0170 | 84.5 | **84.5** |
| 15 | 10:30 | 42.0 | 6.0 | 22.0 | 0.0103 | 75.1 | **75.1** |
| 30 | 10:45 | 39.0 | 6.0 | 22.0 | 0.0075 | 68.8 | **68.8** |
| 60 | 11:15 | 34.0 | 6.0 | 22.0 | 0.0055 | 58.4 | **58.4** |
| 250 | 14:25 | 28.0 | 6.0 | 22.0 | 0.0028 | 45.9 | **45.9** |
| 1440 | 10:15 | 20.0 | 6.0 | 22.0 | 0.0012 | 29.2 | **29.2** |

**COMMENTS:**

**Moisture Content = 29.9%**

| REVIEWED BY: | C. Beadow | Joe Forsyth, P. Eng. |
|---|---|---|

# APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG4216-5 – DESIGNATED SILTY CLAY AREAS


FIGURE 1

# Key Plan

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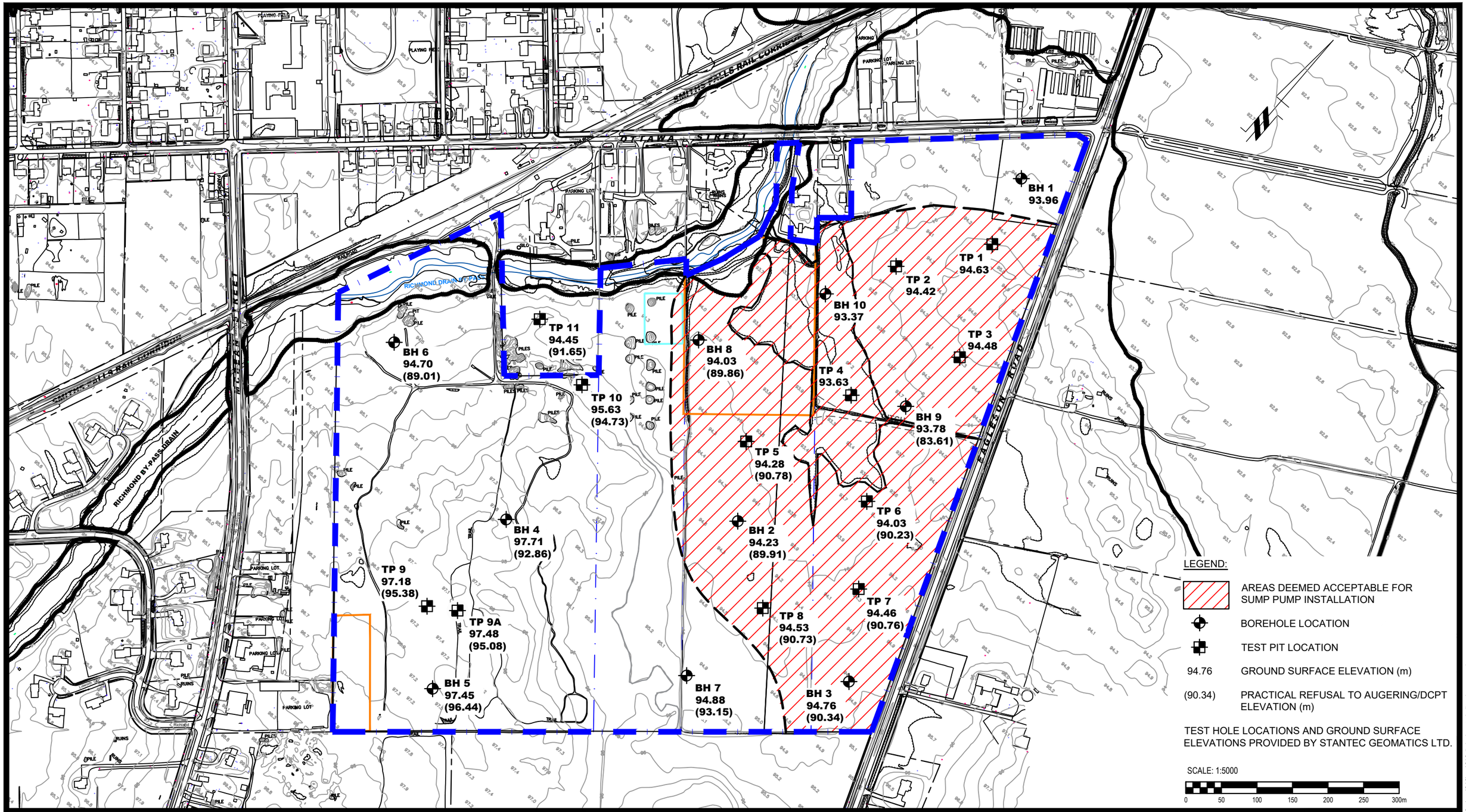


LEGEND:

- AREAS DEEMED ACCEPTABLE FOR SUMP PUMP INSTALLATION
- BOREHOLE LOCATION
- TEST PIT LOCATION
- 94.76 GROUND SURFACE ELEVATION (m)
- (90.34) PRACTICAL REFUSAL TO AUGERING/DCPT ELEVATION (m)

TEST HOLE LOCATIONS AND GROUND SURFACE ELEVATIONS PROVIDED BY STANTEC GEOMATICS LTD.

SCALE: 1:5000

0 50 100 150 200 250 300m


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Ottawa, Ontario K2E 7J5
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| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

TAGGART GROUP OF COMPANIES

GEOTECHNICAL INVESTIGATION
PROP. MULTI-USE DEVELOPMENT - EAGLESON ROAD AT OTTAWA STREET
OTTAWA, ONTARIO

Title:

# DESIGNATED SILTY CLAY AREAS

| | |
|---|---|
| Scale: 1:5000 | Date: 01/2021 |
| Drawn by: YA | Report No.: PG4216 |
| Checked by: FA | Dwg. No.: PG4216-5 |
| Approved by: FA | Revision No.: |

p:\autocad drawings\geotechnical\pg42xx\pg4216\pg4216-5-designated silty clay areas.dwg