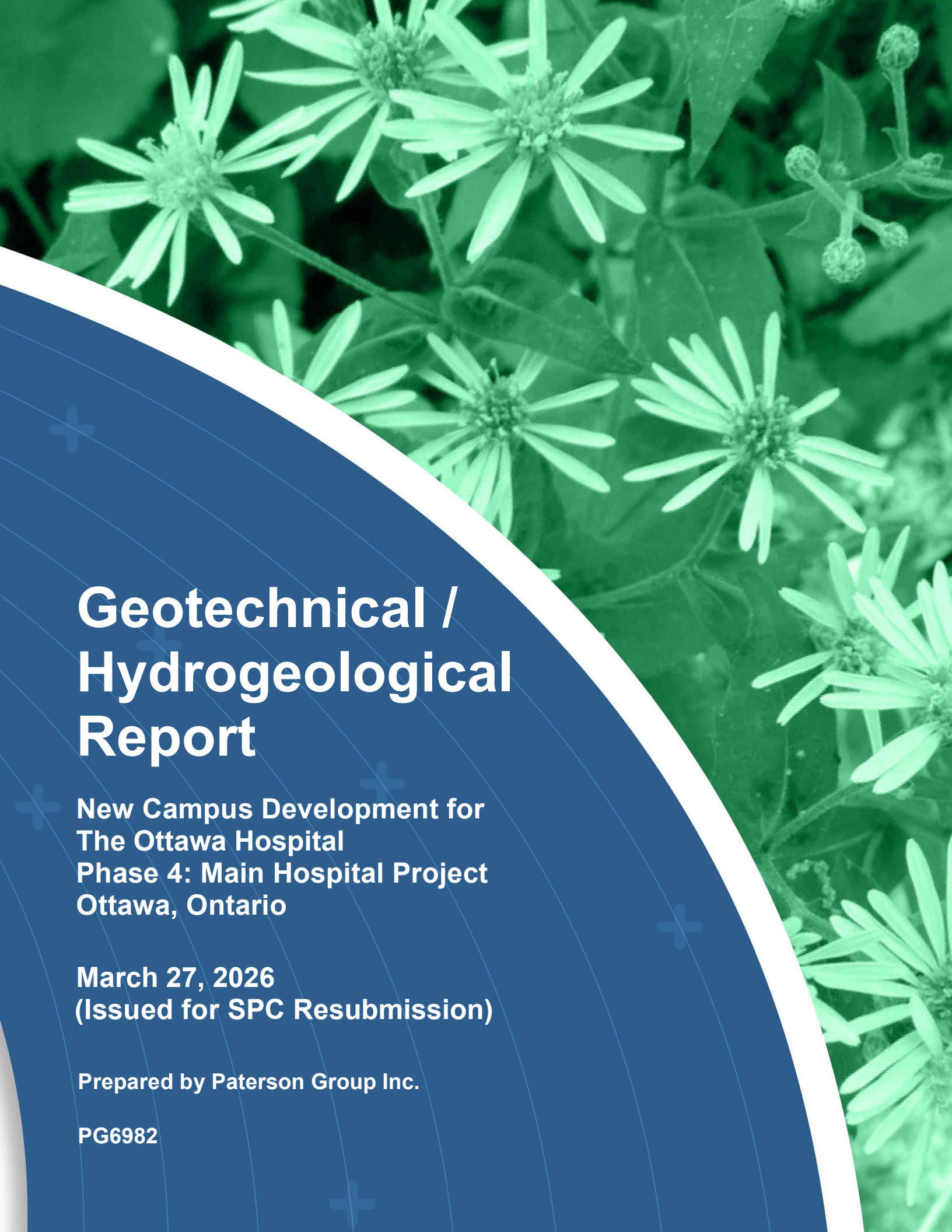

# Geotechnical / Hydrogeological Report

## New Campus Development for The Ottawa Hospital
## Phase 4: Main Hospital Project
## Ottawa, Ontario

**March 27, 2026**
**(Issued for SPC Resubmission)**

**Prepared by Paterson Group Inc.**

**PG6982**

## Version Number and Date

Version 07, 2026/03/27

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## 1.0 INTRODUCTION

Paterson Group (Paterson) was commissioned by PCL-ED to prepare a geotechnical report based on existing soil information obtained by others for the proposed Ottawa Hospital – Civic Campus Redevelopment Project to be located at 900 Carling Avenue in the City of Ottawa (reference should be made to Figure 1 - Key Plan in Appendix 2 of this report).

The objectives of the geotechnical report were to:

- Determine the subsoil and groundwater conditions at this site by means of test holes completed by Paterson and others.
- Provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may affect the design.
- Complete further boreholes and ground water testing to assets ground, rock and water conditions as well as to evaluate soil permeability.
- Complete further investigation to evaluate the depth of the bedrock layer.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains findings by others and includes Paterson's geotechnical recommendations pertaining to the design and construction of the subject development as they are understood by Paterson 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 the present investigation. Therefore, the present report does not address environmental issues.

## 2.0 PROPOSED DEVELOPMENT

Based on the available drawings, it is understood that the Civic Campus Redevelopment project will consist of a new hospital complex. The proposed structure will consist of two separate towers (Tower A and Tower B along the western and eastern halves of the complex footprint, respectively) connected by a centrally located podium structure. Further, a separate pavilion structure will connect the northern portion of the podium structure (and located along the western portion of Tower B) to a pedestrian bridge connecting to an offsite parking structure.

One basement level will be provided below the towers and podium structure footprints. Tower A and Tower B are anticipated to be provided up to 7 and 13 above-ground storeys, respectively, with a potential vertical expansion of Tower A with up to a total of 13 above-ground storeys. The podium structure is anticipated to be provided with 5 above-ground storeys. These structures will be provided with one basement level.

It is anticipated that the pavilion structure will be provided with one basement level of underground parking, which will be partially at exterior grade, and 2 above-ground storeys. It is further expected that associated paved access lanes, vehicle parking areas, an ambulance parking garage, retaining walls and landscaped areas will surround the proposed structure. It is anticipated that the proposed building will be municipally serviced and that previous structures located throughout the building footprint have been recently demolished.

# 3.0 METHOD OF INVESTIGATION

## 3.1 Field Investigation

### Field Program

The field program for the geotechnical investigation was completed by others in between March 20 and May 8, 2023, and May 5 and June 11, 2021. At that time, a total of 76 boreholes were advanced throughout the subject site to a maximum depth of 34.2 m below existing ground surface. Additional historic boreholes were drilled during previous investigations. Relevant borehole information can be found in Appendix 2. The borehole locations are shown on Drawing PG6982-1 - Test Hole Location Plan included in Appendix 2.

A supplementary geotechnical investigation was completed by Paterson between July 8 and July 17, 2025. At that time, a total of 8 boreholes were advanced throughout the subject site to a maximum depth of 29.31 m below existing ground surface.

The subsurface profiles and laboratory testing results completed by others are presented on the Test Hole Logs by Others and Laboratory Testing Results by Others provided in Appendix 1 of this report.

The subsurface profiles and laboratory testing results from the supplementary geotechnical investigation are presented on the Test Hole Logs and Laboratory Testing Results provided in Appendix 1 of this report.

### Sampling and In Situ Testing

Soil samples and rock cores were recovered by others during the field investigation as indicated on the Test Hole Logs by Others included in Appendix 1.

The Standard Penetration Test (SPT) was conducted in the boreholes at regular intervals. 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.

The overburden thickness was evaluated by a dynamic cone penetration test (DCPT) completed at test holes BH 21-201, BH 21-203, BH 21-204, BH 21-205A, BH 21-208, BH 21-209, BH 21-212 and BH 21-222.

The subsurface conditions were recorded by others and as indicated in the Test Hole Logs by Others included in Appendix 1.

### Groundwater

Monitoring wells were installed during the field investigation at 23 boreholes to permit monitoring of the groundwater levels subsequent to the completion of the sampling program.

### Monitoring Well Installation

Typical monitoring well construction details are described below:

- Slotted 32 mm diameter PVC screen at the base of each borehole.
- PVC riser pipe from the top of the screen to the ground surface.
- Silica sand backfill within annular space around screen.
- Bentonite hole plug directly above PVC slotted screen.
- Clean backfill from top of bentonite plug to the ground surface.

Refer to the Test Hole Logs by Others in Appendix 1 for specific well construction details.

### Packer Testing

Packer testing was completed in all the boreholes from the supplementary geotechnical investigation to determine the hydraulic conductivity of the bedrock. The packer testing was conducted by Marathon Underground Construction Corporation (Marathon) under the supervision of Paterson personnel. Packer testing was completed by deploying inflatable packers downhole to isolate two (2) to four (4) ~2.7 m intervals throughout the bedrock profile. Water was injected at each testing interval at a rate which allowed for a desired pressure to be achieved. Each complete packer test involved pressurizing/depressurizing the testing interval at 5 psi steps for a duration of five (5) minutes or until the flow steadied. The flow rate required to maintain the desired pressure for each step was monitored and recorded. The results from the packer testing were used to calculate the hydraulic conductivity at each testing interval. The results of the testing are discussed in Subsection 4.2 and are provided in Appendix 1.

## 3.2 Field Survey

The test hole locations and ground surface elevation at each test hole location were surveyed by others using a GPS unit and referenced to a geodetic datum. The location of the test holes and ground surface elevation at each test hole location are presented on Drawing PG6982-1 - Test Hole Location Plan in Appendix 2.

# 4.0 OBSERVATIONS

## 4.1 Surface Conditions

The subject site is currently undeveloped and generally vacant. Construction (Advance Work) had started on site at the time of Paterson's investigation; the site was noted to have been significantly excavated down. Furthermore, it is understood that a previously existing building located throughout the central portion of the subject site has been recently demolished. Furthermore, piles of fill material have been observed throughout the subject site.

The subject site is bordered by Carling Avenue to the north, Trillium rail corridor to the east, Prince of Wales Drive to the south and Maple Drive followed by governmental buildings to the west. In addition to the observed fill piles, the ground surface across the subject site generally presents a slight downslope towards the northeast.

## 4.2 Subsurface Profile

### Overburden

Generally, the subsurface profile encountered at the test hole locations consists of topsoil and fill material underlain by silty clay, silty sand and/or glacial till deposits.

The fill material consisted of silty clay and/or silty sand, with varying amounts of gravel, cobbles, boulders, organics, brick, concrete and other debris. Based on our review of the soil profiles encountered by others, variable amounts of fill are expected to be encountered throughout the building footprint excavation. In particular, approximately 7 to 9.6 m thick layer of fill is expected to be encountered throughout the northern portion of Tower A and an approximately 5 to 8 m thick layer of fill material is expected to be encountered throughout the pavilion and associated parking structure footprints.

A discontinuous silty sand layer was encountered throughout the subject site and extended to a maximum depth of 7.3 m below the existing ground surface throughout the southeast boundary of the pavilion structure footprint. Further, localized concentrations of subsurface gas were recorded by others at BH 21-206 and BH 21-213 within the silty sand and silty sand portion of the glacial till deposit at a depth of 9.9 and 11.59 m below ground surface, respectively.

The silty clay consisted of a brown weathered silty clay layer which transitioned to an unweathered grey silty clay. The silty clay deposit was observed to a maximum depth of 10.8 m below existing ground level and mostly throughout the north portion of Tower A.

The silty sand and silty clay layers were underlain by a loose to dense glacial till deposit consisting of silty sand with variable amounts of gravel, cobbles and boulders. Localized zones comprising of a silty clay matrix were also encountered within the glacial till deposit.

Reference should be made to the Test Hole Logs by Others in Appendix 1 for details of the soil profile encountered at each borehole location.

### Grain Size Distribution and Hydrometer Testing Results

Grain size distribution (sieve and hydrometer analysis) was completed by others on fifty (50) selected soil samples. The results of the grain size analysis are summarized in Table 4.2-1 and are presented on the Laboratory Testing Results by Others in Appendix 1.

Grain size distribution (sieve analysis) was completed as part of the supplemental geotechnical investigation on seven (7) selected soil samples. The results of the grain size analysis are summarized in Table 4.2-1 and are presented on the Laboratory Testing Results in Appendix 1.

Table 4.2-1: Summary of Grain Size Distribution Analysis

| Borehole | Sample | Depth (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|
| BH 21-213 | 2 | 1.07 | 41 | 44 | 15 | |
| BH 21-217 | 4 | 2.60 | 0 | 9 | 49 | 42 |
| BH 21-205 | 3 | 1.82 | 0 | 2 | 39 | 59 |
| BH 21-212 | 4 | 2.60 | 0 | 1 | 31 | 68 |
| BH 21-221 | 5 | 3.36 | 0 | 2 | 33 | 65 |
| BH21-226 | 5 | 3.36 | 0 | 1 | 43 | 56 |
| BH 22-111 | 3 | 1.83 | 0 | 2 | 30 | 68 |
| BH 22-111 | 4 | 2.60 | 9 | 41 | 50 | |
| BH 22-112 | 4 | 2.60 | 9 | 41 | 37 | 13 |
| BH 23-101 | 11 | 9.45 | 0 | 1 | 99 | |
| BH 23-145 | 5 | 3.36 | 0 | 2 | 98 | |
| BH 21-103 | 2 | 1.21 | 20 | 49 | 31 | |
| BH 21-107 | 2 | 1.21 | 30 | 41 | 29 | |
| BH 21-201 | 2 | 1.07 | 8 | 54 | 38 | |
| BH 21-208 | 5 | 3.36 | 14 | 38 | 35 | 13 |
| BH 21-208 | 9 | 6.41 | 15 | 52 | 33 | |
| BH 21-210 | 5 | 3.36 | 28 | 24 | 30 | 18 |
| BH 21-210 | 9 | 6.48 | 19 | 50 | 31 | |
| BH 21-212 | 10 | 7.17 | 12 | 54 | 34 | |
| BH 21-216 | 13 | 9.45 | 17 | 50 | 33 | |
| BH 21-216 | 6 | 4.12 | 10 | 45 | 41 | 4 |
| BH 21-216 | 7 | 4.88 | 12 | 44 | 44 | |
| BH 21-217 | 10 | 7.17 | 22 | 42 | 35 | |
| BH 21-218 | 10 | 7.17 | 9 | 50 | 26 | 15 |
| BH 21-218 | 15 | 10.98 | 16 | 55 | 29 | |
| BH 21-221 | 11 | 8.69 | 10 | 53 | 29 | 8 |
| BH 21-221 | 12 | 9.45 | 15 | 50 | 35 | |
| BH 21-221 | 14 | 9.45 | 13 | 54 | 26 | 7 |
| BH 21-221 | 15B | 11.89 | 51 | 38 | 11 | |
| BH 21-222 | 14 | 10.22 | 24 | 42 | 28 | 6 |
| BH 21-226 | 8 | 5.64 | 16 | 43 | 41 | |
| BH 22-109 | 5 | 3.36 | 23 | 47 | 30 | |
| BH 22-110 | 6 | 4.12 | 12 | 54 | 34 | |
| BH 22-113 | 6 | 4.12 | 25 | 46 | 29 | |
| BH 23-101 | 13 | 11.76 | 18 | 49 | 24 | 9 |
| BH 23-103 | 11 | 7.93 | 24 | 43 | 33 | |
| BH 23-105 | 4 | 2.60 | 15 | 52 | 33 | |
| BH 23-105 | 10 | 7.17 | 26 | 49 | 25 | |
| BH 23-111 | 5 | 3.36 | 23 | 42 | 26 | 9 |
| BH 23-111 | 13 | 9.45 | 15 | 51 | 24 | 10 |
| BH 23-114 | 6 | 4.12 | 17 | 50 | 33 | |
| BH 23-114 | 19 | 14.03 | 35 | 56 | 9 | |
| BH 23-117 | 8 | 5.56 | 13 | 53 | 24 | 10 |
| BH 23-117 | 19 | 14.79 | 21 | 46 | 31 | 2 |
| BH 23-122 | 5 | 3.36 | 8 | 44 | 48 | |
| BH 23-122 | 15 | 10.89 | 32 | 45 | 23 | |

| Borehole | Sample | Depth (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|
| BH 23-124 | 5 | 3.36 | 13 | 53 | 34 | |
| BH 23-124 | 13 | 9.45 | 26 | 32 | 42 | |
| BH 23-125 | 5 | 4.12 | 13 | 52 | 25 | 10 |
| BH 23-125 | 24 | 23.13 | 12 | 49 | 27 | 12 |
| BH 23-133 | 4 | 2.60 | 12 | 53 | 35 | |
| BH 23-137 | 9 | 6.41 | 12 | 52 | 36 | |
| BH 23-138 | 7 | 4.88 | 20 | 48 | 32 | |
| BH 23-138 | 10 | 7.17 | 16 | 48 | 36 | |
| BH 23-145 | 10 | 7.17 | 9 | 44 | 34 | 13 |
| BH 23-146 | 5 | 3.36 | 14 | 54 | 32 | |
| BH 23-146 | 17 | 12.50 | 20 | 50 | 30 | |
| BH 23-153 | 6 | 4.12 | 19 | 49 | 32 | |
| BH 23-153 | 22 | 22.15 | 12 | 76 | 10 | 2 |
| BH 23-154 | 2 | 1.07 | 13 | 52 | 35 | |
| BH 23-154 | 7 | 4.88 | 14 | 50 | 24 | 12 |
| BH 23-158 | 6 | 4.12 | 19 | 47 | 34 | |
| BH 23-158 | 27 | 15.60 | 32 | 43 | 17 | 8 |
| BH 21-201 | 13 | 9.45 | 53 | 38 | 9 | |
| BH 22-110 | 3 | 1.83 | 44 | 37 | 19 | |
| BH 21-205 | 9 | 6.41 | 16 | 49 | 35 | |
| BH 21-205 | 16 | 11.74 | 13 | 70 | 17 | |
| BH 23-137 | 18 | 13.26 | 55 | 40 | 5 | |
| BH 23-103 | 14A | 10.12 | 13 | 77 | 10 | |
| BH 23-133 | 14A | 10.14 | 2 | 89 | 9 | |
| BH 11-25 | SS6 | 3.8-4.4 | 20.6. | 46.2 | 33.2 | |
| BH 12-25 | SS9 | 6.1-6.7 | 29.9 | 43.5 | 26.6 | |
| BH13-25 | SS3 | 1.5-2.1 | 23.8 | 46.4 | 29.8 | |
| BH14-25 | SS8 | 5.3-5.9 | 25.9 | 43.3 | 30.8 | |
| BH 15-25 | SS4 and SS5 | 2.3-3.7 | 57.7 | 35.5 | 6.8 | |
| BH16-25 | SS11 | 7.6-8.2 | 37.4 | 36.2 | 26.4 | |
| BH17-25 | SS8 | 5.3-5.9 | 15.7 | 42.9 | 41.4 | |

## Atterberg Limit Testing Results

Atterberg limits testing was completed by others on ten (10) silty clay samples. The results of the Atterberg limits are summarized in Table 4.2-2 and on the Laboratory Testing Results by Others in Appendix 1.

Table 4.2-2: Atterberg Limits Results

| Borehole | Sample | Depth (m) | LL (%) | PL (%) | PI (%) | Classification |
|---|---|---|---|---|---|---|
| BH 21-208 | 4 | 2.60 | 61 | 24 | 37 | CH |
| BH 21-212 | 4 | 2.60 | 79 | 26 | 53 | CH |
| BH 21-216 | 3 | 1.85 | 24 | 15 | 9 | CL |
| BH 21-221 | 5 | 3.35 | 87 | 24 | 63 | CH |
| BH 21-221 | 9 | 6.45 | 51 | 23 | 28 | CH |
| BH 22-111 | 3 | 1.85 | 66 | 24 | 42 | CH |
| BH 22-111 | 4 | 2.60 | 21 | 13 | 8 | CL |
| BH 22-112 | 2 | 1.05 | 51 | 20 | 31 | CH |
| BH 22-112 | 4 | 2.60 | 7 | 2 | 5 | CI-ML |
| BH 21-210 | 5 | 3.35 | 16 | 12 | 4 | ML |

| Borehole | Sample | Depth (m) | LL (%) | PL (%) | PI (%) | Classification |
|---|---|---|---|---|---|---|

Notes: LL: Liquid Limit; PL: Plastic Limit; PI: Plastic Index; CH: Inorganic Clay of High Plasticity; CL: Inorganic Clay of Low Plasticity; ML: Inorganic Silt of Low Plasticity; MH: Inorganic Silts of High Plasticity

## Bedrock

Bedrock was cored at several locations throughout the subject site at depths ranging between 1.7 and 17.09 m below ground surface. The bedrock generally consisted of fair to good quality limestone or limestone interbedded with shale.

Based on available geological mapping, the subject site is located in an area where the bedrock consists of Paleozoic limestone of the Bobcaygeon Formation and Paleozoic limestone with interbedded shale of the Verulam formation, with an overburden drift thickness ranging between 0 and 15 m depth.

## Unconfined Compressive Strength Testing of Bedrock Core Samples

Seventeen (17) bedrock cores were tested by others and six (6) bedrock cores were tested as part of the supplemental geotechnical investigation for unconfined compressive strength of the bedrock specimens. All samples submitted for unconfined compressive strength testing consisted of grey limestone bedrock and are summarized in Table 4.2-3 below and on the Laboratory Testing Results by Others and Laboratory Testing Results in Appendix 1.

Table 4.2-3: Summary of Unconfined Bedrock Compressive Strength Testing Results

| Borehole | Sample | Test Core Depth (m) | Bedrock Surface Elevation (m) | Test Core Elevation (m) | Unconfined Compressive Strength (MPa) |
|---|---|---|---|---|---|
| BH 21-207 | RC1 | 14.3 | 68.1 | 65.96 | 74 |
| BH 21-213 | RC1 | 13.8 | 63.9 | 62.31 | 157 |
| BH 21-214 | RC1 | 10.9 | 67.6 | 64.93 | 59 |
| BH 21-219 | RC1 | 12.0 | 68.6 | 67.40 | 62 |
| BH 21-221 | RC1 | 14.8 | 61.2 | 59.79 | 152 |
| BH 23-145 | RC1 | 8.6 | 65.3 | 65.13 | 154 |
| BH 23-148 | RC1 | 11.8 | 64.4 | 63.19 | 55 |
| BH 23-125 | RC1 | 26.8 | 55.8 | 54.35 | 72 |
| BH 23-117 | RC1 | 25.3 | 57.0 | 55.63 | 49 |
| BH 23-111 | RC1 | 13.0 | 66.4 | 66.33 | 22 |
| BH 23-137 | RC1 | 15.7 | 64.5 | 63.67 | 103 |
| BH 23-114 | RC1 | 16.6 | 64.2 | 64.00 | 111 |
| BH 23-133 | RC1 | 11.7 | 66.1 | 65.5 | 103 |
| BH 23-154 | RC1 | 6.2 | 76.7 | 76.55 | 124 |
| BH 23-155 | RC1 | 8.1 | 82.1 | 74.21 | 202 |
| BH 23-158 | RC1 | 26.9 | 60.3 | 55.94 | 57 |
| BH 23-159 | RC1 | 22.4 | 65.8 | 63.52 | 85 |
| BH11-25 | RC5 | 10.6 | 64.32 | 63.72 | 74.6 |
| BH12-25 | RC7 | 20.2 | 59.99 | 56.88 | 39.5 |
| BH13-25 | RC2 | 8.7 | 68.62 | 67.97 | 43.5 |
| BH14-25 | RC3 | 10.6 | 68.09 | 65.92 | 77.7 |
| BH15-25 | RC4 | 20.2 | 66.89 | 56.25 | 69.9 |
| BH16-25 | RC5 | 14.0 | 62.40 | 61.51 | 85.9 |

## Packer Testing

The packer testing results are summarized in Table 4.2-4 below.

Table 4.2-4: Summary of Packer Testing Results

| BH No. | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) |
|---|---|---|---|---|---|---|---|---|
| EL. | 63.03-60.24 | | 60.13-57.34 | | 57.09-54.29 | | 55.87-52.13 | |
| BH11-25 | 15 | 3.66089E-06 | 15 | 1.77278E-06 | 15 | 4.74185E-07 | 20 | 1.78067E-06 |
| | 20 | 3.36349E-06 | 20 | 1.71732E-06 | 20 | 1.79716E-06 | 25 | 2.43058E-06 |
| | 25 | 3.12902E-06 | 25 | 1.6788E-06 | 25 | 1.7042E-06 | 30 | 1.62376E-06 |
| | 20 | 3.23159E-06 | 20 | 1.68429E-06 | 20 | 1.64877E-06 | 25 | 1.56451E-06 |
| | 15 | 3.29883E-06 | 15 | 1.65191E-06 | 15 | 1.72987E-06 | 20 | 1.66526E-06 |
| Avg | 3.34E-06 | | 1.70E-06 | | 1.47E-06 | | 1.81E-06 | |
| EL. | 58.06-55.27 | | 59.862-57.068 | | 52.471-47.645 | | 55.265-52.471 | |
| BH12-25 | 25 | 8.05E-08 | 20 | 3.24E-06 | 35 | 0.00E+00 | 30 | 1.14E-06 |
| | 30 | 1.64E-07 | 25 | 3.03E-06 | 40 | 0.00E+00 | 35 | 7.88E-07 |
| | 35 | 1.87E-07 | 30 | 2.88E-06 | 45 | 0.00E+00 | 40 | 7.08E-07 |
| | 30 | 1.64E-07 | 25 | 2.98E-06 | 41 | 0.00E+00 | 35 | 7.88E-07 |
| | 25 | 1.61E-07 | 20 | 3.18E-06 | 35 | 0.00E+00 | 30 | 8.89E-07 |
| Avg | 1.51E-07 | | 3.06E-06 | | 0.00E+00 | | 8.63E-07 | |
| EL. | 68.62-65.83 | | 65.83-63.03 | | 62.423-59.629 | | 59.019-55.082 | |
| BH13-25 | 11 | 8.47405E-08 | 15 | 1.75404E-06 | 20 | 3.9733E-05 | 26 | 3.34356E-06 |
| | 15 | 7.14924E-07 | 20 | 1.64423E-06 | 25 | 2.54184E-05 | 30 | 3.0422E-06 |
| | 20 | 7.77467E-07 | 25 | 1.64446E-06 | 30 | 2.12729E-05 | 35 | 2.84896E-06 |
| | 15 | 7.5067E-07 | 20 | 1.70402E-06 | 25 | 2.27455E-05 | 31 | 2.88107E-06 |
| | 11 | 8.05034E-07 | 15 | 1.78686E-06 | 20 | 2.49687E-05 | 24 | 3.04108E-06 |
| Avg | 6.27E-07 | | 1.71E-06 | | 2.68E-05 | | 3.03E-06 | |
| EL. | 68.12-65.32 | | 65.32-62.53 | | 62.53-59.73 | | 59.73-55.79 | |
| BH14-25 | 10 | 1.46E-06 | 15 | 1.44037E-05 | 20 | 8.52405E-07 | 25 | 0 |
| | 15 | 1.61E-06 | 20 | 8.11255E-06 | 25 | 8.60955E-07 | 30 | 0 |
| | 20 | 1.59E-06 | 25 | 5.41895E-06 | 30 | 8.45182E-07 | 35 | 1.55109E-08 |
| | 15 | 1.37E-06 | 20 | 4.43839E-06 | 25 | 8.86277E-07 | 30 | 1.73979E-08 |
| | 10 | 1.04E-06 | 15 | 3.81764E-06 | 20 | 8.81799E-07 | 25 | 1.98075E-08 |
| Avg | 1.41E-06 | | 7.24E-06 | | 8.65E-07 | | 1.05E-08 | |
| EL. | 65.89-63.45 | | 62.89-59.89 | | 59.89-56.89 | | 56.89-54.49 | |
| BH15-25 | 5 | 0 | 5 | 0 | 5 | 6.39757E-07 | 5 | 0 |
| | 10 | 0 | 10 | 0 | 10 | 1.07837E-06 | 10 | 7.00323E-08 |
| | 15 | 0 | 15 | 0 | 15 | 1.15855E-06 | 15 | 1.04177E-07 |
| | 10 | 0 | 10 | 0 | 20 | 7.0942E-07 | 10 | 2.10097E-07 |
| | 5 | 0 | 5 | 0 | 5 | 1.64509E-06 | 5 | 3.20508E-07 |
| Avg | 0.00E+00 | | 0.00E+00 | | 1.05E-06 | | 1.41E-07 | |
| EL. | 61.49-58.70 | | 58.45-55.65 | | 55.40-52.60 | | 53.645-50.85 | |
| BH16-25 | 16 | 2.86E-06 | 20 | 0 | 25 | 0 | 26 | 0 |
| | 20 | 2.32E-06 | 25 | 0 | 30 | 0 | 30 | 0 |
| | 26 | 0.00E+00 | 30 | 0 | 35 | 0 | 35 | 0 |
| | 20 | 3.32E-08 | 25 | 0 | 30 | 0 | 30 | 0 |

| BH No. | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) | Gauge Pressure (PSI) | Hydraulic Conductivity (m/sec) |
|---|---|---|---|---|---|---|---|---|
| | 15 | 0.00E+00 | 20 | 0 | 25 | 0 | 25 | 0 |
| Avg | 1.04E-06 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | |
| EL. | 67.911-65.117 | | 62.549-59.755 | | 59.018-55.902 | | | |
| BH17-25 | 6 | 0 | 10 | 0 | 15 | 3.52882E-07 | | |
| | 10 | 0 | 15 | 0 | 20 | 1.32671E-06 | | |
| | 15 | 0 | 20 | 0 | 26 | 1.14927E-06 | | |
| | 10 | 6.08415E-08 | 15 | 0 | 20 | 1.23058E-06 | | |
| | 7 | 0 | 10 | 0 | 15 | 1.36959E-06 | | |
| Avg | 1.22E-08 | | 0.00E+00 | | 1.09E-06 | | | |
| EL. | 65.05-63.47 | | 63.47-61.90 | | 62.48-59.69 | | 56.39-53.59 | |
| BH18-25 | 20 | 0 | 25 | 0 | 16 | 4.27158E-06 | 15 | 3.69973E-06 |
| | 25 | 0 | 30 | 0 | 20 | 3.45908E-06 | 20 | 3.45702E-06 |
| | 30 | 0 | 35 | 0 | 26 | 0 | 25 | 3.31795E-06 |
| | 25 | 0 | 30 | 0 | 20 | 4.94155E-08 | 20 | 3.49059E-06 |
| | 20 | 0 | 25 | 0 | 15 | 0 | 15 | 3.69973E-06 |
| Avg | 0.00E+00 | | 0.00E+00 | | 1.56E-06 | | 3.53E-06 | |

Hydraulic conductivity testing of the bedrock conducted in the bedrock ranged from 0 to 7.24 x 10-6 m/sec.

## 4.3 Groundwater

Groundwater levels were measured by Paterson and others, which are presented in Table 4.3-1, 4.3-2 and 4.3-3 below and in Test Hole Logs presented in Appendix 1. Reference should also be made to Drawing PG6982-2 - Groundwater Contour Plan in Appendix 2 which summarizes groundwater levels encountered throughout the subject site based on the information provided in Table 4.3-1 and 4.3-2 below. Groundwater levels are subject to seasonal fluctuations. Therefore, levels could differ at the time of construction.

Table 4.3-1: Summary of Groundwater Levels by Paterson

| Borehole Number | Observation Method | Ground Surface Elevation (m) | Measured Groundwater Level | | Date Recorded |
|---|---|---|---|---|---|
| | | | Depth (m) | Elevation (m) | |
| BH 11-25 | Monitoring Well | 77.05 | 5.41 | 71.64 | July 25, 2025 |
| BH 12-25 | Monitoring Well | 77.08 | 6.35 | 70.73 | July 25, 2025 |
| BH 13-25 | Monitoring Well | 76.67 | 7.41 | 69.26 | July 25, 2025 |
| BH 14-25 | Monitoring Well | 76.52 | 7.77 | 68.75 | July 25, 2025 |
| BH 15-25 | Monitoring Well | 76.49 | - | - | July 25, 2025 |
| BH 17-25 | Monitoring Well | 73.37 | 3.52 | 69.85 | July 25, 2025 |
| BH 18-25 | Monitoring Well | 76.50 | 5.07 | 71.43 | July 25, 2025 |

**Note:** The ground surface elevation at each borehole location was surveyed using a handheld GPS and referenced to a geodetic datum.

Table 4.3-2: Summary of Groundwater Levels By Others

| Borehole Number | Observation Method | Ground Surface Elevation (m) | Measured Groundwater Level | | Date Recorded |
|---|---|---|---|---|---|
| | | | Depth (m) | Elevation (m) | |
| BH 23-103 | Piezometer | 74.90 | 2.0 | 72.9 | May 11, 2023 |
| BH 23-109 | Piezometer | 79.3 | 5.5 | 73.8 | May 11, 2023 |
| | | | | | May 12, 2023 |
| BH 23-114 | Piezometer | 80.60 | 3.7 | 76.9 | May 11, 2023 |
| | | | | | May 12, 2023 |
| BH 23-117 | Piezometer | 80.93 | 5.7 | 75.2 | May 11, 2023 |
| | | | | | May 12, 2023 |
| BH 23-137 | Piezometer | 79.54 | 6.6 | 73.0 | May 11, 2023 |
| | | | | | May 12, 2023 |
| BH 23-146 | Piezometer | 81.09 | 6.9 | 74.2 | May 11, 2023 |
| | | | 8.5 | 72.6 | May 15, 2023 |
| BH 23-153 | Piezometer | 82.29 | 5.3 | 77.0 | May 11, 2023 |
| | | | | | May 12, 2023 |
| BH 23-154 | Piezometer | 82.75 | 5.5 | 77.3 | May 11, 2023 |
| | | | | | May 12, 2023 |
| BH 22-303 | Piezometer | 80.57 | 4.1 | 76.5 | May 9, 2022 |
| BH21-201 | Piezometer | 82.46 | 6.5 | 76.0 | June 18, 2021 |
| | | | 6.5 | 76.0 | June 24, 2021 |
| BH21-202 | Piezometer | 81.20 | 5.2 | 76.0 | June 9, 2021 |
| | | | 5.3 | 75.9 | June 18, 2021 |
| BH21-204 | Piezometer | 81.09 | 5.2 | 75.9 | June 18, 2021 |
| | | | 5.2 | 75.9 | June 24, 2021 |
| BH21-213 | Piezometer | 76.11 | 0.7 | 75.4 | June 9, 2021 |
| BH21-215 | Piezometer | 72.79 | 2.4 | 70.4 | June 9, 2021 |
| BH21-218 | Piezometer | 78.54 | 5.8 | 72.7 | May 27, 2021 |
| | | | 6.0 | 72.5 | June 9, 2021 |
| BH21-219 | Piezometer | 79.40 | 2.8 | 76.6 | May 28, 2021 |
| | | | 2.9 | 76.5 | June 9, 2021 |
| BH21-221 (shallow) | Piezometer | 74.59 | 1.4 | 73.2 | May 28, 2021 |
| | | | 1.4 | 73.2 | June 9, 2021 |
| BH21-221 (deep) | | | 2.3 | 72.3 | May 28, 2021 |
| | | | 2.4 | 72.2 | June 9, 2021 |
| BH21-222 (shallow) | Piezometer | 78.83 | 6.4 | 72.4 | May 21, 2021 |
| | | | 6.5 | 72.3 | June 9, 2021 |
| BH21-222 (deep) | | | 5.7 | 73.2 | May 21, 2021 |
| | | | 6.8 | 72.0 | June 9, 2021 |
| BH21-224 | Piezometer | 78.90 | 6.3 | 72.6 | May 29, 2021 |
| | | | 6.5 | 72.4 | June 9, 2021 |
| BH21-225 | Piezometer | 75.21 | 3.5 | 71.7 | May 28, 2021 |
| | | | 3.6 | 71.6 | June 9, 2021 |
| BH21-226 | Piezometer | 76.25 | 2.8 | 72.5 | May 28, 2021 |
| | | | 3.0 | 72.3 | June 9, 2021 |

| Borehole Number | Observation Method | Ground Surface Elevation (m) | Measured Groundwater Level | | Date Recorded |
|---|---|---|---|---|---|
| | | | Depth (m) | Elevation (m) | |

**Note:** The ground surface elevation at each borehole location was surveyed using a handheld GPS and referenced to a geodetic datum.

Table 4.3-3: Summary of Groundwater Levels (Historical Investigation)

| Borehole Number | Observation Method | Ground Surface Elevation (m) | Measured Groundwater Level | | Date Recorded |
|---|---|---|---|---|---|
| | | | Depth (m) | Elevation (m) | |
| MW 20-15 | Monitoring Well | 79.71 | 5.9 | 73.8 | February 12, 2020 |
| MW 20-16 | Monitoring Well | 79.55 | 6.1 | 73.5 | February 12, 2020 |
| MW 20-17 | Monitoring Well | 78.67 | 2.9 | 75.8 | February 12, 2020 |
| MW 20-18 | Monitoring Well | 75.04 | 6.9 | 68.1 | February 12, 2020 |
| MW 17-04 | Monitoring Well | 85.13 | 1.6 | 83.5 | August 3, 2017 |
| MW 17-05 | Monitoring Well | - | 3.4 | - | August 3, 2017 |
| MW 17-06 | Monitoring Well | - | Dry | - | August 3, 2017 |
| MW 17-07 | Monitoring Well | - | 4.6 | - | August 3, 2017 |
| MW 17-08 | Monitoring Well | - | 5.2 | - | August 3, 2017 |
| MW 17-09 | Monitoring Well | - | 2.2 | - | August 3, 2017 |
| MW 17-10 | Monitoring Well | - | 2.8 | - | August 3, 2017 |
| MW 16-1A | Monitoring Well | 78.05 | 9.3 | 68.8 | March 16, 2017 |
| MW 16-3 | Monitoring Well | 77.34 | 5.3 | 72.1 | March 16, 2017 |
| MW 16-5 | Monitoring Well | 77.89 | 3.7 | 74.1 | March 16, 2017 |
| MW 16-6 | Monitoring Well | - | 2.5 | - | March 16, 2017 |
| MW 16-7 | Monitoring Well | 75.35 | 4.8 | 70.6 | March 16, 2017 |
| MW 16-7A | Monitoring Well | 75.19 | 5.1 | 70.1 | August 8, 2017 |
| MW 16-8 | Monitoring Well | 74.87 | 5.3 | 69.6 | August 8, 2017 |
| MW 16-9 | Monitoring Well | 73.79 | 5.2 | 68.6 | August 8, 2017 |
| MW 16-14 | Monitoring Well | 79.51 | 7.2 | 72.3 | August 8, 2017 |
| BH 1 | Piezometer | - | 2.7 | - | August 8, 2017 |
| BH 2 | Piezometer | - | 1.9 | - | August 9, 2017 |
| BH 3 | Piezometer | - | 4.0 | - | August 9, 2017 |
| BH 4A | Piezometer | - | 2.1 | - | August 8, 2017 |
| BH 5 | Piezometer | - | 4.4 | - | August 8, 2017 |
| BH 6 | Piezometer | - | 3.5 | - | August 8, 2017 |
| BH 8 | Piezometer | - | 4.5 | - | August 8, 2017 |
| BH 10 | Piezometer | - | 3.9 | - | August 8, 2017 |

**Note:** The ground surface elevation at each borehole location was surveyed using a handheld GPS and referenced to a geodetic datum.

# 5.0 DISCUSSION

## 5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered satisfactory for the proposed development. Based on our review of updated structural loading, the proposed buildings are recommended to be founded using using a mixture of conventional footing and mat footing extending to a bedrock bearing and/or deep pile foundation.

It is expected that the ground surface will need to be lowered throughout the subject site to attain the desired final grades, including retaining walls and construction of slopes. It is recommended that grade raise fill is placed in accordance with the recommendations provided in Subsection 5.2 where required.

It is expected that removal of the entire overburden will be required to reach a bedrock bearing surface for a large portion of the site. Footings in those areas are to be placed on a lean concrete infilled pad as described under Subsection 5.2.

Based on the current drawings, it is expected that bedrock removal will be required for portions of the proposed structure. Line drilling and controlled blasting could be used where large quantities of bedrock are needed to be removed. The blasting operations should be planned and conducted under the guidance of a professional engineer with experience in blasting operations. Existing foundation walls and other construction debris should be entirely removed from within the building perimeters. Under paved areas, existing construction remnants such as foundation walls should be excavated to a minimum of 1 m below final grade.

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

## 5.2 Site Grading and Preparation

### Stripping Depth

Topsoil and deleterious fill, such as those containing significant organic materials, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures. Existing foundation walls and other construction debris should be entirely removed from within the building perimeters. Under paved areas, existing construction remnants such as foundation walls should be excavated to a minimum of 1 m below final grade.

It is recommended that in-situ silty clay be removed from below the building footprint, where encountered at USF. It is recommended that weathered bedrock surface be removed to expose a sound bedrock surface, which should be inspected and approved by Paterson.

### Bedrock Removal

It is anticipated bedrock removal will be required to undertake the earthworks program. It is expected that line-drilling in conjunction with hoe-ramming and controlled blasting will be required to remove the bedrock. In areas of weathered bedrock and where only a small quantity of bedrock is to be removed, bedrock removal may be possible by hoe-ramming.

Prior to considering blasting operations, the effects on the existing services, buildings and other structures should be addressed. A pre-blast or construction survey located in proximity of the blasting operations should be conducted prior to commencing construction. The extent of the survey should be determined by the blasting consultant and sufficient to respond to any inquiries/claims related to the blasting operations.

As a general guideline, peak particle velocity (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing structures.

The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is an experienced blasting consultant.

## Vibration Considerations

Construction operations could cause vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels as much as possible should be incorporated in the construction operations to maintain a cooperative environment with the residents.

The following construction equipment could cause vibrations: piling equipment, hoe ram, compactor, dozer, crane, truck traffic, etc. The construction of a shoring system with soldier piles or sheet piling will require these pieces of equipment. Vibrations, caused by blasting or construction operations could cause detrimental vibrations on the adjoining buildings and structures. Therefore, it is recommended that all vibrations be limited.

Two parameters determine the recommended vibration limit, the maximum peak particle velocity and the frequency. For low frequency vibrations, USBM recommends the maximum allowable peak particle velocity to be less than that for high frequency vibrations. As a guideline put in place, the peak particle velocity should be less than 19 mm/s(for drywall construction) and 13 mm/ sec (for plaster construction) between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz). These guidelines are for current construction standards, see graph below.

Where heritage and sensitive buildings are located near the work area the peak velocity should be lowered to the DIN4150 standard for sensitive and historic structure. Where the peak particle velocity should be less than 3 mm/s between frequencies of 0 to 10 Hz, 3 to 8 mm/s for frequencies from 10 to 50 Hz and 8 to 10 mm/s for frequencies of 50 to 100 Hz.

These guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, a pre-construction survey is recommended to minimize the risks of claims during or following the construction of the proposed development in accordance with the City of Ottawa standards and guidelines associated with preconstruction surveys in advance of blasting and bedrock removal works.

All blasting operations should be in compliance with the City of Ottawa Special Provisions F-1201, which states that "During each blast, ground vibration PPV and the peak sound pressure level shall be monitored at the closest structure, or 100 m, from the blast or at the closest portion of any residence, utility, structure or facility within this radius". A detailed vibration monitoring plan should be completed for construction with all associated setbacks requirements.

## Overbreak in Bedrock

Sedimentary bedrock formation, such as limestone, dolomite and shale, contain bedding planes, joints and fractures, and mud seams which create natural planes of weakness within the rock mass. Although several factors of a blast may be controlled to reduce backbreak and overbreak, upon blasting, the rock mass will tend to break along natural planes of weakness that may be present beyond the designed blast profile. However, estimating the exact amount of backbreak and overbreak that may occur is not possible.

Small backbreak should be expected to occur by the contractor along the perimeter of the building excavation footprint with conventional drill and blast bedrock removal methods. Further, overbreak is expected to occur throughout the lowest vertical lifts of blasting due to the variable bedding planes and planes of weakness in the in-situ bedrock. It is very difficult to mitigate significant overblasting given the constraints posed by footing geometry and spacing with respect to the zone of influence of blasts and the bedrocks in-situ characteristics.

To reduce bedrock overbreak in areas where blasting is used to complete the excavation in bedrock, the blasting operations can be terminated approximately 200-300 mm higher than proposed USF elevation of the raft slab and locally lowered where required by hoe ramming, which will limit the bedrock over break to smaller areas with bedding planes, joints, fractures or mud seams and as such will result in significantly lower volume of granular backfill or lean concrete required to level the uneven bedrock bearing surfaces.

However, it is the responsibility of the excavation contractor to utilize the most suitable excavation methodology for excavation. Depending on the methodology undertaken by the contractor, efforts taken to minimize backbreak and overbreak may add significant time and costs to the excavation operations and is not guaranteed to completely eliminate the potential for backbreak and overbreak. Overbreak below footings should be in-filled with lean-concrete and approved by Paterson prior to placing concrete. It is expected the depth of overbreak will vary across the subject site and follow natural vertical seems in the rock.

If proper techniques for bedrock excavation are not considered by the contractor, this may result in additional materials, such as imported fill and concrete, to make up for additional rock loss. It is recommended that bedrock bearing surfaces be reviewed and approved by Paterson once the bedrock surface has attained the design founding elevation and should not be lowered to a deeper depth until reviewed and approved by Paterson at the time of construction.

It is recommended that the blasting operations be planned and conducted under the supervision of a licensed professional engineer who is an experienced blasting consultant.

### Fill Placement

Fill placed for grading beneath the building area should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The fill material should be tested and approved prior to delivery to the site. The fill should be placed in maximum 300 mm thick lifts and compacted to 98% of the material's standard Proctor maximum dry density (SPMDD).

Site-excavated soil can be placed as general landscaping fill where settlement is a minor concern of the ground surface. 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 placed to increase the subgrade level for areas to be paved, the fill should be compacted in maximum 300 mm thick lifts and to a minimum density of 95% of the respective SPMDD.

Non-specified existing fill and site-excavated soils are not suitable for placement as backfill against foundation walls due to the frost heave potential of the site excavated soils below settlement sensitive areas, such as concrete sidewalks and exterior concrete entrance areas.

If excavated rock is to be used as fill, it should be suitably fragmented to produce a well-graded material with a maximum particle size of 50 mm and meeting the gradation of an OPSS Granular B Type II crushed stone. Where the fill is open graded, a blinding layer of finer granular fill and/or a woven geotextile may be required to prevent adjacent finer materials from migrating into the voids, with associated loss of ground and settlements. This can be assessed at the time of construction. Site-generated blast rock fill should be compacted using a suitably sized smooth drum vibratory roller when considered for placement.

Fill used for grading beneath the base and subbase layers of paved areas should consist, unless otherwise specified, of clean imported granular fill, such as OPSS Granular A, Granular B Type II or select subgrade material. This material should be tested and approved prior to delivery to the site. The fill 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 paved areas should be compacted to at least 95% of its SPMDD.

Under winter conditions, if snow and ice is present within the blast rock fill below future basement slabs, then settlement of the fill should be expected and support of a future basement slab and/or temporary supports for slab pours will be negatively impacted and could undergo settlement during spring and summer time conditions.

Paterson personnel should complete periodic inspections during fill placement to ensure that snow and ice quantities are minimized. Providing a heat source during winter construction may be recommended should compacted fill material is intended to be exposed for long periods of time.

### Lean Concrete In-Filled

Where footings are designed to be supported on bedrock, and the bedrock is not encountered at the design underside of footing elevation, consideration should be given to excavating to expose the underlying bedrock surface and then backfilling with lean concrete (20 MPa 28-day compressive strength). Typically, the excavation sidewalls could be used as the form to support the concrete. The trench excavation should be at least 600 mm wider than all sides of the footing at the base of the excavation for the full capacity to be achievable.

The additional width of the concrete poured against an undisturbed trench sidewall will suffice in providing a direct transfer of the footing load to the underlying bedrock. The excavation bottom should be relatively clean using the hydraulic shovel. Once approved by Paterson's engineer, lean concrete can be poured up to the proposed founding elevation.

### Raft Slab Subgrade Preparation

A raft slab is expected to be used to resist hydrostatic pressures. It is recommended that a minimum 75 mm thick mud slab layer be placed over the prepared bearing medium once reviewed and approved by Paterson personnel. The purpose of the mud slab layer is to protect the approved founding subsoils from inclement weather, heavy truck traffic, worker traffic and other conditions that would adversely impact the bearing soils during the construction phase. It will also allow for clean installation of the waterproofing membrane. The mud slab concrete is recommended to consist of a minimum 20 MPA (28 compressive strength) concrete and should not be placed until the bearing medium has been reviewed and approved at the time of construction by Paterson personnel.

## 5.3 Foundation Design

Based on Paterson's review of the subsoil information attained during previous investigations, review of the building loads associated with the proposed structures and settlement analysis, it is recommended that foundation support for the proposed hospital complex (towers, podium and pavilion structures) consist of conventional footings bearing on bedrock and/or deep pile foundations.

### Conventional Spread and Pad Footings

Conventional spread and pad footing foundations placed on clean, surface-sounded limestone bedrock or on concrete in-filled/zero entry, vertical tranches extended to a clean, surface-sounded limestone bedrock, can be designed using a factored bearing resistance value at ultimate limit states (ULS) of 5,000 kPa, incorporating a geotechnical resistance factor of 0.5.

A clean, surface-sounded bedrock bearing surface should be free of loose materials, and have no near surface seams, voids, fissures, or open joints which can be detected from surface sounding with a rock hammer.

A friction factor of 0.65 can be used for cast concrete in place on the bedrock bearing surface.

Footings placed on concrete in-filled, zero entry, vertical tranches extended to the bedrock surface can be designed to a similar resistance value as the bedrock surface. It should be noted that the vertical trenches should extend horizontally to a minimum of 600 mm beyond the footing faces in all directions. A minimum of 20 MPa concrete (28-day strength) should be used below the proposed footings.

Ambulance Parking Garage

Based on our review of the current design drawings, the ambulance parking garage structure will be supported by conventional shallow spread footing foundations.

The ambulance parking garage is expected to be built on a compact to dense glacial till a bearing resistance value at serviceability limit states (SLS) of 200 kPa and ultimate limit states (ULS) at 350 kPa are considered acceptable for design.

An undisturbed soil bearing surface consists of one from which all loose, frozen or disturbed materials, whether in situ or not, have been removed, in the dry, prior to placement of concrete for foundations. It is expected that bedrock will be encountered at the proposed founding depth.

Parking Garage Tunnel

Based on available plan an exit tunnel is proposed to exit the lower level of the hospital under the parking garage. Currently the tunnel is proposed to be founded at an elevation of approximately 69.35 m. The tunnel can consist of a cast-in-place structure or a precast modular system waterproofed and placed on site.

Based on the proposed elevation it is possible that the tunnel would encounter thin layer of fill material. The fill material at that depth was generally compact, composed of silty sand with some construction debris. It is recommended that the fill material be sub-excavated 300 mm, the bearing surface should be proof rolled and reviewed by Paterson prior to installing a granular pad composed of OPSS Granular A or Granular B type II. The engineered fill should be placed in maximum lifts of 300 mm and compacted to 98% of the material's SPMDD. A bearing resistance value at serviceability limit states (SLS) of 100 kPa and ultimate limit states (ULS) at 200 kPa are considered acceptable for the design of the tunnel installed on an engineered fill pad.

Pedestrian Bridge

Paterson understands a pedestrian bridge will be provided to connect the proposed hospital complex (via the pavilion structure) and an associated parking garage structure located beyond the boundaries of the subject site.

Based on a preliminary review of subsoils that may be encountered throughout the footprint of the future pedestrian bridge, it is anticipated foundation support for the structure could consist of conventional spread footings founded upon in-situ native soils and/or engineered fill and bedrock.

Bearing resistance values for the design of bridge abutment footings at serviceability limit states (SLS) and ultimate limit states (ULS) at 200 kPa and 350 kPa, respectively, are considered acceptable for conventional spread footings supported on an engineered fill and/or native soil bearing surface.

As the bridge approaches the parking structure to the north it is anticipated that interference is to occur with the segmental retaining wall. It is recommended that the closest pier be installed directly onto rock or on deep foundation such as micropiles to avoid lateral loading on the retaining wall structures. Detailed geotechnical recommendations for the design and construction of micropiles have been provided in the following section.

A structural engineer should review the buckling potential, lateral capacity and other structural elements of the micropile design.

## Drilled Shafts and Caissons Design

Cast-in-place caissons can be used where supplemental axial resistance is required for structural design for the proposed buildings. The caisson should be installed by driving a temporary steel casing and excavating the soil through the casing. A minimum of 35 MPa concrete should be used to fill the caissons. The caissons are to be structurally reinforced over their entire length.

The following sections provide the required geotechnical parameters for the structural design of a rock socketed caisson extending into sound bedrock.

Caisson Compression Design

Since the caissons are anticipated to be rock socketed and the rock embedment prevents mobilizing the caissons within the overburden layer to develop skin friction resistance, skin friction in the overburden would be neglected. Therefore, a combination of end bearing and skin friction resistance within the rock socket can be recommended as the total compression capacity for caissons. Furthermore, a 3d (d = caisson diameter) center-to-center spacing is recommended to mitigate group effects.

Based on our review of the boreholes (completed by others) within the subject site, the upper 1.5 m of bedrock surface is considered weathered, and the associated socket resistance should be ignored. For a minimum socket of 1.5 m into sound bedrock, a shaft resistance of **1.2 MPa** at ULS is recommended.

A reduction factor of 0.9 should be applied to caisson spaced at 2d on center. Spacing of less than 2d is not recommended for constructability.

Additionally, an end bearing resistance of **1.5 MPa** at ULS can be considered for rock socketed caissons. It should be noted that this lower end bearing capacity assumes that the base of the casing cannot be properly inspected or cleaned. This end-bearing resistance is not affected by the caisson spacing.

Caisson Tension Design

The uplift resistance of a pile is a result of skin friction acting along the surface area of the embedded pile. For socket length into bedrock, the skin friction resistance should be reduced to **750 kPa**. The dead weight of the pile itself, with an appropriate resistance factor for dead weight, may also be added to the geotechnical resistance in calculating the total uplift resistance.

It should be noted that the uplift resistance of piles is highly dependent upon the installation of the piles as well as the layout of the pile groups. If the piles are relied upon to resist significant uplift loads, and uplift governs the design, consideration may be given to carrying out a tension test to confirm the uplift capacity.

Caisson Lateral Resistance Design

For lateral resistance of pile installed in a granular layer, the horizontal subgrade reaction ($k_h$) may be assumed to be:

$$k_h = \eta_h z \, ,$$

where:

$K_h$ = modulus of subgrade reaction (kN/m$^3$)
$\eta_h$ = coefficient based on soil type (use 4.4 MPa/m for glacial till, 3.0 MPa/m for sand, fill)
Z = depth below footing

Use a reduction factor of 1.0 up to a pile spacing of 6d and 0.25 for up to 3d. The reduction factors for other types of spacing may be interpolated from these linearly. It should be mentioned that, to attain full fixity within the rock socket for the purpose of lateral resistance, the caissons should be provided with a minimum socket length of 2d (d= caisson diameter) below the depth of weathered bedrock (i.e. 2d below 1.5 m below the rock surface).

## Driven Pile Foundation

It is understood that driven piles are considered to support the structure where bedrock is found to be greater depth. Pile driving in the dense bouldery till is expected to be complicated. The contractor should be ready to encounter and drill through boulders.

It is proposed to use concrete filled steel pipe piles driven to refusal on the bedrock surface. A driving shoe is to be used to help with the soil conditions on site.

The geotechnical pile resistance values were estimated using the Hiley dynamic formula, to be confirmed during pile installation with a program of dynamic testing. Diesel pile hammers were considered and an efficiency of 1.0 was considered for the calculations. Applicable pile resistance at SLS values and factored pile resistance at ULS values, along with the transferred hammer energy and the final set of blows, are given in Table 5.3-1. A resistance factor of 0.4 has been incorporated into the factored ULS values. Note that these are all geotechnical axial resistance values.

For this project, the dynamic testing of 10% of production piles would be recommended. This is considered to be the minimum monitoring program, as the piles under shear walls may be required to be driven using the maximum recommended driving energy to achieve the greatest factored resistance at ULS values. Re-striking of all piles at least once will also be required after at least 48 hours have elapsed since initial driving.

Table 5.3-1 - Pile Foundation Design Data

| Pile Outside Diameter (mm) | Pile Wall Thickness (mm) | Geotechnical Axial Resistance | | Final Set (blows/25 mm) | Transferred Hammer Energy (kJ) |
|---|---|---|---|---|---|
| | | SLS (kN) | Factored at ULS (kN) | | |
| 245 | 9 | 925 | 1,110 | 11 | 29 |
| 245 | 11 | 1,050 | 1,260 | 12 | 38 |
| 245 | 13 | 1,200 | 1,440 | 9 | 48 |
| 300 | 15 | 1,500 | 2,320 | 14 | 58 |
| 400 | 15 | 2,350 | 3,600 | 13 | 90 |
| 400 | 19 | 2,550 | 4,000 | 11 | 103 |

Drilled piles embedded at least 1.0 m into the bedrock would achieve similar capacities as presented in table 5.3-1. The design of these piles should be completed by the installer at the time of construction.

## Pile Uplift Resistance

The uplift resistance of a driven pile is taken as the combined skin friction acting on the exterior pile surface of the embedded portion of the pile. The unfactored skin resistance can be taken as:

$$q_s=\beta\sigma_v'$$

Where

$q_s$ is the unfactored skin resistance (in kPa)

$\beta$ is a shaft resistance factored according to the soil type ( $\beta$ = 0.8)

$\sigma'_v$ is the vertical effective stress at the depth z, taken as z $\gamma$ '

$\gamma$ ' is the effective unit weight of the soil, $\gamma$ ' = 9 KN/m$^3$

A resistance factor of 0.3 should be applied to the unfactored skin resistance to obtain the geotechnical uplift resistance. The self-weight of the pile, with an appropriate factor, can be added to the geotechnical resistance for the total uplift resistance.

The total uplift resistance of a pile group (resisting the same load and spacing of les than 5d) is less than the sum of the single resistance as calculated above. Uplift resistance of piles is highly dependent on the installation of the piles as well as the layout of the groups. If piles are to be heavily relied upon for uplift resistance, consideration should be given to completing tension testing or using reinforced micropiles to resist the uplift forces.

## Lateral Resistance Design

For lateral resistance of pile installed in a granular layer, the horizontal subgrade reaction ($k_h$) may be assumed to be:

$k_h = \eta_h z$, where:

$K_h$ = modulus of subgrade reaction ($kN/m^3$)
$\eta_h$ = coefficient based on soil type (use 4.4 MPa/m for glacial till, 3.0 MPa/m for sand, fill)
Z = depth below footing

Group interaction must be considered when piles are tightly spaced. Use a reduction factor of 1.0 for a pile spacing of 6d and 0.25 for 3d. The reduction factors for other types of spacing may be interpolated from these linearly. No reduction is required to the first row of piles.

The method described above is a significant simplification of the soil/pile behavior. If lateral loading governs the design, more rigorous non-linear analysis such as the p-y curve can be used. This method requires knowledge of the pile size, loading, pile cap and layout. Paterson can complete a model analysis when the detailed are more advanced and large lateral loading is expected.

## Construction Consideration

Piles are to be driven to bedrock through a layer of dense till, which is known to contain large number of boulders. Piles can deflect and be damaged during the installation process when encountering boulders. Piles should be equipped with driving shoes/ pile points such are Titus Standard or similar to providing additional mitigation measures. Even with this measure, it should be expected that damage may occur, and replacement piles will be required. For piles driven to rock it is accepted practice to reduce the hammer energy after an abrupt peak is met and then gradually increase the energy over a series of blows to seat the pile in place.

For this project, the dynamic testing of 10% of production piles would be recommended. This is considered to be the minimum monitoring program, as the piles under shear walls may be required to be driven using the maximum recommended driving energy to achieve the greatest factored resistance at ULS values. Re-striking of all piles at least once will also be required after at least 48 hours have elapsed since initial driving.

## Micro Piles

Micropiles are small diameter, deep foundation element composed of a high strength steel casing and a high yield threaded steel bar core. The piles are advanced by rotary drills and normally develop their strength within the underlaying rock layer. The steel elements are grouted in place using non shrink grout in a similar fashion to rock anchors. Pressure grouting can be used to achieve greater bond strengths. The geotechnical resistance presented in Table 5.3-2 below can be used for preliminary purposes, based on the available geotechnical information.

A structural engineer should review the buckling potential, lateral capacity and other structural elements of the micropile design.

Table 5.3-2: Micropile Geotechnical Resistance

| Casing Size (mm) | Threaded Bar Size (mm) | Cased Length (m) | Bond Length (m) | Compression Capacity (kN) | Tension Capacity (kN) |
|---|---|---|---|---|---|
| 150 | 43 | 3 | 3 | 700 | 550 |
| 175 | 43 | 3 | 3 | 800 | 600 |
| 250 | 57 | 3 | 4 | 1,500 | 1,000 |
| 250 | 63 | 3 | 9 | 1,600 | 1,200 |

Since micropiles are considered permanent for a life span of 100 years, double corrosion and/or sacrificial steel corrosion allowance are to be considered for the threaded bar and steel casing. It is recommended that the micropile pile casing has a minimum wall thickness of 12 mm with a minimum of 3 mm of sacrificial steel. The minimum centre-to-centre pile spacing is 2.5 times the pile diameter.

### Settlement

Footings bearing on an acceptable bedrock surface or pile foundation will be subjected to negligible post construction total and differential settlements.

Conventional spread footing foundations for the ambulance parking garage built on approved glacial till surface and designed using the above-noted bearing resistance values, are anticipated to have up to 8 and 10 mm for total and differential settlement, relative to each other.

### Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels.

Adequate lateral support is provided to native soil when a plane extending down and out from the bottom edges of the footing, at a minimum of 1.5H:1V, passes only through in situ soil of the same or higher capacity as that of the bearing medium.

### Grade Raise Restriction

A small portion of the site is expected to contain a silty clay deposit. Based on our review of the preliminary site grading plans, site grades will generally be lowered, with no significant grade raises anticipated. However, Paterson should review the finalized grading and site servicing plans, once available, to confirm.

## 5.4 Design for Earthquakes

Seismic refraction testing was completed for the subject site to map the bedrock surface under the footprint of the proposed structure and to determine the applicable seismic site designation for the proposed building in accordance with the Ontario Building Code 2024. The shear wave velocity testing was completed by Paterson personnel. Results of the shear wave velocity test are provided in Figures 7a and 7b in Appendix 2 of this report.

### Field Program

The seismic survey was completed by Paterson between June 9 and June 21, 2025. At that time, a total of 35 seismic lines were surveyed throughout the proposed building footprint. The seismic lines were distributed in a manner to provide general coverage of the subject site and taking into consideration site features, including excavation, fill piles, and existing services.

The seismic lines were located as presented in Drawings PG6982-7 and PG6982-8, attached to the present report. Paterson field personnel placed between 20 and 24 vertical geophones per line, with geophone spacing ranging between 2 and 5 m. The geophones were connected by a geophone spread cable to a Geode 24 Channel seismograph.

The seismograph was also connected to a laptop computer and a hammer trigger switch attached to a 12-pound dead blow hammer. The hammer trigger switch sends a start signal to the seismograph. The hammer is used to vertically strike a plate seated into the ground surface, which creates the propagation of seismic energy throughout the subsurface.
The hammer shots were repeated between four (4) to eight (8) times at each shot location to improve signal to noise ratio. Nine (9) shot locations were completed per seismic line, and as described in Table 5.4.1. Where possible a minimum of one shot beyond the geophone array was included.

Table 5.4-1: Seismic Testing Details

| Line ID | Active Geophones | Geophone Spacing (m) | Line Length (m) |
|---|---|---|---|
| 1 | 24 | 3 | 75 |
| 2 | 24 | 3 | 75 |
| 3 | 22 | 3 | 65 |
| 4 | 20 | 3 | 59 |
| 5 | 23 | 3 | 68 |
| 6 | 24 | 2 | 52 |
| 7 | 23 | 3 | 66 |
| 8 | 20 | 3 | 58 |
| 9 | 24 | 3 | 75 |
| 10 | 21 | 3 | 62 |
| 11 | 21 | 4 | 80 |
| 12 | 24 | 3 | 75 |
| 13 | 24 | 4 | 98 |
| 14 | 24 | 3 | 75 |
| 15 | 24 | 4 | 94 |
| 16 | 23 | 4 | 88 |
| 17 | 23 | 4 | 88 |
| 18 | 21 | 4 | 80 |
| 19 | 22 | 3 | 63 |
| 20 | 24 | 3 | 75 |
| 21 | 24 | 3 | 75 |
| 22 | 23 | 3 | 69 |
| 23 | 23 | 4 | 94 |
| 24 | 24 | 4 | 98 |
| 25 | 24 | 3 | 75 |
| 28 | 24 | 3 | 71 |
| 29 | 24 | 4 | 98 |
| 30 | 24 | 3 | 75 |
| 31 | 24 | 5 | 125 |
| 32 | 24 | 3 | 75 |
| 33 | 24 | 3 | 75 |
| 34 | 24 | 4 | 112 |
| 35 | 24 | 4 | 97 |
| 36 | 24 | 3 | 74 |

## Data Processing and Interpretation

The seismic refraction method consists of measuring the travel time of the seismic waves critically refracting at the interface between the overburden and the bedrock. The recorded travel time and distances between the seismic source and geophones are used to estimate velocity variations with depth. The method is governed by Snell's law.

The processing sequence included data inspection and edition where required, first break picking, analysis of travel time curves, and data inversion via the Time-Term Method using SeisImager Software. This method allows for the calculation of depths and seismic velocity sections using a combination of linear least squares and delay time analysis. Results of the seismic test are provided in Figures 7a and 7b in Appendix 2 of the present report.

Generally, the subsurface profile indicated one layer of overburden material overlying the bedrock. The surface material could be associated with the loose to dense glacial till deposit. The seismic refraction results were calibrated with the existing borehole information.

The bedrock surface topography was observed to vary throughout the subject site. Reference can be made to Drawing PG6982-6 – Bedrock Contour Plan and Drawing PG6982-7 – Bedrock Heatmap for the seismic testing locations and depth at which bedrock has been interpreted. It should be understood that the bedrock contours depicted on the aforementioned plan are based on linear interpolation between testing locations and is limited to that information. Actual site conditions and bedrock elevation may vary beyond the testing location.

## Average Shear Wave Velocity ($Vs_{30}$)

A vertical seismic profile (VSP) was completed by others at the location of BH 21-207, as presented on Drawing PG6982-1 - Test Hole Location Plan, attached to the present report. It is understood that a 3 component (3C) borehole geophone was used in combination with P- and S- wave sources consisting of a sledgehammer that strikes vertically on a polypropylene plate and laterally on a beam, respectively.

It is further understood that the geophone was connected to a Geode Seismograph and travel time data was acquired at 1 m intervals to a maximum depth of 20 m below the ground surface elevation existing at the time of the testing. It should be noted that the geophone is understood to have been provided with a clamping mechanism and that the borehole was provided with casing and grout for proper coupling. Reference should be made to Geophysical Testing Results by Others included in Appendix 3 for details.

Interpretation and processing of the VSP was completed by others. Based on the above results, the Average Shear Wave Velocity, $Vs_{30}$, of the upper 30 m profile immediately below the proposed finish ground surface was calculated considering the standard equation for average shear wave velocity as presented below

$$V_{s30} = \frac{Depth_{of\ interest}(m)}{\left(\sum_{i=1}^{N} {H_i}/{Vs_i}\right)}$$

$$Depth_{of\ interest}(m) = \sum_{i=1}^{N} H_i$$

Where N is the number of layers, $H_i$ represents the thickness of layer *i*, and $Vs_i$ is the shear wave velocity for layer *i*. Based on the above,

$$V_{s30} = 760\ m/s$$

Based on the results of the seismic velocity testing, the average shear wave velocity $Vs_{30}$ for the subject site is **760 m/s**, which is also consistent with the results of the seismic refraction testing. Therefore, a **Seismic Site Designation $X_{760}$** is considered applicable for design of the proposed structures as per the Ontario Building Code 2024 (OBC 2024).

The soils underlying the subject site are not considered susceptible to liquefaction. Reference should be made to the latest revision of the OBC 2024 for a full discussion of the earthquake design requirements.

## 5.5 Basement Slab Construction

With the removal of all topsoil and fill, containing significant amounts of deleterious or organic materials, the glacial till or bedrock medium or the fill within areas approved by Paterson personnel at the time of excavation will be considered an acceptable subgrade surface on which to commence backfilling for basement slab construction.

Any soft areas in the basement slab subgrade should be removed and backfilled with appropriate backfill material prior to placing fill. OPSS Granular A or Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. All backfill material within the footprint of the proposed building should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

The recommended pavement structures noted in Subsection 5.7 will be applicable for the basement levels.

A subfloor drainage system, consisting of lines of drainage pipe subdrains connected to a positive outlet (i.e., sump pits), should be provided in the backfill layer directly under the lowest basement floor slab structure. For portions of the building with a raft slab, the drainage pipe should be installed directly on the raft. Drainage should be reviewed for slab depressions and exit tunnels.

The spacing and associated design details of the underfloor drainage system should be provided by Paterson during the design phase of the project.

## 5.6 Basement Wall

There are several combinations of backfill materials and retained soils that could be applicable for the basement walls of the subject structure. However, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a bulk (drained) unit weight of 20 kN/m$^3$. The applicable effective (undrained) unit weight of the retained soil can be taken as 13 kN/m$^3$, where applicable. A hydrostatic pressure should be added to the total static earth pressure when using the effective unit weight.

Two distinct conditions, static and seismic, should be reviewed for design calculations. The corresponding parameters are presented below.

### Lateral Earth Pressures

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

$K_o$ = at-rest earth pressure coefficient of the applicable retained soil (0.5)
$\gamma$ = unit weight of fill of the applicable retained soil (kN/m$^3$)
H = height of the wall (m)

An additional pressure having a magnitude equal to $K_o \cdot q$ and acting on the entire height of the wall should be added to the above diagram for any surcharge loading, q (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case. Actual earth pressures could be higher than the “at-rest” case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

### Seismic Earth Pressures

The total seismic force ($P_{AE}$) includes both the earth force component ($P_o$) and the seismic component ($\Delta P_{AE}$).

The seismic earth force ($\Delta P_{AE}$) can be calculated using $0.375 \cdot a_c \cdot \gamma \cdot H^2/g$ where:

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

$\gamma$ = unit weight of fill of the applicable retained soil ($kN/m^3$)

H = height of the wall (m)

g = gravity, 9.81 $m/s^2$

The peak ground acceleration, ($a_{max}$), for the subject site is 0.28g according to OBC 2024 and corrected for a site classification of $X_{760}$. Note that the vertical seismic coefficient is assumed to be zero. The earth force component ($P_o$) under seismic conditions can be calculated using:

$P_o = 0.5\ K_o\ \gamma\ H^2$, where $K_o = 0.5$ for the soil conditions noted above.

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

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

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2024.

## 5.7 Pavement Design

For design purposes, it is recommended that the rigid pavement structure for the lower level of the underground parking structure should consist of Category C2, 32 MPa concrete at 28 days with air entrainment of 5 to 8%. The recommended rigid pavement structure is further presented in Table 5.7-1.

Table 5.7-1: Recommended Rigid Pavement Structure - Lower Parking Level

| Thickness (mm) | Material Description |
|---|---|
| By Others | 32 MPa Concrete – Category C2 Exposure Concrete |
| Min. 300 | **BASE** - OPSS Granular A Crushed Stone |
| **SUBGRADE:** Either approved fill, in-situ, or OPSS Granular B Type I or II material placed on in-situ soil or fill. | |

As noted in Section 5.5 of this report, the base layer of the rigid pavement structure is expected to be dependant on the piping and other subslab infrastructure requirements. Based on that, a minimum of 300 mm of OPSS Granular A crushed stone should be in place throughout the rigid pavement structure footprint.

To control cracking due to shrinking of the concrete floor slab, it is recommended that strategically located saw cuts be used to create control joints within the concrete floor slab of the lower underground parking level.

The control joints are generally recommended to be located at the center of the column lines and spaced at approximately 24 to 36 times the slab thickness (for example, a 0.15 m thick slab should have control joints spaced between 3.6 and 5.4 m).

The joints should be cut between 25 and 30% of the thickness of the concrete floor slab and completed as early as 4 hours after the concrete has been poured during warm temperatures and up to 12 hours during cooler temperatures.

The flexible pavement structure presented in Tables 5.7-2 and 5.7-3 should be used for at grade access lanes and heavy loading parking areas.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 II material.

The pavement granulars (base and subbase) should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable compaction equipment.

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. For light duty parking areas, Ontario Traffic Category A will be used. For access lanes and ambulance parking areas, Ontario traffic Category B should be used for design purposes.

Table 5.7-2: Recommended Light Duty 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 approved fill, in-situ, or OPSS Granular B Type I or II material placed on in-situ soil or fill. | |

Table 5.7-3: Recommended Asphalt Pavement Structure - Access Lanes and Heavy Loading Parking Areas

| Thickness (mm) | Material Description |
|---|---|
| 40 | **Wear Course** - Superpave 12.5 Asphaltic Concrete |
| 50 | **Binder Course** - Superpave 19.0 Asphaltic Concrete |
| 150 | **BASE** - OPSS Granular A Crushed Stone |
| 400 | **SUBBASE** - OPSS Granular B Type II |
| **SUBGRADE** - Either approved fill, in-situ, or OPSS Granular B Type I or II material placed on in-situ soil or fill. | |

Table 5.7-4 below shows the recommended pavement structure for areas located above a podium structure or under buried concrete structure such as a tunnel.

Table 5.7-4: Recommended Asphalt Pavement Structure - Access Lanes and Heavy Loading Parking Areas

| Thickness (mm) | Material Description |
|---|---|
| 40 | **Wear Course** - Superpave 12.5 Asphaltic Concrete |
| 50 | **Binder Course** - Superpave 19.0 Asphaltic Concrete |
| 300 | **BASE** - OPSS Granular A Crushed Stone |
| **SUBGRADE** – High density insulation (HI-100 or equivalent) or concrete structure. | |

Provisions should be carried for remediating site conditions during the time of construction that would impact the construction of the above-noted design pavement structure (i.e., heavy truck traffic rutting and compromising subgrade soils, placement of subbase layers shortly following periods of spring thaw, snowmelt and rainfall events, over service trenches for utilities and poorly compacted backfill, etc.).

Recommendations would be site- and situation specific and only able to be confirmed at the time of construction. However, as a preliminary consideration, provisions should be carried for cow-pathing (over-building haul and access roads to minimize disturbing final subgrade subsoils) localized thickening of subbase layers, supplying and placing separation layers (woven geotextile layer) and reinforcing layers (bi-axial geogrid) advised upon by Paterson personnel at the time of construction.

## Pavement Structure Drainage

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

Consideration should be given to installing subdrains during the pavement construction. The invert of the subdrain pipe is recommended to be located a minimum depth of 300 mm below the pavement structure subgrade and located centrally along the roadway alignment and extending 2.4 m on each sides of catchbasins.

The subdrain pipe is recommended to consist of a minimum 150 mm diameter corrugated and perforated plastic pipe surrounded by a minimum of 150 mm of 10 mm clear crushed stone on all of its sides. The clear stone layer is recommended to be wrapped by a geotextile layer. The drains should be connected to a positive outlet. The subgrade surface should be crowned to promote water flow to the drainage lines.

A curb drainage system is also recommended for the proposed access road between the hospital and the CUP building and the lower loading dock area (east). The system should be composed of flat drainage pipe such as Titan Environment Multi-Flow system placed vertically slightly behind the curb and approximately 300 to 500 mm below the pavement structure subgrade. The system should be connected at regular intervals to nearby catch basins.

# 6.0 DESIGN AND CONSTRUCTION PRECAUTIONS

## 6.1 Foundation Drainage and Backfill

### 6.1.1 Waterproofing System

A waterproofing system consisting of the exterior perimeter walls covered with a layer of exterior foundation waterproofing and provides no hydraulic connection between the exterior backfill and interior space (i.e., no direct connection between backfill and subslab drainage system). The waterproofing membrane would extend across the full height of the foundation walls and across the entire base of the excavation and building footprint.

Typically, the waterproofing layer would be further covered by a protection layer that would be recommended to consist of a composite foundation drainage board on the vertical faces and protection boards on the horizontal portions. The purpose of the drainage board layer would be to drain surface water that migrates within the backfill surrounding the structure to the water table or higher drainage pipe faster. However, a conventional protection board may otherwise be considered for this purpose and as preferred by the contractor.

It would be recommended that a perimeter drainage pipe, consisting of a 150 mm diameter corrugated perforated pipe surrounded by a geosock and on all sides by a 150 mm thick layer of 19 mm clear crushed stone, be placed around the perimeter of the proposed building and in direct contact with the composite foundation drainage board.

The pipe would be recommended to be placed at a minimum of 1.5 m below finish grade (see attached drainage layout plan in attachments) and provided a gravity connection to a suitable drain, such as nearby catch basis and swales, if present. This upper pipe will protect the surface and surrounding hardscape from frost heave by allowing better drainage and control of the groundwater table.

Additional details associated with implementing the proposed waterproofing system are provided below:

- A minimum 75 mm thick mud slab or equivalently smooth surface required by the manufacturers and waterproofing contractor should be placed over the bearing medium below the footprint of the overlying foundation walls to provide a suitable surface for installing the horizontal endlap of the waterproofing membrane.
- Either a heavy-duty or double layer application waterproofing membrane should be placed over the mud slab and below the entire raft slab footprint and extending onto the foundation wall to a maximum of 1.0 m below the finished ground surface.
- A single layer of waterproofing membrane should extend above the weeping tile to the finished exterior ground surface.
- An interior subfloor drainage system will be required and should consist of 150 mm diameter corrugated and perforated interior perimeter drainage pipes placed on the interior side of the foundation walls, wrapped with filter cloth and surrounded on all side by 150 mm of clear crushed stone. The interior perimeter drainage pipe should be installed in conjunction with a 150 mm diameter perforated and corrugated interior underfloor drainage pipes spaced at 12 to 15 m spacing. All drainage pipes should have a positive outlet to sump pits. The purpose of the drainpipes would be to provide a preferential pathway for any groundwater that may potentially migrate into the subslab fill layer over the service life of the proposed structure.
- Additionally, an exterior perimeter drainage pipe will be required and should consist of 150 mm diameter corrugated and perforated drainage pipes placed approximately 1.5 to 1.8 m below the finished ground surface along the exterior side of the foundation walls, wrapped with filter cloth and surrounded on all side by 150 mm of clear crushed stone.
- Pile cap and connection are to be waterproofed as well. Different options are available based on the selected product. The building envelope consultant will provide further information, refer to building science and architecture reports.

Reference should be made to the attached Figure 3 - Waterproofing Detail provided in Appendix 2 of this report for additional details of the above-noted system.

### Raft Slab Construction Joints

It is expected that if a raft slab will be utilized to resist hydrostatic pressures, it will be poured in sections. For the construction joint at each pour, a rubber waterstop along with a chemical grout (Xypex or equivalent) should be applied to the entire vertical joint of the slab.

Furthermore, a rubber waterstop should be incorporated in the horizontal interface between the foundation wall and the raft slab. The raft slab cold joints should also be overlapped in all directions and cast upon a waterproofing membrane across the length of the cold joints.

## 6.1.2 Pavilion Building, Ambulance Garage and Emergency Parking Garage

It is anticipated that the raft foundation for the pavilion building, ambulance garage and emergency parking garage will be founded at approximate geodetic elevations of 75.3 m and above the expected long-term groundwater levels (reference should be made to Subsection 6.5 - Groundwater Control for details). Based on the expected elevation of the post-construction groundwater levels, the closed waterproofing system is not required from a groundwater control perspective.

It is recommended that a perimeter foundation drainage system be provided for the pavilion building and emergency parking garage structures. The system should consist of a 150 mm diameter perforated and corrugated plastic pipe which is surrounded on all sides by 150 mm of 19 mm clear crushed stone and placed at the footing level around the exterior perimeter of each structure. The pipe should have a positive outlet, such as a gravity connection to a catch basin or sump pit.

In addition, underslab drainage is recommended to control water infiltration below the lowest level floor slabs of these structures. For preliminary design purposes, it is recommended that 150 mm diameter perforated pipes be placed at approximately 6 m centers underlying the lowest level floor slabs. The spacing of the underslab drainage system should be confirmed at the time of completing the excavation when water infiltration can be better assessed. It can be preliminary taken as a subdrain line will be required between each column line.

Further, it is expected that elevator shafts, sump pump pits, and other structures that will be extended below the invert level of the sub-slab drainage system are recommended to be waterproofed as per the above-described waterproofing systems.

## 6.1.3 Loading Docks

It is expected that the loading dock ramps will extend below the long-term groundwater levels. It is recommended that a foundation drainage system be provided for the loading docks. The system should consist of a 150 mm diameter perforated and corrugated plastic pipe which is surrounded on all sides by 150 mm of 19 mm clear crushed stone and placed at foundation level around the exterior perimeter of each structure. The pipe should have a positive outlet, such as a gravity connection to a catch basin or sump pit.

In addition, pavement drainage is recommended to be installed as a measure to control water infiltration below the pavement in combination with the proposed pavement drainage around catch basins and curbs. For preliminary design purposes, it is recommended that 150 mm diameter perforated pipes be placed at approximately 6 m on center and 600 mm under the pavement. The spacing of the drainage system should be confirmed at the time of completing the excavation when water infiltration can be better assessed.

It should be noted that Drawing PG6982-3 - Groundwater Contour Plan at Post-Construction Conditions accounts for the estimated local groundwater lowering anticipated throughout the loading docks. Further coordination with the civil design will be required to layout the drainage system along that area of site.

### 6.1.4 Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free-draining, non-frost susceptible granular materials.

Alternatively, consideration may be given to backfilling by the use of site-excavated soils provided it is placed in 300 mm thick loose lifts and compacted to a minimum of 95% of the materials SPMDD and in conjunction with the use of a composite foundation drainage board layer connected to a perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

### 6.1.5 Sidewalks and Walkways

Backfill material below sidewalk and walkway subgrade areas throughout the remainder of the subject site should be provided with a minimum 450 mm thick layer of OPSS Granular A or OPSS Granular B Type II. The subgrade material should be shaped to promote positive drainage towards the building perimeter drainage system.

This material should be placed in maximum 300 mm thick loose lifts and compacted to at least 98% of the materials SPMDD under dry and above-freezing conditions.

Additionally, to avoid differential settlements within the proposed concrete sidewalks adjacent to the building entrance doors, it is recommended to place a minimum 100 mm SM rigid insulation is recommended to be placed directly below the granular material and extend horizontally at least 1.2 m or the full extent of the sidewalk. The rigid insulation should extend horizontally at least 1.5 m beyond the entrance door opening. A 500 mm thick frost taper of granular fill should be placed along the outside edge of the rigid insulation. The frost taper should be shaped with a 3H:1V slope to subgrade level of the adjacent pavement structure.

## 6.2 Protection of Footings Against Frost Action

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

Other exterior unheated footings, such as those for isolated exterior, are more prone to deleterious movement associated with frost action. These should be provided with a minimum 2.1 m thick soil cover (or insulation equivalent).

It is expected that the footings along the entrance of the parking garage will not require protection against frost action due to the founding depth. Unheated structures such as the access ramp may require to be insulated against the deleterious effect of frost action. A minimum of 2.1 m of soil cover alone, or a minimum of 0.6 m of soil cover, in conjunction with foundation insulation, should be provided.

## 6.3 Excavation Side Slopes

### Open Excavation

The side slopes of the anticipated excavation should either be cut back to acceptable slopes or be retained by shoring systems from the beginning of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e., unsupported excavations). Where space restrictions exist, or to reduce the trench width, the excavation can be carried out within the confines of a fully braced steel trench box.

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back to 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly Type 2 and Type 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.

Excavation side slopes around the building excavation should be protected from erosion by surface water and rainfall events by the use of secured tarpaulins spanning the length of the side slopes, or other means of erosion protection along their footprint. Efforts should also be made to maintain dry surfaces at the bottom of the excavation footprints and along the bottom of side slopes.

Additional measures may be recommended at the time of construction by Paterson. However, it should be nonetheless understood that maintaining dewatering efforts and managing groundwater throughout the excavation program will be critical in maintaining a dry excavation footprint and temporary excavation side slopes.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

## Temporary Shoring

Temporary shoring will be required for the overburden soil to complete the required excavations where insufficient room is available for open cut methods.

The shoring requirements designed by a structural engineer specializing in those works will depend on the depth of the excavation, the proximity of the adjacent structures and the elevation of the adjacent building foundations and underground services. The design and implementation of these temporary systems will be the responsibility of the excavation contractor and their design team. Inspections and approval of the temporary system will also be the responsibility of the designer.

The geotechnical information provided below is to assist the designer in completing a suitable and safe shoring system. The designer should take into account the impact of a significant precipitation event and designate design measures to ensure that precipitation will not negatively impact the shoring system or soils supported by the system. Any changes to the approved shoring design system should be reported immediately to the owner's structural design prior to implementation.

The temporary system can consist of a combination of secant pile, sheet pile and soldier pile and lagging. A cut off wall will be required to control the groundwater influx into the excavation if a construction dewatering system is not put in place. Any additional loading due to street traffic, construction equipment, adjacent structures and facilities, etc., should be included in the earth pressures described below.

The use of a soldier pile and lagging system is not recommended for excavation extending below the groundwater table without a full construction dewatering system due to the presence of running sand that can slough into the open excavation during installation. A cut-off shoring system is recommended. Groundwater control will be influenced by the type of shoring system selected by the design engineer.

It is important to note that the management of groundwater will be critical in implementing a temporary shoring system due to sandy and localized loose nature of the in-situ subsoils.

Since a significant amount of water is expected to be flowing into the open excavation a secant pile wall extended into the bedrock could be considered to help control the water influx at the time of construction.

The earth pressures acting on the temporary shoring system may be calculated with the following parameters.

Table 6.3-1: Soils Parameter for Shoring System Design

| Parameters | Values |
|---|---|
| Active Earth Pressure Coefficient ($K_a$) | 0.33 |
| Passive Earth Pressure Coefficient ($K_p$) | 3 |
| At-Rest Earth Pressure Coefficient ($K_0$) | 0.5 |
| Unit Weight ($\gamma$), kN/m$^3$ | 20 |
| Submerged Unit Weight ($\gamma$), kN/m$^3$ | 13 |

The active earth pressure should be calculated where wall movements are permissible while the at-rest pressure should be calculated if no movement is permissible. The dry unit weight should be calculated above the groundwater level while the effective unit weight should be calculated below the groundwater level.

The hydrostatic groundwater pressure should be included to the earth pressure distribution wherever the effective unit weights are calculated for earth pressures. If the groundwater level is lowered, the dry unit weight for the soil/bedrock should be calculated full weight, with no hydrostatic groundwater pressure component.

For design purposes, the minimum factor of safety of 1.5 should be calculated.

## Short Term Backfill Earth Pressure

Based on current plan, it is understood that the temporary shoring system will be recessed from the foundation walls. The space left between the shoring system and the concrete wall will be backfilled has construction progress. Due to the arching effect of soil pressure when backfilling narrow spaced retained on each side, the lateral earth pressures can't fully develop. Under temporary conditions and until the foundation walls are fully based by interior slabs, the arching theory can be used to evaluate the horizontal stresses ($\sigma_h$) on the walls.

$$\sigma_h = \frac{\gamma}{2\tan\delta}\left(1 - e^{-2k\frac{Z}{B}\tan\delta}\right)$$

Where:

$\gamma$ = unit weight of soil (KN/m$^3$)(use 20 KN/m$^3$)
B = backfill width (m)
Z = depth from top of wall (m)
H = wall height (m)
$\delta$ = friction between the backfill and wall (20°)
k = Lateral earth pressure coefficient (assumed $K_o$ for unyielding walls)
$K_o$ = 1-sin Φ'
Φ' = effective friction angle of the backfill material (33°)

Due to the non-linear stress distribution, the above noted equation must be integrated over the height of the wall to find an equivalent applied force and application point. Assuming a that a sandy backfill material with the above noted parameters is used to backfill the space between the foundation wall and temporary shoring, the reduction factors in table-6.3-2 can be used to calculated short term lateral earth pressure on the foundation wall. Note that reduction factors are correlated to the above assumed friction angle. Paterson should review the material used to ensure compliance with the assumptions.

$$\sigma_h = \alpha k\left(\frac{H^2\gamma}{2}\right)$$

Table 6.3-2: Soils Parameter for Shoring System Design

| B/H ratio | Reduction factor (α) | Application point (Z/H) |
|---|---|---|
| 0.1 | 0.44 | 0.600 |
| 0.2 | 0.63 | 0.625 |
| 0.3 | 0.72 | 0.637 |
| 0.4 | 0.78 | 0.644 |
| 0.5 | 0.80 | 0.647 |

Full lateral earth pressures are to be used for long term stability of the structure, assuming that the shoring system will degrade over time.

## 6.4 Pipe Bedding and Backfill

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

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. Where the bedding is located within silty clay or bedrock, the thickness of the bedding material should be increased to a minimum of 300 mm of OPSS Granular A. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to 99% of the material's SPMDD.

Any stones greater than 200 mm in their longest dimension should be removed from these materials prior to placement. Well fractured bedrock should be acceptable as backfill for the lower portion of the trenches when the excavation is within bedrock provided the rock fill is placed only from at least 300 mm above the top of the service pipe and that all stones are 300 mm or smaller in their longest dimension.

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 reduce potential differential frost heaving. The trench backfill should be placed in a maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

### Bedrock/Soil Transitions

In areas where the service subgrade transitions from soil to bedrock, it is recommended that the founding medium be inspected in the field to determine how steeply the bedrock surface, where encountered, drops off. A transition treatment is generally recommended to be provided where the bedrock slopes steeper than 3H:1V.

At these locations, the bedrock should be excavated, and a minimum 500 mm thick layer of bedding be placed to provide a 3H:1V transition from the bedrock subgrade toward the soil subgrade. This treatment will reduce the propensity for bending stresses to occur in the watermain.

## 6.5 Groundwater Control

### Groundwater Control for Building Construction

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. Infiltration levels are anticipated to be high through the excavation face for areas where footings are to be placed below the groundwater table. The groundwater infiltration rate will depend on the depth below the water table.

Dewatering methods, such as well points, may be required for areas where footings are to be placed well below the groundwater table (i.e., 1 to 2 m). Additionally, it is recommended to install deep dewatering wells within the building footprints to control groundwater infiltration from the base of the excavation.

## Expected Construction Dewatering and Water Taking Rates

Based on slug testing results completed by Paterson and others across the site and a series of pump tests by others along the servicing alignment in proximity to the building, hydraulic conductivity values ranged between 1 x $10^{-6}$ and 3.3 x $10^{-3}$ m/sec, therefore, a representative hydraulic conductivity value of **1.0 x $10^{-4}$ m/sec** was chosen for assessing infiltration rates for excavations below the groundwater table.

Based on our ground water level at the time of the investigations, the maximum design groundwater level was measured to vary considerably across the site, up to 11.0 m of saturated material is expected to be encountered. Preliminary construction dewatering volumes presented below in Table 6.5-1. However, it should be noted that a secant wall has been proposed along the perimeter of the proposed hospital complex in order to reduce groundwater infiltration during construction

Table 6.5-1: Construction Water Taking Rates

| Section | Steady State Groundwater Dewatering Rate (L/d) | 5 year - 1 hour Precipitation Volume (L) |
|---|---|---|
| Tower A, B and Podium | 7,500,000 – 8,000,000 | 850,000 |

The water is expected to flow from the west. Construction dewatering methods can include well point systems or local deep well dewatering. Additional deep well dewatering will be required for groundwater control, within the excavation footprints. The depth and position of the wells should be calculated with the radius of influence of each well. Further ongoing field testing of deep dewatering wells is currently underway.

Construction of grout curtains can be considered to control groundwater infiltration through the bedrock, during construction. The grout curtains should be designed by specialized contractor, based on the hydraulic conductivity of the bedrock.

## Permit to Take Water

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) has been issued for the subject site (Ref. No. P-300-5296264592) with a maximum allowable daily pumping rate of 3,550,000 L/day for the Main Hospital and may take up to 10,000,000 L/day for a maximum of 90 days per year. However, it should be noted the PTTW is being amended and will be registered on the Environmental Activity and Sector Registry (EASR) for a maximum allowable daily pumping rate of 25,000,000 L/day. The additional requested volume will account for seasonal variations, variability in the overburden material and bedrock quality, precipitation events above the provided design storm, and unforeseen circumstances.

## Impacts on Neighboring Properties

A local groundwater lowering is anticipated under short-term conditions to accommodate the construction of the proposed complex. Based on a representative hydraulic conductivity of 1 x $10^{-4}$ m/sec, a radius of influence of approximately 300m will develop as a steady state condition from the edge of the excavation and may extend up to 1,200 m should the higher conductive material be encountered during excavation.

The expected groundwater infiltration will be encountered predominantly within the discontinuous silty sand to sandy silt layer and bedrock with minimal compressibility.

Furthermore, given the lateral discontinuity of the silty sand layer across the subject site, the network of faults to the west, and the railway cut and Dow's Lake to the east, the radius of influence is expected to remain confined to the limits of the sand and gravel unit and is not anticipated to extend significantly beyond it during dewatering.

It is understood that ongoing settlement monitoring is being completed on nearby structures during current dewatering activities related to advance works and has shown no settlement to date. It is recommended that ongoing settlement monitoring continue for the duration of the project.

### Long-term Groundwater Control

Daily volumes of water that may be handled by the drainage systems will be contingent on the type of foundation drainage/waterproofing system that will be selected for the design of the proposed structure. In summary, systems should be designed to handle up to 1,000,000 L/day based on the implementation of waterproofing system for the towers and podium. Details associated with the system is provided in Section 6.12 of this report.

The water influx above was evaluated for the foundation drainage system of phase 4 only. Provided information for the ongoing development of the campus (including CUP and road drainage) indicates that further influx from the individual phases will need to be accounted for. A full review of the information and interaction of the different phases yield a total groundwater influx rate of approximately 1,900,000 L/day for the campus.

### Long-term Groundwater Levels

Based on preliminary analysis completed for the subject site and considering that the waterproofing of the foundation structures will be completed as per recommendations, it is expected that the long-term groundwater levels are reduced to an approximate elevation of 73.0 to 74.0 m at the southern portion of the proposed structure and to vary across the site in a south to north direction with the lowest point located at the loading docks. It should be noted that long-term groundwater levels are expected to be encountered below the foundation elevation throughout the pavilion building and emergency parking garage footprint. Reference should be made to Drawing PG6982-3 - Groundwater Contour Plan at Post-Construction Conditions in Appendix 2 which summarizes long-term groundwater levels expected throughout the subject site.

### Long-term Radon Control Measures for Buildings

Radon is formed as part of the normal radioactive decay of uranium in soil and rock. The regional limestone bedrock is of very low concentrations of uranium such that the subsoils below the proposed development are not considered to be sources of radon gas.

A major factor that prevents the passage of radon into a building is the robustness of the building's envelope against the exterior elements. The buildings subsurface foundation structure where the waterproofing system described in Section 6.1 of this report will be constructed to be watertight and the selected membrane are to be of sufficiently robust to resist developing cracks that would allow the ingress of groundwater, as discussed in preceding sections of this report, and soil gases such as radon Based on this, waterproofed structures would be considered to have been designed to a sufficient degree of robustness to mitigate the ingress and/or accumulation of radon gas from a geotechnical perspective.

It is recommended that soil gas mitigation infrastructure "rough ins" should be incorporated in the buildings and section not fully waterproofed (pavilion). These rough-ins and associated designs are recommended to be incorporated in accordance with the recommendations provided in, City of Ottawa Advisory – Radon and Soil Gas Control (November 2020), *Soil Gas Control Systems in New Construction of Multifamily, School, Commercial and Mixed-Use Buildings*, CC-1000 (2018, Revised May 2023) and prepared by the American Associated of Radon Scientists and Technologists (AARST), or other local and equivalent guidelines. However, note, Health Canada established guideline for radon mitigation and concentration do not apply to building portions that are intended to be occupied for less than 4 hours per day. Parking garages would then not require further mitigation measures further from the vapour barrier mandated under the city of Ottawa Advisory.

Rough-ins consist of perforated pipe placed above the drainage pipe level. The pipes should exit the slab envelope into a mechanical room or outside. The pipes are to be temporary capped until a radon test is completed. If a positive radon test is obtained, an active fan system should be installed and exhaust the gas above the roof line.

Paterson may advise and assist with the planning and implementation of the associated rough-ins and associated infrastructure for the non-waterproofed structures during the design phase.

## 6.6 Winter Construction

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

The subsoil conditions at this site 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 building 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 carried out during freezing conditions. Additional information could be provided, if required.

Precautions must be taken where excavations are carried out in proximity of existing structures which may be adversely affected due to the freezing conditions. In particular, it should be recognized that where a shoring system is used, the soil behind the shoring system will be subjected to freezing conditions and could result in heaving of the structure(s) placed within or above frozen soil. Provisions should be made in the contract document to protect the walls of the excavations from freezing, if applicable.

## 6.7 Corrosion Potential and Sulphate

The results of analytical testing completed by others indicate that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and the pH of the samples tested by others indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals, whereas the resistivity is indicative of an aggressive to very aggressive corrosive environment for exposed ferrous metals.

Based on this, it is recommended that a concrete mix consisting of N class concrete would be considered appropriate for structural elements considered for buried foundation elements located beyond the parking garage structure.

## 6.8 Low-Impact Development (LID) Design Considerations

Based on our review, the subsurface conditions generally consist of either relatively impermeable, and saturated grey silty clay or relatively impermeable weathered, partially saturated brown silty clay underlain by unweathered, relatively impermeable, and saturated grey silty clay, overlying mostly saturated silty sand and/or glacial till.

Due to the saturated nature of the soils located throughout the study area within the anticipated minimum invert depth required for installation, infiltration-based LID measures are not anticipated to be able to achieve the minimum 1 m separation form the water table and will therefore not function adequately from a hydrogeological perspective.

As an alternative to infiltration-based techniques, filtration (vegetated medians, bioswales, etc.) and retention (stormwater management facilities, solid pipes in line with servicing alignments, etc.) could otherwise be considered as LID techniques throughout the subject site.

Stormwater retention systems, such as ponds and basins, are generally considered suitable for use throughout the study area given the relatively impervious nature of the subsoils. Since it is anticipated the ponds and basins will be primarily founded within the clay deposit, the clay sidewalls will naturally retain stormwater and will not generally require improvement by commercial impermeable liner products. Sandier subsoil sidewalls, if encountered, would likely require improvement to retain stormwater by replacing sandy sidewalls with site-generated workable silty clay fill. This type of remedial option can be provided at a later stage of design of the stormwater system and if considered required from a geotechnical perspective.

It is generally recommended Paterson advise on suitable LID strategies during the early stages of design of the future development. This would mitigate incorporating strategies that may be incompatible with the soils encountered at the study area prior to detailed design stages.

## 6.9 Landscaping Considerations

### Retaining Walls

Proposed retaining walls should be checked for global stability and designed by a licensed professional engineer to maintain an adequate factor of safety in excess of the required 1.5 for static conditions and 1.1 for seismic loading conditions. The internal and external failure modes of the retaining wall sections should be design according to the CHBDC (CSA S6:19) requirements.

The bearing resistance values provided for the aforementioned pedestrian bridge structure is considered applicable to the design of proposed retaining wall systems. The applicable seismic design should incorporate Peak Ground Acceleration (PGA) for the Ottawa area as per the OBC 2024.

Geotechnical field review must be completed at the time of excavation, prior to placing the granular bedding layer, to assess the bearing medium under the proposed wall. Based on the current site plan grading, it is anticipated that the walls will be founded over an engineered fill pad or undisturbed, in-situ soil bearing surfaces.

The soil parameters presented in Table 6.9-1 should be used for retaining wall design. The design must also include an overall system stability analysis.

Table 6.9-1: Soil parameters for global stability analysis

| Soil Layer | Unit Weight ($kN/m^3$) | Friction Angle (°) | Effective Cohesion (kPa) | Total Cohesion (kPa) |
|---|---|---|---|---|
| Silty Sand | 19 | 36 | 0 | 0 |
| Brown Silty Clay | 17 | 33 | 5 | 80 |
| Grey Silty Clay | 16 | 33 | 10 | 40 |
| Glacial Till | 20 | 38 | 0 | 0 |
| Bedrock | 23 | - | | |

It is recommended that a 100 mm diameter perforated corrugated plastic pipe with geosock, surrounded by 150 mm of 19 mm clear crushed stone on all sides, be placed behind the heel of the wall. The pipe should have a positive outlet, either in front of, under or to the side of the wall, towards a natural slope or drainage system.

Further to promote drainage and drawdown the locally high groundwater table the non-woven geotextile used at the back of the retaining walls should consist of Texel draintube placed in conjunction with the heel drainage pipe.

## Backfill Materials

The retaining wall should be backfilled with free-draining granular backfill material, incorporating longitudinal drains and outlets to ensure proper drainage of the backfill. For the purposes of this report, it is recommended that the wall be backfilled with Granular A or Granular B Type II materials. Backfill should be placed within a wedge-shaped area defined by a line drawn from below the rear edge of the wall's base block at a slope of 1H:1V, or a minimum of 1 m behind the rear of the blocks. All material must be compacted to a minimum of 98% of the materials SPMDD. The geotechnical parameters of the backfill material can be used as shown in Table 6.9-2.

Table 6.9-2: Geotechnical parameters for backfill material

| Material Description | Unit Weight (kN/m$^3$) | | Friction Angle (°) $\phi'$ | Friction Factor, tan $\delta$ | Lateral Earth Pressure Coefficients | | |
|---|---|---|---|---|---|---|---|
| | Drained $\gamma_{dr}$ | Effective $\gamma'$ | | | Active $K_a$ | At Rest $K_o$ | Passive $K_P$ |
| Granular A (Crushed Stone) | 22 | 13.5 | 38 | 0.6 | 0.24 | 0.38 | 4.20 |
| Granular B Type II (Crushed Stone) | 22 | 13.5 | 40 | 0.6 | 0.22 | 0.36 | 4.60 |

Notes:
The properties of backfill materials are for a condition of 98% of the materials SPMDD.
Earth pressure coefficients provided are for the horizontal backfill profile.
For soil above the water table, the “drained” unit weight must be used and below the water table, the “effective” unit weight must be used.

## Lateral Earth Pressure

It is recommended that a minimum of 1 m of backfill material consist of clean imported crushed stone such as Granular A or Granular B Type II. The geotechnical soil parameters shown in Table 6.9-1 should be used for retaining wall design.

## Tree Planting Considerations

Since the structure will be founded on non-cohesive soils, trees and landscaping planned throughout the subject site will not be subject to planting restrictions as based on the *City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines)* from a geotechnical perspective. Tree planted behind (on top) of segmental retaining wall should be setback a minimum of 2 m and planted with root control measures such as root barriers or bags.

## 7.0 RECOMMENDATIONS

It is recommended that the following be completed by Paterson once the final master plan and site development are determined:

- Review of geotechnical aspects of the excavating program, prior to construction.
- Review of waterproofing and perimeter and underground floor drainage system details.
- Inspection of the installation of the waterproofing and perimeter and underground floor drainage system during construction.
- Complete and review retaining wall design and drainage system.
- Observation of all bearing surfaces prior to the placement of concrete.
- Sampling and testing of the concrete and fill materials.
- Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- Observation of all subgrades prior to backfilling.
- Field density tests to determine the level of compaction achieved.
- Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

All excess soil must be handled as per *Ontario Regulation 406/19: On-Site and Excess Soil Management*.

## 8.0 STATEMENT OF LIMITATIONS

The recommendations provided are in accordance with the present understanding of the project. Paterson requests permission to review the recommendations when the drawings and specifications are completed.

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

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on or undertaking the work. The latter should evaluate the factual information provided in this report and determine the suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

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 PCL-ED or their agents is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.

March 27, 2026

Pratheep Thirumoolan, M.Eng., P. Eng.

Joey R. Villeneuve, M.A.Sc., P.Eng., ing.

# APPENDIX 1

## SOIL PROFILE AND TEST DATASHEETS

## SYMBOLS AND TERMS

## GRAIN SIZE ANALYSIS AND TESTING RESULTS

## BEDROCK CORE COMPRESSIVE STRENGTH TESTING RESULTS

## BOREHOLE LOGS BY OTHERS

## LABORATORY TESTING RESULTS BY OTHERS

## SUPPLEMENTARY INVESTIGATION BOREHOLE LOGS

## SUPPLEMENTARY INVESTIGATION GRAIN SIZE ANALYSIS TESTING RESULTS

## SUPPLEMENTARY INVESTIGATION BEDROCK CORE COMPRESSIVE STRENGTH RESULTS

# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366516.91 **NORTHING:** 5028396.00 **ELEVATION:** 77.05

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 11, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 11-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | 77 |
| **FILL:** Brown silty clay, with gravel, some to with sand<br>0.15m [ 76.90m ] | | | SS 1 | 79 | 5-4-4-5<br>8 | | | | |
| **GLACIAL TILL:** Loose to compact, brown silty sand to sandy silt, with gravel, trace clay, occasional cobbles and boulders<br>0.69m [ 76.36m ] | | 1 | SS 2 | 29 | 11-6-10-15<br>16 | | | | 76 |
| **GLACIAL TILL:** Loose, grey silty sand to sandy silt, with clay and gravel, occasional cobbles and boulders | | 2 | SS 3 | 21 | 4-3-4-3<br>7 | | | | 75 |
| | | | SS 4 | 42 | 5-2-2-2<br>4 | | | | |
| | | 3 | SS 5 | 33 | 4-3-2-2<br>5 | | | | 74 |
| | | 4 | SS 6 | 42 | 2-1-3-6<br>4 | | | | 73 |
| - Some cobbles and boulders by 4.72 m depth | | | SS 7 | 11 | 8-50-/-/<br>50/0.08 | | | | |
| - Compact to dense by 4.88 m depth | | 5 | | | | | | | 72 |
| | | | SS 8 | 17 | 11-22-18-15<br>40 | | | 5.41 m 2025-07-25 | |
| | | 6 | | | | | | | 71 |
| | | 7 | RC 1 | 26 | | | | | 70 |
| | | 8 | | | | | | | 69 |
| | | 9 | RC 2 | 0 | | | | | 68 |
| | | 10 | | | | | | | 67 |
| | | | RC 3 | 0 | | | | | |
| | | 11 | | | | | | | 66 |
| | | 12 | RC 4 | 58 | | | | | |

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# SOIL PROFILE AND TEST DATA

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| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| 12.73m [ 64.32m ] | | 12 | RC 4 | | | | | | 65 |
| **BEDROCK:** Poor to fair quality, grey limestone, some black shale partings | | 13 | RC 5 | 100 | RQD 53 | | | | 64 |
| - Excellent Quality from 13.26 m to 16.92 m depth | | 14 | | | | | | | 63 |
| - Calcium carbonate at 15.16 depth | | 15 | RC 6 | 100 | RQD 100 | | | | 62 |
| - Calcium carbonate at 15.98 m depth | | 16 | RC 7 | 100 | RQD 71 | | | | 61 |
| - Some Calcium carbonate from 17.30 m to 17.91 m depth | | 17 | | | | | | | 60 |
| | | 18 | RC 8 | 75 | RQD 27 | | | | 59 |
| | | 19 | RC 9 | 92 | RQD 55 | | | | 58 |
| - Weathered calcium carbonate from 20.32 m to 24.92 m depth | | 20 | | | | | | | 57 |
| | | 21 | RC 10 | 90 | RQD 27 | | | | 56 |
| - 20 mm thick mud steam at 22.07 m depth | | 22 | | | | | | 21.87m | 55 |
| - 40 mm thick mud seam at 22.28 m depth | | | RC 11 | 79 | RQD 27 | | | | |
| - 20 mm to 30 mm thick mud seam at 22.78 m depth | | 23 | | | | | | | 54 |
| - 5 mm thick mud seam at 23.60 m depth | | 24 | RC 12 | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366516.91 **NORTHING:** 5028396.00 **ELEVATION:** 77.05

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 11, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 11-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 | REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 | PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| - 15 mm thick mud seam at 23.90 m depth<br>- 5 mm thick mud seam at 24.05 m, 24.13 m, 24.18 m, 24.23 m, and 24.43 m depths<br>24.92m [ 52.13m ] | | 24 | RC 12 | 90 | RQD 30 | | | | | 24.92m | 53 |
| End of Borehole<br><br>(GWL at 5.41 m depth - July 25, 2025) | | 25<br>26<br>27<br>28<br>29<br>30<br>31<br>32<br>33<br>34<br>35<br>36 | | | | | | | | | 52<br>51<br>50<br>49<br>48<br>47<br>46<br>45<br>44<br>43<br>42 |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366597.11 **NORTHING:** 5028376.13 **ELEVATION:** 77.08

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 16, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 12-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | RECOVERY (%) | N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Grey silty sand, with gravel and crushed stone | | | SS 1 | 100 | 50-/-/-/ 50/0.15 | | | | |
| | | | SS 2 | 0 | 50-/-/-/ 50/0.05 | | | | |
| | | 1 | RC 1 | 0 | | | | | |
| 1.63m [ 75.45m ] | | | | | | | | | |
| **GLACIAL TILL:** Loose to compact, grey silty sand to sandy silt, with gravel, trace to some clay, occasional cobbles and boulders | | 2 | SS 3 | 5 | 5-3-3-5 6 | | | | |
| | | | SS 4 | 12 | 2-3-3-4 6 | | | | |
| - Some cobbles and boulders by 3.05 m depth | | 3 | SS 5 | 0 | 50-/-/-/ 50/0.03 | | | | |
| | | 4 | SS 6 | 0 | 50-/-/-/ 50/0.03 | | | | |
| - Clay content decreasing with depth | | 5 | SS 7 | 50 | 14-6-8-7 14 | | | | |
| | | | SS 8 | 22 | 8-13-50-/ 63/0.3 | | | | |
| - Occasional cobbles and boulders by 5.79 m depth | | 6 | SS 9 | 50 | 3-8-12-17 20 | | | | |
| | | 7 | SS 10 | 25 | 11-11-18-50 29 | | | | |
| | | | SS 11 | 0 | 50-/-/-/ 50/0.15 | | | | |
| | | 8 | | | | | | | |
| | | 9 | SS 12 | 0 | 50-/-/-/ 50/0.05 | | | | |
| | | 10 | SS 13 | 25 | 25-19-6-5 25 | | | | |
| | | 11 | SS 14 | 12 | 5-11-13-12 24 | | | | |
| | | | SS 15 | 54 | 15-25-50-/ 75/0.18 | | | | |
| | | 12 | | | | | | | |

6.35 m 2025-07-25

8.63m

10.15m

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366597.11 **NORTHING:** 5028376.13 **ELEVATION:** 77.08

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 16, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 12-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| | | 12 | SS 16 | 0 | 50-/-/-/ 50/0 | | | | 65 |
| | | 13 | RC 2 | 90 | | | | | 64 |
| | | | SS 17 | 0 | 50-/-/-/ 50/0.05 | | | | |
| | | 14 | SS 18 | 0 | 50-/-/-/ 50/0 | | | | 63 |
| | | 15 | SS 19 | 0 | 50-/-/-/ 50/0.03 | | | | 62 |
| | | 16 | RC 3 | 46 | RQD 46 | | | | 61 |
| 17.09m [ 59.99m ] | | 17 | SS 20 | 62 | 20-30-50-/ 80/0.13 | | | | 60 |
| **BEDROCK:** Fair to good quality grey limestone, with black shale partings | | | RC 4 | 99 | RQD 44 | | | | |
| | | 18 | RC 5 | 100 | RQD 75 | | | | 59 |
| | | 19 | RC 6 | 100 | RQD 73 | | | | 58 |
| - Increasing shale partings with depth | | 20 | | | | | | | 57 |
| | | 21 | RC 7 | 100 | RQD 90 | | | | 56 |
| | | 22 | RC 8 | 100 | RQD 70 | | | | 55 |
| | | 23 | | | | | | | 54 |
| | | 24 | RC 9 | 100 | RQD 58 | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366597.11 **NORTHING:** 5028376.13 **ELEVATION:** 77.08

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 16, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 12-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| - Calcium carbonate at 23.88 m depth | | 24 | RC 9 | | | | | | 53 |
| - Mud seam at 25.08 m depth | | 25 | RC 10 | 73 | RQD 13 | | | | 52 |
| - 100 mm thick mud seam at 25.64 m depth | | | | | | | | | |
| - 100 m to 150 m thick mud seam at 25.81 m depth | | 26 | RC 11 | 95 | RQD 68 | | | | 51 |
| - 150 mm thick mud seam at 27.64 m depth | | 27 | | | | | | | 50 |
| 29.31m [ 47.77m ] | | 28 | RC 12 | 88 | RQD 80 | | | | 49 |
| End of Borehole | | 29 | | | | | | | 48 |
| (GWL at 6.35 m depth - July 25, 2025) | | 30 | | | | | | | 47 |
| | | 31 | | | | | | | 46 |
| | | 32 | | | | | | | 45 |
| | | 33 | | | | | | | 44 |
| | | 34 | | | | | | | 43 |
| | | 35 | | | | | | | 42 |
| | | 36 | | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366565.05 **NORTHING:** 5028447.59 **ELEVATION:** 76.67

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 7, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 13-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | RECOVERY (%) | N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Brown silty sand, with gravel and crushed stone | | | SS 1 | 58 | 16-32-19-13 51 | | | | |
| 0.91m [ 75.76m ] | | | | | | | | | |
| **GLACIAL TILL:** Grey silty sand to sandy silt, with gravel, some clay, occasional cobbles | | 1 | SS 2 | 42 | 8-13-16-18 29 | | | | |
| | | 2 | SS 3 | 46 | 13-32-27-7 59 | | | | |
| | | | SS 4 | 35 | 26-50-/-/ 50/0.1 | | | | |
| | | 3 | SS 5 | 29 | 10-39-9-5 48 | | | | |
| | | 4 | SS 6 | 12 | 6-5-4-2 9 | | | | |
| | | 5 | SS 7 | 4 | 1-7-5-4 12 | | | | |
| | | 6 | SS 8 | 0 | 5-4-2-3 6 | | | | |
| | | | SS 9 | 21 | 5-7-9-15 16 | | | | |
| - Some cobbles and boulders by 7.11 m depth | | 7 | SS 10 | 0 | 5-50-/-/ 50/0.1 | | | 7.41 m 2025-07-25 | |
| | | | RC 1 | 63 | | | | | |
| 8.05m [ 68.62m ] | | 8 | SS 11 | 0 | 50-/-/-/ 50/0.05 | | | | |
| **BEDROCK:** Fair to excellent quality grey limestone | | | RC 2 | 100 | RQD 43 | | | | |
| - Some calcium carbonate from 9.35 to 9.40 m depth | | 9 | | | | | | 9.19m | |
| | | 10 | RC 3 | 100 | RQD 85 | | | | |
| - Some calcium carbonate from 11.23 m to 11.33 m depth | | 11 | | | | | | 10.71m | |
| | | 12 | RC 4 | 100 | RQD 92 | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366565.05 **NORTHING:** 5028447.59 **ELEVATION:** 76.67

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 7, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 13-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| - Some calcium carbonate from 11.73 m to 12.09 m depth<br>- Some black shale partings from 12.14 m to 13.56 m depth<br><br>- Some calcium carbonate from 13.77 m to 14.17 m depth | | 12 | RC 4 | | | | | | 64 |
| | | 13 | RC 5 | 100 | RQD 85 | | | | 63 |
| | | 14 | RC 6 | 100 | RQD 83 | | | | 62 |
| | | 15 | | | | | | | 61 |
| | | 16 | RC 7 | 100 | RQD 83 | | | | 60 |
| | | 17 | | | | | | | 59 |
| | | 18 | RC 8 | 100 | RQD 95 | | | | 58 |
| | | 19 | RC 9 | 100 | RQD 75 | | | | 57 |
| - Some calcium carbonate from 20.04 m to 20.42 m depth<br><br>- Some calcium carbonate from 21.13 m to 21.44 m depth | | 20 | | | | | | | 56 |
| | | 21 | RC 10 | 100 | RQD 82 | | | | 55 |
| 21.59m [ 55.08m ]<br>End of Borehole<br><br>(GWL at 7.41 m depth - July 25, 2025) | | 22 | | | | | | | 54 |
| | | 23 | | | | | | | 53 |
| | | 24 | | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366505.44 **NORTHING:** 5028512.76 **ELEVATION:** 76.52

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 10, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 14-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | RECOVERY (%) | N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Crushed stone and gravel | | | SS 1 | 71 | 2-3-3-2 6 | | | | 76 |
| 0.30m [ 76.22m ] | | | | | | | | | |
| **GLACIAL TILL:** Loose to compact, brown silty sand to sandy silt, with gravel, some clay, occasional cobbles and boulders | | 1 | SS 2 | 25 | 9-6-6-14 12 | | | | |
| | | | SS 3 | 71 | 10-13-5-/ 18/0.2 | | | | 75 |
| 1.83m [ 74.69m ] | | 2 | | | | | | | |
| **GLACIAL TILL:** Loose to compact, grey silty sand to sandy silt, with clay and gravel, occasional cobbles and boulders | | | SS 4 | 58 | 10-6-2-2 8 | | | | 74 |
| | | 3 | SS 5 | 62 | 7-3-6-9 9 | | | | |
| | | 4 | SS 6 | 0 | 50-/-/-/ 50/0 | | | | 73 |
| | | 5 | SS 7 | 8 | 1-7-14-10 21 | | | | 72 |
| | | 6 | SS 8 | 54 | 13-7-12-50 19 | | | | 71 |
| | | | SS 9 | 0 | 50-/-/-/ 50/0 | | | | |
| | | 7 | SS 10 | 60 | 20-32-39-26 71 | | | | 70 |
| | | 8 | RC 1 | 35 | | | | | 69 |
| 8.43m [ 68.09m ] | | | | | | | | | |
| **BEDROCK:** Good to excellent quality grey limestone, some black shale partings | | 9 | RC 2 | 100 | RQD 78 | | | | 68 |
| | | 10 | | | | | | | 67 |
| | | 11 | RC 3 | 100 | RQD 70 | | | | 66 |
| | | 12 | RC 4 | | | | | | 65 |

7.77 m 2025-07-25

9.20m

10.72m

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366505.44 **NORTHING:** 5028512.76 **ELEVATION:** 76.52

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:** **DATE:** July 10, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 14-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| - 10 mm thick mud seam at 13.64 m depth | | 12 | RC 4 | 100 | RQD 93 | | | | 64 |
| | | 13 | | | | | | | 63 |
| - 35 mm thick mud seam at 15.27 m depth | | 14 | RC 5 | 100 | RQD 78 | | | | 62 |
| - Fair to excellent quality grey limestone from 16.15 m to 17.37 m depth<br>- Vertical fracture from 16.46 m to 17.32 m depth | | 15 | RC 6 | 100 | RQD 73 | | | | 61 |
| | | 16 | | | | | | | 60 |
| - 25 mm thick mud seam at 18.54 m depth | | 17 | RC 7 | 100 | RQD 55 | | | | 59 |
| | | 18 | | | | | | | 58 |
| - 5 mm thick mud seam at 19.74 m depth | | 19 | RC 8 | 100 | RQD 67 | | | | 57 |
| 20.73m [ 55.79m ] | | 20 | RC 9 | 100 | RQD 85 | | | | 56 |
| End of Borehole<br><br>(GWL at 7.77 m depth - July 25, 2025) | | 21 | | | | | | | 55 |
| | | 22 | | | | | | | 54 |
| | | 23 | | | | | | | 53 |
| | | 24 | | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366650.12 **NORTHING:** 5028483.54 **ELEVATION:** 76.49

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 10, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 15-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | RECOVERY (%) | N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Crushed stone, with sand and gravel<br>0.56m [ 75.93m ] | | | SS 1 | 58 | 25-22-7-6<br>29 | | | | 76 |
| **FILL:** Dark brown silty sand, with gravel, some crushed stone and topsoil<br>0.69m [ 75.80m ] | | 1 | SS 2 | 12 | 12-3-4-5<br>7 | | | | |
| **FILL:** Grey crushed stone, with sand and gravel<br>1.45m [ 75.04m ] | | | SS 3 | 42 | 1-1-1-2<br>2 | | | | 75 |
| **FILL:** Brown to grey silty clay, some topsoil , trace organics<br>2.21m [ 74.28m ] | | 2 | SS 4 | 46 | 4-15-19-50<br>34 | | | | 74 |
| **FILL:** Brown silty sand, with gravel and crushed stone, occasional cobbles and boulders | | 3 | SS 5 | 42 | 1-12-9-8<br>21 | | | | 73 |
| | | 4 | SS 6 | 0 | 50-/-/-/<br>50/0.61 | | | | 72 |
| | | 5 | RC 1 | 52 | | | | | 71 |
| 6.12m [ 70.37m ] | | 6 | SS 7 | 34 | 5-6-50-/<br>56/0.28 | | | | 70 |
| **FILL:** Brown silty sand, with crushed stone and gravel, some clay and concrete, trace to some fibers<br>6.96m [ 69.53m ] | | 7 | RC 2 | 50 | | | | | 69 |
| **FILL:** Boulders, concrete and crushed stone, with sand, gravel and grout<br>7.87m [ 68.62m ] | | 8 | SS 7 | 42 | 4-3-4-3<br>7 | | | | 68 |
| **GLACIAL TILL:** Grey silty sand to sandy silt, with gravel, trace clay, occasional cobbles and boulders | | 9 | SS 8 | 0 | 4-5-3-5<br>8 | | | | 67 |
| 9.60m [ 66.89m ] | | | SS 9 | 39 | 5-6-5-4<br>11 | | | | |
| **BEDROCK:** Poor to fair quality grey limestone bedrock, with black shale partings<br>- Some clacium carbonate from 9.60 m to 9.80 m depth<br>- 10 mm thick mud seam at 11.10 m depth | | 10 | RC 3 | 100 | RQD 0 | | | | 66 |
| | | 11 | | | | | | | |
| | | 12 | RC 4 | 100 | RQD 58 | | | | 65 |

6.55m

9.60m

DISCLAIMER: THE DATA PRESENTED IN THIS SHEET IS THE PROPERTY OF PATERSON GROUP AND THE CLIENT FOR WHOM IT WAS PRODUCED. THIS SHEET SHOULD BE READ IN CONJUNCTION WITH ITS CORRESPONDING REPORT. PATERSON GROUP IS NOT RESPONSIBLE FOR THE UNAUTHORIZED USE OF THIS DATA.



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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366650.12 **NORTHING:** 5028483.54 **ELEVATION:** 76.49

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 10, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 15-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| - Calcium carbonate at 13.74 m depth<br>- Some interbedded calcium carbonate from 13.82 m to 14.94 m depth<br>- Good to excellent quality by 14.33 m depth | | 12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>22<br>23<br>24 | RC 4<br>RC 5<br>RC 6<br>RC 7<br>RC 8<br>RC 9<br>RC 10<br>RC 11 | 100<br>100<br>100<br>100<br>100<br>100 | RQD 62<br>RQD 83<br>RQD 70<br>RQD 65<br>RQD 88<br>RQD 80<br>RQD 76 | | | | 64<br>63<br>62<br>61<br>60<br>59<br>58<br>57<br>56<br>55<br>54<br>53 |
| - Calcium carbonate at 18.52 m depth | | | | | | | | | |
| - Calcium carbonate at 19.96 m depth | | | | | | | | | |
| 23.14m [ 53.35m ]<br>End of Borehole | | | | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366512.09 **NORTHING:** 5028570.07 **ELEVATION:** 75.51

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 8, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 16-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Gravel and crushed stone, some sand | | 0 | SS 1 | 33 | 11-21-15-11 36 | | | | 75 |
| | | 1 | SS 2 | 46 | 7-16-17-16 33 | | | | 74 |
| | | 2 | SS 3 | 50 | 15-12-10-9 22 | | | | 73 |
| | | | SS 4 | 8 | 6-3-3-3 6 | | | | |
| - Trace concrete at 3.05 m to 3.66 m depth | | 3 | SS 5 | 8 | 4-6-8-6 14 | | | | 72 |
| 3.73m [ 71.78m ] | | | | | | | | | |
| **FILL:** Loose to compact, brown silty sand to sandy sily, with gravel, occasional crushed stone and trace clay | | 4 | SS 6 | 29 | 4-4-4-10 8 | | | | 71 |
| | | 5 | SS 7 | 0 | 4-6-9-6 15 | | | | |
| | | | SS 8 | 0 | 3-3-3-4 6 | | | | 70 |
| | | 6 | SS 9 | 21 | 3-8-8-6 16 | | | | 69 |
| | | 7 | SS 10 | 0 | 15-9-8-6 17 | | | | 68 |
| 7.54m [ 67.97m ] | | | | | | | | | |
| **GLACIAL TILL:** Compact, grey sitly sand, with gravel, trace to some clay, ocasional cobbles | | 8 | SS 11 | 29 | 4-6-9-4 15 | | | | 67 |
| | | | SS 12 | 0 | 50-/-/-/ 50/0 | | | | |
| | | 9 | SS 13 | 0 | 50-/-/-/ 50/0 | | | | 66 |
| | | 10 | RC 1 | 30 | | | | | 65 |
| | | 11 | SS 14 | 4 | 4-7-6-5 13 | | | | 64 |
| | | | SS 15 | 0 | 50-/-/-/ 50/0 | | | | |
| | | 12 | RC 2 | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366512.09 **NORTHING:** 5028570.07 **ELEVATION:** 75.51

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 8, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 16-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| 13.11m [ 62.40m ] | | 12 | RC 2 | 83 | | | | | 63 |
| **BEDROCK:** Very poor quality, grey limestone, trace shale | | 13 | RC 3 | 100 | RQD 36 | | | | 62 |
| - Good to excellent quality by 14.02 m depth | | | RC 4 | 100 | RQD 24 | | | | |
| | | 14 | | | | | | | 61 |
| | | | RC 5 | 100 | RQD 92 | | | | |
| | | 15 | | | | | | | 60 |
| | | 16 | RC 6 | 100 | RQD 100 | | | | 59 |
| | | 17 | | | | | | | 58 |
| | | | RC 7 | 100 | RQD 82 | | | | |
| | | 18 | | | | | | | 57 |
| | | 19 | RC 8 | 100 | RQD 100 | | | | 56 |
| - Some black shale by 19.81 m depth | | 20 | | | | | | | 55 |
| | | | RC 9 | 100 | RQD 87 | | | | |
| | | 21 | | | | | | | 54 |
| | | 22 | RC 10 | 100 | RQD 87 | | | | 53 |
| | | 23 | | | | | | | |
| | | | RC 11 | 100 | RQD 97 | | | | 52 |
| | | 24 | | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366512.09 **NORTHING:** 5028570.07 **ELEVATION:** 75.51

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

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**REMARKS:**

**DATE:** July 8, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 16-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | PIEZOMETER CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| 24.66m [ 50.85m ] | | 24 | RC 11 | | | | | | 51 |
| End of Borehole | | 25 | | | | | | | 50 |
| | | 26 | | | | | | | 49 |
| | | 27 | | | | | | | 48 |
| | | 28 | | | | | | | 47 |
| | | 29 | | | | | | | 46 |
| | | 30 | | | | | | | 45 |
| | | 31 | | | | | | | 44 |
| | | 32 | | | | | | | 43 |
| | | 33 | | | | | | | 42 |
| | | 34 | | | | | | | 41 |
| | | 35 | | | | | | | 40 |
| | | 36 | | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366677.39 **NORTHING:** 5028546.01 **ELEVATION:** 73.37

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 8, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 17-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | RECOVERY (%) | N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Brown silty clay, with sand, some gravel, trace brick | | | SS 1 | | 2-3-3-7 | | | | |
| 0.69m [ 72.68m ] | | | | | 6 | | | | |
| **FILL:** Gravel and crushed stone, with silty sand | | 1 | SS 2 | 71 | 49-50-/-/ 50/0.03 | | | | |
| | | 2 | SS 3 | 29 | 6-19-23-22 42 | | | | |
| - Some silty clay and topsoil at 2.29 m depth | | | | | | | | | |
| 2.44m [ 70.93m ] | | | SS 4 | 54 | 9-4-3-3 7 | | | | |
| **GLACIAL TILL:** Loose, brown silty sand to sandy silt, with gravel, trace clay, occasional cobbles and boulders | | 3 | SS 5 | 21 | 5-4-6-5 10 | | | | |
| - Compact by 3.05 m depth | | 4 | SS 6 | 29 | 9-9-9-7 18 | | | | |
| 4.50m [ 68.87m ] | | | | | | | | | |
| **GLACIAL TILL:** Very stiff to stiff, grey silty clay, with sand and gravel, occasional cobbles and boulders | | 5 | SS 7 | 75 | 2-3-3-3 6 | | | | |
| | | 6 | SS 8 | 62 | 3-3-2-5 5 | | | | |
| | | | SS 9 | 50 | 4-2-2-4 4 | | | | |
| | | 7 | SS 10 | 50 | 10-4-4-4 8 | | | | |
| 7.65m [ 65.72m ] | | | | | | | | | |
| **BEDROCK:** Fair to good quality limestone | | 8 | RC 1 | 100 | RQD 50 | | | | |
| | | 9 | RC 2 | 100 | RQD 47 | | | | |
| | | 10 | | | | | | | |
| | | 11 | RC 3 | 98 | RQD 70 | | | | |
| | | 12 | RC 4 | | | | | | |

3.52 m 2025-07-25

7.55m

9.07m

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366677.39 **NORTHING:** 5028546.01 **ELEVATION:** 73.37

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 8, 2025

**FILE NO. :** PG6982

**HOLE NO. :** BH 17-25

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | SAMPLE WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| - 25 mm thick mud seam at 12.88 m depth<br>- 50 mm thick clay seam at 12.90 m depth<br>- 25 mm thick clay seam at 13.18 m depth<br>- 15 mm thick mud seam at 13.23 m depth | | 12 | RC 4 | 77 | RQD 40 | | | | 61 |
| | | 13 | RC 5 | 100 | RQD 80 | | | | 60 |
| | | 14 | RC 6 | 100 | RQD 73 | | | | 59 |
| | | 15 | RC 7 | 98 | RQD 68 | | | | 58 |
| | | 16 | | | | | | | 57 |
| | | 17 | RC 8 | 100 | RQD 84 | | | | 56 |
| 17.60m [ 55.77m ] | | | | | | | | | |
| End of Borehole<br><br>(GWL at 3.52 m depth - July 25, 2025) | | 18 | | | | | | | 55 |
| | | 19 | | | | | | | 54 |
| | | 20 | | | | | | | 53 |
| | | 21 | | | | | | | 52 |
| | | 22 | | | | | | | 51 |
| | | 23 | | | | | | | 50 |
| | | 24 | | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366540.66 **NORTHING:** 5028368.30 **ELEVATION:** 76.50

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 7, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 18-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) / UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| GROUND SURFACE | | | | | | | | | |
| **FILL:** Brown silty sand, with crushed stone | | | AU 1 | | | | | | |
| 0.69m [ 75.81m ] | | | | | | | | | |
| **GLACIAL TILL:** Loose, brown silty sand, with gravel, occasional cobbles and boulders | | 1 | SS 1 | 37 | 1-2-1-2 3 | | | | |
| | | 2 | SS 2 | 37 | 3-2-2-1 4 | | | | |
| 2.21m [ 74.29m ] | | | | | | | | | |
| **GLACIAL TILL:** Loose to very dense, grey silty sand, with gravel, trace to some clay, occasional cobbles and boulders | | 3 | SS 3 | 9 | 1-2-3-5 5 | | | | |
| | | | SS 4 | 0 | 50-/-/-/ 50/0 | | | | |
| | | 4 | SS 5 | 0 | 50-/-/-/ 50/0.1 | | | | |
| | | | RC 1 | 65 | | | | | |
| | | 5 | SS 6 | 0 | 50-/-/-/ 50/0.03 | | | 5.07 m 2025-07-25 | |
| | | | SS 6 | 0 | 50-/-/-/ 50/0 | | | | |
| | | 6 | SS 7 | 0 | 50-/-/-/ 50/0 | | | | |
| | | 7 | | | | | | | |
| | | 8 | RC 2 | 32 | | | | | |
| | | 9 | SS 8 | 0 | 50-/-/-/ 50/0.03 | | | 9.29m | |
| 10.03m [ 66.47m ] | | | | | | | | | |
| **BEDROCK:** Fair quality, grey limestone | | 10 | RC 3 | 100 | RQD 64 | | | 10.81m | |
| - Vertical fracture from 11.84 m to 12.29 m depth | | 11 | | | | | | | |
| | | 12 | RC 4 | | | | | | |

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# SOIL PROFILE AND TEST DATA

## Geotechnical Investigation

900 Carling Avenue, Ottawa, ON

**COORD. SYS.:** MTM ZONE 9 **EASTING:** 366540.66 **NORTHING:** 5028368.30 **ELEVATION:** 76.50

**PROJECT:** The Ottawa Hospital - Civic Campus Redevelopment Project

**ADVANCED BY:** CME-55 Low Clearance Drill

**REMARKS:**

**DATE:** July 7, 2025

**FILE NO. :** **PG6982**

**HOLE NO. :** **BH 18-25**

| SAMPLE DESCRIPTION | STRATA PLOT | DEPTH (m) | SAMPLE TYPE AND NO. | SAMPLE RECOVERY (%) | SAMPLE N OR RQD | WATER CONTENT (%) | PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80 | MONITORING WELL CONSTRUCTION | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|
| - Good quality bedrock by 13.41 m depth<br>- Black shale partings by 13.72 m depth<br>17.37m [ 59.13m ] | | 12<br>13<br>14<br>15<br>16<br>17 | RC 4<br>RC 5<br>RC 6<br>RC 7 | 100<br>100<br>100<br>100 | RQD 42<br>RQD 62<br>RQD 75<br>RQD 87 | | | | 64<br>63<br>62<br>61<br>60 |
| End of Borehole<br><br>(GWL at 5.07 m depth - July 25, 2025) | | 18<br>19<br>20<br>21<br>22<br>23<br>24 | | | | | | | 59<br>58<br>57<br>56<br>55<br>54<br>53 |

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# 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 relative strength of cohesionless soils is the compactness condition, 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. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

| Compactness Condition | '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 shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

| 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, $S_t$, is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

| | |
|---|---|
| Low Sensitivity: | $S_t < 2$ |
| Medium Sensitivity: | $2 < S_t < 4$ |
| Sensitive: | $4 < S_t < 8$ |
| Extra Sensitive: | $8 < S_t < 16$ |
| Quick Clay: | $S_t > 16$ |

## 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 NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, 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, generally recovered using a piston sampler |
| G | - | "Grab" sample from test pit or surface materials |
| AU | - | Auger sample or bulk sample |
| WS | - | Wash sample |
| RC | - | Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits. |

## SYMBOLS AND TERMS (continued)

### PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

| | | |
|---|---|---|
| WC% | - | Natural water 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 at 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

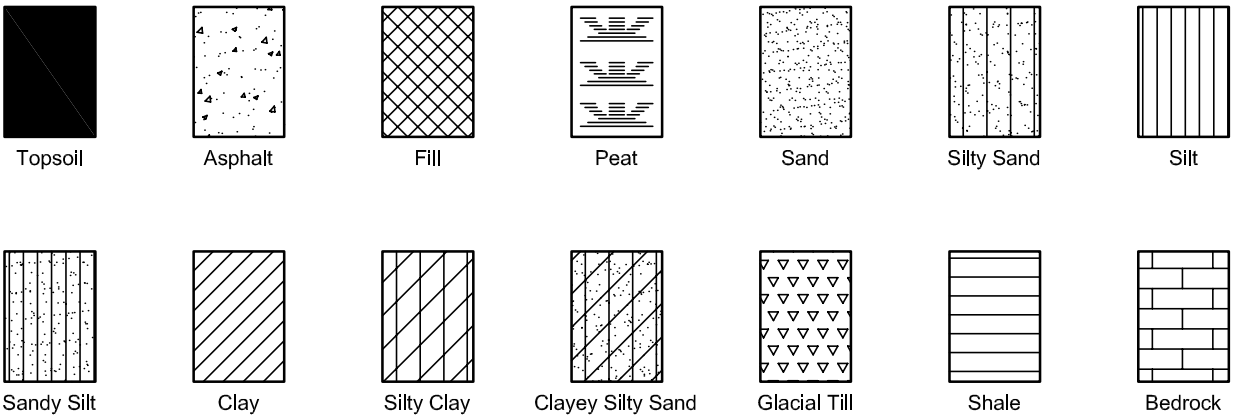
| | | |
|---|---|---|
| $p'_o$ | - | Present effective overburden pressure at sample depth |
| $p'_c$ | - | Preconsolidation pressure of (maximum past pressure on) sample |
| Ccr | - | Recompression index (in effect at pressures below $p'_c$) |
| Cc | - | Compression index (in effect at pressures above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

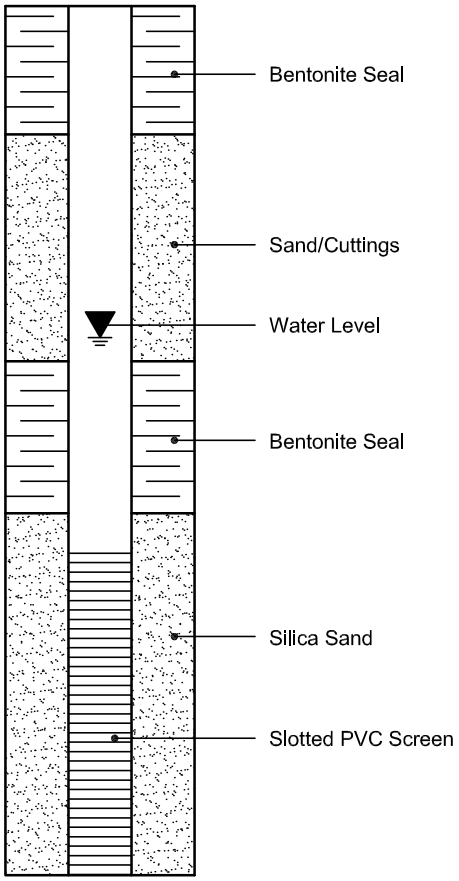
# SYMBOLS AND TERMS (continued)

## STRATA PLOT

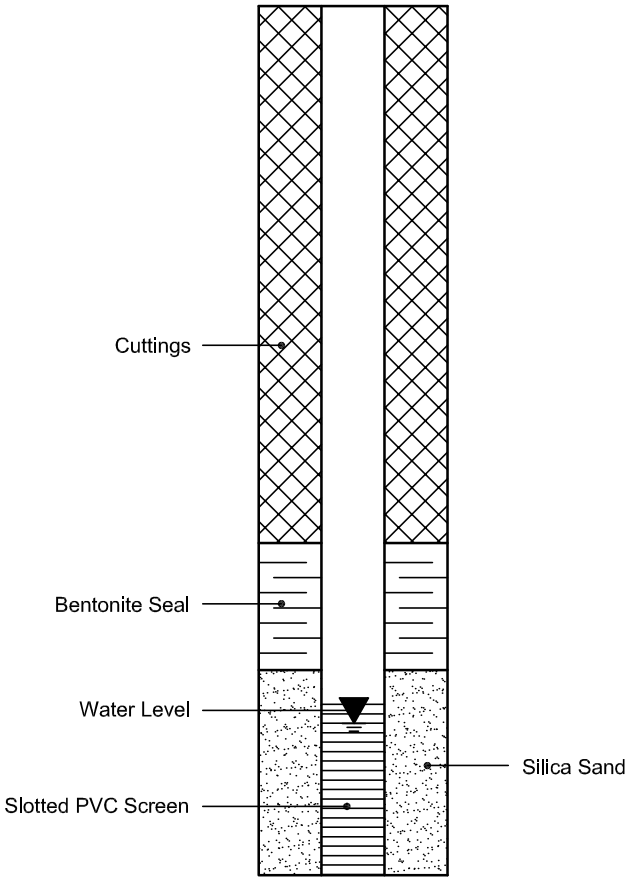



## MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



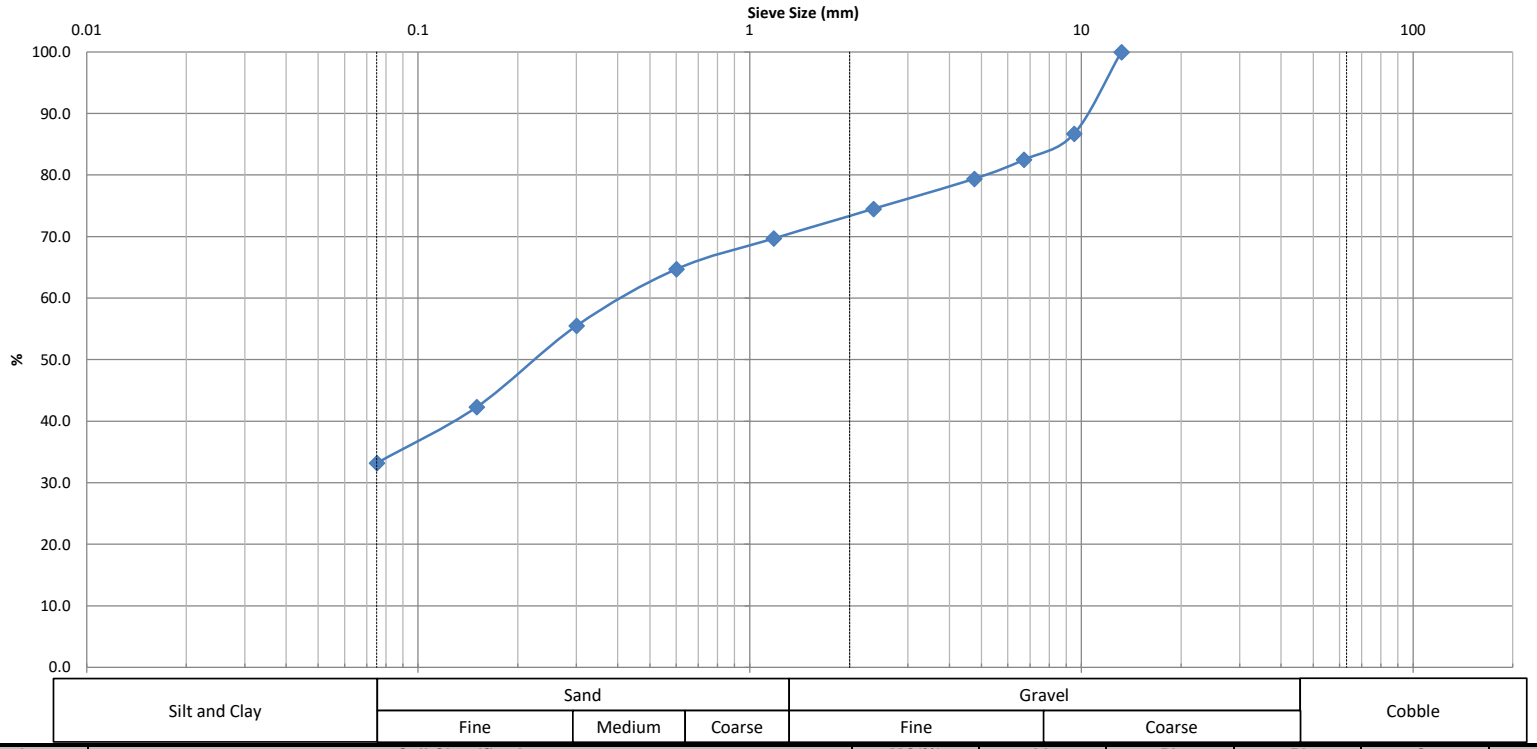

PIEZOMETER CONSTRUCTION



PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 61208 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE RECEIVED: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH11-25 SS6 | DATE REPORTED: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 12'6" - 14'6" | TESTED BY: | AG/HK |




| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 0.76 | 41.2 |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | 13.2 | 0.412 | 0.056 | 0.01 | 20.6 | 46.2 | | 33.2 | | | |

**Comments:**

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO.: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 61208 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE REC'D: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH11-25 SS6 | DATE REP'D: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 12'6" - 14'6" | TESTED BY: | AG/HK |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 559.2 |
| **WEIGHT AFTER WASH** | 394.1 |

| 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 | | | | | | |
| 13.2 | **0.0** | 0.0 | **100.0** | | | |
| 9.5 | **74.1** | 13.3 | **86.7** | | | |
| 6.7 | **98.0** | 17.5 | **82.5** | | | |
| 4.75 | **115.2** | 20.6 | **79.4** | | | |
| 2.36 | **142.5** | 25.5 | **74.5** | | | |
| 1.18 | **169.3** | 30.3 | **69.7** | | | |
| 0.6 | **197.4** | 35.3 | **64.7** | | | |
| 0.3 | **248.7** | 44.5 | **55.5** | | | |
| 0.15 | **322.8** | 57.7 | **42.3** | | | |
| 0.075 | **373.3** | 66.8 | **33.2** | | | |
| PAN | **394.1** | 70.5 | 29.5 | | | |
| SIEVE CHECK FINE | | 0.00 | 0.3% max. | | | **REFERENCE MATERIAL** |

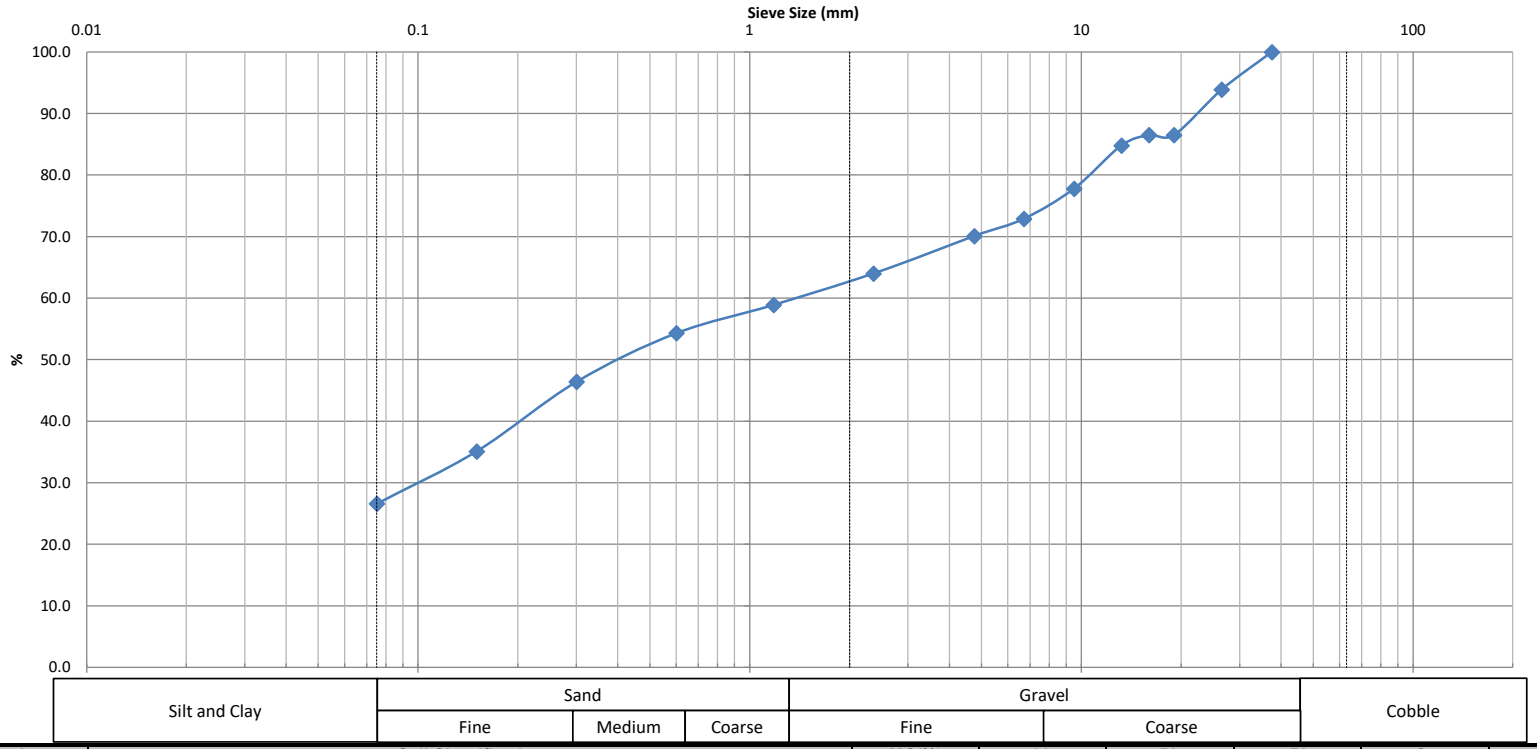
| OTHER TESTS | RESULT | LAB NO. | RESULT |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 61210 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE RECEIVED: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH12-25 SS9 | DATE REPORTED: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 20' - 22' | TESTED BY: | AG/HK |




| Silt and Clay | Sand | | | Gravel | | Cobble |
|---|---|---|---|---|---|---|
| | Fine | Medium | Coarse | Fine | Coarse | |

| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 0.43 | 103.3 |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | 37.5 | 1.55 | 0.1 | 0.015 | 29.9 | 43.5 | | 26.6 | | | |

**Comments:**

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO.: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 61210 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE REC'D: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH12-25 SS9 | DATE REP'D: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 20' - 22' | TESTED BY: | AG/HK |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 688.4 |
| **WEIGHT AFTER WASH** | 522.5 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | **0.0** | 0.0 | **100.0** | | | |
| 26.5 | **42.1** | 6.1 | **93.9** | | | |
| 19 | **93.0** | 13.5 | **86.5** | | | |
| 16 | **93.0** | 13.5 | **86.5** | | | |
| 13.2 | **104.3** | 15.2 | **84.8** | | | |
| 9.5 | **152.6** | 22.2 | **77.8** | | | |
| 6.7 | **186.8** | 27.1 | **72.9** | | | |
| 4.75 | **205.9** | 29.9 | **70.1** | | | |
| 2.36 | **247.5** | 36.0 | **64.0** | | | |
| 1.18 | **282.9** | 41.1 | **58.9** | | | |
| 0.6 | **314.7** | 45.7 | **54.3** | | | |
| 0.3 | **369.3** | 53.6 | **46.4** | | | |
| 0.15 | **446.8** | 64.9 | **35.1** | | | |
| 0.075 | **505.1** | 73.4 | **26.6** | | | |
| PAN | **522.5** | | | | | |
| SIEVE CHECK FINE | | 0.00 | 0.3% max. | | | **REFERENCE MATERIAL** |

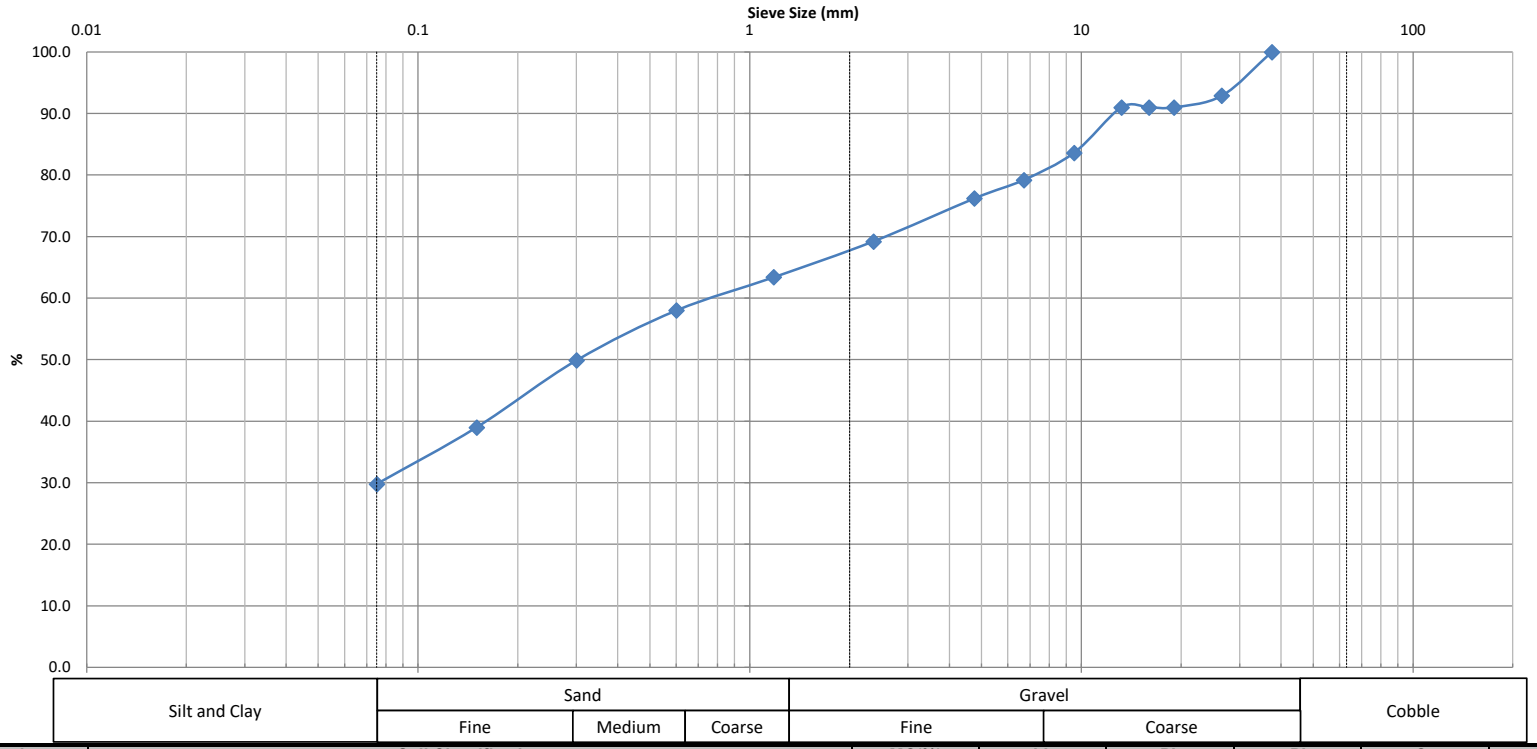
| **OTHER TESTS** | **RESULT** | **LAB NO.** | **RESULT** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 61211 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE RECEIVED: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH13-25 SS3 | DATE REPORTED: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 5' - 7' | TESTED BY: | AG/HK |




| Identification | Soil Classification | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.33 | 35.5 |

| D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|
| 37.5 | 0.78 | 0.075 | 0.022 | 23.8 | 46.4 | 29.8 | |

**Comments:**

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO.: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 61211 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE REC'D: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH13-25 SS3 | DATE REP'D: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 5' - 7' | TESTED BY: | AG/HK |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 518.6 |
| **WEIGHT AFTER WASH** | 375.8 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | **0.0** | 0.0 | **100.0** | | | |
| 26.5 | **37.0** | 7.1 | **92.9** | | | |
| 19 | **46.9** | 9.0 | **91.0** | | | |
| 16 | **46.9** | 9.0 | **91.0** | | | |
| 13.2 | **46.9** | 9.0 | **91.0** | | | |
| 9.5 | **85.2** | 16.4 | **83.6** | | | |
| 6.7 | **107.7** | 20.8 | **79.2** | | | |
| 4.75 | **123.5** | 23.8 | **76.2** | | | |
| 2.36 | **159.7** | 30.8 | **69.2** | | | |
| 1.18 | **189.7** | 36.6 | **63.4** | | | |
| 0.6 | **217.7** | 42.0 | **58.0** | | | |
| 0.3 | **259.8** | 50.1 | **49.9** | | | |
| 0.15 | **316.3** | 61.0 | **39.0** | | | |
| 0.075 | **363.8** | 70.2 | **29.8** | | | |
| PAN | **375.8** | | | | | |
| SIEVE CHECK FINE | | 0.00 | 0.3% max. | | | **REFERENCE MATERIAL** |

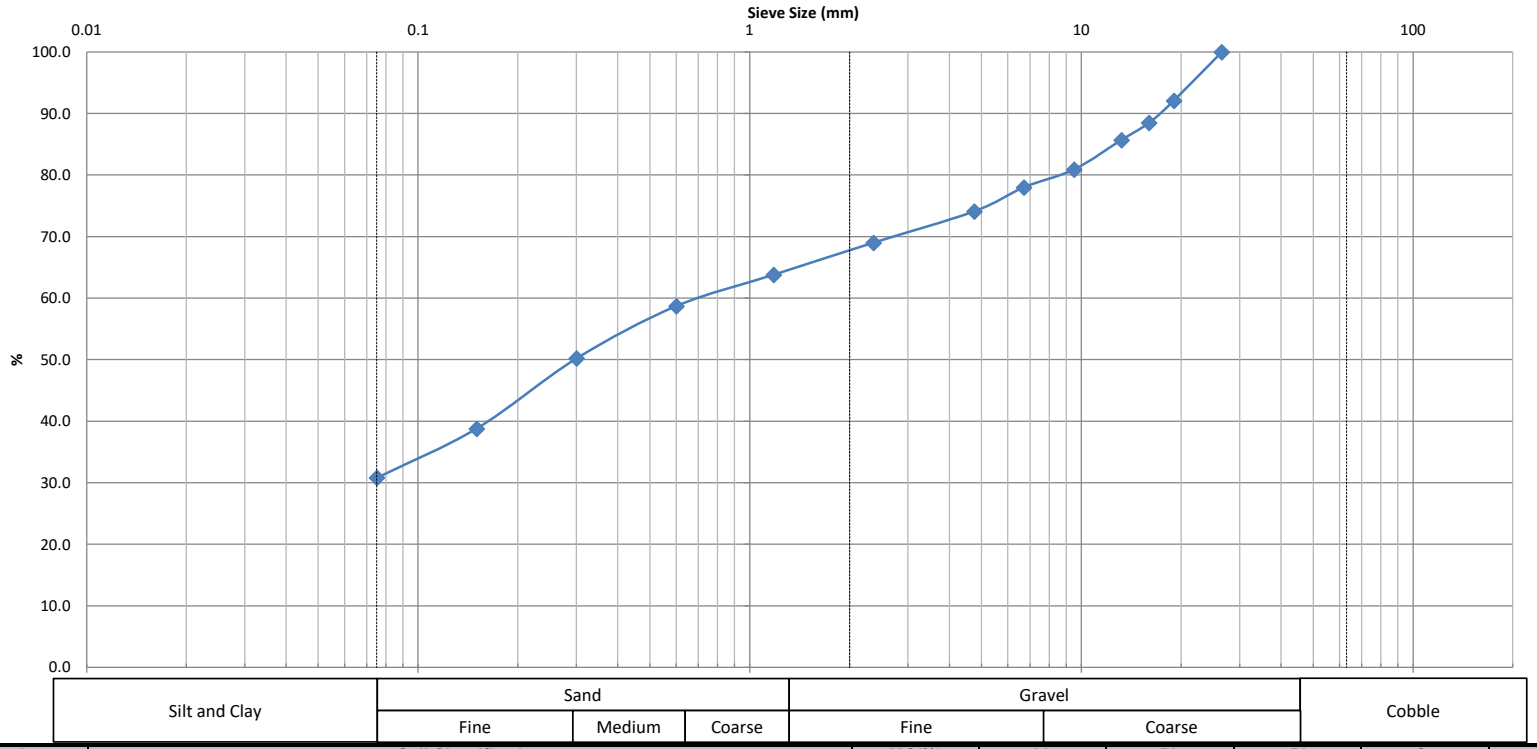
| **OTHER TESTS** | **RESULT** | **LAB NO.** | **RESULT** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 61213 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE RECEIVED: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH14-25 SS8 | DATE REPORTED: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 17'6" - 19'6" | TESTED BY: | AG/HK |




| Identification | Soil Classification | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.51 | 71.0 |

| D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|
| 26.5 | 0.71 | 0.06 | 0.01 | 25.9 | 43.3 | 30.8 | |

**Comments:**

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO.: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 61213 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE REC'D: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH14-25 SS8 | DATE REP'D: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 17'6" - 19'6" | TESTED BY: | AG/HK |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 613.3 |
| **WEIGHT AFTER WASH** | 440.4 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | | | | | | |
| 26.5 | **0.0** | 0.0 | **100.0** | | | |
| 19 | **48.2** | 7.9 | **92.1** | | | |
| 16 | **70.5** | 11.5 | **88.5** | | | |
| 13.2 | **87.6** | 14.3 | **85.7** | | | |
| 9.5 | **117.2** | 19.1 | **80.9** | | | |
| 6.7 | **134.8** | 22.0 | **78.0** | | | |
| 4.75 | **159.0** | 25.9 | **74.1** | | | |
| 2.36 | **190.3** | 31.0 | **69.0** | | | |
| 1.18 | **222.0** | 36.2 | **63.8** | | | |
| 0.6 | **253.4** | 41.3 | **58.7** | | | |
| 0.3 | **305.3** | 49.8 | **50.2** | | | |
| 0.15 | **375.5** | 61.2 | **38.8** | | | |
| 0.075 | **424.2** | 69.2 | **30.8** | | | |
| PAN | **440.4** | | | | | |
| SIEVE CHECK FINE | | 0.00 | 0.3% max. | | | **REFERENCE MATERIAL** |

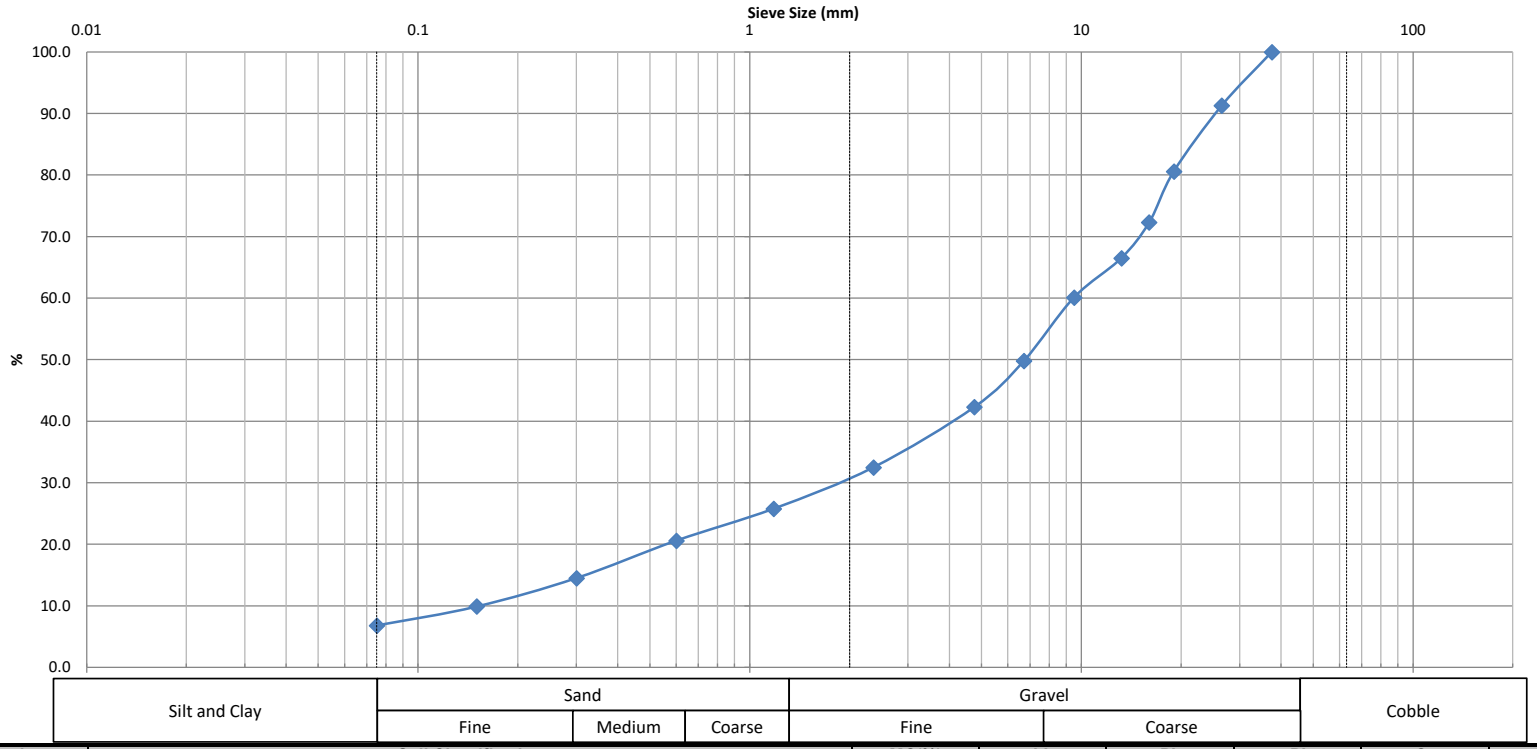
| **OTHER TESTS** | **RESULT** | **LAB NO.** | **RESULT** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 61209 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE RECEIVED: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH15-25 SS4, SS5 | DATE REPORTED: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 7'6" - 12' | TESTED BY: | AG/HK |




| Silt and Clay | Sand | | | Gravel | | Cobble |
|---|---|---|---|---|---|---|
| | Fine | Medium | Coarse | Fine | Coarse | |

| Identification | Soil Classification | | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 2.38 | 59.4 |
| | D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | | Silt (%) | | Clay (%) | |
| | 37.5 | 9.5 | 1.9 | 0.16 | 57.7 | 35.5 | | 6.8 | | | |

**Comments:**

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO.: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 61209 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE REC'D: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH15-25 SS4, SS5 | DATE REP'D: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 7'6" - 12' | TESTED BY: | AG/HK |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 811.1 |
| **WEIGHT AFTER WASH** | 760.9 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | **0.0** | 0.0 | **100.0** | | | |
| 26.5 | **70.6** | 8.7 | **91.3** | | | |
| 19 | **157.7** | 19.4 | **80.6** | | | |
| 16 | **224.7** | 27.7 | **72.3** | | | |
| 13.2 | **271.8** | 33.5 | **66.5** | | | |
| 9.5 | **323.7** | 39.9 | **60.1** | | | |
| 6.7 | **407.5** | 50.2 | **49.8** | | | |
| 4.75 | **467.6** | 57.7 | **42.3** | | | |
| 2.36 | **547.6** | 67.5 | **32.5** | | | |
| 1.18 | **601.6** | 74.2 | **25.8** | | | |
| 0.6 | **643.8** | 79.4 | **20.6** | | | |
| 0.3 | **693.1** | 85.5 | **14.5** | | | |
| 0.15 | **730.4** | 90.1 | **9.9** | | | |
| 0.075 | **755.7** | 93.2 | **6.8** | | | |
| PAN | **760.5** | 93.8 | 6.2 | | | |
| SIEVE CHECK FINE | | 0.05 | 0.3% max. | | | **REFERENCE MATERIAL** |

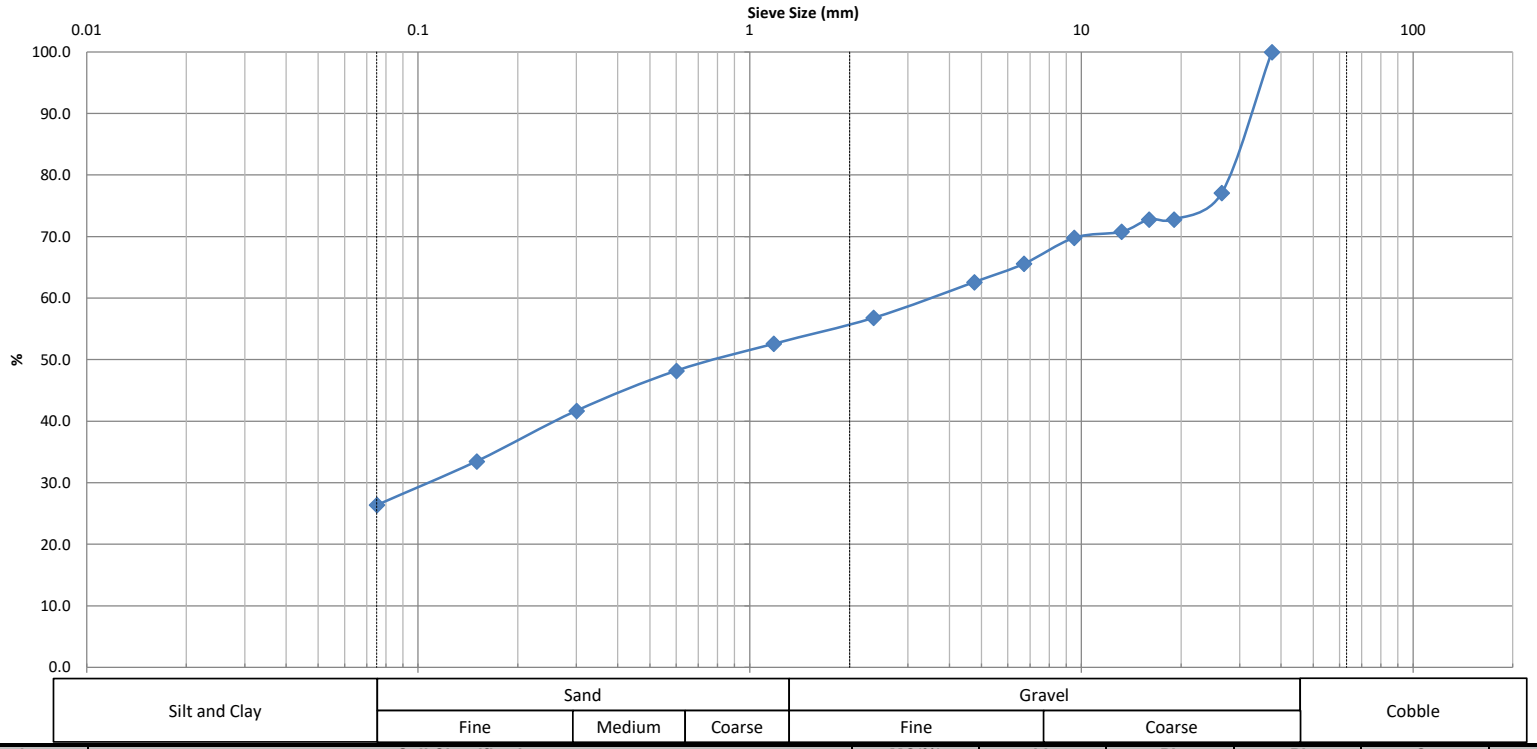
| **OTHER TESTS** | **RESULT** | **LAB NO.** | **RESULT** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 61214 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE RECEIVED: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH16-25 SS11 | DATE REPORTED: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 25' - 27' | TESTED BY: | AG/HK |




| Identification | Soil Classification | | | | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 0.18 | 205.6 |

| D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|
| 37.5 | 3.7 | 0.11 | 0.018 | 37.4 | 36.2 | 26.4 | |

**Comments:**

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO.: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 61214 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE REC'D: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH16-25 SS11 | DATE REP'D: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 25' - 27' | TESTED BY: | AG/HK |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 324.6 |
| **WEIGHT AFTER WASH** | 244.4 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | **0.0** | 0.0 | **100.0** | | | |
| 26.5 | **74.2** | 22.9 | **77.1** | | | |
| 19 | **88.2** | 27.2 | **72.8** | | | |
| 16 | **88.2** | 27.2 | **72.8** | | | |
| 13.2 | **94.7** | 29.2 | **70.8** | | | |
| 9.5 | **97.9** | 30.2 | **69.8** | | | |
| 6.7 | **111.8** | 34.4 | **65.6** | | | |
| 4.75 | **121.4** | 37.4 | **62.6** | | | |
| 2.36 | **140.1** | 43.2 | **56.8** | | | |
| 1.18 | **154.0** | 47.4 | **52.6** | | | |
| 0.6 | **168.0** | 51.8 | **48.2** | | | |
| 0.3 | **189.2** | 58.3 | **41.7** | | | |
| 0.15 | **216.0** | 66.5 | **33.5** | | | |
| 0.075 | **238.9** | 73.6 | **26.4** | | | |
| PAN | **244.2** | | | | | |
| SIEVE CHECK FINE | | 0.08 | 0.3% max. | | | **REFERENCE MATERIAL** |

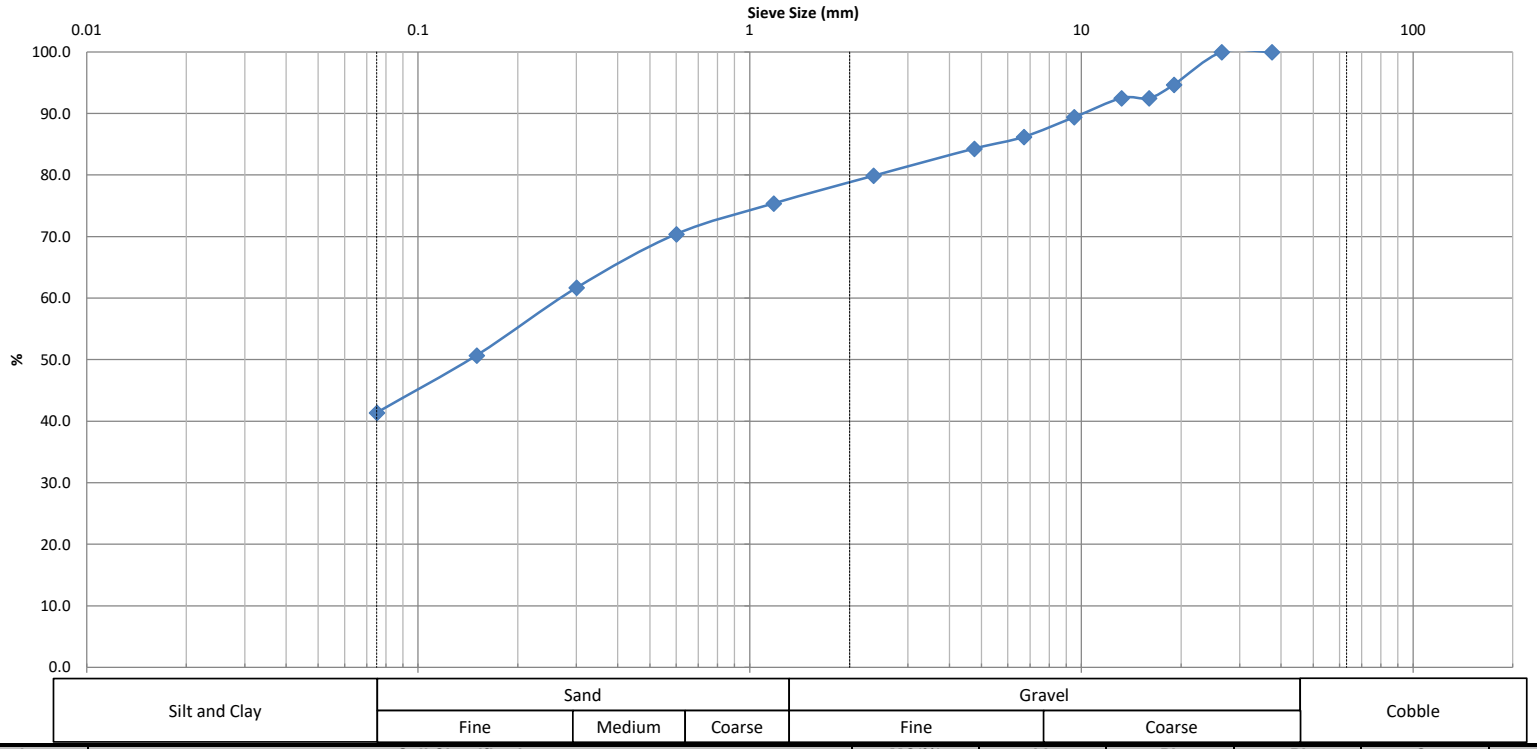
| **OTHER TESTS** | **RESULT** | **LAB NO.** | **RESULT** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO: | 61212 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE RECEIVED: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH17-25 SS8 | DATE REPORTED: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 17'6" - 19'6" | TESTED BY: | AG/HK |




| Identification | Soil Classification | MC(%) | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| | | | | | | 0.22 | 28.0 |

| D100 | D60 | D30 | D10 | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|
| 26.5 | 0.28 | 0.025 | 0.01 | 15.7 | 42.9 | 41.4 | |

**Comments:**

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

PATERSON GROUP

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

| | | | | | |
|---|---|---|---|---|---|
| CLIENT: | PCL/ED | DESCRIPTION: | - | FILE NO.: | PG6982 |
| CONTRACT NO.: | - | SPECIFICATION: | - | LAB NO.: | 61212 |
| PROJECT: | 930 Carling Avenue - Ottawa | INTENDED USE: | - | DATE REC'D: | 17-Jul-25 |
| | | PIT OR QUARRY: | - | DATE TESTED: | 18-Jul-25 |
| DATE SAMPLED: | 7-15-Jul-25 | SOURCE LOCATION: | BH17-25 SS8 | DATE REP'D: | 28-Jul-25 |
| SAMPLED BY: | D.R. | SAMPLE LOCATION: | 17'6" - 19'6" | TESTED BY: | AG/HK |

| | |
|---|---|
| **WEIGHT BEFORE WASH** | 875.9 |
| **WEIGHT AFTER WASH** | 521.3 |

| SIEVE SIZE (mm) | WEIGHT RETAINED | PERCENT RETAINED | PERCENT PASSING | LOWER SPEC | UPPER SPEC | REMARK |
|---|---|---|---|---|---|---|
| 150 | | | | | | |
| 106 | | | | | | |
| 75 | | | | | | |
| 63 | | | | | | |
| 53 | | | | | | |
| 37.5 | **0.0** | 0.0 | **100.0** | | | |
| 26.5 | **0.0** | 0.0 | **100.0** | | | |
| 19 | **46.3** | 5.3 | **94.7** | | | |
| 16 | **66.1** | 7.5 | **92.5** | | | |
| 13.2 | **66.1** | 7.5 | **92.5** | | | |
| 9.5 | **93.2** | 10.6 | **89.4** | | | |
| 6.7 | **121.3** | 13.8 | **86.2** | | | |
| 4.75 | **137.2** | 15.7 | **84.3** | | | |
| 2.36 | **176.2** | 20.1 | **79.9** | | | |
| 1.18 | **215.9** | 24.6 | **75.4** | | | |
| 0.6 | **258.9** | 29.6 | **70.4** | | | |
| 0.3 | **335.2** | 38.3 | **61.7** | | | |
| 0.15 | **432.0** | 49.3 | **50.7** | | | |
| 0.075 | **513.5** | 58.6 | **41.4** | | | |
| PAN | **521.0** | | | | | |
| SIEVE CHECK FINE | | 0.06 | 0.3% max. | | | **REFERENCE MATERIAL** |

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

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

PATERSON GROUP

**BEDROCK CORE COMPRESSIVE STRENGTH**

| | | | |
|---|---|---|---|
| CLIENT: | **PCL/ED Joint Venture** | | FILE No.: **PG6982** |
| PROJECT: | TOH - New Civic Hospital | | REPORT No.: 1 |
| SITE ADDRESS: | **930 Carling Ave.** | | DATE REPT'D: 23-Jul-25 |
| STRUCTURE TYPE & LOCATION: | Bedrock Cores | | |
| **SAMPLE INFORAMTION** | | | |
| LAB NO.: | **61176** | **61177** | **61178** |
| SAMPLE NO.: | BH13-25-RC2 | BH17-25-RC1 | BH16-25-RC5 |
| LOCATION: | 28'5" to 28'9" | 26'2" to 26'6" | 46'1" to 46'5" |
| **SAMPLE DATES** | | | |
| DATE CAST | - | - | - |
| DATE CORED | 7-Jul to 15-Jul, 2025 | 7-Jul to 15-Jul, 2025 | 7-Jul to 15-Jul, 2025 |
| DATE RECEIVED | 17-Jul-25 | 17-Jul-25 | 17-Jul-25 |
| DATE TESTED | 21-Jul-25 | 21-Jul-25 | 21-Jul-25 |
| **SAMPLE DIMENSIONS** | | | |
| AVERAGE DIAMETER (mm) | 60.00 | 60.00 | 60.00 |
| HEIGHT (mm) | 102.00 | 101.00 | 95.00 |
| WEIGHT (g) | 800 | 780 | 760 |
| AREA ($mm^2$) | 2827 | 2827 | 2827 |
| VOLUME ($cm^3$) | 288 | 286 | 269 |
| **UNIT WEIGHT ($kg/m^3$)** | **2774** | **2731** | **2829** |
| **TEST RESULTS** | | | |
| H / D RATIO | 1.70 | 1.68 | 1.58 |
| CORRECTION FACTOR | 0.976 | 0.974 | 0.966 |
| LOAD (lbs) | 28300 | 33900 | 56500 |
| GROSS Mpa | 44.5 | 53.3 | 88.9 |
| **MPa CORRECTED** | **43.5** | **51.9** | **85.9** |
| FORM OF BREAK | **Type A** | **Type A** | **Type A** |
| DIRECTION OF LOADING | PARALLEL | PARALLEL | PARALLEL |
| CURING CONDITIONS | SITE→→→

PATERSON GROUP

# BEDROCK CORE COMPRESSIVE STRENGTH

| | | | |
|---|---|---|---|
| CLIENT: | **PCL/ED Joint Venture** | | FILE No.: **PG6982** |
| PROJECT: | TOH - New Civic Hospital | | REPORT No.: 2 |
| SITE ADDRESS: | **930 Carling Ave.** | | DATE REPT'D: 23-Jul-25 |
| STRUCTURE TYPE & LOCATION: | Bedrock Cores | | |
| **SAMPLE INFORAMTION** | | | |
| LAB NO.: | **61179** | **61180** | **61181** |
| SAMPLE NO.: | BH14-25-RC3 | BH11-25-RC5 | BH15-25-RC4 |
| LOCATION: | 34'8" to 35'0" | 43'9" to 44'1" | 66'5" to 66'9" |
| **SAMPLE DATES** | | | |
| DATE CAST | - | - | - |
| DATE CORED | 7-Jul to 15-Jul, 2025 | 7-Jul to 15-Jul, 2025 | 7-Jul to 15-Jul, 2025 |
| DATE RECEIVED | 17-Jul-25 | 17-Jul-25 | 17-Jul-25 |
| DATE TESTED | 21-Jul-25 | 21-Jul-25 | 21-Jul-25 |
| **SAMPLE DIMENSIONS** | | | |
| AVERAGE DIAMETER (mm) | 60.00 | 60.00 | 60.00 |
| HEIGHT (mm) | 108.00 | 102.00 | 104.00 |
| WEIGHT (g) | 840 | 780 | 820 |
| AREA ($mm^2$) | 2827 | 2827 | 2827 |
| VOLUME ($cm^3$) | 305 | 288 | 294 |
| **UNIT WEIGHT ($kg/m^3$)** | **2751** | **2705** | **2789** |
| **TEST RESULTS** | | | |
| H / D RATIO | 1.80 | 1.70 | 1.73 |
| CORRECTION FACTOR | 0.984 | 0.976 | 0.978 |
| LOAD (lbs) | 50200 | 48600 | 45400 |
| GROSS Mpa | 79.0 | 76.5 | 71.4 |
| **MPa CORRECTED** | **77.7** | **74.6** | **69.9** |
| FORM OF BREAK | **Type A** | **Type A** | **Type A** |
| DIRECTION OF LOADING | PARALLEL | PARALLEL | PARALLEL |
| CURING CONDITIONS | SITE→→→

PATERSON GROUP

**BEDROCK CORE COMPRESSIVE STRENGTH**

| | | | |
|---|---|---|---|
| CLIENT: | **PCL/ED Joint Venture** | FILE No.: | **PG6982** |
| PROJECT: | TOH - New Civic Hospital | REPORT No.: | 3 |
| SITE ADDRESS: | **930 Carling Ave.** | DATE REPT'D: | 23-Jul-25 |
| STRUCTURE TYPE & LOCATION: | Bedrock Cores | | |

| | | | |
|---|---|---|---|
| **SAMPLE INFORAMTION** | | | |
| LAB NO.: | **61182** | | |
| SAMPLE NO.: | BH12-25-RC7 | | |
| LOCATION: | 66'5" to 66'9" | | |
| **SAMPLE DATES** | | | |
| DATE CAST | - | | |
| DATE CORED | 7-Jul to 15-Jul, 2025 | | |
| DATE RECEIVED | 17-Jul-25 | | |
| DATE TESTED | 21-Jul-25 | | |
| **SAMPLE DIMENSIONS** | | | |
| AVERAGE DIAMETER (mm) | 60.00 | | |
| HEIGHT (mm) | 114.00 | | |
| WEIGHT (g) | 880 | | |
| AREA ($mm^2$) | 2827 | | |
| VOLUME ($cm^3$) | 322 | | |
| **UNIT WEIGHT ($kg/m^3$)** | **2730** | | |
| **TEST RESULTS** | | | |
| H / D RATIO | 1.90 | | |
| CORRECTION FACTOR | 0.992 | | |
| LOAD (lbs) | 25300 | | |
| GROSS Mpa | 39.8 | | |
| **MPa CORRECTED** | **39.5** | | |
| FORM OF BREAK | **Type A** | | |
| DIRECTION OF LOADING | PARALLEL | | |
| CURING CONDITIONS | SITE→→→

# METHOD OF SOIL CLASSIFICATION

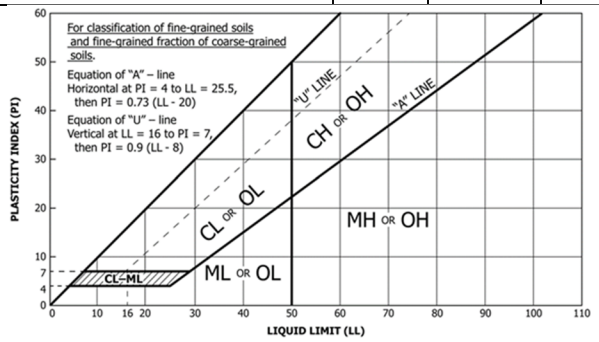
**The WSP Canada Soil Classification[1] System is based on the Unified Soil Classification System (USCS) (after ASTM D2487)**

| Organic or Inorganic | Soil Group | Type of Soil | | Gradation or Plasticity | $Cu = \frac{D_{60}}{D_{10}}$ | | $Cc = \frac{(D_{30})^2}{D_{10} x D_{60}}$ | Organic Content [6,9] | USCS Group Symbol [3,5,7] | Primary Group Name [2] |
|---|---|---|---|---|---|---|---|---|---|---|
| INORGANIC (Organic Content <30% by mass) | **COARSE-GRAINED SOILS** (>50% by mass is larger than 0.075 mm) | GRAVELS (>50% by mass of coarse fraction is larger than 4.75 mm) | Clean Gravels with <5% fines [3] (by mass) | Well Graded | ≥4 | (and) | ≥1 to ≤3 | ≤30% | GW | Well-graded GRAVEL [4,6] |
| | | | | Poorly Graded | <4 | (and/or) | <1 or >3 | | GP | Poorly graded GRAVEL [4,6] |
| | | | Gravels with >12% fines [3] (by mass) | Below A Line | n/a | | | | GM | SILTY GRAVEL [4,6] |
| | | | | Above A Line | n/a | | | | GC | CLAYEY GRAVEL [4,5,6] |
| | | SANDS (≥50% by mass of coarse fraction is smaller than 4.75 mm) | Clean Sands with <5% fines [7] (by mass) | Well Graded | ≥6 | (and) | ≥1 to ≤3 | | SW | Well-graded SAND [6,8] |
| | | | | Poorly Graded | <6 | (and/or) | <1 or >3 | | SP | Poorly graded SAND [6,8] |
| | | | Sands with >12% fines [7] (by mass) | Below A Line | n/a | | | | SM | SILTY SAND [6,8] |
| | | | | Above A Line | n/a | | | | SC | CLAYEY SAND [5,6,8] |

| Organic or Inorganic | Soil Group | Type of Soil | Laboratory Tests | Field Indicators: Dilatancy | Dry Strength | Shine Test | Thread Diameter (mm) | Toughness (of 3 mm thread) | Organic Content [B,H] | USCS Group Symbol [A] | Primary Group Name [A] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INORGANIC (Organic Content <30% by mass) | **FINE-GRAINED SOILS** (≥50% by mass is smaller than 0.075 mm) | SILTS (Nonplastic or PI and LL plot **below A-Line** on Plasticity Chart below) [C] | Liquid Limit <50 [D] | Rapid | None to Low | Dull to None | 3 to >6 | Low/can't roll 3 mm | <15% | ML | SILT [H] |
| | | | | None to Slow | Low to Medium | Dull to Slight | 3 to 6 | Low | 15% to 30% | OL | ORGANIC SILT |
| | | | Liquid Limit ≥50 [D] | None to V.Slow | Low to Medium | Slight | 3 to 6 | Low to Medium | <15% | MH | ELASTIC SILT [H] |
| | | | | None | Medium to High | Dull to Slight | 1 to 3 | Low to Medium | 15% to <30% | OH | ORGANIC SILT |
| | | CLAYS (PI and LL plot **above A-Line** on Plasticity Chart below) [A] | Liquid Limit <50 [D] | None to Medium Slow | Medium to High | Slight to Shiny | 1 to 3 | Medium | <15% | CL | LEAN CLAY [A,E,F,G,H] |
| | | | | None to V.Slow | Medium to High | Slight to Shiny | 1 to 3 | Medium | 15% to <30% | OL | ORGANIC CLAY [E,F,G] |
| | | | Liquid Limit ≥50 [D] | None | High to V.High | Shiny | <1 | High | <15% | CH | FAT CLAY [E,F,G,H] |
| | | | | None | High | Shiny | <1 to 1 | High | 15% to <30% | OH | ORGANIC CLAY [E,F,G] |
| HIGHLY ORGANIC SOILS (Organic Content >30% by mass) | | Peat and mineral soil mixtures | Relatively lightweight, possibly spongy. Some water may squeeze from sample. Some shrinkage may occur on air drying. Sand fraction may be visible. Low to high dilatancy. Thread weak near plastic limit. Low to medium dry strength. | | | | | | 30% to <75% | PT | SILTY PEAT, SANDY PEAT |
| | | Predominantly peat, may contain some mineral soil, fibrous or amorphous peat | Lightweight, spongy. Much water squeezes from sample. Shrinks considerably on air drying (i.e., very high water content). Plant structure identiable to altered. | | | | | | 75% to 100% | | PEAT |

**Coarse-Grained Soil Note(s):**

1. Based on the material passing the 75 mm sieve.
2. If field sample contains or drilling observations indicate cobbles or boulders or both, add, "with cobbles" or "with cobbles and boulders". Include notes on the depth(s) encountered, and sizes if possible.
3. Gravels with 5% to 12% fines require dual symbols:
   (GW-GM) Well-graded GRAVEL with silt,
   (GW-GC) Well-graded GRAVEL with clay,
   (GP-GM) Poorly graded GRAVEL with silt,
   (GP-GC) Poorly graded GRAVEL with clay.
4. If soil contains ≥15% sand, add "with sand" to Group Name.
5. If fines classify as CL-ML, use dual symbol (GC-GM) or (SC-SM) for Group Symbol.
6. If the soil has an organic content (OC) 15%≤OC<30% the prefix "Organic" should be added before the Group Name. If the soil has an organic content 3%≤OC<15% add "with organic fines" to Group Name. If the soil contains >0% to ≤3% organics, the descriptor "trace organics" may be added.
7. Sands with 5% to 12% fines require dual symbols:
   (SW-SM) Well-graded SAND with silt,
   (SW-SC) Well-graded SAND with clay,
   (SP-SM) Poorly graded SAND with silt,
   (SP-SC) Poorly graded SAND with clay.
8. If soil contains ≥15% gravel, add "with gravel" to Group Name.




**Fine-Grained Soil Note(s):**

- **A.** If Atterberg limits plot above the A-line but in the 'hatched' area on the plasticity chart, soil is a (CL-ML) SILTY CLAY.
- **B.** If the soil contains >0% to ≤3% organics, the descriptor "trace organics" may be added.
- **C.** If fine-grained materials are nonplastic (i.e., a plastic limit (PL) cannot be measured), soil is a (ML) SILT.
- **D.** If soil has a liquid limit (LL) >30% to <50%, the term 'medium plasticity' may be included in the description, but the Group Name/Symbol is not changed.
- **E.** If soil contains 15% to <30% +No.200, add "with sand" or "with gravel".
- **F.** If soil contains ≥30% +No.200 mainly sand, add "Sandy" to Group Name.
- **G.** If soil contains ≥30% +No.200 mainly gravel, add "Gravelly" to Group Name.
- **H.** If the soil has an organic content (OC) 3%≤OC<15% add "with organic fines" to Group Name.

# ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS

## PARTICLE SIZES OF CONSTITUENTS

| Soil Constituent | Particle Size Description | Millimetres | Inches (US Std. Sieve Size) |
|---|---|---|---|
| BOULDERS | Not Applicable | >300 | >12 |
| COBBLES | Not Applicable | 75 to 300 | 3 to 12 |
| GRAVEL | Coarse<br>Fine | 19 to 75<br>4.75 to 19 | 0.75 to 3<br>(4) to 0.75 |
| SAND | Coarse<br>Medium<br>Fine | 2.00 to 4.75<br>0.425 to 2.00<br>0.075 to 0.425 | (10) to (4)<br>(40) to (10)<br>(200) to (40) |
| SILT/CLAY | Classified by plasticity | <0.075 | < (200) |

## GRADATIONAL COMPONENT TERMS

| % (by mass) | Term |
|---|---|
| ≤ 5 | Use “trace” |
| > 5 to ≤ 12 | Use “few” |
| > 12 to <30 | Use “little” |
| ≥ 30 to <50 | Use “some” |
| ≥ 50 | Use “mostly” |

## PENETRATION RESISTANCE

### Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split-spoon sampler for a distance of 300 mm (12 in.). Values reported are as recorded in the field and are uncorrected.

### Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 $cm^2$ pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance ($q_t$), porewater pressure (u) and sleeve frictions are recorded electronically at 25 mm penetration intervals.

### Dynamic Cone Penetration Resistance (DCPT); Nd:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

**PH:** Sampler advanced by hydraulic pressure
**PM:** Sampler advanced by manual pressure
**WH:** Sampler advanced by static weight of hammer
**WR:** Sampler advanced by weight of sampler and rod

## SAMPLES

| | |
|---|---|
| AS | Auger sample |
| BS | Block sample |
| CS | Chunk sample |
| DD | Diamond Drilling |
| DO or DP | Seamless open ended, driven, pushed tube sampler, or geoprobe macro-core – note size |
| DS | Denison type sample |
| FS | Foil Sample |
| GS | Grab Sample |
| MC | Modified California Samples – note sample diameter and hammer weight |
| MS | Modified Shelby (for frozen soil) |
| RC | Rock core |
| SC | Soil core |
| SS | Split-spoon sampler (50 mm OD); larger sizes use MC |
| ST | Slotted tube |
| TO | Thin-walled, open – note size (Shelby tube) |
| TP | Thin-walled, piston – note size (Shelby tube) |
| WS | Wash sample |

## SOIL TESTS

| | |
|---|---|
| w | water content |
| PL , $w_p$ | plastic limit |
| LL , $w_L$ | liquid limit |
| C | consolidation (oedometer) test |
| CHEM | chemical analysis (refer to text) |
| CID | consolidated isotropically drained triaxial test[1] |
| CIU | consolidated isotropically undrained triaxial test with porewater pressure measurement[1] |
| $D_R$ | relative density (specific gravity, Gs) |
| DS | direct shear test |
| GS | specific gravity |
| M | sieve analysis for particle size |
| MH | combined sieve and hydrometer (H) analysis |
| MPC | Modified Proctor compaction test |
| SPC | Standard Proctor compaction test |
| OC | organic content test |
| $SO_4$ | concentration of water-soluble sulphates |
| UC | unconfined compression test |
| UU | unconsolidated undrained triaxial test |
| V (FV) | field vane (LV-laboratory vane test) |
| γ | unit weight |

1. Tests anisotropically consolidated prior to shear are shown as CAD, CAU.

## NON-COHESIVE (COHESIONLESS) SOILS

### Compactness[2]

| Term | SPT ‘N’ (blows/0.3m)[1] |
|---|---|
| Very Loose | 0 to 4 |
| Loose | 4 to 10 |
| Compact | 10 to 30 |
| Dense | 30 to 50 |
| Very Dense | >50 |

1. SPT ‘N’ in general accordance with ASTM D1586, uncorrected for the effects of overburden pressure.
2. Definition of compactness terms are based on SPT ‘N’ ranges as provided in Terzaghi, Peck and Mesri (1996). Many factors affect the recorded SPT ‘N’ value, including hammer efficiency (which may be greater than 60% in automatic trip hammers), overburden pressure, groundwater conditions, and grainsize. As such, the recorded SPT ‘N’ value(s) should be considered only an approximate guide to the soil compactness. These factors need to be considered when evaluating the results, and the stated compactness terms should not be relied upon for design or construction.

### Field Moisture Condition

| Term | Description |
|---|---|
| Dry | Soil flows freely through fingers. |
| Moist | Soils are darker than in the dry condition and may feel cool. |
| Wet | As moist, but with free water forming on hands when handled. |

## COHESIVE SOILS

### Consistency

| Term | Undrained Shear Strength (kPa) | SPT ‘N’[1,2] (blows/0.3m) |
|---|---|---|
| Very Soft | <12 | 0 to 2 |
| Soft | 12 to 25 | 2 to 4 |
| Firm | 25 to 50 | 4 to 8 |
| Stiff | 50 to 100 | 8 to 15 |
| Very Stiff | 100 to 200 | 15 to 30 |
| Hard | >200 | >30 |

1. SPT ‘N’ in general accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.
2. SPT ‘N’ values should be considered ONLY an approximate guide to consistency; for sensitive clays (e.g., Champlain Sea clays), the N-value approximation for consistency terms does NOT apply. Rely on direct measurement of undrained shear strength or other manual observations.

### Water Content

| Term | Description |
|---|---|
| w < PL | Material is estimated to be drier than the Plastic Limit. |
| w ~ PL | Material is estimated to be close to the Plastic Limit. |
| w > PL | Material is estimated to be wetter than the Plastic Limit. |

# LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

## I. GENERAL

| | |
|---|---|
| $\pi$ | 3.1416 |
| ln x | natural logarithm of x |
| $\log_{10}$ | x or log x, logarithm of x to base 10 |
| g | acceleration due to gravity |
| t | time |

## II. STRESS AND STRAIN

| | |
|---|---|
| $\gamma$ | shear strain |
| $\Delta$ | change in, e.g. in stress: $\Delta\sigma$ |
| $\varepsilon$ | linear strain |
| $\varepsilon_v$ | volumetric strain |
| $\eta$ | coefficient of viscosity |
| $\upsilon$ | Poisson's ratio |
| $\sigma$ | total stress |
| $\sigma'$ | effective stress ($\sigma' = \sigma - u$) |
| $\sigma'_{vo}$ | initial effective overburden stress |
| $\sigma_1, \sigma_2, \sigma_3$ | principal stress (major, intermediate, minor) |
| $\sigma_{oct}$ | mean stress or octahedral stress $= (\sigma_1 + \sigma_2 + \sigma_3)/3$ |
| $\tau$ | shear stress |
| u | porewater pressure |
| E | modulus of deformation |
| G | shear modulus of deformation |
| K | bulk modulus of compressibility |

## III. SOIL PROPERTIES

### (a) Index Properties

| | |
|---|---|
| $\rho(\gamma)$ | bulk density (bulk unit weight)* |
| $\rho_d(\gamma_d)$ | dry density (dry unit weight) |
| $\rho_w(\gamma_w)$ | density (unit weight) of water |
| $\rho_s(\gamma_s)$ | density (unit weight) of solid particles |
| $\gamma'$ | unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$) |
| $D_R$ | relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly $G_s$) |
| e | void ratio |
| n | porosity |
| S | degree of saturation |

* Density symbol is $\rho$. Unit weight symbol is $\gamma$ where $\gamma = \rho g$ (i.e. mass density multiplied by acceleration due to gravity)

### (a) Index Properties (continued)

| | |
|---|---|
| w | water content |
| $w_l$ or LL | liquid limit |
| $w_p$ or PL | plastic limit |
| $I_p$ or PI | plasticity index = $(w_l - w_p)$ |
| NP | nonplastic |
| $w_s$ | shrinkage limit |
| $I_L$ | liquidity index = $(w - w_p) / I_p$ |
| $I_C$ | consistency index = $(w_l - w) / I_p$ |
| $e_{max}$ | void ratio in loosest state |
| $e_{min}$ | void ratio in densest state |
| $I_D$ | density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density) |

### (b) Hydraulic Properties

| | |
|---|---|
| h | hydraulic head or potential |
| q | rate of flow |
| v | velocity of flow |
| i | hydraulic gradient |
| k | hydraulic conductivity (coefficient of permeability) |
| j | seepage force per unit volume |

### (c) Consolidation (one-dimensional)

| | |
|---|---|
| $C_c$ | compression index (normally consolidated range) |
| $C_r$ | recompression index (over-consolidated range) |
| $C_s$ | swelling index |
| $C_\alpha$ | secondary compression index |
| $m_v$ | coefficient of volume change |
| $c_v$ | coefficient of consolidation (vertical direction) |
| $c_h$ | coefficient of consolidation (horizontal direction) |
| $T_v$ | time factor (vertical direction) |
| U | degree of consolidation |
| $\sigma'_p$ | pre-consolidation stress |
| OCR | over-consolidation ratio = $\sigma'_p / \sigma'_{vo}$ |

### (d) Shear Strength

| | |
|---|---|
| $\tau_p, \tau_r$ | peak and residual shear strength |
| $\phi'$ | effective angle of internal friction |
| $\delta$ | angle of interface friction |
| $\mu$ | coefficient of friction = tan $\delta$ |
| c′ | effective cohesion |
| $c_u, s_u$ | undrained shear strength ($\phi = 0$ analysis) |
| p | mean total stress $(\sigma_1 + \sigma_3)/2$ |
| p′ | mean effective stress $(\sigma'_1 + \sigma'_3)/2$ |
| q | $(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$ |
| $q_u$ | compressive strength $(\sigma_1 - \sigma_3)$ |
| $S_t$ | sensitivity |

**Notes:** 1 $\tau = c' + \sigma' \tan \phi'$

2 shear strength = (compressive strength)/2

PROJECT: 23606896

LOCATION: N 5028595.38; E 366510.03

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-101

BORING DATE: April 10, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W WI) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.31 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | TOPSOIL - (ML) sandy SILT, trace plastic fines, trace gravel; dark brown to black, contains organic matter and rootlets; non-cohesive, moist, loose | | 0.00 / 75.01 | 1 | SS | 12 | | | | |
| | | FILL - (SM/ML) SILTY SAND to SILT, some plastic fines, some gravel; dark brown to grey brown, contains cobbles, boulders and very thin beds to modules of silty clay; non-cohesive, moist, compact | | 0.30 / 74.55 | 2 | SS | 7 | | | | |
| 1 | | FILL - (CL) SILTY CLAY, some sand, some gravel; grey brown, highly fissured, contains organic matter and very thin beds of gravelly silty sand; cohesive, w~PL to w>PL, firm | | 0.76 / 73.79 | 3 | SS | 4 | | | | |
| | | FILL - (ML) sandy SILT, trace to some gravel, trace clay; dark brown, contains organic matter, rootlets and very thin beds of gravelly silty sand; non-cohesive, moist, wet, very loose | | 1.52 / 73.33 | 4 | SS | 13 | | | | |
| 2 | | FILL - (ML) sandy SILT, trace plastic fines; dark brown to black, contains organic matter, rootlets and thin lamination of silty sand, fines grey; non-cohesive, moist, compact | | 1.98 / 72.57 | | | | | | | |
| | | (SM/ML) SILTY SAND, fine to sandy SILT, trace plastic fines; grey brown, contains rootlets and oxidation (WEATHERED CRUST); non-cohesive, moist, compact | | 2.74 / 72.26 | 5 | SS | 21 | | | | |
| 3 | | (SP) SAND,some silt, fine to medium; grey brown, contains thin to thick laminations of silty sand; non-cohesive, moist to wet, compact | | 3.05 / 71.80 | 6 | SS | 4 | | | | |
| | | (CI/CH) SILTY CLAY to CLAY; grey brown, highly fissured (WEATHERED CRUST); cohesive, w>PL, very stiff to stiff | | 3.51 / 70.28 | 7 | SS | 3 | | | | |
| 4 | | SILTY SAND, trace to some plastic fines, trace gravel; grey brown; non-cohesive, wet, very loose | | 5.03 / 69.97 | | | | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace gravel; grey brown, contains thick lamination of sand, fine to coarse; cohesive, w>PL, firm | | 5.34 / 5.49 | 8 | SS | 1 | | | | |
| 5 | | (CI/CH) SILTY CLAY, trace sand, trace gravel; grey; cohesive, w>PL, firm | | | 9 | SS | WH | | | | |
| | | (CI/CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, firm to stiff | | 68.60 / 6.71 | | | | | | | |
| 6 | | | | | 10 | SS | WH | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | 11 | SS | WH | | | MH | |
| 9 | | | | | | | | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028595.38; E 366510.03

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-101

BORING DATE: April 10, 2023

DRILL RIG: CME 75 Trackmount

SHEET 2 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | | | |
| | Power Auger 108 mm ID (Hollow Stem) | (CI/CH) SILTY CLAY to CLAY; grey; cohesive, w>PL, firm to stiff | | 64.64 | | | | | | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey, contains thin laminations of silty sand, fine to medium; cohesive, w>PL, stiff | | 10.67 | | | | | | | | | |
| 11 | | (SM) gravelly SILTY SAND, trace to some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to loose | | 10.83 | 12 | SS | 5 | | | | | | |
| | | | | | 13 | SS | 4 | | | | | MH | |
| 12 | | | | | 14 | SS | 7 | | | | | | |
| | | | | 62.33 | | | | | | | | | |
| 13 | | (GM) SILTY sandy GRAVEL; grey, contains cobbles, boulders and possible weathered bedrock (GLACIAL TILL); non-cohesive, wet | | 12.98 | 1 | RC | DD | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-101 | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-101

SHEET 3 OF 3

LOCATION: N 5028595.38 ;E 366510.03

DRILLING DATE: April 10, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.18 | | | | | | | | | | | | | | | |
| 14 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong, LIMESTONE, with fresh, thinly laminated to thinly bedded, dark brown to black, fine grained, non-porous, weak, SHALE | | 13.13 | 1 | grey 100 | | | | | | | | | | | | BC/LC | |
| 15 | | | | | 2 | grey 100 | | | | | | | | | | | | BC<br>BC<br>BC<br>BC<br>BC<br>BC<br>BC | |
| 16 | | | | | 3 | grey 50 | | | | | | | | | | | | BC/LC<br>BC<br>BC | |
| | | | | 58.54 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 16.77 | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
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| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028578.62; E 366503.33

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-103

BORING DATE: April 12, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 74.90 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | FILL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown, contains organic matter and rootlets; non-cohesive, moist to wet, very loose | | 0.00<br>74.70<br>0.20 | 1 | SS | 4 | | | | Bentonite Seal |
| | | FILL - (SM) Gravelly SILTY SAND, trace plastic fines; dark brown to brown to grey brown, contains organic matter, rootlets and brick fragments, black staining, plastic, fine to coarse; non-cohesive, moist to wet, very loose to compact | | | 2 | SS | 5 | | | | |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | 4 | | | | |
| 2 | | | | | | | | | | | ▽ |
| | | | | | 4 | SS | 10 | | | | |
| 3 | | | | | | | | | | | |
| | | | | | 5 | SS | 5 | | | | |
| 4 | | | | | | | | | | | |
| | | | | | 6 | SS | 3 | | | | |
| | | FILL - (SP) SAND, fine to coarse, some silt, some gravel; brown, contains gravel layers, fine to coarse; non-cohesive, wet, compact | | 70.17<br>4.73 | 7 | SS | 16 | | | | Backfill |
| 5 | | | | 69.56 | | | | | | | |
| | | FILL - (SM/SW) gravelly SILTY SAND, trace plastic fines, trace to some silt; brown to grey, with black staining, contains organic matter, cobbles, boulders, silty clay modules and beds of gravelly SAND, fine to coarse; non-cohesive, wet, loose to very loose | | 5.34 | 8 | SS | 6 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 5 | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 3 | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 67.28<br>7.62 | 11 | SS | 15 | | ○ | M | |
| 8 | | | | | | | | | | | |
| | | | | | 12 | SS | 18 | | | | |
| 9 | | | | | | | | | | | |
| | | | | | 13 | SS | 21 | | | | Bentonite Seal |
| | | | | 64.99 | | | | | | | |
| 10 | | | | 9.91 | 14 | SS | 4 | | | | Silica Sand |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028578.62; E 366503.33

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-103

BORING DATE: April 12, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 108 mm ID (Hollow Stem) | (SP) SAND, trace gravel; grey, fine to medium; non-cohesive, wet, very loose | | 64.53 | 14 | SS | 4 | | ○ | M | Silica Sand |
| | | (SM/ML) SILTY SAND to sandy SILT, trace gravel; grey; non-cohesive, wet, very loose | | 10.37<br>64.23 | | | | | | | |
| 11 | | (SM) Gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 10.67<br>63.47 | 15 | SS | 11 | | | | 32 mm Diam. PVC #10 Slot Screen |
| 12 | | (GM) Sandy SILTY GRAVEL; grey. contains cobbles and boulders (GLACIAL TILL); non-cohesive,wet, very dense | | 11.43 | 16 | SS | 50/ 0.15 | | | | Silica Sand<br>Bentonite Seal |
| | | | | | 1 | RC | DD | | | | Cave |
| 13 | | | | 61.84 | 2 | RC | DD | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-103 | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-103

SHEET 3 OF 3

LOCATION: N 5028578.62 ;E 366503.33

DRILLING DATE: April 12, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY TOTAL CORE % | RECOVERY SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA DIP w.r.t. CORE AXIS | DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATHERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 61.84 | | | | | | | | | | | | | | | |
| 14 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong, LIMESTONE, with fresh, thinly laminated to thinly bedded, dark brown to black, fine grained, non-porous, weak, SHALE | | 13.06 | 2 | grey 100 | | | | | | | | | | | | | |
| 15 | | | | | 3 | grey brown 50-0 | | | | | | | | | | | | | Cave |
| 16 | | | | | 4 | grey brown 50-0 | | | | | | | | | | | | | |
| | | | | 58.23 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE<br><br>Note(s):<br><br>1. Water level in screen measured at 2.00 m (Elev. 72.90 m) on April 11, 2023 | | 16.67 | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
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| 22 | | | | | | | | | | | | | | | | | | | |
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DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

PROJECT: 23606896

LOCATION: N 5028580.21; E 366491.93

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-104

BORING DATE: April 06, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 74.66 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | FILL - (SM) SILTY SAND, trace gravel; dark brown to black, contains oraganic matter and rootlets; non-cohesive, wet, very loose | | 0.00<br>0.15 | 1 | SS | 13 | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND, trace plastic fines; dark brown to brown to grey brown, contains black staining, brick fragments, organic matter, rootlets, silty clay sections and thin laminations to very thin beds of sand, fine to coarse; non-cohesive, moist to wet, very loose to compact | | | 2 | SS | 11 | | | | |
| 2 | | | | | 3 | SS | 4 | | | | |
| | | | | | 4 | SS | 1 | | | | |
| 3 | | | | | 5 | SS | 4 | | | | |
| 4 | | | | | 6 | SS | 4 | | | | |
| | | | | 69.83 | | | | | | | |
| 5 | | TOPSOIL - (SM) SILTY SAND; dark brown, contains roots and organic matter; non-cohesive, moist, loose | | 4.83<br>69.63<br>5.03 | 7 | SS | 8 | | | | |
| | | (SM) Gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose | | 69.32<br>5.34 | 8 | SS | 7 | | | | |
| 6 | | (SM) Gravelly SILTY SAND, trace to some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | | 9 | SS | 6 | | | | |
| 7 | | | | | 10 | SS | 6 | | | | |
| 8 | | | | | 11 | SS | 7 | | | | |
| | | | | | 12 | SS | 8 | | | | |
| 9 | | | | 65.51 | | | | | | | |
| | | (SP) Gravelly SAND, trace silt; grey, contains thick laminations of silty sand, fine to coarse (GLACIAL TILL); non-cohesive, wet, compact | | 9.15<br>65.21<br>9.45 | 13 | SS | 10 | | | | |
| 10 | | | | | 14 | SS | 29 | | | | |

*CONTINUED NEXT PAGE*

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028580.21; E 366491.93

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-104

BORING DATE: April 06, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Power Auger | (SM) Gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 64.60<br>10.06 | 14 | SS | 29 | | | | |
| | | (SM) SILTY SAND, trace gravel; grey, contains cobbles, boulders, fine to medium, thick laminations of sand (GLACIAL TILL); non-cohesive, wet, compact | | 64.14<br>10.52 | 15 | SS | 50 | | | | |
| 11 | Rotary Drill / NQ Core | (SM) Gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 63.80<br>10.86 | 1 | RC | DD | | | | |
| | | (GM) Sandy SILTY GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet | | 63.34 | | | | | | | |
| 12 | | Borehole continued on RECORD OF DRILLHOLE 23-104 | | | 2 | RC | DD | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-104

SHEET 3 OF 3

LOCATION: N 5028580.21 ;E 366491.93

DRILLING DATE: April 6, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY TOTAL CORE % | RECOVERY SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA DIP w.r.t. CORE AXIS | DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.34 | | | | | | | | | | | | | | | |
| 12 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong, LIMESTONE, with fresh, thinly laminated to thinly bedded, dark brown to black, fine grained, non-porous, weak, SHALE | | 11.32 | 2 | grey 100 | | | | | | | | | | | | BC | |
| 13 | | | | | 3 | grey 100 | | | | | | | | | | | | BC | |
| 14 | | | | | | | | | | | | | | | | | | BC/LC | |
| | | | | | 4 | grey 100 | | | | | | | | | | | | BC/LC | |
| 15 | | END OF DRILLHOLE | | 59.67 14.99 | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028558.04; E 366488.68

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-105

BORING DATE: March 23, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.10 | | | | | | | |
| 0 | Power Auger, 108 mm ID (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown; moist | | 0.00 | | | | | | | |
| | | FILL - (SM/GP) SILTY SAND and GRAVEL, fine to coarse; grey to dark brown; non-cohesive, moist, compact to dense | | 0.15 | 1 | SS | 13 | | | | |
| 1 | | | | | 2 | SS | 11 | | | | |
| | | (SM) SILTY SAND, some plastic fines; grey brown to grey, contains cobbles and occasionally boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to dense | | 73.73 1.37 | 3 | SS | 4 | | | | |
| 2 | | | | | 4 | SS | 1 | | ○ | M | |
| 3 | | | | | 5 | SS | 4 | | | | |
| 4 | | | | | 6 | SS | 4 | | | | |
| 5 | | | | | 7 | SS | 8 | | | | |
| | | | | | 8 | SS | 7 | | | | |
| 6 | | | | | 9 | SS | 6 | | | | |
| 7 | | | | | 10 | SS | 6 | | ○ | M | |
| 8 | | | | | 11 | SS | 7 | | | | |
| | Wash boring, NQ3/RC | COBBLES and BOULDERS | | 66.72 8.38 | 12 | SS | 8 | | | | |
| 9 | | Borehole continued on RECORD OF DRILLHOLE 23-105 | | 66.07 | 1 | RC | DD | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: DG

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-105

SHEET 2 OF 2

LOCATION: N 5028558.04 ;E 366488.68

DRILLING DATE: May 17, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.07 | | | | | | | | | | | | | | | |
| 10 | Rotary Drill NQ Core | Fresh to slightly weathered, medium bedded, grey, fine grained, non-porous to slightly porous, SHALEY LIMESTONE, weathered bedding SHALE, calcite VEINS | | 9.03 | 1 | grey 100 | | | | | | | | | | | | | BC |
| | | | | | 2 | grey 100 | | | | | | | | | | | | | |
| | | | | | 3 | grey 100 | | | | | | | | | | | | | BC |
| 11 | | | | | 4 | grey 100 | | | | | | | | | | | | | BC |
| | | | | | | | | | | | | | | | | | | | BC |
| 12 | | END OF DRILLHOLE | | 63.10 12.00 | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: DG
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028522.48; E 366484.33

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-108

BORING DATE: April 3, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 78.91 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | FILL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter; non-cohesive, moist, loose | | 0.00<br>0.15 | 1 | SS | 8 | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND, trace plastic fines, trace organic matter; dark brown to grey brown, contains cobbles and boulders; slightly cohesive, moist to wet, very loose to loose | | | 2 | SS | 5 | | | | |
| 2 | | | | | 3 | SS | 2 | | | | |
| | | | | 76.62 | | | | | | | |
| | | FILL - (GM) SILTY GRAVEL, angular; grey, contains brick; non-cohesive, moist to wet, loose | | 2.29 | 4 | SS | 6 | | | | |
| | | | | 76.01 | | | | | | | |
| 3 | | FILL - (SM) gravelly SILTY SAND; brown, contains thin laminations of sand, fine to coarse; non-cohesive, wet, loose | | 2.90 | 5 | SS | 3 | | | | |
| | | | | 75.10 | | | | | | | |
| | | FILL - (SP) SAND, some gravel, trace silt; brown, contains modules of silty sand, fine to coarse; non-cohesive, moist to wet, very loose to compact | | 3.81 | 6 | SS | 3 | | | | |
| 4 | | | | | 7 | SS | 3 | | | | |
| | | | | 73.88 | | | | | | | |
| 5 | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose | | 5.03<br>73.57 | | | | | | | |
| | | (SP) SAND, fine to medium, some gravel, some silt to silty; grey; non-cohesive, wet, loose | | 5.34 | 8 | SS | 11 | | | | |
| 6 | | | | | 9 | SS | 12 | | | | |
| 7 | | | | | 10 | SS | 10 | | | | |
| 8 | | | | | 11 | SS | 4 | | | | |
| | | | | | 12 | SS | 6 | | | | |
| 9 | | | | | 13 | SS | 18 | | | | |
| 10 | | | | | 14 | SS | 19 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028522.48; E 366484.33

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-108

BORING DATE: April 3, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Power Auger | (SP) SAND, fine to medium, some gravel, some silt to silty; grey; non-cohesive, wet, loose | | | 14 | SS | 19 | | | | |
| | | - Very dense below 10.67 m depth. | | 68.04 | 15 | SS | 50/ 0.20 | | | | |
| 11 | | Borehole continued on RECORD OF DRILLHOLE BH23-108 | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
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| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-108

SHEET 3 OF 3

LOCATION: N 5028522.48 ;E 366484.33

DRILLING DATE: April 3, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | DISCONTINUITY DATA: Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 68.04 | | | | | | | | | | | | | | | |
| 11 | Rotary Drill / NQ Core | Fresh, very thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong, LIMESTONE, with fresh, thinly laminated to very thinly bedded, dark brown to black, fine grained, non-porous, weak, SHALE | | 10.87 | 1 | | | | | | | | | | | | | | |
| 12 | | | | | 2 | | | | | | | | | | | | | | |
| 13 | | | | | 3 | | | | | | | | | | | | | BC | |
| 14 | | | | 64.56 | | | | | | | | | | | | | | BC | |
| | | END OF DRILLHOLE | | 14.35 | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028517.69; E 366506.52

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-109

BORING DATE: March 30, 2023

DRILL RIG: CME 75

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 79.30 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) gravelly SILTY SAND, trace gravel; dark brown, contains organic matter; non-cohesive, wet | | 0.00 | | | | | | | Bentonite Seal |
| | | FILL - (SM) gravelly SILTY SAND, some to trace plastic fines; dark brown to grey brown to black, contains cobbles, pebbles and organic matter; non-cohesive, moist, compact | | 0.15 | 1 | SS | 22 | | | | |
| 1 | | | | | 2 | SS | 13 | | | | |
| | | | | 77.47 | 3 | SS | 11 | | | | |
| 2 | | (SM) gravelly SILTY SAND, some to trace plastic fines; grey brown, contains cobbles, boulders and thin lamination of sand, fine to medium (GLACIAL TILL); non-cohesive, moist, compact to dense | | 1.83 | 4 | SS | 37 | | | | |
| 3 | | | | | 5 | SS | 17 | | | | |
| 4 | | | | | 6 | SS | 14 | | | | |
| | | | | 74.73 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | 4.57 | 7 | SS | 6 | | | | Backfill |
| 5 | | | | 73.96 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to | | 5.34 | 8 | SS | 9 | | | | |
| 6 | | | | | 9 | SS | 8 | | | | |
| 7 | | | | | 10 | SS | 8 | | | | |
| 8 | | | | | 11 | SS | 10 | | | | |
| | | | | | 12 | SS | 10 | | | | |
| 9 | | | | | 13 | SS | 14 | | | | |
| 10 | | | | | 14 | SS | 23 | | | | |

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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028517.69; E 366506.52

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-109

BORING DATE: March 30, 2023

DRILL RIG: CME 75



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | SOIL PROFILE: STRATA PLOT | SOIL PROFILE: ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | | | FILL | 68.83 | 14 | SS | 23 | | | | Backfill / Bentonite Seal |
| | | Borehole continued on RECORD OF DRILLHOLE 23-109 | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-109

SHEET 3 OF 3

LOCATION: N 5028517.69 ;E 366506.52

DRILLING DATE: March 30, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY TOTAL CORE % | RECOVERY SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA DIP w.r.t. CORE AXIS | DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATHERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 68.83 | | | | | | | | | | | | | | | |
| 11 | Rotary Drill NQ Core | Fresh, very thinly to medium bedded, medium grey to brown grey, fine to medium grained, non-porous, medium strong LIMESTONE, with fresh, thinly laminated to very thinly bedded, dark brown to black, fine grained, non-porous, weak SHALE | | 10.47 | 1 | grey 100 | | | | | | | | | | | | BC | Bentonite Seal |
| 12 | | | | | 2 | grey 100 | | | | | | | | | | | | BC<br>BC/LC<br>BC | Silica Sand |
| 13 | | | | | 3 | grey 100 | | | | | | | | | | | | BC<br>BC/LC | 32 mm Diam. PVC #10 Slot Screen |
| 14 | | | | 64.87 | | | | | | | | | | | | | | BC | |
| | | END OF DRILLHOLE<br><br>Note(s):<br><br>1. Water level in screen measured at 5.47 m (Elev. 73.82 m) on April 11, 2023 | | 14.43 | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028509.91; E 366521.26

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-111

BORING DATE: March 29, 2023

DRILL RIG: CME 75

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 79.33 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | FILL - (SM) gravelly SILTY SAND, some gravel; dark brown, contains organic matter; non-cohesive, moist | | 0.00 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, some to trace plastic fines; dark brown to grey brown, with oxidation and black staining, contains cobbles and boulders; non-cohesive, moist, compact | | 0.15 | 1 | SS | 12 | | ○ | | |
| 1 | | | | | 2 | SS | 15 | | | | |
| | | | | 77.81 | | | | | | | |
| | | FILL - (CL/SP) sandy SILTY CLAY to SILTY CLAY and SAND, trace gravel; grey brown, contains cobbles, pebbles and organic matter; non-cohesive, moist, compact | | 1.52 | 3 | SS | 4 | | ○ | | |
| 2 | | | | | 4 | SS | 6 | | | | |
| | | | | 76.28 | | | | | | | |
| 3 | | (SM) Gravelly SILTY SAND, trace plastic fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 3.05 | 5 | SS | 35 | | ○ | | MH |
| 4 | | | | | 6 | SS | 38 | | | | |
| | | | | | 7 | SS | 21 | | ○ | | |
| 5 | | | | 73.99 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 5.34 | 8 | SS | 14 | | | | |
| | | | | 73.38 | | | | | | | |
| 6 | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | 5.95 | 9 | SS | 6 | | ○ | | |
| 7 | | | | | 10 | SS | 4 | | | | |
| 8 | | | | | 11 | SS | 3 | | ○ | | |
| | | | | | 12 | SS | 11 | | | | |
| 9 | | | | | 13 | SS | 5 | | ○ | | MH |
| 10 | | | | | 14 | SS | 17 | | | | |

*CONTINUED NEXT PAGE*

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028509.91; E 366521.26

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-111

BORING DATE: March 29, 2023

DRILL RIG: CME 75



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 108 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | 68.66 | 14 | SS | 17 | | | | |
| 11 | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 10.67 | 15 | SS | 38 | | ○ | | |
| | | | | | 16 | SS | 10 | | ○ | | |
| 12 | | | | 67.29 | | | | | | | |
| | | (SP) Gravelly SAND, fine to coarse; grey (GLACIAL TILL); non-cohesive, wet, dense | | 12.04<br>66.98 | | | | | | | |
| | | (GM) sandy SILTY GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 12.35<br>66.43 | 17 | SS | 93 | | | | |
| 13 | | Borehole continued on RECORD OF DRILLHOLE 23-111 | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-111

SHEET 3 OF 3

LOCATION: N 5028509.91 ;E 366521.26

DRILLING DATE: March 29, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.43 | | | | | | | | | | | | | | | |
| 13 | Rotary Drill / NQ Core | Fresh, very thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong LIMESTONE, with fresh, thinly laminated to very thinly bedded, dark brown to black, fine grained, non-porous, weak shale | | 12.90 | 1 | grey 100 | | | | | | | | | | | | | UCS = 122 MPa |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | 2 | grey 100 | | | | | | | | | | | | BC/LC | |
| 16 | | | | | 3 | grey 100 | | | | | | | | | | | | BC | |
| 17 | | | | 62.00 | | | | | | | | | | | | | | BC | |
| | | END OF DRILLHOLE | | 17.33 | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028460.97; E 366513.31

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-113

BORING DATE: April 4, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.20 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | FILL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter, rootlets; non-cohesive, moist | | 0.00 / 0.15 | 1 | SS | 8 | | | | |
| | | FILL - (CL/CI) sandy SILTY CLAY, some garvel; dark brown to grey brown; cohesive, w<PL, firm | | 79.44 | | | | | | | |
| 1 | | FILL - (SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist to wet, loose | | 0.76 / 79.13 | 2 | SS | 9 | | | | |
| | | (CI) SILTY CLAY, trace sand; grey, brown to grey highly fissured (WEATHERED CRUST); cohesive, w=PL to w>PL, soft to firm | | 1.07 | | | | | | | |
| 2 | | | | | 3 | SS | 11 | | | | |
| | | | | | 4 | SS | 10 | | | | |
| 3 | | | | | 5 | SS | 8 | | | | |
| 4 | | | | | 6 | SS | 4 | | | | |
| | | | | 75.63 | | | | | | | |
| | | (CI) SILTY CLAY, trace sand, trace gravel; grey brown to grey, contains thin beds of sandy silty clay, trace gravel; cohesive, w>PL, soft | | 4.57 / 75.17 | 7 | SS | 2 | | | | |
| 5 | | (SM) gravelly SILTY SAND, some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose | | 5.03 / 74.86 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 5.34 | 8 | SS | 8 | | | | |
| 6 | | | | | 9 | SS | 5 | | | | |
| 7 | | | | | 10 | SS | 9 | | | | |
| 8 | | | | | 11 | SS | 14 | | | | |
| | | | | | 12 | SS | 17 | | | | |
| 9 | | | | | 13 | SS | 26 | | | | |
| 10 | | | | | 14 | SS | 24 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028460.97; E 366513.31

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-113

BORING DATE: April 4, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 108 mm ID (Hollow Stem) | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 69.53 | 14 | SS | 24 | | | | |
| 11 | | (SM) gravelly SILTY SAND, trace plastic fines; grey, thin to thick laminations of sandy silt and sand, fine to medium, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | 10.67 | 15 | SS | 20 | | | | |
| 12 | | | | | 16 | SS | 36 | | | | |
| | | | | | 17 | SS | 6 | | | | |
| 13 | | | | 67.11 | 18 | SS | 50/0.13 | | | | |
| | | Possible weathered Bedrock | | 13.09 / 66.86 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-113 | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-113

SHEET 3 OF 3

LOCATION: N 5028460.97 ;E 366513.31

DRILLING DATE: April 4, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.86 | | | | | | | | | | | | | | | |
| 14 | Rotary Drill / NQ Core | Fresh to slightly weathered, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong to weak SHALEY LIMESTONE | | 13.34 | 1 | grey 100 | | | | | | | | | | | | BC | BC |
| 15 | | | | | 2 | grey 100 | | | | | | | | | | | | BC/LC | |
| 16 | | | | | | | | | | | | | | | | | | | BC |
| 17 | | | | 62.75 | 3 | grey 100 | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 17.45 | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028446.03; E 366496.02

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-114

BORING DATE: April 18-19, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.60 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown; moist | | 0.00 | | | | | | | |
| | | (CI/CH) SILTY CLAY to CLAY; grey brown, slightly fissured (WEATHERED CRUST); cohesive, w<PL, very stiff | | 0.15 | 1 | SS | 5 | | | | |
| 1 | | | | | 2 | SS | 11 | | | | |
| | | | | | 3 | SS | 12 | | | | |
| 2 | | | | | 4A | | | | | | |
| | | | | 78.01 | | SS | 8 | | | | |
| | | (SM) gravelly SILTY SAND, non-plastic fines, well graded, some angular gravel; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact to dense | | 2.59 | 4B | | | | | | |
| 3 | | | | | 5 | SS | 35 | | | | |
| | | | | | 6 | SS | 28 | | ○ | M | |
| 4 | | | | 76.18 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace clay, low plasticity fines, well graded, some angular gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to compact | | 4.42 | 7 | SS | 20 | | | | Backfill |
| 5 | | | | | 8 | SS | 10 | | | | |
| 6 | | | | | 9 | SS | 10 | | | | |
| 7 | | | | | 10 | SS | 17 | | | | |
| 8 | | | | | 11 | SS | 5 | | | | |
| | | | | | 12 | SS | 4 | | | | |
| 9 | | | | 71.61 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace clay, low plasticity fines, well graded, some angular gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 8.99 | 13 | SS | 20 | | | | |
| 10 | | | | | 14 | SS | 41 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028446.03; E 366496.02

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-114

BORING DATE: April 18-19, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 108 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND, trace clay, low plasticity fines, well graded, some angular gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | | 14 | SS | 41 | | | | Backfill |
| 11 | | | | | 15 | SS | 17 | | | | |
| | | | | 69.17 | | | | | | | |
| 12 | Wash boring HW/HQ | (SM/GW) SILTY SAND and GRAVEL, fine to coarse; grey to dark brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense to very dense | | 11.43 | 16 | SS | 32 | | | | Bentonite Seal |
| | | | | | 17 | SS | 52/ 0.15 | | | | Silica Sand |
| 13 | | | | | 18 | SS | 37 | | | | |
| 14 | | | | | 19 | SS | 100 | | ○ | M | 32 mm Diam. PVC #10 Slot Screen |
| 15 | | | | | 20 | SS | 89 | | | | |
| | | | | 65.36 | | | | | | | |
| | | (SM) SILTY SAND, fine, trace gravel; grey (GLACIAL TILL); non-cohesive, wet, compact | | 15.24 | 21 | SS | 26 | | | | |
| 16 | | | | | | | | | | | Silica Sand |
| | | | | | 22 | SS | >76 | | | | |
| | | | | 64.17 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-114 | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-114

SHEET 3 OF 3

LOCATION: N 5028446.03 ;E 366496.02

DRILLING DATE: April 19, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | DISCONTINUITY DATA: Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.17 | | | | | | | | | | | | | | | |
| 17 | Rotary Drill / NQ Core | Fresh, medium bedded, fine grained, non-porous, medium strong SHALEY LIMESTONE, with calcite vanes | | 16.43 | 1 | 100 | | | | | | | | | | | | BC | UCS = 111 MPa |
| 18 | | | | | 2 | 100 | | | | | | | | | | | | | Bentonite Seal |
| 19 | | | | | 3 | 100 | | | | | | | | | | | | BC | |
| | | | | 60.79 | | | | | | | | | | | | | | | |
| 20 | | END OF DRILLHOLE<br><br>Note(s):<br><br>1. Water level in screen measured at 3.71 m (Elev. 76.89 m) on April 11, 2023 | | 19.81 | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028408.18; E 366502.62

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-116

BORING DATE: May 4-5, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.93 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SP) SAND, fine, some silt; dark brown, contains organic matter and rootlets; non-cohesive, moist, very loose | | 0.00 / 0.10 | 1A / 1B | SS | 3 | | | | |
| | | (SP) SAND, fine, trace silt; brown, mottled; non-cohesive, moist, loose | | 80.17 | | | | | | | |
| 1 | | (ML/CL) CLAYEY SILT to SILTY CLAY; brown grey, fissured (WEATHERED CRUST); cohesive, w<PL, stiff | | 0.76 | 2 | SS | 8 | | | | |
| | | | | 79.10 | 3A | SS | 9 | | | | |
| 2 | | (SM) CLAYEY SILTY SAND, trace gravel; grey brown, with black mottling (GLACIAL TILL); non-cohesive to cohesive, wet, compact | | 1.83 / 78.64 | 3B | | | | | | |
| | | (SM) SILTY SAND, some gravel, trace clay; brown to grey (GLACIAL TILL); non-cohesive, wet to moist, loose to compact | | 2.29 | 4 | SS | 9 | | | | |
| 3 | | | | | 5 | SS | 12 | | | | |
| 4 | | - Becomes brown grey, wet at 3.81 m depth | | | 6 | SS | 10 | | | | |
| 5 | | - Becomes grey by 4.88 m depth | | | 7 | SS | 13 | | | | |
| | | | | 75.75 | | | | | | | |
| | | (SM) SILTY SAND, some clay, gravel; grey (GLACIAL TILL); non-cohesive, wet, very loose to loose | | 5.18 | 8 | SS | 5 | | | | |
| 6 | | | | | 9 | SS | 3 | | | | |
| 7 | | | | | 10 | SS | 2 | | | | |
| 8 | | | | | 11 | SS | 7 | | | | |
| | | | | 72.55 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace clay; light grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | 8.38 | 12 | SS | 4 | | | | |
| 9 | | | | 71.79 | | | | | | | |
| | Wash boring HW/HQ | (SW) gravelly SAND, some silt, trace to some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 9.14 | 13 | SS | 77 | | | | |
| 10 | | | | | 14 | SS | 64 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028408.18; E 366502.62

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-116

BORING DATE: May 4-5, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash boring HW/HQ | (SW) gravelly SAND, some silt, trace to some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 70.26 | 14 | SS | 64 | | | | |
| | | (SW) gravelly SAND, some silt, trace clay; grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, dense to compact | | 10.67 | 15 | SS | 30 | | | | |
| 11 | | | | | 16 | SS | 26 | | | | |
| 12 | | | | 68.74 | | | | | | | |
| | | (SM) gravelly SILTY SAND, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 12.19 | 17 | SS | 10 | | | | |
| 13 | | | | | 18 | SS | 10 | | | | |
| 14 | | | | | 19 | SS | 25 | | | | |
| 15 | | | | | 20 | SS | 58/ 0.13 | | | | |
| | | | | 65.08 | | | | | | | |
| | | (SW/SP) gravelly SAND, some silt, trace clay; grey, contains boulders and cobbles (GLACIAL TILL); non-cohesive, wet, dense | | 15.85 | 21 | SS | 46 | | | | |
| 16 | | | | 64.32 | | | | | | | |
| | | (SW/SP) gravelly SAND, trace to some plastic fines; grey, contains boulders and cobbles (GALCIAL TILL); non-cohesive, wet, very dense | | 16.61 | 22 | SS | 79 | | | | |
| 17 | | | | | | | | | | | |
| | | | | 63.12 | | | | | | | |
| 18 | | Borehole continued on RECORD OF DRILLHOLE 23-116 | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-116

SHEET 3 OF 3

LOCATION: N 5028408.18 ;E 366502.62

DRILLING DATE: May 5, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.12 | | | | | | | | | | | | | | | |
| 18 | Rotary Drill / NQ Core | Fresh, medium to thinly bedded, grey, fine to medium grained, non-porous, medium strong to strong LIMESTONE, with shale beds and calcite veins | | 17.81 | 1 | grey 100 | | | | | | | | | | | | BC | |
| 19 | | | | | 2 | grey 100 | | | | | | | | | | | | BC/LC | |
| 20 | | | | | 3 | grey 100 | | | | | | | | | | | | | |
| 21 | | | | 59.53 | | | | | | | | | | | | | | BC | |
| | | END OF DRILLHOLE | | 21.40 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: PAK
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028385.28; E 366497.29

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-117

BORING DATE: May 1-3, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 4

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa — nat V. + Q - ● / rem V. ⊕ U - ○ (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT Wp — W — Wl (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.93 | | | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | FILL - (ML/CL) sandy CLAYEY SILT to SILTY CLAY, trace gravel; brown; cohesive, w~PL to w<PL, firm | | 0.00 | 1 | SS | 4 | | | ○ | | | |
| 1 | | | | | 2 | SS | 8 | | | | | | |
| | | | | | 3A | SS | 4 | | | | | | |
| | | | | 79.10 | | | | | | | | | |
| 2 | | (ML/CL) CLAYEY SILT to SILTY CLAY; brown, fissured (WEATHERED CRUST); cohesive, w<PL, firm | | 1.83 | 3B | | | | | | | | |
| | | | | | 4A | | | | | ○ | | | |
| | | | | 78.34 | | | | | | | | | |
| | | (SM) SILTY SAND, some clay, trace to some gravel; brown, mottling present (GALCIAL TILL); non-cohesive, wet to moist, compact | | 2.59 | 4B | SS | 13 | | | | | | |
| 3 | | | | | 5 | SS | 21 | | | ○ | | | |
| | | | | 77.27 | | | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey (GLACIAL TILL); non-cohesive, moist, compact | | 3.66 | 6 | SS | 22 | | | | | | |
| 4 | | | | | | | | | | | | | |
| | | | | | 7 | SS | 15 | | | ○ | | | Bentonite Seal |
| 5 | | | | 75.75 | | | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, loose | | 5.18 | 8 | SS | 5 | | | ○ | | MH | ▽ |
| 6 | | | | | 9 | SS | 8 | | | | | | |
| | | | | | | | | | | | | | |
| 7 | | | | | 10 | SS | 8 | | | ○ | | | |
| | | | | 73.31 | | | | | | | | | |
| | | (SP/SW) gravelly SAND, some silt, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 7.62 | 11 | SS | 44 | | | | | | |
| 8 | | | | | | | | | | | | | |
| | | | | | 12 | SS | 43 | | | ○ | | | |
| 9 | Wash boring HW/HQ | | | | | | | | | | | | |
| | | | | | 13 | SS | 27 | | | | | | |
| 10 | | | | | 14 | SS | 69 | | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028385.28; E 366497.29

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-117

BORING DATE: May 1-3, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W WI) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash boring HW/HQ | (SP/SW) gravelly SAND, some silt, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | 14 | SS | 69 | | | | |
| | | | | 70.26 | | | | | | | |
| | | (SM/SW) gravelly SILTY SAND to gravelly SAND, some silt, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 10.67 | 15 | SS | 60 | | | | |
| 11 | | | | | | | | | | | |
| | | | | | 16 | SS | 32 | | ○ | | |
| 12 | | | | | | | | | | | |
| | | | | | 17 | SS | 66/ 0.28 | | | | |
| 13 | | | | | | | | | | | |
| | | | | | 18 | SS | 27 | | | | |
| 14 | | | | | | | | | | | |
| | | | | 66.45 | | | | | | | |
| | | (ML) sandy SILT, fine particle, trace to some gravel; grey (GLACIAL TILL); non-cohesive, wet, compact | | 14.48 | 19 | SS | 20 | | ○ | MH | Bentonite Seal |
| 15 | | | | 65.84 | | | | | | | |
| | | (SW) gravelly SAND, some silt, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 15.09 | 20 | SS | 31 | | | | |
| 16 | | | | | | | | | | | |
| | | | | | | | | | | | |
| 17 | | | | | 21 | SS | 17 | | | | |
| | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| | | | | | | | | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028385.28; E 366497.29

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-117

BORING DATE: May 1-3, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | Wash boring HW/HQ | (SW) gravelly SAND, some silt, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 60.20 | 22 | SS | 50/ 0.00 | | | | |
| 21 | | (SM) clayey SILTY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 20.73 | 23 | SS | 102/ 0.15 | | | | |
| 22 | | | | | | | | | | | Bentonite Seal |
| 23 | | | | | 24 | SS | 75/ 0.18 | | ○ | | |
| 24 | | Borehole continued on RECORD OF DRILLHOLE 23-117 | | 57.00 | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-117

SHEET 4 OF 4

LOCATION: N 5028385.28 ;E 366497.29

DRILLING DATE: May 3, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY TOTAL CORE % | RECOVERY SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA DIP w.r.t. CORE AXIS | DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 57.00 | | | | | | | | | | | | | | | |
| 24 | Rotary Drill NQ Core | Fresh, bedded, grey to black, fine to medium grained, slightly porous, medium strong to strong SHALEY LIMESTONE | | 23.93 | 1 | 100 | | | | | | | | | | | | BC/LC | Bentonite Seal |
| 25 | | | | | 2 | dark brown to light grey 100 | | | | | | | | | | | | BC | UCS = 49 MPa Silica Sand |
| 26 | | | | | 3 | dark brown to light grey 100 | | | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 27 | | | | 53.67 | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC/LC | |
| | | END OF DRILLHOLE<br><br>Note(s):<br><br>1. Water level in screen measured at 5.70 m (Elev. 75.23 m) on April 11, 2023 | | 27.26 | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028427.56; E 366522.73

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-118

BORING DATE: April 20-21, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.60 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown; moist | | 0.00 | | | | | | | |
| | | FILL - (SP) GRAVEL; brown, dark grey; non-cohesive, moist, compact | | 0.15 / 80.00 | 1 | SS | 13 | | | | |
| | | (CI/CH) SILTY CLAY to CLAY; grey brown, slightly fissured (WEATHERED CRUST); cohesive, w~PL, stiff | | 0.60 | 2 | SS | 9 | | | | |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | 11 | | | | |
| 2 | | | | | | | | | | | |
| | | | | 78.15 | 4A | | | | | | |
| | | (SM/ML) gravelly SILTY SAND, trace plastic fines; grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 2.45 | 4B | SS | 6 | | | | |
| 3 | | | | | 5 | SS | 15 | | | | |
| 4 | | | | | 6 | SS | 7 | | | | |
| 5 | | | | | 7 | SS | 7 | | | | |
| | | | | | 8 | SS | 13 | | | | |
| 6 | | | | | 9 | SS | 8 | | | | |
| 7 | | | | | 10 | SS | 18 | | | | |
| 8 | | | | | 11 | SS | 14 | | | | |
| | | | | | 12 | SS | 16 | | | | |
| 9 | | | | | | | | | | | |
| | | | | | 13 | SS | 29 | | | | |
| | | | | 70.69 | | | | | | | |
| 10 | | | | 9.91 | 14 | SS | 26 | | | | |

*CONTINUED NEXT PAGE*

DEPTH SCALE

1 : 50

LOGGED: DG

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028427.56; E 366522.73

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-118

BORING DATE: April 20-21, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m |
|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | |
| 10 | Power Auger 108 mm Diam. (Hollow Stem) | (SM/GW) SILT, SAND and GRAVEL, fine to coarse; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 70.08 | 14 | SS | 26 |
| | | (SM/ML) gravelly SILTY SAND, angular gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense to very dense - Trace clay with coarse sand layer from 10.85 m to 11.02 m depth | | 10.52 | | | |
| 11 | | | | | 15 | SS | 34 |
| | | | | | 16 | SS | 33 |
| 12 | | | | | | | |
| | | | | | 17 | SS | 60 |
| 13 | | | | | 18A | SS | 66 |
| | | | | | 18B | | |
| | Rotary Drill NW Casing | | | | 19 | SS | 50 |
| 14 | | | | | | | |
| | | | | | 20 | SS | 99/ 0.15 |
| 15 | | | | | | | |
| | | | | | 21 | SS | 54 |
| 16 | | | | | | | |
| | | | | | 22 | SS | 53 |
| | | | | | | | |
| 17 | | | | 63.54 | 23 | SS | 50/ 0.20 |
| | | Borehole continued on RECORD OF DRILLHOLE 23-118 | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa — nat V. + Q - ● rem V. ⊕ U - ○: 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$

WATER CONTENT PERCENT: Wp — W — Wl: 20 40 60 80

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

DEPTH SCALE

1 : 50

LOGGED: DG

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-118

SHEET 3 OF 3

LOCATION: N 5028427.56 ;E 366522.73

DRILLING DATE: April 21, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.54 | | | | | | | | | | | | | | | |
| 18 | Rotary Drill<br>NQ Coring | Fresh, medium bedded, grey, fine grained, non-porous, weak to medium strong SHALEY LIMESTONE with calcite vanes | | 17.06 | 1 | 100-80 | | | | | | | | | | | | | |
| 19 | | | | | 2 | 100 | | | | | | | | | | | | | |
| 20 | | | | | 3 | 100 | | | | | | | | | | | | | |
| | | | | 59.94 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 20.66 | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: DG
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028423.92; E 366560.27

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-122

BORING DATE: May 8, 2-3, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.55 | | | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; dark brown, contains organic matter, rootlets; non-cohesive, moist, compact | | 0.00 | 1A | SS | 14 | | | | | | |
| | | | | 0.15 | | | | | | | | | |
| | | | | 0.30 | 1B | | | | | | | | |
| | | FILL - (SM) SILTY SAND, fine, trace plastic fines; brown; non-cohesive, moist, compact | | 0.46 | | | | | | | | | |
| | | ASPHALTIC CONCRETE | | | | | | | | | | | |
| 1 | | FILL - (CL/SM) sandy SILTY CLAY and SILTY SAND; grey and brown, layered, highly fissured, contains organic matter, rootlets, wood; cohesive to non-cohesive, moist to wet, compact | | | 2 | SS | 6 | | | | | | |
| | | | | | 3A | | | | | | | | |
| | | | | 78.72 | | SS | 5 | | | | | | |
| 2 | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, black mottling, highly fissured, thin to thick laminations of sand (WEATHERED CRUST); cohesive, w<PL, very stiff | | 1.83 | 3B | | | | | | | | |
| | | | | | 4 | SS | 9 | | | | | | |
| 3 | | | | 77.50 | | | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey brown, dark brown mottling, silty clay layered, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet to moist, compact | | 3.05 | 5 | SS | 3 | | | | | M | |
| 4 | | | | | 6 | SS | 15 | | | | | | |
| | | | | 75.98 | | | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact | | 4.57 | 7 | SS | 13 | | | | | | |
| 5 | | | | 75.22 | | | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 5.33 | 8 | SS | 9 | | | | | | |
| 6 | | | | | 9 | SS | 25 | | | | | | |
| 7 | | | | | 10 | SS | 15 | | | | | | |
| 8 | | | | | 11 | SS | 11 | | | | | | |
| | | | | | 12 | SS | 9 | | | | | | |
| 9 | | | | | 13 | SS | 15 | | | | | | |
| 10 | | | | | | SS | 44 | | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028423.92; E 366560.27

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-122

BORING DATE: May 8, 2-3, 2023

DRILL RIG: CME 75 Trackmount

SHEET 2 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 108 mm Diam. (Hollow Stem) | (SM/GM) sandy SILTY GRAVEL to gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, dense | | 70.34<br>10.21 | 14A<br>14B | SS | 44 | | | | |
| 11 | | (SM/GM) gravelly SILTY SAND to sandy SILTY GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very dense | | 69.88<br>10.67<br>69.29 | 15 | SS | 95/<br>0.28 | | ○ | M | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-122 | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-122

SHEET 3 OF 3

LOCATION: N 5028423.92 ;E 366560.27

DRILLING DATE: May 2-3, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 69.29 | | | | | | | | | | | | | | | |
| 12 | Rotary Drill / NQ Core | Fresh, thin to medium bedded, brownish grey, fine to coarse grained, faintly porous, medium strong LIMESTONE with fresh, thin laminations to medium bedded, dark brown to black, fine grained, faintly porous, weak, SHALE with calcite vanes, chalk layers/ nodules | | 11.26 | 1 | 100 | | | | | | | | | | | | | |
| 13 | | | | | 2 | 100 | | | | | | | | | | | | | |
| 14 | | | | | 3 | 100 | | | | | | | | | | | | | |
| 15 | | | | 65.32 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 15.23 | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028369.72; E 366547.69

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-124

BORING DATE: April 28 - May 1, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.84 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SP/SM) SAND to SILTY SAND, firm; dark brown, contains organics, rootlets; non-cohesive, moist, loose | | 0.00 / 80.59 | 1A | | | | | | |
| | | FILL - (SP/SM) SAND to SILTY SAND, fine, trace clay, trace gravel; brown; non-cohesive, moist, compact | | 0.25 / 80.23 | 1B | SS | 10 | | | | |
| 1 | | (SM) SILTY SAND, some clay, some gravel; light brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.61 | 2 | SS | 16 | | | | |
| 2 | | | | | 3 | SS | 14 | | | | |
| | | | | | 4 | SS | 16 | | | | |
| 3 | | - Moist to wet below 3.05 m depth | | | 5 | SS | 12 | | ○ | M | |
| 4 | | - Grey brown below 3.81 m depth | | | 6 | SS | 16 | | | | |
| | | | | 76.27 | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey (GLACIAL TILL); non-cohesive, wet, loose | | 4.57 | 7 | SS | 8 | | | | |
| 5 | | | | 75.66 | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet to moist, loose to compact | | 5.18 | 8 | SS | 6 | | | | |
| 6 | | | | | 9 | SS | 9 | | | | |
| 7 | | | | | 10 | SS | 14 | | | | |
| | | | | 73.37 | | | | | | | |
| | Wash boring HW/HQ | (SM) SILTY SAND, trace to some clay, trace gravel; grey; non-cohesive, wet, compact | | 7.47 | 11 | SS | 15 | | | | |
| 8 | | | | | 12 | SS | 24 | | | | |
| | | | | 72.00 | | | | | | | |
| 9 | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, compact | | 8.84 | 13 | SS | 17 | | ○ | M | |
| | | | | 70.93 | | | | | | | |
| 10 | | | | 9.91 | 14 | SS | 62 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028369.72; E 366547.69

# RECORD OF BOREHOLE: 23-124

SHEET 2 OF 3

BORING DATE: April 28 - May 1, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Trackmount

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | | | |
| 10 | Wash boring HW/HQ | (GW/SP) GRAVEL and SAND, some silt; grey (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | 14 | SS | 62 | | | | | | |
| 11 | | | | | 15 | SS | 17 | | | | | | |
| 12 | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, dense | | 69.11<br>11.73 | 16 | SS | 41 | | | | | | |
| 13 | | | | | 17 | SS | 43 | | | | | | |
| | | | | 67.05 | 18 | SS | 50/<br>0.05 | | | | | | |
| 14 | | Borehole continued on RECORD OF DRILLHOLE 23-124 | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-124

SHEET 3 OF 3

LOCATION: N 5028369.72 ;E 366547.69

DRILLING DATE: May 1, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 67.05 | | | | | | | | | | | | | | | |
| 14 | Rotary Drill / NQ Core | Slightly weathered bedded, light to dark grey, fine to medium grained, slightly porous, medium strong SHALEY LIMESTONE | | 13.79 | 1 | 100 | | | | | | | | | | | | | |
| 15 | | | | | 2 | 100 | | | | | | | | | | | | | |
| 16 | | | | 64.31 | 3 | 100 | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 16.53 | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028361.38; E 366603.45

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-125

BORING DATE: April 26-27, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 4

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.15 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace clay; dark brown, contains organic matters and rootlets; non-cohesive, moist, loose | | 0.00 / 80.79 | 1 | SS | 4 | | | | |
| | | FILL - (SP/SM) SAND to SILTY SAND, fine, some gravel; brown; non-cohesive, moist to wet, loose | | 0.36 / 80.24 | 2A | | | | | | |
| 1 | | (ML/CL) CLAYEY SILT to SILTY CLAY, trace sand; grey brown; cohesive, w<PL, stiff | | 0.91 / 79.32 | 2B | SS | 12 | | | | |
| | | | | | 3A | | | | | | |
| 2 | | (ML/SM) sandy SILT to SILTY SAND, some clay, trace gravel; brown (GLACIAL TILL); non-cohesive, wet, loose to compact | | 1.83 / 78.41 | 3B | SS | 9 | | | | |
| | | | | | 4 | SS | 15 | | | | |
| 3 | | (SM) SILTY SAND, some clay, some gravel; brown (GLACIAL TILL); non-cohesive, moist, compact | | 2.74 | 5 | SS | 16 | | | MH | |
| 4 | | - Becomes grey brown below 3.66 m depth | | | 6 | SS | 17 | | | | |
| | | - Becomes grey below 4.42 m depth | | | 7 | SS | 20 | | | | |
| 5 | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 5.18 / 75.97 | 8 | SS | 7 | | | | |
| 6 | | | | | 9 | SS | 13 | | | | |
| 7 | | | | | 10 | SS | 9 | | | | |
| | | (SP) SAND, fine to medium, trace gravel, trace silt; grey (GLACIAL TILL); non-cohesive, wet, compact | | 7.62 / 73.53 | 11 | SS | 13 | | | | |
| 8 | Wash boring HW/HQ | (SM) SILTY SAND, trace to some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense to dense | | 8.38 / 72.77 | 12 | SS | 69/ 0.23 | | | | |
| 9 | | | | | 13 | SS | 40 | | | | |
| 10 | | | | | 14 | SS | 34 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028361.38; E 366603.45

# RECORD OF BOREHOLE: 23-125

SHEET 2 OF 4

BORING DATE: April 26-27, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Trackmount

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash boring HW/HQ | (SM) SILTY SAND, trace to some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense to dense | | | 14 | SS | 34 | | | | |
| | | | | 70.48 | | | | | | | |
| | | (SW) SAND, some silt, some gravel, trace clay; grey (GLACIAL TILL); non-cohesive, moist to wet, very dense | | 10.67 | 15 | SS | 54 | | | | |
| 11 | | | | 69.87 | | | | | | | |
| | | (SM) SILTY SAND, some gravel, trace to some clay; grey, contains cobbles and boulders (GLACIAL TILL); wet, compact to very dense | | 11.28 | | | | | | | |
| | | | | | 16 | SS | 10 | | ○ | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| | | | | | 17 | SS | 90 | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| | | | | | 18 | SS | 43 | | ○ | | |
| 16 | | | | 64.69 | | | | | | | |
| | | (SW/SM) SAND, some silt to SILTY SAND, some gravel, trace to some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | 16.46 | | | | | | | |
| 17 | | | | | 19 | SS | 9 | | | | |
| | | | | 63.78 | | | | | | | |
| | | (SP) SAND, some silt, some gravel, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very dense | | 17.37 | | | | | | | |
| | | | | | 20 | SS | 88/ 0.10 | | ○ | | |
| 18 | | | | | | | | | | | |
| | | | | | 21 | SS | 50/ 0.08 | | | | |
| 19 | | | | | | | | | | | |
| | | | | | 22 | SS | 99/ 0.03 | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028361.38; E 366603.45

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-125

BORING DATE: April 26-27, 2023

DRILL RIG: CME 75 Trackmount

SHEET 3 OF 4

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | Wash boring HW/HQ | (SP) SAND, some silt, some gravel, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very dense | | | 22 | SS | | | | | |
| 21 | | | | | 23 | SS | 50/ 0.13 | | | | |
| 22 | | | | 58.90 / 22.25 | | | | | | | |
| | | (SP) SAND, some silt, some gravel, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very dense | | | | | | | | | |
| 23 | | | | | 24 | SS | 91 | | ○ | MH | |
| 24 | | | | | 25 | SS | 50/ 0.08 | | | | |
| 25 | | | | 55.75 | 26 | RC | DD | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-125 | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-125

SHEET 4 OF 4

LOCATION: N 5028361.38 ;E 366603.45

DRILLING DATE: April 27, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 55.75 | | | | | | | | | | | | | | | |
| 26 | Rotary Drill NQ Core | Fresh with weathered shale, bedded light grey, dark grey, slightly porous, medium strong, SHALEY LIMESTONE | | 25.40 | 1 | 100 | | | | | | | | | | | | | |
| 27 | | | | | 2 | 100 | | | | | | | | | | | | | UCS = 72 MPa |
| 28 | | | | | 3 | 100 | | | | | | | | | | | | | |
| | | | | 52.22 | | | | | | | | | | | | | | | |
| 29 | | END OF DRILLHOLE | | 28.93 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028418.21; E 366628.46

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-133

BORING DATE: May 5, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 77.12 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter, rootlets; non-cohesive, wet, loose | | 0.00<br>0.15 | 1 | SS | 20 | | | | |
| 1 | | FILL - (SM) SILTY SAND, some gravel, trace to some plastic fines; dark brown to brown, silty clay layers/nodules, organic matter, contains cobbles and boulders, concrete fragments; non-cohesive, moist to wet, compact | | | 2 | SS | 17 | | | | |
| | | | | 75.75 | | | | | | | |
| 2 | | (SM) gravelly SILTY SAND, some plastic fines; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact | | 1.37 | 3 | SS | 11 | | | | |
| | | | | 74.83 | | | | | | | |
| | | (SM) Gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | 2.29 | 4 | SS | 3 | | ○ | M | |
| 3 | | | | | 5 | SS | 4 | | | | |
| 4 | | | | | 6 | SS | 8 | | | | |
| 5 | | | | | 7 | SS | 12 | | | | |
| | | | | 71.78 | | | | | | | |
| | | (SM) gravelly SILTY SAND, some plastic fines; grey, poorly graded sand laminations, contains cobbles and boulders, thin to thick laminations of sand (GLACIAL TILL); non-cohesive, wet, compact | | 5.34 | 8 | SS | 9 | | | | |
| 6 | | | | | 9 | SS | 6 | | | | |
| 7 | | | | | 10 | SS | 4 | | | | |
| 8 | | | | | 11 | SS | 8 | | | | |
| | | | | | 12A | SS | 65 | | | | |
| | | | | 68.30 | 12B | | | | | | |
| | | (SM) gravelly SILTY SAND, thin beds of sand, fine; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense | | 8.82 | | | | | | | |
| 9 | | | | | 13 | SS | 42 | | | | |
| | | | | 67.21 | | | | | | | |
| 10 | | | | 9.91 | | SS | 53 | | | | |

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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028418.21; E 366628.46

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-133

BORING DATE: May 5, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | | | |
| | Power Auger | (SP) SAND, fine to medium trace gravel; grey (GLACIAL TILL); non-cohesive, wet, very dense | | | 14A | | | | | | ○ | M | |
| | | | | 66.75 | | SS | 53 | | | | | | |
| | | (SW/SM) gravelly SAND, fine to coarse, some silt to silty; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 10.37 | 14B | | | | | | | | |
| | | | | 66.45 | | | | | | | | | |
| 11 | | Borehole continued on RECORD OF DRILLHOLE 23-133 | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-133

SHEET 3 OF 3

LOCATION: N 5028418.21 ;E 366628.46

DRILLING DATE: May 5, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | DISCONTINUITY DATA: Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.45 | | | | | | | | | | | | | | | |
| 11 | Rotary Drill / NQ Core | Slightly weathered LIMESTONE | | 10.67 | | | | | | | | | | | | | | BC | |
| | | | | 66.14 | | | | | | | | | | | | | | | |
| | | Fresh to slightly weathered, thinly to medium bedded, medium brownish grey, fine to medium grained, faintly porous, medium strong LIMESTONE, slightly weathered to fresh, thin laminations to thinly bedded, dark brown to black, fine grained, faintly porous, weak, SHALE calcite vanes | | 10.98 | 1 | 100 | | | | | | | | | | | | | |
| 12 | | | | | 2 | 100 | | | | | | | | | | | | BC | UCS = 103 MPa |
| 13 | | | | | 3 | 100 | | | | | | | | | | | | BC | |
| 14 | | | | 62.56 | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| | | END OF DRILLHOLE | | 14.56 | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028449.66; E 366633.58

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-134

BORING DATE: May 8,2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 76.32 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SM) SILTY SAND, trace gravel; dark brown to black, contains organic matter and rootlets; non-cohesive, moist, very loose | | 0.00 / 0.15 | 1 | SS | 6 | | | | |
| | | FILL - (SM) gravelly SILTY SAND to sandy SILT, trace to some plastic fines; dark brown to brown, contains organic matter, contains cobbles and boulders, concrete fragments, silty clay layers/nodules; non-cohesive, moist to wet, loose to compact | | | 2 | SS | 8 | | | | |
| 1 | | | | | 3 | SS | 19 | | | | |
| 2 | | | | | 4 | SS | 21 | | | | |
| 3 | | | | | 5 | SS | 12 | | | | |
| | | | | 72.51 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 3.81 | 6 | SS | 20 | | | | |
| 4 | | | | | 7 | SS | 33 | | | | |
| 5 | | | | 70.98 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense | | 5.34 | 8 | SS | 59/ 0.28 | | | | |
| 6 | | | | | 9 | SS | 18 | | | | |
| 7 | | | | | 10 | SS | 15 | | | | |
| 8 | | | | | 11 | SS | 6 | | | | |
| | | | | | 12 | SS | 9 | | | | |
| 9 | | | | | 13A | | | | | | |
| | | | | 66.87 | | SS | 23 | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact to dense | | 9.45 | 13B | | | | | | |
| 10 | | | | | 14 | SS | 46 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

GTA-BHS 001 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MIS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028449.66; E 366633.58

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-134

BORING DATE: May 8,2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | 66.26 | | | | | | | |
| | Power Auger 108 mm Diam. (Hollow Stem) | (SW/GW) gravelly SAND, fine to coarse, some silt; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense | | 10.06 / 65.65 | 14 | SS | 46 | | | | |
| 11 | | (SW/GW) gravelly SAND, fine to coarse to silty, trace to some silt; grey, thick laminations of silty sand, fine (GLACIAL TILL); non-cohesive, wet, very dense | | 10.67 / 65.04 | 15 | SS | 54 | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 11.28 / 64.64 | 16 | SS | 52/ 0.18 | | | | |
| 12 | | Borehole continued on RECORD OF DRILLHOLE 23-134 | | | | | | | | | |
| 13 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-134

SHEET 3 OF 3

LOCATION: N 5028449.66 ;E 366633.58

DRILLING DATE: May 8,2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.64 | | | | | | | | | | | | | | | |
| 12 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium brownish grey, fine to medium grained, faintly porous, medium strong, LIMESTONE with fresh, thinly laminated to thinly bedded, dark brown to black, fine grained, faintly porous, weak, SHALE, calcite vanes | | 11.68 | 1 | 100 | | | | | | | | | | | | BC | |
| | | | | | 2 | 100 | | | | | | | | | | | | | |
| 13 | | | | | 3 | 10-50 | | | | | | | | | | | | BC | |
| 14 | | | | | | | | | | | | | | | | | | BC | |
| 15 | | | | | 4 | 25-50 | | | | | | | | | | | | BC | |
| | | | | 60.57 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 15.75 | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
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DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028471.65; E 366644.01

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-135

BORING DATE: March 27, 2023

DRILL RIG: CME 75



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 74.86 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | FILL - (SP) gravelly SAND, some to trace silt; brown, contains concrete; non-cohesive, moist, very dense | | 0.00 | 1 | SS | 50/0.20 | | | | |
| 1 | | | | | 2 | SS | 50/0.15 | | | | |
| | | | | | 3 | SS | 50/0.28 | | | | |
| 2 | | - Wet below 2.29 m depth. | | | 4 | SS | 50/0.15 | | | | |
| 3 | | | | 71.81 | | | | | | | |
| | | FILL - (GP) GRAVEL, some sand, trace silt; brown, contains concrete; non-cohesive, compact, wet | | 3.05 | 5 | SS | 25 | | | | |
| | | | | 71.05 | | | | | | | |
| 4 | | FILL - (ML) CLAYEY SILT, some sand, trace gravel; grey brown; cohesive, w~PL to w>PL | | 3.81 | 6 | SS | 21 | | | | |
| | | | | 70.44 | | | | | | | |
| | | (SP/GP) gravelly SAND to SAND and GRAVEL, trace silt; grey brown (GLACIAL TILL); non-cohesive, wet, loose to very dense | | 4.42 | 7 | SS | 66 | | | | |
| 5 | | | | 69.60 | | | | | | | |
| | | (SM) SILTY SAND, some gravel, trace clay; grey brown (GLACIAL TILL); non-cohesive, wet, loose to very dense | | 5.26 | 8 | SS | 50 | | | | |
| 6 | | | | | 9 | SS | 9 | | | | |
| 7 | | | | | 10 | SS | 6 | | | | |
| | | | | | 11 | SS | 82 | | | | |
| 8 | | - Trace rock fragments below 8.38 m depth. | | | 12 | SS | 52 | | | | |
| 9 | | | | | 13 | SS | 60 | | | | |
| 10 | | - Contains cobbles below 9.91 m depth. | | | 14 | SS | 50 | | | | |

*CONTINUED NEXT PAGE*

DEPTH SCALE

1 : 50

LOGGED: ACM

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028471.65; E 366644.01

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-135

BORING DATE: March 27, 2023

DRILL RIG: CME 75



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | | (SM) SILTY SAND, some gravel, trace clay; grey brown (GLACIAL TILL); non-cohesive, wet, loose to very dense | | 64.41 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-135 | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: ACM

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-135

SHEET 3 OF 3

LOCATION: N 5028471.65 ;E 366644.01

DRILLING DATE: March 28, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.41 | | | | | | | | | | | | | | | |
| 11 | Rotary Drill / NQ Core | Slightly weathered to fresh, thinly to medium bedded, light grey with black bands, grey black grained, slightly porous, weak to medium strong LIMESTONE with shale laminations VERULAM FORMATION | | 10.45 | 1 | grey 100 | | | | | | | | | | | | | BC |
| 12 | | | | | | | | | | | | | | | | | | | BC |
| 13 | | | | | 2 | grey 100 | | | | | | | | | | | | | BC/LC |
| | | | | 60.96 | 3 | grey 100 | | | | | | | | | | | | | BC/LC |
| 14 | | END OF DRILLHOLE | | 13.90 | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
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DEPTH SCALE
1 : 50

LOGGED: ACM
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028468.88; E 366656.14

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-136

BORING DATE: March 27, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.00 | | | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | FILL - (SP) Gravelly SAND, some silt, trace clay; brown, contains asphalt, concrete and cobbles; non-cohesive, moist to wet, compact to loose | | 0.00 | 1 | SS | 14 | | | | | | |
| 1 | | | | | 2 | SS | 7 | | | | | | |
| 2 | | | | | 3 | SS | 27 | | | | | | |
| 3 | | | | | 4 | SS | 2 | | | | | | |
| 4 | | | | | 5 | SS | 12 | | | | | | |
| | | - Shells present as 4.50 m depth. | | | 6 | SS | 9 | | | | | | |
| 5 | | | | | 7 | SS | 3 | | | | | | |
| | | CONCRETE | | 69.36 / 5.64 | 8 | SS | 50/ 0.03 | | | | | | |
| 6 | NQ Coring | | | | 9 | RC | - | | | | | | |
| 7 | | | | | 10 | RC | - | | | | | | |
| 8 | | | | | 11 | RC | - | | | | | | |
| | | | | | 12 | RC | - | | | | | | |
| 9 | | | | | | | | | | | | | |
| | | | | | 13 | RC | - | | | | | | |
| | | (SM) SILTY SAND, some clay, gravel; grey (GLACIAL TILL); non-cohesive, wet | | 65.45 / 9.55 / 65.07 | | | | | | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028468.88; E 366656.14

# RECORD OF BOREHOLE: 23-136

SHEET 2 OF 2

BORING DATE: March 27, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | | CONCRETE | | 9.93<br>64.76 | | | | | | | |
| | | End of Borehole | | 10.24 | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: JS

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PROJECT: 23606896

LOCATION: N 5028475.19; E 366572.36

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-137

BORING DATE: May 3, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 79.37 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SP) SAND, fine to medium, some silt, some gravel; dark brown to black, contains organic matter and rootlets; non-cohesive, moist, loose | | 0.00 / 79.07 | 1A | SS | 7 | | | | Backfill |
| | | FILL - (SM) gravelly SILTY SAND, some clay; grey brown to brown, contains organic matter, brick and asphalt fragments, silty clay layers; non-cohesive, moist, loose | | 0.30 / 78.61 | 1B | | | | | | |
| 1 | | FILL - (CL) sandy SILTY CLAY, trace to some gravel; grey brown to brown, contains organic matter, gravelly silty sand layers, brick fragments; cohesive, w<PL, firm | | 0.76 / 77.85 | 2 | SS | 8 | | | | Bentonite Seal |
| | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, thin laminations of silt, grey, thin to thick laminations of sand (WEATHERED CRUST); cohesive, w<PL, very stiff | | 1.52 | 3 | SS | 11 | | | | |
| 2 | | | | | 4 | SS | 13 | | | | |
| 3 | | | | 76.17 | 5A | | | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; red brown to brown to grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to compact | | 3.20 | 5B | SS | 3 | | | | |
| 4 | | | | | 6 | SS | 15 | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey, contains cobbles and boulders (GALCIAL TILL); non-cohesive, wet, very loose | | 74.80 / 4.57 | 7 | SS | 4 | | | | |
| 5 | | | | 74.03 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace to some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | 5.34 | 8 | SS | 5 | | | | Backfill |
| 6 | | | | | 9 | SS | 4 | | ○ | M | |
| 7 | | | | | 10 | SS | 10 | | | | |
| 8 | | | | | 11 | SS | 9 | | | | |
| | | | | | 12 | SS | 5 | | | | |
| 9 | | | | | 13 | SS | 10 | | | | |
| 10 | | | | | 14 | SS | 5 | | | | |

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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028475.19; E 366572.36

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-137

BORING DATE: May 3, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Power Auger 108 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND, trace to some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | | 14 | SS | 5 | | | | Bentonite Seal |
| | | | | 68.70 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace of plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense | | 10.67 | | | | | | | |
| | | | | 68.39 | 15 | SS | 35 | | | | |
| 11 | | (SW/GW) sandy SILTY GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 10.98 | | | | | | | |
| | | | | | 16 | SS | 36 | | | | |
| 12 | | | | | | | | | | | Silica Sand |
| | | | | | 17 | SS | 39 | | | | |
| 13 | | | | | | | | | | | |
| | | | | | 18 | SS | 14 | | ○ | M | |
| | | | | | | | | | | | |
| 14 | | | | | 19 | SS | 27 | | | | 32 mm Diam. PVC #10 Slot Screen |
| | | | | | | | | | | | |
| | | | | | 20 | SS | 50/ 0.15 | | | | Silica Sand |
| | | | | 64.51 | | | | | | | |
| 15 | | Borehole continued on RECORD OF DRILLHOLE 23-137 | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-137

SHEET 3 OF 3

LOCATION: N 5028475.19 ;E 366572.36

DRILLING DATE: May 3, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.51 | | | | | | | | | | | | | | | |
| 15 | Rotary Drill / NQ Core | Fresh, thin to medium bedded, medium brownish grey, fine to medium grained, faintly porous, medium strong, LIMESTONE with fresh, thinly laminated to thinly bedded, dark brown to black, fine grained, faintly porous, weak , SHALE calcite vanes | | 14.86 | 1 | 100 | | | | | | | | | | | | | |
| 16 | | | | | 2 | 100 | | | | | | | | | | | | | UCS = 103 MPa; Bentonite Seal |
| 17 | | | | | 3 | 100 | | | | | | | | | | | | BC | |
| 18 | | | | 61.13 | | | | | | | | | | | | | | BC; BC | |
| | | END OF DRILLHOLE<br><br>Note(s):<br><br>1. Water level in screen measured at 6.55 m (Elev. 72.82 m) on April 11, 2023 | | 18.24 | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

GTA-RCK 046 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MISS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028489.83; E 366650.44

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-138

BORING DATE: March 24, 2023

DRILL RIG: CME 75

SHEET 1 OF 1

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.90 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | FILL - (SM) gravelly SILTY SAND; dark brown, contains asphalt fragments, concrete fragments, organic matter, cobbles and boulders; non-cohesive, moist to wet, loose to dense | | 0.00 | 1 | SS | 17 | | | | |
| 1 | | | | | 2 | SS | 7 | | | | |
| 2 | | | | | 3 | SS | 33 | | | | |
| | | | | 71.77 | | | | | | | |
| | | FILL - (GM) SILTY sandy GRAVEL; grey to grey brown, contains pebbles, asphalt fragments, concrete fragments, organic matter, cobbles and boulders; non-cohesive, compact to very dense | | 2.13 | 4 | SS | 96 | | | | |
| 3 | | | | | 5 | SS | 29 | | | | |
| | | | | 70.09 | | | | | | | |
| 4 | | FILL - (SM) gravelly SILTY SAND; brown to grey brown, contains concrete fragments, cobbles and boulders; non-cohesive, wet, very dense | | 3.81 | 6 | SS | 83 | | | | |
| | | | | 69.33 | | | | | | | |
| 5 | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 4.57 | 7 | SS | 29 | | ○ | M | |
| 6 | | | | | 8 | SS | 13 | | | | |
| | | | | | 9 | SS | 17 | | | | |
| 7 | | | | | 10 | SS | 12 | | ○ | M | |
| | | | | 66.35 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 7.55 | | | | | | | |
| 8 | | Note(s):<br><br>1. Water level measured in open hole at a depth of 0.38 m (Elev. 73.52 m) on March 24, 2023 | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028508.92; E 366664.91

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-139

BORING DATE: March 22, 2023

DRILL RIG: CME 75

SHEET 1 OF 1

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.80 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | FILL - (SM) gravelly SILTY SAND, trace plastic fines; grey brown; moist to wet, compact to very dense | | 0.00 | 1 | SS | 15 | | | | |
| 1 | | | | | 2 | SS | 68 | | | | |
| | | | | 72.28 | | | | | | | |
| | | FILL - (GM) SILTY GRAVEL, some sand; grey, contains concrete pieces; non-cohesive, wet, dense | | 1.52 | 3 | SS | 46 | | | | |
| 2 | | | | | 4 | SS | 39 | | | | |
| | | | | 71.06 | | | | | | | |
| | | (SW) SAND, trace gravel, trace non-plastic fines; brown; non-cohesive, moist to wet, very loose | | 2.74 | | | | | | | |
| 3 | | | | 70.57 | | | | | | | |
| | | (SM) SILTY SAND, some gravel, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 3.23 | 5 | SS | 10 | | | | |
| 4 | | | | | 6 | SS | 10 | | | | |
| | | | | | 7 | SS | 11 | | | | |
| 5 | | | | | 8 | SS | 11 | | | | |
| 6 | | | | | 9 | SS | 9 | | | | |
| | | | | 67.00 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 6.80 | | | | | | | |
| 7 | | Note(s):<br><br>1. Water level measured in open borehole at a depth of 0.41 m (Elev. 73.39 m) on March 24, 2023 | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: CA

CHECKED: CH

GTA-BHS 001 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MIS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028497.05; E 366638.94

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-140

BORING DATE: March 27, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.96 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace to some gravel; dark brown, contains organic matter, non-cohesive, wet to moist, loose | | 0.00 / 73.73 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace to some plastic fines; grey brown to dark brown, contains concrete and asphalt fragments, cobbles and boulders; non-cohesive, moist to wet, very loose to compact | | 0.23 | 1 | SS | 6 | | | | |
| 1 | | | | | 2 | SS | 7 | | | | |
| 2 | | | | | 3 | SS | 8 | | | | |
| | | | | | 4 | SS | 12 | | | | |
| 3 | | | | | 5 | SS | 19 | | | | |
| 4 | | | | | 6 | SS | 5 | | | | |
| | | | | 69.39 | | | | | | | |
| | | (SM) Gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 4.57 | 7 | SS | 15 | | | | |
| 5 | | | | | 8 | SS | 12 | | | | |
| 6 | | | | | 9 | SS | 13 | | | | |
| 7 | | | | | 10 | SS | 22 | | | | |
| 8 | | | | | 11 | SS | 8 | | | | |
| | | | | | 12 | RC | - | | | | |
| | | | | 65.36 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-140 | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-140

SHEET 2 OF 2

LOCATION: N 5028497.05 ;E 366638.94

DRILLING DATE: March 27, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 65.36 | | | | | | | | | | | | | | | |
| 9 | Rotary Drill NQ Core | Fresh, very thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong LIMESTONE, with fresh, thinly laminated to very thinly bedded, dark brown to black, fine grained, non-porous, weak shale | | 8.60 | 1 | grey 100 | | | | | | | | | | | | | BC<br>BC |
| 10 | | | | | 2 | grey 100 | | | | | | | | | | | | | BC/LC<br>BC |
| 11 | | | | | 3 | grey 100 | | | | | | | | | | | | | BC<br>BC/LC |
| 12 | | | | 61.74 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 12.22 | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028510.69; E 366647.07

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-141

BORING DATE: March 22, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.72 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | FILL - (SM) gravelly SILTY SAND, trace plastic fines; dark brown to brown, contains organic matter and asphalt fragments; non-cohesive, moist to wet, compact | | 0.00 | 1 | SS | 13 | | | | |
| 1 | | | | | 2 | SS | 15 | | | | |
| | | | | 72.20 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace organic matter; brown to grey, concrete odour, contains concrete fragments, cobbles and boulders; non-cohesive, wet, loose to dense | | 1.52 | 3 | SS | 9 | | | | |
| 2 | | | | | 4 | SS | 44 | | | | |
| 3 | | | | 70.67 | | | | | | | |
| | | FILL - (SM) Gravelly SILTY SAND, some plastic fines; grey, contains concrete fragments, cobbles and boulders; non-cohesive, wet, very loose to compact | | 3.05 | 5 | SS | 6 | | | | |
| 4 | | | | | 6 | SS | 8 | | | | |
| 5 | | | | | 7 | SS | 3 | | | | |
| | | | | | 8 | SS | 2 | | | | |
| 6 | | | | | 9 | SS | 10 | | | | |
| 7 | | | | | 10 | SS | 50/ 0.13 | | | | |
| | | | | 66.56 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-141 | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-141

SHEET 2 OF 2

LOCATION: N 5028510.69 ;E 366647.07

DRILLING DATE: March 22, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.56 | | | | | | | | | | | | | | | |
| | | Fresh, thinly to medium bedded, medium grey, fine to medium grained, non-porous, fair to good quality, medium strong LIMESTONE, with shale beds and laminations | | 7.16 | 1 | grey 100 | | | | | | | | | | | | BC | |
| 8 | | | | | | | | | | | | | | | | | | BC | |
| | | | | | 2 | grey 100 | | | | | | | | | | | | BC | |
| 9 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | BC | |
| 10 | | | | | 3 | grey 100 | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 11 | | | | 62.42 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 11.30 | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

GTA-RCK 046 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MISS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028532.63; E 366678.57

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-142

BORING DATE: March 28, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.90 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel, trace plastic fines; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose | | 0.00 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace plastic fines; grey brown; non-cohesive, moist, very loose | | 0.15 | 1 | SS | 3 | | | | |
| | | | | 73.14 | | | | | | | |
| 1 | | FILL - (SP) SAND, fine to medium, trace silt; brown, contains thin to medium beds of silty clay; non-cohesive, moist, compact | | 0.76 | 2 | SS | 15 | | | | |
| | | | | 72.07 | 3 | SS | 21 | | | | |
| 2 | | (CL/CI) sandy SILTY CLAY, trace gravel; grey brown, highly fissured (WEATHERED CRUST); cohesive, w<PL, very stiff | | 1.83 | | | | | | | |
| | | | | 71.46 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; brown to grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very loose to compact | | 2.44 | 4 | SS | 12 | | | | |
| 3 | | | | | 5 | SS | 8 | | | | |
| 4 | | - Becomes grey at 4.12 m depth. | | | 6 | SS | 12 | | | | |
| 5 | | | | | 7 | SS | 3 | | | | |
| 6 | | | | | 8 | SS | 3 | | | | |
| | | | | | 9 | SS | 9 | | | | |
| 7 | | - Very dense below 6.88 m depth. | | | 10 | SS | 54/ 0.13 | | | | |
| | | | | 66.41 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-142 | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-142

SHEET 2 OF 2

LOCATION: N 5028532.63 ;E 366678.57

DRILLING DATE: March 23, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY TOTAL CORE % | RECOVERY SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA DIP w.r.t. CORE AXIS | DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.41 | | | | | | | | | | | | | | | |
| 8 | | Fresh, thinly to medium bedded, medium grey, fine to medium grained, non-porous, fair to good quality, medium strong LIMESTONE, with shale laminations | | 7.49 | 1 | grey 100 | | | | | | | | | | | | BC/LC<br>BC | |
| 9 | | | | | 2 | grey 100 | | | | | | | | | | | | BC<br>BC<br>BC<br>BC | |
| 10 | | | | | 3 | grey 100 | | | | | | | | | | | | BC<br>BC | |
| 11 | | | | 62.42 | | | | | | | | | | | | | | | |
| 12 | | END OF DRILLHOLE<br><br>Note(s):<br><br>1. Water level measured in open borehole prior to rock coring at a depth of 0.18 m (Elev. 68.72 m) on March 24, 2023 | | 11.48 | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

GTA-RCK 046 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MISS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028514.12; E 366679.01

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-143

BORING DATE: March 20, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.72 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | FILL - (SM/GM) Gravelly SILTY SAND to SILTY sandy GRAVEL; grey, concrete fragments, brick fragment; non-cohesive, moist to wet, very loose to dense | | 0.00 | 1 | SS | 10 | | | | |
| 1 | | | | | 2 | SS | 6 | | | | |
| 2 | | | | | 3 | SS | 1 | | | | |
| | | | | | 4 | SS | 46 | | | | |
| 3 | | | | 70.67 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace to some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | 3.05 | 5 | SS | 9 | | | | |
| 4 | | | | | 6 | SS | 24 | | | | |
| 5 | | | | | 7 | SS | 9 | | | | |
| | | | | | 8 | SS | 3 | | | | |
| 6 | | - Very dense below 6.10 m depth. | | 67.55 | 9 | SS | 50/ 0.13 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-143 | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-143

SHEET 2 OF 2

LOCATION: N 5028514.12 ;E 366679.01

DRILLING DATE: March 24, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 67.55 | | | | | | | | | | | | | | | |
| | | Fresh, thinly to medium bedded, medium grey, fine to medium grained, non-porous, good to quality, medium strong LIMESTONE, with shale beds and laminations | | 6.17 | 1 | grey 100 | | | | | | | | | | | | BC | BC |
| 7 | | | | | 2 | grey 100 | | | | | | | | | | | | BC | BC |
| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | 3 | grey 100 | | | | | | | | | | | | BC | BC |
| | | | | 63.81 | | | | | | | | | | | | | | | |
| 10 | | END OF DRILLHOLE | | 9.91 | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028528.43; E 366688.40

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-144

BORING DATE: March 21, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.97 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SM) gravelly SILTY SAND; dark brown, contains organic matter, cobbles and boulders; non-cohesive, moist, wet, compact | | 0.00 / 73.74 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; dark brown, contains asphalt; non-cohesive, moist, very dense | | 0.23 | 1 | SS | 29 | | | | |
| 1 | | | | | 2 | SS | 70 | | | | |
| | | FILL - (SP) SAND, fine to medium, some no-plastic fines; brown; non-cohesive, moist, very dense | | 72.75 / 1.22 | | | | | | | |
| | | (Cl) SILTY CLAY, trace sand; grey-brown, highly fissured (WEATHERED CRUST); cohesive, w<PL | | 72.45 / 1.52 | 3 | SS | 11 | | | | |
| 2 | | | | | 4 | SS | 8 | | | | |
| | | (SM/ML) SILTY SAND to SANDY SILT, trace to some plastic fines; grey brown, contains thin laminations of silty clay; non-cohesive, moist, loose | | 71.38 / 2.59 | | | | | | | |
| 3 | | (SM) Gravelly SILTY SAND, some plastic fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 70.92 / 3.05 | 5 | SS | 5 | | | | |
| 4 | | | | | 6 | SS | 10 | | | | |
| 5 | | | | | 7 | SS | 7 | | | | |
| | | | | | 8 | SS | 7 | | | | |
| 6 | | | | | 9 | SS | 8 | | | | |
| 7 | | | | | 10 | SS | 37 | | | | |
| | | | | 66.52 | | | | | | | |
| 8 | | Borehole continued on RECORD OF DRILLHOLE 23-144 | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-144

SHEET 2 OF 2

LOCATION: N 5028528.43 ;E 366688.40

DRILLING DATE: March 21, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | DISCONTINUITY DATA: Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.52 | | | | | | | | | | | | | | | |
| 8 | | Fresh, thinly to medium bedded, medium grey, fine to medium grained, non-porous, good quality, medium strong LIMESTONE, with shale beds and laminations | | 7.45 | 1 | grey 100 | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | W1 W2 W3 W4 W5 W6 | 2 4 6 | | BC |
| | | | | | | | | | | | | | | | | | | | BC/LC |
| | | | | | | | | | | | | | | | | | | | BC |
| 9 | | | | | 2 | grey 100 | | | | | | | | | | | | | BC |
| | | | | | | | | | | | | | | | | | | | BC |
| 10 | | | | | | | | | | | | | | | | | | | BC |
| | | | | | 3 | grey 100 | | | | | | | | | | | | | BC/LC |
| 11 | | | | 62.49 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 11.48 | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028565.02; E 366670.12

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-145

BORING DATE: March 20, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W WI) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.73 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - gravelly SILTY SAND; dark brown, contains organic matter; non-cohesive, wet, loose | | 0.00 / 0.15 | 1 | SS | 24 | | | | Bentonite Seal |
| 1 | | FILL - (SM) gravelly SILTY SAND, trace clay; grey brown to brown, contains brick fragments, concrete fragment, cobbles and boulders; non-cohesive, wet to moist, very loose to compact | | | 2 | SS | 11 | | ○ | | |
| 2 | | | | | 3 | SS | 4 | | | | |
| | | | | 71.29 | | | | | | | |
| | | (SM) SILTY SAND, fine to medium, trace organic matter; brown, contains thin laminations of silty clay; non-cohesive, moist, very loose | | 2.44 | 4 | SS | 3 | | ○ | | |
| 3 | | | | 70.68 | | | | | | | |
| | | (CL/CI) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w>PL, very stiff | | 3.05 | 5 | SS | 7 | | ○ | MH | |
| | | | | 69.92 | | | | | | | |
| 4 | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | 3.81 | 6 | SS | 5 | | | | Backfill |
| | | | | 69.16 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | 4.57 | 7 | SS | 9 | | ○ | | |
| 5 | | | | 68.39 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 5.34 | 8 | SS | 8 | | ○ | | |
| 6 | | | | | 9 | SS | 8 | | ○ | | |
| 7 | | | | | 10 | SS | 2 | | ○ | MH | |
| 8 | | | | | 11 | SS | 15 | | ○ | | |
| | | | | 65.35 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-145 | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-145

SHEET 2 OF 2

LOCATION: N 5028565.02 ;E 366670.12

DRILLING DATE: March 20, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 65.35 | | | | | | | | | | | | | | | |
| | | Fresh, thinly to medium bedded, medium grey, fine to medium grained, non-porous, fair to excellent quality, medium strong LIMESTONE, with shale laminations | | 8.38 | 1 | grey 100 | | | | | | | | | | | | BC | UCS = 154 MPa |
| 9 | | | | | | | | | | | | | | | | | | | Bentonite Seal |
| 10 | | | | | 2 | grey 100 | | | | | | | | | | | | BC<br>BC | |
| 11 | | | | | | | | | | | | | | | | | | BC | Silica Sand |
| 12 | | | | | 3 | grey 100 | | | | | | | | | | | | BC | 32 mm Diam. PVC #10 Slot Screen |
| | | END OF DRILLHOLE | | 61.46<br>12.27 | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028363.15; E 366628.98

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-146

BORING DATE: April 24-25, 2023

DRILL RIG: CME 55

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.09 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel, trace organics; dark brown, contains rootlets; non-cohesive, moist, compact | | 0.00 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace clay, trace organics; brown; non-cohesive, moist, compact | | 0.15 | 1 | SS | 12 | | | | |
| | | (CL/CH) SILTY CLAY to CLAY, some sand; light brown, highly fissured, (WEATHERED CRUST); cohesive, w~PL, stiff | | 80.33 0.76 | 2 | SS | 11 | | | | |
| | | (SM) gravelly SILTY SAND, trace to some plastic fines; grey (GLACIAL TILL); moist to wet, non-cohesive, loose to dense | | 79.57 1.52 | 3 | SS | 14 | | | | |
| | | | | | 4A | SS | 8 | | | | |
| | | | | | 4B | | | | | | |
| | | | | | 5 | SS | 4 | | | M | |
| | | | | | 6 | SS | 18 | | | | |
| | | - Brown mottling below 4.57 m depth | | | 7 | SS | 10 | | | | Bentonite Seal |
| | | | | | 8 | SS | 6 | | | | |
| | | | | | 9 | SS | 7 | | | | |
| | | | | | 10 | SS | 16 | | | | |
| | | | | | 11 | SS | 19 | | | | |
| | | | | | 12 | SS | 30 | | | | |
| | | | | | 13 | SS | 24 | | | | |
| | | | | 71.34 9.75 | | SS | 64 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: CA

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028363.15; E 366628.98

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-146

BORING DATE: April 24-25, 2023

DRILL RIG: CME 55



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 108 mm Diam. (Hollow Stem) | (SM) SILTY SAND, some gravel, trace clay; grey (GALCIAL TILL); non-cohesive, wet, dense to very dense<br>- Rock fragments between 10.36 m to 10.52 m depth | | | 14A<br>14B | SS | 64 | | | | |
| 11 | | | | | 15 | SS | 37 | | | | |
| | | | | 69.37 | 16A | SS | 24 | | | | |
| 12 | | (SM) SILTY SAND to gravelly SILTY SAND, some gravel, trace clay; grey (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 11.72 | 16B<br>17 | SS | 60 | | ○ | M | |
| 13 | | - Boulders between 12.95 m to 13.34 m depth | | | 18 | RC | DD | | | | |
| | | | | | 19 | SS | 76 | | | | |
| 14 | | - Boulders between 13.62 m to 15.01 m depth | | | 20 | RC | DD | | | | Bentonite Seal |
| 15 | | | | | 21 | SS | 98 | | | | |
| | | | | | 22 | RC | DD | | | | |
| 16 | | | | | 23 | SS | 76 | | | | |
| | | | | | 24 | RC | DD | | | | |
| 17 | | | | 63.92 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-146 | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: CA

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-146

SHEET 3 OF 3

LOCATION: N 5028363.15 ;E 366628.98

DRILLING DATE: April 25, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.92 | | | | | | | | | | | | | | | |
| 18 | Rotary Drill / NQ Core | Fresh to slightly weathered, fine grained, light grey, non to fairly porous, weak to strong, very poor to fair quality. LIMESTONE with shale beds, mud seams and calcite vanes | | 17.17 | 1 | 100 | | | | | | | | | | | | LC | |
| | | | | | | | | | | | | | | | | | | LC | Bentonite Seal |
| 19 | | | | | 2 | 100 | | | | | | | | | | | | LC | |
| | | | | | | | | | | | | | | | | | | LC | Silica Sand |
| 20 | | | | | 3 | 100 | | | | | | | | | | | | LC | |
| | | | | | | | | | | | | | | | | | | BC/LC | 32 mm Diam. PVC #10 Slot Screen |
| | | | | 60.24 | | | | | | | | | | | | | | | |
| 21 | | END OF DRILLHOLE | | 20.85 | | | | | | | | | | | | | | | |
| | | Note(s) | | | | | | | | | | | | | | | | | |
| | | 1. Water level in screen measured at 6.89 m (Elev. 74.2 m) on April 11, 2023 | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: CA

CHECKED: CH

GTA-RCK 046 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MISS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028478.62; E 366633.60

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-148

BORING DATE: March 27, 2023

DRILL RIG: CME 75

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 74.99 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter; non-cohesive, very moist | | 0.00 / 74.69 | 1 | SS | 15 | | | | |
| | | FILL - gravelly SILTY SAND, trace plastic fines; brown to grey brown, contains concrete fragments; non-cohesive, moist to wet, loose to compact | | 0.30 | | | | | | | |
| 1 | | | | | 2 | SS | 5 | | | | |
| | | | | 73.47 | | | | | | | |
| | | FILL - (SW) SAND, fine to coarse, trace to some gravel, trace silt; brown; non-cohesive, wet, loose | | 1.52 | 3 | SS | 6 | | | | |
| 2 | | | | 72.86 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace plastic fines; brown to grey brown, contains cobbles, boulders, silty clay layers and sand, fine to coarse, trace gravel layers; non-cohesive, wet, very loose to loose | | 2.13 | 4 | SS | 5 | | | | |
| 3 | | | | | 5 | SS | 3 | | | | |
| 4 | | | | | 6 | SS | 2 | | | | |
| 5 | | | | | 7 | SS | 3 | | | | |
| | | | | 69.65 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 5.34 | 8 | SS | 11 | | | | |
| 6 | | | | | 9 | SS | 11 | | | | |
| 7 | | | | | 10 | SS | 11 | | | | |
| 8 | | | | | 11 | SS | 32 | | | | |
| | | | | | 12 | SS | 29 | | | | |
| 9 | | | | | 13 | SS | 40 | | | | |
| | | | | 65.08 | | | | | | | |
| 10 | | | | 9.91 | 14 | SS | 80 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF BOREHOLE: 23-148

SHEET 2 OF 3

LOCATION: N 5028478.62; E 366633.60

BORING DATE: March 27, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger | (GM) SILTY sandy GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 64.37 | 14 | SS | 80 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-148 | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-148

SHEET 3 OF 3

LOCATION: N 5028478.62 ;E 366633.60

DRILLING DATE: March 27, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.37 | | | | | | | | | | | | | | | |
| 11 | Rotary Drill / NQ Core | Fresh, very thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong LIMESTONE, with fresh, thinly laminated to very thinly bedded, dark brown to black, fine grained, non-porous to slightly porous, weak shale | | 10.62 | 1 | grey 100 | | | | | | | | | | | | BC | |
| 12 | | | | | 2 | grey 100 | | | | | | | | | | | | | UCS = 55 MPa |
| 13 | | | | | | | | | | | | | | | | | | BC | |
| 14 | | | | 60.56 | 3 | grey 100 | | | | | | | | | | | | BC | |
| | | END OF DRILLHOLE | | 14.43 | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028327.67; E 366464.91

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-149

BORING DATE: March 29, 2023

DRILL RIG: CME 75 Track

SHEET 1 OF 1

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.33 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | FILL - (ML) sandy SILT, trace gravel, trace to some clay; brown, contains organics, cobbles and rootlets; slightly cohesive, w>PL, firm | | 0.00 | 1 | AS | - | | | | |
| | | | | 80.42 | | | | | | | |
| 1 | | FILL - (SP/GW) SAND and GRAVEL, some to trace silt; grey brown, contains cobbles and boulders non-cohesive, moist to wet, dense to very dense | | 0.91 | 2 | SS | 39 | | | | |
| 2 | | | | | 3 | SS | 50/ 0.23 | | | | |
| | | | | | 4 | SS | 50/ 0.05 | | | | |
| 3 | | | | 78.26 | 5 | SS | 50/ 0.01 | | | | |
| | | END OF BOREHOLE | | 3.07 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028327.67; E 366464.91

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-149A

BORING DATE: March 29, 2023

DRILL RIG: CME 75 Track

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.33 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | For soil stratigraphy refer to record of borehole 23-149 | | 0.00 | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | 78.28 | | | | | | | |
| | | (SP/GW) SAND and GRAVEL to sandy GRAVEL, some silt/non-plastic fines; brown to brown-grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very dense | | 3.05 | 1 | SS | 50/ 0.15 | | | | |
| 4 | | | | | 2 | SS | 50/ 0.15 | | | | |
| 5 | | | | | 3 | SS | 77 | | | | |
| | | | | | 4 | SS | 50/ 0.05 | | | | |
| 6 | | | | | 5 | SS | 50/ 0.08 | | | | |
| 7 | | | | | 6 | SS | 50/ 0.08 | | | | |
| | | | | | 7 | SS | 50/ 0.05 | | | | |
| 8 | | | | 73.10 | | | | | | | |
| | | (SP/GW) SAND and GRAVEL; sandy GRAVEL; grey, contains cobbles and boulders, limestone fragments (GLACIAL TILL); non-cohesive, wet, very dense | | 8.23 | 8 | SS | 83 | | | | |
| 9 | | | | 72.19 | | | | | | | |
| | Wash Boring NW/NQ | COBBLES and BOULDERS | | 9.14 | 9 | SS | 50/ 0.20 | | | | |
| 10 | | | | | 10 | RC | DD | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028327.67; E 366464.91

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-149A

BORING DATE: March 29, 2023

DRILL RIG: CME 75 Track



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Boring NW/NQ | COBBLES and BOULDERS | | | 10 | RC | DD | | | | |
| 11 | | | | | 11 | RC | DD | | | | |
| 12 | | | | | 12 | RC | DD | | | | |
| 13 | | | | | 13 | SS | 50/ 0.05 | | | | |
| 14 | | | | | 14 | RC | DD | | | | |
| 14 | | COBBLES and BOULDERS | | 67.35 / 13.98 | 15 | RC | DD | | | | |
| 15 | | | | | 16 | RC | DD | | | | |
| 16 | | | | | | | | | | | |
| 16 | | COBBLES and BOULDERS | | 65.02 / 16.31 | 17 | RC | DD | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | 18 | RC | DD | | | | |
| 19 | | | | | | | | | | | |
| 19 | | COBBLES and BOULDERS | | 62.13 / 19.20 | 19 | RC | DD | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF BOREHOLE: 23-149A

SHEET 3 OF 3

LOCATION: N 5028327.67; E 366464.91

BORING DATE: March 29, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Track

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | Wash Boring NW/NQ | COBBLES and BOULDERS | | | 19 | RC | DD | | | | |
| 21 | | | | | 20 | SS | >50 | | | | |
| 22 | | | | | 21 | RC | DD | | | | |
| 23 | | | | 57.61 | 22 | RC | DD | | | | |
| | | END OF BOREHOLE | | 23.72 | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028280.82; E 366486.26

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-151

BORING DATE: April 28, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.34 | | | | | | | | | |
| 0 | Wash Boring / HW Casing | FILL/TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter and rootlets; non-cohesive, moist | | 0.00 / 82.04 / 0.30 | 1 | SS | 2 | | | | | | |
| 1 | | (SM) gravelly SILTY SAND, trace plastic fines; brown to grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact to dense | | | 2 | SS | 17 | | | | | | |
| 2 | | | | | 3 | SS | 12 | | | | | | |
| 3 | | | | | 4 | SS | 10 | | | | | | |
| 4 | | | | | 5 | SS | 15 | | | | | | |
| | | | | | 6 | SS | 34 | | | | | | |
| | | (SW/GW) sandy GRAVEL, some silt; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, dense to very dense | | 78.07 / 4.27 | 7 | SS | 50/ 0.13 | | | | | | |
| 5 | | | | | 8 | RC | DD | | | | | | |
| | | (SW/GW) gravelly SAND, fine to coarse to sandy GRAVEL, some silt; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, mosit to wet | | 76.85 | 9 | SS / RC | 50/ 0.03 / DD | | | | | | |
| 6 | | Borehole continued on RECORD OF DRILLHOLE 23-151 | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-151

SHEET 2 OF 2

LOCATION: N 5028280.82 ;E 366486.26

DRILLING DATE: April 28, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 76.82 | | | | | | | | | | | | | | | |
| 6 | Rotary Drill / HQ Core | Slightly weathered to fresh, thinly to medium bedded, medium brownish grey, fine to medium grained, faintly porous, medium strong LIMESTONE, with slightly weathered to fresh, thin laminations to thin beds, dark brown to black, fine grained, ffaintly porous, weak shale | | 5.52 | 1 | 100 | | | | | | | | | | | | | |
| 7 | | | | | 2 | 100-0 | | | | | | | | | | | | BC/LC | BC/LC |
| 8 | | | | | 3 | 0 | | | | | | | | | | | | BC | |
| 9 | | | | | 4 | 0 | | | | | | | | | | | | BC | BC |
| 10 | | | | | 5 | 0 | | | | | | | | | | | | BC | BC |
| 11 | | END OF DRILLHOLE | | 71.46 10.88 | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028287.43; E 366526.94

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-153

BORING DATE: April 12, 2023

DRILL RIG: CME 75 Track

SHEET 1 OF 4

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.29 | | | | | | | |
| 0 | Power Auger 108 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organics and rootlets; non-cohesive, moist | | 0.00 | | | | | | | |
| | | (SM) gravelly SILTY SAND; light brown, contains cobbles (GLACIAL TILL); non-cohesive, wet to moist, loose to compact | | 81.99 0.30 | 1 | SS | 3 | | | | |
| 1 | | | | | 2 | SS | 3 | | ○ | | |
| | | | | | 3 | SS | 29 | | | | |
| 2 | | | | | 4 | SS | 29 | | ○ | | |
| 3 | | | | | 5 | SS | 15 | | | | |
| 4 | | - Very dense at 4.57 m depth. | | | 6 | SS | 11 | | ○ | M | |
| 5 | | | | | 7 | SS | 58 | | | | Bentonite |
| | | (SM) gravelly SILTY SAND, some to trace clay; brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, wet to moist, very dense | | 77.11 5.18 | 8 | SS | 50/ 0.13 | | | | |
| 6 | | (SP/GW) SAND and GRAVEL, trace silt, coarse grained; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense to very dense | | 76.19 6.10 | 9 | SS | 56 | | ○ | | |
| 7 | | | | | 10 | SS | 32 | | ○ | | |
| | Wash boring HW/HQ | (SP) gravelly SAND, some silt, trace clay; brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense to very dense | | 74.67 7.62 | 11 | SS | 45 | | | | |
| 8 | | | | | 12 | SS | 50/ 0.13 | | | | |
| 9 | | | | | 13 | SS | 50/ 0.18 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

GTA-BHS 001 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MIS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028287.43; E 366526.94

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-153

BORING DATE: April 12, 2023

DRILL RIG: CME 75 Track

SHEET 2 OF 4

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash boring HW/HQ | (SP) gravelly SAND, some silt, trace clay; brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense to very dense | | | 14 | SS | 39 | | ○ | | |
| | | | | 71.32 / 10.97 | | | | | | | |
| 11 | | (SP/GW) SAND and GRAVEL, trace silt; brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | 15 | SS | 21 | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | 16 | SS | 50 | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 17 | SS | 90 | | ○ | | Bentonite |
| 16 | | | | | 18 | SS | 66/ 0.10 | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | 19 | SS | 50/ 0.13 | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | 20 | SS | 50/ 0.08 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028287.43; E 366526.94

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-153

BORING DATE: April 12, 2023

DRILL RIG: CME 75 Track

SHEET 3 OF 4

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | Wash boring HW/HQ | (SP/GW) SAND and GRAVEL, trace silt; brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | 21 | SS | 50 | | | | Bentonite |
| 21 | | | | | | | | | | | |
| 22 | | | | | 22 | SS | 63 | | ○ | MH | Silica Sand |
| | | | | 59.73 | | | | | | | |
| | | (SP-SM) SAND, some non-plastic fines, some gravel; brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 22.56 | | | | | | | Screen |
| 23 | | | | | 23 | SS | 50/ 0.13 | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | 24 | SS | 50 | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | 25 | SS | 50 | | | | |
| | | | | 54.53 | | | | | | | |
| 28 | | Borehole continued on RECORD OF DRILLHOLE 23-153 | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-153

SHEET 4 OF 4

LOCATION: N 5028287.43 ;E 366526.94

DRILLING DATE: April 12, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Track

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 54.53 | | | | | | | | | | | | | | | |
| 28 | Rotary Drill / NQ Core | Fresh, medium to very thinly bedded, light to dark grey with black bands, fine grained, non to faintly porous, good quality, weak to medium strong to strong LIMESTONE | | 27.76 | 1 | Grey 100 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | 2 | | | | | | | | | | | | | | |
| | | | | 51.61 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 30.68 | | | | | | | | | | | | | | | |
| 31 | | Note(s): | | | | | | | | | | | | | | | | | |
| | | 1. Water level in screen measured at 5.28 m (Elev. 77.01 m) on April 11, 2023 | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028219.05; E 366514.69

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-154

BORING DATE: April 6, 2023

DRILL RIG: CME 75

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.75 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, some clay; dark brown, contains organics and rootlets; non-cohesive, moist, very loose | | 0.00 | | | | | | | |
| | | (SM) gravelly SILTY SAND; brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to dense | | 82.45 / 0.30 | 1 | SS | 3 | | | | |
| 1 | | | | | 2 | SS | 6 | | ○ | M | |
| 2 | | | | | 3 | SS | 15 | | ○ | | |
| | | | | | 4 | SS | 11 | | ○ | | |
| 3 | | | | | 5 | SS | 47 | | ○ | | Bentonite Seal |
| 4 | | | | | 6 | SS | 13 | | ○ | | |
| 5 | | | | | 7 | SS | 5 | | ○ | MH | |
| | | | | | 8 | SS | 10 | | ○ | | |
| 6 | | Borehole continued on RECORD OF DRILLHOLE 23-154 | | 76.69 | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-154

SHEET 2 OF 2

LOCATION: N 5028219.05 ;E 366514.69

DRILLING DATE: April 6, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 76.69 | | | | | | | | | | | | | | | |
| | Rotary Drill / NQ Core | Slightly weathered to fresh bedded, grey with black, fine to medium grained, slightly to moderately porous, medium strong LIMESTONE with shale laminations | | 6.06 | 1 | Grey 100% | | | | | | | | | | | | | UCS = 124 MPa<br>Bentonite Seal<br>Silica Sand<br>32 mm Diam. PVC #10 Slot Screen |
| 7 | | | | | 2 | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | 3 | | | | | | | | | | | | | | |
| 10 | | | | 72.67 | 4 | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE<br><br>Note(s):<br><br>1. Water level in screen measured at 5.46 m (Elev. 77.29 m) on April 11, 2023 | | 10.08 | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028243.84; E 366549.18

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-155

BORING DATE: April 26, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.31 | | | | SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ○ (20 40 60 80) | WATER CONTENT PERCENT: Wp W Wl (20 40 60 80) | | |
| 0 | Power Auger (Hollow Stem) 108 mm Diam. | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter and rootlets; non-cohesive, moist, very loose | | 0.00 / 82.08 | 1 | SS | 50/ 0.08 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-155 | | | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-155

SHEET 2 OF 2

LOCATION: N 5028243.84 ;E 366549.18

DRILLING DATE: April 26, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 82.08 | | | | | | | | | | | | | | | |
| | | Slightly weathered to fresh, thinly to medium bedded, medium brownish grey, fine to medium grained, faintly porous, strong LIMESTONE, with slightly weathered to fresh, thin laminations to thin beds, dark brown to black, fine grained, faintly porous, weak shale | | 0.23 | | | | | | | | | | | | | | | |
| 1 | Rotary Drill NQ Core | | | | 1 | 100-0 | | | | | | | | | | | | BC/LC | |
| | | | | | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 2 | | | | | 2 | 0 | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 3 | | | | | 3 | 0 | | | | | | | | | | | | BC/LC | |
| 4 | | | | | 4 | 0 | | | | | | | | | | | | | |
| 5 | | | | | 5 | 0 | | | | | | | | | | | | BC/LC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 6 | | | | | 6 | 0 | | | | | | | | | | | | | |
| 7 | | | | | 7 | 0 | | | | | | | | | | | | BC | |
| 8 | | | | | 8 | 0 | | | | | | | | | | | | UCS = 202 MPa | |
| | | | | | | | | | | | | | | | | | | BC/LC | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | 72.19 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 10.12 | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028275.66; E 366562.12

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-156

BORING DATE: April 27, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.73 | | | | | | | | | |
| 0 | Rotary Drill | TOPSOIL - (SM/ML) SILTY SAND, fine to sandy SILT, trace gravel; dark brown, contains cobbles and boulders, organic matters and rootlets; non-cohesive, moist | | 0.00 / 82.43 | 1 | SS | 5 | | | | | | |
| | | 0.30 (SM) gravelly SILTY SAND, trace to some plastic fines; grey brown, contains rootlets, thin to thick laminations of sand, cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to dense | | | 2 | SS | 10 | | | | | | |
| 1 | | | | | 3 | SS | 14 | | | | | | |
| 2 | | | | | 4 | SS | 34 | | | | | | |
| | | | | | 5 | RC | DD | | | | | | |
| 3 | | | | | 6 | SS | 17 | | | | | | |
| | | | | 79.38 | | | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 3.35 | 7 | SS | 8 | | | | | | |
| 4 | | | | | 8 | SS | 11 | | | | | | |
| 5 | | | | | 9 | SS | 14 | | | | | | |
| | | | | 77.09 | | | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 5.64 | 10 | SS | 11 | | | | | | |
| 6 | | | | | 11 | SS | 12 | | | | | | |
| 7 | | | | | 12 | RC | DD | | | | | | |
| | | | | | 13 | SS | 17 | | | | | | |
| 8 | | | | 74.65 | 14 | RC | DD | | | | | | |
| | | (SP/GW) gravelly SAND, fine to coarse, some silt to silty; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 8.08 | 15 | SS | 31 | | | | | | |
| 9 | | | | | 16 | SS | 93 | | | | | | |
| | | | | | 17 | SS | 13 | | | | | | |
| | | | | | 18 | SS | 38 | | | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028275.66; E 366562.12

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-156

BORING DATE: April 27, 2023

DRILL RIG: CME 75 Trackmount

SHEET 2 OF 2

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Rotary Drill | | | 72.52 | 18 | SS | 38 | | | | |
| | | (SP) SAND, fine to coarse, some gravel, trace silt; grey: non-cohesive, wet, compact | | 10.21 | | | | | | | |
| | | | | | 19 | SS | 19 | | | | |
| 11 | | | | 71.75 | | | | | | | |
| | | (SP/GW) gravelly SAND, fine to coarse to sandy GRAVEL, trace to some silt; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 10.98 | 20 | RC | DD | | | | |
| 12 | | | | | 21 | SS | 50 | | | | |
| | | | | | 22 | RC | DD | | | | |
| 13 | | | | | | | | | | | |
| | | | | 69.19 | 23 | SS | 50/ 0.10 | | | | |
| | | END OF BOREHOLE | | 13.54 | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

GTA-BHS 001 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MIS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028307.60; E 366601.16

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-157

BORING DATE: April 3, 2023

DRILL RIG: CME 75

SHEET 1 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.92 | | | | | | | |
| 0 | Power Auger 108 mm ID (Hollow Stem) | TOPSOIL - (SP/SM) SAND, fine,SILTY fine SAND; dark brown, contains organics; non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | (SM) SILTY SAND, trace to some clay, some gravel; light brown, contains cobbles (GLACIAL TILL); non-cohesive to slightly cohesive, moist, compact to dense | | 82.62 0.30 | 1 | SS | 2 | | | | |
| 1 | | | | | 2 | SS | 27 | | | | |
| 2 | | | | | 3 | SS | 30 | | | | |
| | | | | | 4 | SS | 34 | | | | |
| 3 | | | | | 5 | SS | 27 | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact | | 79.34 3.58 | 6 | SS | 17 | | | | |
| 4 | | | | | 7 | SS | 21 | | | | |
| 5 | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact to dense | | 77.74 5.18 | 8 | SS | 15 | | | | |
| 6 | | | | | 9 | SS | 25 | | | | |
| 7 | | | | | 10 | SS | 19 | | | | |
| 8 | | | | | 11 | SS | 40 | | | | |
| | | | | | 12 | SS | 20 | | | | |
| 9 | | | | | 13 | SS | 22 | | | | |
| 10 | | | | | 14 | SS | 22 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028307.60; E 366601.16

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-157

BORING DATE: April 3, 2023

DRILL RIG: CME 75



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 108 mm ID (Hollow Stem) | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact to dense | | 72.25 | 14 | SS | 22 | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact, compact to dense | | 10.67 | 15 | SS | 20 | | | | |
| 11 | | | | | | | | | | | |
| | | | | | 16 | SS | 11 | | | | |
| 12 | | | | | | | | | | | |
| | | | | | 17 | SS | 44 | | | | |
| 13 | | | | | | | | | | | |
| | | | | | 18 | SS | 27 | | | | |
| 14 | | | | | | | | | | | |
| | | | | | 19 | SS | 39 | | | | |
| 15 | | | | 67.38 | | | | | | | |
| | | (SW) gravelly SAND, some silt, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 15.54 | 20 | WS | - | | | | |
| 16 | | | | 66.46 | | | | | | | |
| | | (SW) gravelly SAND, some silt, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 16.46 | 21 | WS | - | | | | |
| | | | | | 22 | SS | 50/ 0.18 | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| | | | | | 23 | SS | 50/ 0.18 | | | | |
| 19 | | | | | | | | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028307.60; E 366601.16

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-157

BORING DATE: April 3, 2023

DRILL RIG: CME 75

SHEET 3 OF 3

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | SHEAR STRENGTH Cu, kPa — nat V. + Q - ● rem V. ⊕ U - ○ (20 40 60 80) | WATER CONTENT PERCENT Wp — W — Wl (20 40 60 80) | | |
| 20 | Power Auger 108 mm ID (Hollow Stem) | (SM) SILTY SAND, some gravel, trace clay; brown-grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very dense | | 62.80<br>20.12 | 24 | SS | 50/ 0.28 | | | | |
| 21 | | | | | 25 | RC | DD | | | | |
| | | | | 61.23 | | | | | | | |
| | | END OF BOREHOLE | | 21.69 | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028292.77; E 366642.69

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-158

BORING DATE: April 14, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.84 | | | | | | | |
| 0 | Rotary Drill / HW Casing | TOPSOIL - (SM/ML) SILTY SAND, fine to sandy SILT; dark brown, contains organic matters and rootlets; non-cohesive, moist, very loose | | 0.00 / 82.54 | 1 | SS | 3 | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very loose to dense | | 0.30 | 2 | SS | 22 | | ○ | | |
| 1 | | | | | 3 | SS | 15 | | | | |
| 2 | | | | | 4 | SS | 20 | | ○ | | |
| 3 | | | | | 5 | SS | 45 | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 79.18 / 3.66 | 6 | SS | 8 | | ○ | M | |
| 4 | | | | | 7 | SS | 13 | | | | |
| 5 | | (SM) gravelly SILTY SAND, trace plastic fines; grey contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 77.50 / 5.34 | 8 | SS | 11 | | | | |
| | | | | | 9 | SS | 10 | | | | |
| 6 | | | | | 10 | SS | 7 | | ○ | | |
| 7 | | (SM/GM) gravelly SILTY SAND to sandy SILTY GRAVEL, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 75.22 / 7.62 | 11 | SS | 32 | | | | |
| 8 | | | | | 12 | SS | 50/0.10 | | | | |
| | | | | | 13 | RC | DD | | | | |
| 9 | | | | | 14 | SS | 11 | | | | |
| 10 | | | | | 15 | SS | 25 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028292.77; E 366642.69

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-158

BORING DATE: April 14, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | | | | | 15 | SS | 25 | | | | |
| | | | | 72.32 | | | | | | | |
| | | (SM/GM) gravelly SILTY SAND to sandy SILTY GRAVEL, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 10.52 | 17 | SS | 23 | | ○ | | |
| 11 | | | | | | | | | | | |
| | | | | | 18 | SS | 18 | | | | |
| | | | | | 19 | RC | DD | | | | |
| 12 | | | | | 20 | SS | 28 | | | | |
| | | | | | | | | | | | |
| 13 | | | | | 21 | SS | 40 | | | | |
| | | | | | 22 | RC | DD | | | | |
| | | | | | 23 | SS | 50/ 0.13 | | | | |
| 14 | | | | | 24 | RC | DD | | | | |
| | | | | | 25 | SS | 50/ 0.15 | | | | |
| 15 | Rotary Drill / HW Casing | | | | 26 | RC | DD | | | | |
| | | | | | 27 | SS | 30 | | ○ | MH | |
| | | | | 66.93 | | | | | | | |
| 16 | | (GM/SM) gravelly SILTY SAND to sandy SILTY GRAVEL, trace plastic fines; grey contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense to compact | | 15.91 | 28 | SS | 19 | | | | |
| 17 | | | | | 29 | RC | DD | | | | |
| | | | | 65.31 | | | | | | | |
| | | (GM/SM) gravelly SILTY SAND to sandy SILTY GRAVEL, trace to some plastic fines; grey, contains thin to thick laminates of sand, silty clay-clayey silt layers, cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 17.53 | 30 | RC | DD | | | | |
| 18 | | | | | 31 | SS | 54/ 0.13 | | | | |
| | | | | | 32 | RC | DD | | | | |
| 19 | | | | 63.62 | | | | | | | |
| | | (SP) gravelly SAND, trace silt; grey; non-cohesive, wet, very dense | | 19.22 | 33 | RC | DD | | | | |
| | | | | | 34 | SS | 55/ 0.13 | | | | |
| 20 | | | | | 35 | RC | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

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PROJECT: 23606896

LOCATION: N 5028292.77; E 366642.69

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-158

BORING DATE: April 14, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | | | |
| 20 | Rotary Drill / HW Casing | (SP) gravelly SAND, trace silt; grey; non-cohesive, wet, very dense | | | 35 | RC | DD | | | | | | |
| 21 | | | | 61.80 | | | | | | | | | |
| | | (SM/GM) gravelly SILTY SAND to sandy SILTY GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 21.04 | | | | | | | | | |
| 22 | | | | | 36 | RC | DD | | | | | | |
| | | | | 60.25 | | | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 23-158 | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-158

SHEET 4 OF 4

LOCATION: N 5028292.77 ;E 366642.69

DRILLING DATE: April 14, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 60.25 | | | | | | | | | | | | | | | |
| | Rotary Drill / HQ Core | Slightly weathered to fresh, thinly to medium bedded, medium brownish grey, fine to coarse grained, faintly porous, strong LIMESTONE, with slightly weathered to fresh, thinly laminated to very thin beds, dark brown to black, fine grained, faintly porous, weak, shale, heavy calcite | | 22.59 | 0 | 100 | | | | | | | | | | | | BC | |
| 23 | | | | | | | | | | | | | | | | | | BC | |
| | | | | | 1 | 100 | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 24 | | | | | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC/LC | |
| | | | | | 2 | 100 | | | | | | | | | | | | BC | |
| 25 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | BC/LC | |
| 26 | | | | | 3 | 100 | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | UCS = 57 MPa |
| 27 | | | | | | | | | | | | | | | | | | BC/LC | |
| | | | | | 4 | 100 | | | | | | | | | | | | BC/LC | |
| | | | | | | | | | | | | | | | | | | BC/LC | |
| 28 | | | | | | | | | | | | | | | | | | BC/LC | |
| | | | | | 5 | 100 | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 29 | | | | | 6 | 100 | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 30 | | | | 52.45 | | | | | | | | | | | | | | | |
| | | END OF DRILLHOLE | | 30.39 | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

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PROJECT: 23606896

LOCATION: N 5028220.25; E 366698.11

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-159

BORING DATE: April 20, 2023

DRILL RIG: CME 75 Trackmount

SHEET 1 OF 4

DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W WI) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 85.92 | | | | | | | |
| 0 | Wash boring HW/HQ | TOPSOIL - (SM) SILTY SAND, fine; dark brown to black, contains organic matter and rootlets; non-cohesive, moist,very loose | | 0.00 / 85.62 | 1 | SS | 4 | | | | |
| | | FILL - (SP) SAND, fine, trace to some silt; brown, contains rootlets; non-cohesive, moist, very loose | | 0.30 / 85.16 | | | | | | | |
| 1 | | FILL - (SW) gravelly SAND, fine to coarse, some silt to silty; brown, contains rootlets; non-cohesive, moist to wet, loose | | 0.76 / 84.70 | 2 | SS | 6 | | | | |
| | | (SM) gravelly SILTY SAND, trace to some plastic fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact to dense | | 1.22 | 3 | SS | 28 | | | M | |
| 2 | | (SW) gravelly SILTY SAND, trace plastic fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact to dense | | 83.63 / 2.29 | 4 | SS | 46 | | | | |
| 3 | | | | | 5 | SS | 49 | | | | |
| 4 | | | | | 6 | SS | 20 | | | | |
| 5 | | | | | 7 | SS | 15 | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to dense | | 80.58 / 5.34 | 8 | SS | 9 | | | | |
| 6 | | | | | 9 | SS | 29 | | | | |
| | | | | | 10 | RC | DD | | | | |
| 7 | | | | | 11 | SS | 48 | | | MH | |
| | | (SM) gravelly SILTY SAND, some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | 78.30 / 7.62 | 12 | SS | 8 | | | | |
| 8 | | | | | 13 | RC | DD | | | | |
| | | | | | 14 | SS | 17 | | | | |
| 9 | | | | | 15 | RC | DD | | | | |
| | | | | | 16 | SS | 18 | | | | |
| 10 | | | | | 17 | RC | DD | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

GTA-BHS 001 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MIS.GDT 8/17/23

PROJECT: 23606896

LOCATION: N 5028220.25; E 366698.11

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 23-159

BORING DATE: April 20, 2023

DRILL RIG: CME 75 Trackmount



DATUM: Geodetic

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash boring HW/HQ | (SM) gravelly SILTY SAND, some plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | | 17 | RC | DD | | | | |
| | | | | | 18 | SS | 61 | | | | |
| | | | | 75.15 | | | | | | | |
| | | (SM/GM) gravelly SILTY SAND to sandy SILTY GRAVEL, trace plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 10.77 | | | | | | | |
| 11 | | | | | 19 | RC | DD | | | | |
| | | | | | 20 | SS | 30 | | | | |
| 12 | | | | | | | | | | | |
| | | | | | 21 | RC | DD | | | | |
| 13 | | | | | | | | | | | |
| | | | | | 22 | SS | 12 | | | | |
| | | | | | | | | | | | |
| 14 | | | | | 23 | RC | DD | | | | |
| | | | | 71.23 | | | | | | | |
| | | (SM) SILTY SAND, fine to medium, trace gravel; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 14.69 | | | | | | | |
| 15 | | | | | 24 | SS | 16 | | | | |
| | | | | | | | | | | | |
| 16 | | | | 69.71 | | | | | | | |
| | | (GW/SW) gravelly SAND, fine to coarse, some silt to silty; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 16.21 | 25 | SS | 14 | | | | |
| 17 | | | | | | | | | | | |
| | | | | | 26 | RC | DD | | | | |
| | | | | | | | | | | | |
| 18 | | | | | 27 | SS | 70 | | | | |
| | | | | | | | | | | | |
| | | | | | 28 | RC | DD | | | | |
| 19 | | | | | | | | | | | |
| | | | | | 29 | SS | 24 | | | | |
| | | | | 66.00 | | | | | | | |
| 20 | | Borehole continued on RECORD OF DRILLHOLE 23-159 | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: CH

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PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-159

SHEET 3 OF 4

LOCATION: N 5028220.25 ;E 366698.11

DRILLING DATE: April 14, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 66.00 | | | | | | | | | | | | | | | |
| 20 | Rotary Drill<br>NQ Core | Fresh to slightly weathered, thinly to medium bedded, medium brownish grey, fine to coarse gravel, faintly porous, strong LIMETSONE with fresh to slightly weathered, thin lamination to very thin beds, dark brown to black, fine grained, faintly porous, weak shale; calcite, modular limestone areas | | 19.92 | 1 | 100 | | | | | | | | | | | | BC/LC | |
| | | | | | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 21 | | | | | 2 | 100 | | | | | | | | | | | | BC | |
| 22 | | | | | | | | | | | | | | | | | | | UCS = 85 MPa |
| | | | | | 3 | 100 | | | | | | | | | | | | BC | |
| 23 | | | | | | | | | | | | | | | | | | BC | |
| 24 | | | | | 4 | 0-25 | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 25 | | | | | | | | | | | | | | | | | | BC | |
| | | | | | | | | | | | | | | | | | | BC | |
| 26 | | | | | 5 | 25-50 | | | | | | | | | | | | BC/LC | |
| 27 | | | | | 6 | 25-50 | | | | | | | | | | | | BC/LC | |
| 28 | | | | | | | | | | | | | | | | | | BC | |
| 29 | | | | | 7 | 25 | | | | | | | | | | | | BC/LC | |
| | | | | | | | | | | | | | | | | | | BC/LC | |
| | | | | | 8 | 0 | | | | | | | | | | | | BC | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

GTA-RCK 046 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MISS.GDT 8/17/23

PROJECT: 23606896

# RECORD OF DRILLHOLE: 23-159

SHEET 4 OF 4

LOCATION: N 5028220.25 ;E 366698.11

DRILLING DATE: April 14, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Trackmount

DRILLING CONTRACTOR: Downing Drilling

**NOTE:**
For abbreviations, symbols and descriptions refer to
**LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jr | Ja | Jcon | WEATH-ERING INDEX | Diametral Point Load Index (MPa) | FEATURES | PIEZOMETER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | | | | | | | | | |
| 30 | Rotary Drill / NQ Core | Fresh to slightly weathered, thinly to medium bedded, medium brownish grey, fine to coarse gravel, faintly porous, strong LIMETSONE with fresh to slightly weathered, thin lamination to very thin beds, dark brown to black, fine grained, faintly porous, weak shale; calcite, modular limestone areas | | | 8 | 0 | | | | | | | | | | | | | BC |
| 31 | | | | | | | | | | | | | | | | | | | |
| | | | | | 9 | 0 | | | | | | | | | | | | | BC/LC |
| 32 | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | 10 | 0 | | | | | | | | | | | | | BC |
| 34 | | | | 51.74 | | | | | | | | | | | | | | | BC |
| | | END OF DRILLHOLE | | 34.18 | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | | | | | | | |
| 39 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: CH

GTA-RCK 046 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MISS.GDT 8/17/23

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-01

SHEET 1 OF 2

LOCATION: N 5028666.0 ;E 366664.4

BORING DATE: February 23, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.19 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) gravelly SILTY SAND to sandy SILT, trace clay; brown to dark brown, contains rootlets; non-cohesive, moist, compact | | 0.00 / 65.58 | 1 | SS | 27 | | | M | |
| 1 | | No Sample Recovery<br>Possible Sand Fill, very loose | | 0.61 / 64.67 | 2 | SS | WR | | | | |
| | | FILL - (SP) SAND, fine to medium, some silt and clay; brown; non-cohesive, moist, very dense | | 1.52 / 64.36 | 2A | SS | >50 | | | | |
| 2 | | Borehole continued on RECORD OF DRILLHOLE 22-01 | | 1.83 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-01

SHEET 2 OF 2

LOCATION: N 5028666.0 ;E 366664.4

DRILLING DATE: February 23, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.36 | | | | | | | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Fresh to slightly weathered, thinly to medium bedded, grey to dark grey, fine to medium grained, slighly porous, strong SHALEY LIMESTONE<br><br>- broken core from 2.48 to 2.50 m depth<br>- broken core from 2.52 to 2.70 m depth | | 1.83 | 1 | | | | | | | | | | | | | | | | | | | |
| 3 | | | | 62.84 | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 3.35 | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-02

SHEET 1 OF 1

LOCATION: N 5028644.0 ;E 366711.2

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.60 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) gravelly SILTY SAND to sandy SILT, some clay; dark brown, contains rootlets; non-cohesive, moist, compact | | 0.00 | 1 | SS | 25 | | | | |
| | | | | 65.99 | | | | | | | |
| 1 | | FILL - (SM/SP) SILTY SAND to SAND, fine to medium, some clay, trace gravel; brown to light brown; non-cohesive, moist, compact | | 0.61 | 2 | SS | 20 | | | | |
| | | | | 65.23 | | | | | | | |
| 2 | | FILL - (SP) SAND, fine to medium, some silt; black and reddish brown; non-cohesive, moist, dense to very dense | | 1.37 | 3 | SS | >50 | | | | |
| | | | | | 4 | SS | 35 | | | | |
| | | | | 63.71 | | | | | | | |
| 3 | | End of Borehole<br>Auger Refusal | | 2.89 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-03

SHEET 1 OF 2

LOCATION: N 5028663.0 ;E 366719.8

BORING DATE: February 23, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.71 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, some clay; brown, contains rootlets; non-cohesive, moist, compact | | 0.00 | 1 | SS | 14 | | | | |
| | | | | 66.10 | | | | | | | |
| 1 | | FILL - (SP) SAND, fine to medium, some silt; brown to light brown, mottled reddish orangish black; non-cohesive, moist, loose to very | | 0.61 | 2 | SS | 17 | | | | |
| 2 | | | | | 3 | SS | 6 | | | | |
| | | | | 64.40 | 4 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-03 | | 2.31 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-03

SHEET 2 OF 2

LOCATION: N 5028663.0 ;E 366719.8

DRILLING DATE: February 23, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.40 | | | | | | | | | | | | | | | | | | | | | |
| 3 | Rotary Drill NQ Core | Fresh to slightly weathered, thinly to medium bedded, grey, fine to medium grained, slightly porous, strong LIMESTONE, with laminations of shale<br>- broken core from 2.58 to 2.62 m depth<br>- vertical joint from 2.70 to 3.04 m depth<br>- brocken core from 2.83 to 2.91 m depth | | 2.31 | 1 | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | 2 | | | | | | | | | | | | | | | | | | | | UCS = 108 MPa |
| 5 | | End of Drillhole | | 61.86<br>4.85 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-04

SHEET 1 OF 1

LOCATION: N 5028673.4 ;E 366740.3

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.40 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) gravelly SILTY SAND, some clay; brown to dark brown, contains rootlets; non-cohesive, moist, compact | | 0.00 / 65.79 | 1 | SS | 20 | | | | |
| 1 | | FILL - (SM/SP) SAND to SILTY SAND, trace clay; brown mottled black; non-cohesive, moist, compact | | 0.61 / 64.88 | 2 | SS | 25 | | | | |
| 2 | | FILL - (CL) CLAY, some gravel; brown; cohesive, w>PL, hard | | 1.52 / 64.27 | 3 | SS | 63 | | | | |
| | | FILL - (ML) gravelly sandy SILT; brown to black; non-cohesive, wet, dense to very dense | | 2.13 / 63.93 | 4 | SS | >50 | | | | |
| | | End of Borehole<br>Auger Refusal | | 2.47 | | | | | | | |
| 3 | | | | | | | | | | | |
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DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-05

SHEET 1 OF 1

LOCATION: N 5028687.2 ;E 366714.1

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.26 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) gravelly SILTY SAND to sandy SILT, some clay; brown to dark brown, contains rootlets; non-cohesive, moist, compact | | 0.00 | 1 | SS | 18 | | | | |
| | | | | 65.65 | | | | | | | |
| 1 | | FILL - (CI) SILTY CLAY, trace sand and gravel; brown; cohesive, w>PL, very stiff | | 0.61 | 2 | SS | 24 | | | | |
| | | | | 64.77 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 1.49 | | | | | | | |
| 2 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-06

SHEET 1 OF 1

LOCATION: N 5028724.0 ;E 366710.8

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.86 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace to some clay; brown to dark brown, contains rootlets; non-cohesive, moist, very dense | | 0.00 | 1 | SS | 76 | | | | |
| | | | | 65.25 | | | | | | | |
| 1 | | FILL - (SM) SILTY SAND, some gravel; brown, contains brick fragments, potential cobbles; non-cohesive, moist, compact | | 0.61 | 2 | SS | 17 | | | | |
| | | | | | 3 | SS | >50 | | | | |
| 2 | | | | 63.90 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 1.96 | | | | | | | |
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| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-07

SHEET 1 OF 1

LOCATION: N 5028758.6 ;E 366723.0

BORING DATE: February 24, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.05 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; brown, contains rootlets and 5 cm clay bed; non-cohesive, moist, compact | | 0.00 | 1 | SS | 12 | | | | |
| | | | | 65.44 | | | | | | | |
| | | FILL - (CH) CLAY; brown; cohesive, w~PL, hard | | 0.61 | | | | | | | |
| 1 | | | | 64.99 | 2 | SS | 33 | | | | |
| | | FILL - (SM) SILTY SAND; brown, contains rock fragments, wood chips, gravel pockets; non-cohesive, moist, loose to very dense | | 1.06 | | | | | | | |
| 2 | | | | | 3 | SS | 5 | | | | |
| | | | | 63.66 | 4 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-07 | | 2.39 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-07

SHEET 1 OF 1

LOCATION: N 5028758.6 ;E 366723.0

DRILLING DATE: February 24, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. DEPTH (m) | RUN No. | FLUSH | COLOUR % RETURN | RECOVERY TOTAL CORE % | RECOVERY SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA DIP w.r.t. CORE AXIS | DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX R4 | R3 | R2 | R1 | WEATHERING INDEX W1 | W2 | W3 | W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.66 | | | | | | | | | | | | | | | | | | | | | |
| 3 | Rotary Drill NQ Core | Fresh to slightly weathered, thinly to medium bedded, grey, fine to medium grained, slightly porous, LIMESTONE, with thin to thick laminations of shale<br>- vertical joint from 2.87 to 3.3 m depth | | 2.39 | 1 | | | | | | | | | | | | | | | | | | | | |
| 4 | | - vertical joint from 3.23 to 3.27 m depth | | | 2 | | | | | | | | | | | | | | | | | | | | |
| 5 | | - vertical joint from 4.75 to 5.4 m depth | | 60.65 | 3 | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 5.40 | | | | | | | | | | | | | | | | | | | | | |
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| 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-08

SHEET 1 OF 1

LOCATION: N 5028712.6 ;E 366753.6

BORING DATE: February 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.77 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; brown, contains rootlets; non-cohesive, moist, compact | | 0.00 | 1 | SS | 17 | | | | |
| | | | | 65.16 | | | | | | | |
| 1 | | FILL - (CH) CLAY, trace silt, sand, and gravel; brown mottled black and red, contains gravel, cobbles, and weathered bedrock; cohesive, w>PL, very stiff to hard | | 0.61 | 2 | SS | 17 | | | | |
| 2 | | | | | 3 | SS | 63 | | | | |
| | | | | 63.48 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 2.29 | | | | | | | |
| 3 | | | | | | | | | | | |
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| 10 | | | | | | | | | | | |

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: BW

CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-09

SHEET 1 OF 1

LOCATION: N 5028659.6 ;E 366771.6

BORING DATE: February 22, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.89 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; brown, contains rootlets; non-cohesive, moist, compact | | 0.00 | 1 | SS | 10 | | | | |
| | | | | 66.28 | | | | | | | |
| 1 | | FILL - (CI) SILTY CLAY; brown, contains brick fragments; cohesive, w>PL, firm | | 0.61 | 2 | SS | 6 | | ○ | MH | |
| | | | | 65.37 | | | | | | | |
| 2 | | (SM) SILTY SAND, trace clay, trace gravel; brown; non-cohesive, wet, compact | | 1.52 | 3 | SS | 24 | | | | |
| | | | | | 4 | SS | >50 | | | | |
| | | | | 64.40 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 2.49 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
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| 10 | | | | | | | | | | | |

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: BW

CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-10

SHEET 1 OF 1

LOCATION: N 5028648.4 ;E 366795.1

BORING DATE: February 24, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 67.17 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace to some clay; brown, contains rootlets, small gravel bed; non-cohesive, moist, compact | | 0.00 | 1 | SS | 27 | | | | |
| | | | | 66.56 | | | | | | | |
| | | FILL - (SM) SILTY SAND, some clay; brown mottled black; non-cohesive, moist, compact | | 0.61 | 2 | SS | 10 | | | | |
| 1 | | | | 65.65 | | | | | | | |
| | | FILL - (SM/ML) gravelly SILTY SAND to sandy SILT; brown with a grey area, contains gravel bed; cohesive, w>PL, hard | | 1.52 | 3 | SS | 20 | | ○ | MH | |
| 2 | | | | 64.88 | | | | | | | |
| | | FILL - (SP) SAND, some silt, fine to medium; brown to light brown; non-cohesive, moist, compact | | 2.29 | 4 | SS | 11 | | | | |
| | | | | | 5 | SS | >50 | | | | |
| 3 | | | | 63.64 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-10 | | 3.53 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
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| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: BW
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-10

SHEET 1 OF 1

LOCATION: N 5028648.4 ;E 366795.1

DRILLING DATE: February 24, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.64 | | | | | | | | | | | | | | | | | | | | |
| 4 | Rotary Drill / NQ Core | Fresh to slightly weathered, thinly to medium bedded, grey, fine to medium grained, slightly porous, strong LIMESTONE, with thin to thick laminations of shale | | 3.53 | 1 | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | 3 | | | | | | | | | | | | | | | | | | | |
| | | | | 60.26 | | | | | | | | | | | | | | | | | | | | |
| 7 | | End of Drillhole | | 6.91 | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-11

SHEET 1 OF 2

LOCATION: N 5028697.0 ;E 366812.2

BORING DATE: March 14, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.07 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.05 | | | | | | | |
| | | FILL - (SW/GW) SAND and GRAVEL; grey, crushed stone (PAVEMENT STRUCTURE); non-cohesive, moist | | 65.84 0.23 | 1 | AS | - | | | | |
| | | FILL - (SW/SM) SAND and SILTY SAND, some gravel, trace clay; brown; non-cohesive, moist | | 65.31 0.76 | 2 | SS | >50 | | | | |
| 1 | | Weathered LIMESTONE | | 64.62 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-11 | | 1.45 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-11

SHEET 2 OF 2

LOCATION: N 5028697.0 ;E 366812.2

DRILLING DATE: March 14, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.62 | | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Slightly weathered to fresh, medium bedded, medium grey to dark grey, fine to medium grained, slightly porous, strong LIMESTONE, with interbedded shale | | 1.45 | 1 | | | | | | | | | | | | | | UCS = 89 MPa |
| 3 | | | | | 2 | | | | | | | | | | | | | | |
| 4 | | | | 61.44 | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 4.63 | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-12

SHEET 1 OF 2

LOCATION: N 5028737.1 ;E 366786.1

BORING DATE: March 14, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.45 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.05 | | | | | | | |
| | | FILL - (SW/GW) SAND and GRAVEL; grey, crushed gravel (PAVEMENT STRUCTURE); non-cohesive, moist | | 65.17 0.28 | | | | | | | |
| | | FILL - (SW) SAND, some silt and gravel; brown, contains cobbles; non-cohesive, moist | | | 1 | AS | - | | | | |
| | | | | | 2 | SS | >50 | | | | |
| 1 | | | | 64.38 | | | | | | | |
| | | FILL - (SM) SILTY SAND, some clay and gravel; brown with mottling; slightly cohesive, moist to wet, compact | | 1.07 | | | | | | | |
| | | | | | 3 | SS | 15 | | | | |
| 2 | | | | 63.37 | | | | | | | |
| | | Weathered LIMESTONE | | 2.08 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-12 | | 2.21 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-12

SHEET 2 OF 2

LOCATION: N 5028737.1 ;E 366786.1

DRILLING DATE: March 14, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.24 | | | | | | | | | | | | | | |
| 3 | Rotary Drill / NQ Core | Slightly weathered to fresh, medium bedded, grey to dark grey, fine to medium grained, slightly porous, NODULAR LIMESTONE, with shale interbedded | | 2.21 | 1 | | | | | | | | | | | | | |
| 4 | | | | | 2 | | | | | | | | | | | | | |
| 5 | | | | | 3 | | | | | | | | | | | | | |
| | | | | 59.79 | | | | | | | | | | | | | | |
| | | End of Drillhole | | 5.66 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-13

SHEET 1 OF 2

LOCATION: N 5028787.1 ;E 366761.0

BORING DATE: March 8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.04 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.05 | | | | | | | |
| | | FILL - (SW/GW) SAND and GRAVEL; grey, crushed stone (PAVEMENT STRUCTURE); non-cohesive, moist, compact | | 64.63 | 1 | AS | - | | | | |
| | | FILL - (SM) SILTY SAND, some gravel and clay; brown; non-cohesive, moist | | 0.41<br>64.28 | | | | | | | |
| 1 | | FILL - (SW) SAND, some gravel, trace to some silt, trace clay; brown; non-cohesive, moist, dense to very dense | | 0.76 | 2 | SS | >50 | | | | |
| | | | | | 3 | SS | 37 | | | | |
| 2 | | possible weathered LIMESTONE | | 63.01<br>2.03 | 4 | SS | >50 | | | | |
| | | | | 62.32 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-13 | | 2.72 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-13

SHEET 2 OF 2

LOCATION: N 5028787.1 ;E 366761.0

DRILLING DATE: March 8, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.32 | | | | | | | | | | | | | | |
| 3 | Rorary Drill / NQ Core | Fresh, medium to thinly bedded, grey, fine to medium grained, slightly porous, strong NODULAR LIMESTONE, with shale interbedded | | 2.72 | 1 | | | | | | | | | | | | | |
| 4 | | | | | 2 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | 3 | | | | | | | | | | | | | |
| | | | | 58.44 | | | | | | | | | | | | | | |
| | | End of Drillhole | | 6.60 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-14

SHEET 1 OF 2

LOCATION: N 5028810.9 ;E 366851.2

BORING DATE: March 8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.14 | | | | SHEAR STRENGTH Cu, kPa; nat V. + Q - ●; rem V. ⊕ U - ○ (20 40 60 80) | WATER CONTENT PERCENT Wp W Wl (20 40 60 80) | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE<br>FILL - (SW/GW) SAND and GRAVEL; grey, crushed stone (PAVEMENT STRUCTURE); non-cohesive, moist | | 0.00<br>64.89 | | | | | | | |
| | | FILL - (SW) SAND, some silt and gravel, trace clay; brown; non-cohesive, moist | | 0.25 | 1 | AS | - | | | | |
| | | | | 64.30 | 2 | SS | >50 | | | | |
| 1 | | Possible weathered LIMESTONE | | 0.84<br>63.79 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-14 | | 1.35 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-14

SHEET 2 OF 2

LOCATION: N 5028810.9 ;E 366851.2

DRILLING DATE: March 8, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.79 | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Fresh, medium bedded, grey, fine to medium grained, slightly porous, strong NODULAR LIMESTONE, with thin shaley beds | | 1.35 | 1 | | | | | | | | | | | | | |
| 3 | | | | | 2 | | | | | | | | | | | | | |
| 4 | | | | | 3 | | | | | | | | | | | | | |
| | | | | 60.36 | | | | | | | | | | | | | | |
| 5 | | End of Drillhole | | 4.78 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-15

SHEET 1 OF 2

LOCATION: N 5028690.4 ;E 366474.2

BORING DATE: May 16, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.93 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.00 | | | | | | | |
| | | CEMENTITIOUS CONCRETE | | 0.15 | 1 | GRAB | - | | | | |
| | | | | 66.32 | | | | | | | |
| | | FILL - (SW) SAND, trace gravel; brown (PAVEMENT STRUCTURE); non-cohesive, moist to wet, compact | | 0.61 | | | | | | | |
| 1 | | | | | 2 | SS | 25 | | ○ | M | |
| | | | | 65.63 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; brown-grey with black staining, contains organics; slightly cohesive, moist, compact to dense | | 1.30 | | | | | | | |
| | | | | | 3 | SS | 36 | | ○ | M | |
| 2 | | | | 64.95 | | | | | | | |
| | | TOPSOIL - (ML) sandy SILT, some clay; dark brown, contains organics; non-cohesive, moist, loose | | 1.98 | | | | | | | |
| | | (SM) gravelly SILTY SAND, some clay; grey (GLACIAL TILL); non-cohesive, moist, compact to dense | | 2.13 | | | | | | | |
| | | | | | 4 | SS | 22 | | | | |
| 3 | | | | | 5 | SS | 16 | | ○ | MH | |
| | | | | | 6 | SS | >50 | | | | |
| 4 | | | | 62.79 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-15 | | 4.14 | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-15

SHEET 2 OF 2

LOCATION: N 5028690.4 ;E 366474.2

DRILLING DATE: May 16, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.79 | | | | | | | | | | | | | | |
| 5 | Rotary Drill / NQ Core | Fresh to slightly weathered, thinly bedded, grey to dark grey, fine to medium grained, slighly porous, strong shaley LIMESTONE | | 4.14 / 61.14 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ | 2 4 6 | |
| 6 | | End of Drillhole | | 5.79 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-16

SHEET 1 OF 1

LOCATION: N 5028730.7 ;E 366508.7

BORING DATE: May 16, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | GROUND SURFACE | | 65.97 | | | | | | | |
| | | ASPHALTIC CONCRETE | | 0.00 | | | | | | | |
| | | CEMENTITIOUS CONCRETE | | 0.13 / 65.64 | | | | | | | |
| | | FILL - (SW) SAND, trace gravel; brown (PAVEMENT STRUCTURE); non-cohesive, moist, loose | | 0.33 | 1 | GRAB | - | | | | Bentonite Seal |
| 1 | | | | 64.90 | 2 | SS | 9 | | | | Backfill & Bentonite |
| | | (PT) fibrous PEAT | | 1.07 / 64.60 | | | | | | | Silica Sand |
| | | (SM) gravelly SILTY SAND, some clay; grey (GLACIAL TILL); moist, loose | | 1.37 | 3 | SS | 8 | | | | Sept 29, 2022 |
| 2 | | | | | 4 | SS | 7 | | CH | MH | 32 mm PVC #10 Slot Screen |
| | | | | 63.00 | | | | | | | |
| 3 | | End of Borehole Auger Refusal | | 2.97 | | | | | | | |
| 4 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-17

SHEET 1 OF 2

LOCATION: N 5028822.0 ;E 366648.8

BORING DATE: May 17, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 64.87 | | | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.00 | | | | | | | | | |
| | | CEMENTITIOUS CONCRETE | | 0.13 | | | | | | | | | |
| | | | | 64.46 | | | | | | | | | |
| | | FILL - (SW) SAND, trace gravel; brown (PAVEMENT STRUCTURE); non-cohesive, moist, compact | | 0.41 | 1 | GRAB | - | | | | | | |
| 1 | | | | | 2 | SS | 28 | | | | | | |
| | | | | 63.70 | | | | | | | | | |
| | | FILL - (SM) SILTY SAND, with gravel, some clay; brown; non-cohesive, moist, compact | | 1.17 | | | | | | | | | |
| | | | | 63.35 | | | | | | | | | |
| | | FILL - (GM/SM) SILTY GRAVEL and SAND; brown; non-cohesive, moist, compact | | 1.52 | 3 | SS | 25 | | | | | M | |
| | | | | 62.86 | | | | | | | | | |
| 2 | | Weathered LIMESTONE | | 2.08 | | | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-17 | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
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| 9 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-17

SHEET 2 OF 2

LOCATION: N 5028822.0 ;E 366648.8

DRILLING DATE: May 17, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.79 | | | | | | | | | | | | | | | |
| 3 | Rotary Drill / NQ Core | Slightly weathered to fresh, thinly bedded, nodular, grey to dark grey, fine to medium grained, slightly porous, strong LIMESTONE, with thin laminations of shale | | 2.08 | 1 | | | | | | | | | | | | | | |
| 4 | | | | | 2 | | | | | | | | | | | | | | UCS = 100 Mpa |
| | | | | 60.63 | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 4.24 | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-18

SHEET 1 OF 1

LOCATION: N 5028897.8 ;E 366806.6

BORING DATE: May 16, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 63.14 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.00 | | | | | | | |
| | | CEMENTITIOUS CONCRETE | | 0.13 | | | | | | | |
| | | FILL - (SW) SAND, trace gravel; brown (PAVEMENT STRUCTURE); non-cohesive, moist, dense | | 62.78<br>0.36 | 1 | GRAB | - | | | | |
| 1 | | | | 62.05 | 2 | SS | >50 | | | | |
| | | End of Borehole<br>Auger Refusal | | 1.09 | | | | | | | |
| 2 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-19

SHEET 1 OF 2

LOCATION: N 5028860.2 ;E 366863.0

BORING DATE: May 17, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 63.81 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.00 | | | | | | | |
| | | CEMENTITIOUS CONCRETE | | 0.15<br>63.45 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; brown (PAVEMENT STRUCTURE); non-cohesive, moist, compact | | 0.36 | 1 | GRAB | - | | | | |
| 1 | | | | 62.82 | 2 | SS | >50 | | ○ | M | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-19 | | .99 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
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| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-19

SHEET 2 OF 2

LOCATION: N 5028860.2 ;E 366863.0

DRILLING DATE: May 17, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.82 | | | | | | | | | | | | | | | |
| 1 | Rotary Drill / NQ Core | Fresh, thinly bedded, nodular grey to dark grey, slightly porous, fine to medium grained, strong LIMESTONE, with thin laminations of shale | | 0.99 | 1 | | | | | | | | | | | | | | UCS = 96 Mpa |
| 2 | | | | 61.27 | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 2.54 | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | |
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| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-20

SHEET 1 OF 1

LOCATION: N 5028792.0 ;E 366887.0

BORING DATE: May 17, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.19 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.00 | | | | | | | |
| | | CEMENTITIOUS CONCRETE | | 0.15 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, brown (PAVEMENT STRUCTURE); non-cohesive, moist | | 0.30 | 1 | GRAB | - | | | | |
| | | | | 64.38 | | | | | | | |
| 1 | | FILL - (SM) SILTY SAND, some gravel, some clay; dark brown, moist, dense | | 0.81 64.18 | 2 | SS | >50 | | | | |
| | | Assumed weathered LIMESTONE | | 1.01 63.95 | | | | | | | |
| | | End of Borehole Auger Refusal | | 1.24 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-21

SHEET 1 OF 2

LOCATION: N 5028698.9 ;E 366848.5

BORING DATE: June 20, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.25 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.00 | | | | | | | |
| | | FILL - (GM/SM) SILTY GRAVEL and SAND; grey (PAVEMENT STRUCTURE); non-cohesive, moist | | 0.15 65.89 | 1 | AS | - | | | | |
| | | FILL - (SM) SILTY SAND; some clay; brown; non-cohesive, moist, loose to compact | | 0.36 | | | | | | | Bentonite Seal |
| 1 | | | | | 2 | SS | >50 | | | | |
| | | | | 65.18 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-21 | | 1.07 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-21

SHEET 2 OF 2

LOCATION: N 5028698.9 ;E 366848.5

DRILLING DATE: June 20, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 65.18 | | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Slightly weatrhered to fresh, thinly bedded, nodular, grey/dark grey, fine to mediuim grained, slightly porous, strong SHALEY LIMESTONE | | 1.07 | 1 | 0 | | | | | | | | | | | | | Bentonite Seal; Silica Sand; Sept 29, 2022; 32 mm PVC #10 Slot Screen |
| 3 | | | | 63.20 | 1 | 0 | | | | | | | | | | | | | |
| | | End of Drillhole | | 3.05 | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-22

SHEET 1 OF 1

LOCATION: N 5028665.1 ;E 366827.6

BORING DATE: June 21, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.67 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE (NEW) | | 0.05 | | | | | | | |
| | | ASPHALTIC CONCRETE (OLD) | | 66.42 | | | | | | | |
| | | FILL - (SW) gravelly SAND; brown (PAVEMENT STRUCTURE); non-cohesive, moist | | 0.25 66.22 | 1 | AS | - | | | | |
| | | FILL - (SC/SM) CLAYEY SAND to SILTY SAND, trace gravel; brown, moist, compact | | 0.45 | | | | | | | |
| 1 | | | | | 2 | SS | 14 | | W | MH | |
| | | | | 65.17 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 1.50 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-23

SHEET 1 OF 1

LOCATION: N 5028620.8 ;E 366797.6

BORING DATE: June 21, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 67.47 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.00 67.27 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; brown (PAVEMENT STRUCTURE); non-cohesive, moist | | 0.20 66.96 | 1 | AS | - | | ○ | M | |
| | | FILL - (SC/SM) CLAYEY SAND to SILTY SAND, some gravel; grey, contains organics and debris, slightly cohesive, moist, loose | | 0.51 | 2 | SS | 7 | | | | |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | 7 | | | | |
| 2 | | - Becomes wet at a depth of 2.59 m | | | 4 | SS | 8 | | | | ▽ |
| | | | | 64.42 | | | | | | | |
| 3 | | End of Borehole Auger Refusal | | 3.05 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-24

SHEET 1 OF 2

LOCATION: N 5028558.6 ;E 366757.3

BORING DATE: June 20, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | GROUND SURFACE | | 70.64 | | | | | | | |
| | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.05 | 1 | AS | - | | | | Flush Mount Casing |
| | | FILL - (SP/GP) SAND and GRAVEL; some silt; grey (PAVEMENT STRUCTURE); non-cohesive, moist | | 70.34 | | | | | | | |
| | | FILL -(SW) gravelly SAND, some silt, clay; brown; non-cohesive, moist, compact | | 0.30 | 2 | AS | - | | | | |
| 1 | | | | 69.73 | 2A | | | | | | |
| | | FILL - (SC/SM) CLAYEY SAND to SILTY SAND, some gravel; brown, moist, compact | | 0.91 | 2B | SS | 17 | | | | Bentonite Seal |
| | | | | | 3 | SS | >50 | | | M | |
| 2 | | Borehole continued on RECORD OF DRILLHOLE 22-24 | | 68.68 1.96 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
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| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-24

SHEET 2 OF 2

LOCATION: N 5028558.6 ;E 366757.3

DRILLING DATE: June 20, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % (80 60 40 20) | RECOVERY: SOLID CORE % (80 60 40 20) | R.Q.D. % (80 60 40 20) | FRACT. INDEX PER 0.25 m (5 10 15 20) | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90) | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | Diametral Point Load Index (MPa) (2 4 6) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 68.68 | | | | | | | | | | | | | | | |
| 2 | Rotary Drill NQ Core | Slightly weathered to fresh, thinly bedded, nodular, grey to dark grey, fine to medium grained, slightly porous, strong SHALEY LIMESTONE | | 1.96 | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | |
| 4 | | | | 66.47 | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 4.17 | | | | | | | | | | | | | | | |
| 5 | | Note(s): 1. Water level in screen measured at a depth of 2.56 m (Elev. 68.08 m) on August 4, 2022. | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |

Bentonite Seal

Silica Sand
Sept 29, 2022
Aug 4, 2022

UCS = 53 Mpa
38 mm Diam. PVC
#10 Slot Screen

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 10/3/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-109

SHEET 1 OF 2

LOCATION: N 5028410.9 ;E 366670.1

BORING DATE: March 30, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 76.78 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | FILL - (CI/CL) SILTY CLAY; brown, trace organics; cohesive, w~PL, firm | | 0.00<br>76.55 | | | | | | | |
| | | FILL - (SW) gravelly SAND, some silt; grey to brown, contains debris; non-cohesive, moist, compact | | 0.23<br>76.02 | 1 | SS | 19 | | ○ | | |
| 1 | | FILL - (SM/ML) sandy SILT to SILTY SAND, some clay; grey brown; non-cohesive, moist, dense | | 0.76<br>75.26 | 2 | SS | 44 | | | | |
| | | (SM) gravelly SILTY SAND, some clay; grey (GLACIAL TILL); slightly cohesive, moist to wet, very loose to compact | | 1.52 | 3 | SS | 6 | | | | |
| 2 | | | | | 4 | SS | 8 | | | | |
| 3 | | | | | 5 | SS | 3 | | ○ | M | |
| 4 | | | | | 6 | SS | 3 | | | | |
| | | | | | 7 | SS | 2 | | ○ | | |
| 5 | | | | | 8 | SS | 7 | | | | |
| 6 | | | | | 9 | SS | 15 | | ○ | | |
| 7 | | | | | 10 | SS | 20 | | ○ | | |
| 8 | | | | | 11 | SS | 1 | | | | |
| | | | | | 12 | SS | 18 | | ○ | | |
| 9 | | - Wet below 9.14 m depth | | | 13 | SS | 12 | | | | |
| | DCPT | Dynamic Cone Penetration Test (DCPT) | | 67.03<br>9.75 | | | | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-109

SHEET 2 OF 2

LOCATION: N 5028410.9 ;E 366670.1

BORING DATE: March 30, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | DCPT | Dynamic Cone Penetration Test (DCPT) | | | | | | | | | |
| 11 | | | | 65.65 | | | | | | | |
| | | End of Borehole<br>DCPT Refusal | | 11.13 | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-110

SHEET 1 OF 2

LOCATION: N 5028453.1 ;E 366678.7

BORING DATE: April 1, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.74 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) sandy SILT, some clay; black, contains organics; moist | | 0.00 | | | | | | | |
| | | FILL - (SW) gravelly SAND, some silt; dark brown to grey; non-cohesive, moist, very loose to compact | | 0.08 | 1 | SS | 2 | | | | |
| 1 | | | | | 2 | SS | 10 | | | | |
| | | | | 74.22 | | | | | | | |
| | | (GM/SM) SILTY GRAVEL and SAND; grey; non-cohesive, moist to wet, loose | | 1.52 | 3 | SS | 6 | | ○ | M | |
| 2 | | | | | 4 | SS | 4 | | | | |
| | | | | 72.84 | | | | | | | |
| 3 | | (SM) SILTY SAND, some gravel, trace to some low plasticity fines; grey, contains cobbles and boulders (GLACIAL TILL); moist to wet, loose to dense | | 2.90 | 5 | SS | 28 | | ○ | | |
| 4 | | | | | 6 | SS | 6 | | ○ | M | |
| 5 | | | | | 7 | SS | 8 | | | | |
| | | | | | 8 | SS | 5 | | | | |
| 6 | | | | | 9 | SS | 7 | | | | |
| 7 | | | | | 10 | SS | 13 | | | | |
| 8 | | | | | 11 | SS | 37 | | | | |
| | | | | | 12 | SS | 28 | | | | |
| 9 | | | | | 13 | SS | 28 | | | | |
| | | | | 65.99 | | | | | | | |
| | DCPT | Dynamic Cone Penetration Test (DCPT) | | 9.75 | | | | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: KG

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-110

SHEET 2 OF 2

LOCATION: N 5028453.1 ;E 366678.7

BORING DATE: April 1, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | | Dynamic Cone Penetration Test (DCPT) | | 65.53 | | | | | | | |
| | | End of Borehole<br>DCPT Refusal | | 10.21 | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: KG

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-111

SHEET 1 OF 1

LOCATION: N 5028484.1 ;E 366691.3

BORING DATE: March 29, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.13 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) sandy SILT, some clay; black, contains organics; non-cohesive, moist | | 0.00 / 0.08 | 1 | SS | 13 | | | | |
| | | FILL - (SW) gravelly SAND, some silt; dark grey, contains bricks; non-cohesive, moist, compact | | 74.52 / 0.61 | | | | | | | |
| 1 | | FILL - (SP/SM) SAND, fine, some silt to silty, trace to some clay; dark grey; non-cohesive, moist, compact | | | 2 | SS | 19 | | | | |
| | | (CH) CLAY; brown, mottled, fissured (WEATHERED CRUST); cohesive, w<PL, firm to stiff | | 73.76 / 1.37 | 3 | SS | 8 | | | MH | |
| 2 | | (CL) SILTY CLAY, trace gravel; brown, mottled (WEATHERED CRUST); cohesive moist to wet, soft | | 73.00 / 2.13 | 4 | SS | 3 | | | M | |
| 3 | | (ML/SM) sandy SILT to SILTY SAND, some clay, some gravel; brown (GLACIAL TILL); slightly cohesive, moist to wet, compact | | 72.23 / 2.90 | 5 | SS | 14 | | | | |
| 4 | | | | | 6 | SS | 16 | | | | |
| 5 | | | | | 7 | SS | 18 | | | | |
| | | End of Borehole | | 69.95 / 5.18 | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-112

SHEET 1 OF 1

LOCATION: N 5028510.1 ;E 366728.4

BORING DATE: March 29, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.59 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace clay, trace gravel; dark brown; non-cohesive, moist | | 0.00 | 1 | SS | 17 | | | | |
| | | | | 73.29 | | | | | | | |
| | | FILL - (SP) SAND, fine; grey to brown; non-cohesive, moist, compact | | 0.30 | | | | | | | |
| | | | | 72.98 | | | | | | | |
| | | (CH) CLAY, some to trace sand; brown (WEATHERED CRUST); cohesive, w<PL, soft to stiff | | 0.61 | 2 | SS | 8 | | | | |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | 5 | | | | |
| 2 | | | | 71.30 | | | | | | | |
| | | (CL-ML) SILTY CLAY to CLAYEY SILT, some sand; brown; cohesive, w>PL, wet, soft | | 2.29 | 4 | SS | 3 | | | MH | |
| | | | | 70.69 | | | | | | | |
| 3 | | (ML) sandy SILT, some clay, some gravel; brown (GLACIAL TILL); slightly cohesive, wet, compact | | 2.90 | 5 | SS | 11 | | | | |
| | | | | 69.80 | | | | | | | |
| | | End of Borehole | | 3.79 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-112A

SHEET 1 OF 2

LOCATION: N 5028510.1 ;E 366728.4

BORING DATE: March 31, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 73.59 | | | | | | | |
| 0 | | For soil stratigraphy refer to Record of Borehole 22-112 | | 0.00 | | | | | | | Bentonite Seal |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | Silica Sand |
| 3 | | | | | | | | | | | 50 mm Diam. PVC #10 Slot Screen |
| 4 | | | | 69.58 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-112A | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-112A

SHEET 2 OF 2

LOCATION: N 5028510.1 ;E 366728.4

DRILLING DATE: March 31, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 69.58 | | | | | | | | | | | | | | | |
| 5 | Rotary Drill / NQ Core | Fresh, thinly bedded, grey to dark grey, fine to medium grained, slightly porous, strong LIMESTONE bedrock with shale interbedded | | 4.01 | 1 | | | | | | | | | | | | | | |
| 6 | | | | | 2 | | | | | | | | | | | | | | |
| 7 | | | | | 3 | | | | | | | | | | | | | | UCS = 108 MPa |
| | | | | 65.74 | | | | | | | | | | | | | | | |
| 8 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 2.72 m (Elev. 70.88 m) on May 9, 2022. | | 7.85 | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-113

SHEET 1 OF 2

LOCATION: N 5028442.6 ;E 366704.3

BORING DATE: March 30-31, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 76.05 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | FILL - (CI/CL) SILTY CLAY; brown, contains organics; cohesive, w~PL, firm | | 0.00 | | | | | | | |
| | | FILL - (SW) SAND, some to trace clay and silt, some gravel, some asphalt; brown; non-cohesive, moist, compact | | 0.13 | 1 | SS | 12 | | | | |
| 1 | | FILL - (ML) CLAYEY SILT, some sand, some gravel; grey; cohesive, stiff | | 74.98<br>1.07 | 2 | SS | 7 | | | | |
| | | (SM) gravelly SILTY SAND, some clay; brown (GLACIAL TILL); slightly cohesive, wet, compact to loose | | 74.53<br>1.52 | 3 | SS | 14 | | | | |
| 2 | | | | | 4 | SS | 5 | | | | |
| | | (SM) gravelly SILTY SAND, some clay; grey brown (GLACIAL TILL); slightly cohesive, wet, compact to loose | | 73.31<br>2.74 | | | | | | | |
| 3 | | | | | 5 | SS | 7 | | | | |
| 4 | | | | | 6 | SS | 9 | | ○ | M | |
| | | | | | 7 | SS | 10 | | | | |
| 5 | | (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, loose to compact | | 70.87<br>5.18 | | | | | | | |
| | | | | | 8 | SS | 14 | | | | |
| 6 | | | | | 9 | SS | 14 | | ○ | | |
| 7 | | | | | 10 | SS | 9 | | ○ | | |
| | | | | | 11 | SS | 10 | | | | |
| 8 | | | | 67.69 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-113 | | 8.36 | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-113

SHEET 2 OF 2

LOCATION: N 5028442.6 ;E 366704.3

DRILLING DATE: March 30-31, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 67.69 | | | | | | | | | | | | | | | |
| 9 | Rotary Drill / NQ Core | Fresh to Slightly weathered, thinly to medium bedded, grey to dark grey, slightly porous, strong LIMESTONE with shale interbedded | | 8.36 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ | 2 4 6 | | |
| 10 | | | | | 2 | | | | | | | | | | | | | | UCS = 107 MPa |
| 11 | | | | | 3 | | | | | | | | | | | | | | |
| 12 | | | | 63.87 | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 12.18 | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 1 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 84.60 | | | | | | | |
| 0 | Wash Bore<br>NW/NQ Casing | TOPSOIL - (SM) SILTY SAND, some plastic fines; brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>84.30<br>0.30 | 1 | SS | 6 | | | | |
| | | FILL - (SM) SILTY SAND, some plastic fines, trace gravel; brown, mottled; white/grey and black; non-cohesive, moist, loose | | | 2 | SS | 8 | | | | |
| 1 | | | | 83.23 | | | | | | | |
| | | FILL - (SM) SILTY SAND; brown, mottled black and grey, contains large gravel seams; non-cohesive, moist, compact to dense | | 1.37 | 3 | SS | 18 | | | | Bentonite |
| 2 | | | | | 4 | SS | 33 | | ○ | | |
| 3 | | | | 81.55 | | | | | | | |
| | | (SM) gravelly SILTY SAND; brown to grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | 3.05 | 5 | SS | 16 | | | | Silica Sand |
| 4 | | | | | 6 | SS | 15 | | | | |
| | | | | | 7 | SS | 10 | | | | 32 mm Diam. PVC #10 Slot Screen |
| 5 | | | | | 8 | SS | 16 | | | | |
| 6 | | | | | 9 | SS | 33 | | | | |
| | | | | | 10 | SS | 15 | | ○ | | Silica Sand |
| 7 | | | | | | | | | | | |
| | | | | | 11 | SS | 9 | | | | |
| 8 | | | | | 12 | SS | 9 | | | | Bentonite |
| 9 | | | | | 13 | SS | 20 | | | | |
| | | | | | | | | | | | |
| 10 | | | | | 14 | SS | 26 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 2 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>NW/NQ Casing | (SM) gravelly SILTY SAND; brown to grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | | 14 | SS | 26 | | | | |
| 11 | | | | | 15 | SS | 6 | | ○ | | |
| 12 | | | | | 16 | SS | 9 | | | | |
| 13 | | | | | 17 | SS | 30 | | | | |
| 14 | | | | | 18 | SS | 60 | | | | |
| 15 | | | | | 19 | SS | 10 | | ○ | | Bentonite |
| 16 | | | | | 20 | SS | 17 | | | | |
| 17 | | | | | 21 | SS | 17 | | | | |
| 18 | | | | | 22 | SS | 47 | | | | |
| 19 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 66.31<br>18.29 | 23 | SS | >50 | | | | Cave |
| 20 | | | | | 24 | SS | >50 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 3 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | Wash Bore NW/NQ Casing | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | | | | | | | | |
| 21 | | | | | 25 | SS | >50 | | | | |
| 22 | | | | | 26 | SS | >50 | | ○ | | |
| | | | | 61.89 | | | | | | | |
| | | No Recovery<br>Possible (SM) SILTY SAND, with cobbles and boulders (GLACIAL TILL); very dense | | 22.71 | | | | | | | |
| 23 | | | | | | | | | | | |
| | | | | | 27 | SS | >50 | | | | |
| 24 | | | | | | | | | | | |
| | | | | | | | | | | | Cave |
| 25 | | | | | 28 | SS | >50 | | | | |
| 26 | | | | | | | | | | | |
| | | | | 58.39 | | | | | | | |
| | | (ML/SM) sandy SILT to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); slightly cohesive, moist, very dense | | 26.21 | | | | | | | |
| 27 | | | | | 29 | SS | 58 | | ○ | | |
| 28 | | | | | | | | | | | |
| | | | | | 30 | SS | >50 | | | | |
| 29 | | | | | | | | | | | |
| | | | | | | | | | | | Bentonite |
| 30 | | | | | 31 | SS | 51 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 4 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 30 | Wash Bore NW/NQ Casing | (ML/SM) sandy SILT to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); slightly cohesive, moist, very dense | | | 31 | SS | 51 | | | | Bentonite |
| 31 | | | | 53.20 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-301 | | 31.4 | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-301

SHEET 4 OF 4

LOCATION: N 5028264.4 ;E 366704.1

DRILLING DATE: March 3, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH | COLOUR % RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 53.20 | | | | | | | | | | | | | | | | |
| 32 | Rotary Drill / NQ Core | Moderately weathered, thinly to medium bedded, grey to dark grey, medium to fine grained, slightly porous, medium strong LIMESTONE with shale interbedded | | 31.40 | 1 | | | | | | | | | | | | | | | |
| 33 | | | | | 2 | | | | | | | | | | | | | | | Bentonite |
| 34 | | | | | 3 | | | | | | | | | | | | | | | |
| 35 | | | | 49.24 | | | | | | | | | | | | | | | | |
| 36 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 3.41 m (Elev. 81.19 m) on May 9, 2022. | | 35.36 | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | | | | | | | | |
| 39 | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | |
| 41 | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-302

SHEET 1 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 83.23 | | | | | | | |
| 0 | Wash Bore<br>HW/HQ Casing | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, some clay; reddish dark brown, contains organics; non-cohesive, moist, loose | | 0.00<br>82.98 | | | | | | | |
| | | FILL - (SP) SAND, fine to medium; brown, mottled orange; non-cohesive, moist, loose | | 0.25<br>82.62 | 1 | SS | 5 | | | | |
| 1 | | (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.61 | 2 | SS | 23 | | ○ | M | |
| 2 | | | | | | | | | | | |
| 3 | | | | | 3 | SS | 21 | | | | |
| 4 | | (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 79.42<br>3.81 | 4 | SS | 21 | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | 5 | SS | 22 | | ○ | M | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 6 | SS | 10 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-302

SHEET 2 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>HW/HQ Casing | (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | | | | | | | | |
| | | | | 72.26 | | | | | | | |
| 11 | | (SM/SW) SILTY SAND to SAND, some silt and gravel; grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 10.97 | | | | | | | |
| 12 | | | | | 7 | SS | >50 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 8 | SS | >50 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | 9 | SS | >50 | | | | |
| 19 | | | | | | | | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-302

SHEET 3 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | Wash Bore<br>HW/HQ Casing | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | | (SM/SW) SILTY SAND to SAND, some silt and gravel; grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | | | | | | | | |
| 21 | | | | | 10 | SS | >50 | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | 11 | SS | >50 | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | 56.08 | 12 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-302 | | 27.15 | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-302

SHEET 4 OF 4

LOCATION: N 5028297.1 ;E 366679.0

DRILLING DATE: May 3 & 4, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 56.08 | | | | | | | | | | | | | | | | | | | | |
| 28 | Rotary Drill / HQ Core | Slightly to moderately weathered, medium bedded, grey to dark grey, fine to medium grained, slightly to non-porous, weak to medium strong LIMESTONE, with laminations of shale | | 27.15 | 1 | | | | | | | | | | | | | | | | | | | |
| | | | | 54.56 | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 28.67 | | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | | | | | | | | |

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JS
CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-303

SHEET 1 OF 3

LOCATION: N 5028341.5 ;E 366652.0

BORING DATE: April 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.57 | | | | | | | |
| 0 | Wash Boring / HW Casing | TOPSOIL - (ML/CL) SILTY CLAY to CLAYEY SILT, trace sand; brown, contains organic matter; slightly cohesive | | 0.00 / 0.10 | 1 | SS | 8 | | | | |
| | | FILL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand; brown; cohesive, w<PL, firm to stiff | | | 2 | SS | 8 | | | | |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | 10 | | | M | |
| 2 | | | | | | | | | | | |
| | | (ML/SM) sandy SILT to SILTY SAND, some gravel; brown (GLACIAL TILL); slightly cohesive, wet, loose to dense | | 78.13 / 2.44 | 4 | SS | 8 | | | | |
| 3 | | | | | | | | | | | |
| | | | | | 5 | SS | 28 | | | M | Bentonite |
| | | | | 76.76 | | | | | | | |
| 4 | | (SM) gravelly SILTY SAND to SITY SAND, some gravel, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 3.81 | 6 | SS | 25 | | | | |
| | | | | | 7 | SS | 51 | | | | |
| 5 | | | | | | | | | | | |
| | | | | | 8 | SS | 30 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 12 | | | | Silica Sand |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 23 | | | M | |
| 8 | | | | | | | | | | | |
| | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 9 | | | | | 11 | SS | 20 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-303

SHEET 2 OF 3

LOCATION: N 5028341.5 ;E 366652.0

BORING DATE: April 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Boring / HW Casing | (SM) gravelly SILTY SAND to SITY SAND, some gravel, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 11 | | | | | 12 | SS | 83 | | | | Silica Sand |
| 12 | | | | | 13 | SS | >100 | | ○ | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | 14 | SS | >50 | | | | Bentonite |
| 15 | | | | | | | | | | | |
| 16 | | | | | 15 | SS | 48 | | | | |
| 17 | | | | 63.55 | 16 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-303 | | 17.02 | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-303

SHEET 3 OF 3

LOCATION: N 5028341.5 ;E 366652.0

DRILLING DATE: April 5, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint, FLT - Fault, SHR- Shear, VN - Vein, CJ - Conjugate
BD - Bedding, FO- Foliation, CO- Contact, OR- Orthogonal, CL - Cleavage
PL - Planar, CU- Curved, UN- Undulating, ST - Stepped, IR - Irregular
PO- Polished, K - Slickensided, SM- Smooth, Ro - Rough, MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.55 | | | | | | | | | | | | | | | |
| 18 | Rotary Drill / NQ Core | Slightly weathered to fresh, thinly to medium bedded, fine grained, slightly porous, strong LIMESTONE with shale interbedded | | 17.02 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ | 2 4 6 | | UCS = 120 MPa |
| 19 | | | | | 2 | | | | | | | | | | | | | | Bentonite |
| 20 | | | | | 3 | | | | | | | | | | | | | | |
| | | | | 60.35 | | | | | | | | | | | | | | | |
| 21 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 4.11 m (Elev. 76.46 m) on May 9, 2022. | | 20.22 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-304

SHEET 1 OF 2

LOCATION: N 5028379.9 ;E 366670.3

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 77.64 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) CLAYEY SILT, some sand; dark brown, contains organics; cohesive | | 0.00 | 1A | SS | | | | | |
| | | | | 0.10 | 1B | SS | 4 | | | | |
| | | FILL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand and gravel; brown, fissured; cohesive, w<PL stiff | | 77.03 | | | | | | | |
| | | | | 0.61 | | | | | | | |
| | | (ML/CL) CLAYEY SILT to SILTY CLAY; brown; cohesive, w<PL, stiff | | 76.73 | 2A | SS | | | | | |
| 1 | | | | 0.91 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown to brown grey (GLACIAL TILL); non-cohesive, moist, compact | | | 2B | SS | 12 | | | | |
| | | | | 76.12 | | | | | | | |
| | | (SW/SM) SAND, some silt to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact | | 1.52 | 3 | SS | 17 | | | | |
| 2 | | | | | 4 | SS | 20 | | | M | |
| 3 | | | | | 5 | SS | 19 | | | | |
| 4 | | | | | 6 | SS | 19 | | | | |
| | | - wet from about 4.7 m depth | | | 7 | SS | 9 | | | | |
| 5 | | | | | 8 | SS | 7 | | | M | |
| 6 | | | | | 9 | SS | 5 | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | 10 | SS | 7 | | | | |
| 9 | | | | | 11 | SS | 15 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-304

SHEET 2 OF 2

LOCATION: N 5028379.9 ;E 366670.3

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SW/SM) SAND, some silt to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact | | | | | | | | | |
| | | - Becomes dense from 10.70 m depth | | 66.87 / 10.77 | | | | | | | |
| 11 | | (SW) SAND, some silt; grey; non-cohesive, wet, dense | | | 12 | SS | 47 | | | | |
| 12 | | | | 65.44 / 12.20 | | | | | | | |
| | | Dynamic Cone Penetration Test (DCPT) | | | | | | | | | |
| 13 | | | | 64.61 / 13.03 | | | | 150 | | | |
| | | End of Borehole<br>DCPT Refusal | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-305

SHEET 1 OF 2

LOCATION: N 5028359.6 ;E 366683.8

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 78.37 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SM/ML) SILTY SAND to SAND, some silt and clay; dark brown, mottled, contains organics; moist, loose | | 0.00 | 1 | SS | 9 | | | | |
| | | | | 77.76 | | | | | | | |
| 1 | | FILL - (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; brown, mottled; non-cohesive, moist, compact | | 0.61 | 2 | SS | 24 | | | | |
| | | | | 76.85 | | | | | | | |
| 2 | | (SW/SM) gravelly SILTY SAND to SAND, some silt and gravel, some clay, grey, contains cobbles and boulders (GLACIAL TILL); moist to wet, loose to compact | | 1.52 | 3 | SS | 9 | | | M | |
| 3 | | | | | 4 | SS | 13 | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | 5 | SS | 5 | | | | |
| | | | | 73.19 | | | | | | | |
| | | (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); wet, compact to very dense | | 5.18 | | | | | | | |
| 6 | | | | | 6 | SS | 20 | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | 7 | SS | 12 | | | | |
| 9 | | | | | | | | | | | |
| | | | | | 8 | SS | 52 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-305

SHEET 2 OF 2

LOCATION: N 5028359.6 ;E 366683.8

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); wet, compact to very dense | | 67.70 | | | | | | | |
| 11 | | Dynamic Cone Penetration Test (DCPT) | | 10.67 | | | | | | | |
| 12 | | | | | | | | | 101 | | |
| 13 | | | | 64.73 | | | | | | | |
| 13 | | End of Borehole<br>DCPT Refusal | | 13.64 | | | | | 120 | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-306

SHEET 1 OF 3

LOCATION: N 5028318.0 ;E 366714.1

BORING DATE: March 24 & 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.80 | | | | | | | |
| 0 | Wash Bore / HW/HQ Casing | TOPSOIL - (SM) SILTY SAND, some clay; dark brown, contains organics; non-cohesive, wet, loose | | 0.00 | 1 | SS | 4 | | | | |
| | | | | 82.34 | | | | | | | |
| | | Fill - (SM) SILTY SAND, some gravel and clay; brown, slightly mottled; non-cohesive, wet, very loose | | 0.46 | | | | | | | |
| 1 | | | | | 2 | SS | 3 | | ○ | M | |
| | | | | 81.28 | | | | | | | |
| | | (SM/SW) SILTY SAND to SAND, some clay, slit and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact to very dense | | 1.52 | 3 | SS | 18 | | | | |
| 2 | | | | | 4 | SS | 54 | | ○ | | |
| 3 | | | | | 5 | SS | 15 | | | | |
| 4 | | | | | 6 | SS | 16 | | ○ | | |
| 5 | | | | | 7 | SS | 18 | | | | |
| | | | | | 8 | SS | >50 | | | | |
| 6 | | | | | 9 | SS | 23 | | ○ | | |
| | | | | 76.09 | | | | | | | |
| 7 | | (SM/SW) SILTY SAND to SAND, some clay, silt, and gravel; grey (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to compact | | 6.71 | | | | | | | |
| | | | | | 10 | SS | 3 | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 11 | SS | 10 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-306

SHEET 2 OF 3

LOCATION: N 5028318.0 ;E 366714.1

BORING DATE: March 24 & 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Wash Bore / HW/HQ Casing | (SM/SW) SILTY SAND to SAND, some clay, silt, and gravel; grey (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to compact<br>- dense | | | 12 | SS | 32 | | | | |
| 11 | | | | 71.83<br>10.97 | | | | | | | |
| | | (SM/SW) SILTY SAND to SAND, some clay and gravel; grey (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | 13 | SS | >50 | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | 14 | SS | 29 | | | | |
| 15 | | | | | 15 | SS | >50 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | 16 | SS | 27 | | | | |
| | | | | 65.22<br>17.58 | | | | | | | |
| 18 | | Borehole continued on RECORD OF DRILLHOLE 22-306 | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-306

SHEET 3 OF 3

LOCATION: N 5028318.0 ;E 366714.1

DRILLING DATE: March 24 & 25, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 65.22 | | | | | | | | | | | | | | |
| 18 | Rotary Drill / HQ Core | Moderately weathered to fresh, fine to medium bedded, grey to dark grey, fine grained, slightly porous, strong LIMESTONE, with shale bedding, some beds have nodular sections | | 17.58 | 1 | | | | | | | | | | | | | |
| 19 | | | | | 2 | | | | | | | | | | | | | |
| 20 | | | | | 3 | | | | | | | | | | | | | |
| 21 | | | | | 4 | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | 63.5 mm Diam. VSP |
| 23 | | | | | 5 | | | | | | | | | | | | | UCS = 122 MPa |
| 24 | | | | | 6 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 26 | | | | | 7 | | | | | | | | | | | | | |
| 27 | | End of Drillhole | | 55.88 / 26.92 | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-307

SHEET 1 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 83.57 | | | | | | | |
| 0 | Wash Bore<br>HW/HQ Casing | TOPSOIL - (SM) SILTY SAND, fine; dark brown, contains organics; non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | Fill - (SM) Gravelly SILTY SAND, some clay; brown, contains organics; non-cohesive, moist, loose | | 0.15 | 1 | SS | 4 | | ○ | M | |
| 1 | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to compact | | 82.66<br>0.91 | 2 | SS | 1 | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | 3 | SS | 29 | | ○ | | |
| | | | | 79.76 | | | | | | | |
| 4 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 3.81 | 4 | SS | 19 | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | 5 | SS | 12 | | ○ | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 6 | SS | 11 | | | | |
| | | | | | 7 | SS | 15 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-307

SHEET 2 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>HW/HQ Casing | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | | | | | | | | |
| | | | | 72.60 | | | | | | | |
| 11 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet to moist, compact to very dense | | 10.97 | | | | | | | |
| 12 | | | | | 8 | SS | 21 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 9 | SS | 60 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | 10 | SS | >50 | | | | |
| 19 | | | | | | | | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-307

SHEET 3 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | | | | 63.22 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-307 | | 20.35 | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-307

SHEET 4 OF 4

LOCATION: N 5028283.4 ;E 366737.4

DRILLING DATE: May 2, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.22 | | | | | | | | | | | | | | | |
| 21 | Rotary Drill / HQ Core | Slightly weathered, bedded, grey to dark grey, fine to medium grained, slightly porous, strong SHALEY LIMESTONE | | 20.35 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ | 2 4 6 | | UCS = 93 MPa |
| 22 | | | | 61.30 | 2 | | | | | | | | | | | | | | |
| | | End of Drillhole | | 22.27 | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-308

SHEET 1 OF 3

LOCATION: N 5028305.1 ;E 366766.9

BORING DATE: April 28 & 29, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.93 | | | | | | | |
| 0 | Wash Bore | TOPSOIL - (SM) SILTY SAND, some plastic fines; brown, contains rootlets, trace to some organics; non-cohesive, moist, very loose | | 0.00 / 0.10 | 1 | SS | 3 | | | | Bentonite Seal |
| | HW Casing | (SM) SILTY SAND, some plastic fines; brown (GLACIAL TILL); non-cohesive, wet, very loose | | 82.17 / 0.76 | | | | | | | |
| 1 | | (SM) gravelly SILTY SAND, trace plastic fines; brown, mottled black and orange, contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | | 2 | SS | 16 | | ○ | M | |
| 2 | | | | | 3 | SS | 27 | | ○ | | |
| | | | | | 4 | SS | 38 | | | | |
| 3 | | | | | 5 | SS | 20 | | | | |
| 4 | | | | | 6 | SS | 17 | | | | Silica Sand & Bentonite |
| 5 | | | | | 7 | SS | 32 | | ○ | | |
| | | | | | 8 | SS | 19 | | | | |
| 6 | | | | 76.83 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense | | 6.10 | 9 | SS | 7 | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 29 | | | | Bentonite Seal |
| 8 | | | | | | | | | | | |
| | | | | | | | | | | | Silica Sand |
| 9 | | | | | 11 | SS | 30 | | | | |
| | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-308

SHEET 2 OF 3

LOCATION: N 5028305.1 ;E 366766.9

BORING DATE: April 28 & 29, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore / HW Casing | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense | | | | | | | | | |
| 11 | | | | | 12 | SS | 24 | | | | 32 mm Diam. PVC #10 Slot Screen |
| 12 | | | | | | | | | | | |
| 13 | | | | | 13 | SS | 14 | | | | |
| 14 | | | | | 14 | SS | 33 | | | | Bentonite Seal |
| 15 | | | | | | | | | | | |
| 16 | | | | | 15 | SS | 46 | | | | UCS = 125 MPa |
| 17 | | | | | 16 | SS | 55 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-308 | | 65.66 / 17.27 | | | | | | | Bentonite & Pellets |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-308

SHEET 3 OF 3

LOCATION: N 5028305.1 ;E 366766.9

DRILLING DATE: April 28 & 29, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

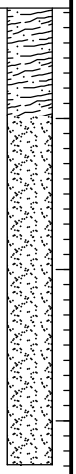
DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jcon | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | ROCK STRENGTH INDEX: R4 | ROCK STRENGTH INDEX: R3 | ROCK STRENGTH INDEX: R2 | ROCK STRENGTH INDEX: R1 | WEATHERING INDEX: W1 | WEATHERING INDEX: W2 | WEATHERING INDEX: W3 | WEATHERING INDEX: W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 65.66 | | | | | | | | | | | | | | | | | | | | |
| 18 | Rotary Drill / HQ Core | Fresh to slightly weathered, thinly to medium bedded, light to dark grey, fine to medium grained, non to slightly porous, medium strong to strong LIMESTONE, with thin to medium beds of shale | | 17.27 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | | | | | | | | | |
| 19 | | - vertical joint from 19.20 to 19.27 m depth<br>- vertical joint from 19.41 to 19.47 m depth | | | 2 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | 3 | | | | | | | | | | | | | | | | | | | |
| | | | | 62.64 | 4 | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 6.01 m (Elev. 76.93 m) on May 9, 2022. | | 20.29 | | | | | | | | | | | | | | | | | | | | |

Bentonite & Pellets

Silica Sand



MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-309

SHEET 1 OF 3

LOCATION: N 5028348.8 ;E 366737.3

BORING DATE: May 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.69 | | | | | | | |
| 0 | Wash Bore<br>HW/HQ Casing | TOPSOIL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand, trace gravel; dark brown, contains organics; cohesive, w<PL, stiff | | 0.00<br>81.49 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.20 | 1 | SS | 9 | | | | |
| 1 | | | | | 2 | SS | 10 | | ○ | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | 3 | SS | 18 | | | | |
| | | | | 77.88 | | | | | | | |
| 4 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 3.81 | | | | | | | |
| | | | | | 4 | SS | 19 | | ○ | MM | |
| 5 | | | | | | | | | | | |
| | | | | 75.90 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very dense | | 5.79 | 5 | SS | >50 | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| | | | | 72.85 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very loose | | 8.84 | | | | | | | |
| 9 | | | | | 6 | SS | 1 | | | | |
| 10 | | | | | | | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-309

SHEET 2 OF 3

LOCATION: N 5028348.8 ;E 366737.3

BORING DATE: May 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>HW/HQ Casing | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very loose | | | | | | | | | |
| | | | | 70.72<br>10.97 | | | | | | | |
| 11 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | | | | | | | |
| 12 | | | | | 7 | SS | 19 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 8 | SS | 81 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| | | | | 64.10<br>17.59 | | | | | | | |
| 18 | | Borehole continued on RECORD OF DRILLHOLE 22-309 | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-309

SHEET 3 OF 3

LOCATION: N 5028348.8 ;E 366737.3

DRILLING DATE: May 5, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.10 | | | | | | | | | | | | | | |
| 18 | Rotary Drill / HQ Core | Slightly weathered, thinly to medium bedded, grey, medium to fine grained, slightly porous, medium strong to strong SHALEY LIMESTONE | | 17.59 | 1 | | | | | | | | | | | | | |
| 19 | | | | | 2 | | | | | | | | | | | | | |
| | | | | 62.39 | | | | | | | | | | | | | | |
| | | End of Drillhole | | 19.30 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-310

SHEET 1 OF 3

LOCATION: N 5028376.9 ;E 366714.5

BORING DATE: April 6-8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.54 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) sandy SILT, some clay; dark brown, contains organic matter; slightly cohesive, w~PL/frozen, compact | | 0.00 | | | | | | | |
| | | | | 80.18 | 1 | SS | 14 | | | | |
| | | (CL) SILTY CLAY; brown; cohesive, w<PL, stiff to very stiff | | 0.36 | | | | | | | |
| 1 | | | | | 2 | SS | 12 | | | | |
| | | | | | | | | | | | Bentonite |
| | | | | | 3 | SS | 15 | | | MH | |
| 2 | | | | | | | | | | | |
| | | | | | 4 | SS | 12 | | | MH | |
| | | | | | | | | | | | Silica Sand |
| 3 | | | | 77.49 | | | | | | | |
| | | (SM) gravelly silty sand, some clay; grey brown to brown (GLACIAL TILL); slightly cohesive, compact | | 3.05 | 5 | SS | 21 | | | MH | |
| | | | | 76.88 | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey brown to grey (GLACIAL TILL); non-cohesive, wet, compact to loose | | 3.66 | | | | | | | |
| 4 | | | | | 6 | SS | 14 | | | | |
| | | | | | | | | | | | 51 mm Diam. PVC #10 Slot Screen |
| | | | | | 7 | SS | 6 | | | | |
| 5 | | | | 75.36 | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose | | 5.18 | | | | | | | |
| | | | | | 8 | SS | 9 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 9 | | | | |
| | | | | 73.83 | | | | | | | |
| | Wash Boring HW Casing | (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose | | 6.71 | | | | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 9 | | | M | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 11 | SS | 4 | | | | |
| 10 | | | | | | | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-310

SHEET 2 OF 3

LOCATION: N 5028376.9 ;E 366714.5

BORING DATE: April 6-8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Boring / HW Casing | (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose | | 69.87 | | | | | | | |
| | | (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose to compact | | 10.67 | 12 | SS | 11 | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | 13 | SS | 4 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | 14 | SS | 46 | | | | |
| | | | | 66.21 | | | | | | | |
| | | (SM/ML) SILTY SAND to sandy SILT, some clay and gravel; grey (GLACIAL TILL); slightly cohesive, wet, very dense | | 14.33 | | | | | | | |
| 15 | | | | | 15 | SS | 55 | | | | |
| 16 | | | | 64.39 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-310 | | 16.15 | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-310

SHEET 3 OF 3

LOCATION: N 5028376.9 ;E 366714.5

DRILLING DATE: April 6-8, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.39 | | | | | | | | | | | | | | |
| 17 | Rotary Drill / HQ Core | Fresh, thinly to medium bedded, grey, medium to fine grained, slightly porous, medium strong to strong LIMESTONE with shale interbedded | | 16.15 | 1 | | | | | | | | | | | | | |
| 18 | | | | | 2 | | | | | | | | | | | | | |
| 19 | | | | 61.36 | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 1.99 m (Elev. 78.55 m) on May 9, 2022. | | 19.18 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 1 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 84.60 | | | | | | | |
| 0 | Wash Bore<br>NW/NQ Casing | TOPSOIL - (SM) SILTY SAND, some plastic fines; brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>84.30<br>0.30 | 1 | SS | 6 | | | | |
| | | FILL - (SM) SILTY SAND, some plastic fines, trace gravel; brown, mottled; white/grey and black; non-cohesive, moist, loose | | | 2 | SS | 8 | | | | |
| 1 | | | | 83.23 | | | | | | | |
| | | FILL - (SM) SILTY SAND; brown, mottled black and grey, contains large gravel seams; non-cohesive, moist, compact to dense | | 1.37 | 3 | SS | 18 | | | | Bentonite |
| 2 | | | | | 4 | SS | 33 | | ○ | | |
| 3 | | | | 81.55 | | | | | | | |
| | | (SM) gravelly SILTY SAND; brown to grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | 3.05 | 5 | SS | 16 | | | | Silica Sand |
| 4 | | | | | 6 | SS | 15 | | | | |
| | | | | | 7 | SS | 10 | | | | 32 mm Diam. PVC #10 Slot Screen |
| 5 | | | | | 8 | SS | 16 | | | | |
| 6 | | | | | 9 | SS | 33 | | | | |
| | | | | | 10 | SS | 15 | | ○ | | Silica Sand |
| 7 | | | | | | | | | | | |
| | | | | | 11 | SS | 9 | | | | |
| 8 | | | | | 12 | SS | 9 | | | | Bentonite |
| 9 | | | | | 13 | SS | 20 | | | | |
| | | | | | | | | | | | |
| 10 | | | | | 14 | SS | 26 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 2 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>NW/NQ Casing | (SM) gravelly SILTY SAND; brown to grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | | 14 | SS | 26 | | | | |
| 11 | | | | | 15 | SS | 6 | | ○ | | |
| 12 | | | | | 16 | SS | 9 | | | | |
| 13 | | | | | 17 | SS | 30 | | | | |
| 14 | | | | | 18 | SS | 60 | | | | |
| 15 | | | | | 19 | SS | 10 | | ○ | | Bentonite |
| 16 | | | | | 20 | SS | 17 | | | | |
| 17 | | | | | 21 | SS | 17 | | | | |
| 18 | | | | | 22 | SS | 47 | | | | |
| 19 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 66.31<br>18.29 | 23 | SS | >50 | | | | Cave |
| 20 | | | | | 24 | SS | >50 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 3 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | Wash Bore NW/NQ Casing | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | | | | | | | | |
| 21 | | | | | 25 | SS | >50 | | | | |
| 22 | | | | | 26 | SS | >50 | | ○ | | |
| | | | | 61.89 | | | | | | | |
| | | No Recovery<br>Possible (SM) SILTY SAND, with cobbles and boulders (GLACIAL TILL); very dense | | 22.71 | | | | | | | |
| 23 | | | | | | | | | | | |
| | | | | | 27 | SS | >50 | | | | |
| 24 | | | | | | | | | | | |
| | | | | | | | | | | | Cave |
| 25 | | | | | 28 | SS | >50 | | | | |
| 26 | | | | | | | | | | | |
| | | | | 58.39 | | | | | | | |
| | | (ML/SM) sandy SILT to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); slightly cohesive, moist, very dense | | 26.21 | | | | | | | |
| 27 | | | | | 29 | SS | 58 | | ○ | | |
| 28 | | | | | | | | | | | |
| | | | | | 30 | SS | >50 | | | | |
| 29 | | | | | | | | | | | |
| | | | | | | | | | | | Bentonite |
| 30 | | | | | 31 | SS | 51 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-301

SHEET 4 OF 4

LOCATION: N 5028264.4 ;E 366704.1

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 30 | Wash Bore NW/NQ Casing | (ML/SM) sandy SILT to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); slightly cohesive, moist, very dense | | | 31 | SS | 51 | | | | Bentonite |
| 31 | | | | 53.20 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-301 | | 31.4 | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-301

SHEET 4 OF 4

LOCATION: N 5028264.4 ;E 366704.1

DRILLING DATE: March 3, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | FLUSH | COLOUR % RETURN | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 53.20 | | | | | | | | | | | | | | | | |
| 32 | Rotary Drill / NQ Core | Moderately weathered, thinly to medium bedded, grey to dark grey, medium to fine grained, slightly porous, medium strong LIMESTONE with shale interbedded | | 31.40 | 1 | | | | | | | | | | | | | | | |
| 33 | | | | | 2 | | | | | | | | | | | | | | | Bentonite |
| 34 | | | | | 3 | | | | | | | | | | | | | | | |
| 35 | | | | 49.24 | | | | | | | | | | | | | | | | |
| 36 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 3.41 m (Elev. 81.19 m) on May 9, 2022. | | 35.36 | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | | | | |
| 38 | | | | | | | | | | | | | | | | | | | | |
| 39 | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | |
| 41 | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-302

SHEET 1 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 83.23 | | | | | | | |
| 0 | Wash Bore<br>HW/HQ Casing | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, some clay; reddish dark brown, contains organics; non-cohesive, moist, loose | | 0.00<br>82.98 | | | | | | | |
| | | FILL - (SP) SAND, fine to medium; brown, mottled orange; non-cohesive, moist, loose | | 0.25<br>82.62 | 1 | SS | 5 | | | | |
| 1 | | (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.61 | 2 | SS | 23 | | ○ | M | |
| 2 | | | | | | | | | | | |
| 3 | | | | | 3 | SS | 21 | | | | |
| 4 | | (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 79.42<br>3.81 | 4 | SS | 21 | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | 5 | SS | 22 | | ○ | M | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 6 | SS | 10 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-302

SHEET 2 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>HW/HQ Casing | (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some clay, grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | | | | | | | | |
| | | | | 72.26 | | | | | | | |
| 11 | | (SM/SW) SILTY SAND to SAND, some silt and gravel; grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 10.97 | | | | | | | |
| 12 | | | | | 7 | SS | >50 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 8 | SS | >50 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | 9 | SS | >50 | | | | |
| 19 | | | | | | | | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-302

SHEET 3 OF 4

LOCATION: N 5028297.1 ;E 366679.0

BORING DATE: May 3 & 4, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | Wash Bore<br>HW/HQ Casing | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 20 | | (SM/SW) SILTY SAND to SAND, some silt and gravel; grey brown to grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | | | | | | | | |
| 21 | | | | | 10 | SS | >50 | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | 11 | SS | >50 | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | 56.08 | 12 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-302 | | 27.15 | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-302

SHEET 4 OF 4

LOCATION: N 5028297.1 ;E 366679.0

DRILLING DATE: May 3 & 4, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 56.08 | | | | | | | | | | | | | | | | | | | | |
| 28 | Rotary Drill / HQ Core | Slightly to moderately weathered, medium bedded, grey to dark grey, fine to medium grained, slightly to non-porous, weak to medium strong LIMESTONE, with laminations of shale | | 27.15 | 1 | | | | | | | | | | | | | | | | | | | |
| | | | | 54.56 | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 28.67 | | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | | | | | | | | | | | | | | | | | | | | | | | | |

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JS
CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-303

SHEET 1 OF 3

LOCATION: N 5028341.5 ;E 366652.0

BORING DATE: April 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.57 | | | | | | | |
| 0 | Wash Boring / HW Casing | TOPSOIL - (ML/CL) SILTY CLAY to CLAYEY SILT, trace sand; brown, contains organic matter; slightly cohesive | | 0.00 / 0.10 | 1 | SS | 8 | | | | |
| | | FILL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand; brown; cohesive, w<PL, firm to stiff | | | 2 | SS | 8 | | | | |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | 10 | | | M | |
| 2 | | | | | | | | | | | |
| | | (ML/SM) sandy SILT to SILTY SAND, some gravel; brown (GLACIAL TILL); slightly cohesive, wet, loose to dense | | 78.13 / 2.44 | 4 | SS | 8 | | | | |
| 3 | | | | | | | | | | | |
| | | | | | 5 | SS | 28 | | | M | Bentonite |
| | | | | 76.76 | | | | | | | |
| 4 | | (SM) gravelly SILTY SAND to SITY SAND, some gravel, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 3.81 | 6 | SS | 25 | | | | |
| | | | | | 7 | SS | 51 | | | | |
| 5 | | | | | | | | | | | |
| | | | | | 8 | SS | 30 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 12 | | | | Silica Sand |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 23 | | | M | |
| 8 | | | | | | | | | | | |
| | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 9 | | | | | 11 | SS | 20 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-303

SHEET 2 OF 3

LOCATION: N 5028341.5 ;E 366652.0

BORING DATE: April 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Boring / HW Casing | (SM) gravelly SILTY SAND to SITY SAND, some gravel, some clay; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 11 | | | | | 12 | SS | 83 | | | | Silica Sand |
| 12 | | | | | 13 | SS | >100 | | ○ | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | 14 | SS | >50 | | | | Bentonite |
| 15 | | | | | | | | | | | |
| 16 | | | | | 15 | SS | 48 | | | | |
| 17 | | | | 63.55 | 16 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-303 | | 17.02 | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-303

SHEET 3 OF 3

LOCATION: N 5028341.5 ;E 366652.0

DRILLING DATE: April 5, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint, FLT - Fault, SHR- Shear, VN - Vein, CJ - Conjugate
BD - Bedding, FO- Foliation, CO- Contact, OR- Orthogonal, CL - Cleavage
PL - Planar, CU- Curved, UN- Undulating, ST - Stepped, IR - Irregular
PO- Polished, K - Slickensided, SM- Smooth, Ro - Rough, MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.55 | | | | | | | | | | | | | | | |
| 18 | Rotary Drill / NQ Core | Slightly weathered to fresh, thinly to medium bedded, fine grained, slightly porous, strong LIMESTONE with shale interbedded | | 17.02 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ | 2 4 6 | | UCS = 120 MPa |
| 19 | | | | | 2 | | | | | | | | | | | | | | Bentonite |
| 20 | | | | | 3 | | | | | | | | | | | | | | |
| | | | | 60.35 | | | | | | | | | | | | | | | |
| 21 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 4.11 m (Elev. 76.46 m) on May 9, 2022. | | 20.22 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-304

SHEET 1 OF 2

LOCATION: N 5028379.9 ;E 366670.3

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 77.64 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) CLAYEY SILT, some sand; dark brown, contains organics; cohesive | | 0.00 | 1A | SS | | | | | |
| | | | | 0.10 | 1B | SS | 4 | | | | |
| | | FILL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand and gravel; brown, fissured; cohesive, w<PL stiff | | 77.03 | | | | | | | |
| | | | | 0.61 | | | | | | | |
| | | (ML/CL) CLAYEY SILT to SILTY CLAY; brown; cohesive, w<PL, stiff | | 76.73 | 2A | SS | | | | | |
| 1 | | | | 0.91 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown to brown grey (GLACIAL TILL); non-cohesive, moist, compact | | | 2B | SS | 12 | | | | |
| | | | | 76.12 | | | | | | | |
| | | (SW/SM) SAND, some silt to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact | | 1.52 | 3 | SS | 17 | | | | |
| 2 | | | | | 4 | SS | 20 | | | M | |
| 3 | | | | | 5 | SS | 19 | | | | |
| 4 | | | | | 6 | SS | 19 | | | | |
| | | - wet from about 4.7 m depth | | | 7 | SS | 9 | | | | |
| 5 | | | | | 8 | SS | 7 | | | M | |
| 6 | | | | | 9 | SS | 5 | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | 10 | SS | 7 | | | | |
| 9 | | | | | 11 | SS | 15 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-304

SHEET 2 OF 2

LOCATION: N 5028379.9 ;E 366670.3

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SW/SM) SAND, some silt to SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact | | | | | | | | | |
| | | - Becomes dense from 10.70 m depth | | 66.87 / 10.77 | | | | | | | |
| 11 | | (SW) SAND, some silt; grey; non-cohesive, wet, dense | | | 12 | SS | 47 | | | | |
| 12 | | | | 65.44 / 12.20 | | | | | | | |
| | | Dynamic Cone Penetration Test (DCPT) | | | | | | | | | |
| 13 | | | | 64.61 / 13.03 | | | | 150 | | | |
| | | End of Borehole<br>DCPT Refusal | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-305

SHEET 1 OF 2

LOCATION: N 5028359.6 ;E 366683.8

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 78.37 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SM/ML) SILTY SAND to SAND, some silt and clay; dark brown, mottled, contains organics; moist, loose | | 0.00 | 1 | SS | 9 | | | | |
| | | | | 77.76 | | | | | | | |
| 1 | | FILL - (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; brown, mottled; non-cohesive, moist, compact | | 0.61 | 2 | SS | 24 | | | | |
| | | | | 76.85 | | | | | | | |
| 2 | | (SW/SM) gravelly SILTY SAND to SAND, some silt and gravel, some clay, grey, contains cobbles and boulders (GLACIAL TILL); moist to wet, loose to compact | | 1.52 | 3 | SS | 9 | | | M | |
| 3 | | | | | 4 | SS | 13 | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | 5 | SS | 5 | | | | |
| | | | | 73.19 | | | | | | | |
| | | (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); wet, compact to very dense | | 5.18 | | | | | | | |
| 6 | | | | | 6 | SS | 20 | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | 7 | SS | 12 | | | | |
| 9 | | | | | | | | | | | |
| | | | | | 8 | SS | 52 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-305

SHEET 2 OF 2

LOCATION: N 5028359.6 ;E 366683.8

BORING DATE: May 6, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM/SW) SILTY SAND to SAND, some silt, clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); wet, compact to very dense | | 67.70 | | | | | | | |
| 11 | | Dynamic Cone Penetration Test (DCPT) | | 10.67 | | | | | | | |
| 12 | | | | | | | | | 101 | | |
| 13 | | | | 64.73 | | | | | | | |
| 13 | | End of Borehole<br>DCPT Refusal | | 13.64 | | | | | 120 | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-306

SHEET 1 OF 3

LOCATION: N 5028318.0 ;E 366714.1

BORING DATE: March 24 & 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.80 | | | | | | | |
| 0 | Wash Bore / HW/HQ Casing | TOPSOIL - (SM) SILTY SAND, some clay; dark brown, contains organics; non-cohesive, wet, loose | | 0.00 | 1 | SS | 4 | | | | |
| | | | | 82.34 | | | | | | | |
| | | Fill - (SM) SILTY SAND, some gravel and clay; brown, slightly mottled; non-cohesive, wet, very loose | | 0.46 | | | | | | | |
| 1 | | | | | 2 | SS | 3 | | ○ | M | |
| | | | | 81.28 | | | | | | | |
| | | (SM/SW) SILTY SAND to SAND, some clay, slit and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, compact to very dense | | 1.52 | 3 | SS | 18 | | | | |
| 2 | | | | | 4 | SS | 54 | | ○ | | |
| 3 | | | | | 5 | SS | 15 | | | | |
| 4 | | | | | 6 | SS | 16 | | ○ | | |
| 5 | | | | | 7 | SS | 18 | | | | |
| | | | | | 8 | SS | >50 | | | | |
| 6 | | | | | 9 | SS | 23 | | ○ | | |
| | | | | 76.09 | | | | | | | |
| 7 | | (SM/SW) SILTY SAND to SAND, some clay, silt, and gravel; grey (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to compact | | 6.71 | | | | | | | |
| | | | | | 10 | SS | 3 | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 11 | SS | 10 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-306

SHEET 2 OF 3

LOCATION: N 5028318.0 ;E 366714.1

BORING DATE: March 24 & 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Wash Bore / HW/HQ Casing | (SM/SW) SILTY SAND to SAND, some clay, silt, and gravel; grey (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to compact<br>- dense | | | 12 | SS | 32 | | | | |
| 11 | | | | 71.83<br>10.97 | | | | | | | |
| | | (SM/SW) SILTY SAND to SAND, some clay and gravel; grey (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | 13 | SS | >50 | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | 14 | SS | 29 | | | | |
| 15 | | | | | 15 | SS | >50 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | 16 | SS | 27 | | | | |
| | | | | 65.22<br>17.58 | | | | | | | |
| 18 | | Borehole continued on RECORD OF DRILLHOLE 22-306 | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-306

SHEET 3 OF 3

LOCATION: N 5028318.0 ;E 366714.1

DRILLING DATE: March 24 & 25, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 65.22 | | | | | | | | | | | | | | |
| 18 | Rotary Drill / HQ Core | Moderately weathered to fresh, fine to medium bedded, grey to dark grey, fine grained, slightly porous, strong LIMESTONE, with shale bedding, some beds have nodular sections | | 17.58 | 1 | | | | | | | | | | | | | |
| 19 | | | | | 2 | | | | | | | | | | | | | |
| 20 | | | | | 3 | | | | | | | | | | | | | |
| 21 | | | | | 4 | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | 63.5 mm Diam. VSP |
| 23 | | | | | 5 | | | | | | | | | | | | | UCS = 122 MPa |
| 24 | | | | | 6 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 26 | | | | | 7 | | | | | | | | | | | | | |
| 27 | | End of Drillhole | | 55.88 / 26.92 | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-307

SHEET 1 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 83.57 | | | | | | | |
| 0 | Wash Bore<br>HW/HQ Casing | TOPSOIL - (SM) SILTY SAND, fine; dark brown, contains organics; non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | Fill - (SM) Gravelly SILTY SAND, some clay; brown, contains organics; non-cohesive, moist, loose | | 0.15 | 1 | SS | 4 | | ○ | M | |
| 1 | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to compact | | 82.66<br>0.91 | 2 | SS | 1 | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | 3 | SS | 29 | | ○ | | |
| | | | | 79.76 | | | | | | | |
| 4 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 3.81 | 4 | SS | 19 | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | 5 | SS | 12 | | ○ | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 6 | SS | 11 | | | | |
| | | | | | 7 | SS | 15 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-307

SHEET 2 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>HW/HQ Casing | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | | | | | | | | |
| | | | | 72.60 | | | | | | | |
| 11 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet to moist, compact to very dense | | 10.97 | | | | | | | |
| 12 | | | | | 8 | SS | 21 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 9 | SS | 60 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | 10 | SS | >50 | | | | |
| 19 | | | | | | | | | | | |
| 20 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-307

SHEET 3 OF 4

LOCATION: N 5028283.4 ;E 366737.4

BORING DATE: May 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | | | | 63.22 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-307 | | 20.35 | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-307

SHEET 4 OF 4

LOCATION: N 5028283.4 ;E 366737.4

DRILLING DATE: May 2, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.22 | | | | | | | | | | | | | | | |
| 21 | Rotary Drill / HQ Core | Slightly weathered, bedded, grey to dark grey, fine to medium grained, slightly porous, strong SHALEY LIMESTONE | | 20.35 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ | 2 4 6 | | UCS = 93 MPa |
| 22 | | | | 61.30 | 2 | | | | | | | | | | | | | | |
| | | End of Drillhole | | 22.27 | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-308

SHEET 1 OF 3

LOCATION: N 5028305.1 ;E 366766.9

BORING DATE: April 28 & 29, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.93 | | | | | | | |
| 0 | Wash Bore | TOPSOIL - (SM) SILTY SAND, some plastic fines; brown, contains rootlets, trace to some organics; non-cohesive, moist, very loose | | 0.00 / 0.10 | 1 | SS | 3 | | | | Bentonite Seal |
| | HW Casing | (SM) SILTY SAND, some plastic fines; brown (GLACIAL TILL); non-cohesive, wet, very loose | | 82.17 / 0.76 | | | | | | | |
| 1 | | (SM) gravelly SILTY SAND, trace plastic fines; brown, mottled black and orange, contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | | 2 | SS | 16 | | ○ | M | |
| 2 | | | | | 3 | SS | 27 | | ○ | | |
| | | | | | 4 | SS | 38 | | | | |
| 3 | | | | | 5 | SS | 20 | | | | |
| 4 | | | | | 6 | SS | 17 | | | | Silica Sand & Bentonite |
| 5 | | | | | 7 | SS | 32 | | ○ | | |
| | | | | | 8 | SS | 19 | | | | |
| 6 | | | | 76.83 | | | | | | | |
| | | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense | | 6.10 | 9 | SS | 7 | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 29 | | | | Bentonite Seal |
| 8 | | | | | | | | | | | |
| | | | | | | | | | | | Silica Sand |
| 9 | | | | | 11 | SS | 30 | | | | |
| | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-308

SHEET 2 OF 3

LOCATION: N 5028305.1 ;E 366766.9

BORING DATE: April 28 & 29, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore / HW Casing | (SM) gravelly SILTY SAND, trace plastic fines; grey, contains rock fragments, potential cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense | | | | | | | | | |
| 11 | | | | | 12 | SS | 24 | | | | 32 mm Diam. PVC #10 Slot Screen |
| 12 | | | | | | | | | | | |
| 13 | | | | | 13 | SS | 14 | | | | |
| 14 | | | | | 14 | SS | 33 | | | | Bentonite Seal |
| 15 | | | | | | | | | | | |
| 16 | | | | | 15 | SS | 46 | | | | UCS = 125 MPa |
| 17 | | | | | 16 | SS | 55 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-308 | | 65.66 / 17.27 | | | | | | | Bentonite & Pellets |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-308

SHEET 3 OF 3

LOCATION: N 5028305.1 ;E 366766.9

DRILLING DATE: April 28 & 29, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

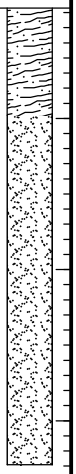
DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jcon | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | ROCK STRENGTH INDEX: R4 | ROCK STRENGTH INDEX: R3 | ROCK STRENGTH INDEX: R2 | ROCK STRENGTH INDEX: R1 | WEATHERING INDEX: W1 | WEATHERING INDEX: W2 | WEATHERING INDEX: W3 | WEATHERING INDEX: W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 65.66 | | | | | | | | | | | | | | | | | | | | |
| 18 | Rotary Drill / HQ Core | Fresh to slightly weathered, thinly to medium bedded, light to dark grey, fine to medium grained, non to slightly porous, medium strong to strong LIMESTONE, with thin to medium beds of shale | | 17.27 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | | | | | | | | | |
| 19 | | - vertical joint from 19.20 to 19.27 m depth<br>- vertical joint from 19.41 to 19.47 m depth | | | 2 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | 3 | | | | | | | | | | | | | | | | | | | |
| | | | | 62.64 | 4 | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 6.01 m (Elev. 76.93 m) on May 9, 2022. | | 20.29 | | | | | | | | | | | | | | | | | | | | |

Bentonite & Pellets

Silica Sand



MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-309

SHEET 1 OF 3

LOCATION: N 5028348.8 ;E 366737.3

BORING DATE: May 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.69 | | | | | | | |
| 0 | Wash Bore<br>HW/HQ Casing | TOPSOIL - (ML/CL) CLAYEY SILT to SILTY CLAY, some sand, trace gravel; dark brown, contains organics; cohesive, w<PL, stiff | | 0.00<br>81.49 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.20 | 1 | SS | 9 | | | | |
| 1 | | | | | 2 | SS | 10 | | ○ | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | 3 | SS | 18 | | | | |
| | | | | 77.88 | | | | | | | |
| 4 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 3.81 | | | | | | | |
| | | | | | 4 | SS | 19 | | ○ | MM | |
| 5 | | | | | | | | | | | |
| | | | | 75.90 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very dense | | 5.79 | 5 | SS | >50 | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| | | | | 72.85 | | | | | | | |
| | | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very loose | | 8.84 | | | | | | | |
| 9 | | | | | 6 | SS | 1 | | | | |
| 10 | | | | | | | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-309

SHEET 2 OF 3

LOCATION: N 5028348.8 ;E 366737.3

BORING DATE: May 5, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Bore<br>HW/HQ Casing | (SM) SILTY SAND, some clay and gravel; brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, very loose | | | | | | | | | |
| | | | | 70.72<br>10.97 | | | | | | | |
| 11 | | (SM) SILTY SAND, some clay and gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | | | | | | | | |
| 12 | | | | | 7 | SS | 19 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 8 | SS | 81 | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| | | | | 64.10<br>17.59 | | | | | | | |
| 18 | | Borehole continued on RECORD OF DRILLHOLE 22-309 | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-309

SHEET 3 OF 3

LOCATION: N 5028348.8 ;E 366737.3

DRILLING DATE: May 5, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.10 | | | | | | | | | | | | | | |
| 18 | Rotary Drill / HQ Core | Slightly weathered, thinly to medium bedded, grey, medium to fine grained, slightly porous, medium strong to strong SHALEY LIMESTONE | | 17.59 | 1 | | | | | | | | | | | | | |
| 19 | | | | | 2 | | | | | | | | | | | | | |
| | | | | 62.39 | | | | | | | | | | | | | | |
| | | End of Drillhole | | 19.30 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-310

SHEET 1 OF 3

LOCATION: N 5028376.9 ;E 366714.5

BORING DATE: April 6-8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.54 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) sandy SILT, some clay; dark brown, contains organic matter; slightly cohesive, w~PL/frozen, compact | | 0.00 | | | | | | | |
| | | | | 80.18 | 1 | SS | 14 | | | | |
| | | (CL) SILTY CLAY; brown; cohesive, w<PL, stiff to very stiff | | 0.36 | | | | | | | |
| 1 | | | | | 2 | SS | 12 | | | | |
| | | | | | | | | | | | Bentonite |
| | | | | | 3 | SS | 15 | | | MH | |
| 2 | | | | | | | | | | | |
| | | | | | 4 | SS | 12 | | | MH | |
| | | | | | | | | | | | Silica Sand |
| 3 | | | | 77.49 | | | | | | | |
| | | (SM) gravelly silty sand, some clay; grey brown to brown (GLACIAL TILL); slightly cohesive, compact | | 3.05 | 5 | SS | 21 | | | MH | |
| | | | | 76.88 | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey brown to grey (GLACIAL TILL); non-cohesive, wet, compact to loose | | 3.66 | | | | | | | |
| 4 | | | | | 6 | SS | 14 | | | | |
| | | | | | | | | | | | 51 mm Diam. PVC #10 Slot Screen |
| | | | | | 7 | SS | 6 | | | | |
| 5 | | | | 75.36 | | | | | | | |
| | | (SM) SILTY SAND, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose | | 5.18 | | | | | | | |
| | | | | | 8 | SS | 9 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 9 | | | | |
| | | | | 73.83 | | | | | | | |
| | Wash Boring HW Casing | (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose | | 6.71 | | | | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 9 | | | M | |
| 8 | | | | | | | | | | | |
| 9 | | | | | 11 | SS | 4 | | | | |
| 10 | | | | | | | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-310

SHEET 2 OF 3

LOCATION: N 5028376.9 ;E 366714.5

BORING DATE: April 6-8, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Wash Boring / HW Casing | (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose | | 69.87 | | | | | | | |
| | | (SM/ML) SILTY SAND to sandy SILT, some clay, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose to compact | | 10.67 | 12 | SS | 11 | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | 13 | SS | 4 | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | 14 | SS | 46 | | | | |
| | | | | 66.21 | | | | | | | |
| | | (SM/ML) SILTY SAND to sandy SILT, some clay and gravel; grey (GLACIAL TILL); slightly cohesive, wet, very dense | | 14.33 | | | | | | | |
| 15 | | | | | 15 | SS | 55 | | | | |
| 16 | | | | 64.39 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-310 | | 16.15 | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-310

SHEET 3 OF 3

LOCATION: N 5028376.9 ;E 366714.5

DRILLING DATE: April 6-8, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.39 | | | | | | | | | | | | | | |
| 17 | Rotary Drill / HQ Core | Fresh, thinly to medium bedded, grey, medium to fine grained, slightly porous, medium strong to strong LIMESTONE with shale interbedded | | 16.15 | 1 | | | | | | | | | | | | | |
| 18 | | | | | 2 | | | | | | | | | | | | | |
| 19 | | | | 61.36 | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 1.99 m (Elev. 78.55 m) on May 9, 2022. | | 19.18 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-401

SHEET 1 OF 2

LOCATION: N 5028655.7 ;E 366449.5

BORING DATE: March 16-17, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | GROUND SURFACE | | 68.56 | | | | | | | |
| | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SP) SAND, fine, some silt; dark brown, contains organics; non-cohesive, moist | | 0.00 | | | | | | | |
| | | FILL - (SW) SAND, some low plasticity fines; brown, contains brick, concrete and cinders; non-cohesive, moist, loose to very dense | | 0.08 | 1 | SS | 12 | | | | |
| 1 | | | | | 2 | SS | 25 | | | | |
| | | | | | 3 | SS | 6 | | | | |
| 2 | | | | | 4 | SS | >50 | | | | Bentonite ▽ May 9, 2022 |
| | | TOPSOIL - (SP) SAND, fine, some silt; black, contains rootlets; non-cohesive, moist, loose | | 65.82 2.74 | | | | | | | |
| 3 | | | | | 5 | SS | 9 | | | | |
| | | (SW/SM) SAND to SILTY SAND, some low plasticity fines; grey (GLACIAL TILL); slightly cohesive, moist to wet, very loose to loose | | 65.21 3.35 | | | | | | | |
| 4 | | | | | 6 | SS | 2 | | | | |
| | | | | | 7 | SS | 6 | | | | Silica Sand |
| 5 | | | | 63.38 | | | | | | | |
| | | (SW/SM) SAND to SILTY SAND, some low plasticity fines, some gravel; grey (GLACIAL TILL); slightly cohesive, wet, loose to dense | | 5.18 | 8 | SS | 7 | | ○ | | |
| 6 | | | | | 9 | SS | 45 | | | | 32 mm Diam. PVC #10 Slot Screen |
| 7 | | | | | 10 | SS | 28 | | | | |
| | | | | 60.94 | | | | | ○ | | |
| | Wash Boring NW casing | (SW) SAND, some gravel, some low plasticity fines; grey (GLACIAL TILL); non-cohesive, moist, compact to very dense | | 7.62 | 11 | SS | 28 | | | | |
| 8 | | | | | | | | | | | Silica Sand |
| | | | | 60.03 | 12 | SS | >50 | | | | |
| | | (SW/SM) SILTY SAND, some gravel, some low plasticity fines; grey (GLACIAL TILL); non-cohesive, moist, compact | | 8.53 | | | | | | | |
| 9 | | | | | 13 | SS | 28 | | | | Bentonite |
| | | | | 58.83 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-401 | | 9.73 | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-401

SHEET 2 OF 2

LOCATION: N 5028655.7 ;E 366449.5

DRILLING DATE: March 16-17, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 58.83 | | | | | | | | | | | | | | | |
| 10 | Rotary Drill / NQ Core | Slightly weathered to fresh, thinly to medium bedded, grey to dark grey, fine grained, slightly porous, strong LIMESTONE with shale interbedded<br><br>- Broken core from 9.73 m to 9.74 m | | 9.73 | 1 | | | | | | | | | | | | | | |
| 11 | | - Broken core from 10.76 m to 10.88 m | | | | | | | | | | | | | | | | | Bentonite |
| 12 | | | | | 2 | | | | | | | | | | | | | | UCS = 99 MPa |
| 13 | | | | | 3 | | | | | | | | | | | | | | |
| | | | | 54.94 | | | | | | | | | | | | | | | |
| 14 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 2.30 m (Elev. 66.26 m) on May 9, 2022. | | 13.62 | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: JS
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-402

SHEET 1 OF 1

LOCATION: N 5028686.9 ;E 366502.4

BORING DATE: March 7, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.73 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SP) SAND, fine, some silt; dark brown, contains organics; non-cohesive, frozen | | 0.00 | | | | | | | |
| | | | | 0.15 | 1 | SS | 17 | | | | |
| | | FILL - (SW) gravelly SAND to SAND, some gravel, some low plasticity fines; brown; non-cohesive, moist, compact | | | | | | | | | |
| 1 | | | | | 2 | SS | 19 | | | | |
| | | | | 65.21 | | | | | | | |
| | | FILL - (SM) SILTY SAND, some low plasticity fines; brown; non-cohesive, moist, loose | | 1.52 | 3 | SS | 6 | | | | |
| 2 | | | | 64.44 | | | | | | | |
| | | (PT) Fibrous PEAT | | 2.29 | | | | | | | |
| | | | | 64.24 | 4 | SS | 8 | | | | |
| | | (SM) Gravelly SILTY SAND to SILTY SAND, some gravel, some low plasticity fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive to slightly cohesive, wet, loose to very dense | | 2.49 | | | | | ○ | | |
| 3 | | | | | 5 | SS | 75 | | | M | |
| | | | | | | | | | | | |
| 4 | | | | | 6 | SS | >58 | | | | |
| | | | | 62.51 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 4.22 | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-403

SHEET 1 OF 2

LOCATION: N 5028704.0 ;E 366527.3

BORING DATE: February 28, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.74 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | FILL/TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, dense | | 0.00 | 1 | SS | 42 | | | | |
| | | | | 65.36 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, angular; grey brown; non-cohesive, moist, dense | | 0.38<br>65.18 | | | | | | | |
| | | | | 0.56 | | | | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND; dark brown to black, contains ash and coal; non-cohesive, moist, loose | | 64.52 | 2 | SS | 9 | | | | |
| | | (PT) Amorphous PEAT; black; non-cohesive, moist, loose | | 1.22 | | | | | | | |
| | | | | 64.06 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, possible cobbles (GLACIAL TILL); non-cohesive, wet, loose | | 1.68 | 3 | SS | 9 | | | | |
| 2 | | | | 63.61 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, possible cobbles (GLACIAL TILL); non-cohesive, wet, very loose | | 2.13 | 4 | SS | 3 | | | M | |
| 3 | | | | 62.69 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-403 | | 3.05 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-403

SHEET 2 OF 2

LOCATION: N 5028704.0 ;E 366527.3

DRILLING DATE: February 28, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jcon | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | ROCK STRENGTH INDEX: R4 | ROCK STRENGTH INDEX: R3 | ROCK STRENGTH INDEX: R2 | ROCK STRENGTH INDEX: R1 | WEATHERING INDEX: W1 | WEATHERING INDEX: W2 | WEATHERING INDEX: W3 | WEATHERING INDEX: W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.69 | | | | | | | | | | | | | | | | | | | | |
| | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE | | 3.05 | 1 | 100 | | | | | | | | | | | | | | | | | | |
| 4 | | - Broken core from 3.15 m to 3.17 m<br>- Broken/lost core from 3.56 m to 3.62 m<br>- Broken core from 3.99 m to 4.08 m | | | 2 | 100 | | | | | | | | | | | | | | | | | | |
| 5 | | - Broken core from 4.29 m to 4.32 m<br>- Broken core from 4.45 m to 4.46 m | | | 3 | 100 | | | | | | | | | | | | | | | | | | |
| | | - Broken core from 5.28 m to 5.29 m | | | 4 | 100 | | | | | | | | | | | | | | | | | | |
| 6 | | - Broken core from 6.15 m to 6.19 m | | | 5 | 100 | | | | | | | | | | | | | | | | | | |
| 7 | | - Broken/lost core from 6.88 m to 7.65 m<br>- Lost core from 7.62 m to 7.97 m | | | 6 | 100 | | | | | | | | | | | | | | | | | | UCS = 132 MPa |
| 8 | | - Broken core from 8.73 m to 8.74 m | | | 7 | 100 | | | | | | | | | | | | | | | | | | |
| 9 | | - Broken core from 9.77 m to 9.79 m | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | - Broken core from 10.36 m to 10.38 m | | 55.02 | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 10.72 | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-404

SHEET 1 OF 1

LOCATION: N 5028735.4 ;E 366573.4

BORING DATE: March 1, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.53 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SM) SILTY SAND, trace gravel; brown to dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, very dense | | 0.00 / 65.33 | 1 | SS | 65 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; brown; non-cohesive, moist/frozen, very dense | | 0.20 / 65.00 | | | | | | | |
| | | FILL - (SM) SILTY SAND, trace to some gravel; black, contains ash/slag; non-cohesive, moist, very dense to compact | | 0.53 / 64.62 | 2 | SS | 24 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; brown; non-cohesive, moist, compact | | 0.91 / 64.31 | | | | | | | |
| | | (PT) Amorphous PEAT; black; non-cohesive, moist, loose | | 1.22 / 64.01 | 3 | SS | 6 | | | | |
| | | (SM) gravelly SILTY SAND; grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to dense | | 1.52 | 4 | SS | 3 | | | | |
| | | | | | 5 | SS | 6 | | | | |
| | | | | | 6 | SS | 44 | | | | |
| | | | | 60.96 | | | | | | | |
| | | (SM) gravelly SAND, fine to coarse, some silt; grey, possible cobbles and boulders; non-cohesive, wet, very dense | | 4.57 / 60.65 | 7 | SS | >50 | | | | |
| | | End of Borehole | | 4.88 | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-405

SHEET 1 OF 2

LOCATION: N 5028745.9 ;E 366607.5

BORING DATE: February 25, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 67.19 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact | | 0.00 | | | | | | | |
| | | FILL - (CI/CH) SILTY CLAY to CLAY; brown; cohesive, w<PL to w~PL, frozen to thawed, firm to very stiff | | 0.08 | 1 | SS | 21 | | | | Bentonite Seal |
| 1 | | | | | 2 | SS | 3 | | | | |
| | | | | 65.67 | | | | | | | |
| | | FILL - (SP) SAND, fine to medium, trace low plasticity fines; brown, mottled reddish black; non-cohesive, moist, compact | | 1.52 | 3 | SS | 12 | | | | Backfill |
| 2 | | | | | 4 | SS | 22 | | | | |
| | | | | 64.17 | | | | | | | |
| 3 | | Borehole continued on RECORD OF DRILLHOLE 22-405 | | 3.02 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: BW

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-405

SHEET 2 OF 2

LOCATION: N 5028745.9 ;E 366607.5

DRILLING DATE: February 25, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.17 | | | | | | | | | | | | | | | | | | | | |
| 4 | Rotary Drill / NQ Core | Fresh to slightly weathered, thinly to medium bedded, pale grey to black, fine to medium grained, non to slightly porous, medium strong SHALEY LIMESTONE | | 3.02 | 1 | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | 2 | | | | | | | | | | | | | | | | | | | |
| 6 | | | | 61.10 | 3 | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at a depth of 4.00 m (Elev. 63.18 m) on May 9, 2022. | | 6.09 | | | | | | | | | | | | | | | | | | | | |

Backfill
Bentonite Seal
Silica Sand
May 9, 2022
UCS = 141 MPa
PVC #10 Slot Screen

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: BB

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-406

SHEET 1 OF 1

LOCATION: N 5028716.8 ;E 366617.5

BORING DATE: March 1, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.23 | | | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML/SM) sandy SILT to SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact | | 0.00<br>66.03<br>0.20 | 1 | SS | 14 | | | | | | |
| | | FILL - (CL) SILTY CLAY, some sand, trace gravel; grey brown, contains brick; cohesive, w~PL, stiff | | 65.47<br>0.76 | | | | | | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND, angular; brown; non-cohesive, moist, compact | | 65.16<br>1.07 | 2 | SS | 28 | | | | | | |
| | | FILL - (SM/ML) gravelly SILTY SAND to sandy SILT; dark brown, contains concrete, brick and ash; non-cohesive, moist, compact to loose | | | 3 | SS | 8 | | | | | | |
| 2 | | | | 63.94 | | | | | | | | | |
| | | (SM/ML) Gravelly SAND and SILT; grey brown, possible cobbles (GLACIAL TILL); non-cohesive, moist to wet, very dense | | 2.29<br>63.59 | 4 | SS | >55 | | | | | M | |
| | | End of Borehole<br>Auger Refusal | | 2.64 | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-407

SHEET 1 OF 1

LOCATION: N 5028700.7 ;E 366579.9

BORING DATE: March 7, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.96 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | FILL - (SW) SAND, some silt, some gravel; dark brown, contains brick; non-cohesive, moist/frozen, compact | | 0.00 / 66.35 | 1 | SS | 14 | | | | |
| 1 | | FILL - (CI/CH) SILTY CLAY to CLAY, some sand, some gravel; grey; cohesive, w~PL, stiff | | 0.61 / 65.44 | 2 | SS | 6 | | | | |
| 2 | | FILL - (SW) SAND, some silt, some gravel; brown, with layers of black asphalt; non-cohesive, moist to wet, dense to loose | | 1.52 / 63.30 | 3 | SS | 41 | | | | |
| 3 | | | | | 4 | SS | 8 | | | | |
| | | | | | 5 | SS | 4 | | | | |
| 4 | | (SW) SAND, some low plasticity fines, some gravel; grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, dense | | 3.66 / 62.39 | 6 | SS | 3 | | | | |
| | | End of Borehole Auger Refusal | | 4.57 | 7 | SS | >50 | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-408

SHEET 1 OF 2

LOCATION: N 5028677.3 ;E 366555.2

BORING DATE: March 3, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) SHEAR STRENGTH Cu, kPa (20 40 60 80) nat V. + Q - ● rem V. ⊕ U - ○ | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) WATER CONTENT PERCENT Wp W Wl (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.02 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact | | 0.00<br>65.79 | 1 | SS | 12 | | | | |
| | | FILL - (CL) SILTY CLAY, some sand, trace gravel; grey brown; cohesive, w~PL, stiff | | 0.23<br>65.56 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, sub-rounded to sub-angular; brown; non-cohesive, moist, compact | | 0.46<br>65.11 | 2 | SS | 15 | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND; black, contains ash, slag and brick; non-cohesive, moist, compact | | 0.91<br>1.07<br>64.50 | | | | | | | |
| | | FILL - (SM) SILTY SAND, trace to some gravel; grey, contains organic matter; non-cohesive, moist, compact to loose | | 1.52<br>1.68 | 3 | SS | 3 | | | | |
| 2 | | (SM) gravelly SILTY SAND; grey brown (GLACIAL TILL); non-cohesive, moist to wet, very loose | | | 4 | SS | 4 | | | | |
| | | (SM) gravelly SILTY SAND; grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to loose | | | | | | | | | |
| 3 | | | | | 5 | SS | 9 | | | | |
| | | | | 62.30 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 22-408 | | 3.72 | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-408

SHEET 2 OF 2

LOCATION: N 5028677.3 ;E 366555.2

DRILLING DATE: March 3, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jcon | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | ROCK STRENGTH INDEX: R4 | ROCK STRENGTH INDEX: R3 | ROCK STRENGTH INDEX: R2 | ROCK STRENGTH INDEX: R1 | WEATHERING INDEX: W1 | WEATHERING INDEX: W2 | WEATHERING INDEX: W3 | WEATHERING INDEX: W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.30 | | | | | | | | | | | | | | | | | | | | |
| 4 | Rotary Drill / NQ Core | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet | | 3.72 / 62.12 | 1 | 100 | | | | | | | | | | | | | | | | | | >> |
| | | | | 3.90 | | | | | | | | | | | | | | | | | | | | |
| | | Slightly weathered to fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE | | | 2 | 100 | | | | | | | | | | | | | | | | | | |
| 5 | | - Broken core from 3.84 m to 3.90 m | | | | | | | | | | | | | | | | | | | | | | |
| | | - Broken core from 4.38 m to 4.39 m | | | | | | | | | | | | | | | | | | | | | | |
| | | - Broken core from 4.75 m to 4.76 m | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | 3 | 100 | | | | | | | | | | | | | | | | | | |
| | | - Broken/lost core from 6.23 m to 6.29 m | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | - Broken/lost core from 7.09 m to 7.11 m | | | 4 | 100 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | - Broken core from 8.16 m to 8.18 m | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | 5 | 100 | | | | | | | | | | | | | | | | | | UCS = 140 MPa |
| | | - Broken/lost core from 9.55 m to 9.57 m | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | - Broken/lost core from 10.66 m to 10.67 m | | | 6 | 100 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | 7 | 100 | | | | | | | | | | | | | | | | | | |
| 13 | | End of Drillhole | | 53.04 / 12.98 | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-409

SHEET 1 OF 1

LOCATION: N 5028655.4 ;E 366477.0

BORING DATE: March 7, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 67.62 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SW/SM) SAND, some silt to silty sand, trace low plasticity fines; brown, contains organic matter (rootlets); non-cohesive, moist, compact | | 0.00 | | | | | | | |
| | | FILL - (SW/SM) SAND, some silt to silty sand, some low plastic fines, trace gravel, trace organics; brown to dark brown, mottling present; slightly cohesive, moist, very loose to loose | | 0.10 | 1 | SS | 16 | | | | |
| 1 | | | | | 2 | SS | 7 | | | | |
| | | | | | 3 | SS | 3 | | | | |
| 2 | | | | 65.33 | | | | | | | |
| | | (SW/SM) SAND to SILTY SAND, some low plastic fines, some gravel; light brown to grey (GLACIAL TILL); slightly cohesive, wet, loose | | 2.29 | 4 | SS | 5 | | | M | |
| 3 | | | | | 5 | SS | 7 | | | | |
| 4 | | | | | 6 | SS | 7 | | | | |
| | | | | 63.05 | | | | | | | |
| | | (SW/SM) SAND to SILTY SAND, some low plastic fines, some gravel; grey (GLACIAL TILL); loose to compact | | 4.57 | 7 | SS | 11 | | H | | |
| 5 | | | | | 8 | SS | 9 | | | | |
| | | | | 61.83 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 5.79 | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-410

SHEET 1 OF 1

LOCATION: N 5028654.1 ;E 366523.2

BORING DATE: March 7, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.99 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL | | 0.00 / 66.79 | | | | | | | |
| | | FILL - (SW) SAND, some silt, some gravel; brown; non-cohesive, moist, compact | | 0.20 / 66.23 | 1 | SS | 29 | | | | |
| 1 | | FILL - (ML-SM) sandy SILT to SILTY SAND, some low plasticity fines, some gravel; brown; non-cohesive, moist to wet, very dense | | 0.76 / 65.47 | 2 | SS | 61 | | | | |
| 2 | | (SM) Gravelly SILTY SAND, some low plasticity fines; grey brown to grey (GLACIAL TILL): non-cohesive, wet, compact | | 1.52 | 3 | SS | 16 | | | | |
| | | | | | 4 | SS | 22 | | | | |
| 3 | | | | | 5 | SS | 11 | | | M | |
| 4 | | | | | 6 | SS | 13 | | | | |
| | | | | | 7 | SS | >50 | | | | |
| | | End of Borehole Auger Refusal | | 62.29 / 4.70 | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-411

SHEET 1 OF 2

LOCATION: N 5028653.8 ;E 366567.0

BORING DATE: March 2, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | GROUND SURFACE | | 66.72 | | | | | | | |
| | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact | | 0.00 / 66.54 | 1 | SS | 14 | | | | |
| | | FILL - (CL) SILTY CLAY, some sand, trace gravel; grey brown, contains organic matter, ash and slag; cohesive, w~PL, stiff | | 0.18 / 65.96 | | | | | | | |
| 1 | | (SM) gravelly SILTY SAND; grey brown (GLACIAL TILL); non-cohesive, moist to wet, loose | | 0.76 | 2 | SS | 5 | | | | Bentonite Seal |
| | | | | | 3 | SS | 8 | | | | Silica Sand |
| 2 | | | | 64.59 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | 2.13 | 4 | SS | 5 | | | | |
| 3 | | | | | 5 | SS | 30 | | | | 32 mm Diam. PVC #10 Slot Screen 'B' |
| 4 | | | | | 6 | SS | 10 | | | M | |
| | | | | 62.15 | | | | | | | Silica Sand |
| | | Borehole continued on RECORD OF DRILLHOLE 22-411 | | 4.57 | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 22-411

SHEET 2 OF 2

LOCATION: N 5028653.8 ;E 366567.0

DRILLING DATE: March 2, 2022

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 62.15 | | | | | | | | | | | | | | | | | | | | | |
| 5 | Rotary Drill / NQ Core | (SM) gravelly SILTY SAND; grey, possible ccobbles and boulders (GLACIAL TILL); non-cohesive, wet | | 4.57 | | | | | | | | | | | | | | | | | | | | | |
| | | | | 4.73 | 1 | 100 | | | | | | | | | | | | | | | | | | | |
| 6 | | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE<br>- Lost core from 4.57 m to 4.60 m<br>- Broken/lost core from 4.69 m to 4.73 m<br>- Broken core from 5.02 m to 5.03 m<br>- Broken core from 5.79 m to 5.5 m<br>- Broken/lost core from 6.21 m to 6.24 m<br>- Broken/lost core from 6.57 m to 6.56 m | | | 2 | 50 | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | 3 | 50 | | | | | | | | | | | | | | | | | | | |
| 8 | | | | 58.37 | | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen 'A' measured at a depth of 2.41 m (Elev. 64.31 m) on May 9, 2022.<br>2. Water level in screen 'B' measured at a depth of 0.77 m (Elev. 65.95 m) on May 9, 2022. | | 8.35 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | |

Bentonite Seal

Silica Sand

UCS = 89 MPa

32 mm Diam. PVC #10 Slot Screen 'A'

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: BB

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 22-412

SHEET 1 OF 1

LOCATION: N 5028677.0 ;E 366602.3

BORING DATE: March 1, 2022

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.38 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL/FILL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist/frozen, compact | | 0.00 | 1 | SS | 15 | | | | |
| | | FILL - (CL) SILTY CLAY, some sand, trace gravel; grey brown; cohesive, w~PL, stiff | | 66.02<br>0.36<br>65.62 | | | | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND; grey brown, contains silty clay layers; non-cohesive, moist, dense | | 0.76<br>65.24 | 2 | SS | 49 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; black, contains ash and slag; non-cohesive, moist, dense | | 1.14<br>64.86 | | | | | | | |
| 2 | | FILL - (SM) gravelly SILTY SAND; grey brown; non-cohesive, moist, compact | | 1.52<br>64.40 | 3 | SS | 12 | | | | |
| | | (PT) Amorphous PEAT; black; non-cohesive, moist | | 1.98<br>64.09 | | | | | | | |
| 3 | | (SM) gravelly SILTY SAND; grey, possible cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to very dense | | 2.29 | 4 | SS | 7 | | | | |
| | | | | | 5 | SS | 9 | | | M | |
| | | | | 62.47 | 6 | SS | >50 | | | | |
| 4 | | End of Borehole<br>Auger Refusal | | 3.91 | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: JS

CHECKED: BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 9/6/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-01

SHEET 1 OF 1

LOCATION: N 5028807.8 ;E 366831.0

BORING DATE: June 11, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.05 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | ASPHALTIC CONCRETE | | 0.05 | | | | | | | Flush Mount Casing |
| | | FILL - (SW/GW) gravelly SAND to sandy GRAVEL, angular; grey (PAVEMENT STRUCTURE) | | 64.44 | 1 | SS | 14 | | | | Backfill; Bentonite Seal |
| 1 | | FILL - (SW) gravelly SILTY SAND; dark brown to brown; non-cohesive, moist to wet, compact | | 0.61 | | | | | | | Silica Sand |
| | | | | 63.85 | 2 | SS | 18 | | | | |
| | | FILL - Wood; brown; non-cohesive, moist | | 1.20 | | | | | | | 52 mm Diam. PVC #10 Slot Screen |
| | | | | 1.30 | | | | | | | |
| | | FILL/WASTE - (SM) gravelly SILTY SAND; dark brown to black, contains asphalt; non-cohesive, moist, compact | | 1.45 | | | | | | | |
| | | | | 63.37 | 3 | SS | >50 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; brown, with black staining; non-cohesive, moist to wet, compact | | 1.68 | | | | | | | |
| 2 | | | | 63.14 | | | | | | | Cave |
| | | FILL - (GW) sandy GRAVEL; grey; non-cohesive, moist, very dense | | 1.91 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | | | | | | | | |
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DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: KM/BB

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-02

SHEET 1 OF 2

LOCATION: N 5028720.9 ;E 366811.1

BORING DATE: May 18, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | GROUND SURFACE | | 65.67 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Holow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; dark brown, contains brick, ash, organic matter and silty clay layers; non-cohesive, moist, loose to compact | | 0.15 | 1 | SS | 9 | | ○ | M | Bentontie Seal |
| 1 | | | | | 2 | SS | >50 | | | | |
| | | | | 64.40 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-02 | | 1.27 | | | | | | | |
| 2 | | | | | | | | | | | |
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| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-02

SHEET 2 OF 2

LOCATION: N 5028720.9 ;E 366811.1

DRILLING DATE: May 18, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.40 | | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, very strong SHALEY NODULAR LIMESTONE<br><br>- Broken core from 1.44 m to 1.55 m | | 1.27 | 1 | 100 | | | | | | | | | | | | | Bentontie Seal<br>Silica Sand<br>UCS = 130 MPa |
| 3 | | | | | 2 | 100 | | | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 4 | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | 3 | 100 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | Silica Sand |
| 7 | | | | 58.38 | 4 | 100 | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at 2.09 m (Elev. 63.59 m) on May 28, 2021 | | 7.29 | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: KM/CH

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-03

SHEET 1 OF 2

LOCATION: N 5028765.9 ;E 366781.2

BORING DATE: May 18, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 64.97 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>64.72 | 1 | SS | 5 | | | | |
| | | FILL - (SM) SILTY SAND, trace gravel; dark brown to grey brown, contains organic matter and brick fragments; non-cohesive, moist, compact | | 0.25 | | | | | | | Bentonite Seal |
| 1 | | | | | 2 | SS | 10 | | | | |
| | | | | 63.45 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown (GLACIAL TILL); non-cohesive, moist, very dense | | 1.52 | 3 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-03 | | 1.68 | | | | | | | |
| 2 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-03

SHEET 2 OF 2

LOCATION: N 5028765.9 ;E 366781.2

DRILLING DATE: May 18, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.29 | | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, very strong SHALEY NODULAR LIMESTONE<br><br>- Broken core from 2.05 m to 2.07 m | | 1.68 | 1 | 100 | | | | | | | | | | | | | Bentontie Seal<br>UCS = 130 MPa<br>Silica Sand |
| 3 | | | | | 2 | 100 | | | | | | | | | | | | | |
| | | - Broken core from 3.57 m to 3.58 m | | | | | | | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen |
| 4 | | | | | 3 | 100 | | | | | | | | | | | | | |
| 5 | | - Broken core from 4.64 m to 4.66 m | | 59.66 | | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at 2.59 m (Elev. 62.38 m) on May 28, 2021<br><br>2. Water level in screen measured at 2.67 m (Elev. 62.30 m) on June 23, 2021 | | 5.31 | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | |
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| 11 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: KM/CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-04

SHEET 1 OF 1

LOCATION: N 5028747.0 ;E 366692.9

BORING DATE: May 13, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 67.61 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) sandy SILT; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose | | 0.00 | | | | | | | |
| | | | | 67.31 | 1 | SS | 5 | | | | |
| | | FILL - (CL/CI) SILTY CLAY, trace to some sand, trace gravel; grey brown, contains concrete fragments and organic matter; cohesive, w>PL, firm | | 0.30 | | | | | | | |
| 1 | | | | | 2 | SS | 6 | | | | |
| | | | | | 3 | SS | 5 | | | | |
| 2 | | | | 65.32 | | | | | | | |
| | | FILL - (GM/SM) SILTY GRAVEL and SAND; dark brown, contains concrete, brick and wood fragments; non-cohesive, moist to wet, compact to very loose | | 2.29 | 4 | SS | 18 | | | M | |
| 3 | | | | | 5 | SS | 1 | | | | |
| | | | | 63.80 | 6 | SS | >50 | | | | |
| | | End of Borehole<br>Auger Refusal | | 3.81 | | | | | | | |
| 4 | | | | | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-05

SHEET 1 OF 2

LOCATION: N 5028738.6 ;E 366737.3

BORING DATE: May 14, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 65.58 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML/SM) SILTY SAND to sandy SILT, trace gravel; dark brown, contains brick fragments and organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>65.35<br>0.23 | 1 | SS | 12 | | | | |
| | | FILL - (SM) gravelly SILTY SAND, some low-plastisity fines; dark brown, contains concrete, carpet and organic matter (rootlets); non-cohesive, moist, loose | | | | | | | | | Bentonite Seal |
| 1 | | | | | 2 | SS | 50 | | ○ | MH | |
| | | | | 64.34 | | | | | | | |
| | Rotary Drill NQ Core | CONCRETE | | 1.24 | 1 | RC | DD | | | | Bentonite Seal |
| | | | | 63.79 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; brown; non-cohesive, moist to wet | | 1.79 | | | | | | | |
| 2 | | Borehole continued on RECORD OF DRILLHOLE 21-05 | | 1.95 | | | | | | | |
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| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-05

SHEET 2 OF 2

LOCATION: N 5028738.6 ;E 366737.3

DRILLING DATE: May 14, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.63 | | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, grey to dark brey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE | | 1.95 | | | | | | | | | | | | | | | UCS = 97 MPa |
| 3 | | | | | 2 | 0 | | | | | | | | | | | | | Bentonite Seal |
| 4 | | | | | 3 | 0-25 | | | | | | | | | | | | | Silica Sand |
| 5 | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | 4 | 0-25 | | | | | | | | | | | | | 38 mm Diam. PVC #10 Slot Screen |
| | | | | 58.64 | | | | | | | | | | | | | | | |
| 7 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at 2.72 m (Elev. 62.86 m) on May 28, 2021<br><br>2. Water level in screen measured at 2.73 m (Elev. 62.85 m) on June 2, 2021 | | 6.94 | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | |
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| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: KM/CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-06

SHEET 1 OF 2

LOCATION: N 5028643.3 ;E 366748.4

BORING DATE: May 12, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | GROUND SURFACE | | 67.00 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | | | 0.15 | 1 | SS | 11 | | | | Bentonite Seal |
| 1 | | FILL - (SC) SILTY CLAYEY SAND, some low-medium plasticity fines, trace gravel; brown to dark brown, with black staining, contains wood, organic matter (rootlets); cohesive, moist, compact | | | 2 | SS | 14 | | | | Backfill |
| | | | | | 3 | SS | 15 | | | MH | Bentonite Seal |
| 2 | | | | 64.97 | | | | | | | |
| 2 | | Borehole continued on RECORD OF DRILLHOLE 21-06 | | 2.03 | | | | | | | |
| 3 | | | | | | | | | | | |
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| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-06

SHEET 2 OF 2

LOCATION: N 5028643.3 ;E 366748.4

DRILLING DATE: May 12, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.97 | | | | | | | | | | | | | | | |
| 3 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, very strong SHALEY NODULAR LIMESTONE | | 2.03 | 1 | 100 | | | | | | | | | | | | | Bentonite Seal<br>UCS = 109 MPa |
| | | | | | 2 | 100 | | | | | | | | | | | | | Silica Sand |
| 4 | | - Broken core from 4.03 m to 4.04 m | | | 3 | 100 | | | | | | | | | | | | | 38 mm Diam. PVC #10 Slot Screen |
| 5 | | | | 61.60 | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 5.40 | | | | | | | | | | | | | | | |
| 6 | | Note(s): | | | | | | | | | | | | | | | | | |
| | | 1. Water level in screen measured at 1.19 m (Elev. 65.82 m) on May 27, 2021 | | | | | | | | | | | | | | | | | |
| | | 2. Water level in screen measured at 2.70 m (Elev. 64.31 m) on June 23, 2021 | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: KM/CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-07

SHEET 1 OF 2

LOCATION: N 5028686.9 ;E 366770.2

BORING DATE: May 17, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | GROUND SURFACE | | 66.70 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel, trace clay; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>66.47 | | | | | | | |
| 0 | | FILL - (SM) SILTY SAND, trace gravel, trace to some clay; dark brown to brown, contains ash, organic matter, brick fragments, concrete fragments, silty clay layers and wood; non-cohesive, moist, loose to very dense | | 0.23 | 1 | SS | 8 | | | | Bentonite Seal |
| 1 | | | | | 2 | SS | 19 | | | | |
| 2 | | | | | 3 | SS | >50 | | | | 64 mm Diam. VSP Pipe |
| 2 | | | | 64.16 | 4 | SS | >50 | | | | |
| 2 | | Borehole continued on RECORD OF DRILLHOLE 21-07 | | 2.54 | | | | | | | |

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RI

CHECKED: KM/CH

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-07

SHEET 2 OF 2

LOCATION: N 5028686.9 ;E 366770.2

DRILLING DATE: May 17, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.16 | | | | | | | | | | | | | | | |
| 3 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, grey to dark grey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE<br>- Lost core from 2.54 m to 2.64 m<br>- Broken core from 3.08 m to 3.10 m | | 2.54 | 1 | 100 | | | | | | | | | | | | | |
| 4 | | | | | 2 | 100 | | | | | | | | | | | | | UCS = 95 MPa |
| 5 | | | | | 3 | 100 | | | | | | | | | | | | | UCS = 106 MPa |
| 6 | | - Broken core from 6.21 m to 6.23 m | | | | | | | | | | | | | | | | | |
| 7 | | | | | 4 | 100 | | | | | | | | | | | | | 64 mm Diam. VSP Pipe |
| 8 | | | | | 5 | 100 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | 6 | 100 | | | | | | | | | | | | | |
| | | | | 55.79 | | | | | | | | | | | | | | | |
| 11 | | End of Borehole | | 10.91 | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: KM/CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-08

SHEET 1 OF 1

LOCATION: N 5028762.3 ;E 366650.3

BORING DATE: May 18, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.02 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) gravelly SILTY SAND; brown, contains organics; cohesive, moist, dense | | 0.00 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace organics andgravel; brown, contains brick fragments; cohesive, moist, dense to very dense | | 0.15 | 1 | SS | 30 | | ○ | | |
| 1 | | | | | 2 | SS | >50 | | ○ | | |
| | | | | 64.80 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 1.22 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: AKP

CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-09

SHEET 1 OF 2

LOCATION: N 5028717.0 ;E 366649.1

BORING DATE: May 18, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.35 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) gravelly SILTY SAND; brown, contains organics; non-cohesive, moist, loose | | 0.00 | 1 | SS | 10 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; dark brown to brown, trace organics; non-cohesive, moist, loose to dense | | 0.15 | | | | | | | |
| 1 | | | | | 2 | SS | 41 | | ○ | M | |
| | | | | 64.78 | 3 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-09 | | 1.57 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: AKP

CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-09

SHEET 2 OF 2

LOCATION: N 5028717.0 ;E 366649.1

DRILLING DATE: May 18, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.78 | | | | | | | | | | | | | | |
| 2 | Rortary Drill / BW Casing | Fresh, thinly bedded, medium to dark brownish grey, fine grained, non-porous, strong SHALEY NODULAR LIMESTONE<br>- veritcal join from 2.04 to 2.09 m depth<br>- vertical joint from 2.38 to 2.43 m depth | | 1.57 | 1 | | | | | | | | | | | | | |
| 3 | | | | 63.23 | | | | | | | | | | | | | | |
| | | End of Drillhole | | 3.12 | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: AKP
CHECKED: KM/CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-10

SHEET 1 OF 2

LOCATION: N 5028684.9 ;E 366642.2

BORING DATE: May 18, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 66.19 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) gravelly SILTY SAND; brown, contains organics; non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | | | 0.15 | 1 | SS | 10 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; dark brown to brown, contains organics, brick fragments and clay pockets; non-cohesive, moist, loose to compact | | | 2 | SS | 15 | | | | Bentonite Seal |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | >50 | | | | |
| 2 | | | | 64.01 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-10 | | 2.18 | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: AKP

CHECKED: KM/CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-10

SHEET 2 OF 2

LOCATION: N 5028684.9 ;E 366642.2

DRILLING DATE: May 18, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.01 | | | | | | | | | | | | | | | |
| 3 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE<br>-broken core from 2.38 to 2.45 m depth<br>- vertical joint from 2.69 to 4.06 m | | 2.18 | 1 | | 80 60 40 20 | 80 60 40 20 | 80 60 40 20 | 5 10 15 20 | 0 30 60 90 | | | | | $10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$ | 2 4 6 | | Bentonite Seal<br>Silica Sand |
| 4 | | | | | 2 | | | | | | | | | | | | | | 38 mm Diam. PVC #10 Slot Screen |
| 5 | | - broken core from 5.1 to 5.22 m depth | | 60.70 | | | | | | | | | | | | | | | |
| | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at 2.66 m (Elev. 63.53 m) on May 28, 2021<br><br>2. Water level in screen measured at 2.66 m (Elev. 63.53 m) on June 23, 2021 | | 5.49 | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: AKP
CHECKED: KM/CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-11

SHEET 1 OF 1

LOCATION: N 5028623.7 ;E 366685.5

BORING DATE: May 13, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 67.35 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, some clay; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose | | 0.00 | 1 | SS | 3 | | | | |
| | | | | 67.05 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace to some clay; dark brown, contains organic matter; non-cohesive, moist to wet, very loose to compact | | 0.30 | | | | | | | |
| 1 | | | | | 2 | SS | 11 | | | | |
| | | | | | 3 | SS | >50 | | | | |
| | | | | 65.67 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 1.68 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-12

SHEET 1 OF 2

LOCATION: N 5028586.9 ;E 366762.5

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 68.72 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) gravelly SILTY SAND; brown, contains organics; non-cohesive, moist | | 0.00 | | | | | | | |
| | | FILL - (SM) gravellly SILTY SAND; dark brown to brown with black mottling; non-cohesive, moist, compact | | 0.15 | 1 | SS | 26 | | | | |
| 1 | | | | | 2 | SS | 20 | | | | |
| | | | | 67.32 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-12 | | 1.4 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

DEPTH SCALE

1 : 50

GOLDER

LOGGED: AKP

CHECKED: CH

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-12

SHEET 2 OF 2

LOCATION: N 5028586.9 ;E 366762.5

DRILLING DATE: May 19, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR / % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 67.32 | | | | | | | | | | | | | | |
| 2 | Rotary Drill / NQ Core | Fresh, thinly bedded, medium to dark brownish grey, fine grained, non-porous, strong SHALEY NODULAR LIMESTONE<br>- broken core from 1.61 to 1.70 m depth<br>- broken core from 2.15 to 2.19 m depth | | 1.40<br>65.75 | | | | | | | | | | | | | | |
| 3 | | End of Drillhole | | 2.97 | | | | | | | | | | | | | | |
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| 10 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: AKP
CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-13

SHEET 1 OF 2

LOCATION: N ;E

BORING DATE: May 13, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (ML) sandy SILT, trace clay; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00 | | | | | | | |
| | | FILL - (CL/CI) SILTY CLAY, trace sand, trace gravel; grey brown, contains organic matter; cohesive, w~PL, firm | | 0.23 | 1 | SS | 6 | | ○ | | |
| 1 | | (SM/ML) SILTY SAND to sandy SILT, some gravel to gravelly; grey (GLACIAL TILL); non-cohesive, moist to wet, compact | | 0.76 | 2 | SS | 23 | | ○ | M | |
| 2 | | | | | 3 | SS | 10 | | ○ | | |
| 3 | | Borehole continued on RECORD OF DRILLHOLE 21-13 | | 2.97 | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-13

SHEET 2 OF 2

LOCATION: N ;E

DRILLING DATE: May 13, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint, FLT - Fault, SHR- Shear, VN - Vein, CJ - Conjugate
BD - Bedding, FO- Foliation, CO- Contact, OR- Orthogonal, CL - Cleavage
PL - Planar, CU- Curved, UN- Undulating, ST - Stepped, IR - Irregular
PO- Polished, K - Slickensided, SM- Smooth, Ro - Rough, MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | HYDRAULIC CONDUCTIVITY K, cm/sec | Diametral Point Load Index (MPa) | RMC -Q' AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | | | | | | | | | | | | | | | |
| 3 | Rotary Drill / NQ Core | Slightly weathered to fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong SHALEY LIMESTONE<br>- broken core from 2.97 to 3.05 m depth<br>- vertical joint from 2.97 to 3.27 m depth | | 2.97 | | | | | | | | | | | | | | |
| 4 | | - lost core from 3.88 to 4.30 m depth | | | 1 | | | | | | | | | | | | | |
| 5 | | End of Drillhole | | 4.98 | | | | | | | | | | | | | | |
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| 10 | | | | | | | | | | | | | | | | | | |
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| 12 | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

LOCATION: N 5028354.77; E 366451.17

# RECORD OF BOREHOLE: 21-101

SHEET 1 OF 1

BORING DATE: June 11, 2021

DATUM: NAD 1983

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.42 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains cobbles, boulderse and organic matter (rootlets); non-cohesive, moist | | 0.00 / 81.12 | | | | | | | |
| | | FILL - (SM) SILTY SAND, trace gravel; brown to dark brown, contains organic matter (rootlets), possible cobbles and boulders; non-cohesive, moist, loose | | 0.30 / 80.61 | 1 | SS | 6 | | | | |
| 1 | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.81 / 79.90 | 2 | SS | 21 | | | | |
| | | End of Borehole | | 1.52 | | | | | | | |
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| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 21451149

# RECORD OF BOREHOLE: 21-102

SHEET 1 OF 1

LOCATION: N 5028319.00; E 366502.10

BORING DATE: June 11, 2021

DATUM: NAD 1983

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.80 | | | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (TOPSOIL); non-cohesive, moist | | 0.00 | | | | | | | | | |
| | | FILL - (SM) SILTY SAND, fine to medium brown to dark bbrown, contains organic matter (rootlets); non-cohesive, moist, compact | | 81.52<br>0.28 | 1 | SS | 14 | | | | | | |
| 1 | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact to dense | | 81.19<br>0.61 | 2 | SS | 41 | | | | | | |
| | | | | 80.28 | | | | | | | | | |
| | | End of Borehole | | 1.52 | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 21451149

LOCATION: N 5028356.84; E 366519.53

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 21-103

BORING DATE: June 11, 2021

DRILL RIG: CME 55

SHEET 1 OF 1

DATUM: NAD 1983

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.25 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; dark brown to grey brown, contains organic matter; non-cohesive, moist, compact | | 80.89<br>0.36 | | | | | | | |
| | | | | 80.64<br>0.61 | 1 | SS | 20 | | | | |
| 1 | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | | 2 | SS | 28 | | ○ | M | |
| | | | | 79.73 | | | | | | | |
| | | End of Borehole | | 1.52 | | | | | | | |
| 2 | | | | | | | | | | | |
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| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 21451149

LOCATION: N 5028277.11; E 366533.33

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 21-104

BORING DATE: June 11, 2021

DRILL RIG: CME 55

SHEET 1 OF 1

DATUM: NAD 1983

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.69 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00<br>82.44 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains organic matter, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact | | 0.25 | 1 | SS | 6 | | | | |
| 1 | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 81.62<br>1.07 | 2 | SS | 22 | | | | |
| | | End of Borehole | | 81.17<br>1.52 | | | | | | | |
| 2 | | | | | | | | | | | |
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| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 21451149

LOCATION: N 5028324.42; E 366594.05

# RECORD OF BOREHOLE: 21-105

SHEET 1 OF 1

BORING DATE: June 11, 2021

DATUM: NAD 1983

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.12 | | | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00 | | | | | | | | | |
| | | FILL - (SM/ML) SILTY SAND to sandy SILT, trace to some gravel; dark brown to brown, contains organic matter; non-cohesive, moist, loose | | 81.82 / 0.30 | 1 | SS | 6 | | | | | | |
| 1 | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to compact | | 81.41 / 0.71 | 2 | SS | 28 | | | | | | |
| | | End of Borehole | | 80.60 / 1.52 | | | | | | | | | |

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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

PROJECT: 21451149

LOCATION: N 5028291.08; E 366596.90

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 21-106

BORING DATE: June 11, 2021

DRILL RIG: CME 55

SHEET 1 OF 1

DATUM: NAD 1983

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.68 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00 / 82.43 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains organic matter, cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.25 / 82.07 | 1 | SS | 13 | | | | |
| 1 | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 0.61 / 81.16 | 2 | SS | 19 | | | | |
| | | End of Borehole | | 1.52 | | | | | | | |
| 2 | | | | | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 21451149

LOCATION: N 5028261.19; E 366663.58

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

# RECORD OF BOREHOLE: 21-107

BORING DATE: June 11, 2021

DRILL RIG: CME 55

SHEET 1 OF 1

DATUM: NAD 1983

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 84.54 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00 | | | | | | | |
| | | | | 84.21 | | | | | | | |
| | | FILL - (SM/ML) SILTY SAND to sandy SILT, fine; brown to dark brown, contains organic matter; non-cohesive, moist | | 0.33 | | | | | | | |
| | | | | 0.42 | 1 | SS | 25 | | | | |
| 1 | | FILL - (SW) gravelly SAND, fine to coarse, some silt; brown, contains cobbles and boulders; non-cohesive, moist, compact | | 83.85 | | | | | | | |
| | | | | 0.69 | 2 | SS | 38 | | ○ | M | |
| | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact to dense | | 83.02 | | | | | | | |
| 2 | | End of Borehole | | 1.52 | | | | | | | |
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DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

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PROJECT: 21451149

LOCATION: N 5028229.55; E 366723.88

# RECORD OF BOREHOLE: 21-108

SHEET 1 OF 1

BORING DATE: June 11, 2021

DATUM: NAD 1983

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 86.48 | | | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist | | 0.00 | | | | | | | | | |
| | | (SP) SAND, fine to medium, trace silt; brown, possibly stratified; non-cohesive, moist, very loose to loose | | 86.02<br>0.46 | 1 | SS | 3 | | | | | | |
| 1 | | | | | 2 | SS | 5 | | | | | | |
| | | (SW) gravelly SAND, fine to coarse, some silt; bbrown; non-cohesive, moist to wet, loose | | 85.11<br>1.37 | | | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose | | 1.52 | | | | | | | | | |
| 2 | | End of Borehole | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

GTA-BHS 001 S:\CLIENTS\OTTAWA_HOSPITAL\NEW_CIVIC_CAMPUS\02_DATA\GINT\NEW_CIVIC_CAMPUS.GPJ GAL-MIS.GDT 8/18/23

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-201

SHEET 1 OF 2

LOCATION: N 5028309.4 ;E 366459.5

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 82.46 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets): non-cohesive, moist, loose | | 0.00 / 82.08 | 1 | SS | 5 | | | | |
| | | FILL - (SM) SILTY SAND, brown to dark brown, contains organic matter; non-cohesive, moist, loose | | 0.38 / 81.70 | | | | | | | |
| 1 | | (SM) SILTY SAND, grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 0.76 | 2 | SS | 9 | | ○ | M | Bentonite Seal |
| 2 | | | | | 3 | SS | 19 | | | | |
| | | | | | 4 | SS | 15 | | | | |
| 3 | | | | 79.41 | | | | | | | |
| | | (SM/GM) SILTY gravelly SAND to SILTY sandy GRAVEL; grey to red brown, contains cobbles and boulders; non-cohesive, moist to wet, compact to very dense | | 3.05 | 5 | SS | >50 | | | | |
| 4 | | | | | 6 | SS | 14 | | | | Backfill |
| | | | | | 7 | SS | 76 | | | | |
| 5 | Rotary Drill/Wash Boring NW Casing | | | 77.48 | | | | | | | |
| | | (SP/GP) Gravelly SAND to Sandy GRAVEL, some non-plastic fines; brown, contains cobbles and boulders; non-cohesive, wet, very dense | | 4.98 | 8 | RC | - | | | | |
| 6 | | | | | 9 | RC | - | | | | June 18, 2021<br>June 24, 2021 |
| 7 | | | | | 10 | RC | - | | | | Bentonite Seal |
| 8 | | | | | | SS | >50 | | | | |
| | | | | | 12 | RC | - | | | | Silica Sand |
| 9 | | | | | 13 | SS | 102 | | ○ | M | 32 mm Diam. PVC #10 Slot Screen |
| | | | | | 14 | RC | - | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-201

SHEET 2 OF 2

LOCATION: N 5028309.4 ;E 366459.5

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s / WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Rotary Drill/Wash Boring; NW Casing | (SP/GP) Gravelly SAND to Sandy GRAVEL, some non-plastic fines; brown, contains cobbles and boulders; non-cohesive, wet, very dense | | | 14 | RC | - | | | | |
| | | | | | 15 | SS | >50 | | | | 32 mm Diam. PVC #10 Slot Screen |
| 11 | | | | | 16 | RC | - | | | | |
| 12 | | | | | | | | | | | |
| | | | | | 17 | SS | 89 | | | | Cave |
| | | | | 69.78 | | | | | | | |
| | DCPT | Dynamic Cone Penetration Test (DCPT) | | 12.68 / 69.58 | | | | | 120 | | |
| 13 | | End of Borehole<br>DCPT Refusal | | 12.88 | | | | | | | |
| | | 1. Water level in screen measured at 6.5 m (Elev. 75.95 m) on June 24, 2021<br>2. Water level in screen measured at 6.45 m (Elev. 76.01) on June 18, 2021 | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-202

SHEET 1 OF 3

LOCATION: N 5028386.4 ;E 366468.2

BORING DATE: May 25, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.20 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose | | 0.00<br>80.95 | | | | | | | |
| | | FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, very loose | | 0.25 | 1 | SS | 3 | | | | Bentonite Seal |
| 1 | | | | | 2 | SS | 4 | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w<PL, very stiff | | 79.98<br>1.22 | | | | | | | |
| | | | | 79.37 | 3 | SS | 14 | | | | |
| 2 | | (SM) gravelly SILTY SAND; grey brown, possible cobbles and boulders (GLACIAL TILL); non-cohesive, moist, loose to dense | | 1.83 | | | | | | | |
| | | | | | 4 | SS | 16 | | | | |
| 3 | | | | | 5 | SS | 10 | | | | |
| 4 | | | | | 6 | SS | 36 | | | | |
| | | | | | 7 | SS | 7 | | | | June 9, 2021 |
| 5 | | | | 75.86 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose | | 5.34 | 8 | SS | 2 | | | | Backfill |
| 6 | | | | 75.10 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose | | 6.10 | 9 | SS | WH | | | | |
| | | | | 74.34 | | | | | | | |
| 7 | | (SM/GM) gravelly SILTY SAND to SILTY sandy GRAVEL; brown, contains cobbles and boulders; non-cohesive, wet, dense | | 6.86 | 10 | SS | 45 | | | | |
| 8 | | | | | 11 | SS | 34 | | | | |
| | | | | 72.97 | | | | | | | |
| | | (SW) gravelly SAND, fine to coarse, trace to some silt; grey brown, possible cobbles and boulders; non-cohesive, wet, compact | | 8.23 | 12 | SS | 16 | | | | |
| 9 | | | | | 13 | SS | 24 | | | | |
| 10 | | | | | 14 | SS | 14 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-202

SHEET 2 OF 3

LOCATION: N 5028386.4 ;E 366468.2

BORING DATE: May 25, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SW) gravelly SAND, fine to coarse, trace to some silt; grey brown, possible cobbles and boulders; non-cohesive, wet, compact | | | 14 | SS | 14 | | | | |
| 11 | | | | | 15 | SS | 27 | | | | |
| | | | | 69.61 | | | | | | | |
| | | (SW) gravelly SAND, fine to coarse, trace to some silt; brown, contains cobbles and boulders; non-cohesive, wet, compact to dense | | 11.59 | 16 | SS | 1 | | | | |
| 12 | | | | | 17 | SS | 12 | | | | |
| 13 | Rotary Drill/Wash Boring NW Casing | | | | 18 | SS | >50 | | | | Backfill |
| | | | | | 19 | RC | DD | | | | |
| | | | | | 20 | SS | 43 | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | 21 | SS | 32 | | | | |
| 16 | | | | | | | | | | | Bentonite Seal |
| | | | | 64.71 | 22 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-202 | | 16.49 | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-202

SHEET 3 OF 3

LOCATION: N 5028386.4 ;E 366468.2

DRILLING DATE: May 25, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jcon | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | ROCK STRENGTH INDEX: R4 | ROCK STRENGTH INDEX: R3 | ROCK STRENGTH INDEX: R2 | ROCK STRENGTH INDEX: R1 | WEATHERING INDEX: W1 | WEATHERING INDEX: W2 | WEATHERING INDEX: W3 | WEATHERING INDEX: W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 64.71 | | | | | | | | | | | | | | | | | | | | | |
| 17 | Rotary Drill / NQ core | Slightly weathered to fresh, thickly to massive bedded, medium brownish grey, fine to coarse grained, faintly porous, strong LIMESTONE, with thin shale partings<br><br>- Broken core from 16.49 m to 16.58 m<br><br>- Broken core from 16.82 m to 16.85 m<br>- Broken core from 17.56 m to 17.59 m | | 16.49 | 1 | 100 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | 2 | 25 | | | | | | | | | | | | | | | | | | | |
| 19 | | - Broken/lost core from 19.25 m to 19.36 m | | | 3 | 25 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | 59.38 | 4 | 25 | | | | | | | | | | | | | | | | | | | |
| 22 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at 5.15 m (Elev. 76.04 m) on June 9, 2021 | | 21.82 | | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | | | | | | | |

Bentonite Seal

Silica Sand

32 mm Diam. PVC #10 Slot Screen

Silica Sand

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-203

SHEET 1 OF 2

LOCATION: N 5028375.5 ;E 366524.0

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.36 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>81.11 | 1 | SS | 31 | | | | |
| | | FILL - (SM) SILTY SAND; brown; non-cohesive, moist, compact | | 0.25<br>80.45 | | | | | | | |
| 1 | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains organic matter (WEATHERED CRUST); cohesive, w>PL, very stiff to stiff | | 0.91<br>1.07 | 2 | SS | 4 | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | | 3 | SS | 15 | | | | |
| 2 | | | | | 4 | SS | 20 | | | | |
| 3 | | | | | 5 | SS | 17 | | | | |
| 4 | | | | | 6 | SS | 15 | | | | |
| | | | | | 7 | SS | 15 | | | | |
| 5 | | | | 76.02 | | | | | | | ▽ |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | 5.34 | 8 | SS | 4 | | | | |
| 6 | | | | | 9 | SS | 12 | | | | |
| 7 | | | | | 10 | SS | 11 | | | | |
| 8 | | | | | 11 | SS | 42 | | | | |
| | | | | 72.98 | | | | | | | |
| | | (SW) SAND, fine to coarse, trace to some gravel; grey; non-cohesive, wet, loose to compact | | 8.38 | 12 | SS | 5 | | | | |
| 9 | | | | | 13 | SS | 10 | | | | |
| 10 | | | | | 14 | SS | 17 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-203

SHEET 2 OF 2

LOCATION: N 5028375.5 ;E 366524.0

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SW) SAND, fine to coarse, trace to some gravel; grey; non-cohesive, wet, loose to compact | | | 14 | SS | 17 | | | | |
| 11 | | | | | 15 | SS | 29 | | | | |
| | | | | 69.77 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders; non-cohesive, wet, very dense | | 11.59 | 16 | SS | 100 | | | | |
| 12 | | | | 69.16 | | | | | | | |
| | | (GW/SW) gravelly SAND to sandy GRAVEL, some silt; grey, contains cobbles and boulders; non-cohesive, wet, very dense | | 12.20 | 17 | SS | 74 | | | | |
| 13 | | | | | | | | | | | |
| | | | | 67.34 | | | | | | | |
| 14 | | (SM/ML) SILTY SAND to sandy SILT, trace to some gravel; grey; non-cohesive, wet, compact | | 14.02 | 18 | SS | 13 | | | | |
| 15 | | | | 66.12 | | | | | | | |
| | | (SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet, dense | | 15.24 | 19 | SS | 41 | | | | |
| | | | | 65.51 | | | | | | | |
| 16 | DCPT | Dynamic Cone Penetration Test (DCPT) | | 15.85 | | | | | 162 / 162 | | |
| | | | | 64.46 | | | | | | | |
| 17 | | End of Borehole<br>DCPT Refusal | | 16.90 | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-204

SHEET 1 OF 2

LOCATION: N 5028364.7 ;E 366570.7

BORING DATE: June 9, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.09 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL -(SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | | | 0.15 | 1 | SS | 5 | | | | Bentonite Seal |
| | | FILL - (SP) SAND, fine to medium, some silt; brown to dark brown, contains organic matter; non-cohesive, moist, loose | | 80.48 | | | | | | | |
| | | | | 0.61 | | | | | | | |
| 1 | | FILL - (SM) SILTY SAND, trace gravel; brown to dark brown, contains organic matter; non-cohesive, moist, loose | | | 2 | SS | 6 | | | | |
| | | | | 79.57 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 1.52 | 3 | SS | 6 | | | | |
| 2 | | | | | 4 | SS | 11 | | | | |
| 3 | | | | | 5 | SS | 19 | | | | Backfill |
| | | | | 77.28 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 3.81 | 6 | SS | 15 | | | | |
| 4 | | | | | | | | | | | |
| | | | | | 7 | SS | 25 | | | | |
| 5 | | | | | | | | | | | June 18, 2021<br>June 24, 2021 |
| | | | | | 8 | SS | >50 | | | | Bentonite Seal |
| 6 | | | | | | | | | | | Silica Sand |
| | | | | | 9 | SS | 18 | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 11 | | | | |
| | | | | | | | | | | | 50 mm Diam. PVC #10 Slot Screen |
| 8 | | | | | 11 | SS | 16 | | | | |
| | | | | | | | | | | | |
| | | | | | 12 | SS | 21 | | | | |
| 9 | | | | 71.94 | | | | | | | |
| | DCPT | (SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet, compact | | 9.15 | 13 | SS | 24 | | | | Cave |
| | | | | 71.33 | | | | | | | |
| | | Dynamic Cone Penetration Test (DCPT) | | 9.76 | | | | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-204

SHEET 2 OF 2

LOCATION: N 5028364.7 ;E 366570.7

BORING DATE: June 9, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | DCPT | Dynamic Cone Penetration Test (DCPT) | | | | | | | | | Cave |
| | | | | 70.21 | | | | | | | |
| 11 | | End of Borehole<br>DCPT Refusal | | 10.88 | | | | | 105 | | |
| | | Note(s):<br><br>1. Water level in screen measured at 5.21 m (Elev. 75.88 m) on June 24, 2021<br>2. Water level in screen measured at 5.16 m (Elev. 75.93 m) on June 18, 2021 | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-205

SHEET 1 OF 2

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.68 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | | | 81.38 | 1 | SS | 1 | | | | |
| | | FILL - (SM) SILTY SAND; dark brown to brown, contains organic matter; non-cohesive, moist, compact | | 0.30 | | | | | | | |
| 1 | | | | | 2 | SS | 10 | | | | |
| | | | | 80.46 | | | | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w<PL, very stiff | | 1.22 | | | | | | | |
| 2 | | | | | 3 | SS | 17 | | ○ | MH | |
| | | | | | 4 | SS | 12 | | | | |
| | | | | 78.94 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesve, moist to wet, compact | | 2.74 | | | | | | | |
| 3 | | | | | 5 | SS | 16 | | | | |
| | | | | | 6 | SS | 12 | | | | |
| 4 | | | | | | | | | | | |
| | | | | 76.80 | 7 | SS | 16 | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 4.88 | | | | | | | |
| 5 | | | | 76.34 | | | | | | | |
| | | (SW) gravelly SAND, fine to coarse; grey; non-cohesive, wet, wet, loose to compact | | 5.34 | 8 | SS | 8 | | | | |
| 6 | | | | | 9 | SS | 4 | | ○ | M | |
| 7 | | | | | 10 | SS | 4 | | | | |
| 8 | | | | | 11 | SS | 14 | | | | |
| | | | | | 12 | SS | 24 | | | | |
| 9 | | | | | 13 | SS | 17 | | | | |
| 10 | | | | | 14 | SS | 12 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-205

SHEET 2 OF 2

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SW) gravelly SAND, fine to coarse; grey; non-cohesive, wet, wet, loose to compact | | | 14 | SS | 12 | | | | |
| 11 | | | | | 15 | SS | 67 | | | | |
| 12 | | | | | 16 | SS | 4 | | ○ | M | |
| | | | | 69.18 | 17 | SS | 62 | | | | |
| | | (SW) gravelly SAND, fine to coarse, some silt; grey non-cohesive; wet, very dense | | 12.50 | | | | | | | |
| 13 | | | | | 18 | SS | 51 | | | | |
| | | | | 67.96 | | | | | | | |
| | Rotary Drill NW Casing | (SM/GM) SILTY sandy GRAVEL to SILTY gravelly SAND; grey; non-cohesive, wet, very dense | | 13.72 | 19 | SS | 79 | | | | |
| 14 | | | | 67.05 | | | | | | | |
| | | | | 14.63 | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-205A

SHEET 1 OF 2

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.68 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | For soil stratigraphy refer to record of borehole 21-205 | | 0.00 | | | | | | | |
| 1 | | | | 80.16 | | | | | | | |
| | DCPT | Dynamic Cone Penetration Test (DCPT) | | 1.52 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-205A

SHEET 2 OF 2

LOCATION: N 5028354.6 ;E 366633.4

BORING DATE: June 8, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | DCPT | Dynamic Cone Penetration Test (DCPT) | | | | | | 114 | | | |
| | | | | 71.09 | | | | | | | |
| | | End of Borehole<br>DCPT Refusal | | 10.59 | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-206

SHEET 1 OF 2

LOCATION: N 5028404.8 ;E 366638.6

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 77.09 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter; non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | FILL -(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders; non-cohesive, moist, compact to very dense | | 0.15 | 1 | SS | 9 | | | | |
| 1 | | | | | 2 | SS | >50 | | | | |
| | | | | 75.57 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 1.52 | 3 | SS | 7 | | | | |
| 2 | | | | | 4 | SS | 8 | | | | |
| 3 | | | | | 5 | SS | 10 | | | | |
| 4 | | | | | 6 | SS | 13 | | | | |
| | | | | | 7 | SS | 9 | | | | |
| 5 | | | | 71.75 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 5.34 | 8 | SS | 10 | | | | |
| 6 | | | | | 9 | SS | 13 | | | | |
| 7 | | | | | 10 | SS | 13 | | | | |
| | | | | 69.47 | | | | | | | |
| | | (SP/SM) gravelly SAND to SILTY SAND, some gravel; grey; non-cohesive, moist to wet, loose to very dense | | 7.62 | 11 | SS | 23 | | | | |
| 8 | | | | | 12 | SS | 16 | | | | |
| 9 | | | | | 13 | SS | 3 | | | | |
| 10 | | | | | 14 | SS | 7 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: BW

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-206

SHEET 2 OF 2

LOCATION: N 5028404.8 ;E 366638.6

BORING DATE: May 19, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SP/SM) gravelly SAND to SILTY SAND, some gravel; grey; non-cohesive, moist to wet, loose to very dense | | | 14 | SS | 7 | | | | |
| 11 | | | | | 15 | SS | 10 | | | | |
| 12 | | | | 65.00 | 16 | SS | >50 | | | | |
| | | End of Borehole<br>Auger Refusal | | 12.09 | | | | | | | |
| 13 | | Note(s):<br><br>1. Methane gas noted at a depth of 9.90 mbgs | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-207

SHEET 1 OF 3

LOCATION: N 5028410.7 ;E 366583.4

BORING DATE: June 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) SHEAR STRENGTH Cu, kPa nat V. + Q - rem V. ⊕ U - | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) WATER CONTENT PERCENT Wp W Wl (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | 80.26 | | | | | | | |
| 0 | Rotary Drill/ Wash Boring NW Casing | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | 0.00<br>80.03<br>0.23 | 1 | SS | 1 | | | | Bentonite Seal |
| | | FILL - (SM) gravelly SILTY SAND, angular; grey; non-cohesive, moist, very loose | 0.38<br>79.50 | | | | | | | |
| 1 | | FILL - (SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, very loose | 0.76 | 2 | SS | 5 | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace siltl; grey brown, highly fissured (WEATHERED CRUST); cohesive, w~PL to w>PL, very stiff | | 3 | SS | 7 | | | | |
| 2 | | | | 4 | SS | 6 | | | | |
| | | | 77.52 | | | | | | | |
| | | (SM) gravelly SILTY SAND; brown to grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose | 2.74 | 5 | SS | 9 | | | | |
| 3 | | | | | | | | | | |
| | | | 76.45 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | 3.81 | 6 | SS | 5 | | | | |
| 4 | | | | 7 | SS | 5 | | | | |
| | | | 74.92 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | 5.34 | 8 | SS | 9 | | | | 64 mm Diam. VSP Pipe |
| 5 | | | | 9 | SS | 7 | | | | |
| 6 | | | | 10 | SS | 11 | | | | |
| 7 | | | | 11 | SS | 10 | | | | |
| 8 | | | | 12 | SS | 13 | | | | |
| 9 | | | | 13 | SS | 15 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-207

SHEET 2 OF 3

LOCATION: N 5028410.7 ;E 366583.4

BORING DATE: June 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Rotary Drill/ Wash Boring NW Casing | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 69.59 | | | | | | | |
| 11 | | (SW) gravelly SAND, trace to some silt; grey, contains cobbles and boulders; non-cohesive, wet, loose to very dense | | 10.67 | 14 | SS | 4 | | | | 64 mm Diam. VSP Pipe |
| | | | | | 15 | RC | - | | | | |
| 12 | | | | 68.09 | 16 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-207 | | 12.17 | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-207

SHEET 3 OF 3

LOCATION: N 5028410.7 ;E 366583.4

DRILLING DATE: June 4, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATH-ERING INDEX: W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 68.09 | | | | | | | | | | | | | | | | | | | | | |
| 13 | Rotary Drill / HQ Core | Fresh, thinly to medium bedded, medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, strong SHALEY NODULAR LIMESTONE<br>- Broken/lost core from 12.17 m to 12.34 m | | 12.17 | 1 | 100 | | | | | | | | | | | | | | | | | | | 64 mm Diam. VSP Pipe |
| 14 | | | | | 2 | 100 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | 3 | 100 | | | | | | | | | | | | | | | | | | | UCS = 74 MPa |
| 16 | | | | | 4 | 100 | | | | | | | | | | | | | | | | | | | |
| 17 | | - Mud seam from 16.66 m to 16.69 m | | | | | | | | | | | | | | | | | | | | | | | 64 mm Diam. VSP Pipe |
| 18 | | - Heavy fossilferous/bioturbated from 17.60 m to 21.61 m | | | 5 | 100 | | | | | | | | | | | | | | | | | | | |
| 19 | | - Heavy calcite veining from 18.40 m to 21.61 m | | | 6 | 100 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | - Broken core from 20.54 m to 20.59 m | | | 7 | 100 | | | | | | | | | | | | | | | | | | | |
| | | | | 58.65 | | | | | | | | | | | | | | | | | | | | | |
| 22 | | End of Drillhole<br>Note(s):<br>1. Water level in screen measured at 3.32 m (Elev. 76.94 m) on June 9, 2021 | | 21.61 | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-208

SHEET 1 OF 2

LOCATION: N 5028416.5 ;E 366534.7

BORING DATE: June 1, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.77 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>80.52 | | | | | | | |
| | | FILL - (SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, loose | | 0.25<br>79.86 | 1 | SS | 6 | | | | |
| 1 | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains thin lamination of silty sand and very thin beds of gravelly silty sand (WEATHERED CRUST); cohesive, w~PL to w>PL, very stiff | | 0.91 | 2 | SS | 9 | | | | |
| | | | | | 3 | SS | 13 | | | | |
| 2 | | | | | 4 | SS | 8 | | | | |
| 3 | | | | 77.57 | | | | | | | |
| | | (SM/ML) SILTY SAND to sandy SILT, some gravel, some low plasticity fines; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 3.20 | 5 | SS | 8 | | | MH | |
| 4 | | | | 76.65 | 6 | SS | 13 | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to loose | | 4.12 | 7 | SS | 7 | | | | |
| 5 | | | | 75.43 | | | | | | | |
| | | (SM) SILTY SAND, some gravel to gravelly, some low plasticity fines; grey, contains thin beds of gravelly sand, very thin beds of silty sand, cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | 5.34 | 8 | SS | 7 | | | | |
| 6 | | | | | 9 | SS | 8 | | | MH | |
| 7 | | | | | 10 | SS | 9 | | | | |
| 8 | | | | | 11 | SS | 21 | | | | |
| | | | | | 12 | SS | 9 | | | | |
| 9 | | | | | 13 | SS | 9 | | | | |
| 10 | | | | | 14 | SS | 24 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-208

SHEET 2 OF 2

LOCATION: N 5028416.5 ;E 366534.7

BORING DATE: June 1, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM) SILTY SAND, some gravel to gravelly, some low plasticity fines; grey, contains thin beds of gravelly sand, very thin beds of silty sand, cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | | 14 | SS | 24 | | | | |
| 11 | | | | | 15 | SS | 41 | | | | |
| | | | | 69.49 | | | | | | | |
| | | (SW) gravelly SAND, fine to coarse, trace to some silt; grey; non-cohesive, wet, compact | | 11.28 | | | | | | | |
| 12 | | | | | 16 | SS | 29 | | ○ | | |
| | | | | | 17 | SS | 19 | | | | |
| | | | | 67.97 | | | | | | | |
| 13 | DCPT | Dynamic Cone Penetration Test (DCPT) | | 12.80 | | | | | 114 | | |
| 14 | | | | 66.44 | | | | | | | |
| | | End of Borehole DCPT Refusal | | 14.33 | | | | | 105 | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-209

SHEET 1 OF 2

LOCATION: N 5028422.9 ;E 366480.2

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 81.03 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact | | 0.00 | 1 | SS | 14 | | | | |
| | | | | 80.57 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, some clay; dark brown to grey brown, contains clay layers and organic matter (rootlets); non-cohesive, moist, compact to loose | | 0.46 | | | | | | | |
| 1 | | | | | 2 | SS | 13 | | | | |
| | | | | | 3 | SS | 5 | | | | |
| 2 | | | | 78.90 | | | | | | | |
| | | FILL - (CL/CI) SILTY CLAY, soem sand, trace gravel; grey brown, contains roganic matter; cohesive, w>PL, soft to firm | | 2.13 | 4 | SS | 2 | | | | |
| 3 | | | | | 5 | SS | 4 | | | | |
| | | | | 77.37 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; grey brown, contains clay layers and nodules; non-cohesive, wet, very loose | | 3.66 | 6 | SS | 3 | | | | |
| 4 | | | | 76.46 | | | | | | | |
| | | FILL - (CL/CI) SILTY CLAY, trace sand; grey brown, highly fissured; cohesive, w>PL, soft to firm | | 4.57 | 7 | SS | 4 | | | | |
| 5 | | | | 75.92 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose | | 5.11 | | | | | | | |
| | | | | 75.69 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | 5.34 | 8 | SS | 7 | | | | |
| 6 | | | | | 9 | SS | 4 | | | | |
| 7 | | | | | 10 | SS | 5 | | | | |
| 8 | | | | | 11 | SS | 11 | | | | |
| | | | | | 12 | SS | 11 | | | | |
| 9 | | | | | 13 | SS | 13 | | | | |
| | | | | 71.27 | | | | | | | |
| | DCPT | Dynamic Cone Penetration Test (DCPT) | | 9.76 | | | | | | | |
| 10 | | | | | | | | | | | |

*CONTINUED NEXT PAGE*

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-209

SHEET 2 OF 2

LOCATION: N 5028422.9 ;E 366480.2

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) | WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | | | |
| | DCPT | Dynamic Cone Penetration Test (DCPT) | | 70.15 | | | | | | | | | |
| 11 | | End of Borehole<br>DCPT Refusal | | 10.88 | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-210

SHEET 1 OF 1

LOCATION: N 5028466.5 ;E 366489.7

BORING DATE: June 2, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.23 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, loose | | 0.00<br>80.00 | | | | | | | |
| | | FILL -(SM) SILTY SAND, trace gravel, some clay; dark brown, contains organic matter and silty clay layers; non-cohesive, moist, compact | | 0.23<br>79.62 | 1 | SS | 10 | | | | |
| | | FILL - (CI/CH) SILTY CLAY to CLAY, trace to some sand, trace gravel; grey brown, highly fissured, contains silty sand pockets/nodules/layers and organic matter; cohesive, w~PL, firm to stiff | | 0.61 | 2 | SS | 9 | | | | |
| 1 | | | | | | | | | | | |
| | | | | | 3 | SS | 4 | | ○ | | |
| 2 | | | | | | | | | | | |
| | | | | 77.79 | | | | | | | |
| | | FILL - (SW) SAND, fine to coarse, trace gravel; brown, contains organic matter (wood/rootlets); non-cohesive, moist, loose | | 2.44 | 4 | SS | 5 | | ○ | | |
| 3 | | | | 77.18 | | | | | | | |
| | | (ML/SM) sandy SILT to SILTY SAND, some gravel to gravelly, some low plastic fines; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 3.05 | 5 | SS | 8 | | ⊕ | | MH |
| 4 | | | | | 6 | SS | 12 | | | | |
| | | | | | 7 | SS | 25 | | ○ | | |
| 5 | | | | 74.89 | | | | | | | |
| | | (SM) SILTY SAND, some gravel to gravelly; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to dense | | 5.34 | 8 | SS | 21 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 27 | | ○ | | MH |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 23 | | | | |
| 8 | | | | | 11 | SS | 13 | | | | |
| | | | | | 12 | SS | 46 | | | | |
| 9 | | | | 71.08 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 9.15 | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-211

SHEET 1 OF 2

LOCATION: N 5028465.6 ;E 366539.9

BORING DATE: May 20, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 79.60 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) SILTY SAND to sandy SILT, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00 | 1 | SS | 10 | | | | |
| | | | | 0.15 | | | | | | | |
| | | FILL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter; non-cohesive, moist, compact | | 0.30 | | | | | | | |
| 1 | | FILL - (CL/CI) sandy SILTY CLAY, trace gravel; grey brown to grey, contains organic matter; cohesive, w~PL to w>PL, stiff | | | 2 | SS | 5 | | | | |
| | | | | | 3 | SS | 3 | | | | |
| 2 | | | | 77.31 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, trace to some clay; grey brown, contains organic matter; non-cohesive, moist to wet, very loose | | 2.29 | 4 | SS | 2 | | | | |
| | | | | 76.86 | | | | | | | |
| | | FILL - (SW) SAND, fine to coarse, trace gravel; brown, contains silty clay to clayey silt lens; non-cohesive, mosit, very loose | | 2.74 | | | | | | | |
| 3 | | | | | 5 | SS | 3 | | | | |
| 4 | | | | | 6 | SS | 2 | | | | |
| | | | | | 7 | SS | 2 | | | | |
| 5 | | | | 74.26 | | | | | | | |
| | | (SM) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to dense | | 5.34 | 8 | SS | 3 | | | | |
| 6 | | | | | 9 | SS | 4 | | | | |
| 7 | | | | | 10 | SS | 10 | | | | |
| | | | | | 11 | SS | 12 | | | | |
| 8 | | | | | 12 | SS | 3 | | | | |
| 9 | | | | | 13 | SS | 11 | | | | |
| 10 | | | | | 14 | SS | 41 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-211

SHEET 2 OF 2

LOCATION: N 5028465.6 ;E 366539.9

BORING DATE: May 20, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger | (SM) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, very loose to dense | | | 14 | SS | 41 | | | | |
| | | | | 68.83 | 15 | SS | >50 | | | | |
| | | End of Borehole<br>Auger Refusal | | 10.77 | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-212

SHEET 1 OF 2

LOCATION: N 5028459.5 ;E 366591.9

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 79.89 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00 | 1 | SS | 7 | | | | |
| | | | | 79.59 | | | | | | | |
| | | FILL - (SP) SAND, fine to medium, trace silt; brown to dark brown, contains organic matter; non-cohesive, moist, loose | | 0.30 | | | | | | | |
| | | | | 79.13 | | | | | | | |
| 1 | | (CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w>PL, very stiff | | 0.76 | 2 | SS | 12 | | | | |
| 2 | | | | | 3 | SS | 17 | | | | |
| | | | | | 4 | SS | 13 | | | MH | |
| 3 | | | | | 5 | SS | 8 | | | | |
| | | | | 76.38 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist, compact | | 3.51 | | | | | | | |
| 4 | | | | | 6 | SS | 12 | | | | |
| | | | | | 7 | SS | 13 | | | | |
| 5 | | | | | | | | | | | |
| | | | | 74.55 | | | | | | | |
| | | (SM) SILTY SAND, some gravel to gravell; contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 5.34 | 8 | SS | 6 | | | | |
| 6 | | | | | 9 | SS | 6 | | | | |
| 7 | | | | | 10 | SS | 5 | | | MH | |
| | | | | | 11 | SS | 12 | | | | |
| 8 | | | | | 12 | SS | 15 | | | | |
| 9 | | | | | 13 | SS | 11 | | | | |
| | | | | 70.13 | | | | | | | |
| 10 | DCPT | Dynamic Cone Penetration Test (DCPT) | | 9.76 | | | | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-212

SHEET 2 OF 2

LOCATION: N 5028459.5 ;E 366591.9

BORING DATE: June 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | DCPT | Dynamic Cone Penetration Test (DCPT) | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | 66.70 | | | | | | | |
| | | End of Borehole<br>DCPT Refusal | | 13.19 | | | | | | | |
| | | Note(s):<br>1. Water level in open hole at 7.47 m upon completion of drilling | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: 20, 40, 60, 80

HYDRAULIC CONDUCTIVITY, k, cm/s: $10^{-6}$, $10^{-5}$, $10^{-4}$, $10^{-3}$

WATER CONTENT PERCENT: 20, 40, 60, 80

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-213

SHEET 1 OF 3

LOCATION: N 5028443.0 ;E 366650.3

BORING DATE: May 31, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 76.11 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact | | 0.00<br>75.91<br>0.20 | 1 | SS | 20 | | | | Bentonite Seal |
| | | FILL - (SM) gravelly SILTY SAND; dark brown, contains concrete and organic matter; non-cohesive, moist, compact | | 75.20 | | | | | | | June 9, 2021 |
| 1 | | FILL - (SM/GM) SILTY gravelly SAND to SILTY sandy GRAVEL, angular; dark brown to grey brown; non-cohesive, moist, dense | | 0.91<br>74.59 | 2 | SS | 33 | | ○ | M | |
| | | FILL - (SM) gravelly SILTY SAND, trace to some clay; brown to grey brown, contains silty clay layers and organic matter (rootlets/wood); non-cohesive, moist to wet, very loose to compact | | 1.52 | 3 | SS | 6 | | | | |
| 2 | | | | | 4 | SS | 10 | | | | Backfill |
| 3 | | | | | 5 | SS | 4 | | | | |
| | | FILL - (SW) gravelly SAND, fine to coarse; brown; non-cohesive, wet, very loose | | 72.30<br>3.81 | 6 | SS | 1 | | | | |
| 4 | | | | | 7 | SS | 1 | | | | Bentonite Seal |
| 5 | | | | 70.77 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, possible sand layer from 8.38 m to 8.99 m, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 5.34 | 8 | SS | 10 | | | | |
| 6 | | | | | 9 | SS | 10 | | | | |
| 7 | | | | | 10 | SS | 20 | | | | Native Sand and Gravel |
| 8 | | | | | 11 | SS | 24 | | | | |
| | | | | | 12 | SS | 13 | | | | |
| 9 | | | | | 13 | SS | 40 | | | | |
| 10 | | | | | 14 | SS | >50 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-213

SHEET 2 OF 3

LOCATION: N 5028443.0 ;E 366650.3

BORING DATE: May 31, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND; grey, possible sand layer from 8.38 m to 8.99 m, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 65.44 | | | | | | | |
| 11 | | (SW) gravelly SAND, fine to coarse, some silt; grey; non-cohesive, wet, dense to very loose | | 10.67 | 15 | SS | 40 | | | | 50 mm Diam. PVC #10 Slot Screen |
| | | | | 64.52 | | | | | | | |
| 12 | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | 11.59 | 16 | SS | 4 | | | | |
| | | | | 63.91 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-213<br><br>Note(s):<br><br>1. Methane gas noted at a depth of 11.59 mbgs | | 12.2 | | | | | | | |

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RI

CHECKED: CH

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-213

SHEET 3 OF 3

LOCATION: N 5028443.0 ;E 366650.3

DRILLING DATE: May 31, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate; BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage; PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular; PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break; BR - Broken Rock

**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATH-ERING INDEX: W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.91 | | | | | | | | | | | | | | | | | | | | | |
| 13 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, very strong SHALEY LIMESTONE<br><br>- Broken core from 12.38 m to 12.40 m | | 12.20 | 1 | 100 | | | | | | | | | | | | | | | | | | | Silica Sand |
| 14 | | | | | 2 | 100-0 | | | | | | | | | | | | | | | | | | | UCS = 157 MPa<br><br>Bentonite Seal |
| 15 | | | | | 3 | 100 | | | | | | | | | | | | | | | | | | | |
| | | | | 60.31 | | | | | | | | | | | | | | | | | | | | | |
| 16 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at 0.71 m (Elev. 75.40 m) on June 9, 2021 | | 15.80 | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-214

SHEET 1 OF 2

LOCATION: N 5028490.1 ;E 366670.1

BORING DATE: May 22, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.83 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, very loose | | 0.00<br>0.15 | 1 | SS | 21 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; dark brown, contains concrete fragments, silty clay layers, organic matter and asphalt fragments; non-cohesive, mosit, compact to very dense | | | 2 | SS | >50 | | | | |
| 1 | | | | | | | | | | | |
| | | | | 74.00 | 3 | SS | 18 | | | | |
| | | FILL -(SW) SAND, fine to coarse, some gravel, some silt; brown, contains silty sand layers and silty clay layers; non-cohesive, mosit to wet, compact to very loose | | 1.83 | | | | | | | |
| 2 | | | | | 4 | SS | 7 | | | | |
| 3 | | | | | 5 | SS | 2 | | | | |
| | | | | 72.02 | | | | | | | |
| | | FILL - (CL/CI) sandy SILTY CLAY: grey brown, contains silty sand layers; cohesive, w>PL, soft to firm | | 3.81 | 6 | SS | 4 | | | | |
| 4 | | | | 71.26 | | | | | | | |
| | | FILL - (SM) CLAYEY SILTY SAND, some gravel; dark grey brown, with black staining, contains organic matter; non-cohesive, wet, very loose | | 4.57 | 7 | SS | 2 | | | | |
| 5 | | | | 70.46 | | | | | | | |
| | | FILL - (SW) SAND, fine to coarse, some gravel, trace to some silt; brown, silty clay layers; non-cohesive, wet, dense | | 5.37<br>70.04 | 8 | SS | 49 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; grey, with black staining and oxidation staining, contains silty clay layers, possible organic matter; non-cohesive, wet, loose to very loose | | 5.79 | 9 | SS | >50 | | | | |
| 6 | | | | | 10 | SS | 5 | | | | |
| | | | | 68.97 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact | | 6.86 | 11 | SS | 10 | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 12 | SS | 14 | | | | |
| 8 | | | | 67.55 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-214 | | 8.28 | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-214

SHEET 2 OF 2

LOCATION: N 5028490.1 ;E 366670.1

DRILLING DATE: May 22, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 67.55 | | | | | | | | | | | | | | | | | | | | | |
| 9 | Rotary Drill / NQ Core | Fresh to slightly weathered, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, strong SHALEY LIMESTONE<br>- Broken core from 8.51 m to 8.58 m<br>- Broken/lost core from 9.08 m to 9.16 m | | 8.28 | 1 | 100 | | | | | | | | | | | | | | | | | | | |
| 10 | | - Broken/lost core from 9.25 m to 9.35 m | | | 2 | 100 | | | | | | | | | | | | | | | | | | | |
| 11 | | - Broken/lost core from 10.57 m to 10.77 m | | | 3 | 100 | | | | | | | | | | | | | | | | | | | UCS = 59 MPa |
| 12 | | - Broken core from 12.16 m to 12.27 m | | 63.56 | | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 12.27 | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-215

SHEET 1 OF 1

LOCATION: N 5028548.6 ;E 366698.7

BORING DATE: May 28, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 72.79 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | | | 72.41 | 1 | SS | 6 | | | | Bentonite Seal |
| | | FILL - (SM) SILTY SAND, fine to medium; brown, contains organic matter (rootlets); non-cohesive, moist, loose to compact | | 0.38 | | | | | | | |
| 1 | | | | | 2 | SS | 10 | | | | |
| | | | | 71.57 | | | | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace sand; grey brown, highly fissured, contains thin to thick laminations of silty sand (WEATHERED CRUST); cohesive, w>PL, very stiff | | 1.22 | | | | | | | |
| | | | | | 3 | SS | 8 | | | | Backfill |
| 2 | | | | 70.73 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose | | 2.06 | | | | | | | |
| | | | | | 4 | SS | 8 | | | | June 9, 2021 |
| 3 | | | | | 5 | SS | 8 | | | | Bentonite Seal |
| | | | | | | | | | | | Silica Sand |
| 4 | | | | | 6 | SS | 9 | | | | |
| | | | | 68.22 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TIL); non-cohesive, wet, loose to very dense | | 4.57 | | | | | | | |
| 5 | | | | | 7 | SS | 6 | | | | |
| | | | | | 8 | SS | 7 | | | | 50 mm Diam. PVC #10 Slot Screen |
| 6 | | | | | 9 | SS | 9 | | | | |
| | | | | | 10 | SS | >50 | | | | |
| 7 | | | | 65.73 | | | | | | | |
| | | End of Borehole<br>Auger Refusal | | 7.06 | | | | | | | |
| 8 | | Note(s):<br><br>1. Water level in screen measured at 2.39 m (Elev. 70.40 m) on June 9, 2021 | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-216

SHEET 1 OF 3

LOCATION: N 5028587.2 ;E 366636.0

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 74.34 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM/ML) mixture of SILTY SAND and SILTY CLAY; dark brown; non-cohesive, loose | | 0.00 | | | | | | | |
| | | FILL - (CL/CI) SILTY CLAY, trace gravel; grey brown; cohesive, w~PL, very stiff | | 0.15 | 1 | SS | 7 | | | | |
| 1 | | | | | 2 | SS | 7 | | | | |
| | | | | | 3 | SS | 6 | | | | |
| 2 | | | | 72.05 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, fine to medium brown, contains clay seams; non-cohesive, moist, compact | | 2.29 | 4 | SS | 16 | | | | |
| 3 | | | | | 5 | SS | 12 | | | | |
| | | | | 70.68 | | | | | | | |
| | | (SM/ML) SILTY SAND to sandy SILT, some gravel; grey brown to grey (GLACIAL TILL); moist to wet, loose to very dense | | 3.66 | 6 | SS | 12 | | | MH | |
| 4 | | | | | | | | | | | |
| | | | | | 7 | SS | 10 | | | M | |
| 5 | | | | | | | | | | | |
| | | | | | 8 | SS | 8 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 4 | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 6 | | | | |
| | | | | | | | | | | | |
| 8 | | | | | 11 | SS | 4 | | | | |
| | | | | | | | | | | | |
| | | | | | 12 | SS | 4 | | | | |
| 9 | | | | | | | | | | | |
| | | | | | 13 | SS | 6 | | | M | |
| | | | | | | | | | | | |
| 10 | | | | | 14 | SS | 4 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI/BW
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-216

SHEET 2 OF 3

LOCATION: N 5028587.2 ;E 366636.0

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger | (SM/ML) SILTY SAND to sandy SILT, some gravel; grey brown to grey (GLACIAL TILL); moist to wet, loose to very dense | | | 14 | SS | 4 | | | | |
| | | | | | | | | | | | |
| 11 | | | | | 15 | SS | >50 | | | | |
| | | | | 63.21 | | | | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-216 | | 11.13 | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI/BW

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-216

SHEET 3 OF 3

LOCATION: N 5028587.2 ;E 366636.0

DRILLING DATE: May 5, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 63.21 | | | | | | | | | | | | | | | | | | | | |
| 12 | Rotary Drill / NQ Core | Fresh, thinly to medium bedded, medium to brownish grey, fine to medium grained, non-porous, strong SHALEY LIMESTONE<br>- Broken core from 11.23 m to 11.25 m<br>- Broken core from 11.5 m to 11.51 m | | 11.13 | 1 | 100 | | | | | | | | | | | | | | | | | | |
| 13 | | - Broken/lost core from 12.13 m to 12.37 m<br>- Broken core from 12.54 m to 12.55 m | | | 2 | 100 | | | | | | | | | | | | | | | | | | |
| 14 | | - Broken core from 13.14 m to 13.15 m<br>- Mud seam from 14.03 m to 14.06 m<br>- Mud seam from 14.28 m to 14.3 m<br>- Mud seam from 14.41 m to 14.45 m<br>- Mud seam from 14.55 m to 14.58 m | | | 3 | 100 | | | | | | | | | | | | | | | | | | |
| 15 | | | | 59.10 | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 15.24 | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI/BW
CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-217

SHEET 1 OF 1

LOCATION: N 5028539.7 ;E 366660.8

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.19 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains rootlets; moist | | 0.00<br>74.98 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; grey brown, contains clay seams; non-cohesive, moist, loose to dense | | 0.21 | 1 | SS | 7 | | | | |
| 1 | | | | | 2 | SS | 7 | | ○ | | |
| | | | | | 3 | SS | 39 | | | | |
| 2 | | | | 72.90 | | | | | | | |
| | | FILL - (CI/CH) SILTY CLAY; grey brown; cohesive, w>PL, very stiff | | 2.29 | 4 | SS | 14 | | ○ | MH | |
| 3 | | | | 72.14 | | | | | | | |
| | | (SM) gravelly silty sand, grey brown to grey contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | 3.05 | 5 | SS | 19 | | | | |
| 4 | | | | | 6 | SS | 27 | | ○ | | |
| | | | | | 7 | SS | 8 | | | | |
| 5 | | | | | 8 | SS | 8 | | | | |
| 6 | | | | | 9 | SS | 6 | | ○ | | |
| 7 | | | | | 10 | SS | 7 | | ○ | MH | |
| | | | | | 11 | SS | 12 | | | | |
| 8 | | | | | 12 | SS | >50 | | ○ | | |
| | | | | 66.35 | | | | | | | |
| 9 | | End of Borehole<br>Auger Refusal | | 8.84 | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED:

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-217

SHEET 1 OF 1

LOCATION: N 5028539.7 ;E 366660.8

BORING DATE: May 5, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.19 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown, contains rootlets; moist | | 0.00<br>74.98 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND; grey brown, contains clay seams; non-cohesive, moist, loose to dense | | 0.21 | 1 | SS | 7 | | | | |
| 1 | | | | | 2 | SS | 7 | | ○ | | |
| | | | | | 3 | SS | 39 | | | | |
| 2 | | | | 72.90 | | | | | | | |
| | | FILL - (CI/CH) SILTY CLAY; grey brown; cohesive, w>PL, very stiff | | 2.29 | 4 | SS | 14 | | ○ | MH | |
| 3 | | | | 72.14 | | | | | | | |
| | | (SM) gravelly silty sand, grey brown to grey contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | 3.05 | 5 | SS | 19 | | | | |
| 4 | | | | | 6 | SS | 27 | | ○ | | |
| | | | | | 7 | SS | 8 | | | | |
| 5 | | | | | 8 | SS | 8 | | | | |
| 6 | | | | | 9 | SS | 6 | | ○ | | |
| | | | | | 10 | SS | 7 | | ○ | MH | |
| 7 | | | | | | | | | | | |
| | | | | | 11 | SS | 12 | | | | |
| 8 | | | | | 12 | SS | >50 | | ○ | | |
| | | | | 66.35 | | | | | | | |
| 9 | | End of Borehole<br>Auger Refusal | | 8.84 | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED:

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-218

SHEET 1 OF 2

LOCATION: N 5028493.7 ;E 366635.3

BORING DATE: May 7, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 78.54 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic matter (rootlets); moist | | 0.00 | | | | | | | |
| | | FILL - (CL/CI) SILTY CLAY, trace gravel; grey brown, contains organic matter (rootlets); cohesive, w~PL, hard | | 0.15<br>77.78 | 1 | SS | 46 | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND, fine to coarse; grey to brown, contains brick particles and concrete; non-cohesive, dry to moist, compact to very dense | | 0.76 | 2 | SS | 30 | | | | |
| | | | | | 3 | SS | 23 | | | | Bentonite Seal |
| 2 | | | | | 4 | SS | 74 | | | | |
| 3 | | | | | 5 | SS | 29 | | | | Backfill |
| 4 | | | | | 6 | SS | 19 | | | | |
| 5 | | | | | 7 | SS | 22 | | | | Bentonite Seal |
| | | (SW) SAND, fine to coarse, trace gravel; brown; non-cohesive, moist, very loose | | 73.21<br>5.33 | 8 | SS | 2 | | | | May 28, 2021<br>June 9, 2021 |
| 6 | | | | | 9 | SS | 3 | | | | Silica Sand |
| | | (ML/SM) Sandy SILT to SILTY SAND, some low-med plasticity fines; brown, contains clay seams; non-cohesive, moist, loose | | 71.99<br>6.55 | | | | | | | |
| 7 | | | | | 10 | SS | 4 | | | MH | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | 71.22<br>7.32 | | | | | | | |
| 8 | | | | | 11 | SS | 9 | | | | 50 mm Diam. PVC #10 Slot Screen |
| 9 | | | | | 12 | SS | 10 | | | | |
| | | | | | 13 | SS | 23 | | | | Silica Sand |
| 10 | | | | | 14 | SS | 7 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-218

SHEET 2 OF 2

LOCATION: N 5028493.7 ;E 366635.3

BORING DATE: May 7, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to compact | | | 14 | SS | 7 | | | | |
| 11 | | | | | 15 | SS | 4 | | ○ | M | |
| 12 | | | | | 16 | SS | 5 | | | | Bentonite Seal |
| 13 | | | | | 17 | SS | 9 | | | | |
| | | | | | 18 | SS | 11 | | | | |
| | | | | 64.95 | | | | | | | |
| 14 | | End of Borehole<br>Auger Refusal<br><br>Note(s):<br><br>1. Water level in screen measured at 6.02 m (Elev. 72.52 m) on June 9, 2021<br><br>2. Water level in screen measured at 5.83 m (Elev. 72.71 m) on May 28, 2021 | | 13.59 | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-219

SHEET 1 OF 3

LOCATION: N 5028505.1 ;E 366485.3

BORING DATE: May 6, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 79.40 | | | | | | | |
| 0 | Power Auger / 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, some gravel; dark brown, contains organic matter (rootlets); moist, loose | | 0.00 | | | | | | | |
| | | | | 0.15 | 1 | SS | 7 | | | | Bentonite Seal |
| 1 | | FILL - (SM) SILTY SAND, trace gravel; brown; non-cohesive, moist, loose | | | 2 | SS | 7 | | | | |
| | | | | 77.88 | | | | | | | Silica Sand |
| | | FILL - (CI/CH) SILTY CLAY, trace sand; grey brown, fissured; cohesive, w~PL, stiff to very stiff | | 1.52 | 3 | SS | 7 | | | | |
| 2 | | | | | 4 | SS | 8 | | | | |
| | | | | | | | | | | | May 28, 2021 |
| 3 | | | | | 5 | SS | 16 | | | | June 9, 2021 |
| | | | | | | | | | | | 38 mm Diam. PVC #10 Slot Screen |
| | | | | 75.59 | | | | | | | |
| | | (SW) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | 3.81 | 6 | SS | 42 | | | | |
| 4 | | | | | | | | | | | |
| | | | | | 7 | SS | 5 | | | | |
| 5 | | | | | | | | | | | Silica Sand |
| | | | | | 8 | SS | 8 | | | | |
| 6 | | | | | | | | | | | |
| | | | | | 9 | SS | 7 | | | | |
| 7 | | | | | | | | | | | |
| | | | | | 10 | SS | 12 | | | | |
| | | | | | | | | | | | |
| 8 | | | | | 11 | SS | 12 | | | | Bentonite Seal |
| | | | | | | | | | | | |
| | | | | | 12 | SS | 34 | | | | |
| 9 | | | | | | | | | | | |
| | | | | | 13 | SS | 12 | | | | |
| | | | | | | | | | | | |
| 10 | | | | | 14 | SS | 18 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI/BW

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-219

SHEET 2 OF 3

LOCATION: N 5028505.1 ;E 366485.3

BORING DATE: May 6, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Rotary Drill / HW Casing | (SW) gravelly SILTY SAND; grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, loose to very dense | | | 14 | SS | 18 | | | | |
| | | | | | 15 | SS | >50 | | | | |
| | | | | 68.56 | | | | | | | |
| 11 | | Borehole continued on RECORD OF DRILLHOLE 21-219 | | 10.84 | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RI/BW

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-219

SHEET 3 OF 3

LOCATION: N 5028505.1 ;E 366485.3

DRILLING DATE: May 6, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 68.56 | | | | | | | | | | | | | | | | | | | | | |
| 11 | Rotary Drill / NQ Core | Fresh to slightly weathered, thickly to massive bedded, medium brownish grey, fine to coarse grained, faintly porous, strong LIMESTONE, with thin partings of shale<br>- vertical joint from 11.11 to 11.27 m<br>- broken core from 11.31 to 11.32 m<br>- vertical joint from 11.45 to 11.59 m<br>- broken core from 11.54 to 11.59 m<br>- lost core from 11.59 to 11.64 m | | 10.84 | 1 | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | 2 | | | | | | | | | | | | | | | | | | | | UCS = 62 MPa |
| | | - vertical bedding from 12.35 to 12.45 m | | | 3 | | | | | | | | | | | | | | | | | | | | Bentonite Seal |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | - vertical joint from 13.23 to 13.45 m and 14.63 to 14.69 m | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | 4 | | | | | | | | | | | | | | | | | | | | |
| | | | | 64.71 | | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 14.69 | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI/BW
CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-221

SHEET 1 OF 3

LOCATION: N 5028600.7 ;E 366490.8

BORING DATE: May 21, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | GROUND SURFACE | | 74.59 | | | | | | | |
| | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, compact | | 0.00<br>74.39<br>0.20 | 1 | SS | 12 | | | | |
| | | FILL - (SM) gravelly SILTY SAND; dark brown to brown, contains organic matter and brick; non-cohesive, moist, compact | | 73.83<br>0.76 | 2 | SS | 12 | | | | Bentonite Seal |
| 1 | | TOPSOIL - (SM) SILTY SAND, fine; dark brown, contains organic matter; non-cohesive, moist, compact | | 73.37<br>1.22 | | | | | | | |
| | | (SM) SILTY SAND, fine to medium; brown; on-cohesive, moist, compact | | | 3 | SS | 12 | | | | May 28, 2021<br>June 9, 2021 |
| 2 | | | | 72.61<br>1.98 | | | | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace to some sand; grey brown, highly fissured, contains thin laminations of silty sand (WEATHERED CRUST); cohesive, w>PL, stiff to very stiff | | | 4 | SS | 11 | | | | May 28, 2021<br>June 9, 2021 |
| 3 | | | | | 5 | SS | 3 | | | MH | |
| 4 | | | | | 6 | SS | 2 | | | | |
| 5 | | | | | 7 | SS | 2 | | | | Backfill |
| | | | | 69.25 | | | | | | | |
| | | (CI/CH) SILTY CLAY to CLAY; grey; cohesive, firm to stiff | | 5.34 | 8 | SS | - | ⊕ + | | | |
| 6 | | | | | 9 | SS | 1 | ⊕ + | | | |
| 7 | | | | | | | | ⊕ + | | | |
| | | | | 66.66 | | | | | | | |
| 8 | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | 7.93 | 10 | SS | 6 | | | | |
| | | | | | 11 | SS | 15 | | ○ | MH | |
| 9 | | | | | | | | | | | Bentonite Seal |
| | | | | | 12 | SS | 17 | | ○ | M | |
| 10 | | | | | 13 | SS | 20 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-221

SHEET 2 OF 3

LOCATION: N 5028600.7 ;E 366490.8

BORING DATE: May 21, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp — W — Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very loose to compact | | | 13 | SS | 20 | | | | Native Sand |
| 11 | | | | | 14 | SS | 3 | | ○ | MH | |
| | | | | 63.31 | | | | | | | |
| | | (SW) SAND, fine to coarse, trace gravel; grey; non-cohesive, wet, very dense | | 11.28 | | | | | | | |
| | | | | 62.85 | 15 | SS | 83 | | | | |
| 12 | | (SM) SILTY sandy GRAVEL; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 11.74 | | | | | ○ | M | 32 mm Diam. PVC #10 Slot Screen 'S' |
| | | | | 62.09 | 16 | SS | 114 | | | | |
| | | (SM/ML) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 12.50 | | | | | | | |
| 13 | | | | | 17 | SS | >50 | | | | |
| | | | | 61.18 | | | | | | | |
| | Rotary Drill NW Casing | (SM/ML) gravelly SILTY SAND to sandy SILT; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 13.41 | 1 | RC | - | | | | Silica Sand |
| | | | | 60.63 | | | | | | | Bentonite Seal |
| 14 | | Borehole continued on RECORD OF DRILLHOLE 21-221 | | 13.96 | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-221

SHEET 3 OF 3

LOCATION: N 5028600.7 ;E 366490.8

DRILLING DATE: May 21, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint, FLT - Fault, SHR- Shear, VN - Vein, CJ - Conjugate
BD - Bedding, FO- Foliation, CO- Contact, OR- Orthogonal, CL - Cleavage
PL - Planar, CU- Curved, UN- Undulating, ST - Stepped, IR - Irregular
PO- Polished, K - Slickensided, SM- Smooth, Ro - Rough, MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. DEPTH (m) | RUN No. | COLOUR % RETURN FLUSH | RECOVERY TOTAL CORE % | RECOVERY SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA DIP w.r.t. CORE AXIS | DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX R4 | R3 | R2 | R1 | WEATHERING INDEX W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 60.63 | | | | | | | | | | | | | | | | | | | | | |
| 14 | Rotary Drill NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, very strong SHALEY LIMESTONE | | 13.96 | 2 | 100 | | | | | | | | | | | | | | | | | | | Bentonite Seal<br>Silica Sand<br>UCS = 152 MPa |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | - broken core from 15.55 m to 15.56 m depth | | | 3 | 100 | | | | | | | | | | | | | | | | | | | 32 mm Diam. PVC #10 Slot Screen 'D' |
| 17 | | | | | 4 | 100 | | | | | | | | | | | | | | | | | | | |
| | | | | 56.96 | | | | | | | | | | | | | | | | | | | | | |
| 18 | | End of Drillhole<br><br>Note(s):<br><br>1. Water level in screen measured at 1.35 m (Elev. 73.23 m) on May 28, 2021 (Shallow)<br><br>2. Water level in screen measured at 1.43 m (Elev. 73.15 m) on June 9, 2021 (Shallow)<br><br>3. Water level in screen measured at 2.33 m (Elev. 72.26 m) on May 28, 2021 (Deep)<br><br>4. Water level in screen measured at 2.41 m (Elev. 72.18 m) on June 9, 2021 (Deep) | | 17.63 | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-222A

SHEET 1 OF 1

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 78.83 | | | | | | | |
| 0 | Power Augger 200 mm Diam. (Hollow Stem) | For soil stratigraphy refer to record of borehole 21-222 | | 0.00 | | | | | | | Bentonite Seal |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | Backfill |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | Bentonite Seal |
| 5 | | | | | | | | | | | Silica Sand |
| 6 | | | | | | | | | | | 50 mm Diam. PVC #10 Slot Screen 'S' |
| 7 | | | | 71.21 | | | | | | | May 28, 2021<br>June 9, 2021 |
| | | End of Borehole | | 7.62 | | | | | | | |
| 8 | | Note(s):<br><br>1. Water level in screen measured at 6.42 m (Elev. 72.41 m) on May 28, 2021 (Shallow)<br>2. Water level in screen measured at 6.52 m (Elev. 72.31 m) on June 9, 2021 (Shallow) | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-222

SHEET 1 OF 2

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 78.83 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00 | | | | | | | |
| | | | | 0.15 | 1 | SS | 14 | | | | Bentonite Seal |
| | | FILL - (CL/CI) SILTY CLAY, trace to some sand, some gravel; brown, contains brick fragments; cohesive, w~PL, very stiff | | 0.30 | | | | | | | |
| | | | | 77.92 | | | | | | | |
| 1 | | FILL - (SM) gravelly SILTY SAND; grey brown, possible cobbles and boulders; non-cohesive, moist, compact to loose | | 0.91 | 2 | SS | 5 | | ○ | | |
| | | FILL - (CL/CI) SILTY CLAY, some sand, some gravel; grey brown; cohesive, w~PL, stiff | | 77.15 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, fine to coarse; brown to grey brown, concrete fragments, brick fragments, organic matter and wood; non-cohesive, moist, loose to very dense | | 1.68 | 3 | SS | 7 | | | | |
| 2 | | | | | 4 | SS | 18 | | ○ | | |
| 3 | | | | | 5 | SS | 5 | | | | Backfill |
| 4 | | | | | 6 | SS | >50 | | | | |
| 5 | | | | | 7 | SS | 65 | | ○ | | |
| | | | | 73.49 | | | | | | | |
| | | FILL -(SM) gravelly SILTY SAND; grey brown, contains concrete and brick fragments; non-cohesive, moist, compact | | 5.34 | 8 | SS | 24 | | | | May 28, 2021 ▽ |
| 6 | | | | | 9 | SS | 11 | | | | June 9, 2021 ▽ |
| | | | | 71.97 | | | | | | | |
| 7 | | FILL - (GP) sandy GRAVEL; grey, contains concrete fragments; non-cohesive, wet, dense | | 6.86 | 10 | SS | 35 | | | | |
| | | | | 71.21 | | | | | | | Cave |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | 7.62 | 11 | SS | 35 | | ○ | | |
| 8 | | | | | 12 | SS | 17 | | | | |
| 9 | | | | | 13 | SS | 9 | | | | Bentonite Seal |
| 10 | | | | | 14 | SS | 14 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED: RI/BW

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-222

SHEET 2 OF 2

LOCATION: N 5028541.6 ;E 366553.3

BORING DATE: May 12, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to dense | | | 14 | SS | 14 | | | MH | Bentonite Seal |
| 11 | | | | | 15 | SS | 39 | | | | Silica Sand |
| 12 | | | | | 16 | SS | 9 | | | | 38 mm Diam. PVC #10 Slot Screen 'D' |
| | | | | | 17 | SS | 33 | | | | |
| | | | | 66.03 | | | | | | | |
| 13 | DCPT | Dynamic Cone Penetration Test (DCPT) | | 12.80 | | | | | | | Silica Sand |
| 14 | | | | 64.81 | | | | | 109 | | |
| | | End of Borehole<br>DCPT Refusal<br><br>1. Water level in screen measured at 5.65 m (Elev. 73.18 m) on May 28, 2021 (Deep)<br>2. Water level in screen measured at 6.79 m (Elev. 72.04 m) on June 9, 2021 (Deep) | | 14.02 | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED: RI/BW
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-224

SHEET 1 OF 3

LOCATION: N 5028516.4 ;E 366593.7

BORING DATE: May 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$); WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 78.90 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND, trace organic matter; dark brown; moist | | 0.00 | | | | | | | |
| | | FILL - (SM) gravelly SILTY SAND, fine to coarse; dark brown to brown, contains concrete fragments; non-cohesive, moist, loose to very dense | | 0.15 | 1 | SS | 41 | | | | Bentonite Seal |
| 1 | | | | | 2 | SS | 71 | | | | |
| | | | | | | | | | | | Backfill |
| 2 | | | | | 3 | SS | 61 | | | | |
| | | | | | 4 | SS | 22 | | | | |
| 3 | | | | | | | | | | | |
| | | | | | 5 | SS | 16 | | | | Bentonite Seal |
| 4 | | | | | 6 | SS | 22 | | | | |
| | | | | | | | | | | | Silica Sand |
| 5 | | | | | 7 | SS | 29 | | | | |
| | | | | | 8 | SS | 43 | | | | |
| 6 | | | | | | | | | | | 50 mm Diam. PVC #10 Slot Screen |
| | | | | | 9 | SS | 15 | | | | May 28, 2021 ▽ June 9, 2021 ▽ |
| 7 | | | | | 10 | SS | 20 | | | | |
| | | | | | 11 | SS | >50 | | | | |
| 8 | | | | | 12 | SS | 6 | | | | |
| | | | | 70.52 | | | | | | | Silica Sand |
| | | (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, loose to compact | | 8.38 | 13 | SS | 24 | | | | |
| 9 | | | | | 14 | SS | 11 | | | | Bentonite Seal |
| 10 | | | | | 15 | SS | 9 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

WSP GOLDER

LOGGED:

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-224

SHEET 2 OF 3

LOCATION: N 5028516.4 ;E 366593.7

BORING DATE: May 10, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) | HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, wet, loose to compact | | | 15 | SS | 9 | | | | |
| 11 | | | | | 16 | SS | 8 | | | | |
| | | | | 67.47 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, compact to very dense | | 11.43 | 17 | SS | 18 | | | | |
| 12 | | | | | 18 | SS | 25 | | | | |
| 13 | | | | | 19 | SS | 50 | | | | Bentonite Seal |
| 14 | | | | | 20 | SS | 57 | | | | |
| | | | | 64.42 | | | | | | | |
| | | (SW) SAND, fine to coarse, trace gravel; grey, contains thin beds of gravelly silty sand; non-cohesive, wet, compact | | 14.48 | 21 | SS | 23 | | | | |
| 15 | | | | 63.66 | | | | | | | |
| | | (SM) gravelly SILTY SAND; gery, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, very dense | | 15.24 | 22 | SS | 91 | | | | |
| 16 | | | | | 23 | SS | >50 | | | | |
| | | | | 61.98 | | | | | | | |
| 17 | | Borehole continued on RECORD OF DRILLHOLE 21-224 | | 16.92 | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED:

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-224

SHEET 3 OF 3

LOCATION: N 5028516.4 ;E 366593.7

DRILLING DATE: May 10, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | DISCONTINUITY DATA: Jcon | DISCONTINUITY DATA: Jr | DISCONTINUITY DATA: Ja | ROCK STRENGTH INDEX: R4 | ROCK STRENGTH INDEX: R3 | ROCK STRENGTH INDEX: R2 | ROCK STRENGTH INDEX: R1 | WEATHERING INDEX: W1 | WEATHERING INDEX: W2 | WEATHERING INDEX: W3 | WEATHERING INDEX: W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 61.98 | | | | | | | | | | | | | | | | | | | | | |
| 17 | Rotary Drill NQ Core | Fresh, thinly to medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong to weak SHALEY LIMESTONE | | 16.92 | 1 | 100 | | | | | | | | | | | | | | | | | | | Bentonite Seal |
| 18 | | | | | 2 | 100 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | 3 | 100 | | | | | | | | | | | | | | | | | | | |
| 20 | | - broken core from 19.80 m to 19.82 m depth | | 58.70 | | | | | | | | | | | | | | | | | | | | | |
| | | End of Drillhole | | 20.20 | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | | | | | | | |

DEPTH SCALE
1 : 50

LOGGED:

CHECKED: CH

MIS-RCK 004 21451149.GPJ GAL-MISS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-225

SHEET 1 OF 2

LOCATION: N 5028560.9 ;E 366591.4

BORING DATE: May 3, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp W Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.21 | | | | | | | |
| 0 | Power Auger | TOPSOIL - (SM) SILTY SAND; dark brown, contains brick and organic matter (rootlets); moist | | 0.00<br>74.98 | 1 | SS | >50 | | | | |
| | 200 mm Diam. (Hollow Stem) | FILL - (SM) gravelly SILTY SAND; brown, contains cobbles and boulders; non-cohesive, dry, very dense | | 0.23 | | | | | | | |
| 1 | | | | | 2 | SS | 78 | | | | Bentonite Seal |
| | | | | 73.69 | | | | | | | |
| | | FILL - (CI/CH) SILTY CLAY, some sand, trace gravel; grey brown; cohesive, w~PL, very stiff | | 1.52 | 3 | SS | 12 | | | | |
| 2 | | | | | 4 | SS | 10 | | | | Silica Sand |
| | | | | 72.16 | | | | | | | |
| 3 | | (CI/CH) SILTY CLAY, trace sand; grey brown, slightly fissured (WEATHERED CRUST); cohesive, W~PL, very stiff | | 3.05 | 5 | SS | 13 | | | | 50 mm Diam. PVC #10 Slot Screen |
| | | | | 71.40 | | | | | | | May 28, 2021<br>June 9, 2021 |
| | | (SM) gravelly SILTY SAND; grey brown to grey (GLACIAL TILL); non-cohesive, moist to wet, compact | | 3.81 | 6 | SS | 12 | | | | |
| 4 | | | | | 7 | SS | 15 | | | | |
| 5 | | | | | 8 | SS | 19 | | | | Silica Sand |
| 6 | | | | | 9 | SS | 10 | | | | |
| 7 | | | | | 10 | SS | 20 | | | | |
| 8 | | | | | 11 | SS | 23 | | | | Bentonite Seal |
| | | | | | 12 | SS | 13 | | | | |
| 9 | | | | | 13 | SS | 12 | | | | |
| 10 | | | | | 14 | SS | 11 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE
1 : 50

WSP GOLDER

LOGGED: RI
CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-225

SHEET 2 OF 2

LOCATION: N 5028560.9 ;E 366591.4

BORING DATE: May 3, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| 10 | Power Auger 200 mm Diam. (Hollow Stem) | (SM) gravelly SILTY SAND; grey brown to grey (GLACIAL TILL); non-cohesive, moist to wet, compact | | | 14 | SS | 11 | | | | |
| 11 | | | | | 15 | SS | 10 | | | | Bentonite Seal |
| 12 | | | | | 16 | SS | 11 | | | | |
| 13 | | | | 62.23 | 17 | SS | 13 | | | | Cave |
| | | End of Borehole<br>Auger Refusal | | 12.98 | | | | | | | |
| 14 | | Note(s):<br><br>1. Water level in screen measured at 3.63 m (Elev. 71.59 m) on June 9, 2021<br><br>2. Water level in screen measured at 3.54 m (Elev. 71.68 m) on May 28, 2021<br><br>3. Water level measured at a depth of 2.96 m on May 5, 2021 | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/13/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-226

SHEET 1 OF 2

LOCATION: N 5028544.1 ;E 366622.8

BORING DATE: May 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES NUMBER | SAMPLES TYPE | SAMPLES BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa nat V. + Q - ● rem V. ⊕ U - ○ (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT Wp W Wl (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 75.31 | | | | | | | |
| 0 | Power Auger 200 mm Diam. (Hollow Stem) | TOPSOIL - (SM) SILTY SAND; dark brown; moist | | 0.00<br>75.08 | | | | | | | |
| | | FILL - (SM) SILTY SAND, fine to coarse, some gravel, trace clay; brown; non-cohesive, moist, loose to dense | | 0.23 | 1 | SS | 12 | | | | |
| 1 | | | | | 2 | SS | 38 | | | | Bentonite Seal |
| | | | | | 3 | SS | 95 | | | | |
| 2 | | | | | 4 | SS | 21 | | | | Silica Sand |
| | | FILL - (CL/CH) SILTY CLAY, trace sand; grey brown, with black mottling, contains organic matter; w<PL, very stiff | | 73.02<br>2.29 | | | | | | | |
| 3 | | | | 72.26 | | | | | | | |
| | | (CI/CH) SILTY CLAY, trace sand; grey brown, highly fissured (WEATHERED CRUST); cohesive, w<PL, stiff to very stiff | | 3.05 | 5 | SS | 12 | | ○ | MH | |
| 4 | | | | | 6 | SS | 5 | | | | 50 mm Diam. PVC #10 Slot Screen<br>May 28, 2021<br>June 9, 2021 |
| | | | | 70.74 | | | | | | | |
| | | (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, compact to very dense | | 4.57 | 7 | SS | 19 | | | | |
| 5 | | | | | 8 | SS | 11 | | ○ | M | Silica Sand |
| 6 | | | | | 9 | SS | 13 | | | | |
| 7 | | | | | 10 | SS | 9 | | | | |
| 8 | | | | | 11 | SS | 15 | | | | Bentonite Seal |
| | | | | | 12 | SS | 11 | | | | |
| 9 | | | | | 13 | SS | 10 | | | | |
| 10 | | | | | 14 | SS | 32 | | | | |
| | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DEPTH SCALE

1 : 50

LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-226

SHEET 2 OF 2

LOCATION: N 5028544.1 ;E 366622.8

BORING DATE: May 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.30m | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80) | HYDRAULIC CONDUCTIVITY, k, cm/s ($10^{-6}$ $10^{-5}$ $10^{-4}$ $10^{-3}$) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Power Auger | (SM) gravelly SILTY SAND; grey brown to grey, contains cobbles (GLACIAL TILL); non-cohesive, moist to wet, compact to very dense | | | 14 | SS | 32 | | | | Bentonite Seal |
| | | | | | 15 | SS | 87 | | | | Cave |
| | | | | 64.36 | | | | | | | |
| 11 | | End of Borehole<br>Auger Refusal | | 10.95 | | | | | | | |
| | | Note(s):<br><br>1. Water level in screen measured at 3.77 m (Elev. 72.48 m) on May 28, 2021<br><br>2. Water level in screen measured at 3.94 m (Elev. 72.31 m) on June 9, 2021<br><br>3. Water level measured at a depth of 2.40 m on May 5, 2021 | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DEPTH SCALE

1 : 50

GOLDER

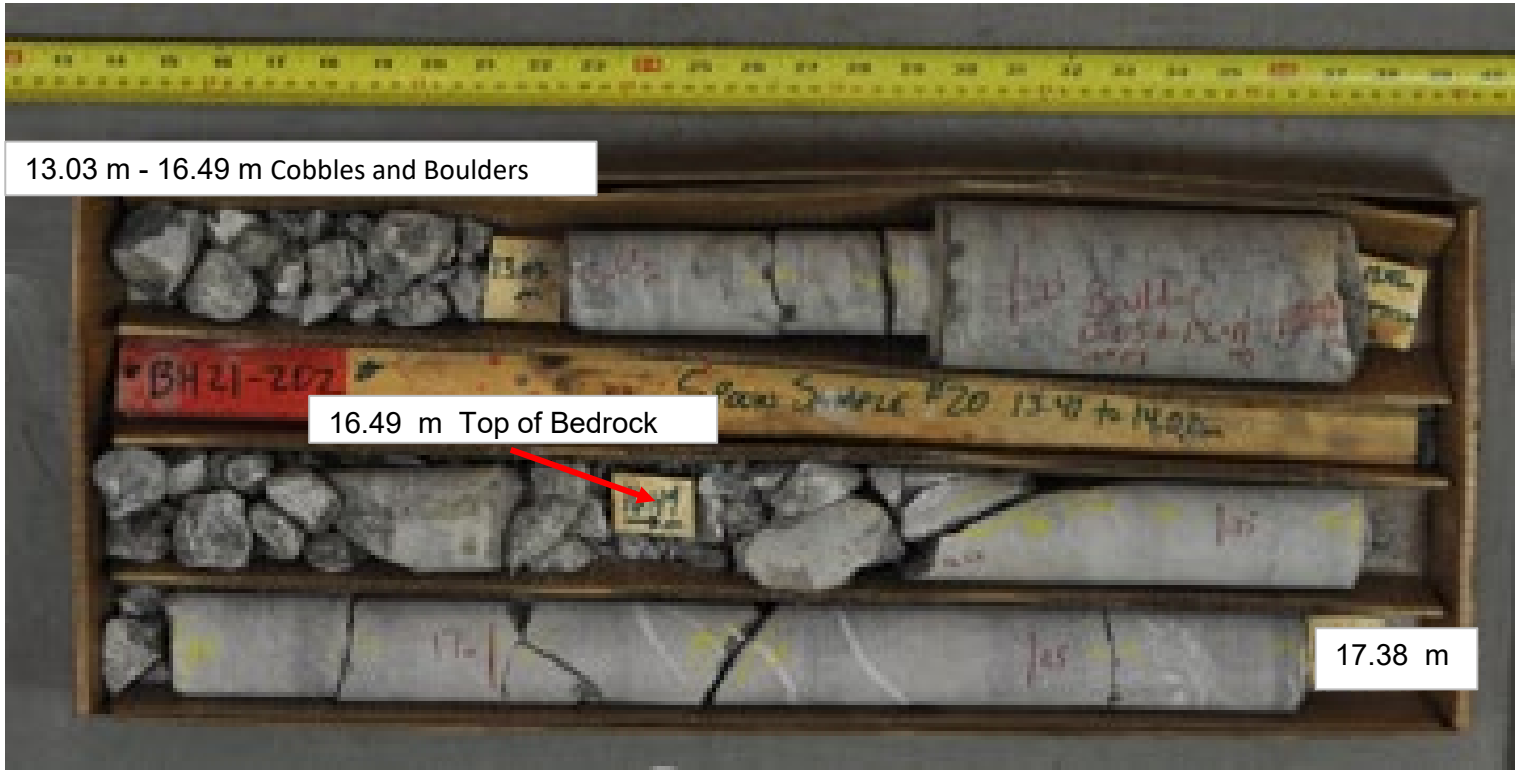
LOGGED: RI

CHECKED: CH

MIS-BHS 001 21451149.GPJ GAL-MIS.GDT 6/16/22

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Dry)
Cored Length of 13.03 to 17.38 metres
Core Box 1 of 4

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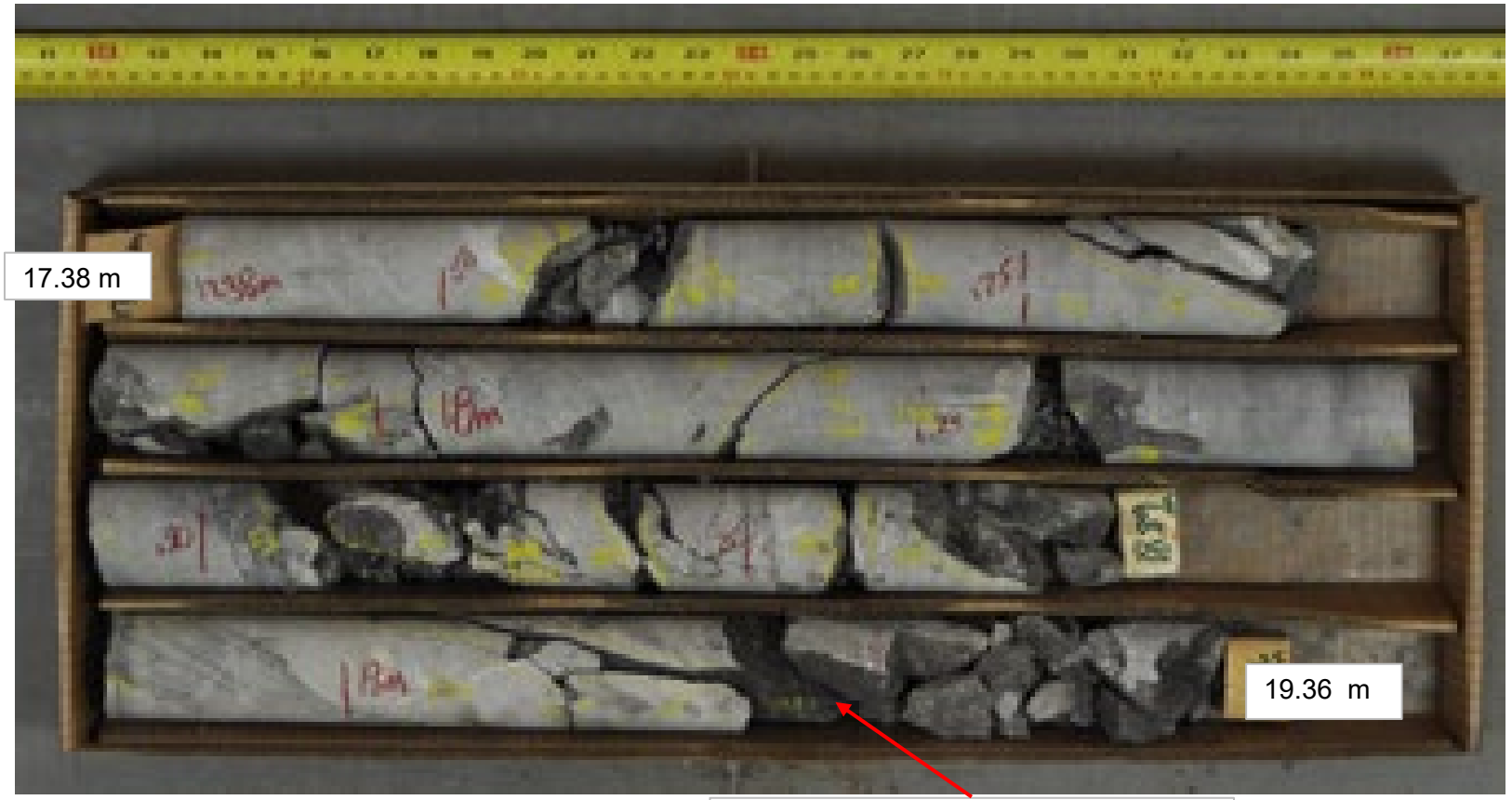
|---|---|
| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE 21-202 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-1 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Dry)
Cored Length of 17.38 to 19.36 metres
Core Box 2 of 4

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| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
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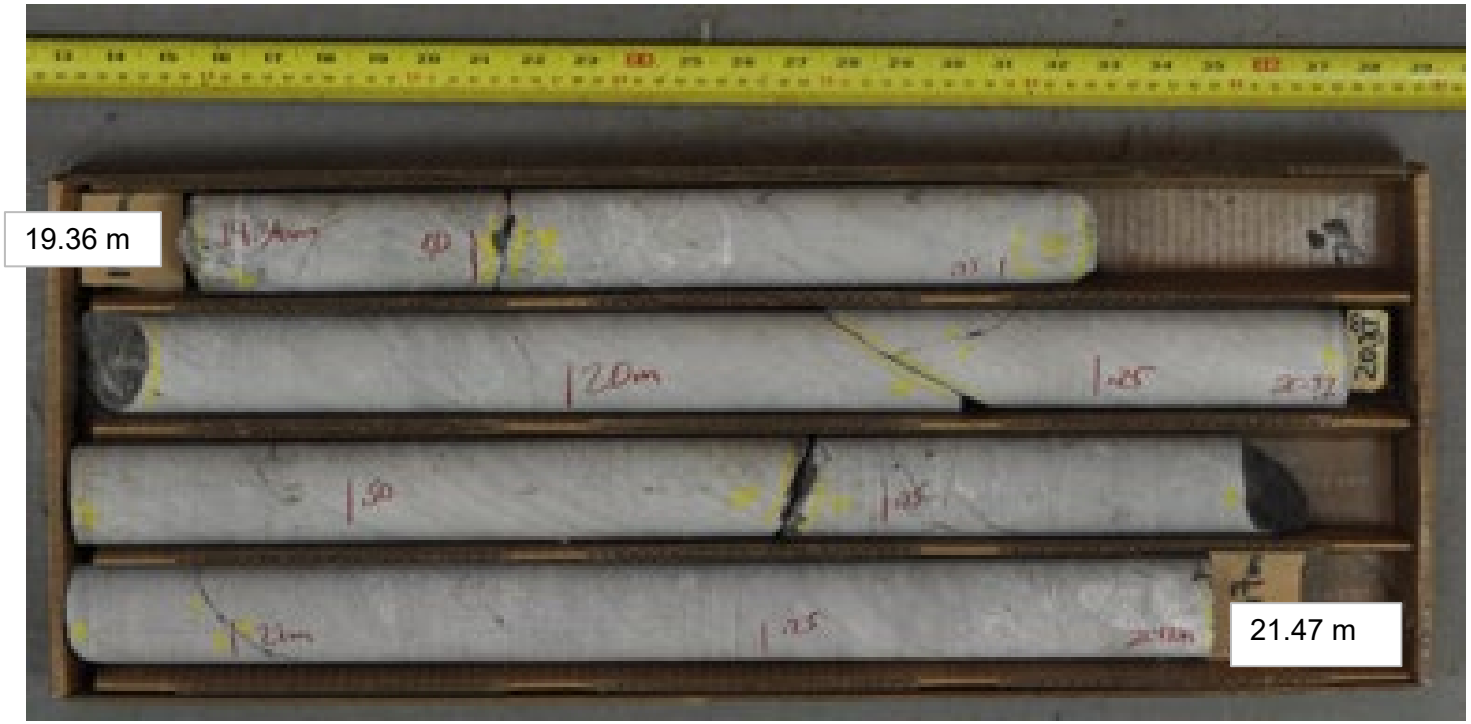
| APPROVED | |

TITLE
**COREHOLE 21-202 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-2 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Dry)
Cored Length of 19.36 to 21.47 metres
Core Box 3 of 4

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| DESIGN | AKP |
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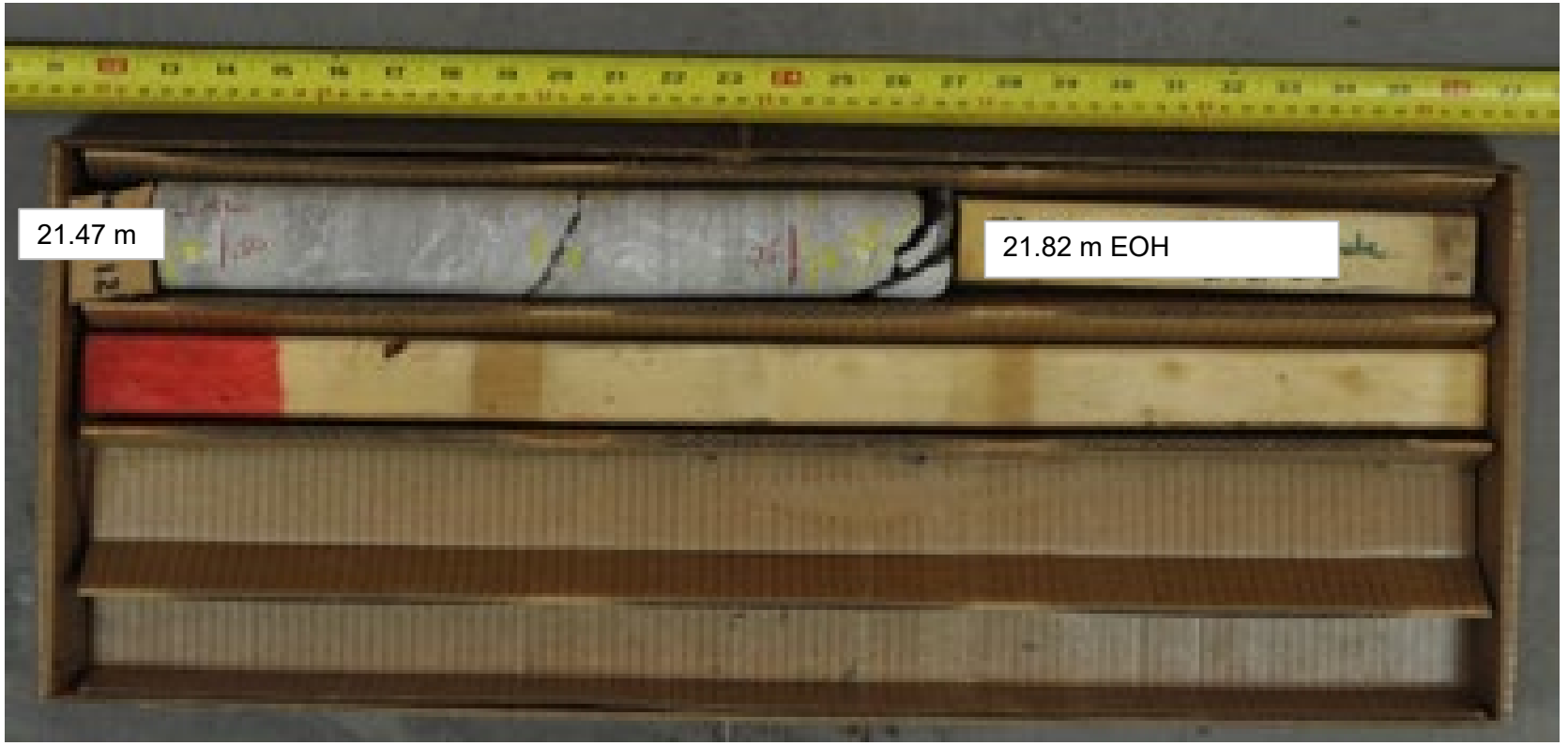
TITLE
**COREHOLE 21-202 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-3 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Dry)
Cored Length of 21.47 to 21.82 metres
Core Box 4 of 4

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| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE 21-202 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-4 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Wet)
Cored Length of 13.03 to 17.38 metres
Core Box 1 of 4

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| PREPARED | AKP |
| DESIGN | AKP |
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TITLE
**COREHOLE 21-202 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-5 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Wet)
Cored Length of 17.38 to 19.36 metres
Core Box 2 of 4

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| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
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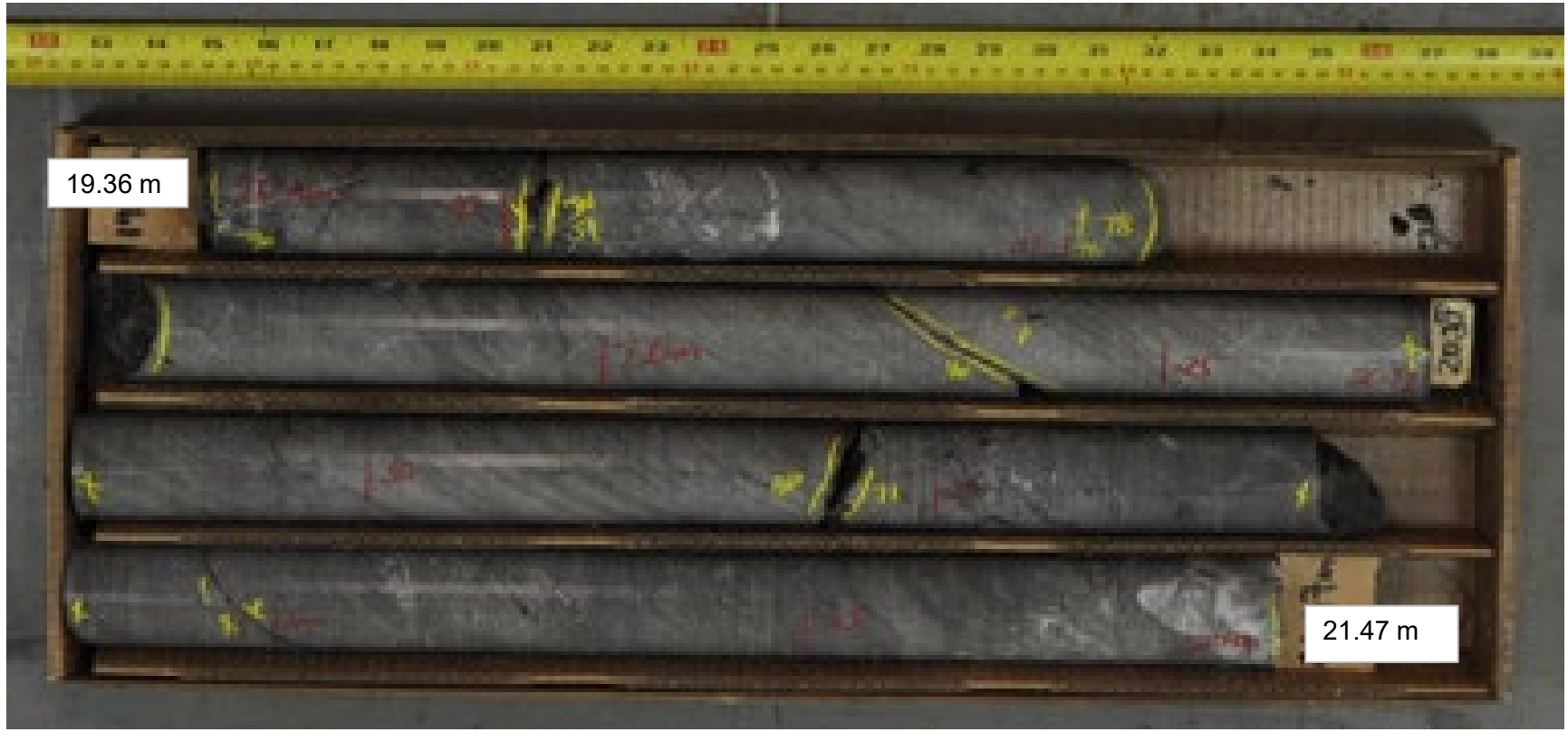
TITLE
**COREHOLE 21-202 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-6 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Wet)
Cored Length of 19.36 to 21.47 metres
Core Box 3 of 4

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| DESIGN | AKP |
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TITLE
**COREHOLE 21-202 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-7 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-202 (Wet)
Cored Length of 21.47 to 21.82 metres
Core Box 4 of 4

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| | |
|---|---|
| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
| APPROVED | |

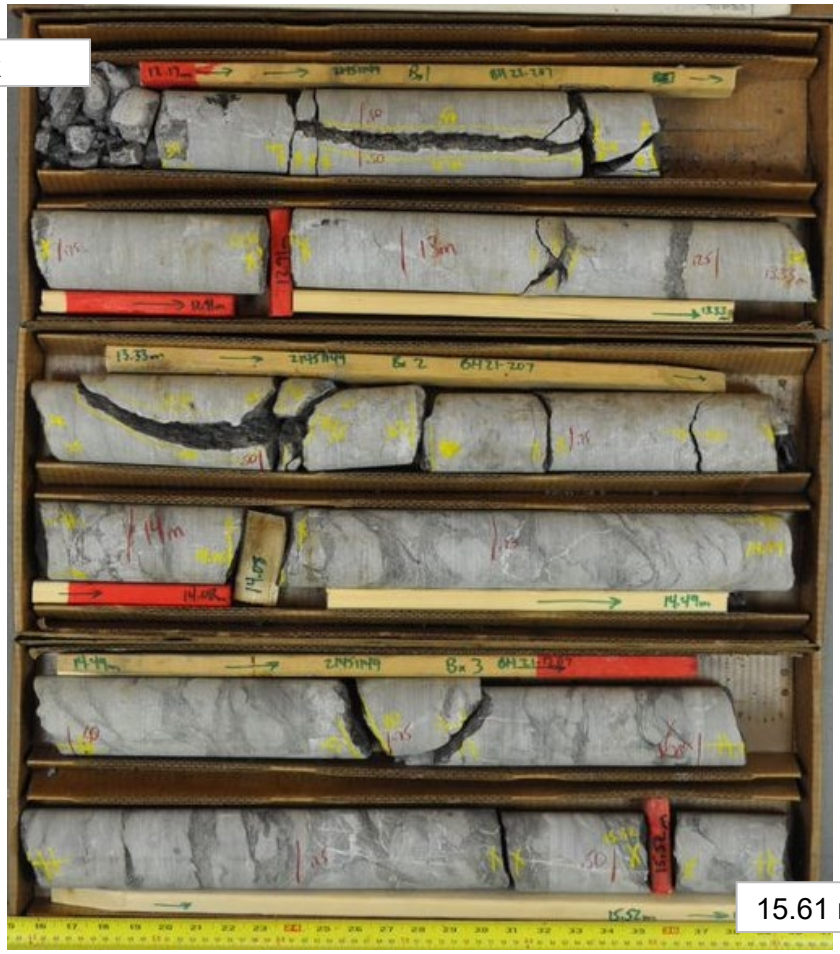
TITLE
**COREHOLE 21-202 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-8 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-207 (Dry)
Cored Length of 12.17 to 15.61 metres
Core Box 1 to 3 of 3

12.17 m Top of bedrock



15.61 m

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| | |
|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-207 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-9 |

BH 21-207 (Dry)
Cored Length of 15.61 to 18.95 metres
Core Box 4 to 6 of 9

15.61 m

18.95 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
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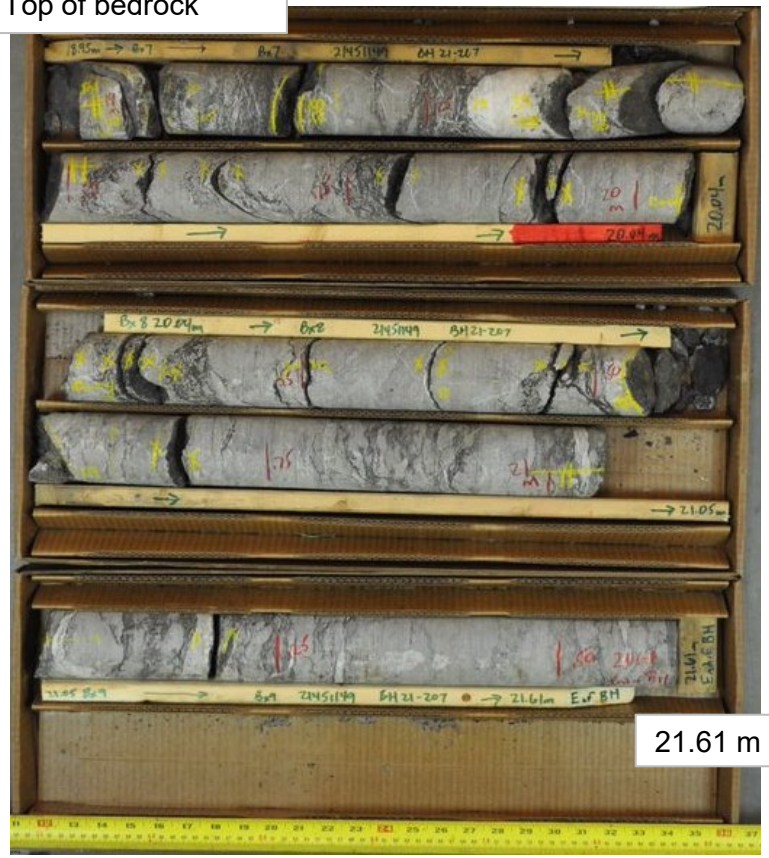
|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-207 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-10 |

BH 21-207 (Dry)
Cored Length of 18.95 to 21.61 metres
Core Box 7 to 9 of 9

18.95 m Top of bedrock




21.61 m EOH

CLIENT
Parsons Inc.

PROJECT
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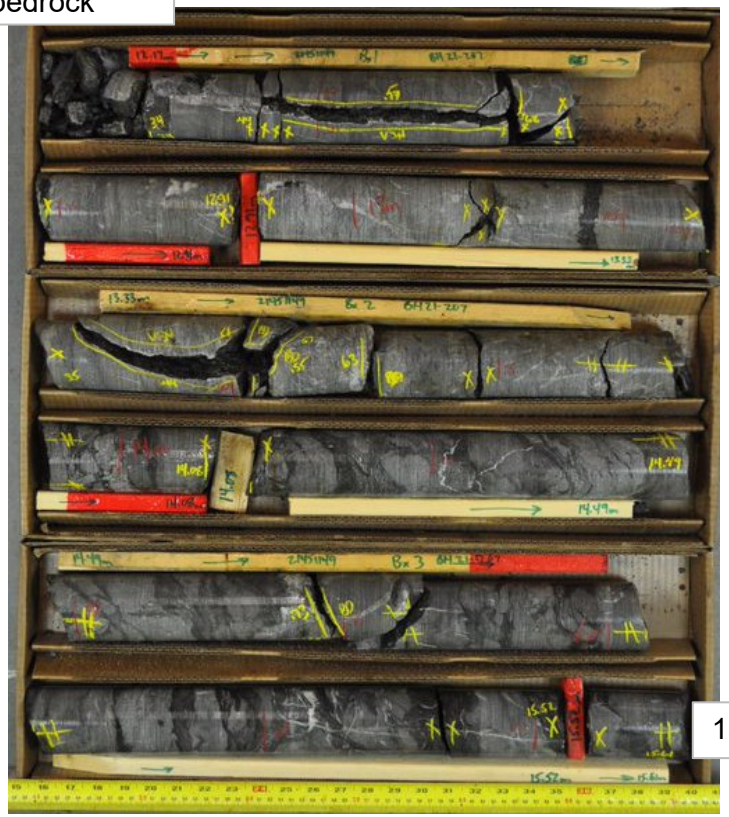
| | |
|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-207 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-11 |

BH 21-207 (Wet)
Cored Length of 12.17 to 15.61 metres
Core Box 1 to 3 of 9

12.17 m Top of bedrock



15.61 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
GOLDER
MEMBER OF WSP

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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-207 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-12 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-207 (Wet)
Cored Length of 15.61 to 18.95 metres
Core Box 4 to 6 of 9

15.61 m

18.95 m

CLIENT
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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-207 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-13 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-207 (Wet)
Cored Length of 15.61 to 18.95 metres
Core Box 4 to 6 of 9

15.61

18.95 m EOH

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
GOLDER
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| | |
|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

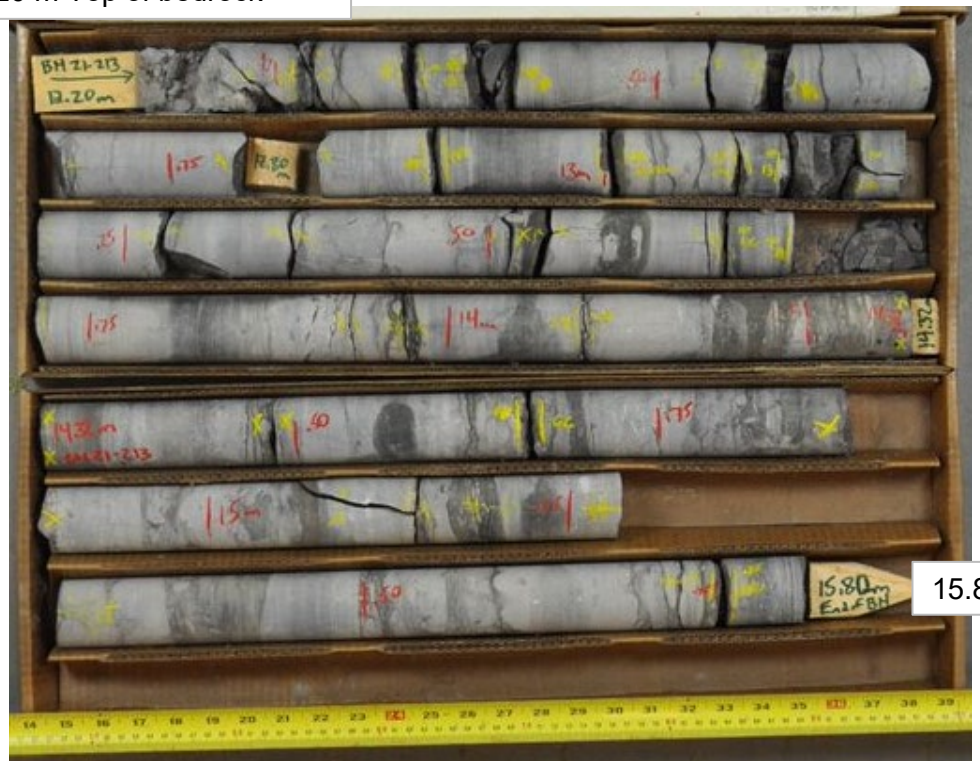
TITLE
**BOREHOLE 21-207 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-14 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-213 (Dry)
Cored Length of 12.20 to 15.80 metres
Core Box 1 to 2 of 2

12.20 m Top of bedrock




15.80 m EOH

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
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MEMBER OF WSP

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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-213 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-15 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-213 (Wet)
Cored Length of 12.20 to 15.80 metres
Core Box 1 to 2 of 2

12.20 m Top of bedrock

15.80 m EOH

CLIENT
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PROJECT
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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-213 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-16 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-214 (Dry)
Cored Length of 8.28 to 12.27 metres
Core Box 1 to 2 of 2

8.28 m Top of bedrock

12.27 m EOH

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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-214 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-17 |

BH 21-214 (Wet)
Cored Length of 8.28 to 12.27 metres
Core Box 1 to 2 of 2

8.28 m Top of bedrock

12.27 m EOH

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

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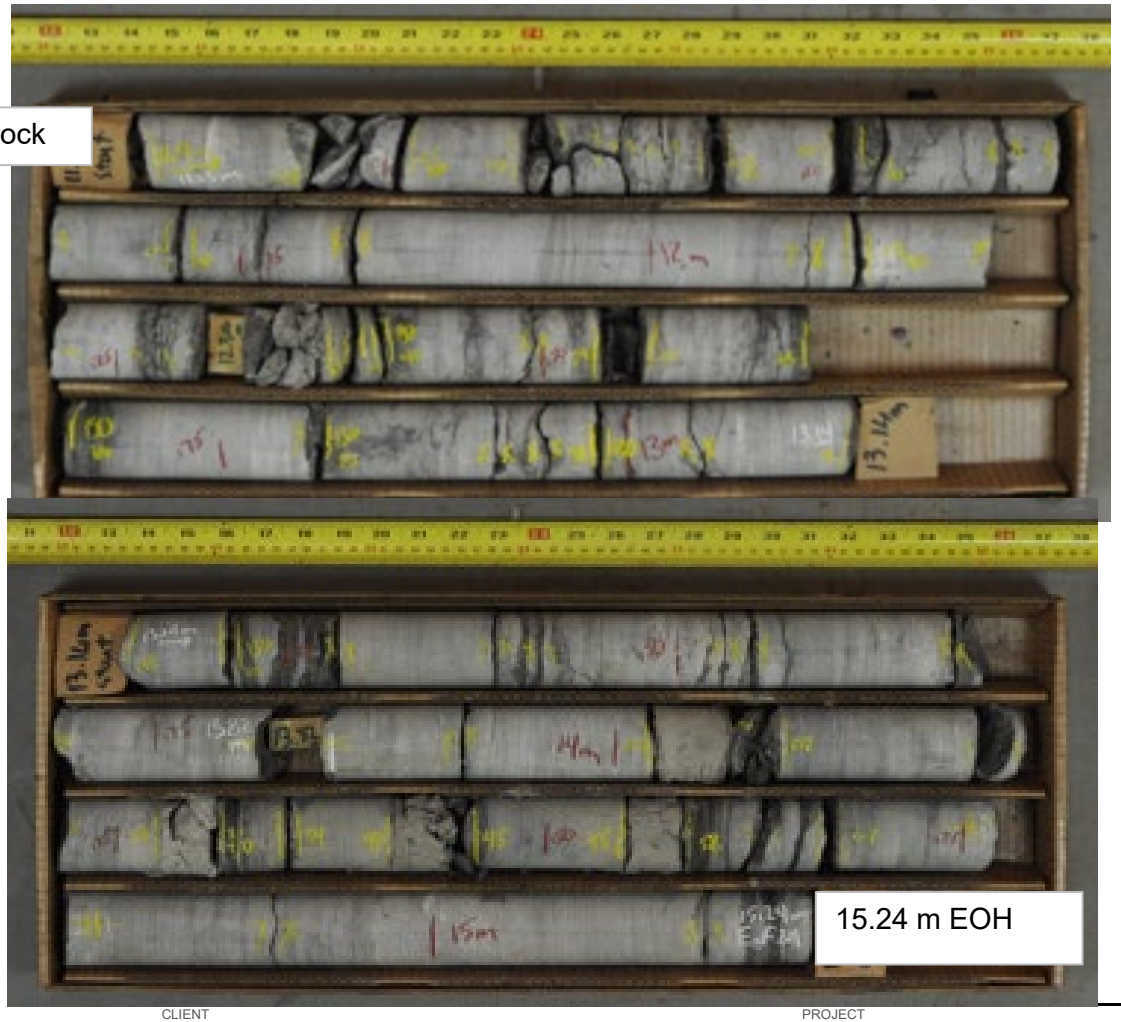
|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-214 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-18 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-216 (Dry)
Cored Length of 11.13 to 15.24 metres
Core Box 1 of 2




CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

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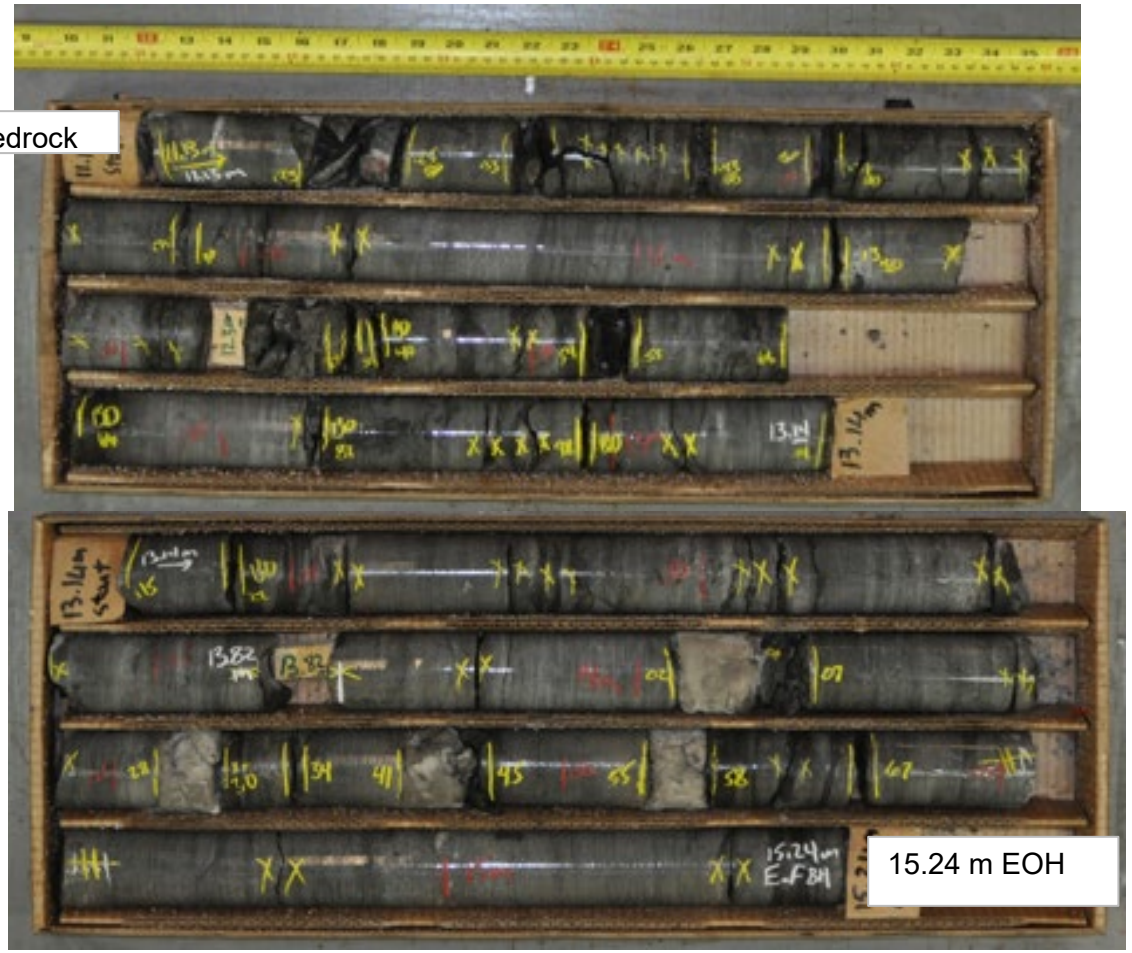
| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE 21-216 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-19 |

21-216 (Wet)
Cored Length of 11.13 to 13.14 metres
Core Box 1 of 2




CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

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|---|---|
| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE 21-216 (WET)**
**CORE PHOTOGRAPHS**

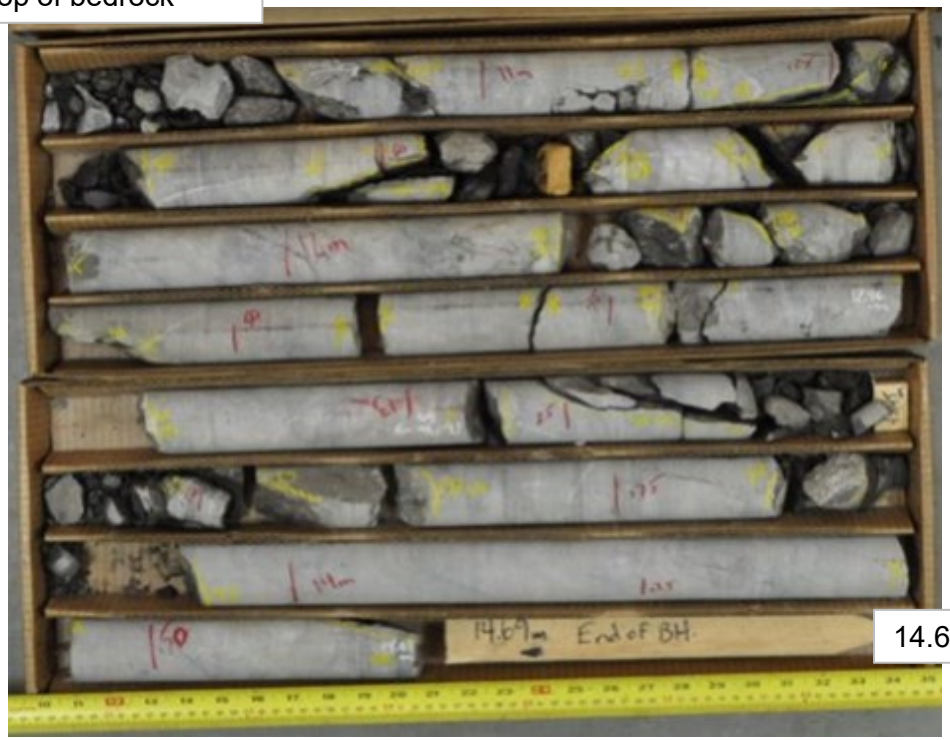
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-20 |

0 1in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-219 (Dry)
Cored Length of 10.83 to 14.69 metres
Core Box 1 to 2 of 2

10.84 m Top of bedrock




14.69 m EOH

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PROJECT
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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-219 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-21 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-219 (Wet)
Cored Length of 10.83 to 14.69 metres
Core Box 1 to 2 of 2

10.84 m Top of bedrock

14.69 m EOH

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
GOLDER
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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-219 (WET)**
**CORE PHOTOGRAPHS**

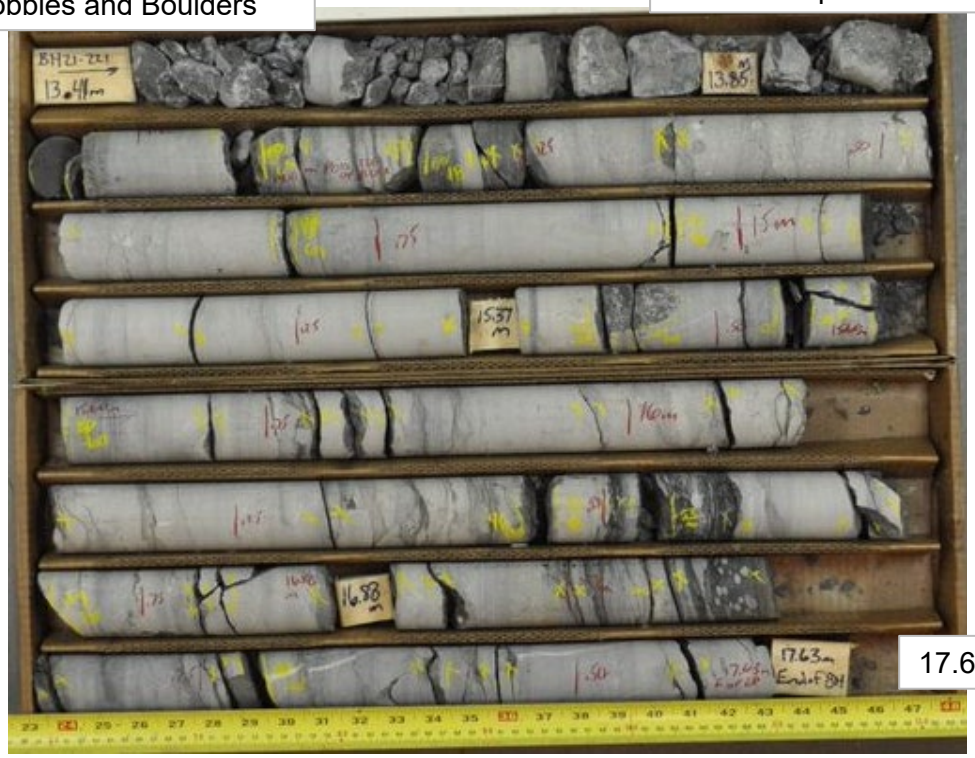
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-22 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-221 (Dry)
Cored Length of 13.41 to 17.63 metres
Core Box 1 to 2 of 2

13.41 m Cobbles and Boulders

13.96 m Top of Bedrock




17.63 m EOH

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
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|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-221 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-23 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

BH 21-221 (Wet)
Cored Length of 13.41 to 17.63 metres
Core Box 1 to 2 of 2

13.41 m Cobbles and Boulders

13.96 m Top of Bedrock

17.63 m EOH

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
GOLDER
MEMBER OF WSP

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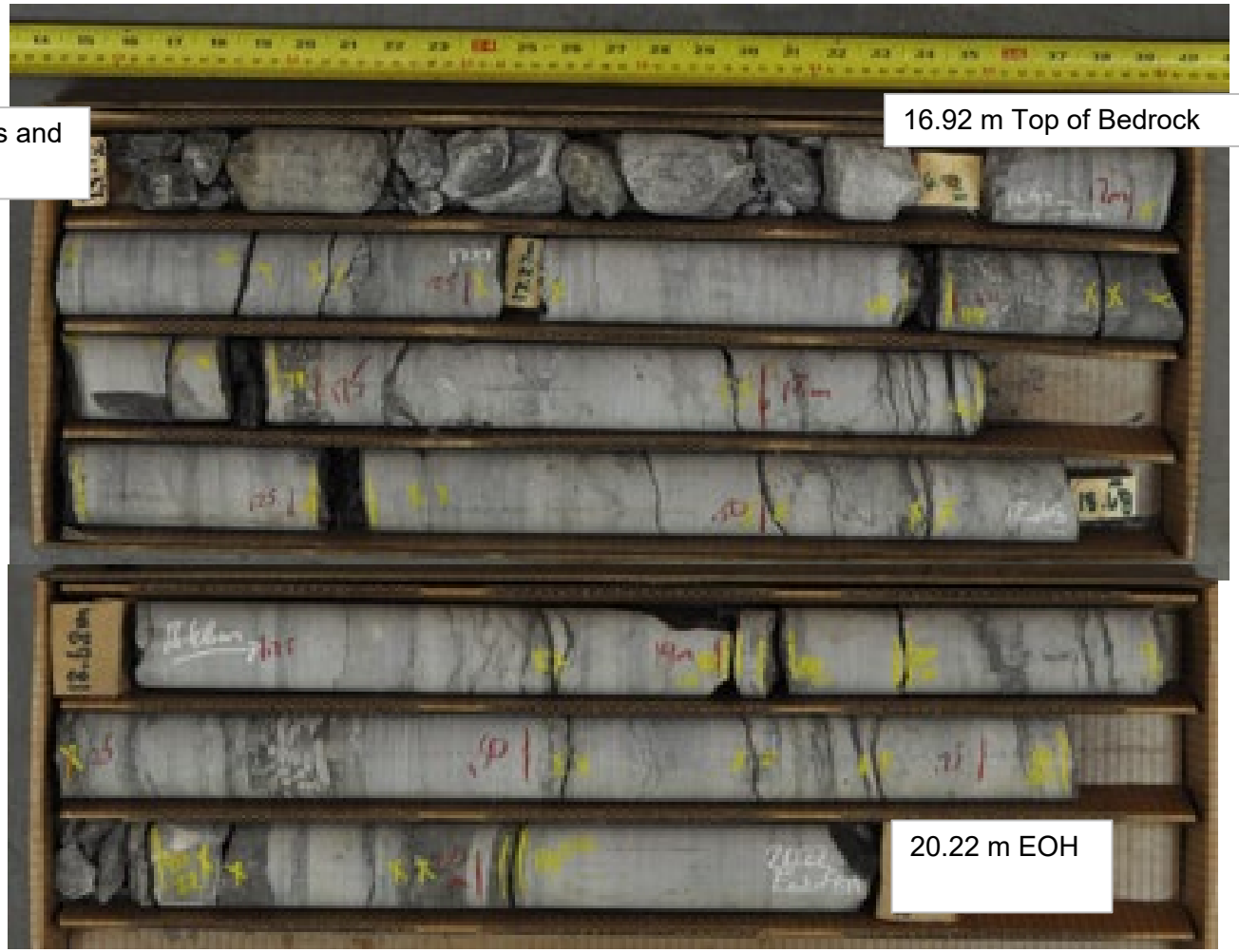
|---|---|
| YYY/MM/DD | 2021-05-20 |
| PREPARED | KM |
| DESIGN | KM |
| REVIEW | |
| APPROVED | |

TITLE
**BOREHOLE 21-221 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-24 |

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-224 (Dry)
Cored Length of 15.98 to 20.22 metres
Core Box 1 to 2 of 2




CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
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|---|---|
| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
| APPROVED | |

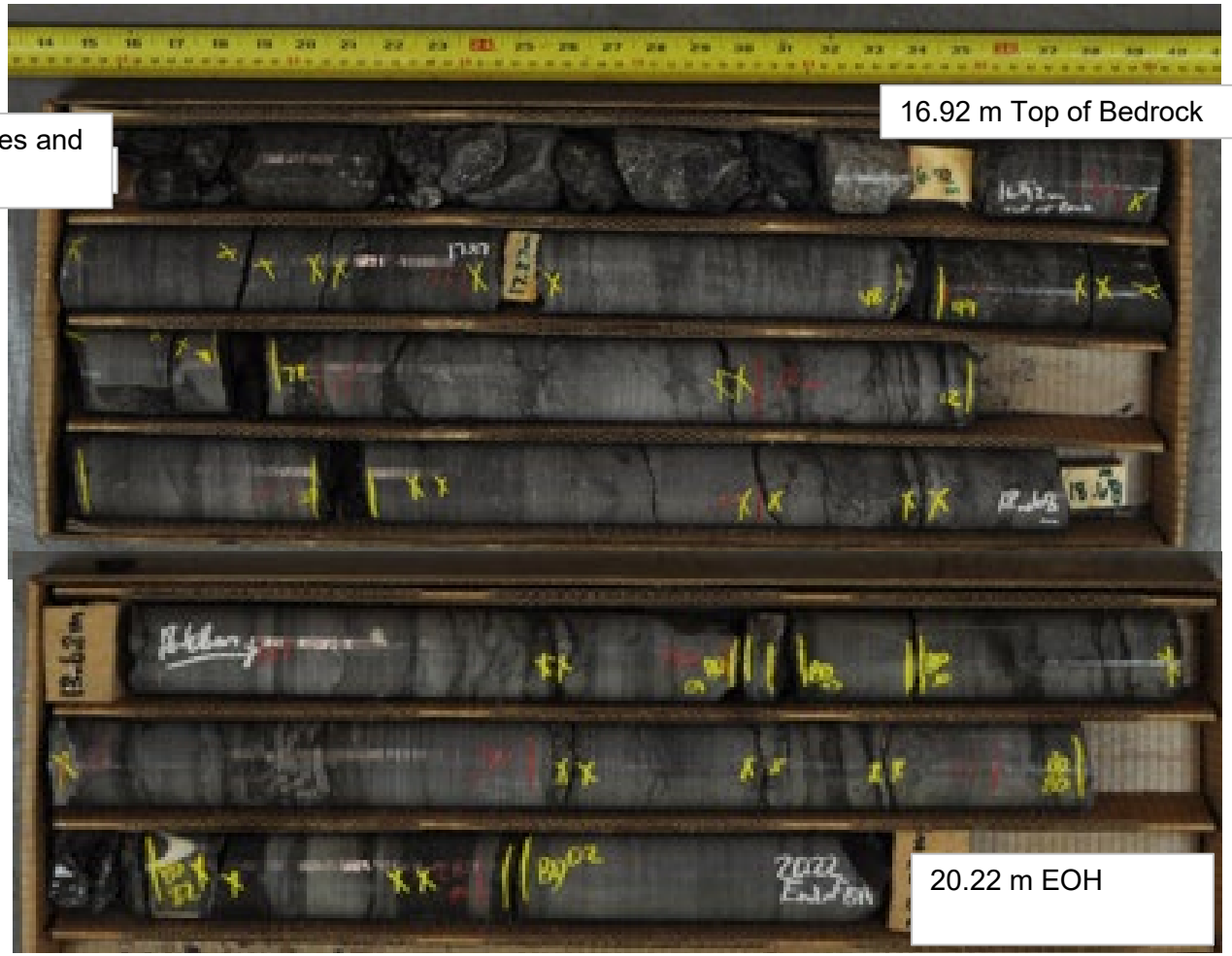
TITLE
**COREHOLE 21-224 (DRY)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-25 |

0 1in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

Path: https://golderassociates-my.sharepoint.com/personal/bbocage_golder_com/Documents/Documents/21451149_TOH Project Docs/Figure B1 to B26_Core Photos Plate 21451149-2000 | File: Figure B1 to B26_Core Photos Plate 21451149-2000

21-224 (Wet)
Cored Length of 15.98 to 20.22 metres
Core Box 1 to 2 of 2




CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
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| | |
|---|---|
| YYY/MM/DD | 2021-08-05 |
| PREPARED | AKP |
| DESIGN | AKP |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE 21-224 (WET)**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 21451149 | 2000 | 0a | B-26 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
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Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-101
Cored Length of 12.98 to 16.77 metres
Core Box 1 of 2

12.98 m

16.77 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |
| TITLE | **COREHOLE BH23-101**<br>**CORE PHOTOGRAPHS** |

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-27 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-103
Cored Length of 12.04 to 16.67 metres
Core Box 1 of 2

12.04 m

16.67 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
wsp

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|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

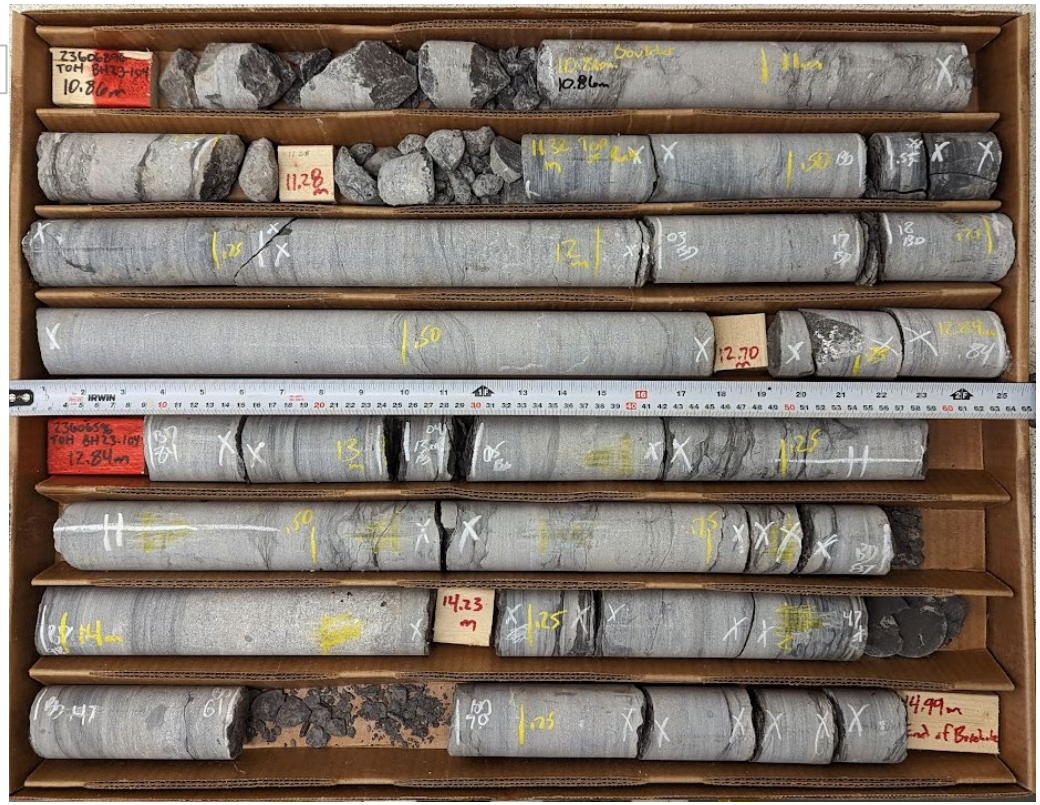
TITLE
**COREHOLE BH23-103**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-28 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH-104
Cored Length of 10.86 to 14.99 metres
Core Box 1 of 2

10.86 m




14.99 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | |
| DESIGN | |
| REVIEW | |
| APPROVED | |
| TITLE | |

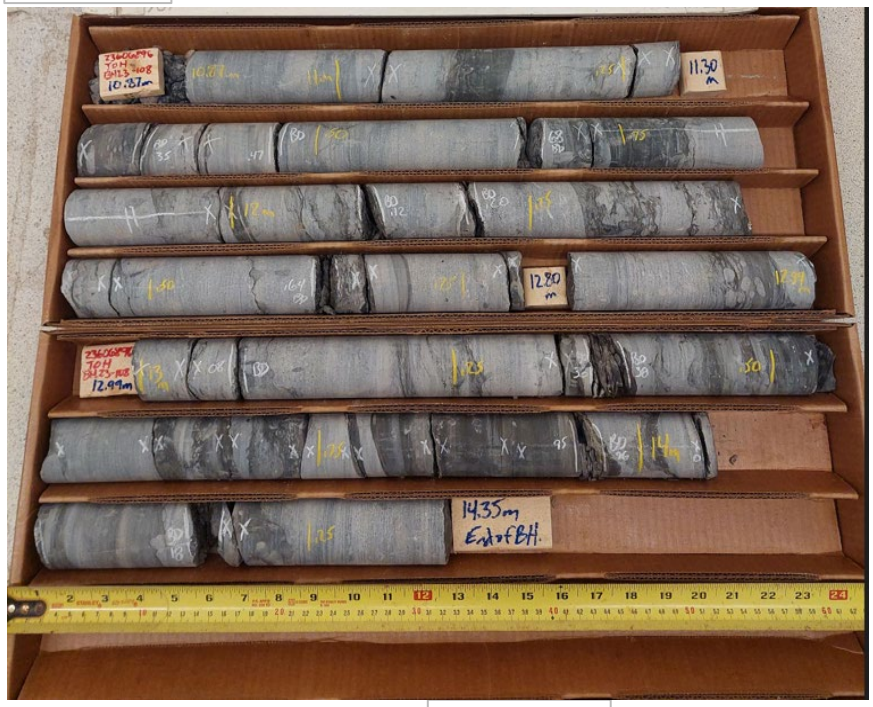
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-29 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-108
Cored Length of 10.87 to 14.35 metres
Core Box 1 of 2

10.87 m




14.35 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
wsp

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| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-108**
**CORE PHOTOGRAPHS**

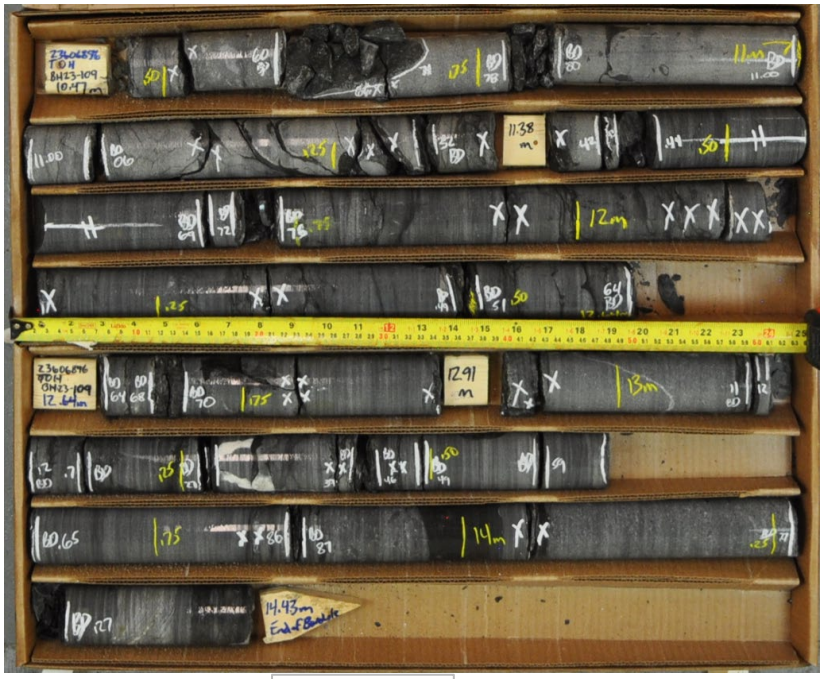
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-30 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-109
Cored Length of 10.47 to 14.43 metres
Core Box 1 of 2

10.47 m




14.43 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

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|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-109**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-31 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-111
Cored Length of 12.90 to 17.33 metres
Core Box 1 of 2

12.90 m

17.33 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
wsp

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-111**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-32 |

0 1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A

BH23-113
Cored Length of 13.34 to 17.45 metres
Core Box 1 of 2

13.34 m

17.45 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-113**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-33 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

23-114
Cored Length of 16.43 to 19.21 metres
Core Box 1 of 1

16.43 m

19.21 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE 23-114**
**CORE PHOTOGRAPHS**

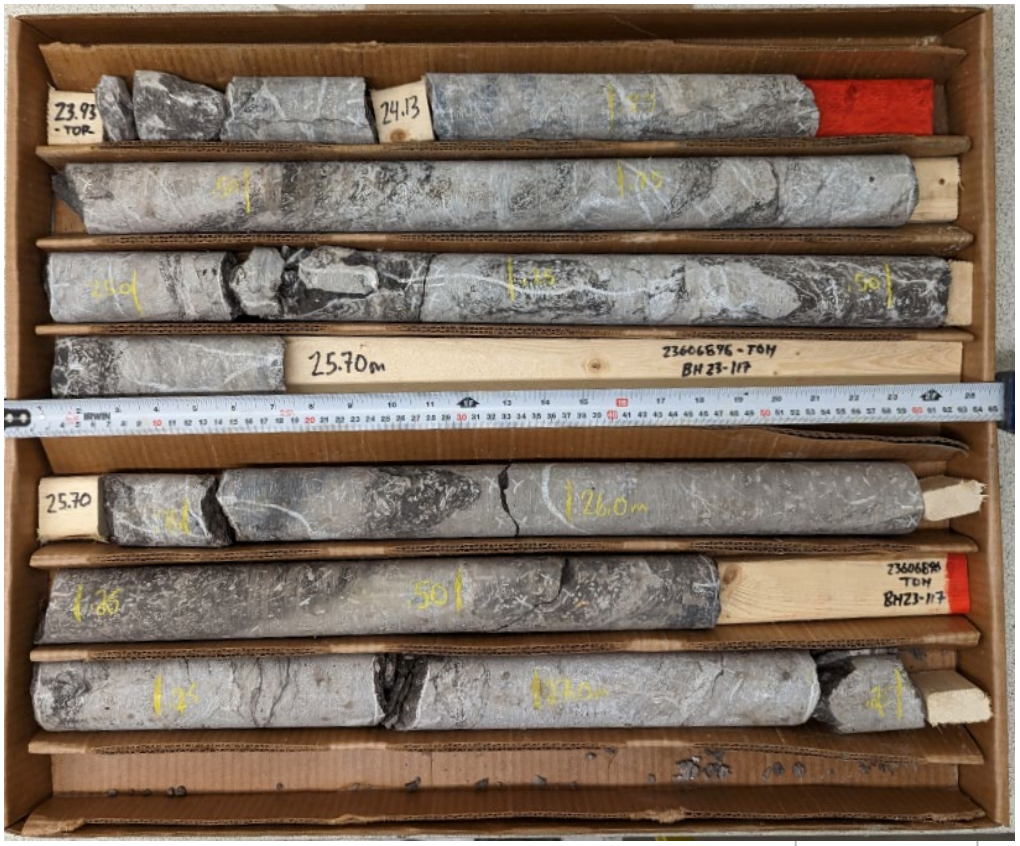
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-34 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-117
Cored Length of 23.93 to 27.26 metres
Core Box 1 of 2

23.93 m




27.26 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | |
| DESIGN | |
| REVIEW | |
| APPROVED | |
| TITLE | **COREHOLE BH23-117**<br>**CORE PHOTOGRAPHS** |

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-35 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-118
Cored Length of 17.06 to 20.66 metres
Core Box 1 of 1

17.06 m

20.66 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
wsp

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-118**
**CORE PHOTOGRAPHS**

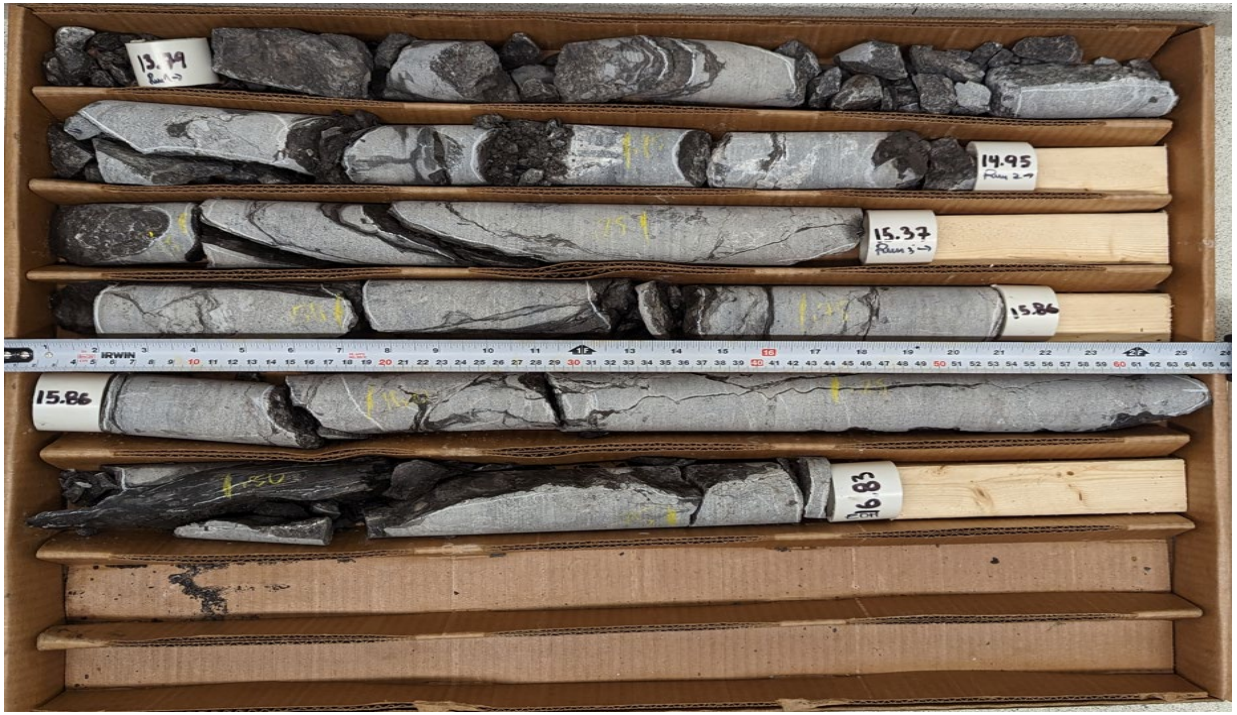
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-36 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-124
Cored Length of 13.79 to 16.83 metres
Core Box 1 of 2

13.79 m




16.83 m

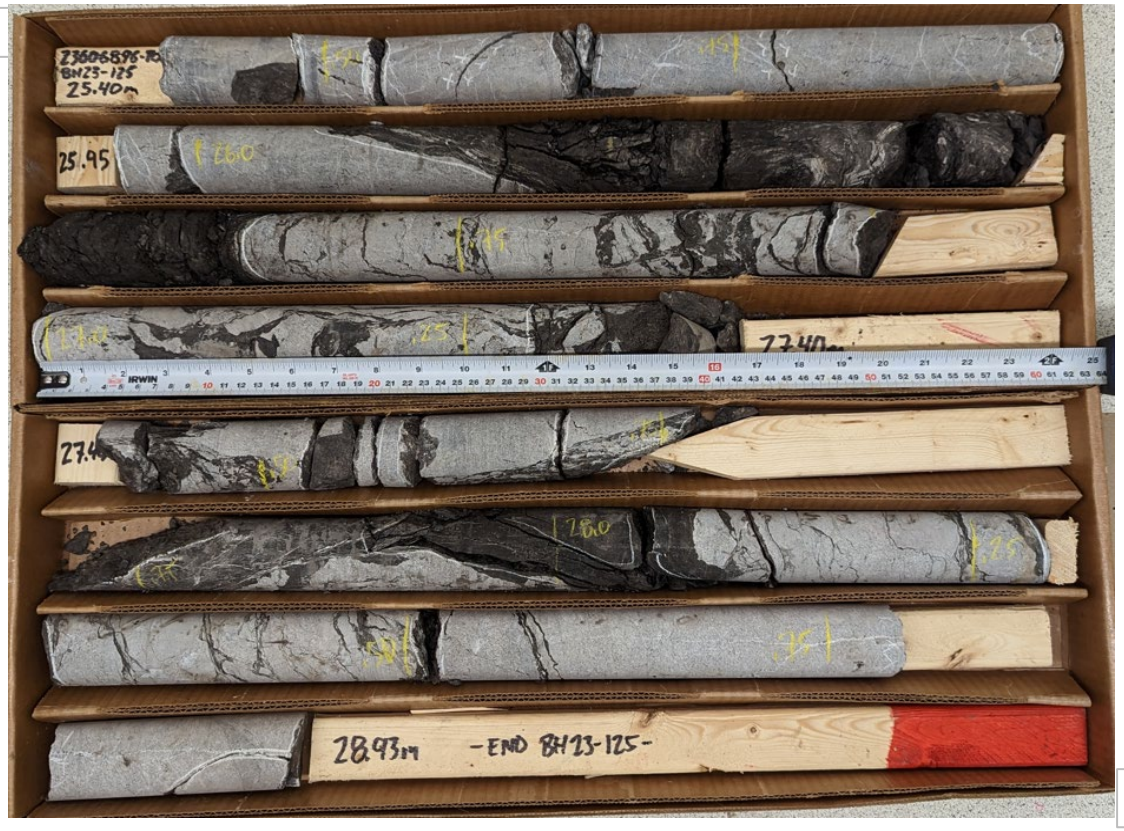
| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |
| TITLE | **COREHOLE BH23-124**<br>**CORE PHOTOGRAPHS** |

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-37 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-125
Cored Length of 25.40 to 28.93 metres
Core Box of

25.4 m




28.93 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |
| TITLE | **COREHOLE BH23-125**<br>**CORE PHOTOGRAPHS** |

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-38 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-133
Cored Length of 10.67 to 14.56 metres
Core Box 1 of 2

10.67 m

14.56 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
wsp

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | 0 |
| APPROVED | |

TITLE
**COREHOLE BH23-133**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-39 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-134
Cored Length of 11.68 to 15.75 metres
Core Box 1 of 2

11.68 m

15.75 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | |
| DESIGN | |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-134**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-40 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-137
Cored Length of 14.86 to 18.24 metres
Core Box 1 of 2

14.86 m

18.24 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

YYY/MM/DD 2023-07-18
PREPARED
DESIGN
REVIEW
APPROVED

TITLE
**COREHOLE BH23-137**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-41 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-135
Cored Length of 10.45 to 13.90 metres
Core Box 1 of 2

10.45 m

13.90 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-135**
**CORE PHOTOGRAPHS**

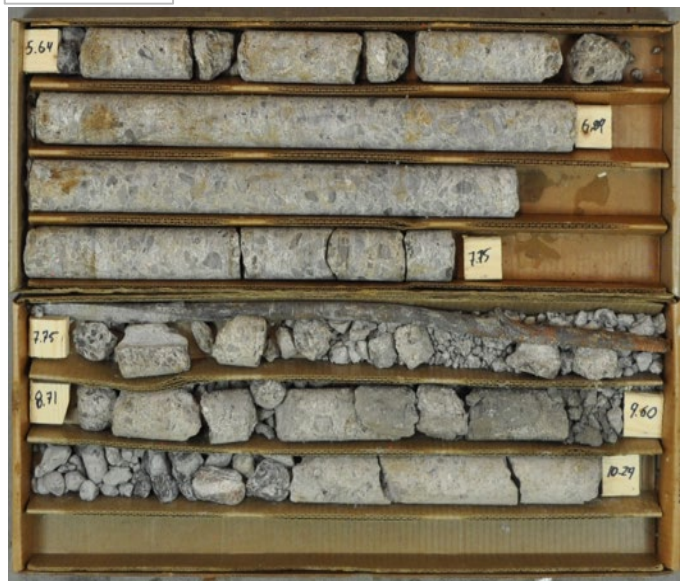
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-42 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-136
Concrete from 5.69 to 10.29 metres
Box 1 of 2

5.69 m




10.29 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | |
| DESIGN | |
| REVIEW | |
| APPROVED | |

TITLE
**CONCRETE IN BH23-136**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-43 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-140
Cored Length of 8.20 to 12.22 metres
Core Box 1 of 2

8.2 m

12.22 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-140**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-44 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-141
Cored Length of 7.16 to 11.30 metres
Core Box 1 of 2

7.16 m

11.30 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-141**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-45 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-142
Cored Length of 7.29 to 11.48 metres
Core Box 1 of 2

7.29 m

11.48 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-142**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-46 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-143
Cored Length of 6.19 to 9.91 metres
Core Box 1 of 2

6.19 m

9.91 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-143**
**CORE PHOTOGRAPHS**

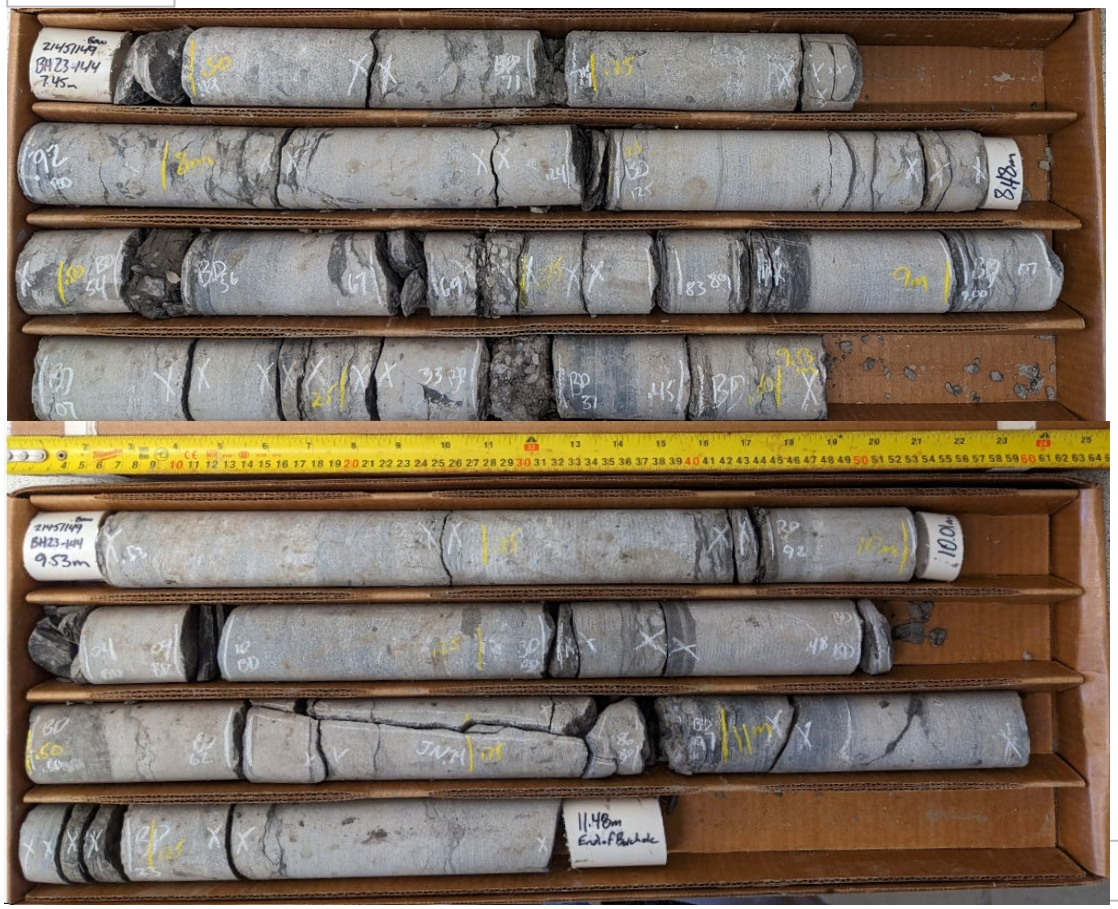
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-47 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-144
Cored Length of 7.45 to 11.48 metres
Core Box 1 of 2

7.45 m




11.48 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |
| TITLE | |

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-48 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-145
Cored Length of 8.38 to 12.27 metres
Core Box 1 of 2

8.38 m

12.27 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |
| TITLE | |

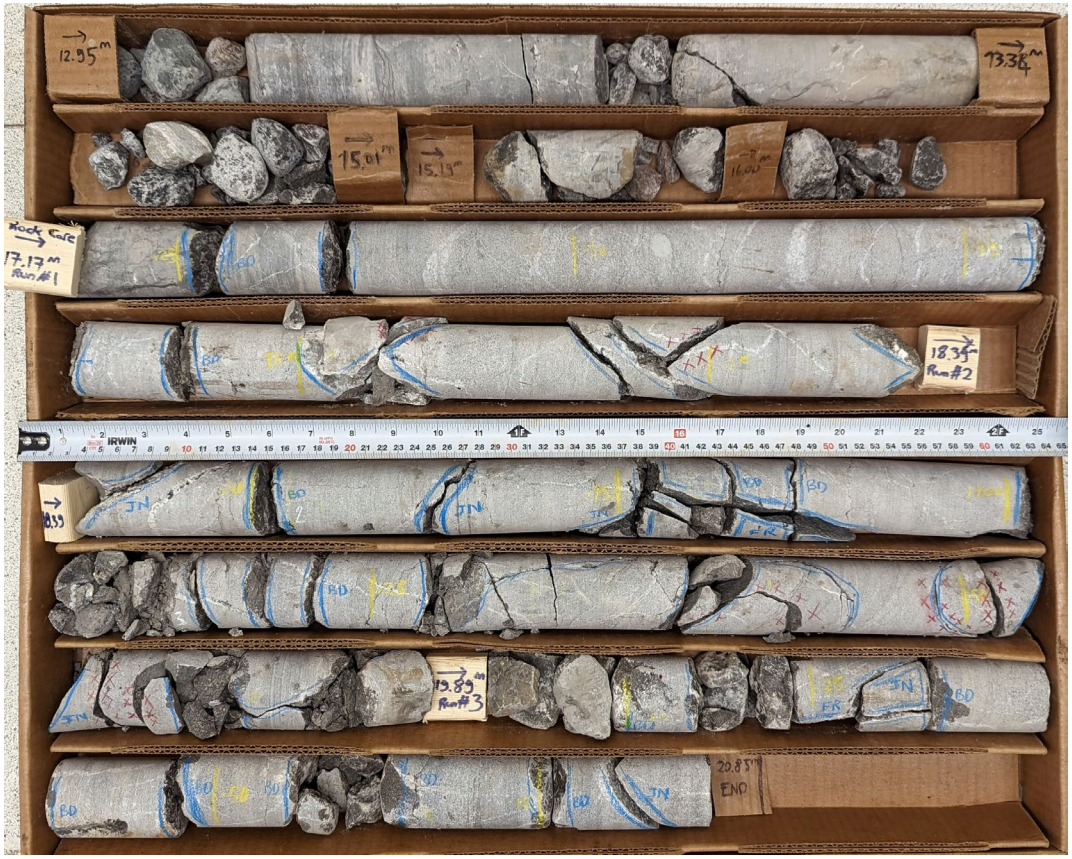
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-49 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/4000 | File: 4000

BH23-146
Cored Length of 17.17 to 20.85 metres
Core Box 1 of 2

17.17 m




20.85 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
wsp

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-146**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 4000 | 1 | B-50 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

# BH23-148
## Cored Length of 10.67 to 14.43 metres
## Core Box 1 of 2

10.67 m

14.43 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | |
| DESIGN | |
| REVIEW | |
| APPROVED | |
| TITLE | **COREHOLE BH23-148**<br>**CORE PHOTOGRAPHS** |
| PROJECT No. | 23606896 |
| PHASE | 4000 |
| Rev. | 1 |
| FIGURE | B-51 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/3000 | File: 3000

BH23-151
Cored Length of 5.52 to 10.88 metres
Core Box 1 of 2

5.52m

10.88 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-151**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 3000 | 1 | B-52 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/3000 | File: 3000

BH23-153
Cored Length of 27.76 to 30.68 metres
Core Box 1 of 2

27.76 m

30.68 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| TITLE | **COREHOLE BH23-153**<br>**CORE PHOTOGRAPHS** |

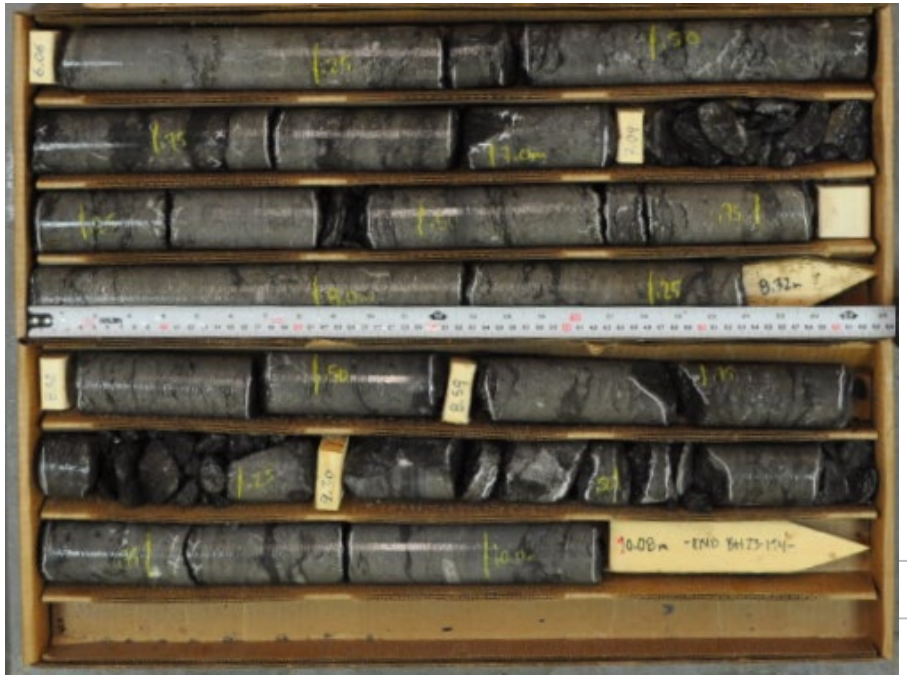
| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 3000 | 1 | B-53 |

0 1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A

Path: https://wsponlinecan.sharepoint.com/sites/CA-23606896/Shared Documents/06. Deliverables/Phase 4000 - Add. boreholes - Main Hospital Report/Geotechnical Data Report (GDR)/App B - Rock Core Photos/3000 | File: 3000

BH23-154
Cored Length of 6.06 to 10.08 metres
Core Box 1 of 2

6.06 m




10.08 m

| | |
|---|---|
| CLIENT | Parsons Inc. |
| PROJECT | PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA |
| CONSULTANT | wsp |
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |
| TITLE | **COREHOLE BH23-154**<br>**CORE PHOTOGRAPHS** |
| PROJECT No. | 23606896 |
| PHASE | 3000 |
| Rev. | 1 |
| FIGURE | B-54 |

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI A
0 1 in

BH23-155
Cored Length of 0.23 to 10.12 metres
Core Box 1 of 2

0.23 m

10.12 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT

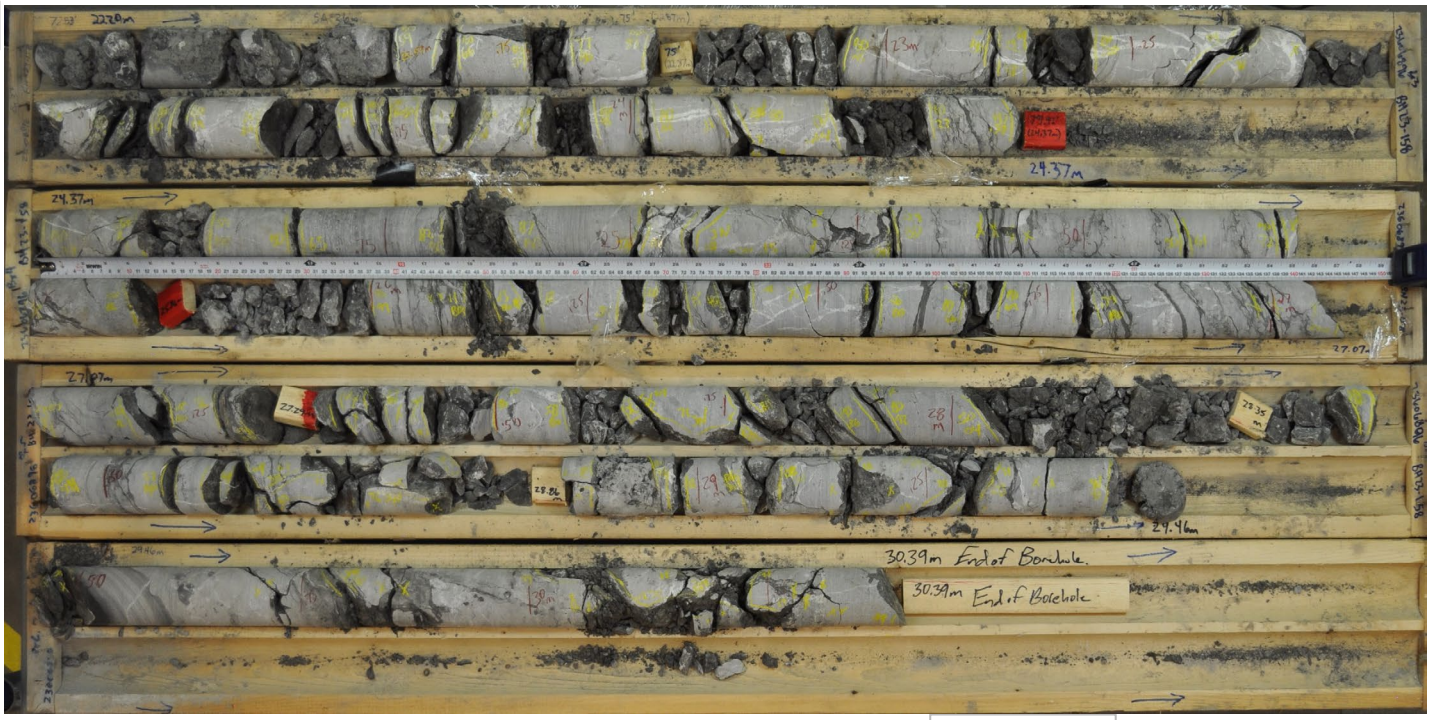
| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-155**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 3000 | 1 | B-55 |

BH23-158
Cored Length of 22.87 to 30.39 metres
Core Box 1 of 2

22.87 m




30.39 m

CLIENT
Parsons Inc.

PROJECT
PARSONS/ OTTAWA HOSPITAL EXPANSION/ OTTAWA

CONSULTANT
wsp

| | |
|---|---|
| YYY/MM/DD | 2023-07-18 |
| PREPARED | PAK |
| DESIGN | PAK |
| REVIEW | |
| APPROVED | |

TITLE
**COREHOLE BH23-158**
**CORE PHOTOGRAPHS**

| PROJECT No. | PHASE | Rev. | FIGURE |
|---|---|---|---|
| 23606896 | 3000 | 1 | B-56 |

# RECORD OF AUGER PROBE AP - 2

SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-2044

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (M) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3M | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O) | HYDRAULIC CONDUCTIVITY, k, CM/SEC / WATER CONTENT, PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Power Auger 150mm Diam (Solid Stem) | Ground Surface | | | | | | | | | |
| | | ASPHALT | | | | | | | | | |
| | | Grey silty sand, some gravel (FILL) | | 0.06 | | | | | | | |
| | | Brown silty sand (FILL) | | 0.49 | | | | | | | |
| 1 | | | | 0.82 | | | | | | | |
| 2 | | Probably grey brown to grey silty sand, some gravel, trace clay, occasional cobble and boulder (GLACIAL TILL) | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| | | End of Hole | | 6.10 | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

0 / 15 / 10 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 50

Golder Associates

LOGGED S.Leighton

CHECKED CRM

# RECORD OF AUGER PROBE AP-3

SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-2044

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (M) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3M | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m | HYDRAULIC CONDUCTIVITY, k, CM/SEC | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | Ground Surface | | | | | | SHEAR STRENGTH Cu, kPa; nat.V.- + Q.- ● rem.V.- ⊕ U.- O | WATER CONTENT, PERCENT Wp W Wl | | |
| | | ASPHALT | | 0.00 | | | | | | | |
| | | Brown silty sand, some gravel (FILL) | | 0.23 | | | | | | | |
| 1 | | | | 0.98 | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | Power Auger 150mm Diam (Solid Stem) | Probably grey brown to grey silty clay becoming silty sand, some gravel, trace clay, occasional cobble and boulder (GLACIAL TILL) | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| | | End of Hole | | 9.14 | | | | | | | |
| 10 | | | | | | | | | | | |

0 / 16 / 10 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 50

Golder Associates

LOGGED S.Leighton

CHECKED CRM

# RECORD OF AUGER PROBE AP-4

SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-2044

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (M) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3M | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m | SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O) | HYDRAULIC CONDUCTIVITY, k, CM/SEC | WATER CONTENT, PERCENT (Wp W Wl) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Power Auger 150mm Diam (Solid Stem) | Ground Surface | | | | | | | | | | | |
| | | ASPHALT | | 0.00 | | | | | | | | | |
| | | Dark grey silty sand, some gravel (FILL) | | 0.09 | | | | | | | | | |
| | | | | 0.21 | | | | | | | | | |
| 1 | | Brown silty sand, trace gravel (Probably Fill) | | | | | | | | | | | |
| | | | | 1.28 | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 3 | | Probably grey brown to grey SILTY CLAY | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| | | End of Hole | | 6.10 | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

16 (0 / 10) 6 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 50

Golder Associates

LOGGED S.Leighton

CHECKED CRMM

# RECORD OF AUGER PROBE AP-5

SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-2044

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (M) | SAMPLES: NUMBER | TYPE | BLOWS/0.3M | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m | HYDRAULIC CONDUCTIVITY, k, CM/SEC | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | Ground Surface | | | | | | SHEAR STRENGTH Cu, kPa nat.V.- + Q.- ● rem.V.- ⊕ U.- O | WATER CONTENT, PERCENT Wp W Wl (20 40 60 80) | | |
| | | ASPHALT | | 0.00 | | | | | | | |
| | | Grey silty sand and gravel (FILL) | | 0.09 | | | | | | | |
| | | | | 0.37 | | | | | | | |
| 1 | | Very stiff grey brown SILTY CLAY, trace sand and gravel (Weathered Crust) | | | 1 | 50 DO | 16 | | | | |
| 2 | | | | | 2 | 50 DO | 10 | | | | |
| | | | | 2.16 | | | | | | | |
| 3 | | | | | 3 | 50 DO | 25 | | | | |
| 4 | Power Auger | | | | | | | | | | |
| 5 | | Grey brown to grey silty sand some gravel, trace clay, occasional cobble and boulder (GLACIAL TILL) | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| | | End of Hole | | 8.63 | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

0 / 15 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 50

Golder Associates

LOGGED S.Leighton

CHECKED CRM

# RECORD OF AUGER PROBE AP-6

SHEET 1 of 1

LOCATION See Figure 2

BORING DATE Feb.5,1988

DATUM GEODETIC

SAMPLER HAMMER, 63.5kg, DROP, 760mm

PENETRATION TEST HAMMER, 63.5kg, DROP, 760mm

PROJECT 881-2044

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. / DEPTH (M) | SAMPLES: NUMBER | SAMPLES: TYPE | SAMPLES: BLOWS/0.3M | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m | SHEAR STRENGTH Cu, kPa (nat.V.- + Q.- ● rem.V.- ⊕ U.- O) | HYDRAULIC CONDUCTIVITY, k, CM/SEC | WATER CONTENT, PERCENT (Wp, W, Wl; 20 40 60 80) | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | Ground Surface | | | | | | | | | | | |
| | | Medium brown silty sand, trace organic matter (FILL) | | 0.00 | | | | | | | | | |
| | | | | 0.24 | | | | | | | | | |
| 1 | | Medium brown silty sand, trace gravel (FILL) | | | | | | | | | | | |
| | | | | 1.25 | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 4 | Power Auger 150mm Diam (Hollow Stem) | Probably grey brown to grey silty sand, some gravel, trace clay, occasional cobble and boulder (GLACIAL TILL) | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| | | End of Hole | | 9.14 | | | | | | | | | |
| 10 | | | | | | | | | | | | | |

0 / 15 / 10 PERCENT AXIAL STRAIN AT FAILURE

DEPTH SCALE

1 : 50

Golder Associates

LOGGED S.Leighton

CHECKED CRM

# Monitoring Well: MW16-1

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | GM100 (Direct Push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 14-Mar-2016 |
| **Location:** | Sir John Carling Building | **Ground surface elevation:** | 97.46 m RTD |
| **Number:** | 122511246 | **Top of casing elevation:** | 97.37 m RTD |
| **Field investigator:** | J. Urben / B. Chenier | **Easting:** | 444332.2 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026985.7 |

| Depth (ft) | Depth (m) | Graphic Log | Lithologic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ground Surface | 97.46 | | | | | | | |
| | | | TOPSOIL<br>moist to wet | 0.00<br>97.38 | | | | | | | Flushmount protective cover with concrete seal |
| | | | CRUSHED CONCRETE (FILL)<br>grey, silt, trace clay, dry | 0.08 | 1 | DP | 17"<br>28% | pH, Phenols | <5 ● ○ <0.02 | | |
| 5 | | | | 95.94 | | | | | | | |
| | 2 | | SANDY SILT (FILL)<br>brown, trace gravel, trace concrete dust, dry | 1.52 | 2 | DP | 47"<br>78% | | <5 ● ○ 1.0 | | Bentonite backfill<br>50 mm ID PVC pipe |
| 10 | | | | 94.41 | | | | | | | |
| | | | SANDY SILT (FILL)<br>grey, gravel, crushed concrete, brick fragments, dry | 3.05 | 3 | DP | 31"<br>52% | Explosives | <5 ● ○ 1.0 | | |
| | 4 | | | | | | | | | | |
| 15 | | | - becomes grey | | 4 | DP | 26"<br>43% | Metals & Inorganics, Phenols | <5 ● ○ 1.0 | | Groundwater Level: 5.29 m BGS 17-Mar-16 |
| 20 | 6 | | - becomes moist to wet | | 5 | DP | 30"<br>50% | PHC, VOC, PAH, Field Duplicate | 10 ● ○ <0.02 | | Silica sand backfill<br>50 mm ID slotted PVC pipe |
| | | | | 90.45 | | | | | | | |
| | | | CLAY<br>grey, moist, black staining at 7.5 m BGS | 7.01 | | | | | | | |
| 25 | 8 | | - becomes wet | | 6 | DP | 30"<br>50% | | <5 ● ○ 1.0 | | |
| | | | | 88.32 | | | | | | | Slough |
| 30 | | | End of Borehole | 9.14 | | | | | | | |

Screen Interval: 5.64 - 8.69 m BGS
Sand Pack Interval: 5.33 - 8.69 m BGS
Well Seal Interval: 0.23 - 5.33 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

Field Duplicate - MW16-1A SS5

Stantec

Drawn By/Checked By: M. Ford



STANTEC BOREHOLE AND WELL V2 122511246.GPJ STANTEC - DATA TEMPLATE.GDT 3/29/16 MFORD

# Borehole: BH16-2

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | GM100 (Direct Push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 14-Mar-2016 |
| **Location:** | Sir John Carling Building | **Ground surface elevation:** | 99.32 m RTD |
| **Number:** | 122511246 | **Top of casing elevation:** | n/a |
| **Field investigator:** | J. Urben / B. Chenier | **Easting:** | 444365.8 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026932.5 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Lithologic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 ppm OTOV Comb● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 99.32 | | | | | | | |
| | | | TOPSOIL | 0.00 | | | | | | | |
| | | | CLAYEY SILT<br>brown with orange mottling, sand, gravel, dry | 99.17<br>0.15 | 1 | DP | 21"<br>70% | Explosives, PAH, Metals | <5 ● ○ <0.02 | | |
| | | | | | 2a | DP | 19"<br>63% | | <5 ● ○ <0.02 | | |
| 5 | | | | 97.80 | | | | | | | |
| | | | SILTY SAND<br>grey-brown, with gravel, moist | 1.52 | 2b | DP | 19"<br>32% | | <5 ● ○ <0.02 | | |
| | 2 | | | | | | | | | | |
| 10 | | | - becomes grey, dry | | 3 | DP | 24"<br>40% | | <5 ● ○ <0.02 | | |
| | 4 | | | | | | | | | | |
| 15 | | | - with silt, moist | | 4 | DP | 12"<br>20% | VOC, PHC | <5 ● ○ <0.02 | | Bentonite backfill |
| | 6 | | | 93.22 | | | | | | | |
| 20 | | | No soil samples recovered | 6.10 | | | | | | | |
| | | | | 91.70 | | | | | | | |
| 25 | | | CLAY<br>grey, gravel, trace silt, wet | 7.62 | 6 | DP | 12"<br>20% | | <5 ● ○ <0.02 | | |
| | 8 | | | 90.18 | | | | | | | |
| 30 | | | End of Borehole | 9.14 | | | | | | | |

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

Stantec

Drawn By/Checked By: M. Ford



STANTEC BOREHOLE AND WELL V2 122511246.GPJ STANTEC - DATA TEMPLATE.GDT 3/29/16 MFORD

# Monitoring Well: MW16-3

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | GM100 (Direct Push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 14-Mar-2016 |
| **Location:** | Sir John Carling Building | **Ground surface elevation:** | 98.02 m RTD |
| **Number:** | 122511246 | **Top of casing elevation:** | 97.96 m RTD |
| **Field investigator:** | J. Urben / B. Chenier | **Easting:** | 444386.4 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026952 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS |
|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Lithologic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV ● Comb 200 400 600 800 | Diagram / Description |
| | | | Ground Surface | 98.02 | | | | | | |
| | | | TOPSOIL | 0.00<br>97.76 | | | | | | Flushmount protective cover with concrete seal |
| | | | CRUSHED CONCRETE (FILL)<br>with sand, gravel, dry | 0.26 | 1 | DP | 9"<br>15% | Phenols | <5 ● ○ <0.02 | Bentonite backfill |
| 5 | | | - brick fragments | | | | | | | 50 mm ID PVC pipe |
| | 2 | | | | 2 | DP | 14"<br>23% | PAH, Metals & Inorganics | <5 ● ○ <0.02 | |
| 10 | | | | 94.97 | | | | | | |
| | | | SAND (FILL)<br>brown, gravel, dry | 3.05 | 3 | DP | 10"<br>17% | Phenols, Explosives | | Groundwater Level: 3.80 m BGS 17-Mar-16 |
| | 4 | | | 93.45 | | | | | | Silica sand backfill |
| 15 | | | GRAVEL (FILL)<br>trace silt, moist | 4.57 | 4 | DP | 11"<br>18% | VOC, pH, PHC | | 50 mm ID slotted PVC pipe |
| 20 | 6 | | - with silt, trace clay, wet | 91.62 | | | | | | |
| | | | CLAY<br>grey, with gravel, wet | 6.40 | 5 | DP | 31"<br>52% | | <5 ● ○ <0.02 | |
| 25 | | | - trace sand | | | | | | | Silica sand backfill |
| | 8 | | | | 6 | DP | 38"<br>63% | | <5 ● ○ <0.02 | |
| 30 | | | | 88.88 | | | | | | |
| | | | End of Borehole | 9.14 | | | | | | |

Screen Interval: 3.05 - 6.10 m BGS
Sand Pack Interval: 2.74 - 9.14 m BGS
Well Seal Interval: 0.23 - 2.74 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

Stantec

Drawn By/Checked By: M. Ford



STANTEC BOREHOLE AND WELL V2 122511246.GPJ STANTEC - DATA TEMPLATE.GDT 3/29/16 MFORD

# Borehole: BH16-4

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | GM100 (Direct Push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 14-Mar-2016 |
| **Location:** | Sir John Carling Building | **Ground surface elevation:** | 94.29 m RTD |
| **Number:** | 122511246 | **Top of casing elevation:** | n/a |
| **Field investigator:** | J. Urben / B. Chenier | **Easting:** | 444468.1 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026816 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Lithologic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 94.29 | | | | | | | |
| | | | SILTY SAND<br>grey, trace clay, gravel, moist | 0.00 | 1 | DP | 24"<br>40% | PAH, Metals, Explosives, Field Duplicate | <5 ● ○ <0.02 | | |
| 5 | | | | 92.51 | | | | | | | |
| | 2 | | SAND<br>coarse to medium grained, with gravel | 1.78 | 2 | DP | 24"<br>40% | Glycol, pH | <5 ● ○ <0.02 | | |
| | | | | 91.24 | | | | | | | |
| 10 | | | SILTY SAND<br>grey, with clay, gravel, wet | 3.05 | 3 | DP | 36"<br>60% | VOC, PHC | <5 ● ○ <0.02 | | Bentonite backfill |
| | 4 | | | | | | | | | | |
| 15 | | | | | 4 | DP | 29"<br>81% | | <5 ● ○ <0.02 | | |
| | | | | | 5 | DP | 29"<br>121% | | <5 ● ○ <0.02 | | |
| 20 | 6 | | | | 6 | DP | 36"<br>100% | | <5 ● ○ <0.02 | | |
| | | | | 87.28 | | | | | | | |
| | | | Refusal on inferred bedrock<br>End of Borehole | 7.01 | | | | | | | |
| 25 | | | | | | | | | | | |
| | 8 | | | | | | | | | | |
| 30 | | | | | | | | | | | |

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

Field Duplicate - BH16-4 SS7 (for Metals Only)

Stantec

Drawn By/Checked By: M. Ford



STANTEC BOREHOLE AND WELL V2 122511246.GPJ STANTEC - DATA TEMPLATE.GDT 3/29/16 MFORD

# Monitoring Well: MW16-5

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | GM100 (Direct Push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 14-Mar-2016 |
| **Location:** | Sir John Carling Building | **Ground surface elevation:** | 96.18 m RTD |
| **Number:** | 122511246 | **Top of casing elevation:** | 96.10 m RTD |
| **Field investigator:** | J. Urben / B. Chenier | **Easting:** | 444404.1 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026972.9 |

| Depth (ft) | Depth (m) | Graphic Log | Lithologic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV ● Comb 200 400 600 800 | Diagram | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ground Surface | 96.18 | | | | | | | |
| | | | SAND (FILL)<br>brown, clay, gravel, dry | 0.00 | | | | | | | Flushmount protective cover with concrete seal |
| | | | | | 1 | DP | 11"<br>18% | VOC, PHC, PAH, Metals & Inorganics, Explosives | <5 ● ○ <0.02 | | |
| 5 | | | - becomes grey, moist | | | | | | | | Bentonite backfill |
| | 2 | | | | | | | | | | 50 mm ID PVC pipe |
| | | | | 93.74 | 2 | DP | 36"<br>60% | Glycol, Field Duplicate | <5 ● ○ <0.02 | | Groundwater Level: 2.28 m BGS 17-Mar-16 |
| | | | SILTY SAND<br>grey, gravel | 2.44 | | | | | | | |
| 10 | | | - trace clay, moist to wet | | | | | | | | |
| | 4 | | | | 3 | DP | 37"<br>62% | | <5 ● ○ <0.02 | | |
| 15 | | | | | | | | | | | Silica sand backfill |
| | | | | | 4 | DP | 27"<br>45% | | <5 ● ○ <0.02 | | 50 mm ID slotted PVC pipe |
| 20 | 6 | | | | | | | | | | |
| | | | | 89.47 | 5 | DP | 19"<br>79% | | <5 ● ○ <0.02 | | |
| | | | Refusal on inferred bedrock<br>End of Borehole | 6.71 | | | | | | | |
| 25 | | | | | | | | | | | |
| | 8 | | | | | | | | | | |
| 30 | | | | | | | | | | | |

Screen Interval: 3.05 - 6.10 m BGS
Sand Pack Interval: 2.74 - 6.71 m BGS
Well Seal Interval: 0.23 - 2.74 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

Field Duplicate - MW16-5 SS7

Stantec

Drawn By/Checked By: M. Ford



STANTEC BOREHOLE AND WELL V2 122511246.GPJ STANTEC - DATA TEMPLATE.GDT 3/29/16 MFORD

# Monitoring Well: MW16-6

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | GM100 (Direct Push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 11-Mar-2016 / 14-Mar-2016 |
| **Location:** | Sir John Carling Building | **Ground surface elevation:** | 94.85 m RTD |
| **Number:** | 122511246 | **Top of casing elevation:** | 94.82 m RTD |
| **Field investigator:** | J. Urben / B. Chenier | **Easting:** | 444454.1 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026972.9 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Lithologic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV ● Comb 200 400 600 800 | Diagram / Description |
| | | | Ground Surface | 94.85 | | | | | | |
| | | | SILTY CLAY (FILL)<br>grey, gravel, moist | 0.00 | 1 | DP | 0"<br>0% | Phenols, Explosives, PAH, Metals & Inorganics | | Flushmount protective cover with concrete seal |
| 5 | | | | | | | | | | Groundwater Level: 0.73 m BGS 17-Mar-16 |
| | 2 | | | | 2 | DP | 12"<br>50% | | <5 ● ○ <0.02 | Bentonite backfill |
| | | | | 92.72 | | | | | | 50 mm ID PVC pipe |
| | | | SILTY SAND<br>brown, trace clay, soft, moist | 2.13 | 3 | DP | 18"<br>50% | VOC, pH | <5 ● ○ <0.02 | |
| 10 | | | - gravel, wet | | 4 | DP | 24"<br>80% | | <5 ● ○ <0.02 | |
| | 4 | | | | | | | | | Silica sand backfill |
| | | | - seam of coarse brown sand | | 5 | DP | 24"<br>80% | | <5 ● ○ <0.02 | 50 mm ID slotted PVC pipe |
| 15 | | | - becomes grey | | 6 | DP | 27"<br>45% | | <5 ● ○ <0.02 | |
| 20 | 6 | | | | 7 | DP | 24"<br>50% | PHC | 220 ● ○ <0.02 | Slough |
| | | | | 87.54 | | | | | | |
| | | | Refusal on inferred bedrock<br>End of Borehole | 7.32 | | | | | | |
| 25 | | | | | | | | | | |
| | 8 | | | | | | | | | |
| 30 | | | | | | | | | | |

Screen Interval: 2.59 - 5.64 m BGS
Sand Pack Interval: 2.29 - 5.64 m BGS
Well Seal Interval: 0.23 - 2.29 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

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STANTEC BOREHOLE AND WELL V2 122511246.GPJ STANTEC - DATA TEMPLATE.GDT 3/29/16 MFORD

# Monitoring Well: MW16-7

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | GM100 (Direct Push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 14-Mar-2016 |
| **Location:** | Sir John Carling Building | **Ground surface elevation:** | 95.47 m RTD |
| **Number:** | 122511246 | **Top of casing elevation:** | 95.36 m RTD |
| **Field investigator:** | J. Urben / B. Chenier | **Easting:** | 444336.2 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5027014.9 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS |
|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Lithologic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 95.47 | | | | | | | |
| | | | TOPSOIL with grass, sand, dry | 0.00<br>95.16 | | | | | | | |
| | | | SILTY CLAY<br>brown, soft, dry | 0.30 | 1 | DP | 24"<br>100% | | ●<br>○ <5<br><0.02 | | Flushmount protective cover with concrete seal |
| | | | | | 2 | DP | 24"<br>67% | Phenols, Metals, Explosives, PAH | ●<br>○ <5<br><0.02 | | Bentonite backfill |
| 5 | 2 | | | | 3 | DP | 36"<br>60% | | ●<br>○ <5<br>1.0 | | 50 mm ID PVC pipe |
| | | | | 92.73 | | | | | | | |
| | | | SILTY SAND<br>brown, coarse grained sand, gravel<br>- becomes wet | 2.74 | 4 | DP | 24"<br>80% | PHC, VOC, Field Duplicate | ●<br>○ 60<br><0.02 | | |
| 10 | 4 | | - grey | | 5 | DP | 30"<br>100% | | ●<br>○ <5<br><0.02 | | |
| | | | | 90.90 | | | | | | | |
| 15 | | | SILTY SAND<br>grey, trace clay, gravel, moist | 4.57 | 6 | DP | 36"<br>60% | | ●<br>○ <5<br><0.02 | | Groundwater Level: 4.79 m BGS 17-Mar-16 |
| 20 | 6 | | | | 7 | DP | 30"<br>50% | | ●<br>○ <5<br><0.02 | | Silica sand backfill<br>50 mm ID slotted PVC pipe |
| 25 | 8 | | | | 8 | DP | 28"<br>47% | | ●<br>○ <5<br><0.02 | | Slough |
| 30 | | | | 86.33 | | | | | | | |
| | | | End of Borehole | 9.14 | | | | | | | |

Screen Interval: 3.66 - 6.71 m BGS
Sand Pack Interval: 3.35 - 6.71 m BGS
Well Seal Interval: 0.23 - 3.35 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

PAH - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOC - volatile organic compounds

Field Duplicate - MW16-2A SS4

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STANTEC BOREHOLE AND WELL V2 122511246.GPJ STANTEC - DATA TEMPLATE.GDT 3/29/16 MFORD

# Monitoring Well: MW17-05

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | Geoprobe (direct push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 26-Jul-2017 |
| **Location:** | 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario | **Ground surface elevation:** | 94.49 m RTD |
| **Number:** | 122170088 | **Top of casing elevation:** | 94.39 m RTD |
| **Field investigator:** | A. Parrott | **Easting:** | 444231.6325 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026850.536 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Stratigraphic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 94.49 | | | | | | | |
| 1 | | | TOPSOIL<br>black-brown, organics, moist | 0.00 | | | | | | | |
| 2 | 0.5 | | | 93.88 | 1 | DP | 100% | H-P, Metals, PAHs, Phenols, VOCs | <5 ● ○ <0.02 | | Flushmount protective cover with concrete seal |
| 3 | | | SILT<br>brown-grey, moist | 0.61 | | | | | | | |
| 4 | 1.0 | | | | 2 | | | PHC F1-F4 | <5 ● ○ <0.02 | | Backfilled with bentonite |
| 5 | 1.5 | | | | | | | | | | |
| 6 | | | | | 3 | | | | <5 ● ○ <0.02 | | 50 mm ID PVC pipe |
| 7 | 2.0 | | | 92.05 | | DP | 100% | | | | |
| 8 | 2.5 | | SILTY SAND<br>brown, trace gravel, wet | 2.44 | | | | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | | | |
| 9 | | | | | 4 | | | | <5 ● ○ <0.02 | | |
| 10 | 3.0 | | - brown-grey | | | | | | | | |
| 11 | | | | | 5 | | | | <5 ● ○ <0.02 | | Groundwater Level: 3.43 m BGS 3-Aug-17 |
| 12 | 3.5 | | - grey | | | | | | | | |
| 13 | 4.0 | | | | | DP | 80% | | | | |
| 14 | | | | | 6 | | | | <5 ● ○ <0.02 | | |
| 15 | 4.5 | | | | | | | | | | Backfilled with silica sand |
| 16 | | | | | 7 | | | | <5 ● ○ <0.02 | | |
| 17 | 5.0 | | | | | | | | | | 50 mm ID slotted PVC pipe |
| 18 | 5.5 | | | | | DP | 80% | | | | |
| 19 | | | | | 8 | | | | <5 ● ○ <0.02 | | |
| 20 | 6.0 | | | 88.39 | | | | | | | |
| 21 | | | End of Borehole | 6.10 | | | | | | | |
| 22 | 6.5 | | | | | | | | | | |
| 23 | 7.0 | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | 7.5 | | | | | | | | | | |
| 26 | 8.0 | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | 8.5 | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | 9.0 | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | 9.5 | | | | | | | | | | |
| 33 | 10.0 | | | | | | | | | | |
| 34 | 10.5 | | | | | | | | | | |

Screen Interval: 3.05 - 6.10 m BGS
Sand Pack Interval: 2.74 - 6.10 m BGS
Well Seal Interval: 0.23 - 2.74 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

H-P - herbicides and pesticides
PAHs - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOCs - volatile organic compounds
Comb - combustible soil vapour
TOV - total organic vapour

Stantec

Drawn By/Checked By: T. Pawlick / J. Yaraskavitch



STANTEC BOREHOLE AND WELL V2 DRAFT_122170088_BHLOGS.GPJ STANTEC - DATA TEMPLATE.GDT 8/22/17 TPAWLICK

# Monitoring Well: MW17-06

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | Geoprobe (direct push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 26-Jul-2017 |
| **Location:** | 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario | **Ground surface elevation:** | 95.09 m RTD |
| **Number:** | 122170088 | **Top of casing elevation:** | 95.03 m RTD |
| **Field investigator:** | A. Parrott | **Easting:** | 444175.7424 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026815.478 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Stratigraphic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 95.09 | | | | | | | |
| 1 | | | TOPSOIL<br>black-brown, organics, moist | 0.00<br>94.78 | | | | | | | |
| 2 | 0.5 | | SANDY SILT<br>brown, trace gravel, moist | 0.30 | 1 | DP | 75% | H-P, Metals, PAHs, Phenols, VOCs | | | |
| 3 | 1.0 | | | 93.87 | | | | | <5 | | |
| 4 | | | SILTY SAND<br>brown, trace gravel, moist to wet | 1.22 | 2 | | | PHC F1-F4 | ● 1<br>○ | | Flushmount protective cover with concrete seal<br>Backfilled with bentonite<br>50 mm ID PVC pipe |
| 5 | 1.5 | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | 2.0 | | | | | | | | | | |
| 8 | 2.5 | | | | 3 | DP | 50% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5<br>● ○ <0.02 | | Backfilled with silica sand |
| 9 | | | | | | | | | | | |
| 10 | 3.0 | | - brown-grey | | | | | | | | 50 mm ID slotted PVC pipe |
| 11 | | | | | 4 | | | | <5 | | |
| 12 | 3.5 | | | | | | | | ● ○ <0.02 | | |
| 13 | 4.0 | | | | | DP | n/a | | <5 | | |
| 14 | | | | 90.82 | 5 | | | | ● ○ <0.02 | | |
| 15 | 4.5 | | SAND<br>brown, wet | 4.27<br>90.48 | | | | | | | Groundwater Level: dry on 3-Aug-17 |
| 16 | | | Refusal at inferred bedrock<br>End of Borehole | 4.60 | 6 | DP | n/a | | ● ○ <0.02 | | |
| 17 | 5.0 | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | 5.5 | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | 6.0 | | | | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | 6.5 | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | 7.0 | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | 7.5 | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | 8.0 | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | 8.5 | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | 9.0 | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| | 9.5 | | | | | | | | | | |
| | 10.0 | | | | | | | | | | |
| | 10.5 | | | | | | | | | | |

Screen Interval: 1.55 - 4.60 m BGS
Sand Pack Interval: 1.25 - 4.60 m BGS
Well Seal Interval: 0.23 - 1.25 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

H-P - herbicides and pesticides
PAHs - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOCs - volatile organic compounds
Comb - combustible soil vapour
TOV - total organic vapour

Stantec

Drawn By/Checked By: T. Pawlick / J. Yaraskavitch



STANTEC BOREHOLE AND WELL V2 DRAFT_122170088_BHLOGS.GPJ STANTEC - DATA TEMPLATE.GDT 8/22/17 TPAWLICK

# Monitoring Well: MW17-07

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | Geoprobe (direct push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 26-Jul-2017 |
| **Location:** | 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario | **Ground surface elevation:** | 94.64 m RTD |
| **Number:** | 122170088 | **Top of casing elevation:** | 94.58 m RTD |
| **Field investigator:** | A. Parrott | **Easting:** | 444240.9625 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026754.904 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Stratigraphic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 94.64 | | | | | | | |
| | | | TOPSOIL<br>black, organics, moist | 0.00<br>94.34 | | | | | | | Flushmount protective cover with concrete seal |
| | | | SILTY SAND<br>brown, trace gravel, moist to wet | 0.30 | 1 | DP | 40% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | Backfilled with bentonite |
| | | | | | 2 | DP | 40% | | <5 ● ○ <0.02 | | 50 mm ID PVC pipe |
| | | | | | 3 | DP | 100% | | <5 ● ○ <0.02 | | |
| | | | - brown-grey | | 4 | | | | <5 ● ○ <0.02 | | Backfilled with silica sand |
| | | | | | 5 | DP | 50% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | Groundwater Level: 4.58 m BGS 3-Aug-17 |
| | | | - wet | | | | | | | | 50 mm ID slotted PVC pipe |
| | | | | | 6 | DP | 25% | | <5 ● ○ <0.02 | | |
| | | | | 87.02 | | | | | | | Slough |
| | | | End of Borehole | 7.62 | | | | | | | |

Screen Interval: 3.66 - 6.71 m BGS
Sand Pack Interval: 3.35 - 7.01 m BGS
Well Seal Interval: 0.23 - 3.35 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

H-P - herbicides and pesticides
PAHs - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOCs - volatile organic compounds
Comb - combustible soil vapour
TOV - total organic vapour

Drawn By/Checked By: T. Pawlick / J. Yaraskavitch



STANTEC BOREHOLE AND WELL V2 DRAFT_122170088_BHLOGS.GPJ STANTEC - DATA TEMPLATE.GDT 8/22/17 TPAWLICK

# Monitoring Well: MW17-08

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | Geoprobe (direct push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 26-Jul-2017 |
| **Location:** | 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario | **Ground surface elevation:** | 95.59 m RTD |
| **Number:** | 122170088 | **Top of casing elevation:** | 95.52 m RTD |
| **Field investigator:** | A. Parrott | **Easting:** | 444299.964 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026787.713 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Stratigraphic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 95.59 | | | | | | | |
| | | | TOPSOIL<br>black, organics, moist | 0.00<br>94.98 | | | | | | | Flushmount protective cover with concrete seal |
| | | | SAND<br>brown, trace silt and gravel, moist | 0.61<br>94.07 | 1 | DP | 40% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | Backfilled with bentonite<br>50 mm ID PVC pipe |
| | | | SILTY SAND<br>brown, trace gravel, moist | 1.52<br>93.15 | 2 | DP | 50% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | |
| | | | No soil samples recovered<br>- augered through boulders | 2.44 | 3 | DP | 20% | | | | Backfilled with silica sand |
| | | | | | 4 | RC | n/a | | | | 50 mm ID slotted PVC pipe |
| | | | | 90.41 | | | | | | | |
| | | | SILTY SAND<br>grey, trace gravel, moist | 5.18<br>90.11 | | | | | | | Groundwater Level:<br>5.21 m BGS<br>3-Aug-17 |
| | | | Refusal at inferred bedrock<br>End of Borehole | 5.49 | | | | | | | |

Screen Interval: 2.23 - 5.28 m BGS
Sand Pack Interval: 1.93 - 5.49 m BGS
Well Seal Interval: 0.23 - 1.93 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
RC - rock core
ppm - parts per million by volume
n/a - not available

H-P - herbicides and pesticides
PAHs - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOCs - volatile organic compounds
Comb - combustible soil vapour
TOV - total organic vapour

Drawn By/Checked By: T. Pawlick / J. Yaraskavitch



STANTEC BOREHOLE AND WELL V2 DRAFT_122170088_BHLOGS.GPJ STANTEC - DATA TEMPLATE.GDT 8/22/17 TPAWLICK

# Monitoring Well: MW17-09

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | Geoprobe (direct push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 27-Jul-2017 |
| **Location:** | 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario | **Ground surface elevation:** | 99.19 m RTD |
| **Number:** | 122170088 | **Top of casing elevation:** | 99.12 m RTD |
| **Field investigator:** | A. Parrott | **Easting:** | 444493.9007 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026676.009 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Stratigraphic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 99.19 | | | | | | | |
| | | | TOPSOIL<br>black, organics, moist | 0.00<br>98.89 | | | | | | | |
| | | | SAND (FILL)<br>brown, trace gravel, moist | 0.30 | 1 | DP | 30% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | Flushmount protective cover with concrete seal<br>Backfilled with bentonite<br>50 mm ID PVC pipe |
| | | | | 97.97 | | | | | | | |
| | | | SILTY SAND<br>brown, trace gravel, moist | 1.22 | 2<br>3 | DP | 70% | | <5 ● ○ <0.02<br><5 ● ○ <0.02 | | Groundwater Level: 2.24 m BGS 3-Aug-17 |
| | | | | | 4 | DP | 50% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | |
| | | | | | 5 | DP | 25% | | <5 ● ○ <0.02 | | Backfilled with silica sand |
| | | | - grey, wet | | 6<br>7 | DP | 80% | | <5 ● ○ <0.02<br><5 ● ○ <0.02 | | 50 mm ID slotted PVC pipe |
| | | | | | 8<br>9 | DP | 100% | | <5 ● ○ <0.02<br><5 ● ○ <0.02 | | Slough |
| | | | | 91.57 | | | | | | | |
| | | | End of Borehole | 7.62 | | | | | | | |

Screen Interval: 3.66 - 6.71 m BGS
Sand Pack Interval: 3.35 - 7.01 m BGS
Well Seal Interval: 0.23 - 3.35 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

H-P - herbicides and pesticides
PAHs - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOCs - volatile organic compounds
Comb - combustible soil vapour
TOV - total organic vapour

Drawn By/Checked By: T. Pawlick / J. Yaraskavitch



STANTEC BOREHOLE AND WELL V2 DRAFT_122170088_BHLOGS.GPJ STANTEC - DATA TEMPLATE.GDT 8/22/17 TPAWLICK

# Monitoring Well: MW17-10

| | | | |
|---|---|---|---|
| **Project:** | Phase II Environmental Site Assessment | **Drilling method:** | Geoprobe (direct push) |
| **Client:** | Public Services and Procurement Canada | **Date started/completed:** | 27-Jul-2017 |
| **Location:** | 870 and 930 Carling Avenue and 520 Preston Street, Ottawa, Ontario | **Ground surface elevation:** | 96.57 m RTD |
| **Number:** | 122170088 | **Top of casing elevation:** | 96.48 m RTD |
| **Field investigator:** | A. Parrott | **Easting:** | 444546.5613 |
| **Contractor:** | Strata Drilling Group | **Northing:** | 5026699.988 |

| SUBSURFACE PROFILE | | | | SAMPLE DETAILS | | | | | INSTALLATION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Depth (m) | Graphic Log | Stratigraphic Description | Elevation (m RTD) Depth (m BGS) | Sample Number | Sample Type | Recovery | Lab Analyses | %LEL Comb▲ 20 40 60 80 / ppm OTOV / Comb ● 200 400 600 800 | Diagram | Description |
| | | | Ground Surface | 96.57 | | | | | | | |
| 1 | | | TOPSOIL<br>black, organics, moist | 0.00<br>96.26 | | | | | | | |
| 2 | 0.5 | | SILTY SAND<br>brown, trace gravel, wet | 0.30 | 1 | DP | 60% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | Flushmount protective cover with concrete seal |
| 3 | | | | | | | | | | | Backfilled with bentonite |
| 4 | 1.0 | | | | 2 | | | | <5 ● ○ <0.02 | | 50 mm ID PVC pipe |
| 5 | 1.5 | | - moist | | | | | | | | |
| 6 | | | | | 3 | DP | 75% | H-P, Metals, PAHs, PHC F1-F4, Phenols, VOCs | <5 ● ○ <0.02 | | |
| 7 | 2.0 | | | | | | | | | | |
| 8 | 2.5 | | | | 4 | | | | <5 ● ○ <0.02 | | Groundwater Level: 2.79 m BGS 3-Aug-17 |
| 9 | | | | | | | | | | | |
| 10 | 3.0 | | | | 5 | DP | 75% | | <5 ● ○ <0.02 | | |
| 11 | | | | | | | | | | | |
| 12 | 3.5 | | | | 6 | | | | <5 ● ○ <0.02 | | Backfilled with silica sand |
| 13 | 4.0 | | | | | | | | | | |
| 14 | | | | | 7 | DP | 50% | | <5 ● ○ <0.02 | | 50 mm ID slotted PVC pipe |
| 15 | 4.5 | | - grey | | | | | | | | |
| 16 | | | | | 8 | | | | <5 ● ○ <0.02 | | |
| 17 | 5.0 | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | 5.5 | | | | | | | | | | |
| 20 | | | | 90.47 | | | | | | | |
| 21 | 6.0 | | No sample recovered | 6.10 | 9 | DP | 0% | | | | Slough |
| 22 | 6.5 | | | | | | | | | | |
| 23 | | | | 89.25 | | | | | | | |
| 24 | 7.0 | | End of Borehole | 7.32 | | | | | | | |
| 25 | 7.5 | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | 8.0 | | | | | | | | | | |
| 28 | 8.5 | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | 9.0 | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | 9.5 | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | 10.0 | | | | | | | | | | |
| | 10.5 | | | | | | | | | | |

Screen Interval: 3.05 - 6.10 m BGS
Sand Pack Interval: 2.74 - 6.40 m BGS
Well Seal Interval: 0.23 - 2.74 m BGS

Notes:
m BGS - metres below ground surface
DP - direct push sample
ppm - parts per million by volume
n/a - not available

H-P - herbicides and pesticides
PAHs - polycyclic aromatic hydrocarbons
PHC F1-F4 - petroleum hydrocarbon fractions 1 to 4
VOCs - volatile organic compounds
Comb - combustible soil vapour
TOV - total organic vapour

Stantec

Drawn By/Checked By: T. Pawlick / J. Yaraskavitch



STANTEC BOREHOLE AND WELL V2 DRAFT_122170088_BHLOGS.GPJ STANTEC - DATA TEMPLATE.GDT 8/22/17 TPAWLICK

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** Geoprobe **DATE** July 27, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 1

| 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 | |
| **FILL:** Loose, brown silty clay, trace sand, gravel and organics 0.61 | | SS | 2 | 100 | 4 | | |
| | | SS | 3 | 54 | 13 | 1 | |
| **GLACIAL TILL:** Compact, brown silty sand, some gravel, trace clay, cobbles and boulders 1.22 | | SS | 4 | 38 | 10 | | |
| | | SS | 5 | 100 | 10 | 2 | |
| | | SS | 6 | 100 | 8 | | |
| **GLACIAL TILL:** Stiff to very soft, brown to grey silty clay, some sand and gravel, trace cobbles and boulders | | SS | 7 | 83 | 5 | 3 | |
| | | SS | 8 | 96 | 2 | 4 | |
| 6.10 | | | | | | 5 | |
| **GLACIAL TILL:** Loose, grey silty sand, trace gravel, cobbles, boulders and clay | | SS | 9 | 46 | 8 | 6 | |
| 7.34 | | | | | | 7 | |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 7.34m depth | | | | | | | |
| (GWL @ 2.74m - August 8, 2017) | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** Geoprobe **DATE** July 27, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 2

| 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 | |
| **FILL:** Grey silty clay, trace sand and gravel | 0.30 | | SS | 2 | 67 | 13 | | |
| | 0.99 | | SS | 3 | 62 | 6 | 1 | |
| **FILL:** Compact to loose, brown silty sand, some gravel and cobbles, trace clay and asphalt | | | SS | 4 | 83 | 1 | | |
| | | | SS | 5 | 75 | 8 | 2 | |
| | | | SS | 6 | 83 | 1 | | |
| **GLACIAL TILL:** Very soft to very stiff, brown silty clay, some sand, trace gravel, cobbles and boulders | | | | | | | 3 | |
| - grey by 3.4m depth | | | SS | 7 | 42 | 17 | 4 | |
| | | | SS | 8 | 42 | 8 | 5 | |
| | | | SS | 9 | 83 | 6 | 6 | |
| | | | SS | 10 | 100 | 14 | 7 | |
| | 8.18 | | | | | | 8 | |
| End of Borehole | | | | | | | | |
| Practical refusal to augering at 8.18m depth | | | | | | | | |
| (GWL @ 1.85m - August 9, 2017) | | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** Geoprobe **DATE** July 28, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 3

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | |
| **TOPSOIL** 0.18 | | AU | 1 | | | | |
| | | SS | 2 | 83 | 6 | | |
| **FILL:** Loose to compact, brown silty clay, trace sand, gravel, cobbles and boulders | | SS | 3 | 33 | 10 | 1 | |
| | | SS | 4 | 58 | 3 | | |
| | | SS | 5 | 92 | 3 | 2 | |
| 2.69 | | SS | 6 | 71 | 11 | | |
| | | SS | 7 | 50 | 20 | 3 | |
| **GLACIAL TILL:** Very stiff to firm, brown silty clay, trace sand, gravel, cobbles and boulders | | SS | 8 | 54 | 13 | 4 | |
| - grey by 5.5m depth | | SS | 9 | 25 | 7 | 5 | |
| | | SS | 10 | 46 | 11 | 6 | |
| | | SS | 11 | 100 | 10 | 7 | |
| | | SS | 12 | 100 | 9 | 8 | |
| 9.75 | | | | | | 9 | |
| Dynamic Cone Penetration Test commenced at 9.75m depth | | | | | | 10 | |
| Inferred **GLACIAL TILL** | | | | | | | |
| 11.20 | | | | | | 11 | |
| End of Borehole | | | | | | | |
| Practical DCPT refusal at 11.20m depth | | | | | | | |
| (GWL @ 3.98m - August 9, 2017) | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** CME 55 Power Auger **DATE** July 24, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 4

| SOIL DESCRIPTION | | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) | Photo Ionization Detector: Volatile Organic Rdg. (ppm) / Lower Explosive Limit % | Monitoring Well Construction |
|---|---|---|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | | | | |
| Asphaltic concrete | 0.10 | | AU | 1 | | | 0 | | | |
| **FILL:** Crushed stone with silt and sand | 0.69 | | | | | | | | | |
| **GLACIAL TILL:** Stiff, brown silty clay, some sand, gravel, cobbles and boulders | | | SS | 2 | 25 | 14 | 1 | | | |
| | | | SS | 3 | 100 | 9 | | | | |
| | 2.03 | | | | | | 2 | | | |
| End of Borehole | | | | | | | | | | |
| Practical refusal to augering at 2.03m depth | | | | | | | | | | |
| (BH dry upon completion) | | | | | | | | | | |

Lower Explosive Limit % scale: 20 40 60 80

RKI Eagle Rdg. (ppm) scale: 100 200 300 400 500

▲ Full Gas Resp. △ Methane Elim.

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** CME 55 Power Auger **DATE** July 24, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 4A

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | |
| Asphaltic concrete 0.10 | | | | | | | |
| **FILL:** Crushed stone with silt and sand 0.69 | | | | | | | |
| | | SS | 1 | 67 | 22 | 1 | |
| | | SS | 2 | 83 | 12 | 2 | |
| | | SS | 3 | 4 | 11 | 3 | |
| **GLACIAL TILL:** Very stiff to firm, brown silty clay, some sand, gravel, cobbles and boulders | | | | | | 4 | |
| - grey by 4.6m depth | | SS | 4 | 67 | 19 | 5 | |
| | | SS | 5 | 58 | 16 | 6 | |
| | | SS | 6 | 50 | 5 | 7 | |
| | | SS | 7 | 100 | 6 | 8 | |
| 9.75 | | | | | | 9 | |
| Dynamic Cone Penetration Test commenced at 9.75m depth | | | | | | 10 | |
| Inferred **GLACIAL TILL** | | | | | | | |
| 11.15 | | | | | | 11 | |
| End of Borehole | | | | | | | |
| Practical DCPT refusal at 11.15m depth | | | | | | | |
| (GWL @ 2.12m - August 8, 2017) | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** CME 55 Power Auger **DATE** July 24, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 5

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | |
| Asphaltic concrete 0.05 | | AU | 1 | | | 0 | |
| **FILL:** Crushed stone with silt and sand 0.71 | | | | | | | |
| **FILL:** Brown silty clay, some sand, gravel and cobbles | | SS | 2 | 33 | 6 | 1 | |
| 1.83 | | SS | 3 | 50 | 4 | | |
| Loose, brown **SILTY SAND,** trace gravel 1.96 | | | | | | 2 | |
| Hard, brown **SILTY CLAY** | | SS | 4 | 100 | P | | |
| 3.45 | | SS | 5 | 100 | P | 3 | |
| | | SS | 4 | 100 | 4 | 4 | |
| **GLACIAL TILL:** Soft to very stiff, brown silty clay, some sand, gravel, cobbles and boulders | | | | | | 5 | |
| - grey by 4.6m depth | | SS | 5 | 33 | 19 | 6 | |
| | | SS | 6 | 88 | 11 | 7 | |
| | | | | | | 8 | |
| | | SS | 7 | 62 | 14 | 9 | |
| 9.75 | | | | | | | |
| Dynamic Cone Penetration Test commenced at 9.75m depth 10.26 | | | | | | 10 | |
| Inferred **GLACIAL TILL** | | | | | | | |
| End of Borehole | | | | | | | |
| Practical DCPT refusal at 10.26m depth | | | | | | | |
| (GWL @ 4.40m - August 8, 2017) | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** Geoprobe **DATE** July 26, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 6

| 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 | |
| **FILL:** Very loose, brown silty sand some clay, trace gravel 0.61 | | SS | 2 | 50 | 3 | | |
| | | SS | 3 | 100 | 11 | 1 | |
| Stiff to very stiff, brown **SILTY CLAY,** trace sand | | SS | 4 | 100 | 14 | | |
| 2.41 | | SS | 5 | 100 | 22 | 2 | |
| | | SS | 6 | 100 | 23 | | |
| | | SS | 7 | 100 | 11 | 3 | |
| | | SS | 8 | 75 | 39 | 4 | |
| **GLACIAL TILL:** Firm to hard, brown silty clay, some sand, trace gravel, cobbles and boulders | | | | | | | |
| - grey by 3.0m depth | | SS | 9 | 33 | 16 | 5 | |
| | | SS | 10 | 50 | 5 | | |
| | | SS | 11 | 100 | 26 | 6 | |
| | | SS | 12 | 100 | 57 | 7 | |
| 9.75 | | | | | | 8 | |
| Dynamic Cone Penetration Test commenced at 9.75m depth. 10.31 | | | | | | 9 | |
| Inferred **GLACIAL TILL** | | | | | | 10 | |
| End of Borehole | | | | | | | |
| Practical DCPT refusal at 10.31m depth | | | | | | | |
| (GWL @ 3.45m - August 8, 2017) | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** Geoprobe **DATE** July 26, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 8

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | NUMBER | % RECOVERY | N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | |
| **TOPSOIL** 0.23 | | AU | 1 | | | 0 | |
| | | SS | 2 | 50 | 4 | | |
| Soft to stiff, brown **SILTY CLAY,** trace sand | | SS | 3 | 100 | 12 | 1 | |
| 1.35 | | SS | 4 | 62 | 15 | | |
| | | SS | 5 | 100 | 20 | 2 | |
| | | SS | 6 | 100 | 8 | | |
| | | SS | 7 | 42 | 21 | 3 | |
| **GLACIAL TILL:** Very soft to very stiff, brown silty clay, some sand, trace gravel, cobbles and boulders | | | | | | 4 | |
| | | SS | 8 | 42 | 2 | | |
| - grey by 4.9m depth | | | | | | 5 | |
| | | SS | 9 | 100 | 5 | | |
| | | | | | | 6 | |
| | | SS | 10 | 100 | 3 | | |
| | | | | | | 7 | |
| 8.86 | | SS | 11 | 100 | 50+ | 8 | |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 8.86m depth | | | | | | | |
| (GWL @ 4.52m - August 8, 2017) | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**FILE NO.** PE4096

**HOLE NO.** BH 9

**BORINGS BY** Geoprobe **DATE** July 26, 2017

| SOIL DESCRIPTION | | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | | |
| **TOPSOIL** | 0.23 | | AU | 1 | | | 0 | |
| **FILL:** Brown silty clay, some sand, gravel and topsoil | 0.30 | | SS | 2 | 83 | 1 | | |
| | 0.61 | | SS | 3 | 42 | 0 | 1 | |
| **FILL:** Brown silty sand, trace gravel and topsoil | 1.22 | | SS | 4 | 50 | 21 | | |
| **FILL:** Brown silty clay, some sand, trace gravel and cobbles | | | SS | 5 | 100 | 24 | 2 | |
| **GLACIAL TILL:** Compact to dense, brown silty sand, trace clay, gravel, cobbles and boulders | | | SS | 6 | 83 | 31 | | |
| | 3.43 | | | | | | 3 | |
| End of Borehole | | | | | | | | |
| Practical refusal to augering at 3.43m depth | | | | | | | | |
| (BH dry upon completion) | | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** Geoprobe **DATE** July 26, 2017

**FILE NO.** PE4096

**HOLE NO.** BH 9A

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) | Photo Ionization Detector: ● Volatile Organic Rdg. (ppm) / ○ Lower Explosive Limit % | Monitoring Well Construction |
|---|---|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | 0 | | | |
| **OVERBURDEN** | | | | | | 1 | | | |
| | | | | | | 2 | | | |
| 3.25 | | | | | | 3 | | | |
| End of Borehole<br>Practical refusal to augering at 3.25m depth<br>(BH dry upon completion) | | | | | | | | | |

Photo Ionization Detector
● Volatile Organic Rdg. (ppm)
○ Lower Explosive Limit %
20 40 60 80
100 200 300 400 500
RKI Eagle Rdg. (ppm)
▲ Full Gas Resp. △ Methane Elim.

# patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

## SOIL PROFILE AND TEST DATA

**Environmental Investigation of Existing Fault Line**
**Proposed New Hospital Campus - Carling Avenue**
**Ottawa, Ontario**

**DATUM**

**REMARKS**

**BORINGS BY** Geoprobe **DATE** July 26, 2017

**FILE NO.** PE4096

**HOLE NO.** BH10

| SOIL DESCRIPTION | STRATA PLOT | SAMPLE TYPE | SAMPLE NUMBER | SAMPLE % RECOVERY | SAMPLE N VALUE or RQD | DEPTH (m) | ELEV. (m) |
|---|---|---|---|---|---|---|---|
| **GROUND SURFACE** | | | | | | | |
| **TOPSOIL** | | AU | 1 | | | 0 | |
| 0.56 | | SS | 2 | 50 | 1 | | |
| | | SS | 3 | 92 | 5 | 1 | |
| | | SS | 4 | 75 | 3 | | |
| **GLACIAL TILL:** Very soft to stiff, brown silty clay, trace sand, gravel and cobbles | | SS | 5 | 100 | 4 | 2 | |
| | | SS | 6 | 100 | 2 | | |
| - silty clay layer from 2.13 to 2.44m and 2.64 to 3.02m depths | | | | | | 3 | |
| | | SS | 7 | 83 | 6 | | |
| - grey by 4.6m depth | | | | | | 4 | |
| | | SS | 8 | 50 | 7 | 5 | |
| | | | | | | 6 | |
| | | SS | 9 | 75 | 10 | | |
| 7.29 | | | | | | 7 | |
| End of Borehole | | | | | | | |
| Practical refusal to augering at 7.29m depth | | | | | | | |
| (GWL @ 3.89m - August 8, 2017) | | | | | | | |

**Photo Ionization Detector**

● Volatile Organic Rdg. (ppm)

○ **Lower Explosive Limit %**

20 40 60 80

100 200 300 400 500

**RKI Eagle Rdg. (ppm)**

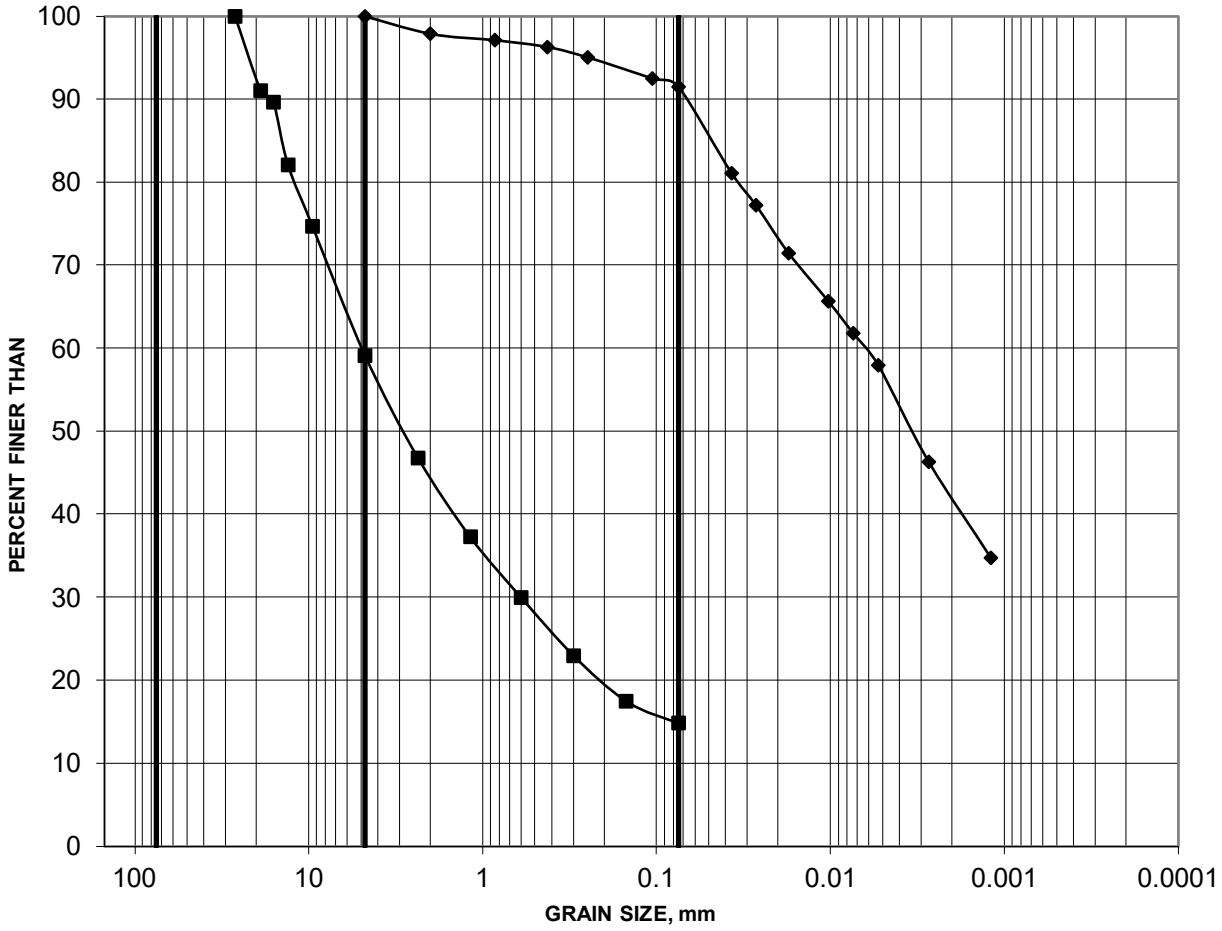
▲ Full Gas Resp. △ Methane Elim.

Monitoring Well Construction

## GRAIN SIZE DISTRIBUTION

**FIGURE 12**

### FILL




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 21-213 | 2 | 0.76-1.37 | 41 | 44 | | 15 |
| ◆ | 21-217 | 4 | 2.29-2.90 | 0 | 9 | 49 | 42 |

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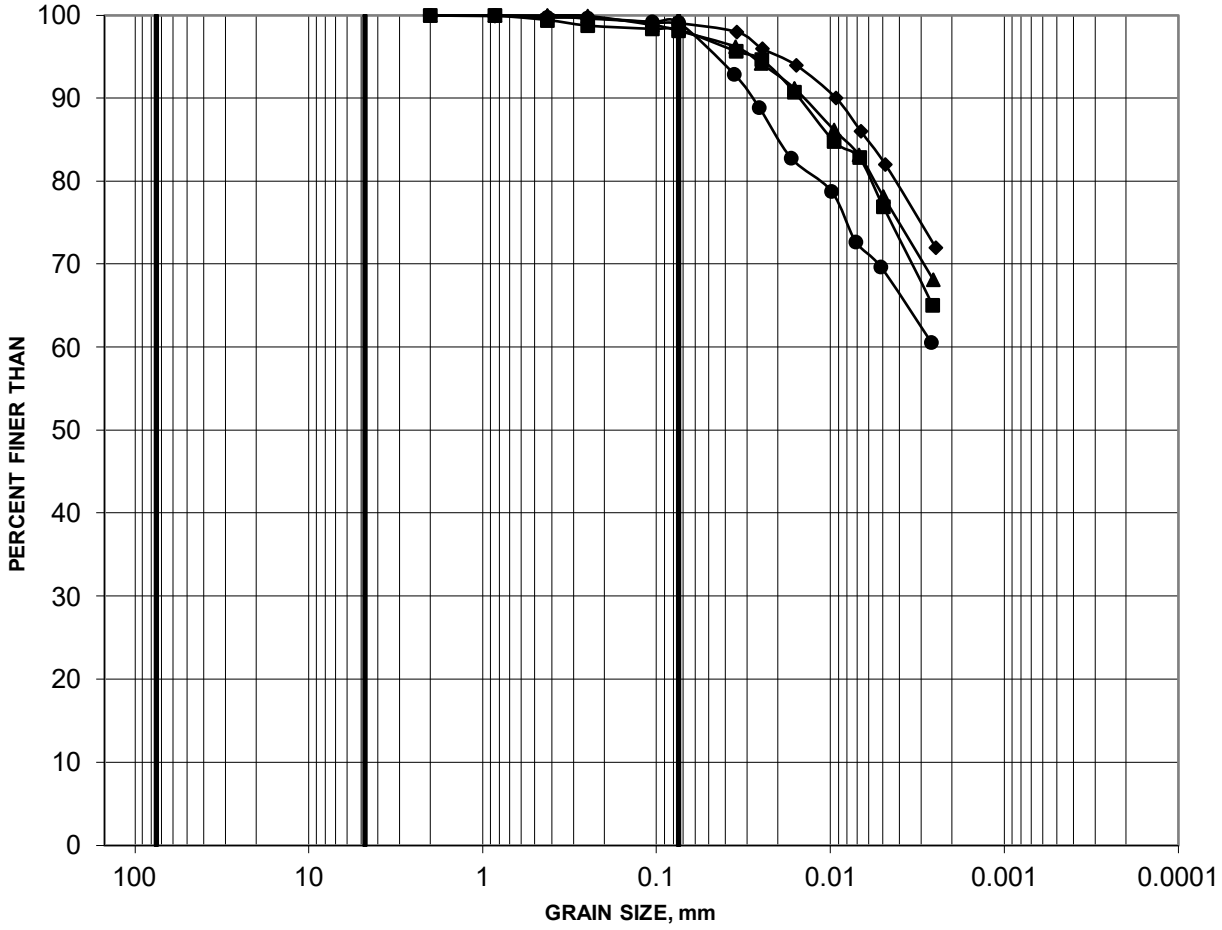
## GRAIN SIZE DISTRIBUTION

**FIGURE 13A**

### SILTY CLAY TO CLAY (WEATHERED CRUST)




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 21-205 | 3 | 1.52-2.13 | 0 | 2 | 39 | 59 |
| ◆ | 21-212 | 4 | 2.29-2.90 | 0 | 1 | 31 | 68 |
| ▲ | 21-221 | 5 | 3.05-3.66 | 0 | 2 | 33 | 65 |
| ● | 21-226 | 5 | 3.05-3.66 | 0 | 1 | 43 | 56 |

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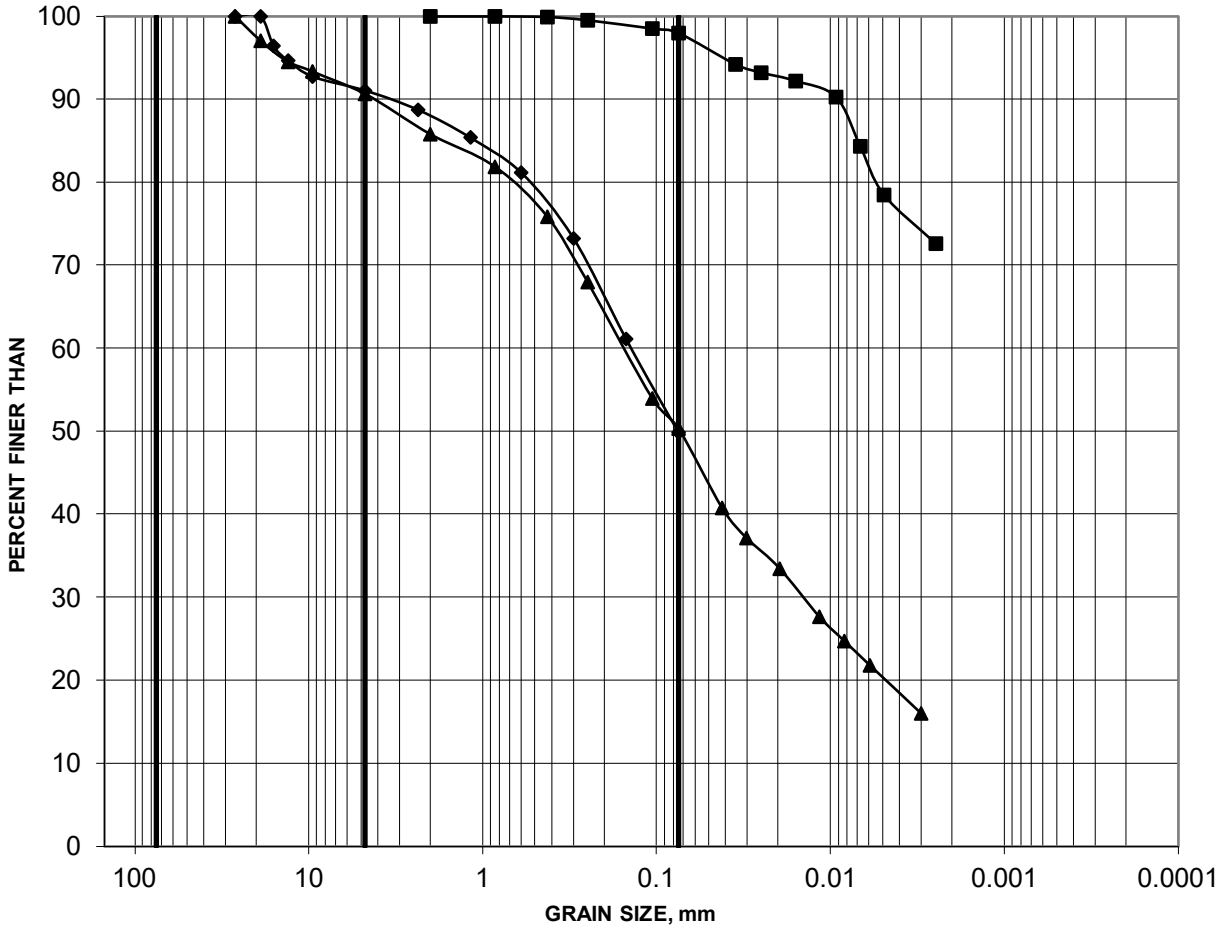
## GRAIN SIZE DISTRIBUTION

**FIGURE 13B**

### SILTY CLAY TO CLAY (WEATHERED CRUST)




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 22-111 | 3 | 1.52-2.13 | 0 | 2 | 30 | 68 |
| ◆ | 22-111 | 4 | 2.29-2.90 | 9 | 41 | | 50 |
| ▲ | 22-112 | 4 | 2.29-2.90 | 9 | 41 | 37 | 13 |

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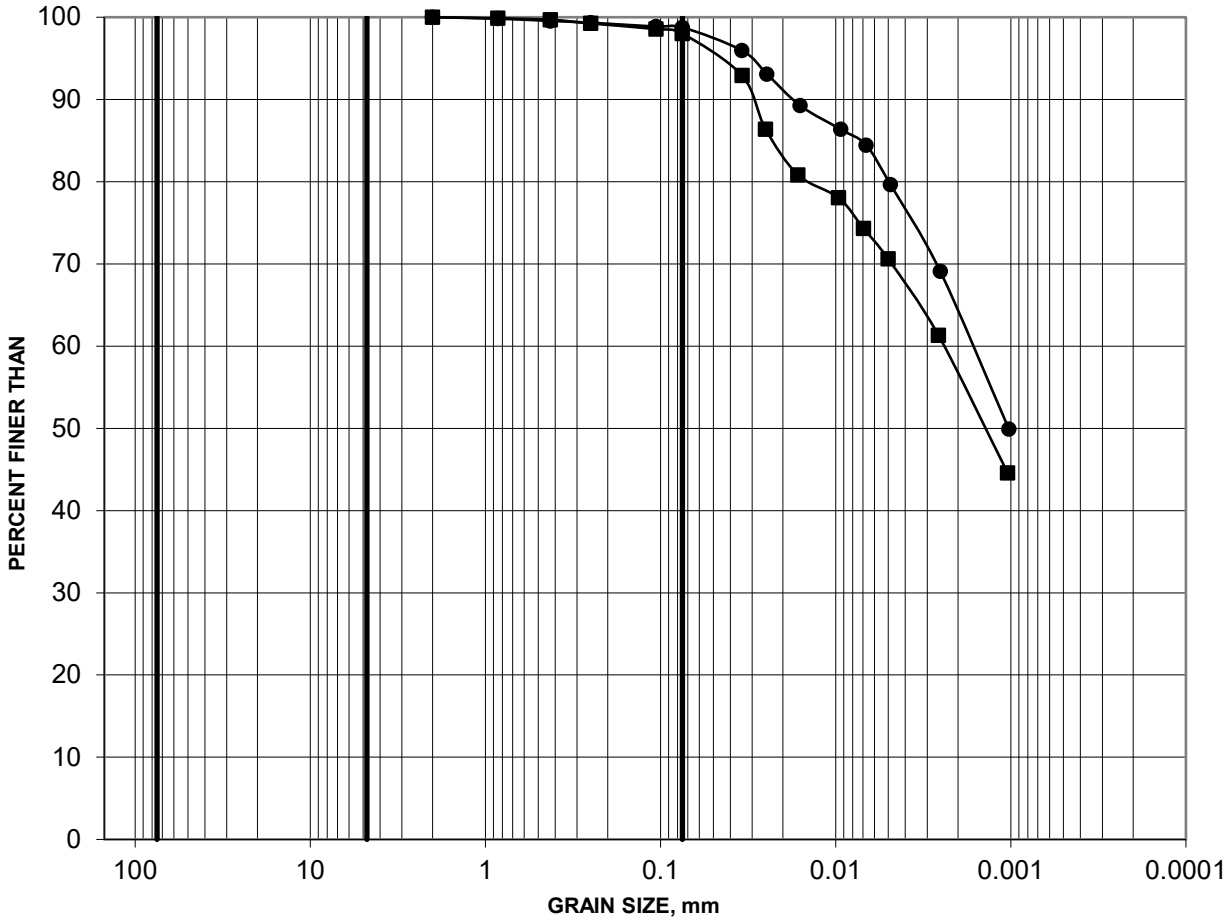
## GRAIN SIZE DISTRIBUTION

**FIGURE 13C**

### SILTY CLAY




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ●— | 23-101 | 11 | 9.14-9.75 | 0 | 1 | 99 | |
| ■— | 23-145 | 5 | 3.05-3.66 | 0 | 2 | 98 | |

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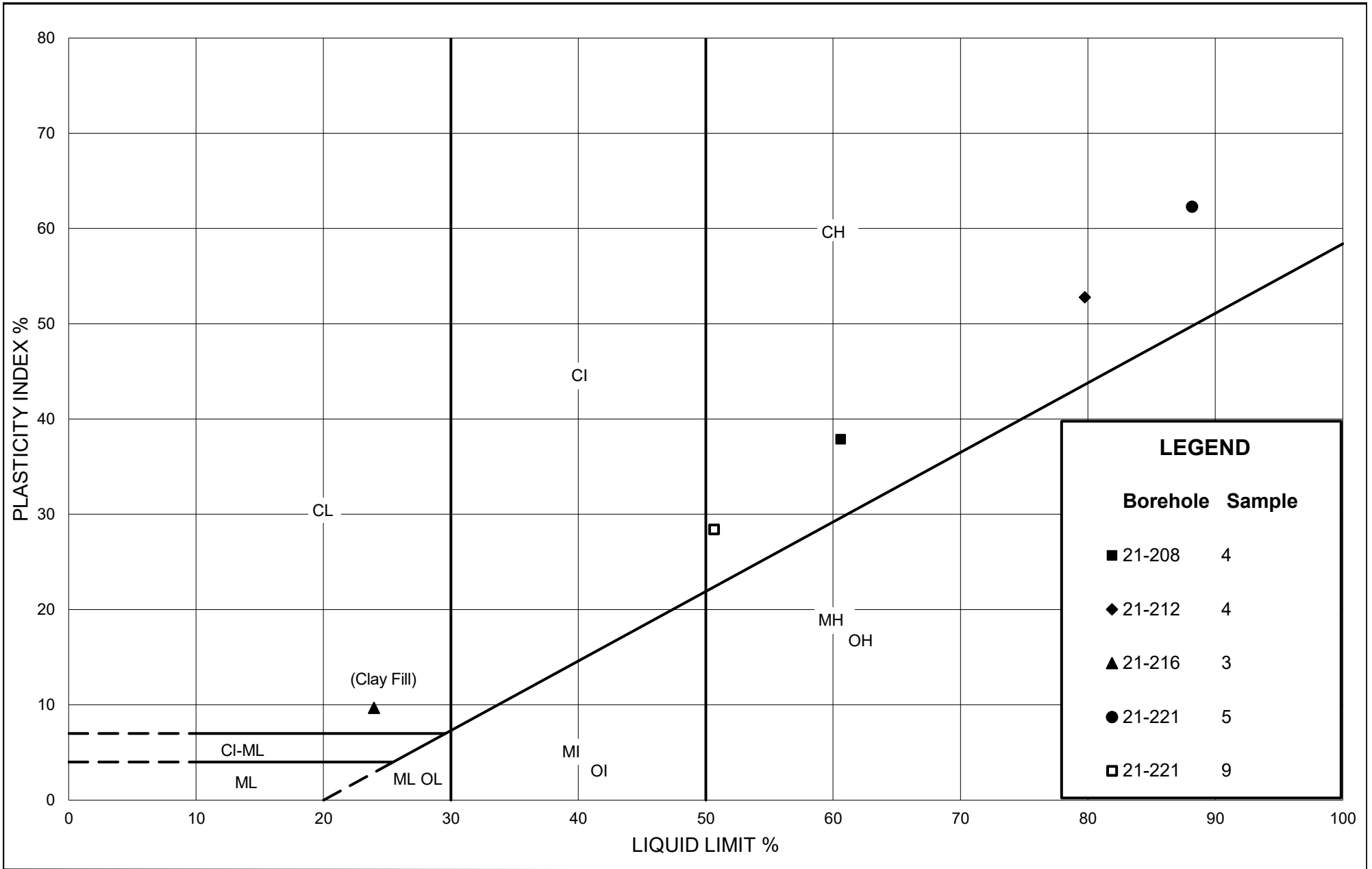


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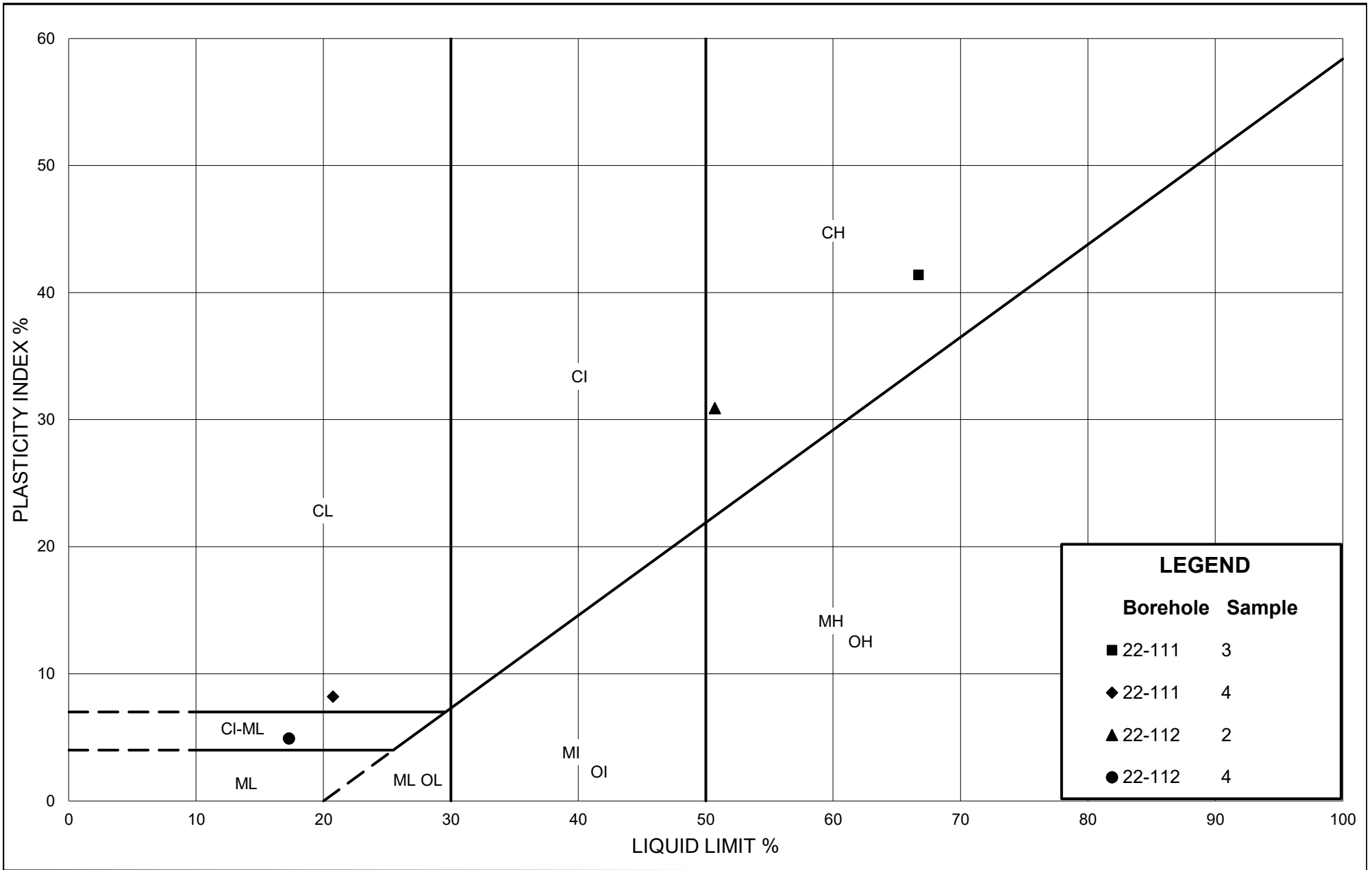
# PLASTICITY CHART

## SILTY CLAY TO CLAY (WEATHERED CRUST)

| | |
|---|---|
| Figure: | 14A |
| Project: | 21451149/2000 |
| Created By: CW | Checked By: MI |

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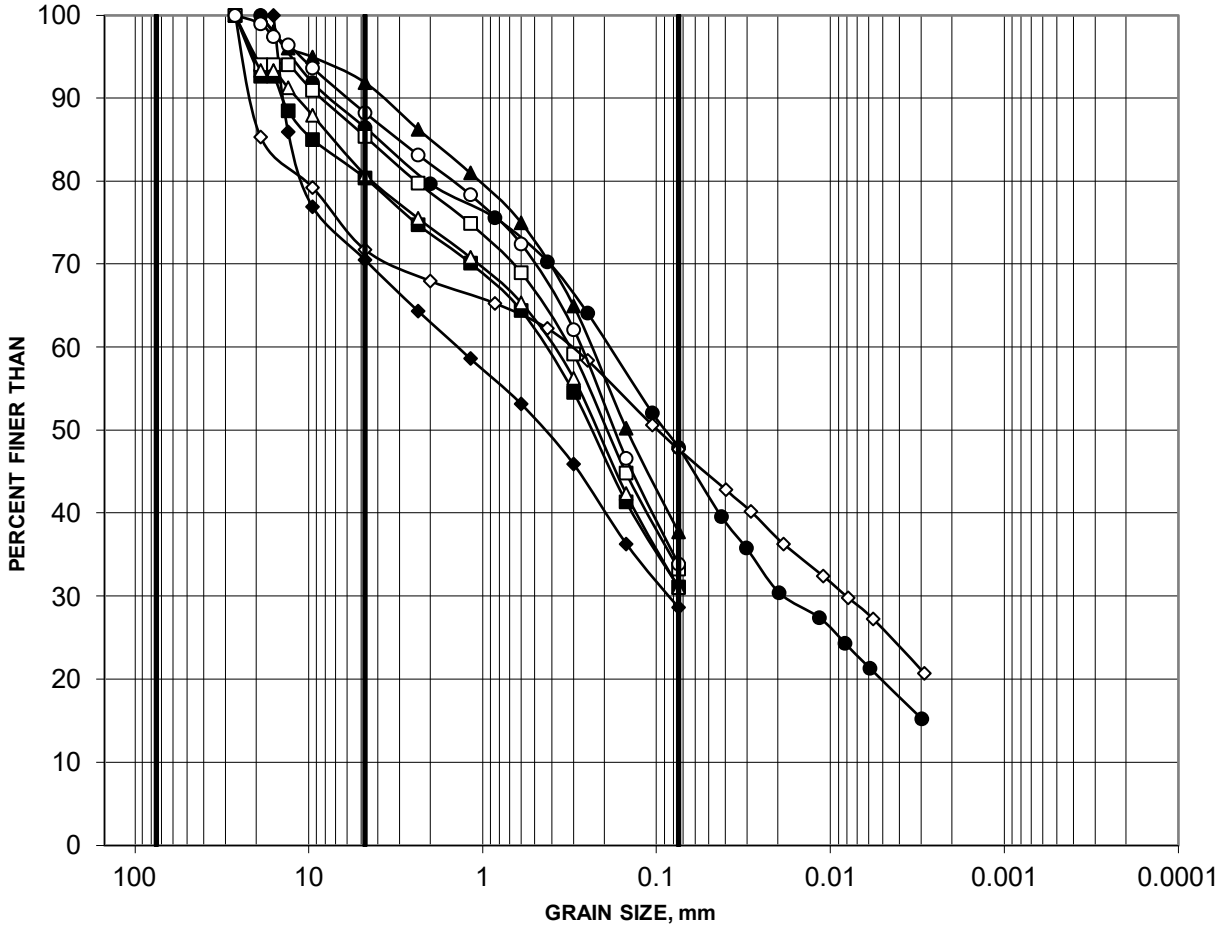
# PLASTICITY CHART
## WEATHERED CRUST

| | |
|---|---|
| Figure: | 14B |
| Project: | 21451149/2000 |
| Created By: CW | Checked By: MI |

## GRAIN SIZE DISTRIBUTION

**FIGURE 15A**

### GLACIAL TILL




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 21-103 | 2 | 0.91-1.52 | 20 | 49 | 31 | |
| ◆ | 21-107 | 2 | 0.91-1.52 | 30 | 41 | 29 | |
| ▲ | 21-201 | 2 | 0.76-1.37 | 8 | 54 | 38 | |
| ● | 21-208 | 5 | 3.05-3.66 | 14 | 38 | 35 | 13 |
| □ | 21-208 | 9 | 6.10-6.71 | 15 | 52 | 33 | |
| ◇ | 21-210 | 5 | 3.05-3.66 | 28 | 24 | 30 | 18 |
| △ | 21-210 | 9 | 6.10-6.86 | 19 | 50 | 31 | |
| ○ | 21-212 | 10 | 6.86-7.47 | 12 | 54 | 34 | |

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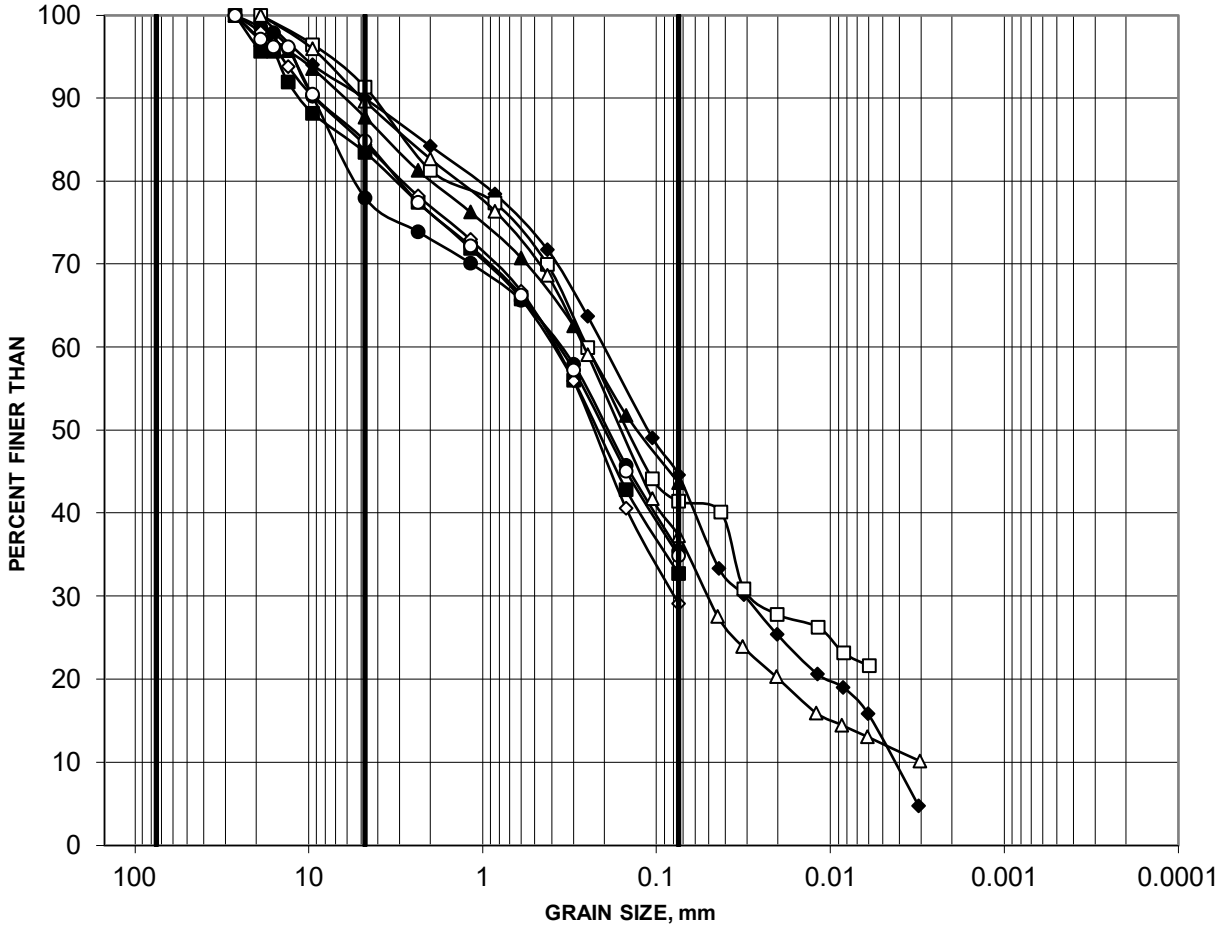
## GRAIN SIZE DISTRIBUTION

**FIGURE 15B**

### GLACIAL TILL




| COBBLE SIZE | GRAVEL SIZE | | SAND SIZE | | | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 21-216 | 13 | 9.14-9.75 | 17 | 50 | | 33 |
| ◆ | 21-216 | 6 | 3.81-4.42 | 10 | 45 | 41 | 4 |
| ▲ | 21-216 | 7 | 4.57-5.18 | 12 | 44 | | 44 |
| ● | 21-217 | 10 | 6.86-7.47 | 22 | 43 | | 35 |
| □ | 21-218 | 10 | 6.86-7.47 | 9 | 50 | 26 | 15 |
| ◇ | 21-218 | 15 | 10.67-11.28 | 16 | 55 | | 29 |
| △ | 21-221 | 11 | 8.38-8.99 | 10 | 53 | 29 | 8 |
| ○ | 21-221 | 12 | 9.14-9.75 | 15 | 50 | | 35 |

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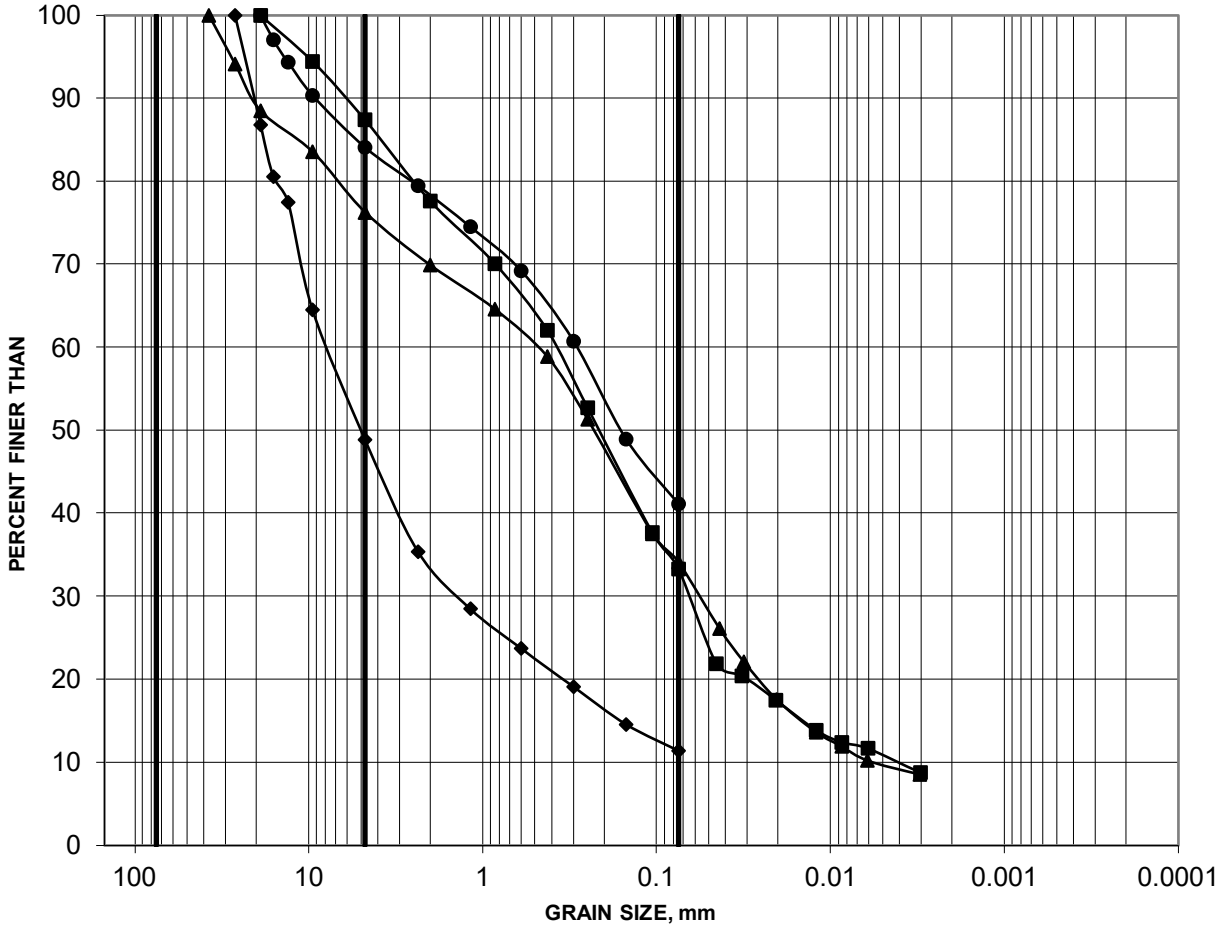
## GRAIN SIZE DISTRIBUTION

**FIGURE 15C**

### GLACIAL TILL




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 21-221 | 14 | 9.14-9.75 | 13 | 54 | 26 | 7 |
| ◆ | 21-221 | 15B | 11.73-12.04 | 51 | 38 | 11 | |
| ▲ | 21-222 | 14 | 9.91-10.52 | 24 | 42 | 28 | 6 |
| ● | 21-226 | 8 | 5.33-5.94 | 16 | 43 | 41 | |

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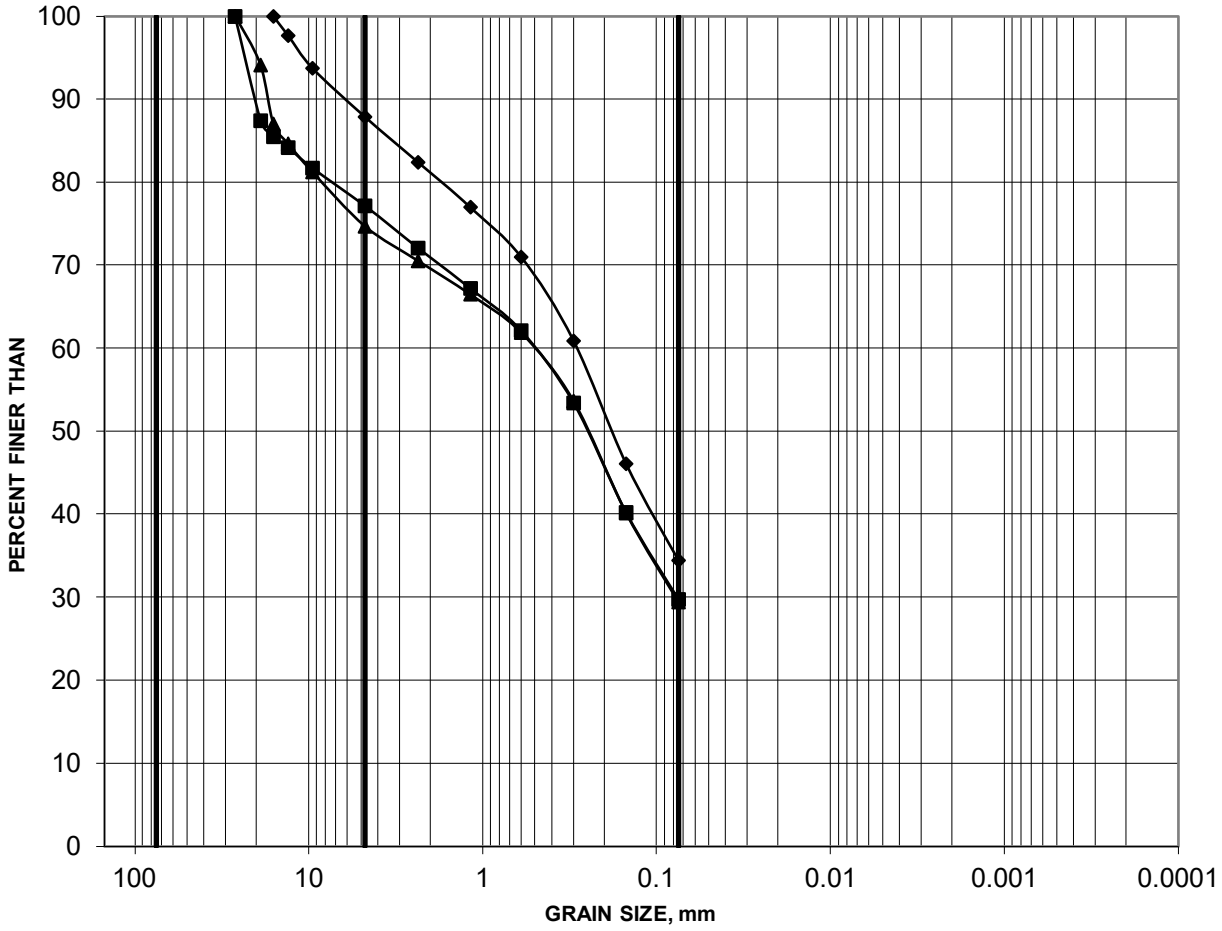
## GRAIN SIZE DISTRIBUTION

**FIGURE 15D**

### GLACIAL TILL




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 22-109 | 5 | 3.05-3.66 | 23 | 47 | 30 | |
| ◆ | 22-110 | 6 | 3.81-4.42 | 12 | 54 | 34 | |
| ▲ | 22-113 | 6 | 3.81-4.42 | 25 | 46 | 29 | |

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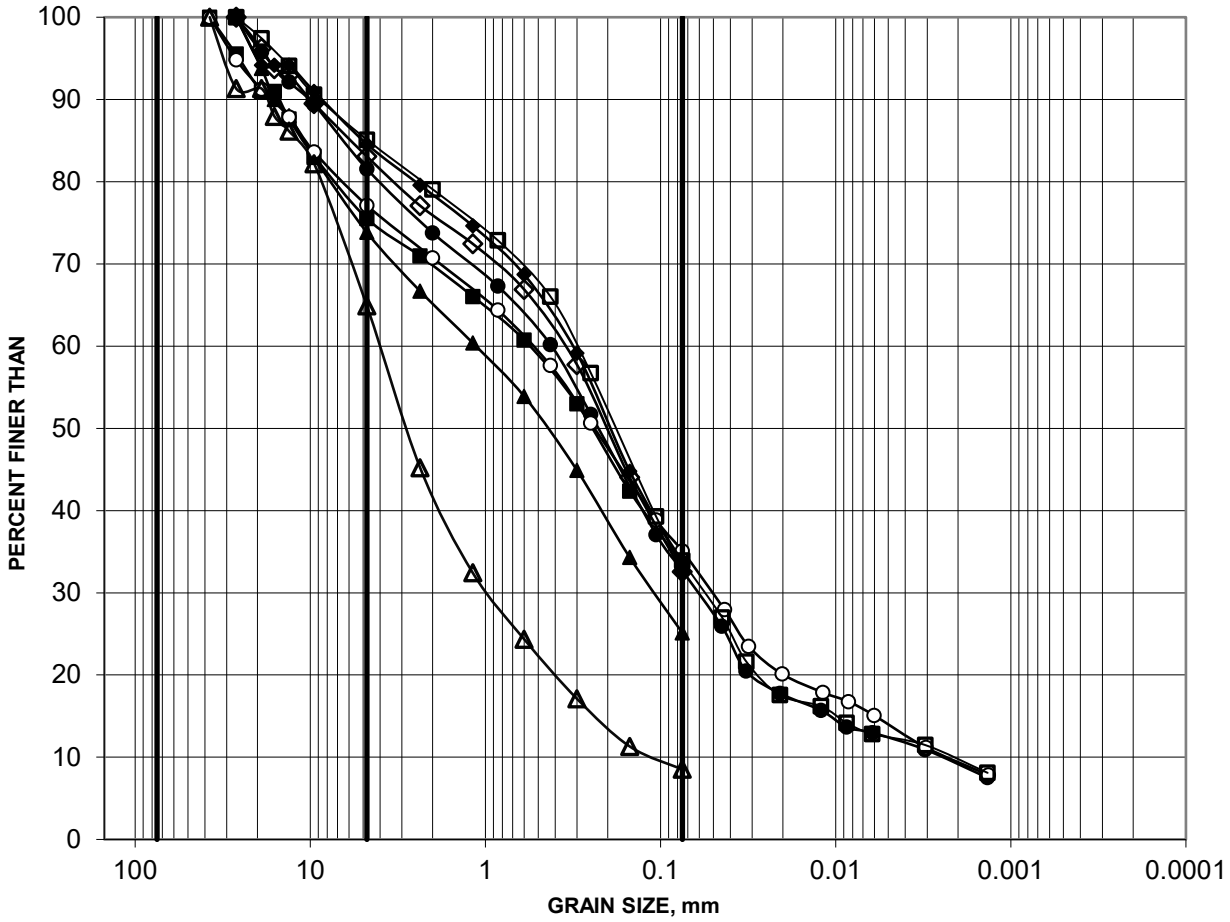
## GRAIN SIZE DISTRIBUTION

**FIGURE 15E**

### GLACIAL TILL




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ● | 23-101 | 13 | 11.43-12.04 | 18 | 49 | 24 | 9 |
| ■ | 23-103 | 11 | 7.62-8.23 | 24 | 43 | 33 | |
| ◆ | 23-105 | 4 | 2.29-2.90 | 15 | 52 | 33 | |
| ▲ | 23-105 | 10 | 6.86-7.47 | 26 | 49 | 25 | |
| ○ | 23-111 | 5 | 3.05-3.66 | 23 | 42 | 26 | 9 |
| □ | 23-111 | 13 | 9.14-9.75 | 15 | 51 | 24 | 10 |
| ◇ | 23-114 | 6 | 3.81-4.42 | 17 | 50 | 33 | |
| △ | 23-114 | 19 | 13.72-14.33 | 35 | 56 | 9 | |

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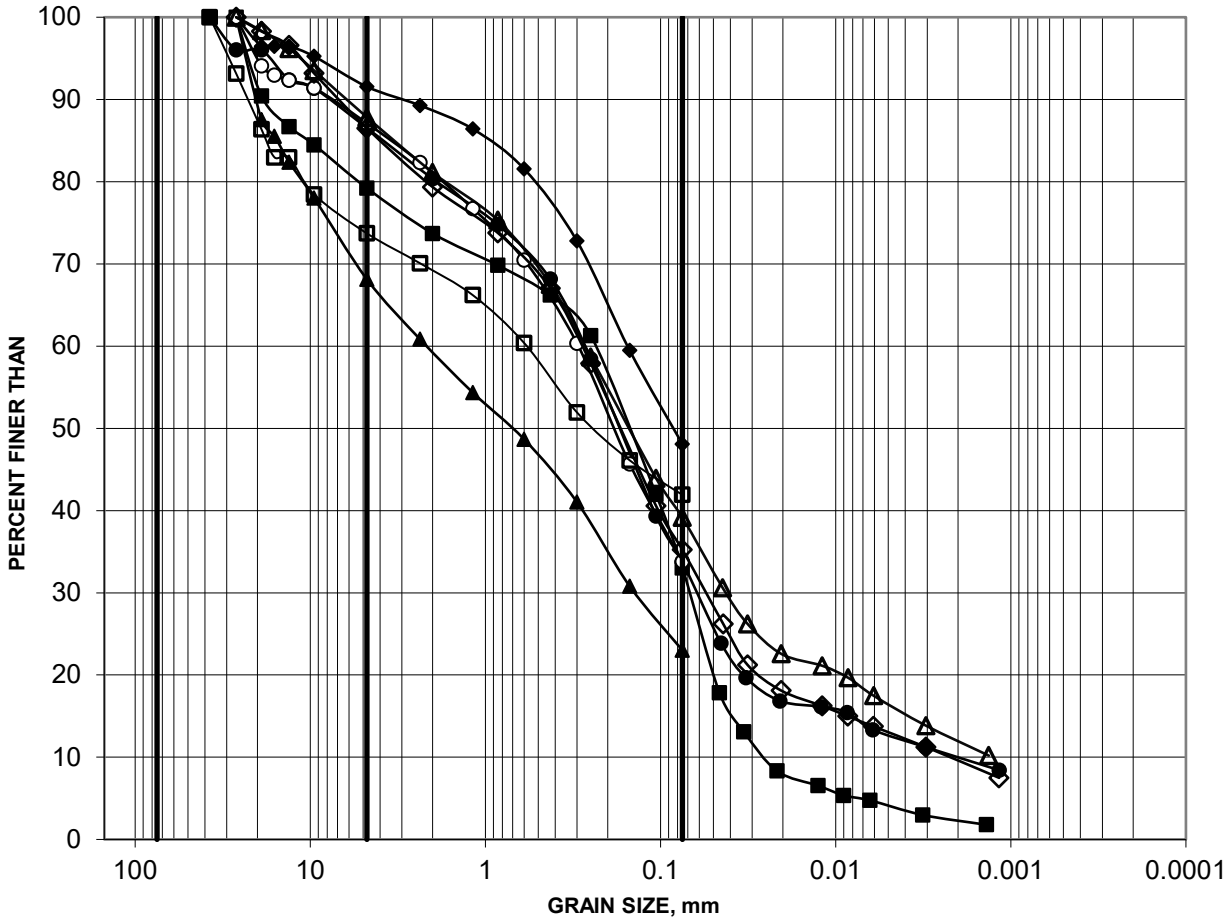
## GRAIN SIZE DISTRIBUTION

**FIGURE 15F**

### GLACIAL TILL




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|
| 23-117 | 8 | 5.33-5.79 | 13 | 53 | 24 | 10 |
| 23-117 | 19 | 14.48-15.09 | 21 | 46 | 31 | 2 |
| 23-122 | 5 | 3.05-3.66 | 8 | 44 | 48 | |
| 23-122 | 15 | 10.67-11.10 | 32 | 45 | 23 | |
| 23-124 | 5 | 3.05-3.66 | 13 | 53 | 34 | |
| 23-124 | 13 | 9.14-9.75 | 26 | 32 | 42 | |
| 23-125 | 5 | 3.81-4.42 | 13 | 52 | 25 | 10 |
| 23-125 | 24 | 22.86-23.40 | 12 | 49 | 27 | 12 |

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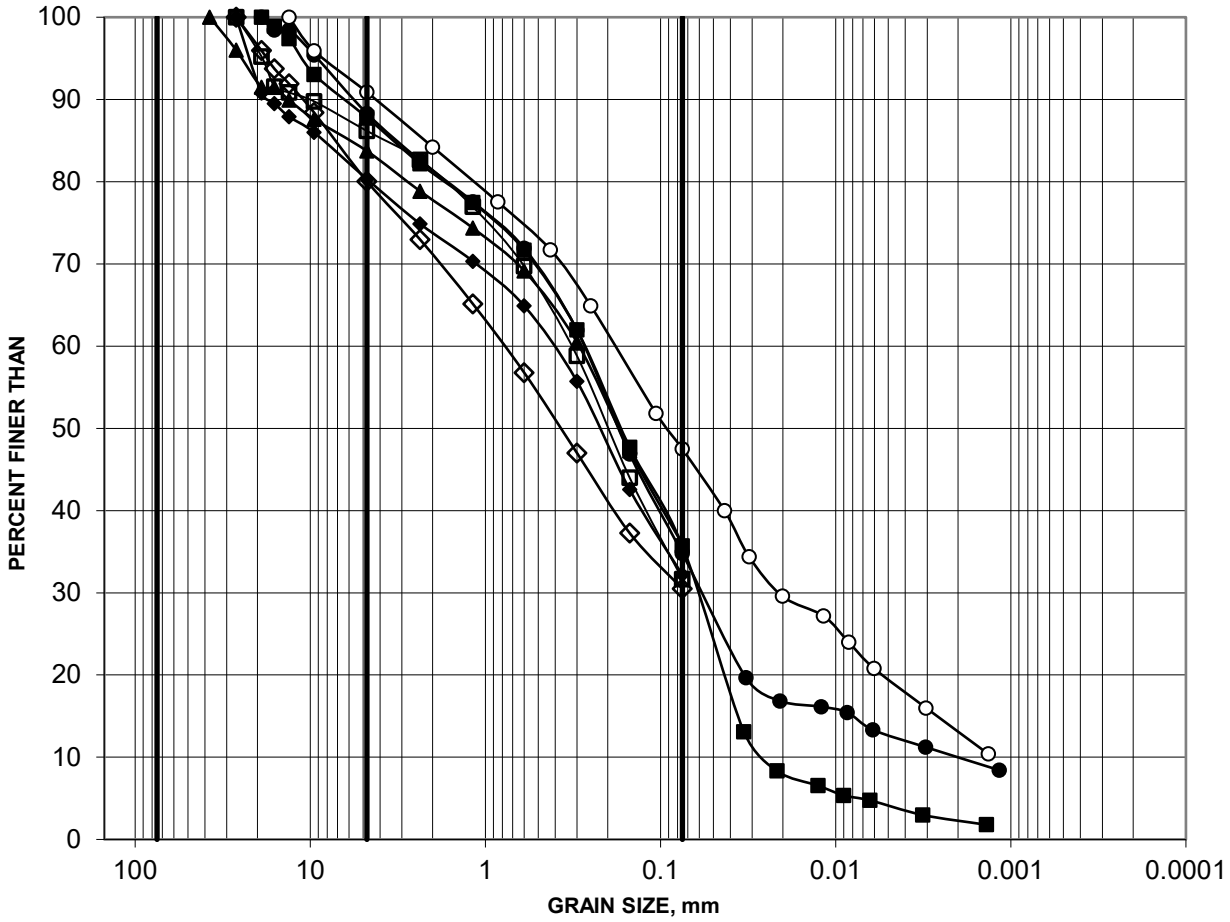
## GRAIN SIZE DISTRIBUTION

**FIGURE 15G**

### GLACIAL TILL




| COBBLE SIZE | COARSE | FINE | COARSE | MEDIUM | FINE | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL SIZE | | SAND SIZE | | | |

| Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|
| 23-133 | 4 | 2.29-2.90 | 12 | 53 | 35 | |
| 23-137 | 9 | 6.10-6.71 | 12 | 52 | 36 | |
| 23-138 | 7 | 4.57-5.18 | 20 | 48 | 32 | |
| 23-138 | 10 | 6.86-7.47 | 16 | 48 | 36 | |
| 23-145 | 10 | 6.86-7.47 | 9 | 44 | 34 | 13 |
| 23-146 | 5 | 3.05-3.66 | 14 | 54 | 32 | |
| 23-146 | 17 | 12.19-12.80 | 20 | 50 | 30 | |

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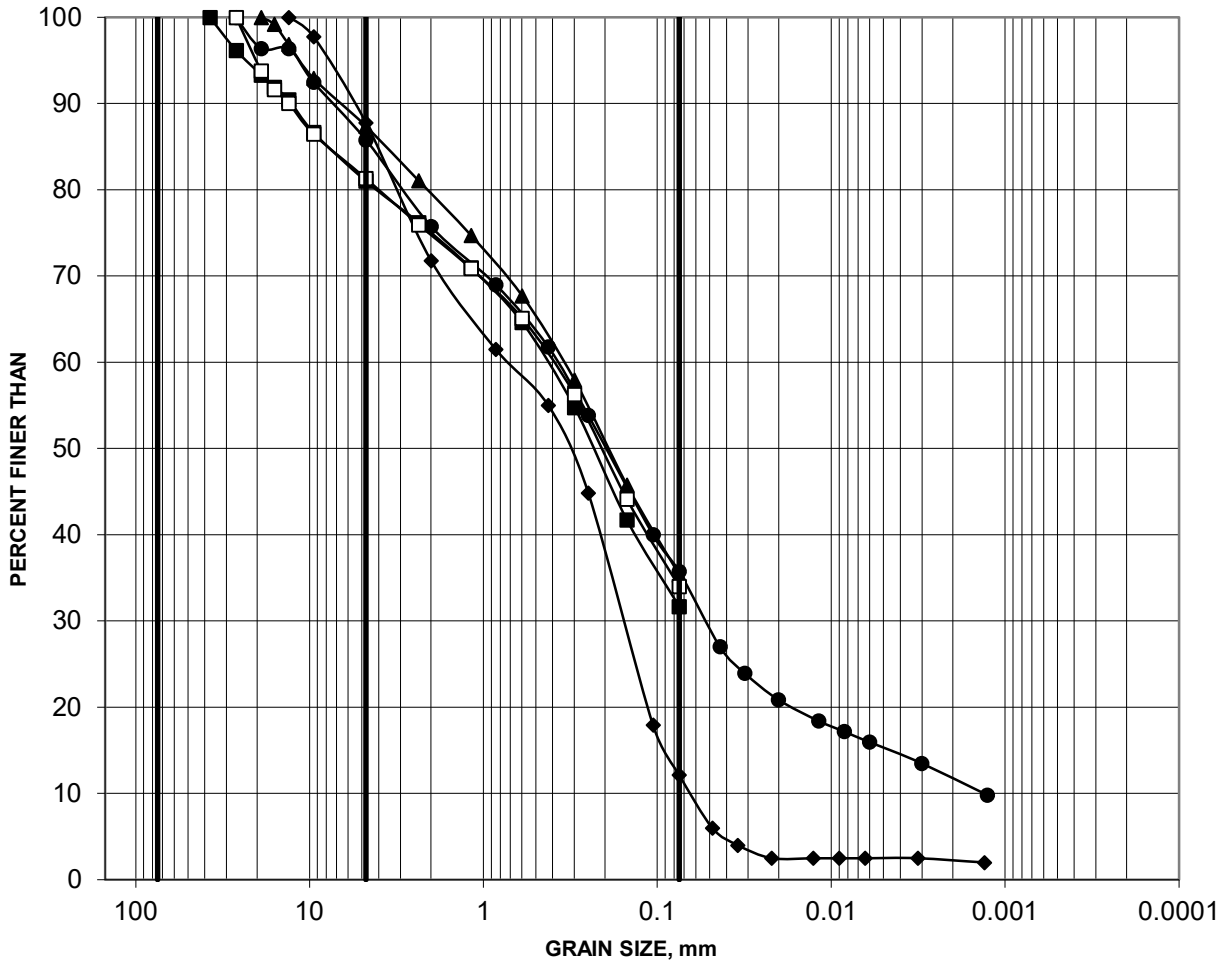
## GRAIN SIZE DISTRIBUTION

**FIGURE 15H**

### GLACIAL TILL




| COBBLE SIZE | GRAVEL SIZE | | SAND SIZE | | | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 23-153 | 6 | 3.81-4.42 | 19 | 49 | 32 | |
| ◆ | 23-153 | 22 | 21.84-22.45 | 12 | 76 | 10 | 2 |
| ▲ | 23-154 | 2 | 0.76-1.37 | 13 | 52 | 35 | |
| ● | 23-154 | 7 | 4.57-5.18 | 14 | 50 | 24 | 12 |
| ○ | 23-158 | 6 | 3.81-4.42 | 19 | 47 | 34 | |
| □ | 23-158 | 27 | 15.29-15.90 | 32 | 43 | 17 | 8 |

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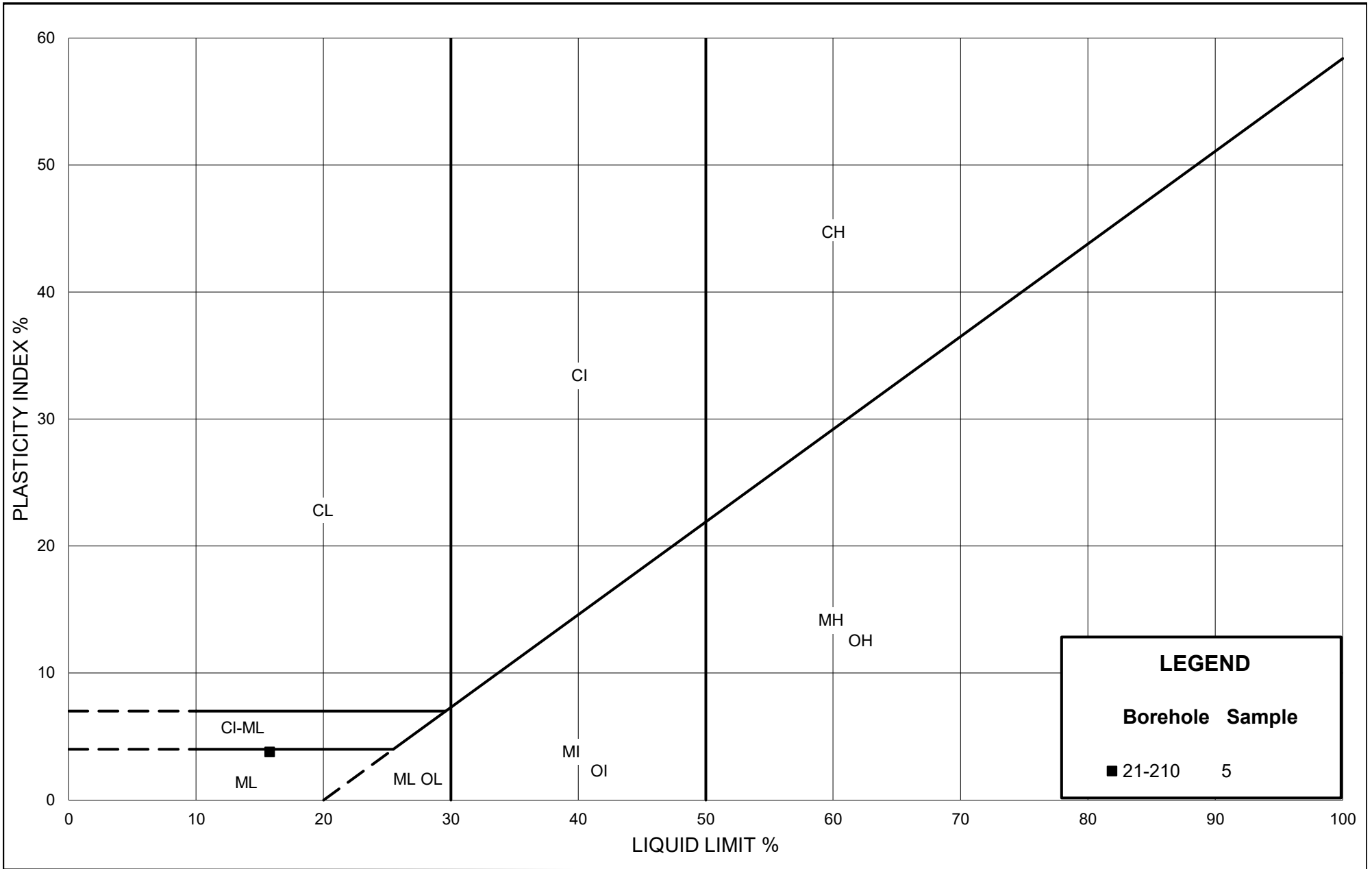


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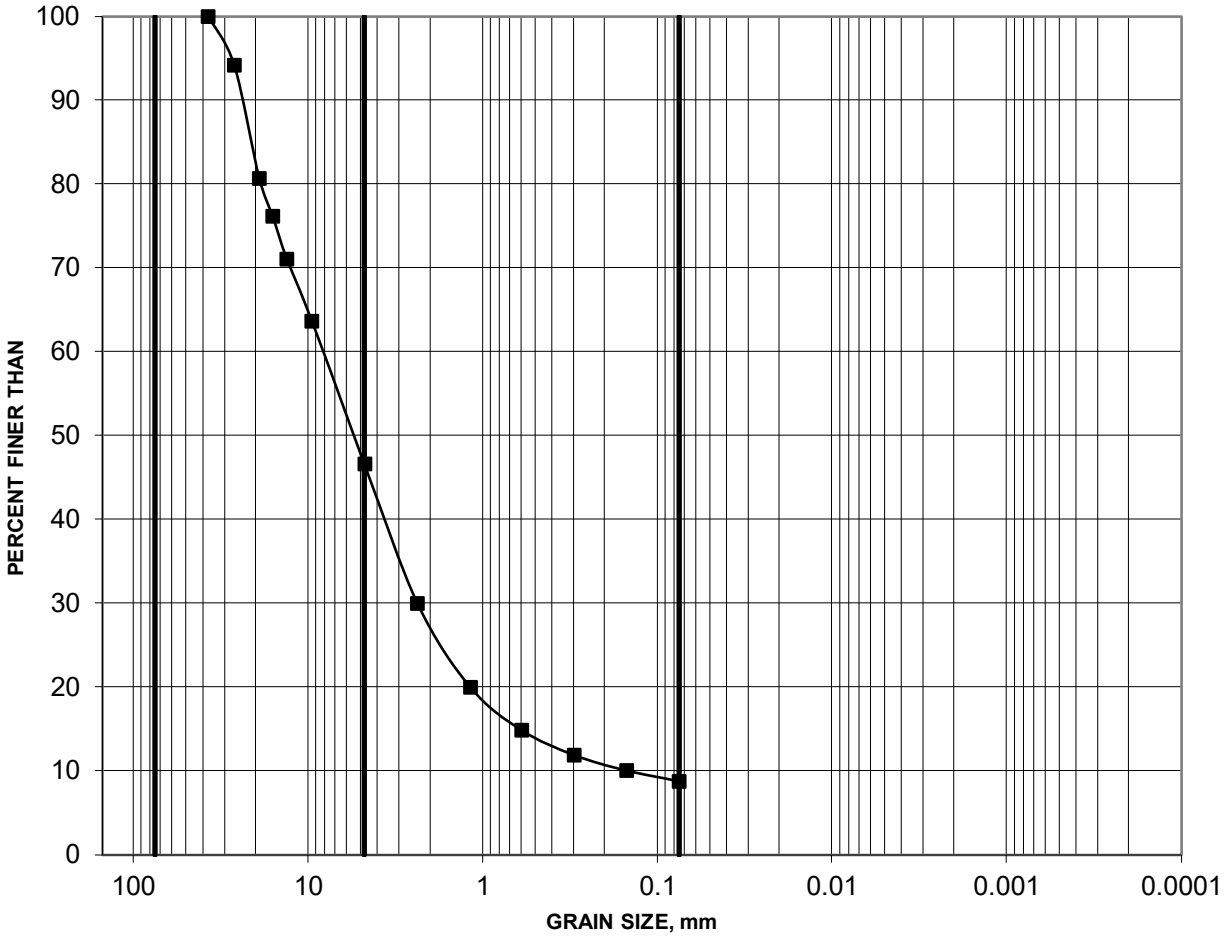
# PLASTICITY CHART
## GLACIAL TILL

| | |
|---|---|
| Figure: | 16 |
| Project: | 21451149/2000 |
| Created By: CW | Checked By: MI |

## GRAIN SIZE DISTRIBUTION

**FIGURE 17A**

### GRAVEL AND SAND




| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| —■— | 21-201 | 13 | 9.14-9.75 | 53 | 38 | | 9 |

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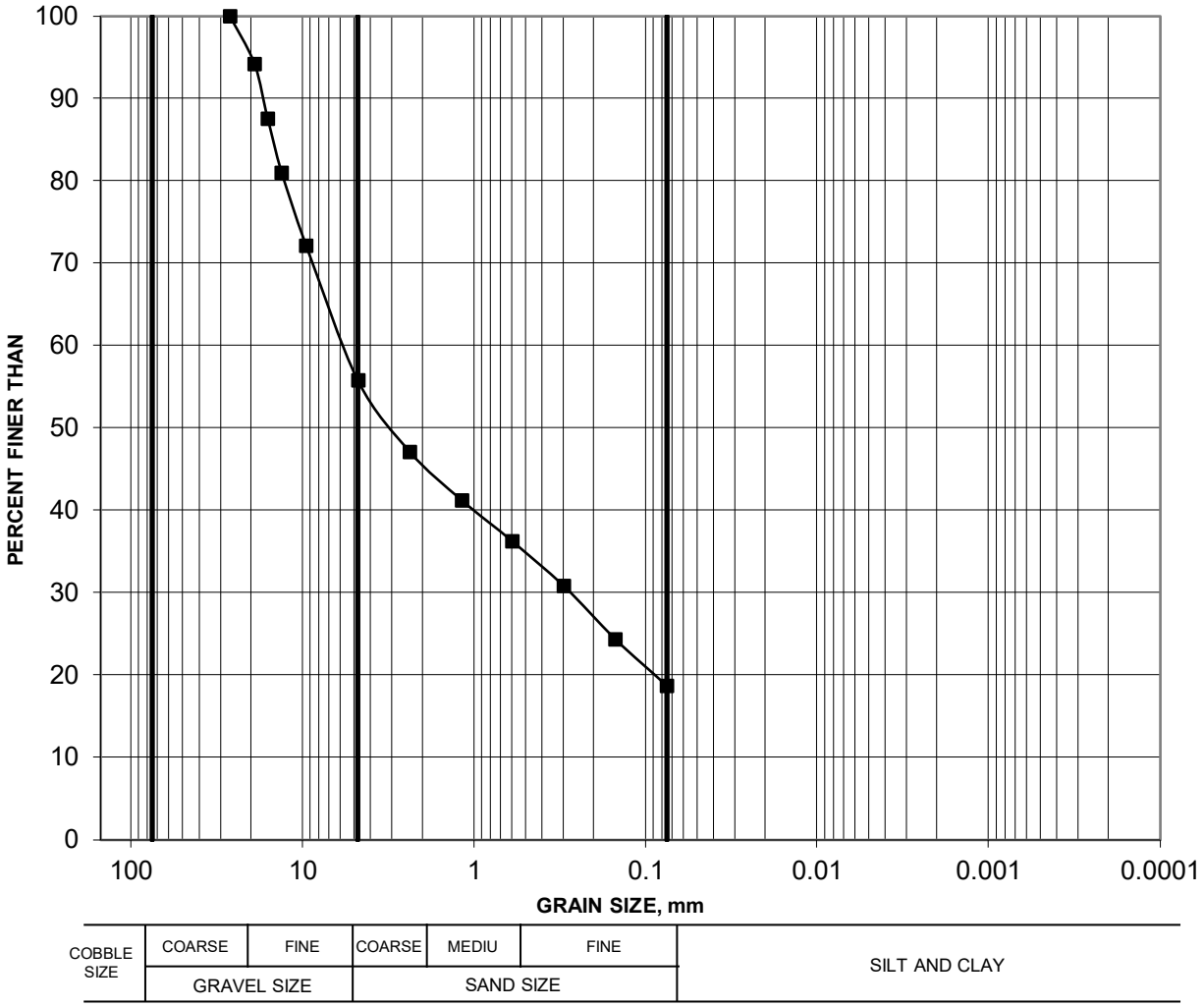
Checked by: MI

## GRAIN SIZE DISTRIBUTION

**FIGURE 17B**

### SILTY GRAVEL AND SAND




| Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|
| 22-110 | 3 | 1.52-2.13 | 44 | 37 | 19 | |

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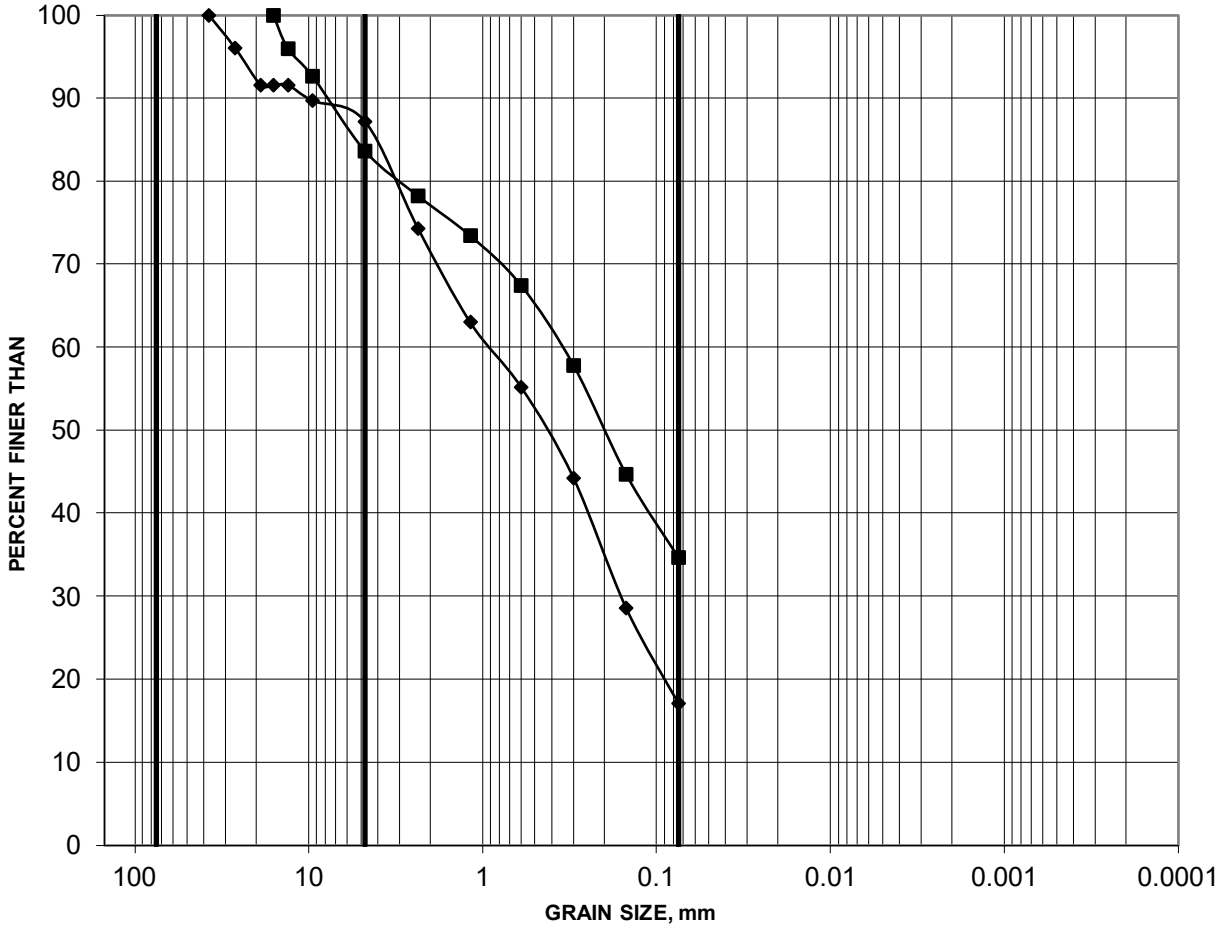
## GRAIN SIZE DISTRIBUTION

**FIGURE 17C**

### GRAVELLY SILTY SAND




| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 21-205 | 9 | 6.10-6.71 | 16 | 49 | 35 | |
| ◆ | 21-205 | 16 | 11.43-12.04 | 13 | 70 | 17 | |

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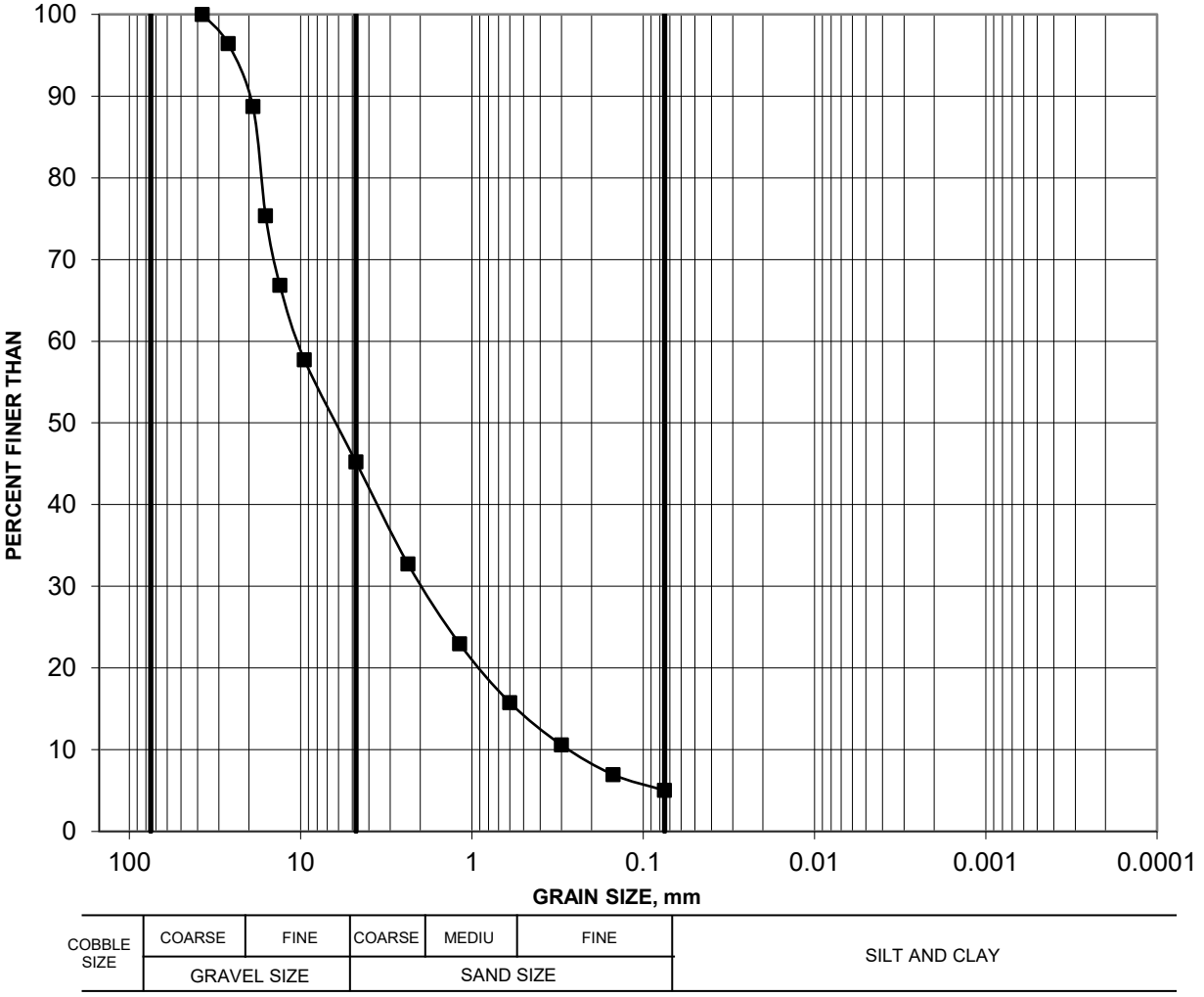
## GRAIN SIZE DISTRIBUTION

**FIGURE 17D**

### GRAVEL AND SAND




| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| —■— | 23-137 | 18 | 12.95-13.56 | 55 | 40 | | 5 |

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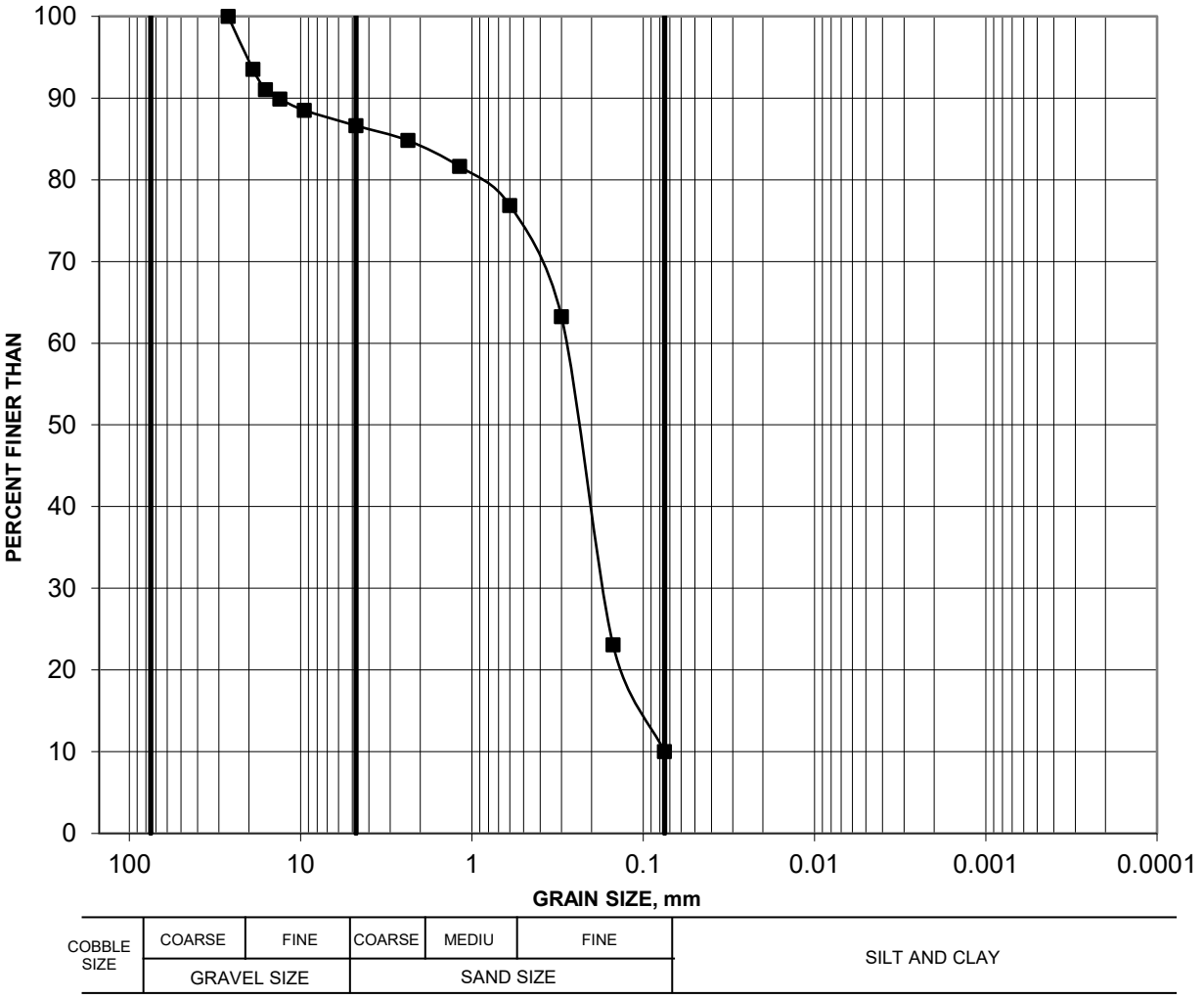
| GRAIN SIZE DISTRIBUTION | FIGURE 17E |
|---|---|

## GRAVELLY SAND




| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| —■— | 23-103 | 14A | 9.88-10.36 | 13 | 77 | 10 | |

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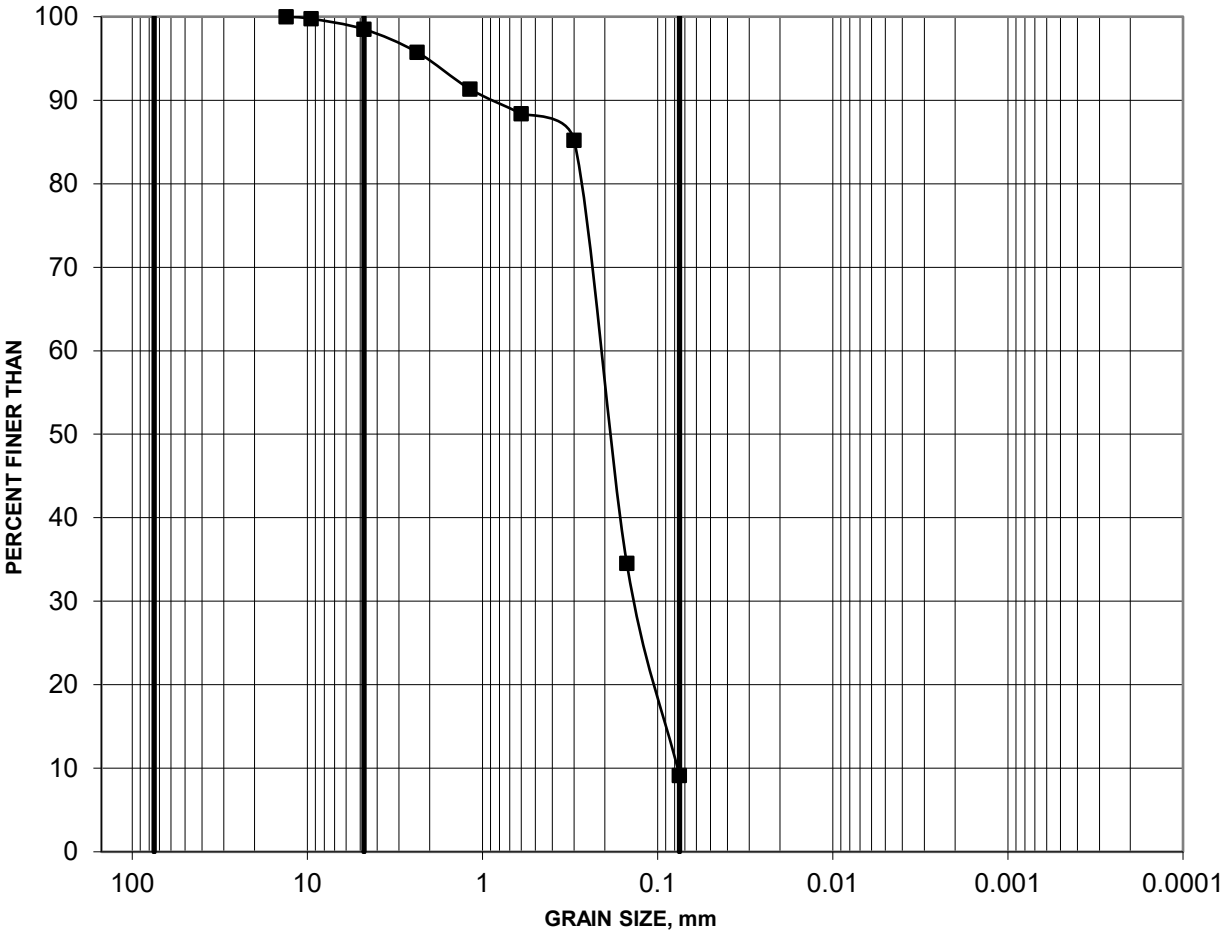
## GRAIN SIZE DISTRIBUTION

**FIGURE 17F**

### SAND




| | Borehole | Sample | Depth (m) | Constituents (%) Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|---|---|
| ■ | 23-133 | 14A | 9.91-10.36 | 2 | 89 | | 9 |

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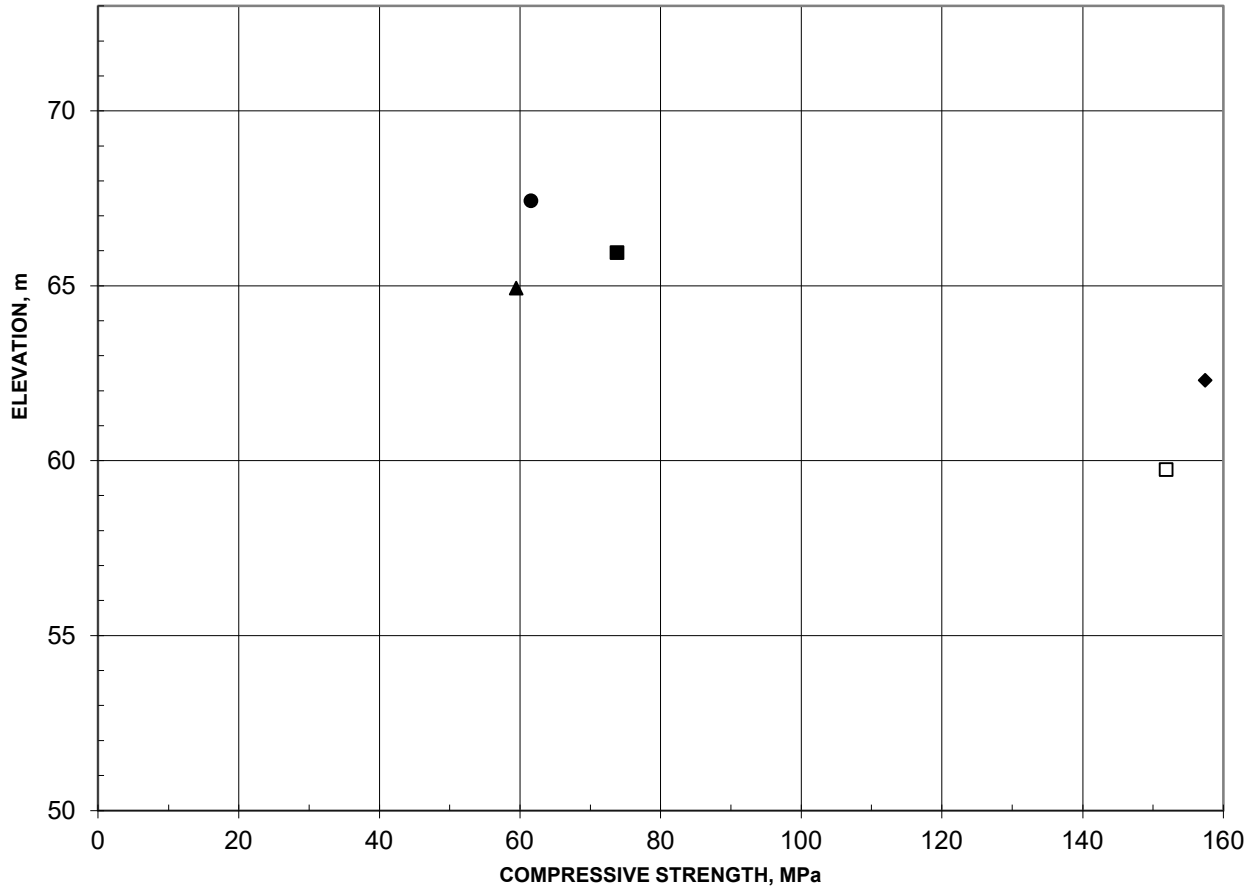
Checked by: JGH

**ASTM D7012 - Method C**
**UNCONFINED COMPRESSIVE STRENGTH OF ROCK CORE**
**SUMMARY OF LABORATORY TEST RESULTS**

**FIGURE 18A**




| Borehole | Depth (m) | L/D | Bulk Density (kg/m$^3$) | Lithology | UCS (MPa) | Failure Type |
|---|---|---|---|---|---|---|
| BH21-207 RC1 | 14.3 | 2.4 | 2690 | Limestone | 74 | 1 |
| BH21-213 RC1 | 13.8 | 2.4 | 2693 | Limestone | 157 | 1 |
| BH21-214 RC1 | 10.9 | 2.2 | 2661 | Limestone | 59 | 1 |
| BH21-219 RC1 | 12.0 | 2.4 | 2685 | Limestone | 62 | 1 |
| BH21-221 RC1 | 14.8 | 2.5 | 2681 | Limestone | 152 | 1 |

**Notes:**

**Failure Types**

1. Well formed cones on both ends

**Remarks**

- Cores tested in vertical direction.
- Cores tested in air-dry condition.
- Time to failure > 2 and < 15 minutes.

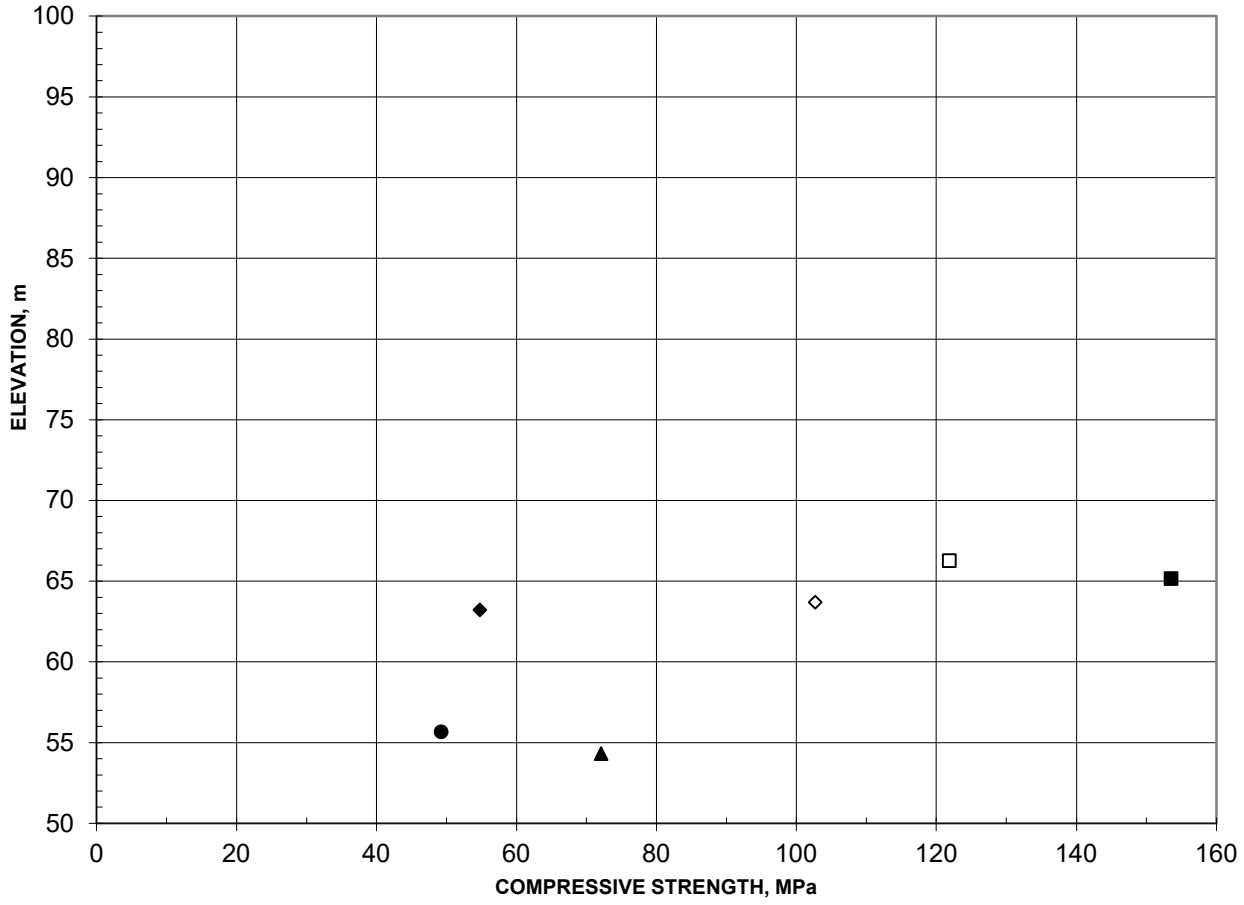
Project: 21451149/2000

GOLDER
MEMBER OF WSP

| | |
|---|---|
| Created by: | MI |
| Checked by: | CW |

**ASTM D7012 - Method C**
**UNIAXIAL UNCONFINED COMPRESSIVE STRENGTH OF ROCK CORE**
**SUMMARY OF LABORATORY TEST RESULTS**

**FIGURE 18B**




| | Borehole | Depth (m) | L/D | Bulk Density (kg/m$^3$) | Lithology | UCS (MPa) | Failure Type |
|---|---|---|---|---|---|---|---|
| ■ | BH23-145 RC1 | 8.6 | 2.4 | 2663 | Limestone | 154 | 1 |
| ◆ | BH23-148 RC1 | 11.8 | 2.4 | 2654 | Limestone | 55 | 1 |
| ▲ | BH23-125 RC1 | 26.8 | 2.4 | 2651 | Limestone | 72 | 1 |
| ● | BH23-117 RC1 | 25.3 | 2.5 | 2624 | Limestone | 49 | 1 |
| □ | BH23-111 RC1 | 13.0 | 2.4 | 2658 | Limestone | 122 | 1 |
| ◇ | BH23-137 RC1 | 15.7 | 2.2 | 2653 | Limestone | 103 | 1 |

**Notes:**

**Failure Types**

1. Well formed cones on both ends
2. Well formed cones on one end, vertical cracks through cap
3. Columnar vertical craking through both ends
4. Diagonal fracture with no cracking through ends
5. Side fractures at top or bottom
6. Side fractures at both sides of top or bottom

**Remarks**

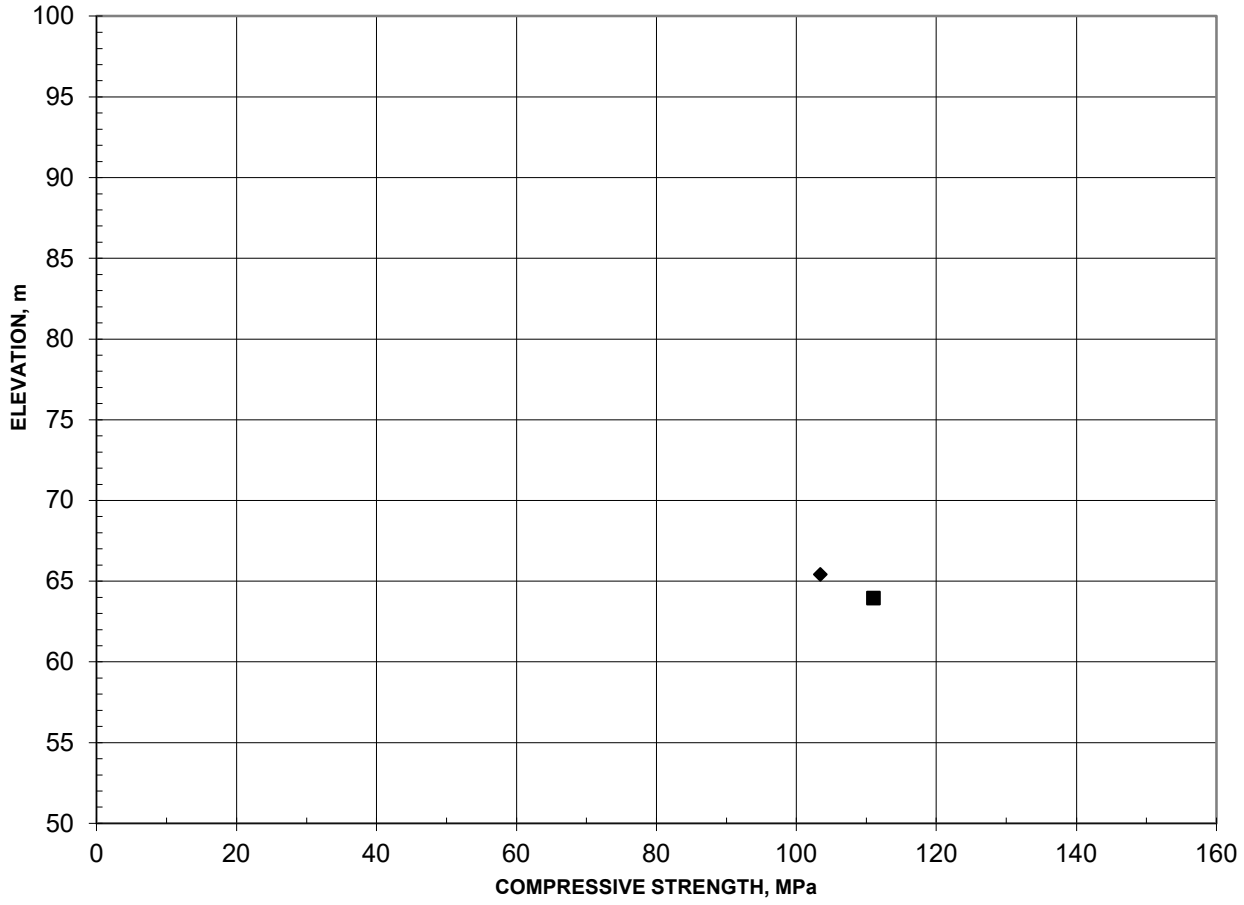
- Cores tested in vertical direction.
- Cores tested in air-dry condition.
- Time to failure > 2 and < 15 minutes.

Project: 23606896/4000

Created by: MI
Checked by: CW

**ASTM D7012 - Method C**
**UNIAXIAL UNCONFINED COMPRESSIVE STRENGTH OF ROCK CORE**
**SUMMARY OF LABORATORY TEST RESULTS**

**FIGURE 18C**




| Borehole | Depth (m) | L/D | Bulk Density (kg/m$^3$) | Lithology | UCS (MPa) | Failure Type |
|---|---|---|---|---|---|---|
| BH23-114 RC1 | 16.6 | 2.5 | 2692 | Limestone | 111 | 1 |
| BH23-133 RC1 | 11.7 | 2.4 | 2634 | Limestone | 103 | 1 |

**Notes:**

**Failure Types**

1. Well formed cones on both ends
2. Well formed cones on one end, vertical cracks through cap
3. Columnar vertical craking through both ends
4. Diagonal fracture with no cracking through ends
5. Side fractures at top or bottom
6. Side fractures at both sides of top or bottom

**Remarks**

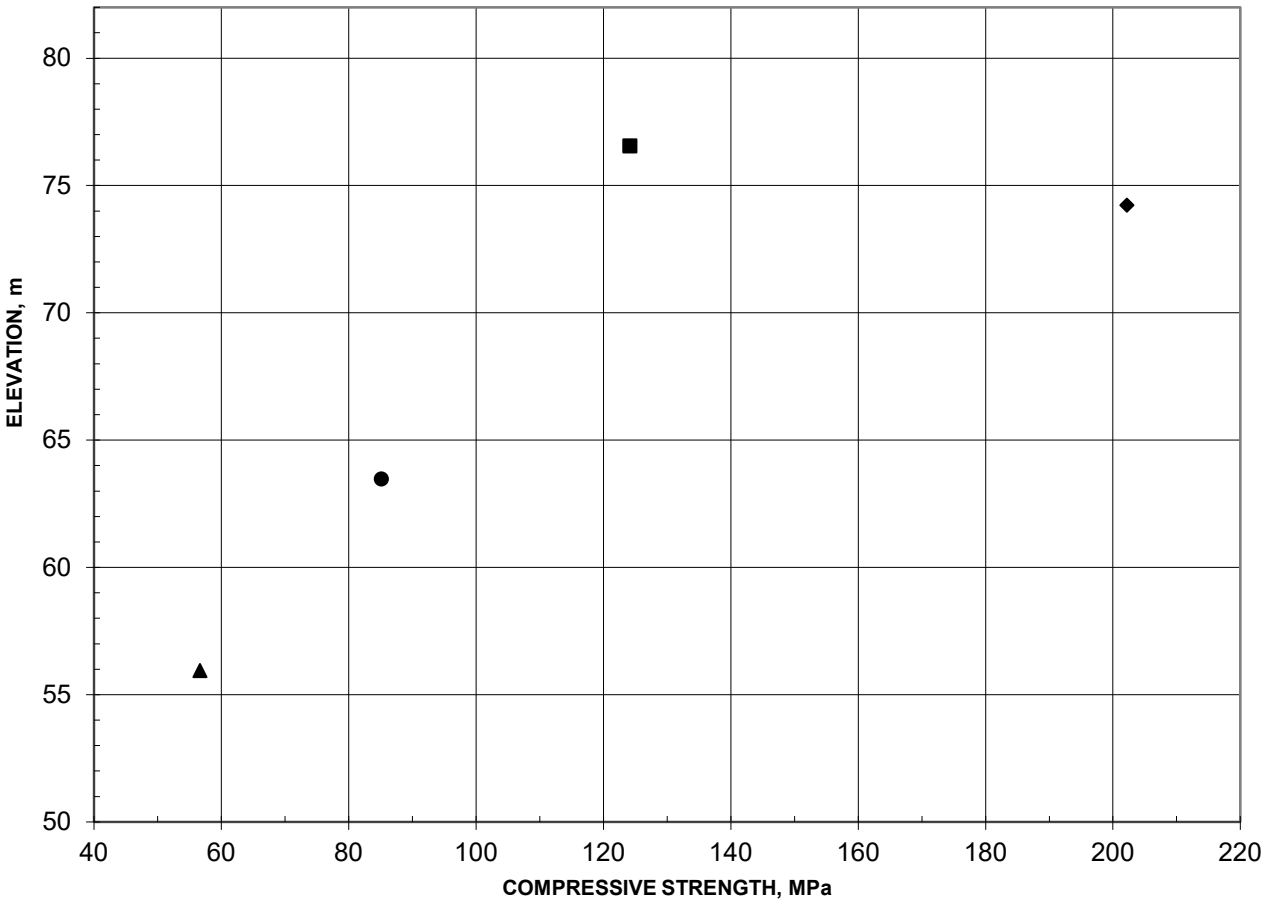
- Cores tested in vertical direction.
- Cores tested in air-dry condition.
- Time to failure > 2 and < 15 minutes.

Project: 23606896/4000

Created by: MI
Checked by: CW

**ASTM D7012 - Method C**
**UNIAXIAL UNCONFINED COMPRESSIVE STRENGTH OF ROCK CORE**
**SUMMARY OF LABORATORY TEST RESULTS**

**FIGURE 18D**




| | Borehole | Depth (m) | L/D | Bulk Density (kg/m$^3$) | Lithology | UCS (MPa) | Failure Type |
|---|---|---|---|---|---|---|---|
| ■ | BH23-154 RC1 | 6.2 | 2.4 | 2683 | Limestone | 124 | 1 |
| ◆ | BH23-155 RC1 | 8.1 | 2.5 | 2691 | Limestone | 202 | 1 |
| ▲ | BH23-158 RC1 | 26.9 | 1.9 | 2686 | Limestone | 57 | 1 |
| ● | BH23-159 RC1 | 22.4 | 2.5 | 2676 | Limestone | 85 | 1 |

**Notes:**

**Failure Types**

1. Well formed cones on both ends
2. Well formed cones on one end, vertical cracks through cap
3. Columnar vertical craking through both ends
4. Diagonal fracture with no cracking through ends
5. Side fractures at top or bottom
6. Side fractures at both sides of top or bottom

**Remarks**

- Cores tested in vertical direction.
- Cores tested in air-dry condition.
- Time to failure > 2 and < 15 minutes.

Project: 23606896/3000

| | |
|---|---|
| Created by: | MI |
| Checked by: | JGH |

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES LTD
1931 ROBERTSON ROAD
OTTAWA, ON K2H5B7
(613) 592-9600
ATTENTION TO: Kim MacDonald
PROJECT: 21451149
AGAT WORK ORDER: 21Z766508
WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Lab Manager
DATE REPORTED: Jun 30, 2021
PAGES (INCLUDING COVER): 5
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

*Disclaimer:*

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
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- *The test results reported herewith relate only to the samples as received by the laboratory.*
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- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*



Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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AGAT Laboratories

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CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

# Certificate of Analysis

AGAT WORK ORDER: 21Z766508

PROJECT: 21451149

CLIENT NAME: GOLDER ASSOCIATES LTD

ATTENTION TO: Kim MacDonald

SAMPLING SITE:

SAMPLED BY:James Sullivan

## (Water) Inorganic Chemistry

DATE RECEIVED: 2021-06-25

DATE REPORTED: 2021-06-30

| SAMPLE DESCRIPTION: | | | | BH21-10-GW | | BH21-215-GW | | BH21-213-GW | BH21-201-GW | | BH21-2215-GW |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE TYPE: | | | | Water | | Water | | Water | Water | | Water |
| DATE SAMPLED: | | | | 2021-06-25 09:00 | | 2021-06-25 09:20 | | 2021-06-25 09:35 | 2021-06-25 10:05 | | 2021-06-25 09:45 |
| Parameter | Unit | G / S | RDL | 2662463 | RDL | 2662465 | RDL | 2662466 | 2662467 | RDL | 2662468 |
| pH | pH Units | | NA | 7.53 | NA | 7.66 | NA | 7.87 | 7.79 | NA | 7.70 |
| Electrical Conductivity | µS/cm | | 2 | 1460 | 2 | 1980 | 2 | 1310 | 1500 | 2 | 2420 |
| Chloride | mg/L | | 0.12 | 4.73 | 0.24 | 267 | 0.12 | 225 | 216 | 0.49 | 497 |
| Sulphate | mg/L | | 0.10 | 458 | 0.19 | 305 | 0.10 | 74.3 | 130 | 0.38 | 169 |

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

2662463 Dilution required, RDL has been increased accordingly.

Analysis perfomed at AGAT Toronto (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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http://www.agatlabs.com

# Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 21Z766508

PROJECT: 21451149

ATTENTION TO: Kim MacDonald

SAMPLING SITE:

SAMPLED BY:James Sullivan

## Water Analysis

| RPT Date: Jun 30, 2021 | | | DUPLICATE | | | | REFERENCE MATERIAL | | | METHOD BLANK SPIKE | | | MATRIX SPIKE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARAMETER | Batch | Sample Id | Dup #1 | Dup #2 | RPD | Method Blank | Measured Value | Acceptable Limits | | Recovery | Acceptable Limits | | Recovery | Acceptable Limits | |
| | | | | | | | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| (Water) Inorganic Chemistry | | | | | | | | | | | | | | | |
| pH | 2661074 | | 7.78 | 7.79 | 0.1% | NA | 101% | 98% | 103% | NA | | | NA | | |
| Electrical Conductivity | 2661074 | | 1130 | 1130 | 0.0% | < 2 | 108% | 90% | 110% | NA | | | NA | | |
| Chloride | 2662465 | 2662465 | 267 | 258 | 3.4% | < 0.10 | 97% | 70% | 130% | 103% | 80% | 120% | NA | 70% | 130% |
| Sulphate | 2662465 | 2662465 | 305 | 295 | 3.3% | < 0.10 | 96% | 70% | 130% | 99% | 80% | 120% | NA | 70% | 130% |

Comments: NA Signifies Not Applicable
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:

Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST



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*Results relate only to the items tested. Results apply to samples as received.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

# Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD

AGAT WORK ORDER: 21Z766508

PROJECT: 21451149

ATTENTION TO: Kim MacDonald

SAMPLING SITE:

SAMPLED BY:James Sullivan

| PARAMETER | AGAT S.O.P | LITERATURE REFERENCE | ANALYTICAL TECHNIQUE |
|---|---|---|---|
| Water Analysis | | | |
| pH | INOR-93-6000 | modified from SM 4500-H+ B | PC TITRATE |
| Electrical Conductivity | INOR-93-6000 | modified from SM 2510 B | PC TITRATE |
| Chloride | INOR-93-6004 | modified from SM 4110 B | ION CHROMATOGRAPH |
| Sulphate | INOR-93-6004 | modified from SM 4110 B | ION CHROMATOGRAPH |



*Results relate only to the items tested. Results apply to samples as received.*

# Certificate of Analysis

Client: Golder Associates Ltd (Ottawa)
1931 Robertson Road,
Ottawa, Ontario
.
Attention: Mr. Jesus Gonzalez-Hurtado
PO#:
Invoice to: WSP Canada Inc.

Report Number: 1997593
Date Submitted: 2023-05-30
Date Reported: 2023-06-06
Project: 23606896
COC #: 908167



**Dear Jesus Gonzalez-Hurtado:**

**Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).**

Report Comments:

APPROVAL: _____
Raheleh Zafari, Environmental Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

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Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

# Certificate of Analysis

eurofins | Environment Testing

Client: Golder Associates Ltd (Ottawa)
1931 Robertson Road,
Ottawa, Ontario
.
Attention: Mr. Jesus Gonzalez-Hurtado
PO#:
Invoice to: WSP Canada Inc.

Report Number: 1997593
Date Submitted: 2023-05-30
Date Reported: 2023-06-06
Project: 23606896
COC #: 908167

| Group | Analyte | MRL | Units | Guideline | Lab I.D.<br>Sample Matrix<br>Sample Type<br>Sampling Date<br>Sample I.D. | 1689344<br>Soil<br><br>2023-04-10<br>23-153 Sa<br>17/47-48.83' | 1689345<br>Soil<br><br>2023-04-06<br>23-154 Sa<br>8/17.5-19.5 | 1689346<br>Soil<br><br>2023-04-21<br>23-159 Sa<br>14/27.5-29.5' | 1689347<br>Soil<br><br>2023-04-14<br>23-158 Sa<br>10/22.5-24.5' |
|---|---|---|---|---|---|---|---|---|---|
| Anions | Cl | 0.002 | % | | | 0.004 | 0.002 | 0.003 | 0.006 |
| | SO4 | 0.01 | % | | | 0.03 | 0.04 | 0.04 | 0.03 |
| General Chemistry | Electrical Conductivity | 0.05 | mS/cm | | | 0.27 | 0.32 | 0.31 | 0.36 |
| | pH | 2.00 | | | | 8.31 | 8.20 | 8.33 | 8.25 |
| | Resistivity | 1 | ohm-cm | | | 3704 | 3125 | 3226 | 2778 |

**Guideline =** *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

# Certificate of Analysis

eurofins | Environment Testing

Client: Golder Associates Ltd (Ottawa)
1931 Robertson Road,
Ottawa, Ontario
.
Attention: Mr. Jesus Gonzalez-Hurtado
PO#:
Invoice to: WSP Canada Inc.

Report Number: 1997593
Date Submitted: 2023-05-30
Date Reported: 2023-06-06
Project: 23606896
COC #: 908167

## *QC Summary*

| Analyte | Blank | QC % Rec | QC Limits |
|---|---|---|---|
| **Run No** 442852 **Analysis/Extraction Date** 2023-06-05 **Analyst** IP<br>**Method** Cond-Soil | | | |
| Electrical Conductivity | <0.05 mS/cm | 100 | 90-110 |
| pH | 6.66 | 99 | 90-110 |
| Resistivity | | | |
| **Run No** 442925 **Analysis/Extraction Date** 2023-06-06 **Analyst** IP<br>**Method** AG SOIL | | | |
| SO4 | <0.01 % | 91 | 70-130 |
| **Run No** 442940 **Analysis/Extraction Date** 2023-06-06 **Analyst** AsA<br>**Method** C CSA A23.2-4B | | | |
| Chloride | <0.002 % | | 90-110 |

**Guideline =** *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

# Certificate of Analysis

Client: Golder Associates Ltd (Ottawa)
1931 Robertson Road,
Ottawa, Ontario
.
Attention: Mr. Jesus Gonzalez-Hurtado
PO#:
Invoice to: WSP Canada Inc.

Report Number: 1997642
Date Submitted: 2023-05-31
Date Reported: 2023-06-07
Project: 23606896/4000
COC #: 908202



**Dear Jesus Gonzalez-Hurtado:**

**Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).**

Report Comments:

APPROVAL: _____
Raheleh Zafari, Environmental Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

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Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

# Certificate of Analysis

eurofins | Environment Testing

Client: Golder Associates Ltd (Ottawa)
1931 Robertson Road,
Ottawa, Ontario
.
Attention: Mr. Jesus Gonzalez-Hurtado
PO#:
Invoice to: WSP Canada Inc.

Report Number: 1997642
Date Submitted: 2023-05-31
Date Reported: 2023-06-07
Project: 23606896/4000
COC #: 908202

| Group | Analyte | MRL | Units | Guideline | Lab I.D.<br>Sample Matrix<br>Sample Type<br>Sampling Date<br>Sample I.D. | 1689506<br>Soil<br><br>2023-04-10<br>23-101 Sa10 / 25-27' | 1689507<br>Soil<br><br>2023-04-26<br>23-125 Sa16 / 38.2-40.2' |
|---|---|---|---|---|---|---|---|
| Anions | Cl | 0.002 | % | | | 0.003 | 0.003 |
| | SO4 | 0.01 | % | | | 0.04 | 0.03 |
| General Chemistry | Electrical Conductivity | 0.05 | mS/cm | | | 0.31 | 0.23 |
| | pH | 2.00 | | | | 7.94 | 8.33 |
| | Resistivity | 1 | ohm-cm | | | 3226 | 4348 |

**Guideline =** *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

eurofins | Environment Testing

# Certificate of Analysis

Client: Golder Associates Ltd (Ottawa)
1931 Robertson Road,
Ottawa, Ontario
.
Attention: Mr. Jesus Gonzalez-Hurtado
PO#:
Invoice to: WSP Canada Inc.

Report Number: 1997642
Date Submitted: 2023-05-31
Date Reported: 2023-06-07
Project: 23606896/4000
COC #: 908202

## *QC Summary*

| Analyte | Blank | QC % Rec | QC Limits |
|---|---|---|---|
| **Run No** 442925 **Analysis/Extraction Date** 2023-06-06 **Analyst** IP<br>**Method** AG SOIL | | | |
| SO4 | <0.01 % | 91 | 70-130 |
| **Run No** 442938 **Analysis/Extraction Date** 2023-06-06 **Analyst** IP<br>**Method** Cond-Soil | | | |
| Electrical Conductivity | <0.05 mS/cm | 100 | 90-110 |
| pH | 6.12 | 99 | 90-110 |
| Resistivity | | | |
| **Run No** 442940 **Analysis/Extraction Date** 2023-06-06 **Analyst** AsA<br>**Method** C CSA A23.2-4B | | | |
| Chloride | <0.002 % | | 90-110 |

**Guideline =** *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

# APPENDIX 2

## FIGURE 1 - KEY PLAN

## FIGURE 2 - SETTLEMENT ANALYSIS - RAFT SLAB FOUNDATION

## FIGURE 4 - WATERPROOFING DETAIL (PODIUM/TOWERS)

## FIGURE 5 – TYPICAL FOUNDATION DRAINAGE SYSTEM(PAVILLION/GARAGES)

## FIGURE 6 – BEDROCK/SOIL PIPE TRANSITION DETAIL

## FIGURE 7 – SEISMIC SHEAR WAVE VELOCITY PROFILE

## DRAWING PG6982-1 - TEST HOLE LOCATION PLAN

## DRAWING PG6982-2 - GROUNDWATER CONTOUR PLAN

## DRAWING PG6982-3 - GROUNDWATER CONTOUR PLAN POST-CONSTRUCTION

## DRAWING PG6982-4 - CROSS SECTION LOCATION PLAN

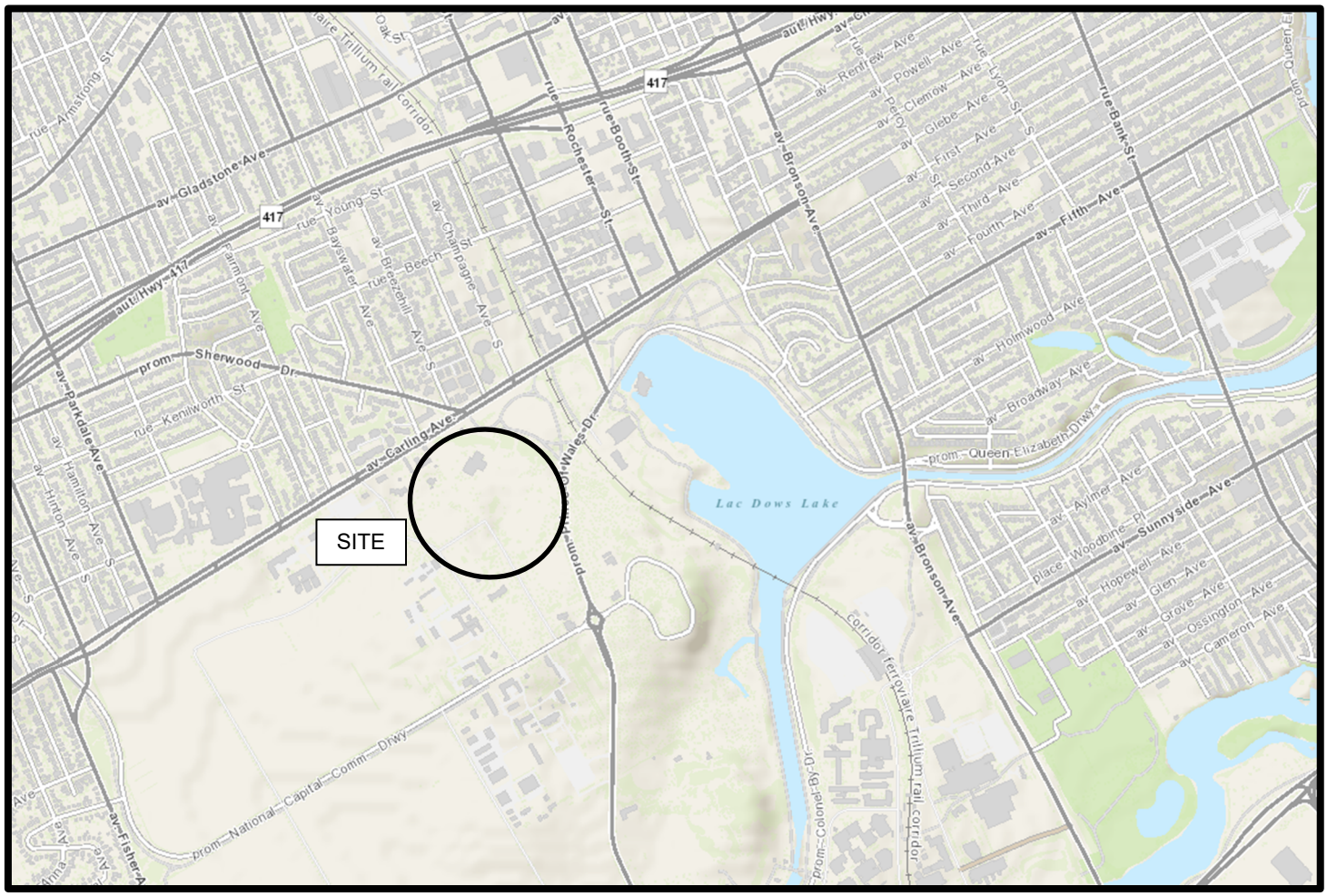
## DRAWINGS PG6982 - 4A TO 4D – CROSS SECTIONS

## DRAWING PG6982-5 – RETAINING WALLS AND TEMPORARY SHORING SYSTEM PLAN

## DRAWING PG6982-7 - BEDROCK CONTOUR PLAN

## DRAWING PG6982-8 - BEDROCK HEATMAP

## DRAWINGS CA0027758.0-51 – C5-200 TO C5-202 -EXTERIOR PERIMETER DRAINAGE PLAN

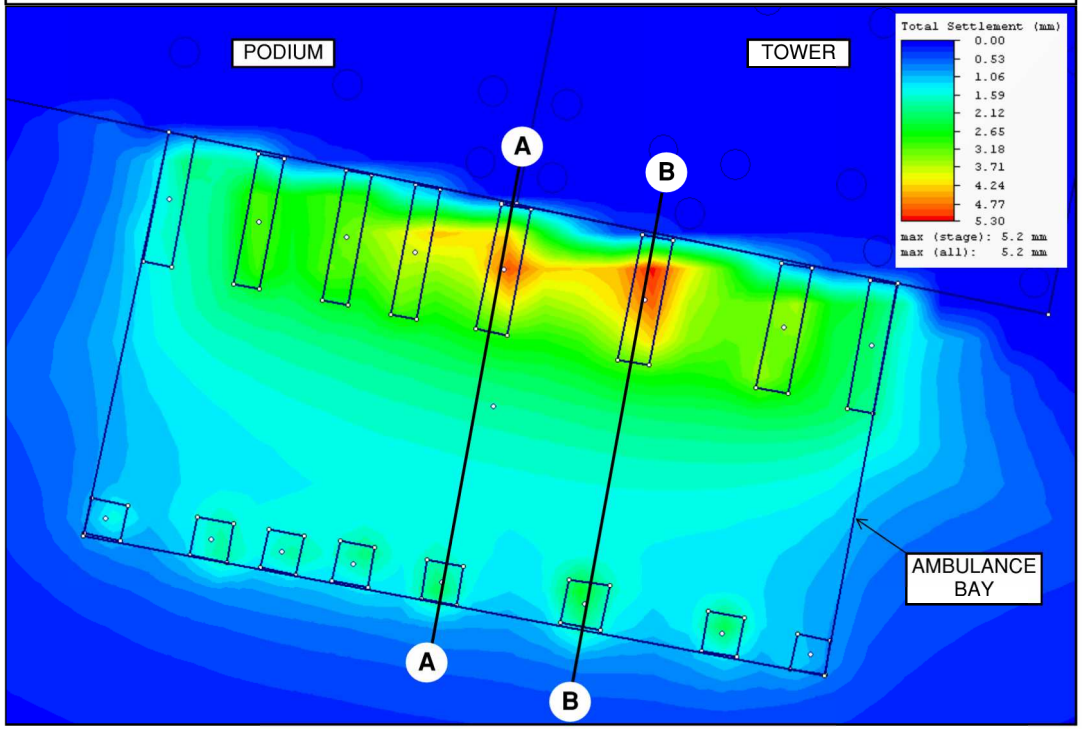



# FIGURE 1

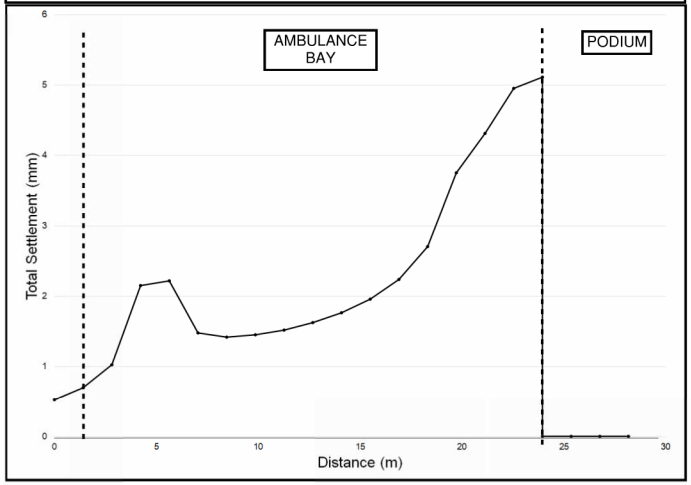
## KEY PLAN

PATERSON GROUP

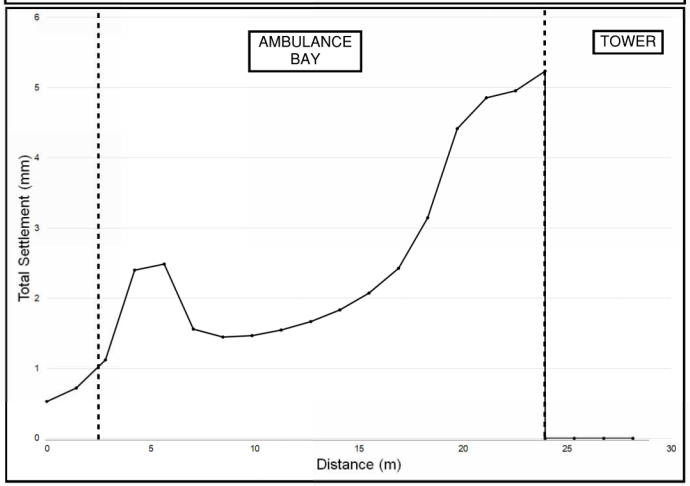
## PLAN VIEW - TOTAL SETTLEMENT




## CROSS SECTION A - TOTAL SETTLEMENT




## CROSS SECTION B - TOTAL SETTLEMENT



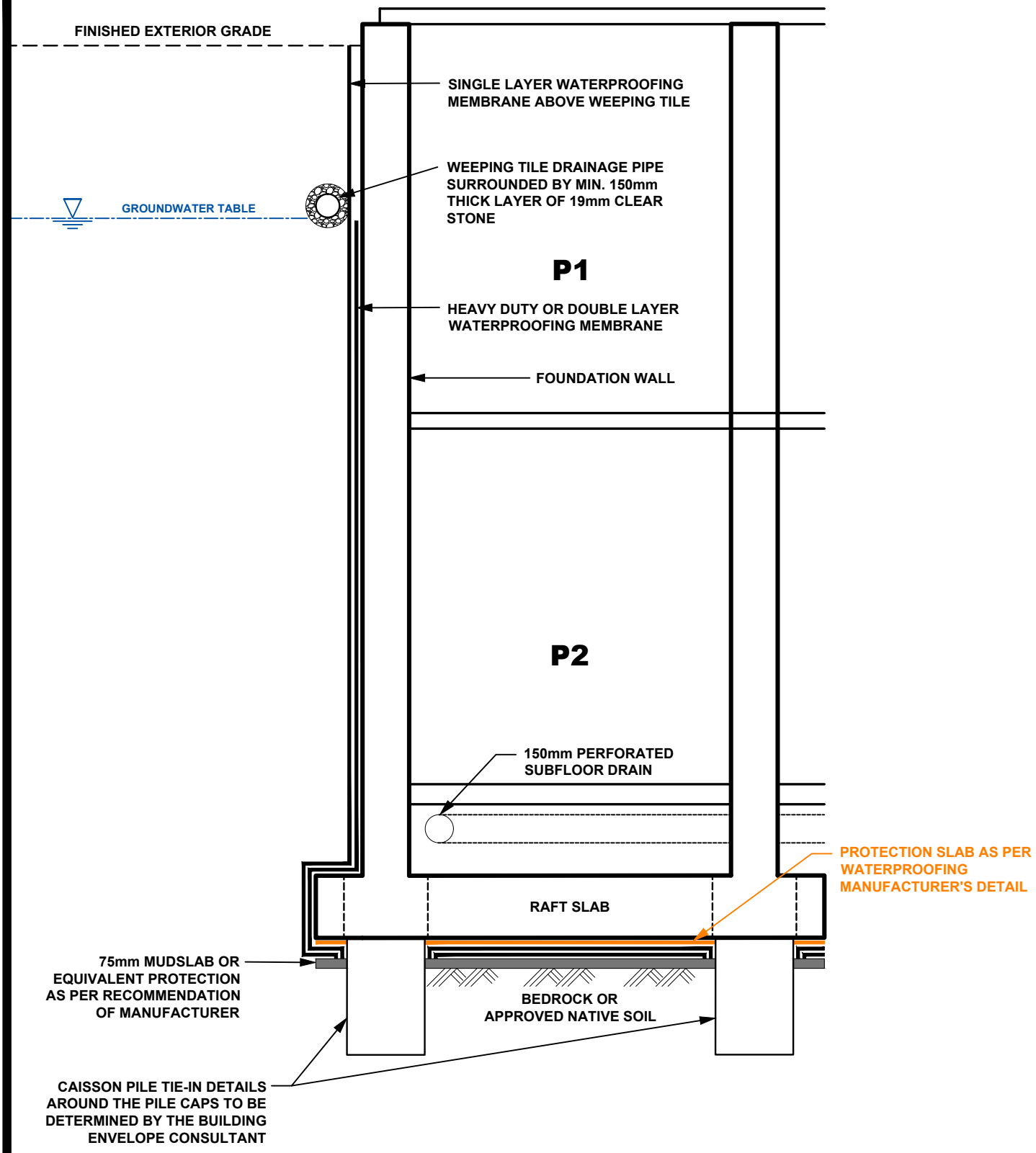

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |

PCL CONSTRUCTORS
GEOTECHNICAL INVESTIGATION
PROPOSED OTTAWA CIVIC HOSPITAL
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
**SETTLEMENT ANALYSIS - AMBULANCE GARAGE**

| | |
|---|---|
| Scale: NTS 1:3000 | Date: 01/2026 |
| Drawn by: FC | Report No.: PG6982-1 |
| | Dwg. No.: **FIGURE 2** |
| Approved by: JV | Revision No.: |

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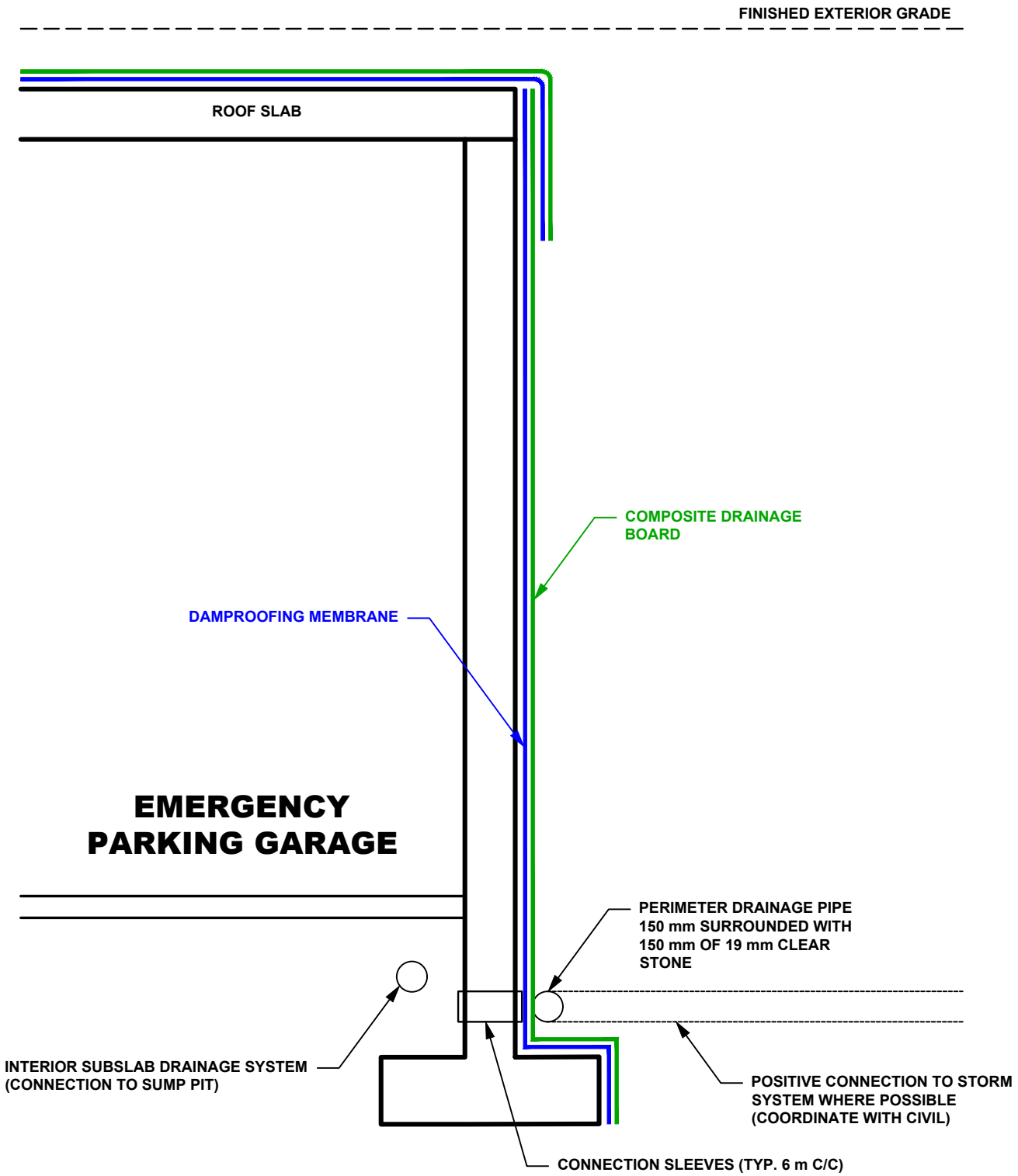
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:

# WATERPROOFING DETAIL (TOWERS/PODIUM)

| Date: | Report No.: |
|---|---|
| 01/2026 | PG6982-1 |
| Scale: | Drawing No.: |
| N.T.S. | FIGURE 3 |
| Drawn by: NFRV | Checked by: JV |

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-figure 3 - tanking waterproofing figure (january 2026).dwg

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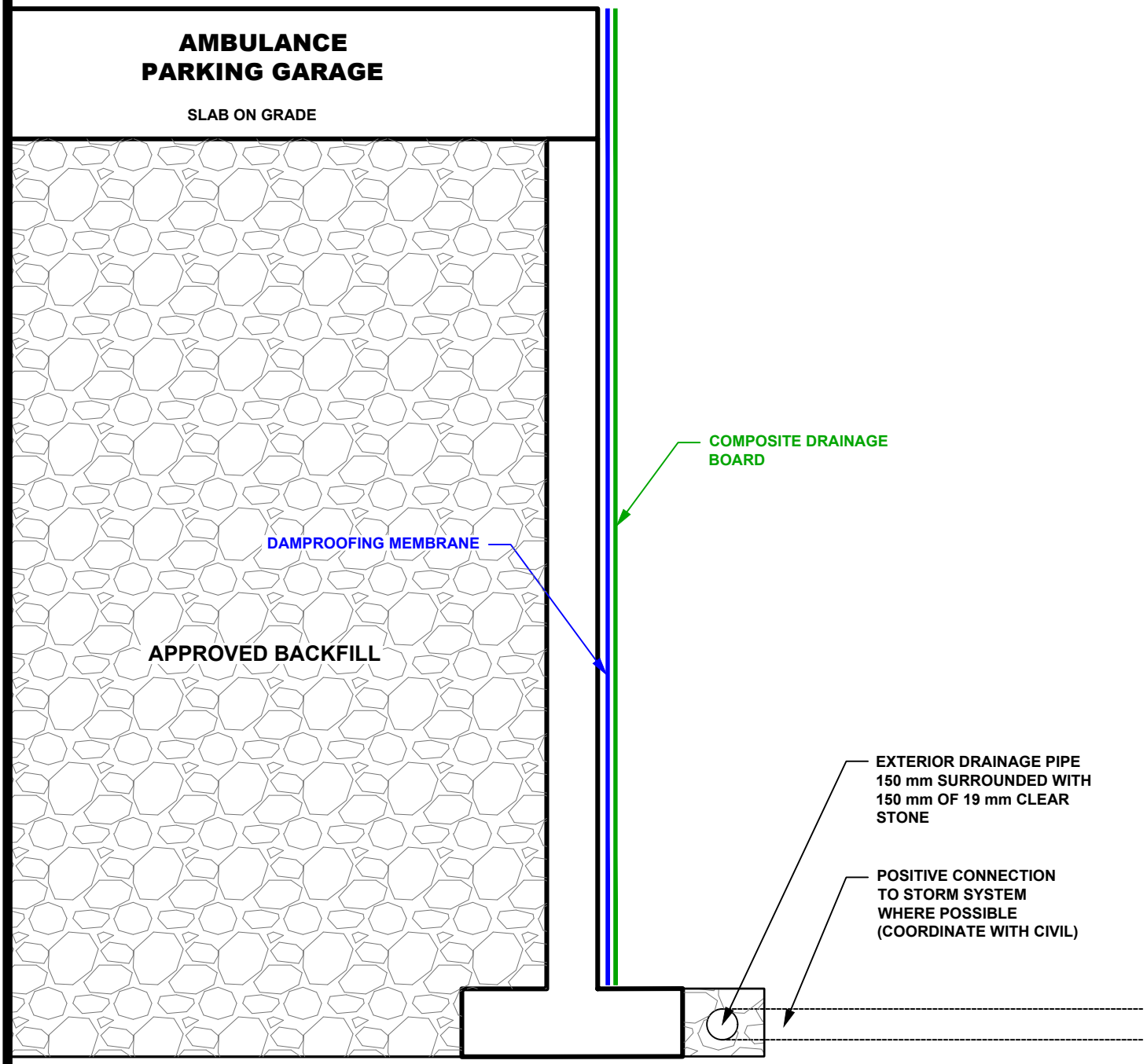
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:

# TYPICAL FOUNDATION DRAINAGE SYSTEM (PAVILION/GARAGES)

| Date: | Report No.: |
|---|---|
| 01/2026 | PG6982-1 |
| Scale: | Drawing No.: |
| N.T.S. | FIGURE 4 |
| Drawn by: ZS | Checked by: JV |

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-figure 3 - tanking waterproofing figure (january 2026).dwg




PATERSON GROUP

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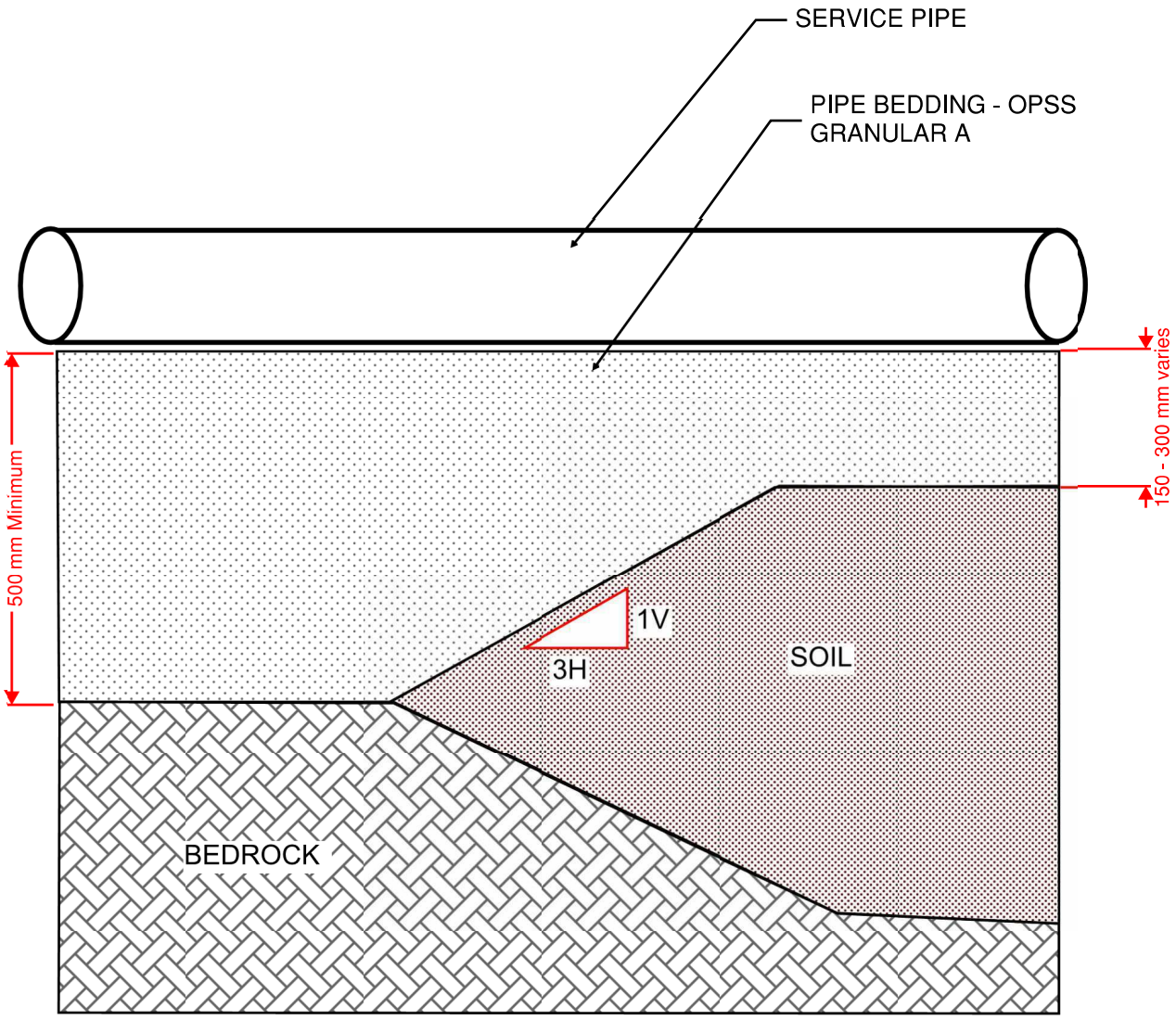
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:

# TYPICAL FOUNDATION DRAINAGE SYSTEM - AMBULANCE PARKING GARAGE

| Date: | Report No.: |
|---|---|
| 01/2026 | PG6982-1 |
| Scale: | Drawing No.: |
| N.T.S. | FIGURE 5 |
| Drawn by: ZS | Checked by: JV |

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-figure 3 - tanking waterproofing figure (january 2026).dwg




PATERSON GROUP

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TOH - CIVIC CAMPUS REDEVELOPMENT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:

**BEDROCK/SOIL PIPE TRANSITION DETAIL**

| Date: | Report No.: |
|---|---|
| 05/2025 | PG6982-1 |
| Scale: | Drawing No.: |
| N.T.S. | FIGURE 6 |
| Drawn by: PT | Checked by: JV |

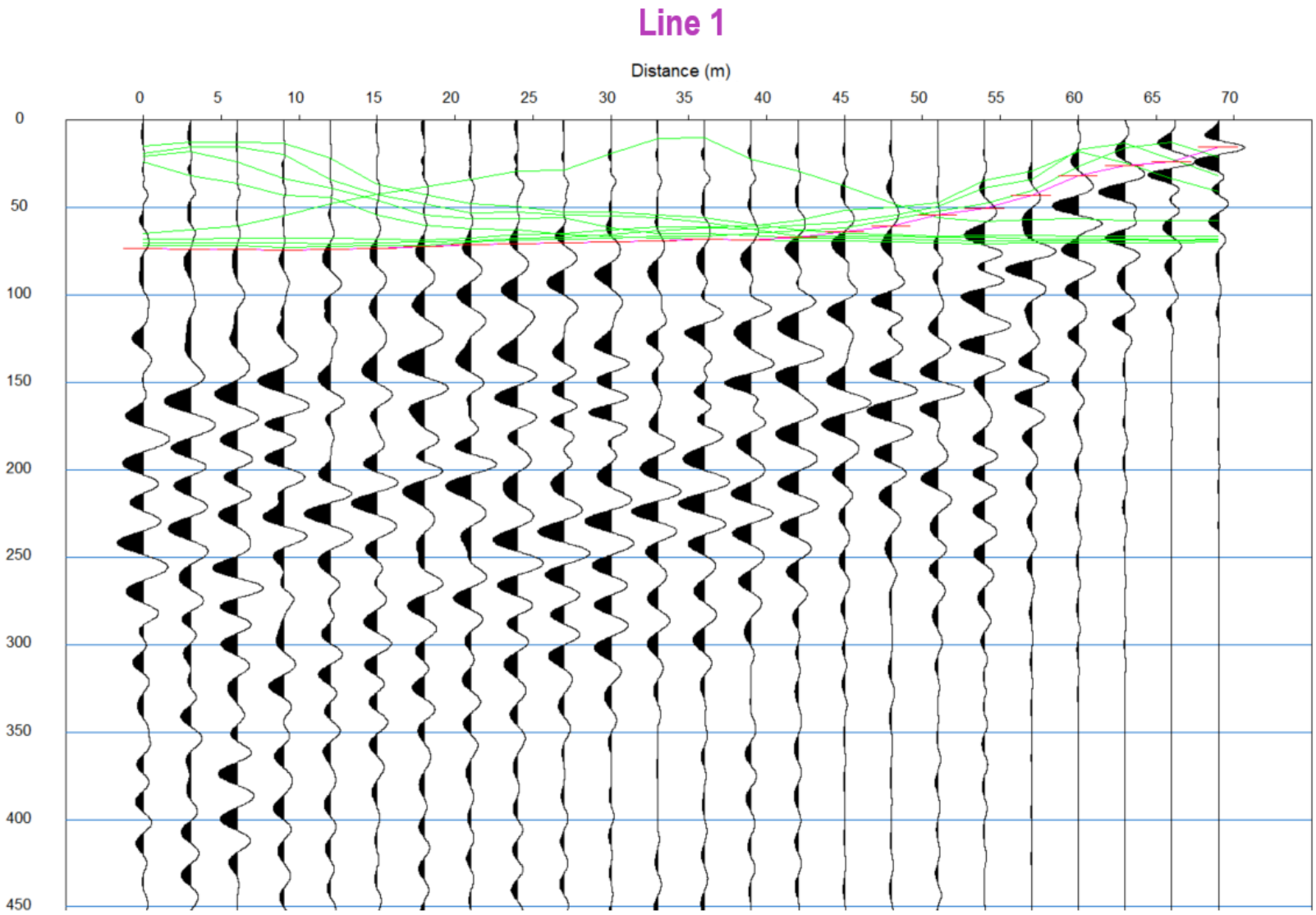


Figure 7a – Shear Wave Velocity Profile at Shot Location 72 m

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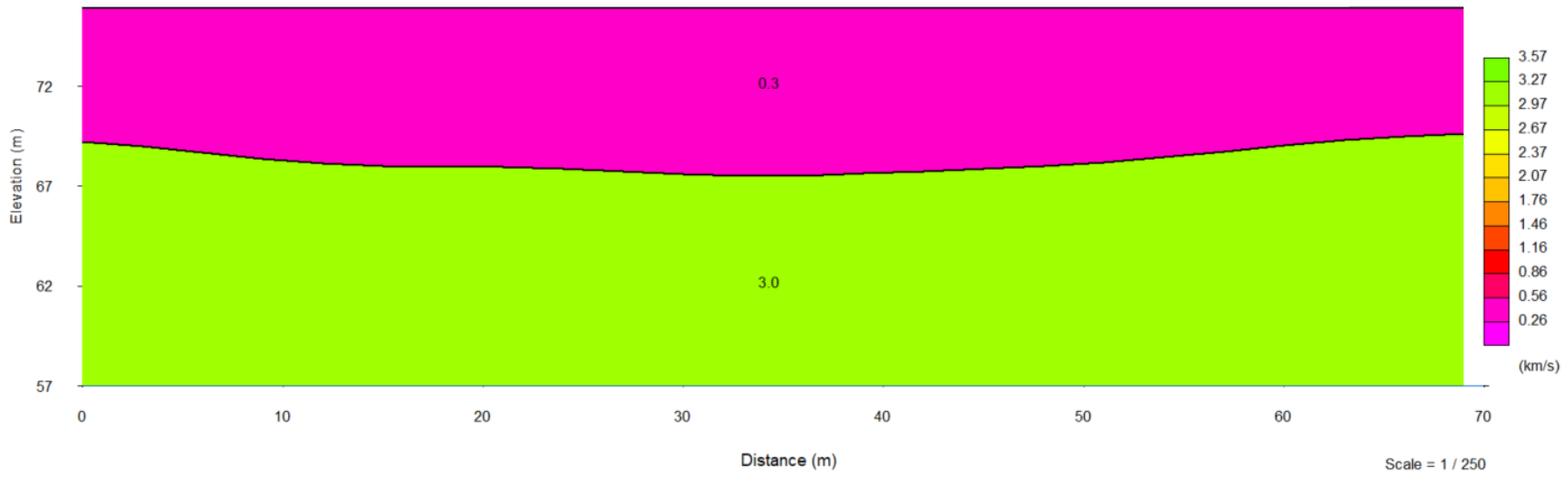


Figure 7b – Shear Wave Velocity Profile at Line 1

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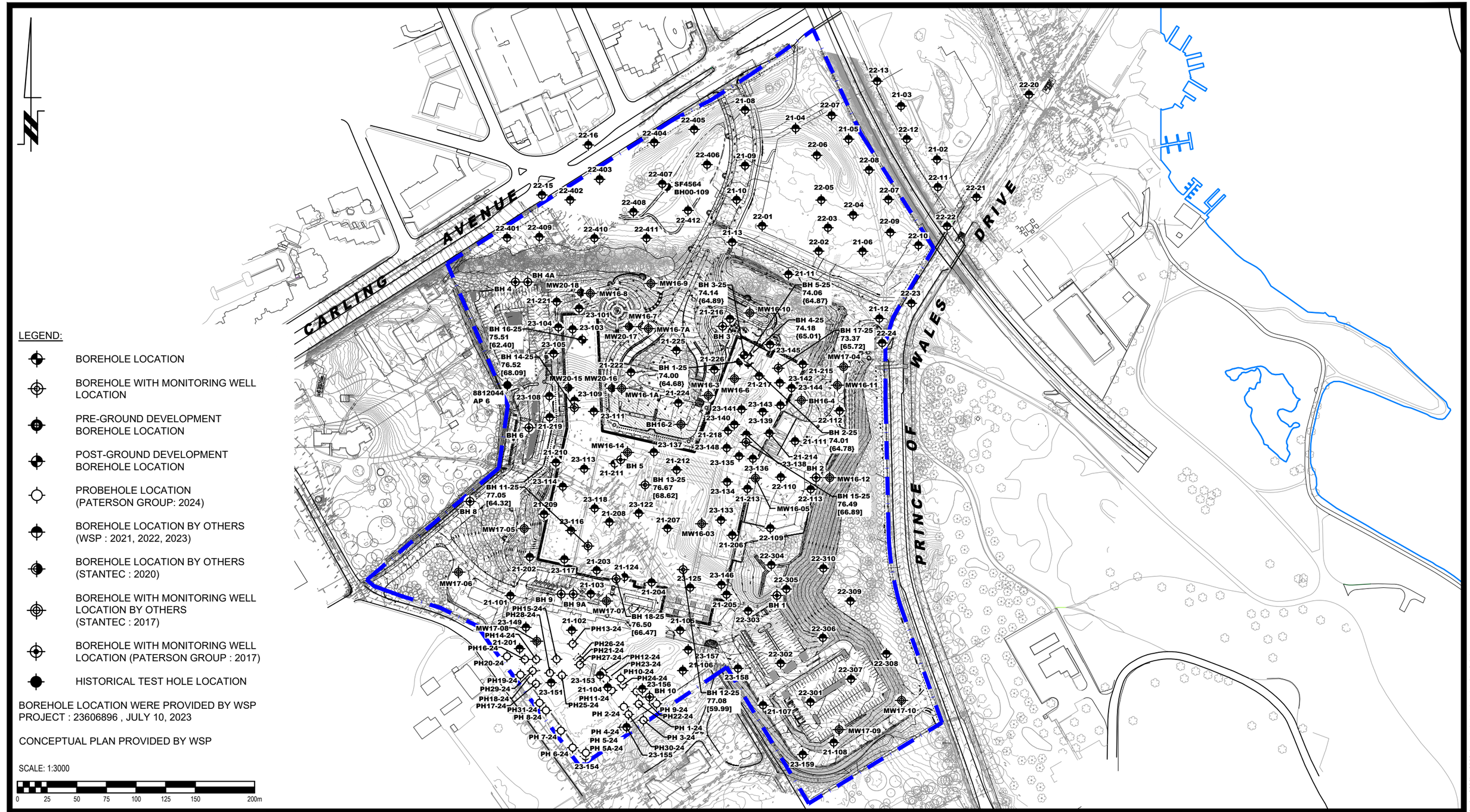


LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- PRE-GROUND DEVELOPMENT BOREHOLE LOCATION
- POST-GROUND DEVELOPMENT BOREHOLE LOCATION
- PROBEHOLE LOCATION (PATERSON GROUP: 2024)
- BOREHOLE LOCATION BY OTHERS (WSP : 2021, 2022, 2023)
- BOREHOLE LOCATION BY OTHERS (STANTEC : 2020)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (STANTEC : 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP : 2017)
- HISTORICAL TEST HOLE LOCATION

BOREHOLE LOCATION WERE PROVIDED BY WSP
PROJECT : 23606896 , JULY 10, 2023

CONCEPTUAL PLAN PROVIDED BY WSP

SCALE: 1:3000

0 25 50 75 100 125 150 200m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| 5 | UPDATED CONCEPTUAL PLAN | 18/11/2025 | PT |
| 4 | ADDED 2024 PROBEHOLE LOCATIONS | 13/08/2025 | FC |
| 3 | ADDED 2025 BH 11-25 TO BH 18-25 BOREHOLE LOCATION | 31/07/2025 | PT |
| 2 | ADDED 2025 BH 1-25 TO BH 5-25 BOREHOLE LOCATION<br>ADDED SEISMIC SHEAR WAVE VELOCITY TEST LOCATION | 20/06/2025 | PT |
| 1 | UPDATED CONCEPTUAL PLAN | 29/08/2024 | JV |

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THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# TEST HOLE LOCATION PLAN

| | |
|---|---|
| Scale: 1:3000 | Date: 03/2024 |
| Drawn by: YA | Report No.: PG6982-1 |
| Checked by: DP | Dwg. No.: PG6982-1 |
| Approved by: JV | Revision No.: 5 |

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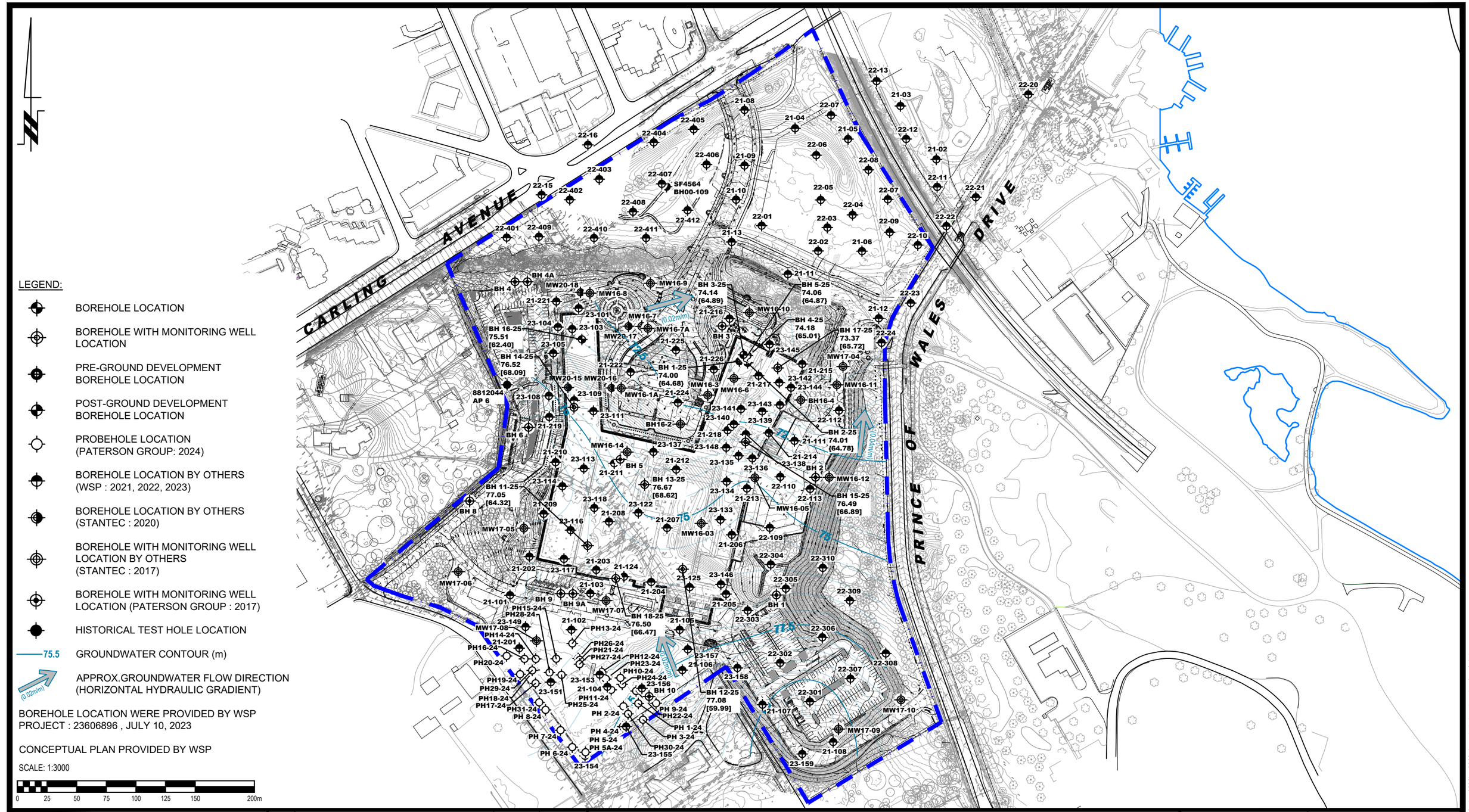
11x17


CARLING AVENUE
PRINCE OF WALES DRIVE
RIDEAU CANAL
BH 4A
BH 4
MW20-18
MW16-8
MW16-9
BH 3-25
74.14
{64.89}
BH 5-25
74.06
{64.87}
MW16-10
BH 16-25
75.51
[62.40]
BH 14-25
76.52
[68.09]
MW16-7
(0.02m/m)
MW16-7A
MW20-17
BH 3
BH 4-25
74.18
{65.01}
BH 17-25
73.37
[65.72]
MW17-04
BH 1-25
74.00
{64.68}
MW20-15
MW20-16
MW16-3
MW16-6
MW16-1A
8812044
AP 6
BH16-2
BH16-4
MW16-11
BH 2-25
74.01
{64.78}
MW16-14
BH 6
BH 5
BH 2
MW16-12
BH 11-25
77.05
[64.32]
BH 13-25
76.67
[68.62]
BH 15-25
76.49
[66.89]
BH 8
MW16-05
MW17-05
MW16-03
MW17-06
BH 9
BH 9A
MW17-07
BH 1
BH 18-25
76.50
[66.47]
MW17-08
PH15-24
PH28-24
PH14-24
PH16-24
PH20-24
PH19-24
PH29-24
PH18-24
PH17-24
PH31-24
PH 8-24
PH 7-24
PH 6-24
PH26-24
PH21-24
PH27-24
PH12-24
PH23-24
PH10-24
PH24-24
PH11-24
PH25-24
PH 2-24
PH 4-24
PH 5-24
PH 5A-24
PH 9-24
PH22-24
PH 1-24
PH 3-24
PH30-24
BH 10
BH 12-25
77.08
[59.99]
MW17-09
MW17-10
75
77.5
72.5
70
67.5
65
62.5
60
57.5
55
52.5
50
47.5
45
42.5
40
37.5
35
32.5
30
27.5
25
22.5
20
17.5
15
12.5
10
7.5
5
2.5
0
-2.5
-5
-7.5
-10
-12.5
-15
-17.5
-20
-22.5
-25
-27.5
-30
-32.5
-35
-37.5
-40
-42.5
-45
-47.5
-50
-52.5
-55
-57.5
-60
-62.5
-65
-67.5
-70
-72.5
-75
-77.5
-80
-82.5
-85
-87.5
-90
-92.5
-95
-97.5
-100

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- PRE-GROUND DEVELOPMENT BOREHOLE LOCATION
- POST-GROUND DEVELOPMENT BOREHOLE LOCATION
- BOREHOLE LOCATION BY OTHERS (WSP : 2021, 2022, 2023)
- BOREHOLE LOCATION BY OTHERS (STANTEC : 2020)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (STANTEC : 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP : 2017)
- HISTORICAL TEST HOLE LOCATION
- 72.0 GROUNDWATER CONTOUR (m) AT POST CONSTRUCTION CONDITIONS
- (0.08m/m) APPROX.GROUNDWATER FLOW DIRECTION (HORIZONTAL HYDRAULIC GRADIENT) AT POST CONSTRUCTION CONDITIONS

BOREHOLE LOCATION WERE PROVIDED BY WSP
PROJECT : 23606896 , JULY 10, 2023

CONCEPTUAL PLAN PROVIDED BY WSP

SCALE: 1:3000

0 25 50 75 100 125 150 200m

PATERSON GROUP
9 AURIGA DRIVE
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| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| 3 | UPDATED CONCEPTUAL PLAN | 29/10/2025 | PT |
| 2 | UPDATED GROUNDWATER CONTOURS | 15/05/2025 | PT |
| 1 | UPDATED CONCEPTUAL PLAN & GROUNDWATER CONTOURS - DRAINAGE OF LOADING DOCK AREA | 20/01/2025 | JV |

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900 CARLING AVENUE
OTTAWA, ONTARIO

Title: GROUNDWATER CONTOUR PLAN - POST CONSTRUCTION CONDITIONS

| | |
|---|---|
| Scale: 1:3000 | Date: 06/2024 |
| Drawn by: YA | Report No.: PG6982-1 |
| Checked by: DP | Dwg. No.: PG6982-3 |
| Approved by: JV | Revision No.: 3 |

11x17

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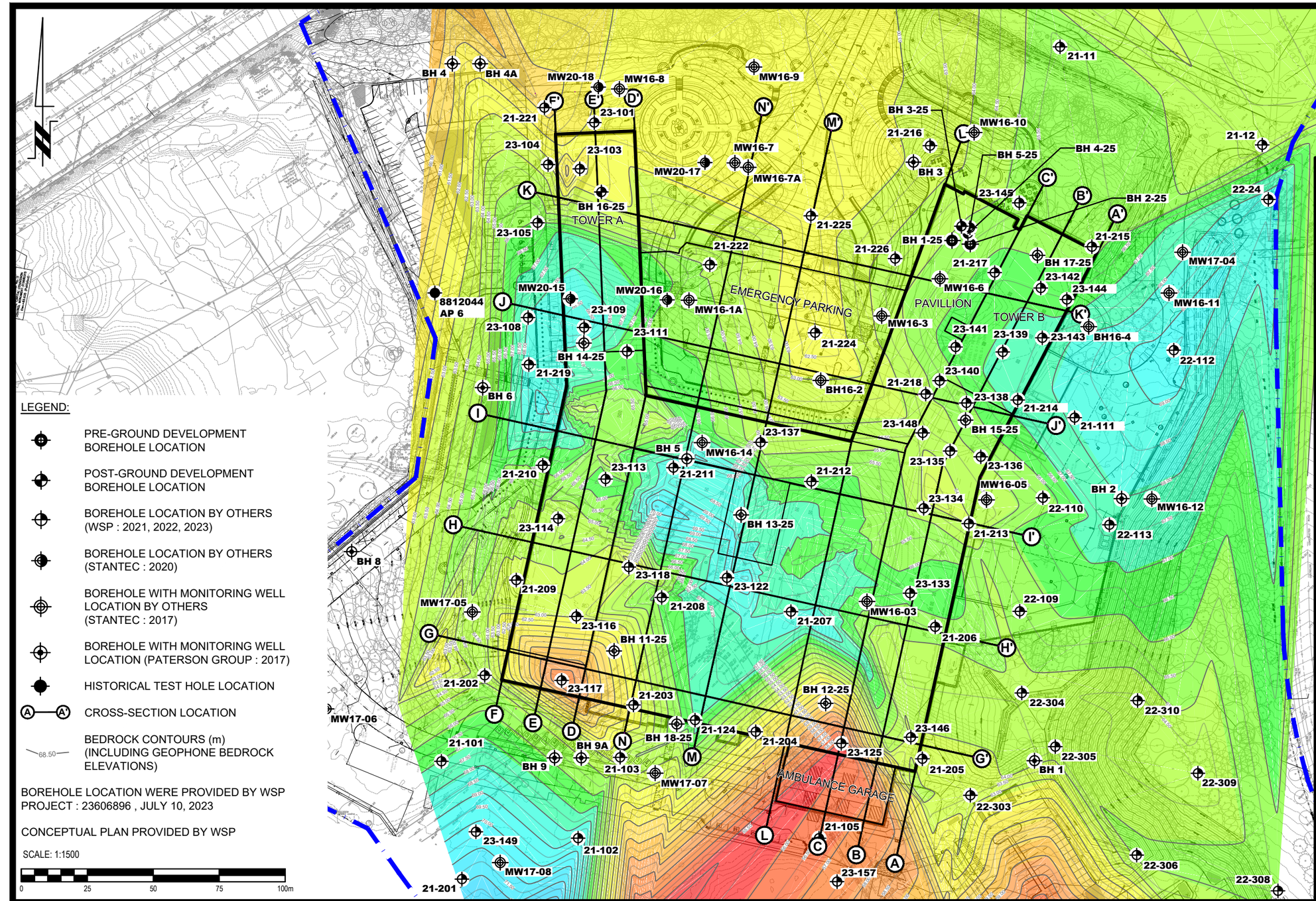


LEGEND:

- PRE-GROUND DEVELOPMENT BOREHOLE LOCATION
- POST-GROUND DEVELOPMENT BOREHOLE LOCATION
- BOREHOLE LOCATION BY OTHERS (WSP : 2021, 2022, 2023)
- BOREHOLE LOCATION BY OTHERS (STANTEC : 2020)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (STANTEC : 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP : 2017)
- HISTORICAL TEST HOLE LOCATION
- A — A' CROSS-SECTION LOCATION
- 68.50 BEDROCK CONTOURS (m) (INCLUDING GEOPHONE BEDROCK ELEVATIONS)

BOREHOLE LOCATION WERE PROVIDED BY WSP
PROJECT : 23606896 , JULY 10, 2023

CONCEPTUAL PLAN PROVIDED BY WSP

SCALE: 1:1500

0 25 50 75 100m

| BEDROCK HEATMAP | | |
|---|---|---|
| MIN. ELEVATION (m) | MAX. ELEVATION (m) | COLOR |
| 53.00 | 54.00 | |
| 54.00 | 55.00 | |
| 55.00 | 56.00 | |
| 56.00 | 57.00 | |
| 57.00 | 58.00 | |
| 58.00 | 59.00 | |
| 59.00 | 60.00 | |
| 60.00 | 61.00 | |
| 61.00 | 62.00 | |
| 62.00 | 63.00 | |
| 63.00 | 64.00 | |
| 64.00 | 65.00 | |
| 65.00 | 66.00 | |
| 66.00 | 67.00 | |
| 67.00 | 68.00 | |
| 68.00 | 69.00 | |
| 69.00 | 70.00 | |
| 70.00 | 71.00 | |
| 71.00 | 72.00 | |
| 72.00 | 73.00 | |
| 73.00 | 74.00 | |
| 74.00 | 75.00 | |
| 75.00 | 76.00 | |
| 76.00 | 77.00 | |
| 77.00 | 78.00 | |
| 78.00 | 79.00 | |
| 79.00 | 80.00 | |
| 80.00 | 81.00 | |
| 81.00 | 82.00 | |
| 82.00 | 83.00 | |

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| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| 3 | UPDATED CONCEPTUAL PLAN & ADDED BEDROCK CONTOURS, INCLUDING GEOPHONE BEDROCK ELEVATIONS | 03/11/2025 | PT |
| 2 | ADDED 2025 BH 11-25 TO BH 18-25 BOREHOLE LOCATION | 02/09/2025 | JV |
| 1 | UPDATED USF ELEVATIONS | 20/05/2025 | JV |

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THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# CROSS-SECTION LOCATION PLAN

| | |
|---|---|
| Scale: 1:1500 | Date: 01/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: FV | Dwg. No.: PG6982-4 |
| Approved by: JV | Revision No.: 3 |

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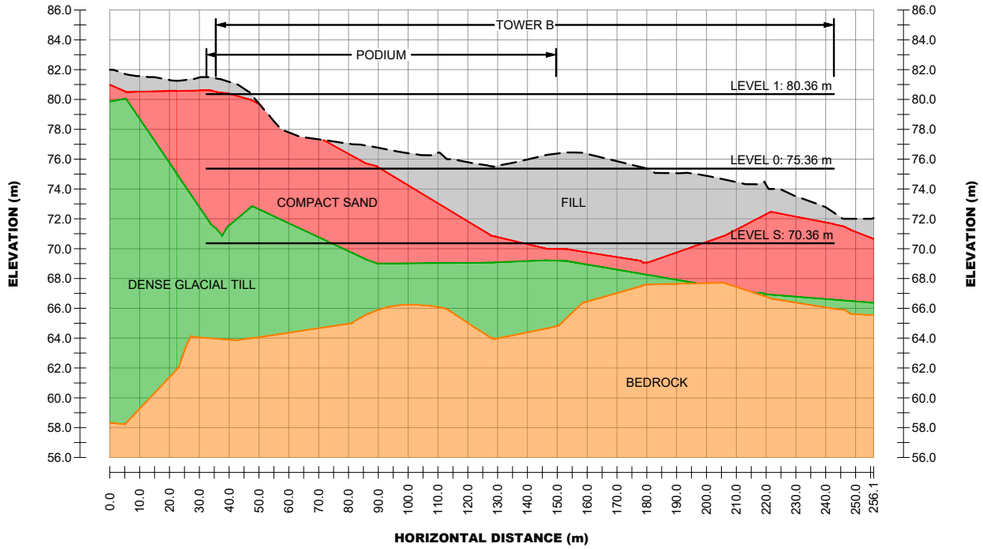
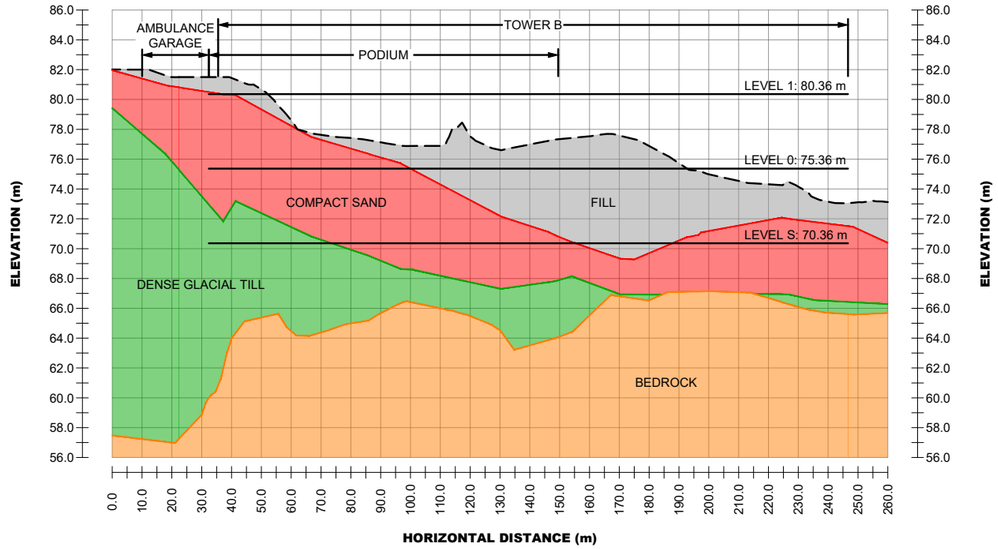
11x17

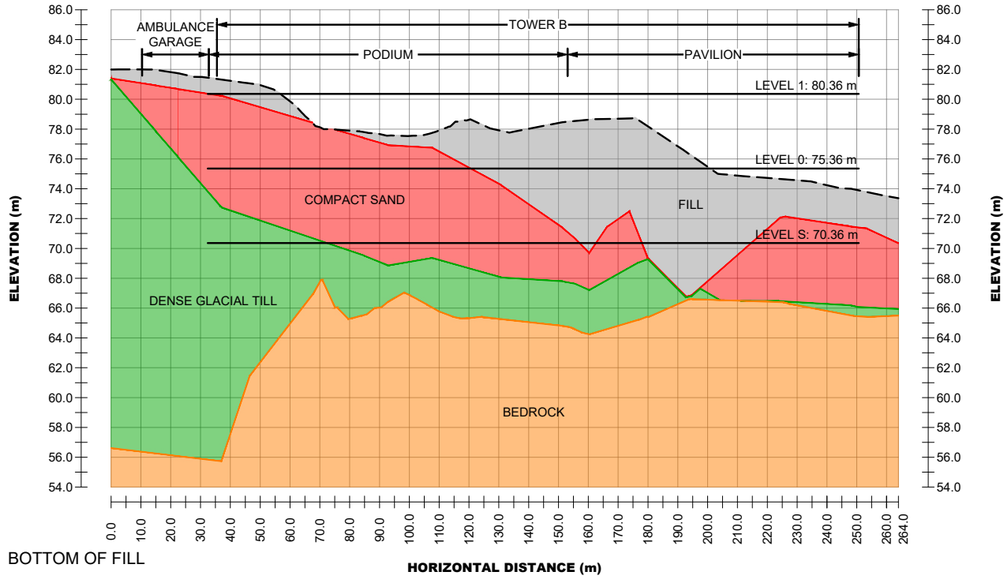
## CROSS-SECTION A-A'



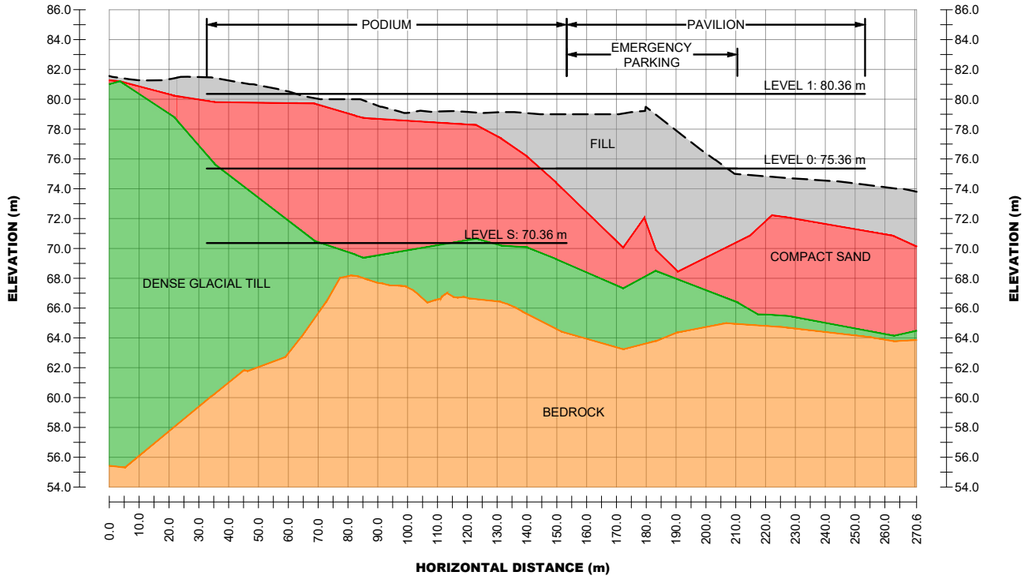

## CROSS-SECTION B-B'




## CROSS-SECTION C-C'




## CROSS-SECTION L-L'




LEGEND:

- BOTTOM OF FILL
- TOP OF DENSE TILL
- BEDROCK SURFACE


PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381


| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 2 | REMOVED USF ELEVATIONS & ADDED BEDROCK SURFACE, INCLUDING GEOPHONE BEDROCK ELEVATIONS | 03/11/2025 | PT |
| 1 | UPDATED USF ELEVATIONS | 20/05/2025 | JV |

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GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# CROSS-SECTIONS - TOWER B AND PAVILION

| | |
|---|---|
| Scale: AS SHOWN | Date: 01/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: FV | Dwg. No.: PG6982-4A |
| Approved by: JV | Revision No.: 2 |

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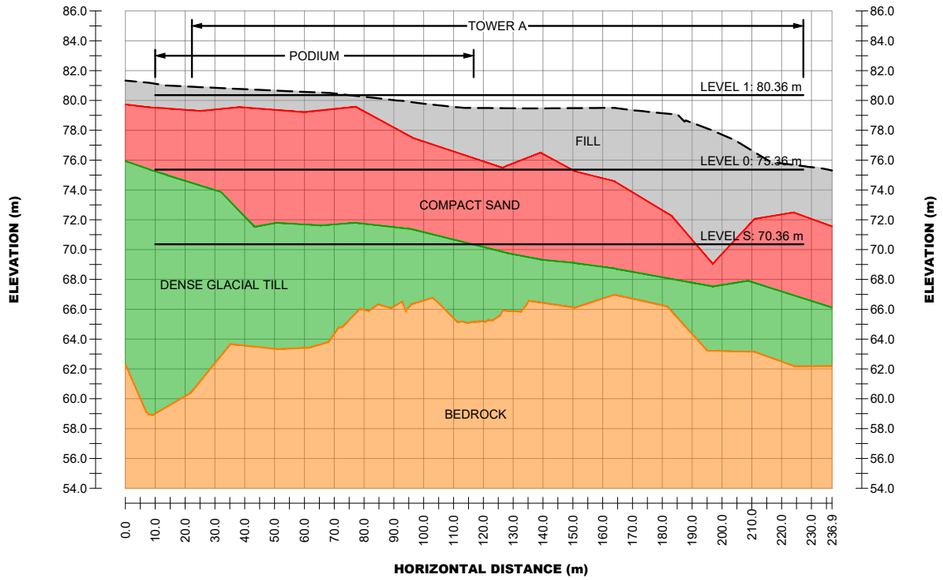
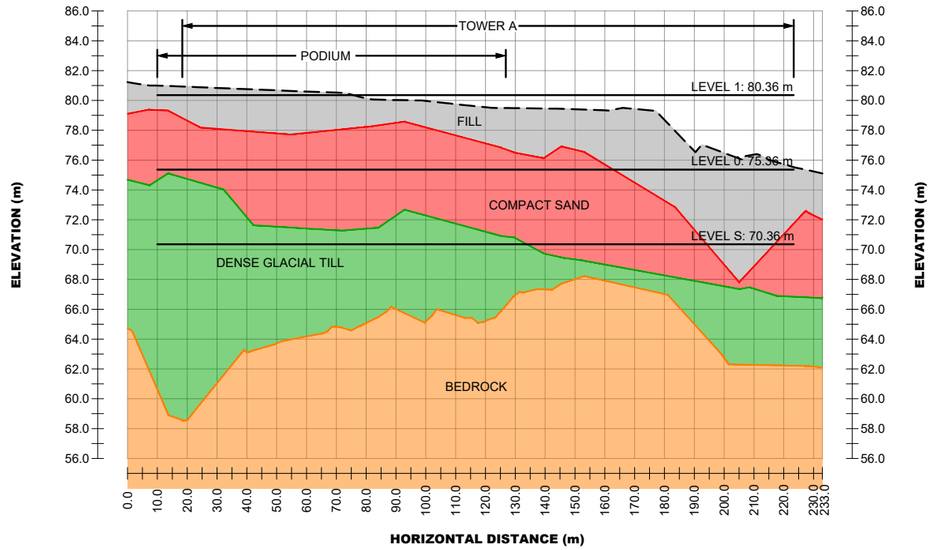
11x17

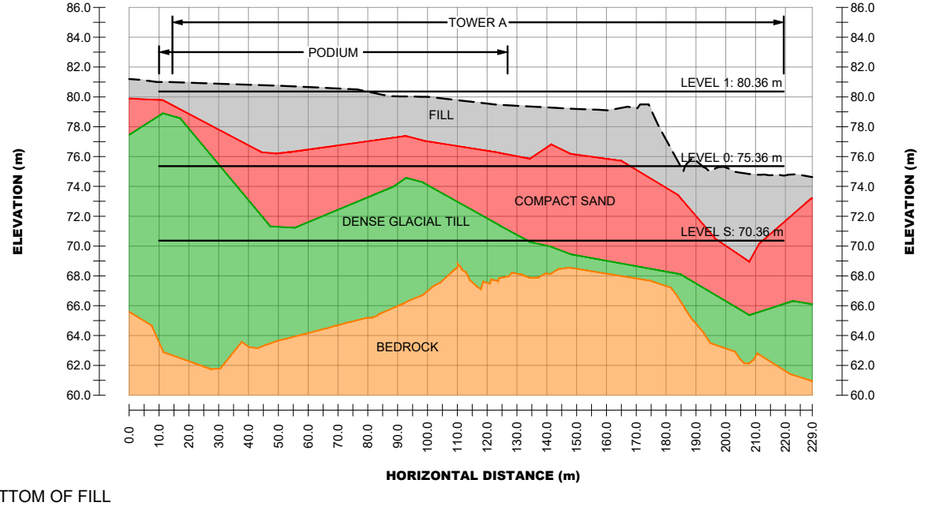
## CROSS-SECTION D-D'



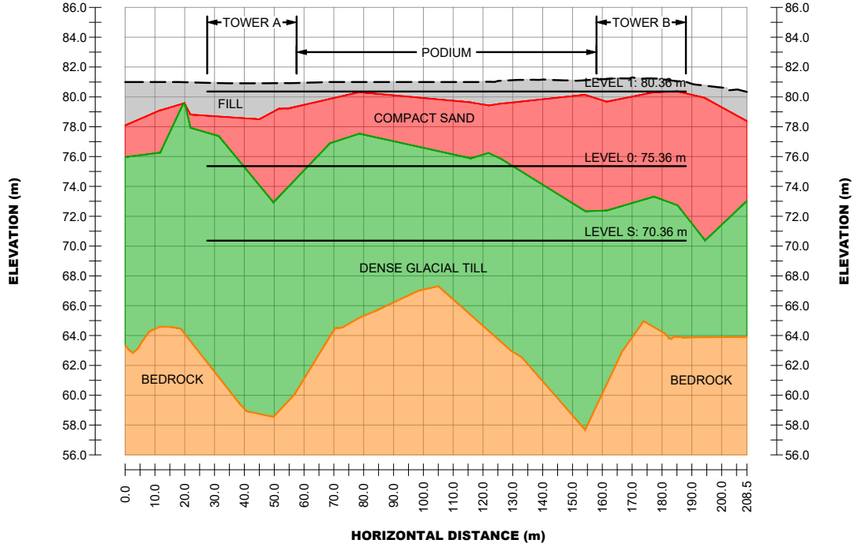

## CROSS-SECTION E-E'




## CROSS-SECTION F-F'




## CROSS-SECTION G-G'




LEGEND:

- BOTTOM OF FILL
- TOP OF DENSE TILL
- BEDROCK SURFACE

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 2 | REMOVED USF ELEVATIONS & ADDED BEDROCK SURFACE, INCLUDING GEOPHONE BEDROCK ELEVATIONS | 03/11/2025 | PT |
| 1 | UPDATED USF ELEVATIONS | 20/05/2025 | JV |

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GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# CROSS-SECTIONS - TOWER B

| | |
|---|---|
| Scale: AS SHOWN | Date: 01/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: FV | Dwg. No.: PG6982-4B |
| Approved by: JV | Revision No.: 2 |

11x17

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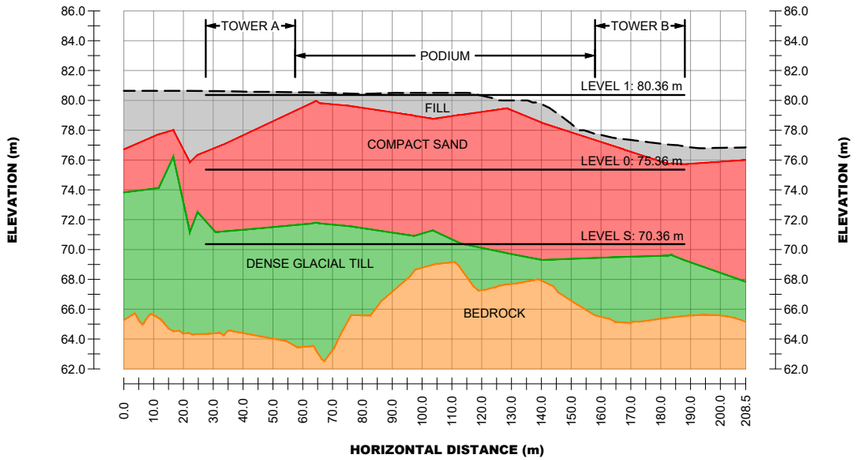
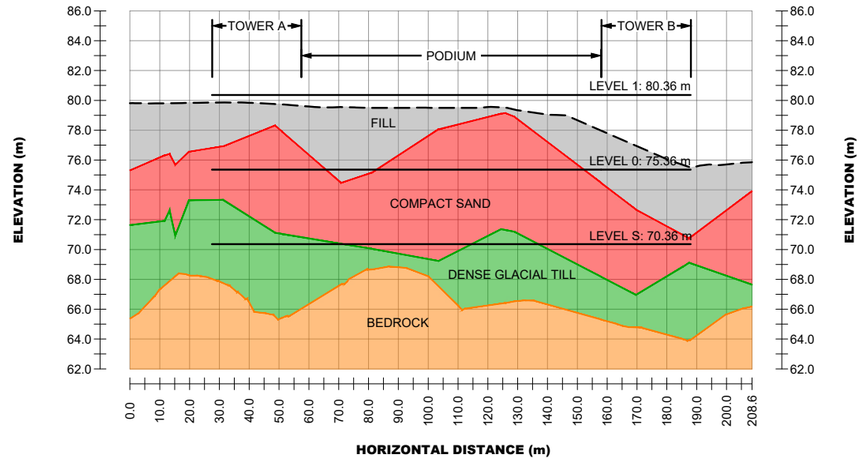
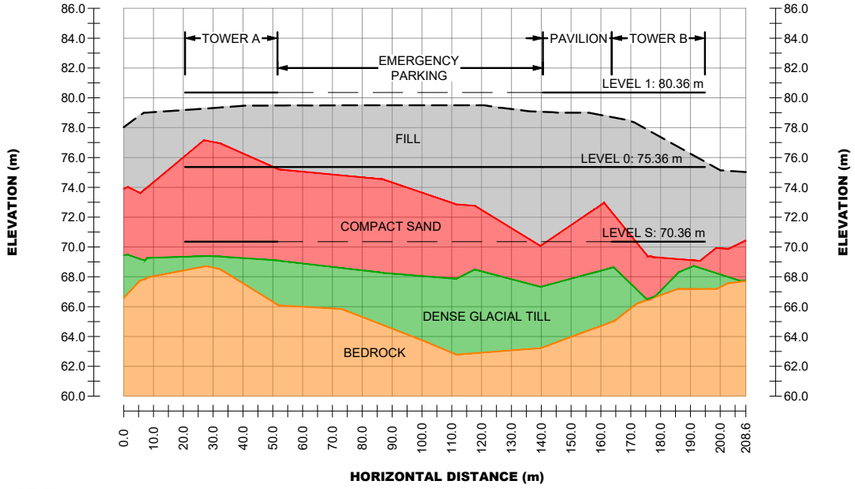
## CROSS-SECTION H-H'



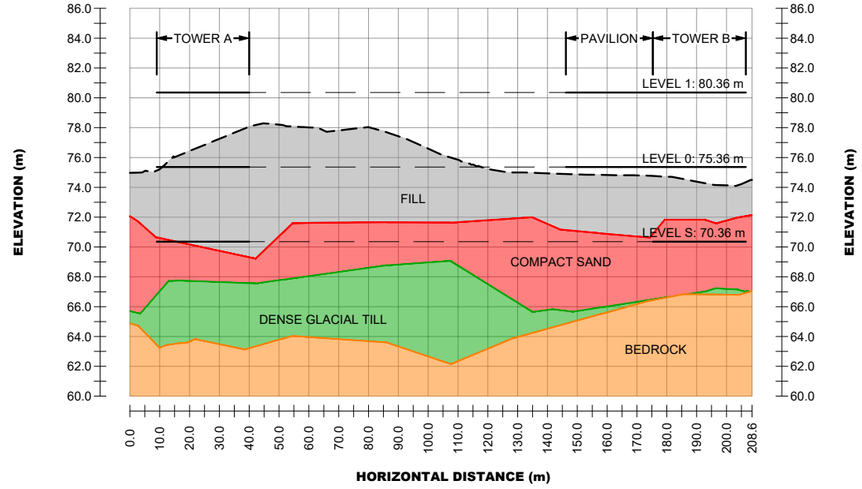

## CROSS-SECTION I-I'




## CROSS-SECTION J-J'




## CROSS-SECTION K-K'




LEGEND:

- BOTTOM OF FILL
- TOP OF DENSE TILL
- BEDROCK SURFACE

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| 2 | REMOVED USF ELEVATIONS & ADDED BEDROCK SURFACE, INCLUDING GEOPHONE BEDROCK ELEVATIONS | 03/11/2025 | PT |
| 1 | UPDATED USF ELEVATIONS | 20/05/2025 | JV |

PCL - ED
GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

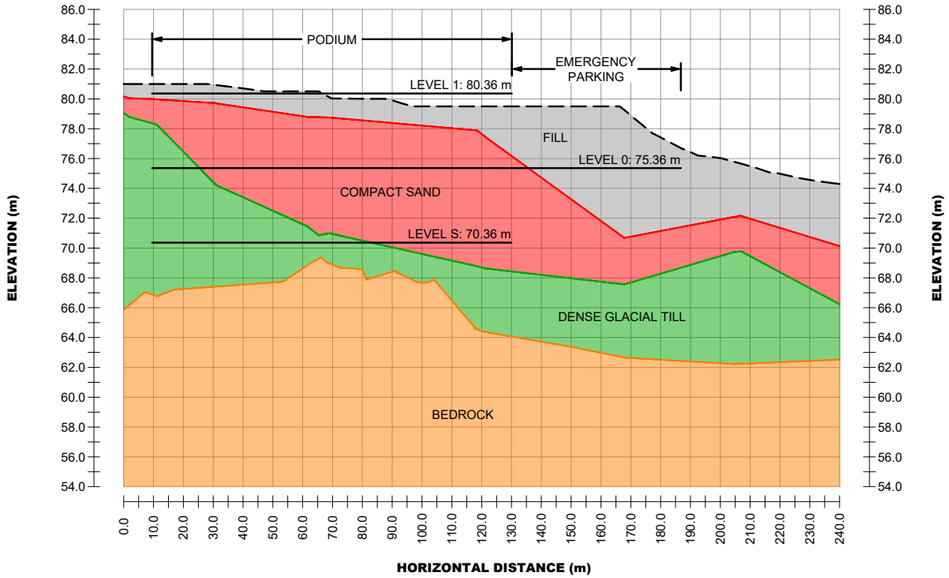
Title:
# CROSS-SECTIONS EAST-WEST

| | |
|---|---|
| Scale: AS SHOWN | Date: 01/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: FV | Dwg. No.: PG6982-4C |
| Approved by: JV | Revision No.: 2 |

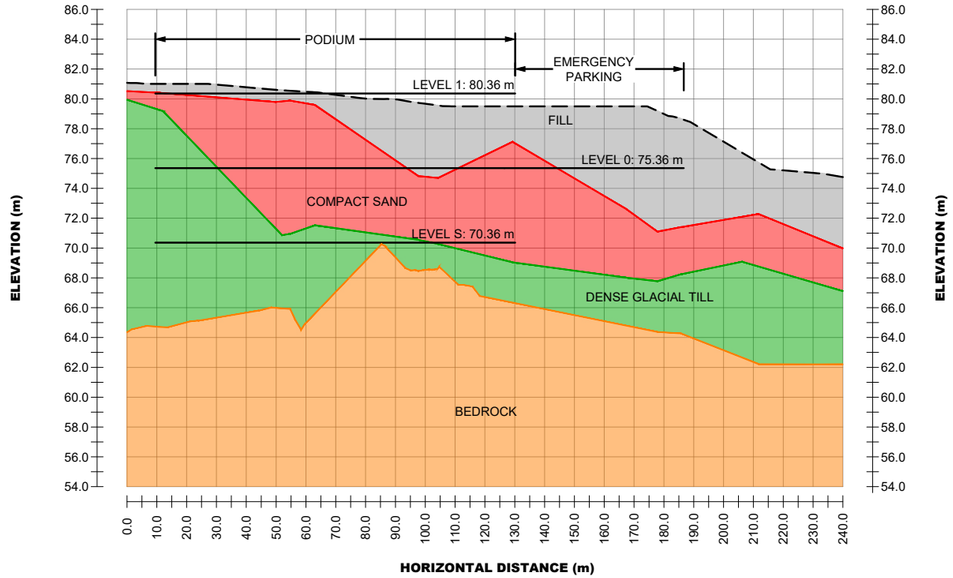
11x17

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-4-ground improvement plan and sections (rev.02) (october 2025).dwg

**CROSS-SECTION M-M'**




**CROSS-SECTION N-N'**




LEGEND:

- BOTTOM OF FILL
- TOP OF DENSE TILL
- BEDROCK SURFACE

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 2 | REMOVED USF ELEVATIONS & ADDED BEDROCK SURFACE, INCLUDING GEOPHONE BEDROCK ELEVATIONS | 03/11/2025 | PT |
| 1 | UPDATED USF ELEVATIONS | 20/05/2025 | JV |

PCL - ED
GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# CROSS-SECTIONS - PODIUM AND EMERGENCY PARKING

| | |
|---|---|
| Scale: AS SHOWN | Date: 01/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: FV | Dwg. No.: PG6982-4D |
| Approved by: JV | Revision No.: 2 |

11x17

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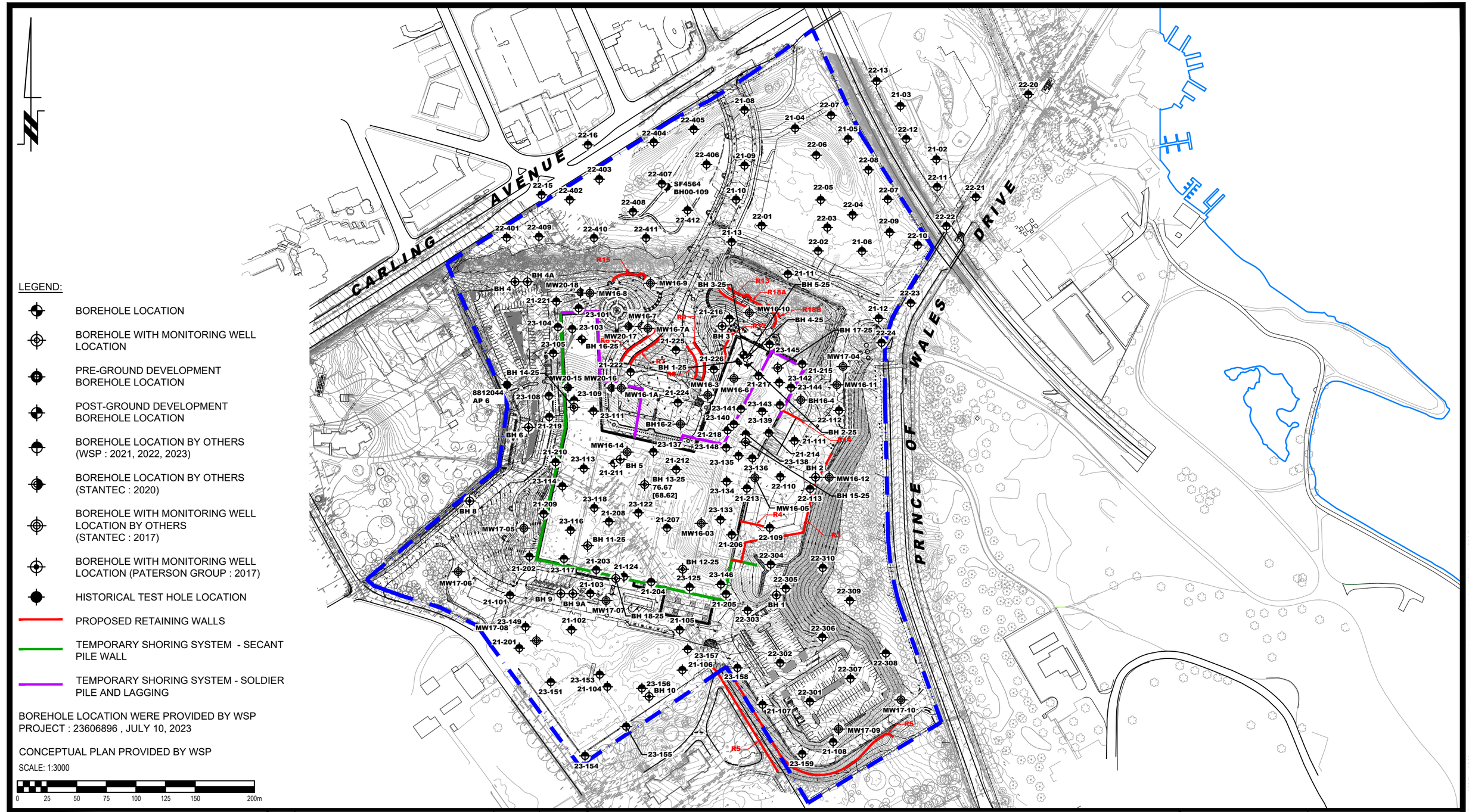


LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- PRE-GROUND DEVELOPMENT BOREHOLE LOCATION
- POST-GROUND DEVELOPMENT BOREHOLE LOCATION
- BOREHOLE LOCATION BY OTHERS (WSP : 2021, 2022, 2023)
- BOREHOLE LOCATION BY OTHERS (STANTEC : 2020)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (STANTEC : 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP : 2017)
- HISTORICAL TEST HOLE LOCATION
- PROPOSED RETAINING WALLS
- TEMPORARY SHORING SYSTEM - SECANT PILE WALL
- TEMPORARY SHORING SYSTEM - SOLDIER PILE AND LAGGING

BOREHOLE LOCATION WERE PROVIDED BY WSP
PROJECT : 23606896 , JULY 10, 2023

CONCEPTUAL PLAN PROVIDED BY WSP

SCALE: 1:3000

0 25 50 75 100 125 150 200m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 2 | UPDATED CONCEPTUAL PLAN | 29/10/2025 | PT |
| 1 | ADDED 2025 BH 11-25 TO BH 18-25 BOREHOLE LOCATION | 02/09/2025 | JV |

PCL - ED
GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# RETAINING WALLS AND TEMPORARY SHORING SYSTEM PLAN

| | |
|---|---|
| Scale: 1:3000 | Date: 05/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: PT | Dwg. No.: PG6982-5 |
| Approved by: JV | Revision No.: 2 |

11x17

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-5-retaining walls and temporary shoring systems plan (rev.02) (january 2026).dwg

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- PRE-GROUND DEVELOPMENT BOREHOLE LOCATION
- POST-GROUND DEVELOPMENT BOREHOLE LOCATION
- PROBEHOLE LOCATION (PATERSON GROUP: 2024)
- BOREHOLE LOCATION BY OTHERS (WSP : 2021, 2022, 2023)
- BOREHOLE LOCATION BY OTHERS (STANTEC : 2020)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (STANTEC : 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP : 2017)
- HISTORICAL TEST HOLE LOCATION
- {64.80} PRACTICAL REFUSAL TO AUGERING ELEVATION (m)
- [62.18] BEDROCK SURFACE ELEVATION (m)
- 21 SEISMIC TESTING LOCATION
- 68.50 BEDROCK CONTOURS (m) (INCLUDING GEOPHONE BEDROCK ELEVATIONS)

BOREHOLE LOCATION WERE PROVIDED BY WSP PROJECT : 23606896 , JULY 10, 2023

CONCEPTUAL PLAN PROVIDED BY BBB ARCHITECTS OTTAWA INC.

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 2 | UPDATED CONCEPTUAL PLAN | 27/03/2026 | PT |
| 1 | UPDATED CONCEPTUAL PLAN | 18/11/2025 | PT |

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GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# BEDROCK CONTOUR PLAN

| | |
|---|---|
| Scale: 1:2000 | Date: 08/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: DP | Dwg. No.: PG6982-6 |
| Approved by: JV | Revision No.: 2 |

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-7-bedrock contour plan (august 2025).dwg

11x17

LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- PRE-GROUND DEVELOPMENT BOREHOLE LOCATION
- POST-GROUND DEVELOPMENT BOREHOLE LOCATION
- PROBEHOLE LOCATION (PATERSON GROUP: 2024)
- BOREHOLE LOCATION BY OTHERS (WSP : 2021, 2022, 2023)
- BOREHOLE LOCATION BY OTHERS (STANTEC : 2020)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (STANTEC : 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP : 2017)
- HISTORICAL TEST HOLE LOCATION

{64.80} PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

[62.18] BEDROCK SURFACE ELEVATION (m)

21 SEISMIC TESTING LOCATION

68.50 BEDROCK CONTOURS (m) (INCLUDING GEOPHONE BEDROCK ELEVATIONS)

BOREHOLE LOCATION WERE PROVIDED BY WSP PROJECT : 23606896 , JULY 10, 2023

CONCEPTUAL PLAN PROVIDED BY BBB ARCHITECTS OTTAWA INC.

SCALE: 1:2000

0 25 50 75 100 125 150m

| BEDROCK HEATMAP | | |
|---|---|---|
| MIN. ELEVATION (m) | MAX. ELEVATION (m) | COLOR |
| 53.00 | 54.00 | |
| 54.00 | 55.00 | |
| 55.00 | 56.00 | |
| 56.00 | 57.00 | |
| 57.00 | 58.00 | |
| 58.00 | 59.00 | |
| 59.00 | 60.00 | |
| 60.00 | 61.00 | |
| 61.00 | 62.00 | |
| 62.00 | 63.00 | |
| 63.00 | 64.00 | |
| 64.00 | 65.00 | |
| 65.00 | 66.00 | |
| 66.00 | 67.00 | |
| 67.00 | 68.00 | |
| 68.00 | 69.00 | |
| 69.00 | 70.00 | |
| 70.00 | 71.00 | |
| 71.00 | 72.00 | |
| 72.00 | 73.00 | |
| 73.00 | 74.00 | |
| 74.00 | 75.00 | |
| 75.00 | 76.00 | |
| 76.00 | 77.00 | |
| 77.00 | 78.00 | |
| 78.00 | 79.00 | |
| 79.00 | 80.00 | |
| 80.00 | 81.00 | |
| 81.00 | 82.00 | |
| 82.00 | 83.00 | |

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| 2 | UPDATED CONCEPTUAL PLAN | 27/03/2026 | PT |
| 1 | UPDATED CONCEPTUAL PLAN | 18/11/2025 | PT |

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GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# BEDROCK HEATMAP PLAN

| | |
|---|---|
| Scale: 1:2000 | Date: 08/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: DP | Dwg. No.: PG6982-7 |
| Approved by: JV | Revision No.: 2 |

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-7-bedrock contour plan (august 2025).dwg

11x17

1016 (ARC) x 1651 (ISO) CUSTOM SHEET SIZE

MATCHLINE SEE C5-200 ABOVE LEFT

MATCHLINE SEE C5-200

MATCHLINE SEE C5-202

MATCHLINE SEE C5-203

CENTRAL UTILITY PLANT (SEPARATE CONTRACT)

REFER TO CENTRAL UTILITY PLANT DRAWING PACKAGE FOR DETAILED GRADING

MAIN HOSPITAL BUILDING
LEVEL 1 = 80.36m
LEVEL 0 = 75.36m
LEVEL S = 70.36m

Connect to SWM Tank - INV @ 73.58 m

73.65 m

73.15 m

Connect to MHST 213 - INV @ 68.73 m

68.75 m

67.60 m

68.30 m

Pavement Sub-Drain System - Refer to Section 5.7

Connect to MHST 214 - INV @ 70.37 m

REFER TO SECTION ON SHEET C5-500

PROPERTY LINE

FACILITY LEASE BOUNDARY

OLF GROSS OR SUNDHAGE No. 4 ORDER No. 20R-10888

PROPOSED LID

PROPOSED RETAINING WALL #3. REFER TO DRAWING C-402 FOR DETAILS AND TOP OF WALL, CIVIL GRADING SHOWS FRONT AND BACK OF WALL.

PROPOSED RETAINING WALL #4. REFER TO DRAWING C77-401 FOR DETAILS

ADVANCED WORK RETAINING WALL. REFER TO ADVANCED WORKS DRAWING PACKAGE FOR MORE DETAILS.

PARAPET WALL ONTOP OF MORGUE TUNNEL. SEE ARCHITECTURAL. RETAINING WALL TO ABUT PARAPET

INFILTRATION SWALE #42

INFILTRATION SWALE #60B

CONVEYANCE SWALE

SWM Tank Chamber 204

TANK INLET 1 TANK 204 INLET 1 T/G = 75.14

TANK OUTLET TANK 204 OUTLET T/G = 75.23

TANK INLET TANK 204 INLET 2 T/G = 75.10

TANK INLET 3 T/G = 75.17

TANK 201 INLET 1 T/G = 70.25

ENTRANCE 75.36

EXIT 75.36

ENTRANCE 75.30

EXIT 75.30

ENTRANCE 75.30

ENTRANCE 75.30

ENTRANCE 75.30

EXIT 75.30

EXIT

MATCHLINE SEE C5-200

MATCHLINE SEE C5-200 ABOVE RIGHT

MATCHLINE SEE C5-201

MATCHLINE SEE C5-203

MATCHLINE SEE C5-204

step at foundation level between pavilion and parking structure

Connection to MHST 144 - INV @ 69.85 m

Connection to MHST 203 - INV @ 73.60 m

Connection to MHST 203 - INV @ 73.19 m

Connection to MHST 204 - INV @ 73.19 m

Connection to MHST 204 - INV @ 73.19 m

step at foundation level between pavilion and parking structure

step at foundation level between pavilion and tower

Connection to MHST 142 - INV @ 69.45 m

Connection to MHST 211 - INV @ 70.20 m

Connection to MHST 221 - INV @ 67.30 m

PROPOSED RETAINING WALL #15. REFER TO DRAWING C7-406 FOR DETAILS AND TOP OF WALL. GRADING SHOWS FRONT AND BACK OF WALL.

PROPOSED RETAINING WALL #6. REFER TO DRAWING C7-404 FOR DETAILS.

PROPOSED RETAINING WALL #7. REFER TO DRAWING

PROPOSED RETAINING WALL #12. REFER TO DRAWING C7-405 FOR DETAILS AND TOP OF WALL.

PROPOSED RETAINING WALL #13. REFER TO DRAWING C7-405 FOR DETAILS AND TOP OF WALL. GRADING SHOWS BACK AND FRONT OF WALL.

PROPOSED RETAINING WALL #16A. REFER TO DRAWING C7-405 FOR DETAILS AND TOP OF WALL. GRADING SHOWS FRONT AND BACK OF WALL.

PROPOSED RETAINING WALL #16B. REFER TO DRAWING C7-405 FOR DETAILS AND TOP OF WALL. GRADING SHOWS FRONT AND BACK OF WALL.

PROPOSED RETAIN #14. REFER TO DRA..... F7-402 FOR DETAILS.

PROPOSED EMERGENCY ACCESS PEDESTRIAN ROUTE.

PROPOSED SPSI GAS METER LOCATION

LIMIT OF GRADING ADJACENT TO EXISTING TREES. TREES TO BE PROTECTED AND MAINTAINED. REFER TO LANDSCAPE DRAWINGS FOR PLANTING INFORMATION.

LIMIT OF WORK LINE

PROVISIONAL BASE TOP per SC12

REFER TO SECTION ON SHEET C5-500

CARLING AVENUE PROTECTED R.O.W. AND FACILITY LEASE BOUNDARY

EXISTING R.O.W.

CARLING AVE

OFF-SITE WORKS, BY OTHERS

65.41 TIE-IN ELEVATION WITH OFF-SITE WORKS AS COMPLETED BY OTHERS TO PARKING GARAGE CONTRACT. LOCATION PROVIDED BY PARKING GARAGE CONTRACT TO DEVCO 2025-04-22.

BI-DIRECTIONAL CYCLE TRACK AND SIDEWALK AT ENTRANCE, PER SC27.1

BI-DIRECTIONAL CYCLE TRACK AND SIDEWALK AT ENTRANCE, PER SC27.1

GRADING LIMIT TO BE MATCHED TO PARKING GARAGE CONTRACT. REFER TO PHASE 2 PARKING GARAGE GRADING PLANS C007 AND C008 FOR CONTINUATION.

GRADING LIMIT TO MATCH PARKING GARAGE CONTRACT. REFER TO PHASE 2 PARKING GARAGE GRADING PLANS C007 AND C008 FOR CONTINUATION.

UNDERSIDE OF PED BRIDGE APPROX 80.00m SEE DWG AS-256. ASPHALT ELEVATION APPROX 70.20m. VERTICAL CLEARANCE APPROX 9.70m

UNDERSIDE OF PED BRIDGE APPROX 80.30m SEE DWG AS-256. ASPHALT ELEVATION APPROX 70.10m. VERTICAL CLEARANCE APPROX 10.20m

MAIN HOSPITAL BUILDING
LEVEL 1 = 80.36m
LEVEL 0 = 75.36m
LEVEL S = 70.36m

PARKING GARAGE
(SEPARATE CONTRACT)

TRILLIUM TRAIN LINE

REFER TO SECTION ON SHEET C5-500

REFER TO SECTION ON SHEET C5-500

INFILTRATION SWALE #60B ENDS

CONVEYANCE SWALE

MAXIMUM PONDING LIMIT 100 YEAR +20% HGL = 69.41 100 YEAR HGL = 69.13 5 YEAR HGL = 68.38

MAXIMUM PONDING LIMIT 100 YEAR +20% HGL = 69.92 100 YEAR HGL = 69.49 5 YEAR HGL = 68.94

PROJECT

**THE OTTAWA HOSPITAL NEW CAMPUS DEVELOPMENT - PHASE 4 MAIN HOSPITAL BUILDING**

900 CARLING AVE, OTTAWA, ONTARIO

CLIENT

The Ottawa Hospital | L'Hôpital d'Ottawa

Infrastructure Ontario

PCL CONSTRUCTION | EllisDon

CLIENT PROJECT NO.

**1070002**

KEY PLAN

TRUE NORTH | PROJECT NORTH

| NO. | ISSUED | DATE |
|---|---|---|
| 10 | SITE PLAN CONTROL RESUBMISSION R2 | 2026-03-27 |
| 09 | DESIGN-BUILD BASELINE SUBMISSION | 2026-03-09 |
| 08 | FOUNDATION PERMIT SUBMISSION | 2026-01-12 |
| 07 | SITE PLAN CONTROL RESUBMISSION | 2026-01-12 |
| 06 | 95% DD SUBMISSION | 2025-09-19 |
| 05 | SITE PLAN CONTROL RESUBMISSION | 2025-06-05 |
| 04 | 65% DD SUBMISSION | 2025-06-05 |
| 03 | 35% DD SUBMISSION | 2025-01-28 |
| 02 | ISSUED FOR ACPOR READINESS | 2025-01-08 |
| 01 | 80% SD SUBMISSION | 2024-08-15 |

REVISIONS

DRAWING STATUS

**NOT FOR CONSTRUCTION**

DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO THE ARCHITECT BEFORE PROCEEDING.
ONLY FIGURED DIMENSIONS ARE TO BE USED. CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE. THIS DRAWING IS PROTECTED BY COPYRIGHT.

ALL DIMENSIONS ARE SHOWN IN METRIC.

AUTHOR

wsp

PROJECT TEAM

| | |
|---|---|
| DESIGN-BUILDER | PCLED, A JOINT VENTURE |
| ARCHITECTURAL | PARKIN ARCHITECTS LIMITED<br>JODOIN LAMARRE PRATTE ARCHITECTES<br>ADAMSON ASSOCIATES ARCHITECTS<br>bbb ARCHITECTS OTTAWA INC. |
| STRUCTURAL | SALAS O'BRIEN CANADA INC.<br>SOUTHBLETTE PIRSTEAU INC. |
| MECHANICAL | HH ANGUS & ASSOCIATES LTD.<br>SALAS O'BRIEN CANADA INC. |
| ELECTRICAL | MULVEY & BANANI INTERNATIONAL INC. |
| CIVIL | WSP CANADA INC. |
| LANDSCAPE | VERTECHS DESIGN INC.<br>PWP LANDSCAPE ARCHITECTURE |
| BUILDING CODE | LMDG BUILDING CODE CONSULTANTS LTD. |

AUTHOR PROJECT NO.

**CA0027758.0-51**

STAMP | STAMP

DRAWING TITLE

**SITE GRADING PLAN 3 OF 5**

| DRAWN | CHECKED |
|---|---|
| L. CURLEY / D MARATHA | C. GRAHAM |
| SCALE AT 40" x 65" | DATE |
| 1:250 | 2024-02-26 |

GRAPHIC SCALE
0 5m 5m 10m 20m
1:250

DRAWING NO. **C5-202** REV NO. **10**

D07-12-26-0008

#19424

PLOT DATE:

1018 mPy \ 1851 (ISO CUSTOM [sheet] 1.stb)

# APPENDIX 3

# GEOPHYSICAL TESTING RESULTS

**APPENDIX E**

# Geophysical Testing Memorandum

# TECHNICAL NOTE

**TO:** Bridgit Bocage

**FROM:** Mr. Erwan Pau-Corfa, WSP Canada Inc
Mr. Didier Leynaud, PhD, WSP Canada Inc.

**SUBJECT:** BH 21-207 DOWNHOLE SEISMIC SHEAR WAVE SURVEY
OTTAWA HOSPITAL, ON

**PROJECT No.:** 221-03780-0

**DATE:** May 3, 2022

## 1 CONTEXT

The Ottawa new Civic Hospital and its parking facilities require a geotechnical study in and around Queen Juliana Park. WSP was mandated to carry a downhole shear wave survey (VSP) in borehole 21-207 located south of 930 Carling Avenue.

### 1.1 SITE LOCATION

The selected borehole for downhole *in situ* testing is the BH-21-207 (Figure 1) which has a 21.21 m depth. Glacial till was encountered at 2.74 m depth and bedrock surface is at 12.17 m.

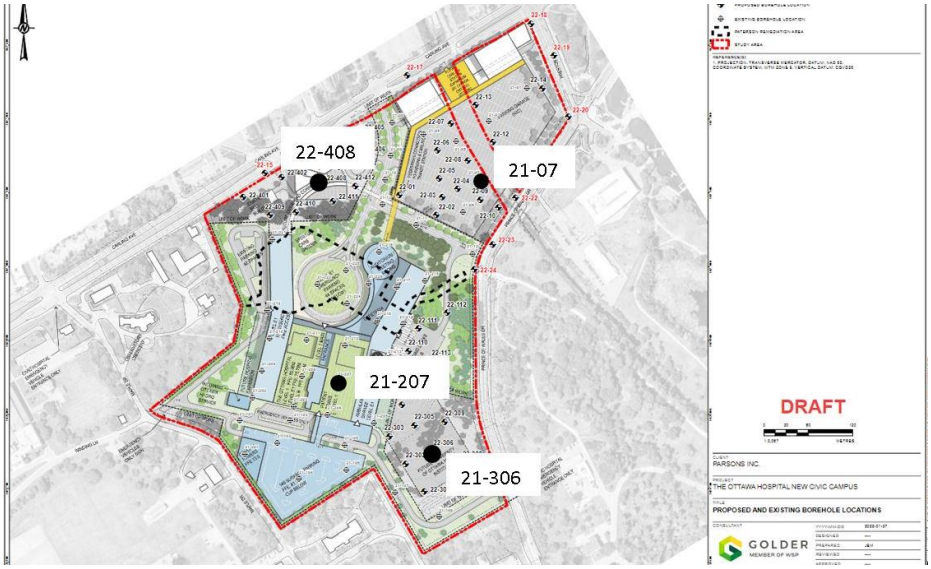


**Figure 1: Ottawa Hospital VSP site location**

1135, boulevard Lebourgneuf
Québec (Québec)
G2K 0M5 Canada

T +1 418 623-2254
F +1 418 624-1857
www.wsp.com

# 2 METHODOLOGY

## 2.1 EQUIPMENT AND DATA ACQUISITION METHOD

The objective of downhole surveys is to get in situ seismic wave velocities for site-specific investigations and material characterization.

The downhole seismic technic determines the compressional (P) and shear (S) wave velocity of sub-surface geological layers (materials) for different depths. The results can be used for soil and rock mechanics, foundation studies and earthquake engineering. Downhole seismic testing is conducted in the near surface for site-specific engineering applications. The *in situ* densities and the P and S wave velocities allow to determine the dynamic elastic moduli of a material.

It shall be mentioned that boreholes shall be completed with casing and grout that closely match the formation density according to the ASTM procedures. Borehole preparation is one of the main parameter controlling the success of downhole seismic testing. If the coupling between casing and geological formation is not good enough, then seismic waves will be attenuated, and arrival times delayed.

### DATA ACQUISITION

Borehole verticality was assumed, and no measurements were operated to confirm this parameter.

A geometrics Geode Seismograph was used to record the synchronized seismic data for different depths related to the triggering mechanism. The equipment is composed of a wall-lock 3C borehole geophone allowing shear waves measurements in 3 directions (X-Y-Z orientations) and a BHGC-4 controller (Annex). The geophone diameter is 1.9 inches (48 mm). The clamping mechanism is a steel spring controlled by a DC electric motor.

The S-wave source for side records is an 8-ft weighted beam struck using a sledgehammer on both ends. The P-wave source for the centre record is a polypropylene plate struck with a sledgehammer (Figure 2)

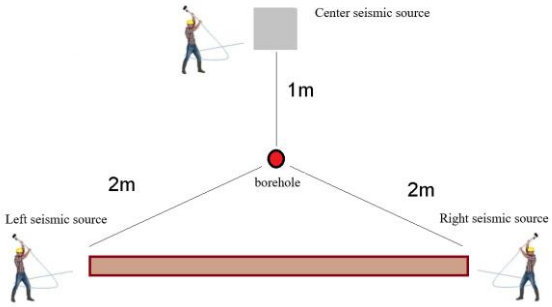


**Figure 2: Seismic Source Diagram**

A downhole seismic survey consists of measuring the time for seismic wave to propagate between an impulsive source (plate for P-wave, beam for S-wave) and a censor (geophone) moved at different depths in the borehole. The horizontal geophones are used to detect the first arrival for the S-wave while the vertical geophone is used for detecting the compressional P-wave arrival. At each depth, the sensor needs to be locked to the borehole wall using the clamping mechanism for coupling as well as possible the seismic signal propagating in the ground.

The P-wave propagating in the ground faster than the S-wave, its energy appears first on the seismic record. So, the S-wave needs to be amplified to be correctly visualized within the seismic

wave train. To do that we are using a reverse polarity generated by the seismic source (beam struck by a sledgehammer on its right and left side). The S-wave phase reversal allows a clear identification of the first S-wave arrival on the seismic record.

The main parameters controlling data quality for downhole seismic measurements are:

- Correct preparation of the borehole for a good coupling between the geophone and ground (borehole in the ground).
- Amplification of the shear wave using the reverse component for the horizontal censors (H1 and H2 components).
- Polarization of the signal to better visualize the maximum amplitude (in the 2D plane propagation, considering H1 + H2 components).

# 3 DATA PROCESSING

The data were recorded down to 20 metre depth by 1 metre increments.

The seismic data presents an acceptable signal to noise ratio allowing the picking of first P and S-wave arrivals for all the depths and all the components (Figure 3 & 4).

The processing can be summarized as follows:

- Components H1 and H2 stacked for both sources (right and left side of the beam).
- Picking of the first arrivals time for the P & S waves for each depth.
- Definition of the different layers for the calculation of the average seismic velocity.

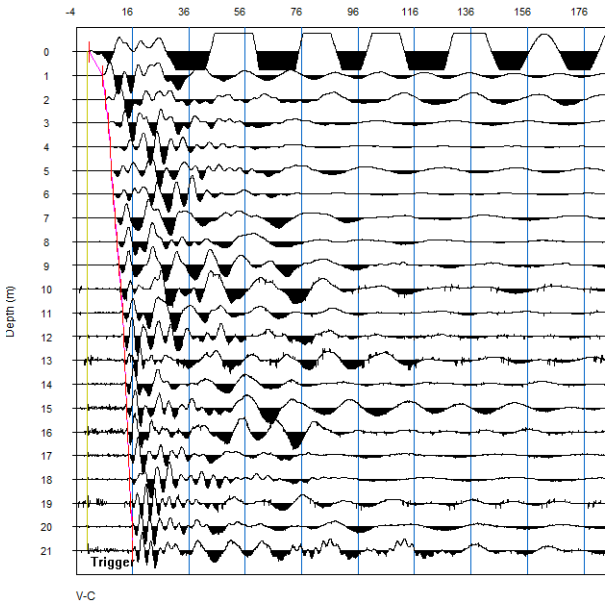


**Figure 3: P-wave picking borehole 21-207**

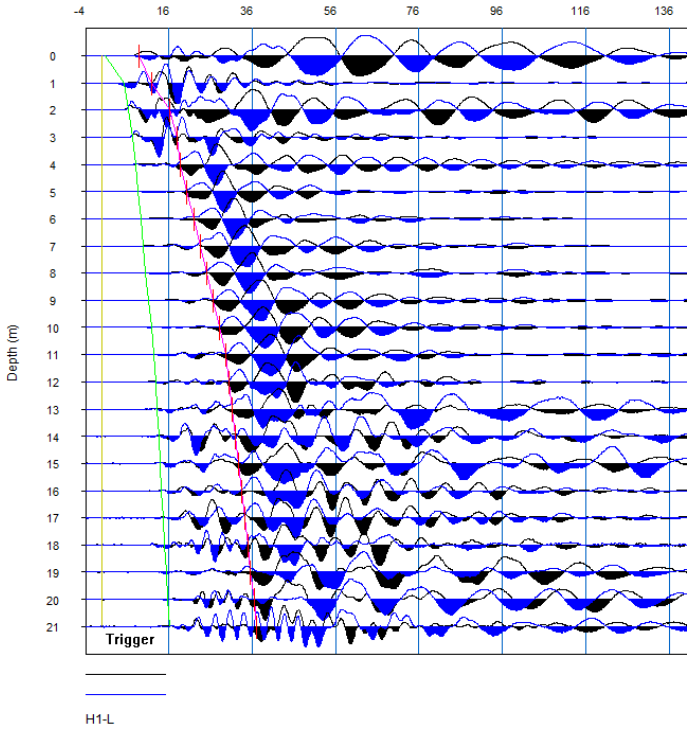


**Figure 4: S-wave picking borehole 21-207**

# 4 RESULTS AND DISCUSSION

The P and Shear waves velocity model for the borehole **21-207**:

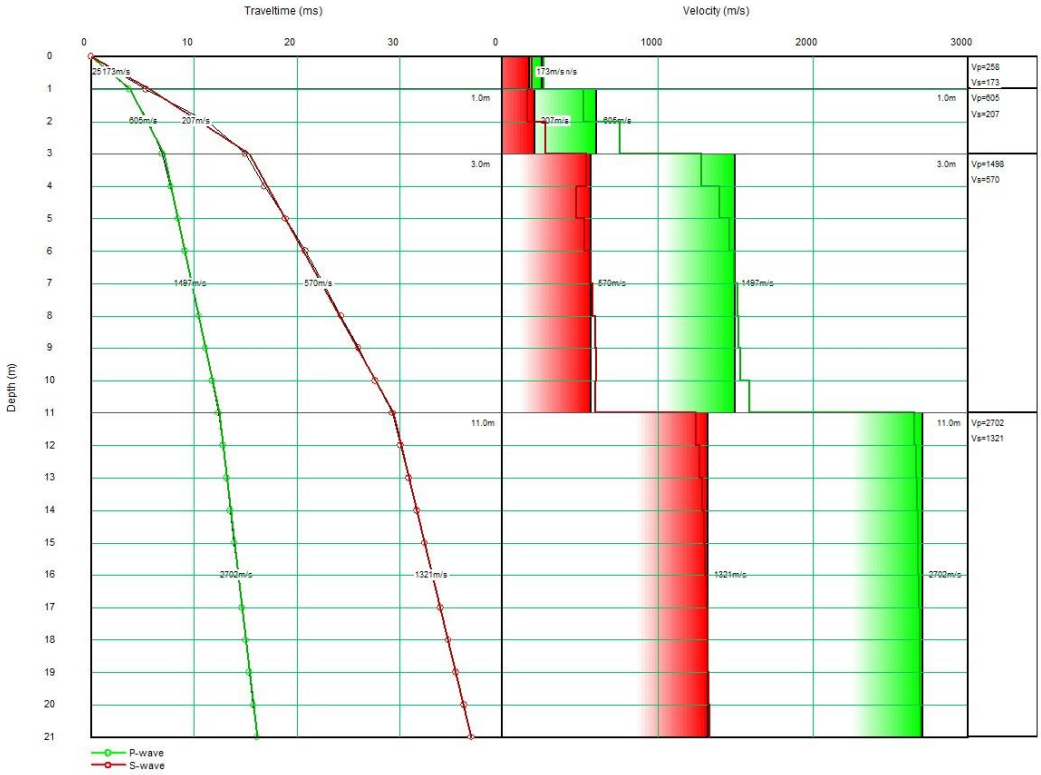


**Figure 5: Seismic downhole velocity model, BH 21-207**

$V_S30$ based on the first 20 m is 709.9 m/sec which corresponds to a C class (Figure 6).

| Site class | Type of Soil profile | Average properties in top 30 m | | |
|---|---|---|---|---|
| | | Soil shear wave average velocity $\overline{V}_s$ (m/s) | Standard penetration resistance $\overline{N}_{60}$ | Soil undrained shear strength $s_u$ (kPa) |
| A | Hard rock | $\overline{V}_s > 1500$ | – | – |
| B | Rock | $760 < \overline{V}_s \leq 1500$ | – | – |
| C | Very dense soil and soft rock | $360 < \overline{V}_s < 760$ | $\overline{N}_{60} > 50$ | $s_u > 100$ |
| D | Stiff soil | $180 < \overline{V}_s < 360$ | $15 \leq \overline{N}_{60} \leq 50$ | $50 < s_u \leq 100$ |
| E | (1)Soft soil | $\overline{V}_s < 180$ | $\overline{N}_{60} < 15$ | $s_u < 50$ |
| F | (2)Others | Site specific evaluation required | | |

**Figure 6: Table 4.1.8.1A from the NBCC 2015 showing ranges of Vs30 values and their corresponding seismic site classification.**

Downhole result is provided in Annex A and B with the corresponding borehole log. The seismic data is consistent with the geological information in the borehole log within a ±1 m precision.

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Reviewed by:

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Team Leader – Geophysical and Ecomorphological Studies
Solange Momy
Administrative Assistant

EPC/DL/sm

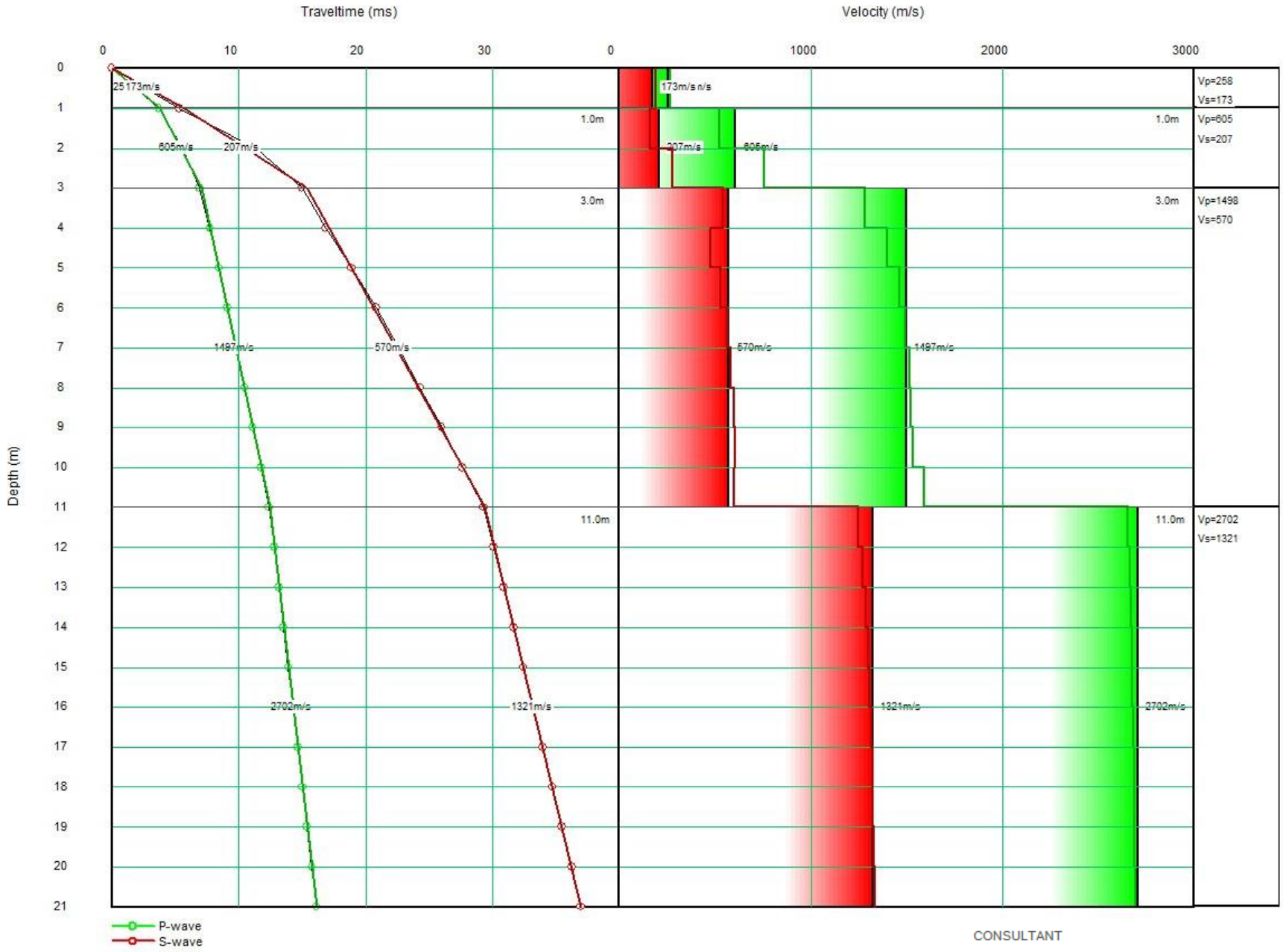
Encl. Appendix 1 – BH 21-207 Seismic model

Appendix 2 – Borehole 21-207 log

# APPENDIX 1

## BH 21-207 SEISMIC MODEL

# DOWNHOLE SEISMIC SURVEY MODEL, BH 21-207, Ottawa civic hospital



# APPENDIX 2

BOREHOLE 21-207 LOG

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-207

SHEET 1 OF 3

LOCATION: N 5028410.7 ;E 366583.4

BORING DATE: June 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) 20 40 60 80 | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m 20 40 60 80 / WATER CONTENT PERCENT Wp W Wl 20 40 60 80 | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GROUND SURFACE | | 80.26 | | | | | | | |
| 0 | Rotary Drill/ Wash Boring; NW Casing | TOPSOIL - (SM) SILTY SAND, trace gravel; dark brown, contains organic matter (rootlets); non-cohesive, moist, loose | | 0.00<br>80.03 | 1 | SS | 1 | | | | Bentonite Seal |
| | | FILL - (SM) gravelly SILTY SAND, angular; grey; non-cohesive, moist, compact | | 0.23<br>0.38<br>79.50 | | | | | | | |
| 1 | | FILL -(SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, compact | | 0.76 | 2 | SS | 5 | | | | |
| | | (CI/CH) SILTY CLAY to CLAY, trace siltl; grey brown, highly fissured (WEATHERED CRUST); cohesive, w~PL to w>PL, very stiff | | | 3 | SS | 7 | | | | |
| 2 | | | | | 4 | SS | 6 | | | | |
| | | (SM) gravelly SILTY SAND; brown to grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist to wet, loose | | 77.52<br>2.74 | | | | | | | |
| 3 | | | | | 5 | SS | 9 | | | | |
| | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose | | 76.45<br>3.81 | 6 | SS | 5 | | | | |
| 4 | | | | | | | | | | | |
| | | | | | 7 | SS | 5 | | | | |
| 5 | | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 74.92<br>5.34 | 8 | SS | 9 | | | | 64 mm Diam. VSP Pipe |
| 6 | | | | | 9 | SS | 7 | | | | |
| 7 | | | | | 10 | SS | 11 | | | | |
| 8 | | | | | 11 | SS | 10 | | | | |
| | | | | | 12 | SS | 13 | | | | |
| 9 | | | | | 13 | SS | 15 | | | | |
| 10 | | *CONTINUED NEXT PAGE* | | | | | | | | | |

DRAFT

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED:

PROJECT: 21451149

# RECORD OF BOREHOLE: 21-207

SHEET 2 OF 3

LOCATION: N 5028410.7 ;E 366583.4

BORING DATE: June 4, 2021

DATUM: NAD 1983

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

| DEPTH SCALE METRES | BORING METHOD | SOIL PROFILE: DESCRIPTION | STRATA PLOT | ELEV. DEPTH (m) | SAMPLES: NUMBER | TYPE | BLOWS/0.3m | SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) 20 40 60 80 | DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m 20 40 60 80 / WATER CONTENT PERCENT Wp W Wl 20 40 60 80 | ADDITIONAL LAB. TESTING | PIEZOMETER OR STANDPIPE INSTALLATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | *--- CONTINUED FROM PREVIOUS PAGE ---* | | | | | | | | | |
| | Rotary Drill/ Wash Boring NW Casing | (SM) gravelly SILTY SAND; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, loose to compact | | 69.59 | | | | | | | |
| | | (SW) gravelly SAND, trace to some silt; grey, contains cobbles and boulders; non-cohesive, wet, loose to very dense | | 10.67 | 14 | SS | 4 | | | | |
| 11 | | | | | 15 | RC | - | | | | 64 mm Diam. VSP Pipe |
| 12 | | | | 68.09 | 16 | SS | >50 | | | | |
| | | Borehole continued on RECORD OF DRILLHOLE 21-207 | | 12.17 | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |

DRAFT

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED:

PROJECT: 21451149

# RECORD OF DRILLHOLE: 21-207

SHEET 3 OF 3

LOCATION: N 5028410.7 ;E 366583.4

DRILLING DATE: June 4, 2021

DATUM: NAD 1983

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
**NOTE:** For additional abbreviations refer to list of abbreviations & symbols.

| DEPTH SCALE METRES | DRILLING RECORD | DESCRIPTION | SYMBOLIC LOG | ELEV. / DEPTH (m) | RUN No. | COLOUR % RETURN / FLUSH | RECOVERY: TOTAL CORE % | RECOVERY: SOLID CORE % | R.Q.D. % | FRACT. INDEX PER 0.25 m | DISCONTINUITY DATA: DIP w.r.t. CORE AXIS | DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION | Jcon | Jr | Ja | ROCK STRENGTH INDEX: R4 | R3 | R2 | R1 | WEATHERING INDEX: W1 | W2 | W3 | W4 | Q AVG. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BEDROCK SURFACE | | 68.09 | | | | | | | | | | | | | | | | | | | | | |
| 13 | Rotary Drill / HQ Core | Fresh, thinly to medium bedded, medium bedded, medium grey to brownish grey, fine to medium grained, non-porous, medium strong to weak SHALEY NODULAR LIMESTONE<br>- Broken/lost core from 12.17 m to 12.34 m | | 12.17 | 1 | 100 | | | | | | | | | | | | | | | | | | | 64 mm Diam. VSP Pipe |
| 14 | | | | | 2 | 100 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | 3 | 100 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | 4 | 100 | | | | | | | | | | | | | | | | | | | |
| 17 | | - Mud seam from 16.66 m to 16.69 m | | | | | | | | | | | | | | | | | | | | | | | 64 mm Diam. VSP Pipe |
| 18 | | - Heavy fossilferous/bioturbated from 17.60 m to 21.61 m | | | 5 | 100 | | | | | | | | | | | | | | | | | | | |
| 19 | | - Heavy calcite veining from 18.40 m to 21.61 m | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | 6 | 100 | | | | | | | | | | | | | | | | | | | |
| 21 | | - Broken core from 20.54 m to 20.59 m | | | 7 | 100 | | | | | | | | | | | | | | | | | | | |
| 22 | | End of Drillhole<br>Note(s):<br>1. Water level in screen measured at 3.32 m (Elev. 76.94 m) on June 9, 2021 | | 58.65<br>21.61 | | | | | | | | | | | | | | | | | | | | | |

DRAFT

DEPTH SCALE

1 : 50

GOLDER

LOGGED: RI

CHECKED:

wsp.com

# APPENDIX 4

## RETAINING WALL DESIGN – GLOBAL STABILITY

## DRAWING PG6982-5 RETAINING WALLS AND TEMPORARY SHORING SYSTEM PLAN

March 27, 2026
File: PG6982-LET.01 Revision 2

PCL/ED, a Joint Venture
3755 Riverside Drive,
Ottawa, Ontario
K1G 4K9

**Attention:** Dev Co

**Subject:** PG6982 – LET.01 -Global Stability Analysis
Proposed Retaining Walls
Civic Campus Redevelopment Project
900 Carling Avenue, Ottawa, Ontario

As requested, Paterson Group Inc. (Paterson) completed a global stability analysis to determine the stability of the proposed retaining walls higher than 1 m to be located at the aforementioned site. The following section provide a summary of our analysis of the proposed conditions and construction considerations for the proposed retaining wall structures.

## BACKGROUND INFORMATION

The following grading plans prepared by WSP were reviewed as part of our global stability analysis:

- WSP Project No. CA0027758.0-51 – Site Grading Plan 1 of 5 – Drawing No. C5-200 – Revision 10 dated March 27, 2026.
- WSP Project No. CA0027758.0-51 – Site Grading Plan 2 of 5 – Drawing No. C5-201 – Revision 10 dated March 27, 2026.
- WSP Project No. CA0027758.0-51 – Site Grading Plan 3 of 5 – Drawing No. C5-202 – Revision 10 dated March 27, 2026.
- WSP Project No. CA0027758.0-51 – Site Grading Plan 4 of 5 – Drawing No. C5-203 – Revision 10 dated March 27, 2026.
- WSP Project No. CA0027758.0-51 – Site Grading Plan 5 of 5 – Drawing No. C5-203 – Revision 10 dated March 27, 2026.

Based on our review, there are nine (9) proposed retaining walls, greater than 1.0 m in height, expected to be constructed outside of the podium deck structure footprint of the proposed hospital building. Ramp walls were excluded from the global stability review due to their structural detailing and interconnection with the foundation and concrete apron. It is expected that the walls will consist of either segmental precast concrete blocks or cast in place concrete walls.

## SUBSURFACE PROFILE

The subsurface profile at the subject site consists of a layer of brown silty sand underlain by a glacial till layer. A layer of fill material of various composition was also encountered on the eastern portion of the subject site. Reference should be made to Paterson's geotechnical report for more information.

## BEDROCK

Bedrock was cored at several locations throughout the subject site at depths ranging between 1.7 and 16.6 m below ground surface. The bedrock generally consisted of fair to good quality limestone or limestone interbedded with shale.

Based on available geological mapping, the subject site is located in an area where the bedrock consists of Paleozoic limestone of the Bobcaygeon Formation and Paleozoic limestone with interbedded shale of the Verulam formation, with an overburden drift thickness ranging between 0 and 15 m depth.

## RETAINING WALLS

For the purpose of the following review the refer to Civil drawing C7-400 Revision 6, Retaining walls - Site Layout, dated September 19, 2025.

## BEARING RESISTANCE VALUES

Footings placed on an undisturbed, silty sand or on engineered fill which is placed and compacted directly over the undisturbed, grey silty clay, can be designed using a bearing resistance value at serviceability limit states (SLS) of 100 kPa and a factored bearing resistance value at ultimate limit states (ULS) of 150 kPa. A geotechnical resistance factor of 0.5 was applied to the above-noted bearing resistance value at ULS.

Footings placed on an undisturbed, compact to dense glacial till, can be designed using a bearing resistance value at serviceability limit states (SLS) of 200 kPa and a factored bearing resistance value at ultimate limit states (ULS) of 350 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. Footings designed using the bearing resistance values at SLS given above will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

## GLOBAL STABILITY ANALYSIS

Based on the grading plan and proposed retaining walls plan prepared by WSP, one cross section considered the “worse case” scenario critical locations have been selected for global stability analysis at each wall location. The section was selected based on the retained soil and above-ground surface wall height.

The global stability analysis was modeled in Slide, a computer program which permits a two-dimensional slope stability analysis calculating several methods including the Bishop’s method, which is a widely accepted slope analysis method. The program calculates a factor of safety, which represents the ratio of the forces resisting failure to forces favoring failure. Theoretically, a factor of safety of 1.0 represents a condition where the slope is stable. However, due to intrinsic limitations of the calculation methods and the variability of the subsurface soil and groundwater conditions, a factor of safety greater than 1.0 is generally required for the failure risk to be considered acceptable.

A minimum factor of safety of 1.5 is generally recommended for conditions where the slope failure would comprise permanent structures. An analysis considering seismic loading was also completed. A horizontal acceleration of 0.175 g was considered for the sections for the seismic loading condition.

A factor of safety of 1.1 is considered to be satisfactory for stability analyses including seismic loading. The retaining wall section was reviewed using the design loading according to CHBDC 2019 (CSA S6:19).

The following parameters were used for the slope stability analysis under static and seismic conditions:

Table 1 - Effective Soil Parameters for Global Stability Analysis

| Soil Layer | Unit Weight (kN/m3) | Friction Angle (degrees) | Cohesion effective (kPa) | Cohesion Total (kPa) |
|---|---|---|---|---|
| Granular A | 22 | 38 | 0 | 0 |
| Granular B Type II | 22 | 40 | 0 | 0 |
| Silty Sand | 19 | 36 | 0 | 0 |
| Brown Silty Clay | 17 | 33 | 5 | 80 |
| Grey Silty Clay | 16 | 33 | 10 | 40 |
| Glacial Till | 20 | 38 | 0 | 0 |
| Bedrock | 23 | - | | |

Concrete structures are considered stiff and impenetrable, it is the responsibility of the structural designer to ensure sufficient capacity of the structural elements and provide internal compound analysis at the time of shop drawings.

### Soil Parameters

The soil parameters used for the global stability analysis have been extracted from the geological mapping, available information and Paterson's experience in the area. The results of the analysis are considered acceptable from a geotechnical perspective. It should be noted that all soil parameters used in the analysis can be found in Figures 1A through 2B attached at the end of this report.

## ANALYSIS RESULTS

The factor of safety for the retaining wall sections was greater than 1.5 for static conditions. Similarly, the results under seismic loading yielded a factor of safety for this section greater than 1.1. Based on these results, the retaining walls are considered to be stable under static and seismic loading. The results are summarized in the below table, note that the structural designer is responsible for the internal compound stability check at the time of shop drawings based on the final product selected for the construction of each retaining walls.

Table 2 - Global Stability Analysis Factor of Safety

| Retaining Wall | Factor of Safety Static | Factor of Safety Seismic |
|---|---|---|
| 3 | 1.936 | 1.476 |
| 4 | 4.980 | 2.742 |
| 5 | 1.627 | 1.247 |
| 12 | 3.373 | 2.680 |
| 13 | 4.131 | 2.066 |
| 14 | 4.011 | 2.426 |
| 15 | 2.534 | 1.559 |
| 18A & 18B | 2.462 | 1.692 |

## CONSTRUCTION RECOMMENDATIONS

### Drainage

A 150 to 200 mm diameter perforated drainage pipe wrapped in geotextile and surrounded on all sides by 150 mm of clear crushed stone, should be installed at the heel of the retaining wall footing. The drainage should have positive drainage to a nearby outlet such as a catch basin or other suitable drainage features such as swales. It is recommended that the outlets be spaced evenly along the retaining wall with a minimum spacing of 15 m center to center passing through the wall or connected to a nearby catch basin.

Retaining walls placed along the south and western portion of the site are expected to extend below the existing groundwater table. The wall acts as drainage element around the site and controls the groundwater along the perimeter. It is recommended that Texel Draintube product be used as a separation and drainage geotextile at the back of those walls. Show drawings should show the use of Draintube geotextile and connection to nearby storm drainage systems.

Cast in place retaining walls extending below the groundwater in areas where a perforated drain cannot be provided with a positive connection should be fully waterproofed as indicated in the foundation waterproofing recommendations.

### Backfill Material

The retaining wall should be backfilled with free-draining, non-frost susceptible granular backfill materials and incorporate longitudinal drains and weep holes to provide positive drainage of the backfill. For the purpose of this report, it is recommended that the wall be backfilled with either OPSS Granular B Type II or Granular A materials. The backfill should be placed within a wedge-shaped zone defined by a line drawn up and back from the back edge of the top of the footing along the rear face and bottom corner of the wall at an inclination of 1H:1V or a minimum of 600 mm behind the wall. All material should be compacted to a minimum of 98% of the material's SPMDD.

### Frost Protection

For cast in place retaining walls, it is recommended that a minimum embedment of 2.1 m be available to provide sufficient frost protection. Based on the available drawing, it is noted that the soil cover will be insufficient for some of the retaining walls. Further, based on the geological mapping and experience in the area, It is expected that the footings for the retaining wall will be founded on a frost susceptible silty sand material

In order to provide additional frost protection, thick rigid insulation panels consisting of SR.P400 or other approved equivalent should be placed below the footing and extending 1.2 m beyond the faces of the footings. Every 300 mm of missing soil should be replaced with 25 mm of rigid insulation. It is always recommended that the minimum thickness of insulation placed be no less than 50mm.

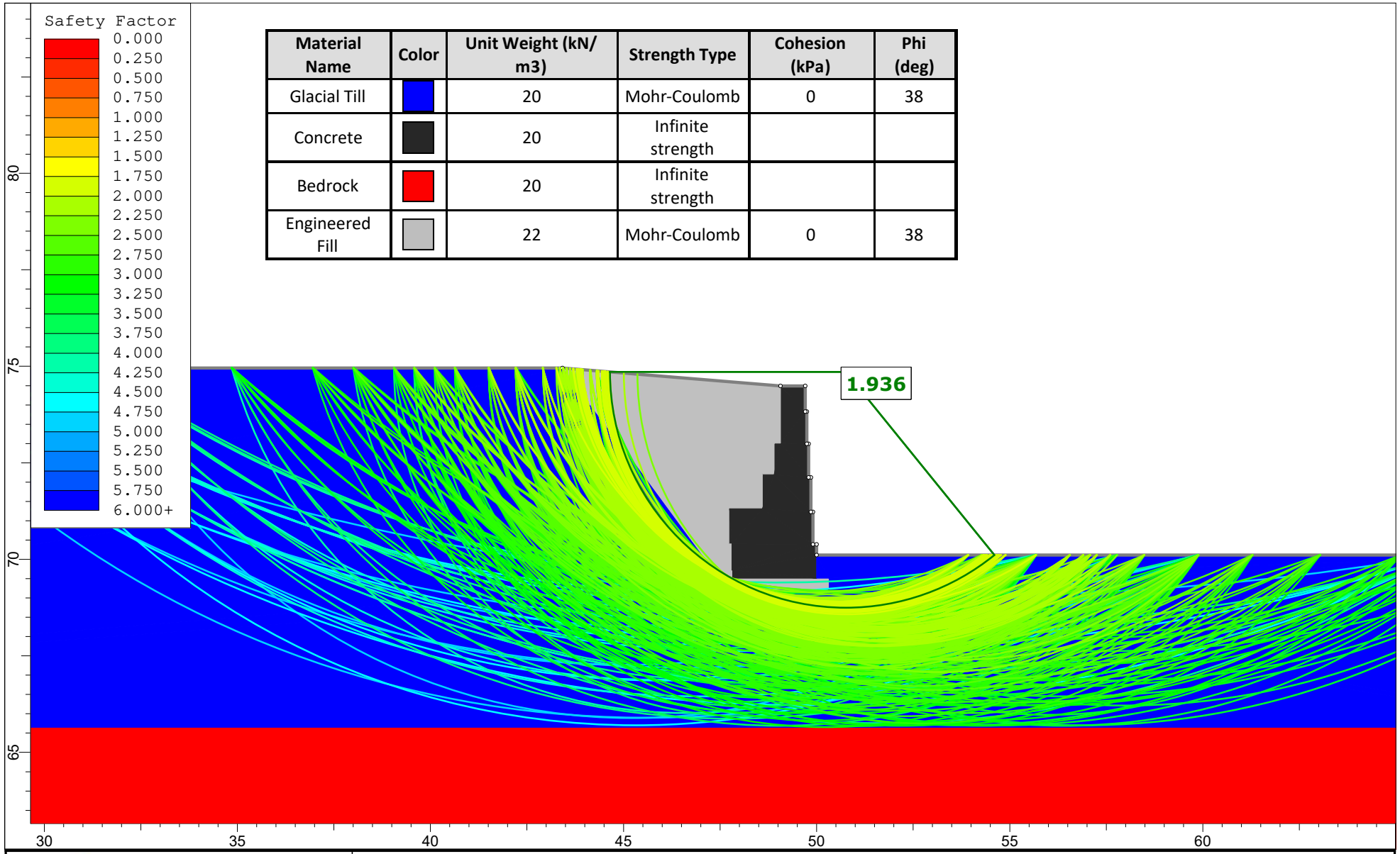
Due to the flexibility and inherent composition of a segmental concrete block retaining wall, frost protection is not required for these types of walls. Segmental concrete blocks wall should be installed on a minimum 300 mm thick OPSS Granular A or Granular B type II pad with a minimum embedment of 200 mm along the bottom course of blocks. Supplemental embedment may be required to accommodate slopes and swales in front of the walls.

## CONSTRUCTION INSPECTION RECOMMENDATIONS

It is recommended that the following be completed once the retaining wall design and course of action are determined:

- Observation of all bearing surfaces prior to backfill or placement of concrete.
- 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 placing backfilling materials.
- Observation of the drainage system prior to backfilling.
- Field density tests to ensure the specified level of compaction was achieved.
- Periodic observation of the retaining wall installation. It is further recommended that all bedding and backfill materials be placed under dry conditions and above freezing temperatures and approved by the geotechnical consultant at the time of construction.
- Precautions should be taken to ensure that the bedding material does not freeze before placement and backfill of the retaining wall base blocks, which could lead to detrimental movement within the retaining wall, once the frost leaves the bedding material.

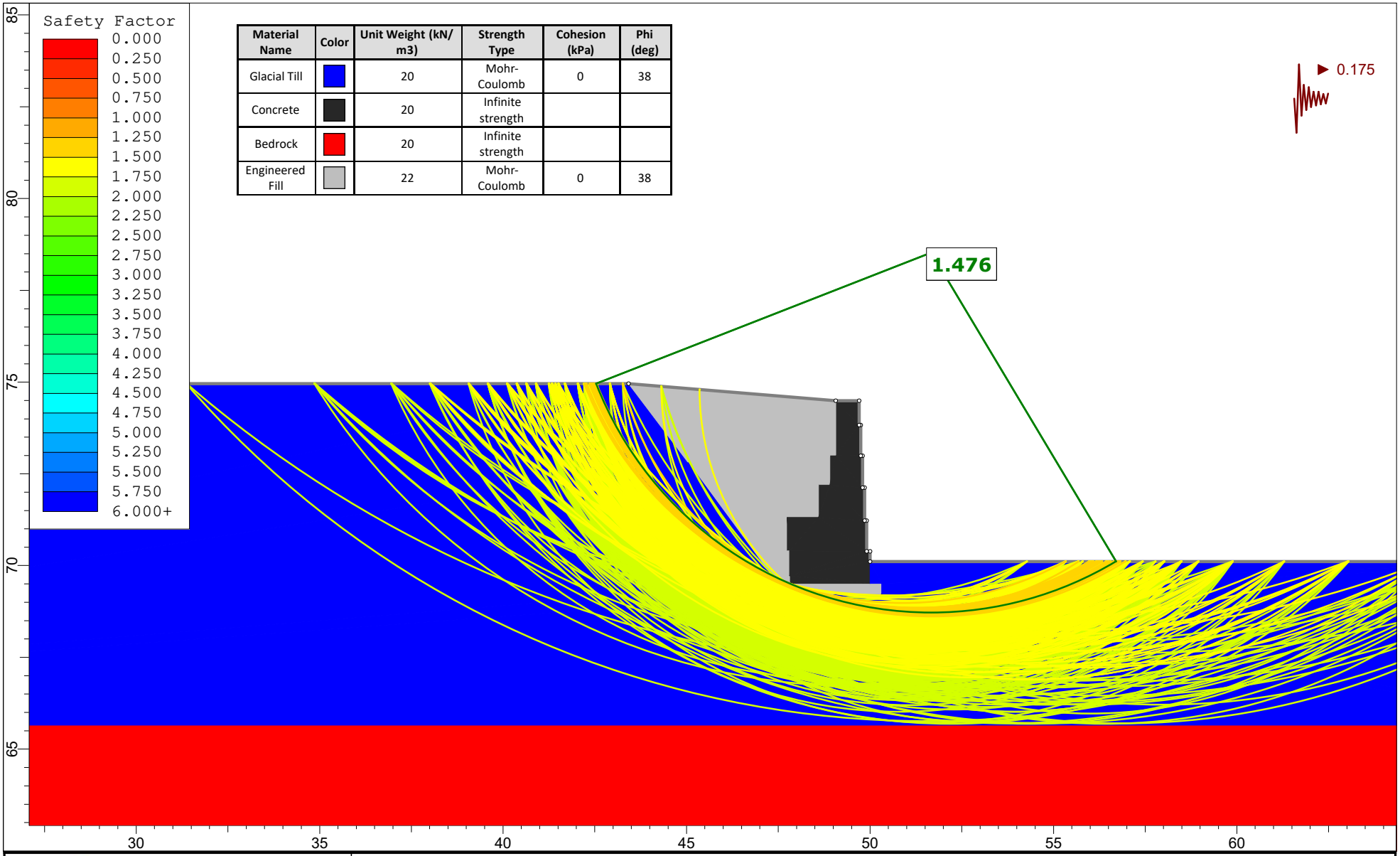
| Material Name | Color | Unit Weight (kN/ m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |




PATERSON GROUP

SLIDEINTERPRET 9.025

| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 3 - Static Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |

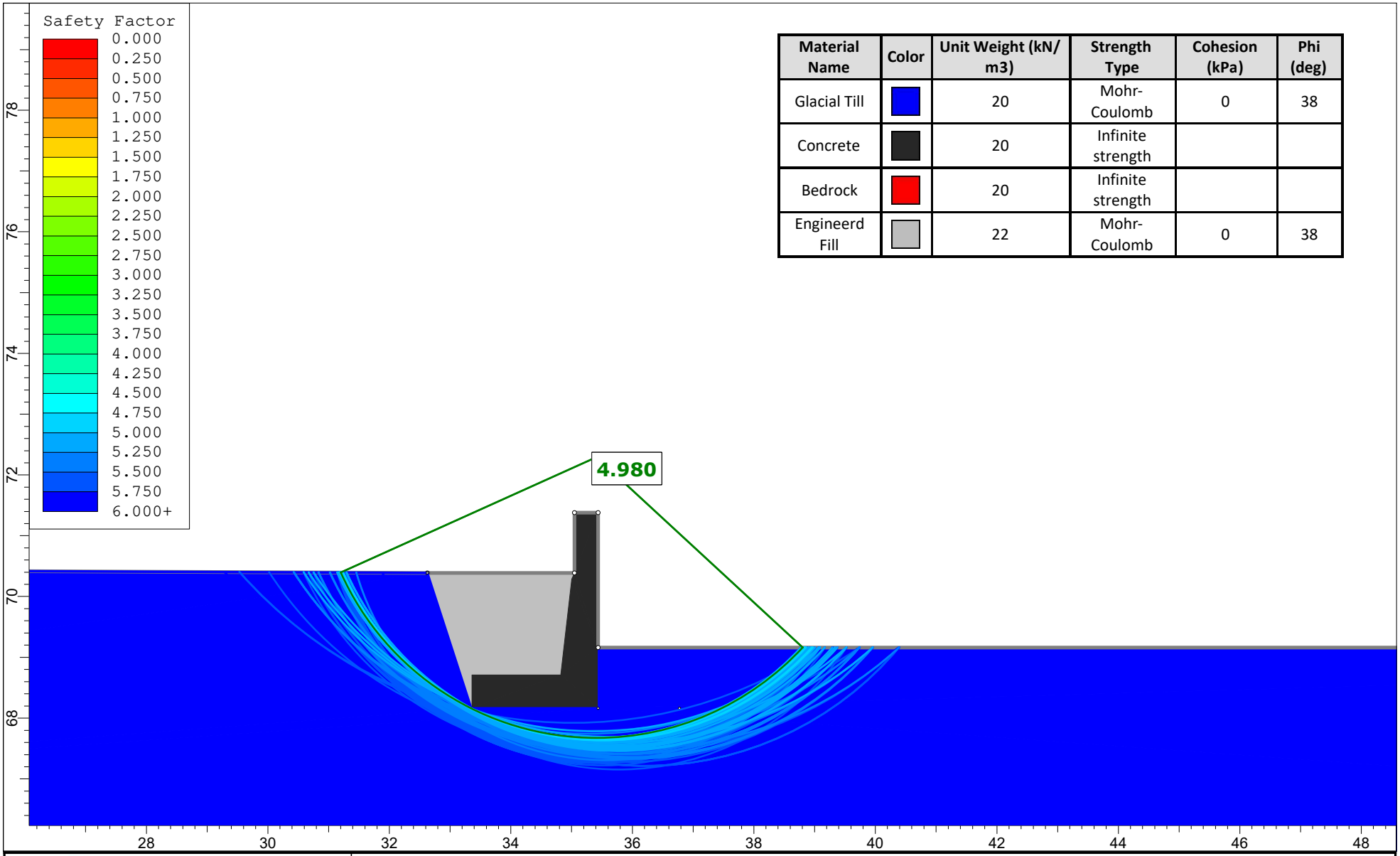



| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |

PATERSON GROUP

SLIDEINTERPRET 9.025

| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 3 - Seismic Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |

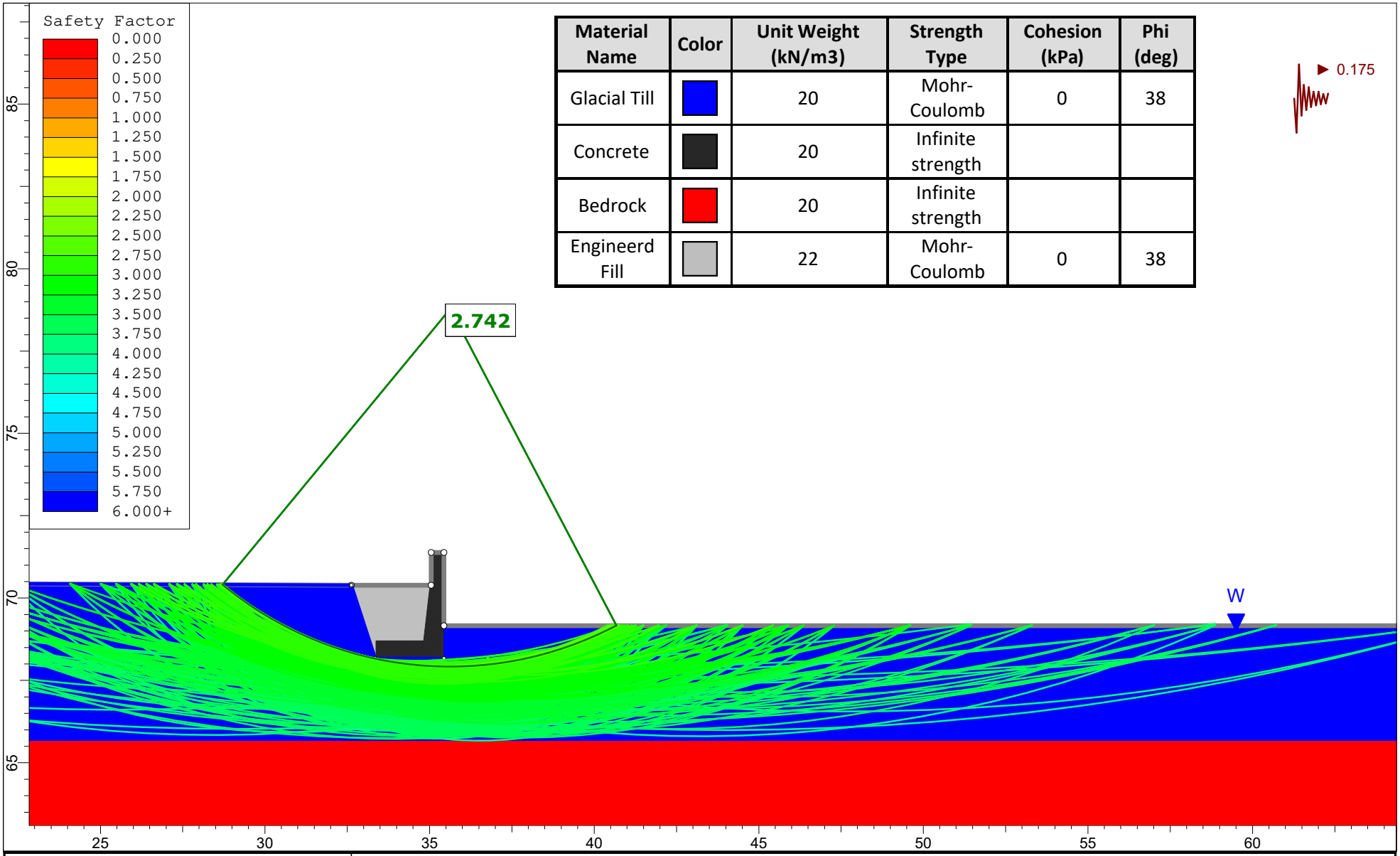



| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |
| Engineerd Fill | | 22 | Mohr-Coulomb | 0 | 38 |

PATERSON GROUP

SLIDEINTERPRET 9.025

| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 4 - Static Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |

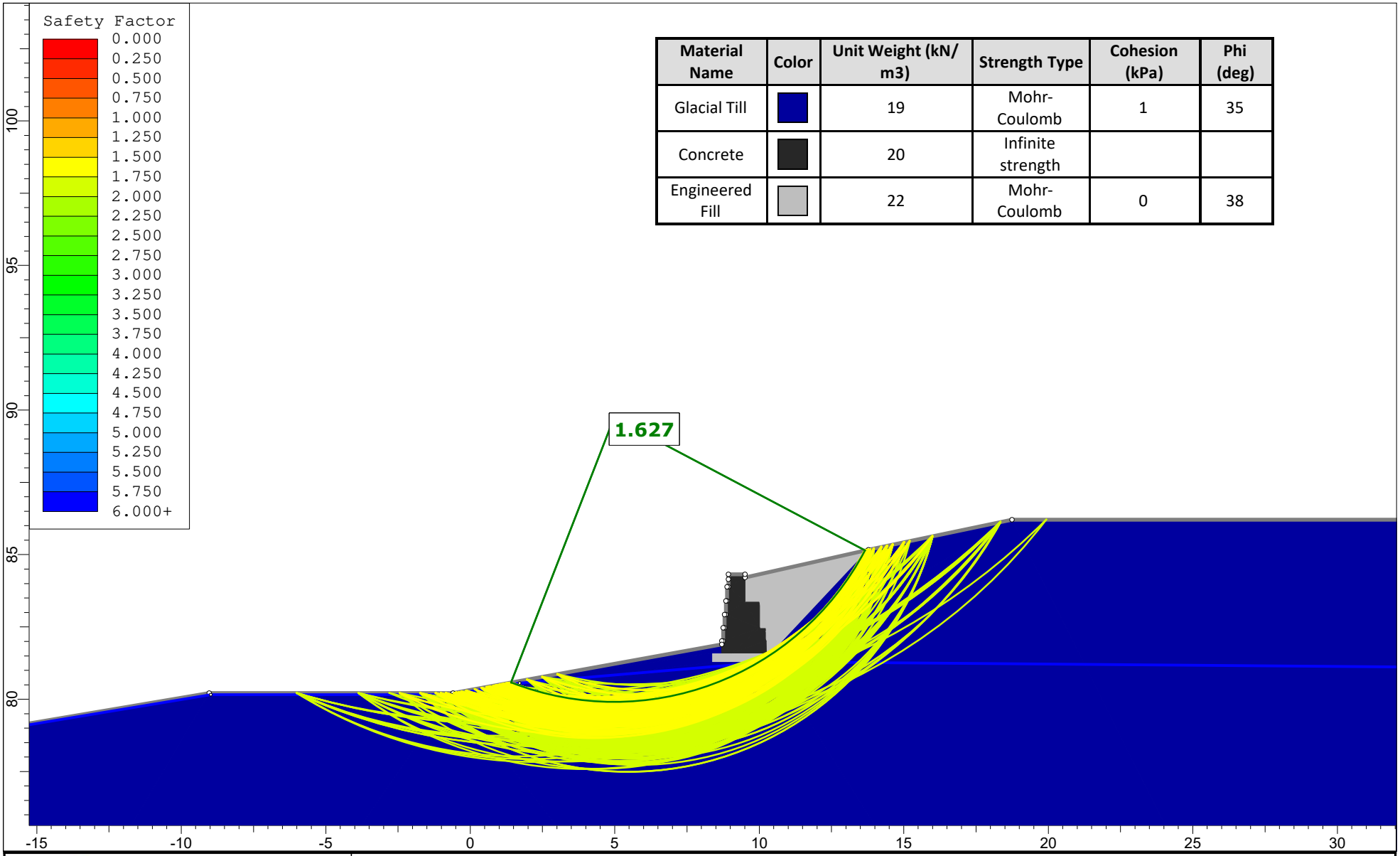



| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |
| Engineerd Fill | | 22 | Mohr-Coulomb | 0 | 38 |

PATERSON GROUP

SLIDEINTERPRET 9.025

| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 4 - Seismic Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 19 | Mohr-Coulomb | 1 | 35 |
| Concrete | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |

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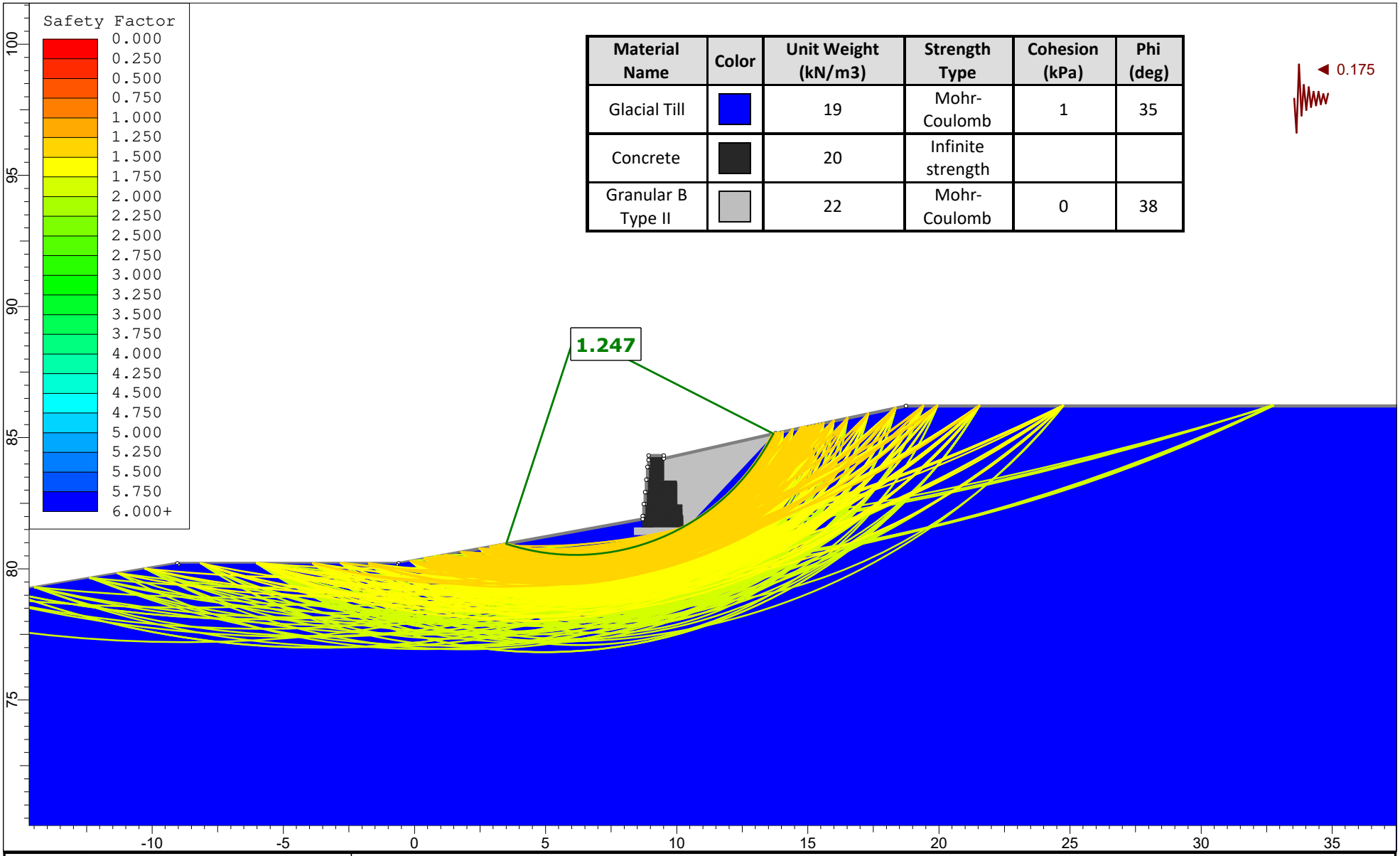
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 5 - Static Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 19 | Mohr-Coulomb | 1 | 35 |
| Concrete | | 20 | Infinite strength | | |
| Granular B Type II | | 22 | Mohr-Coulomb | 0 | 38 |

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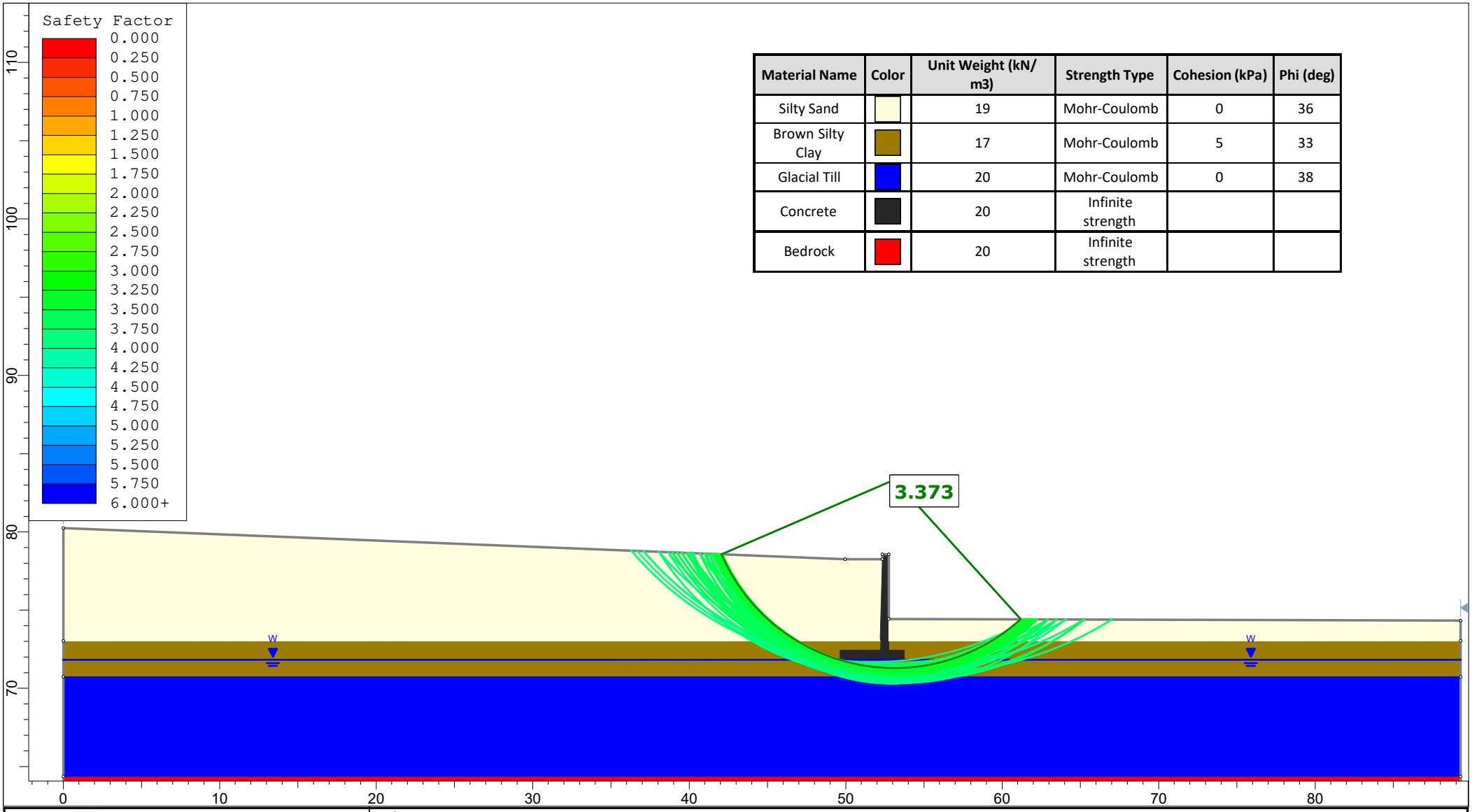
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 5 - Seismic Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 |
| Brown Silty Clay | | 17 | Mohr-Coulomb | 5 | 33 |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |

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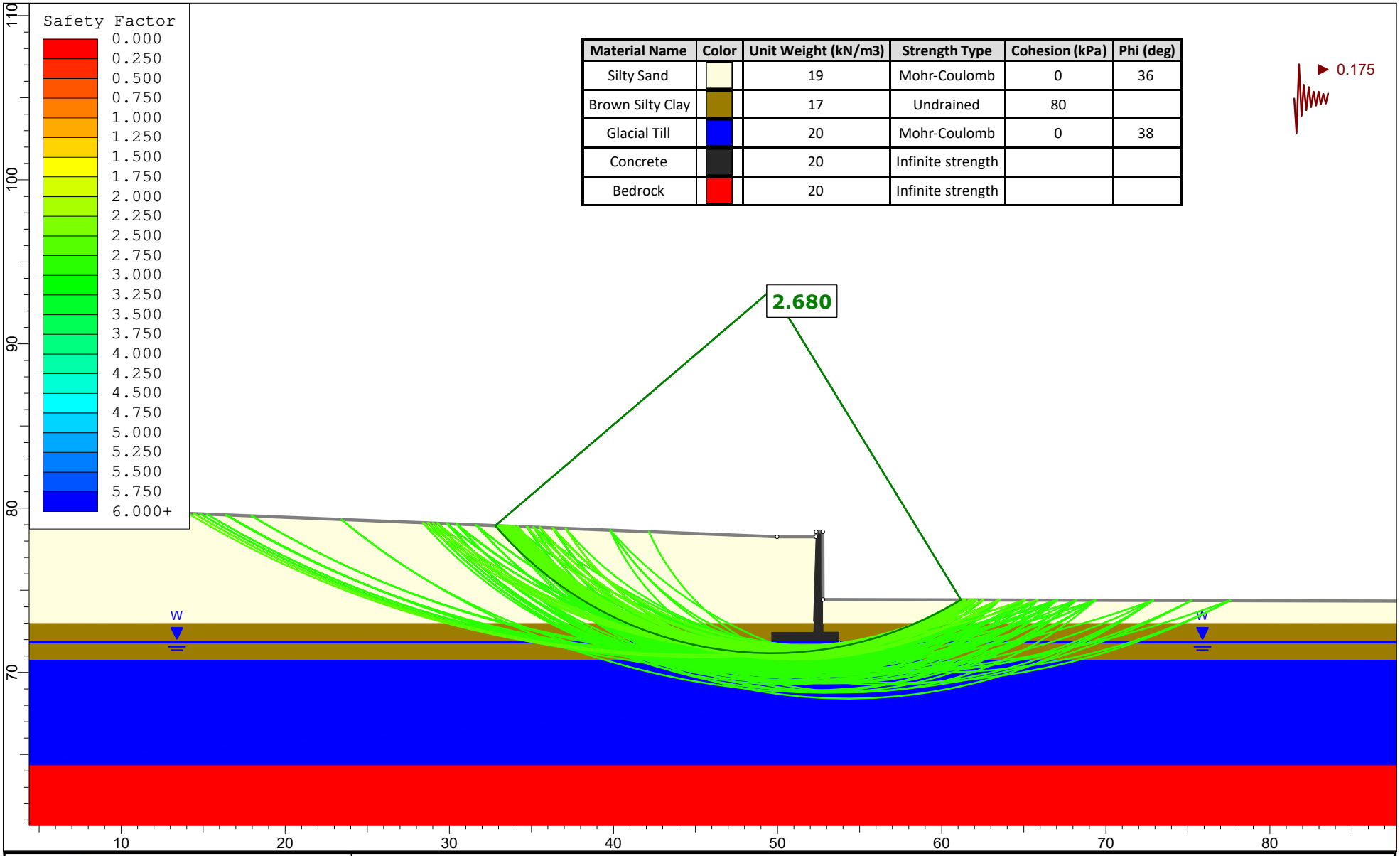
|---|---|---|---|
| ***Project*** | **NCD - New Civic Hospital Campus Development** | | |
| ***Figure No.*** | **Retaining Wall 12 - Static Conditions** | | |
| ***Drawn By*** | Pratheep Thirumoolan | ***Comany*** | Paterson Group |
| ***Date*** | 01/2026 | ***File Name*** | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 |
| Brown Silty Clay | | 17 | Undrained | 80 | |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |

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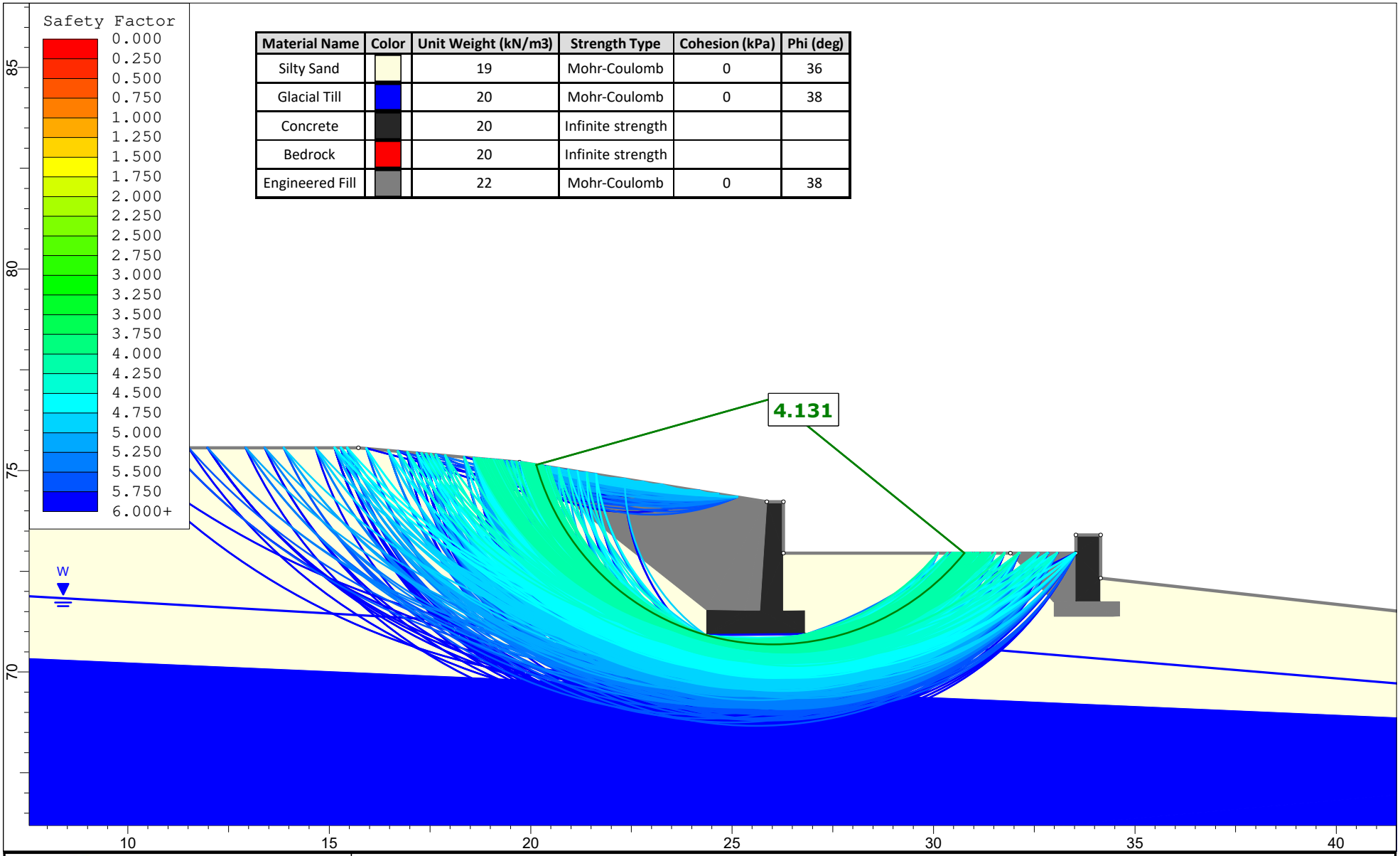
|---|---|---|---|
| ***Project*** | **NCD - New Civic Hospital Campus Development** | | |
| ***Figure No.*** | **Retaining Wall 12 - Seismic Conditions** | | |
| ***Drawn By*** | Pratheep Thirumoolan | ***Comany*** | Paterson Group |
| ***Date*** | 01/2026 | ***File Name*** | New Civic - Retaining Wall Global Stability Analysis |

| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |

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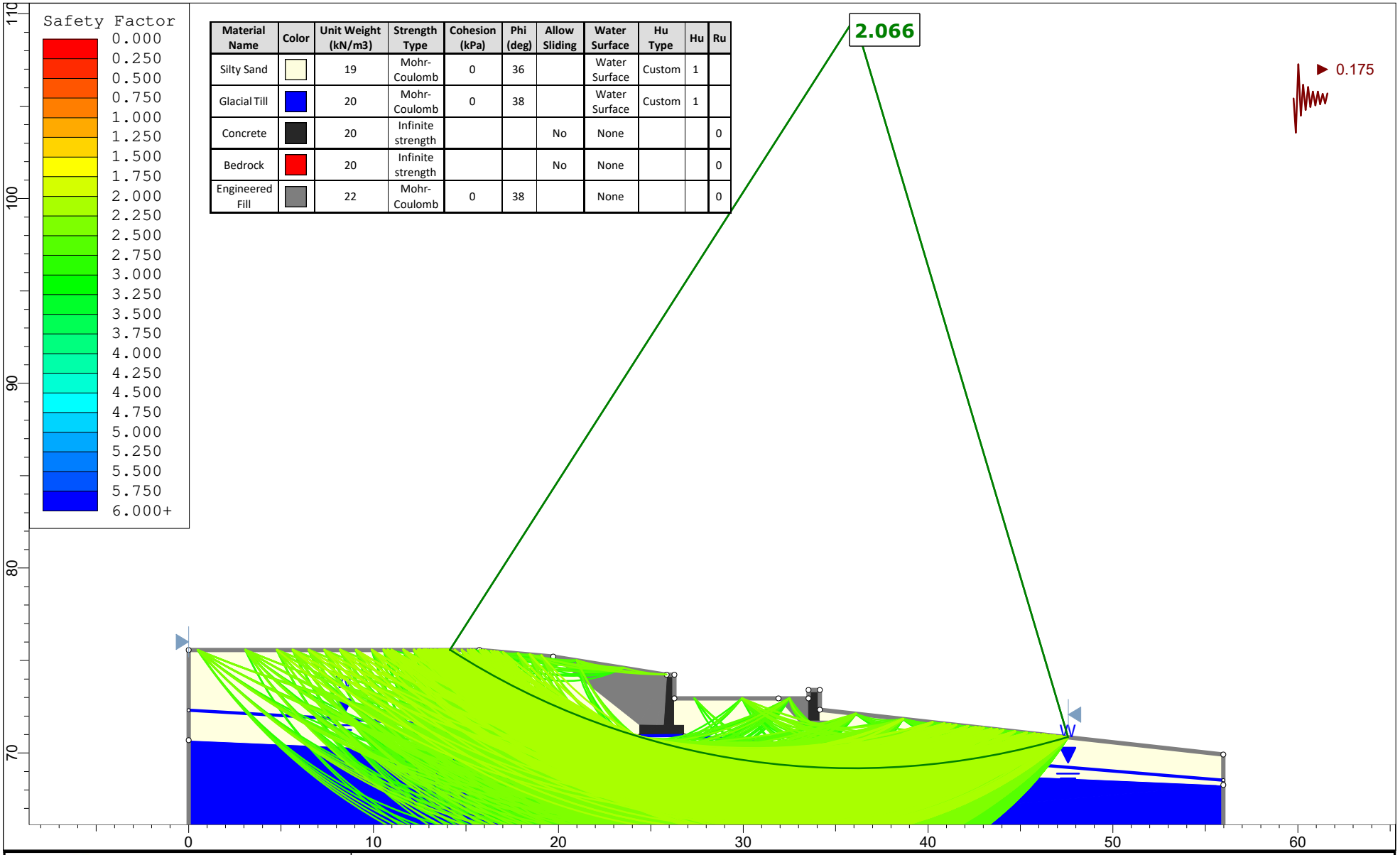
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 13 - Static Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) | Allow Sliding | Water Surface | Hu Type | Hu | Ru |
|---|---|---|---|---|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 | | Water Surface | Custom | 1 | |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 | | Water Surface | Custom | 1 | |
| Concrete | | 20 | Infinite strength | | | No | None | | | 0 |
| Bedrock | | 20 | Infinite strength | | | No | None | | | 0 |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 | | None | | | 0 |

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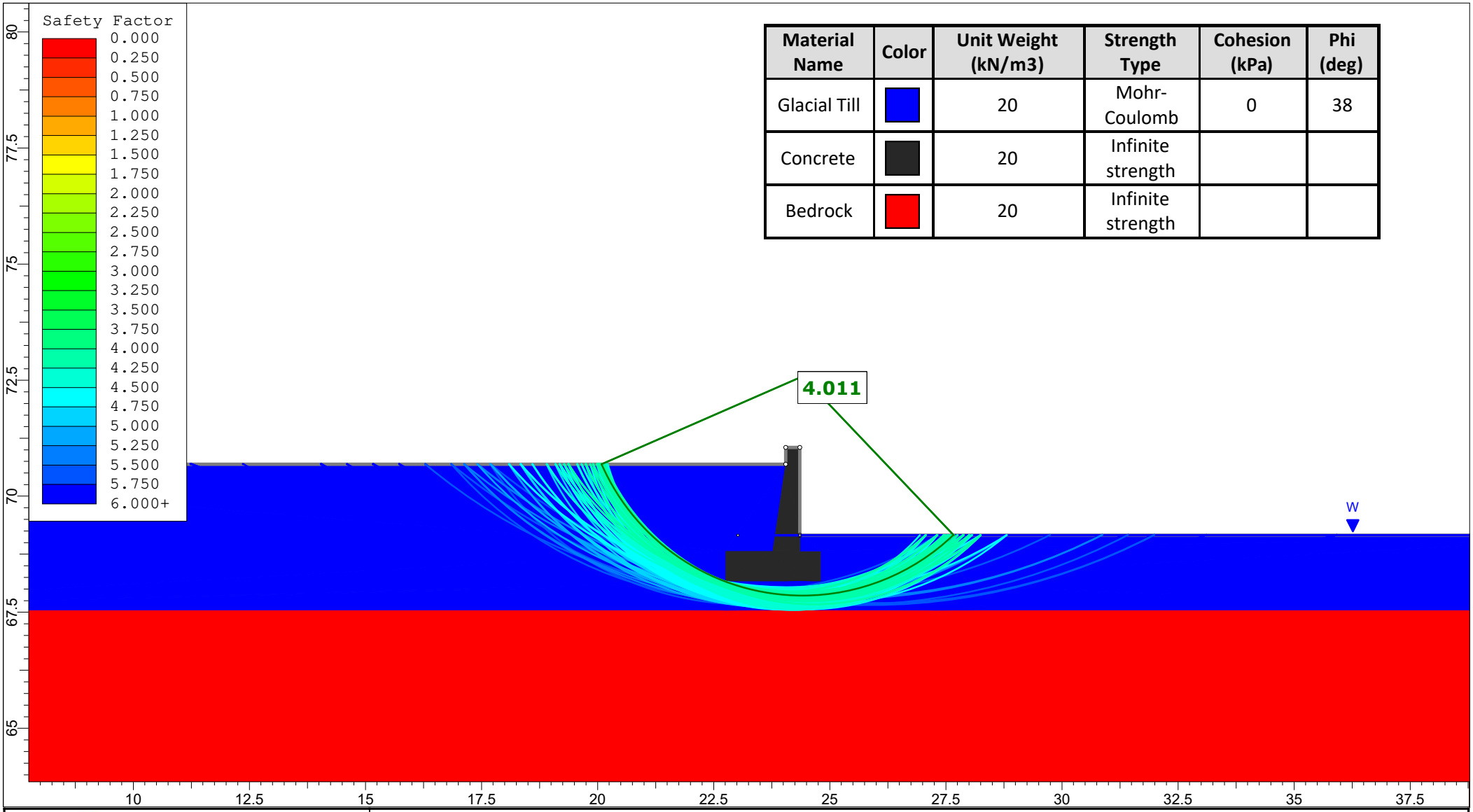
|---|---|
| ***Project*** | **NCD - New Civic Hospital Campus Development** |
| ***Figure No.*** | **Retaining Wall 13 - Seismic Conditions** |
| ***Drawn By*** Pratheep Thirumoolan | ***Comany*** Paterson Group |
| ***Date*** 01/2026 | ***File Name*** New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |

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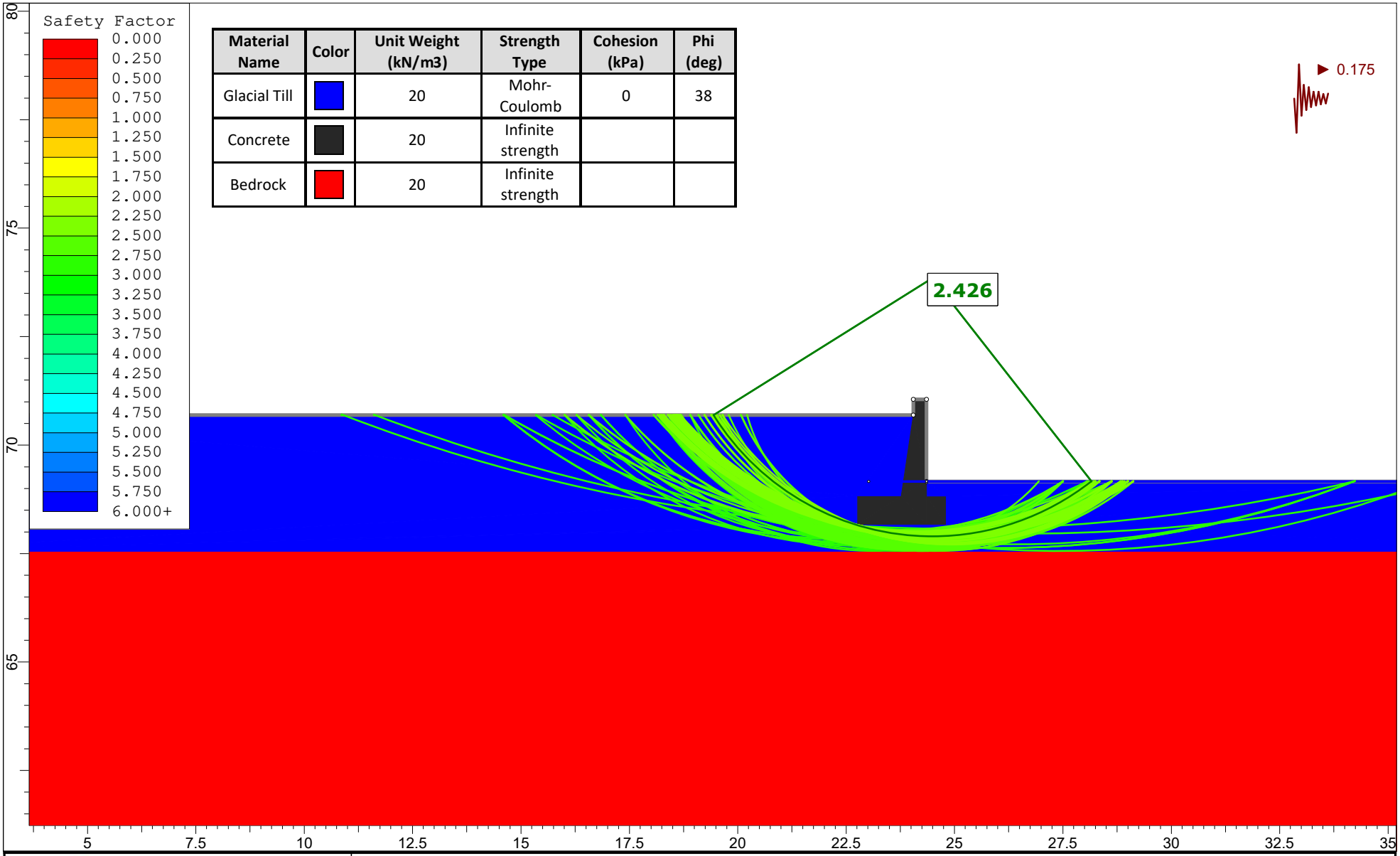
| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 14 - Static Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |

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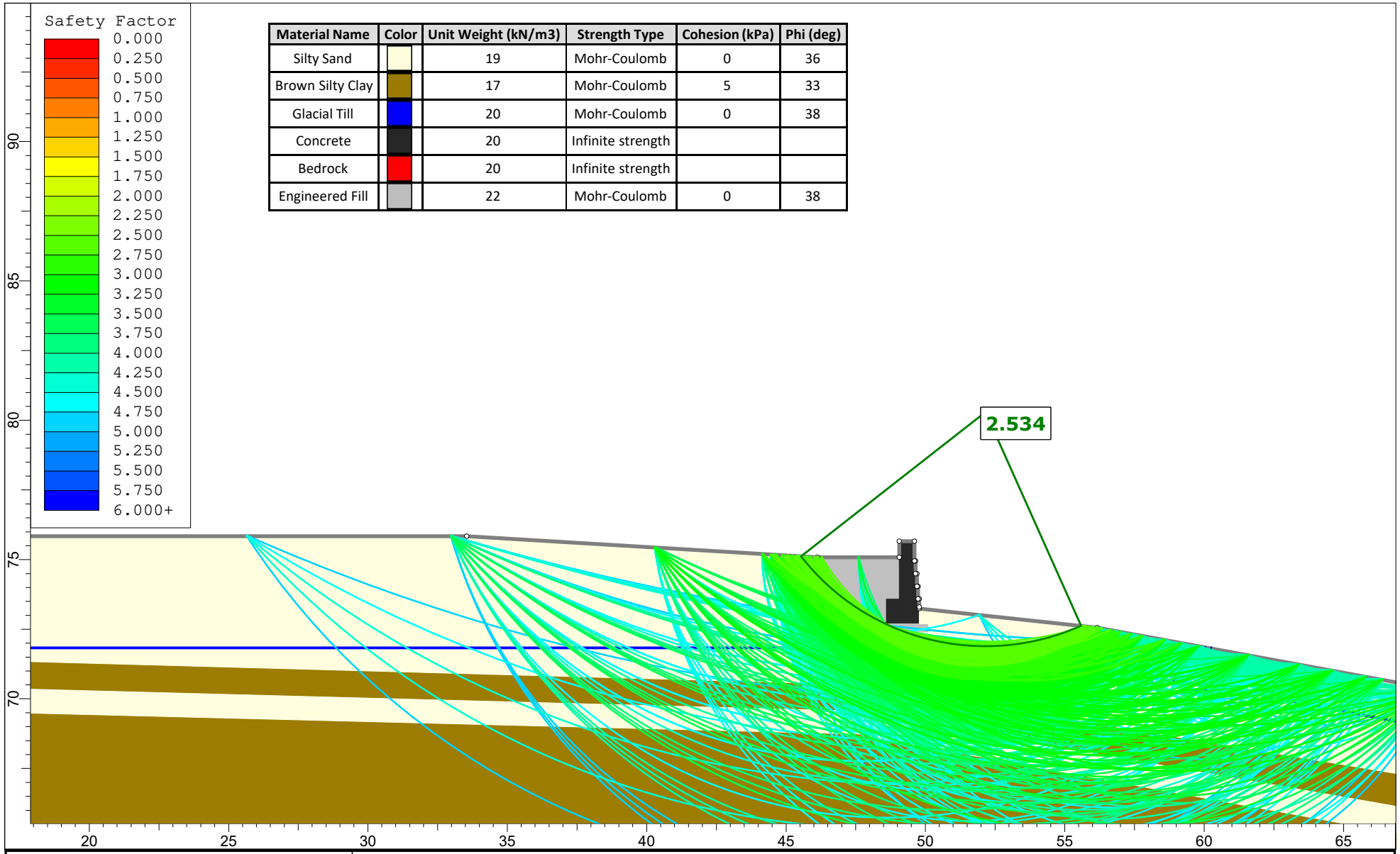
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 14 - Seismic Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |

| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 |
| Brown Silty Clay | | 17 | Mohr-Coulomb | 5 | 33 |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |

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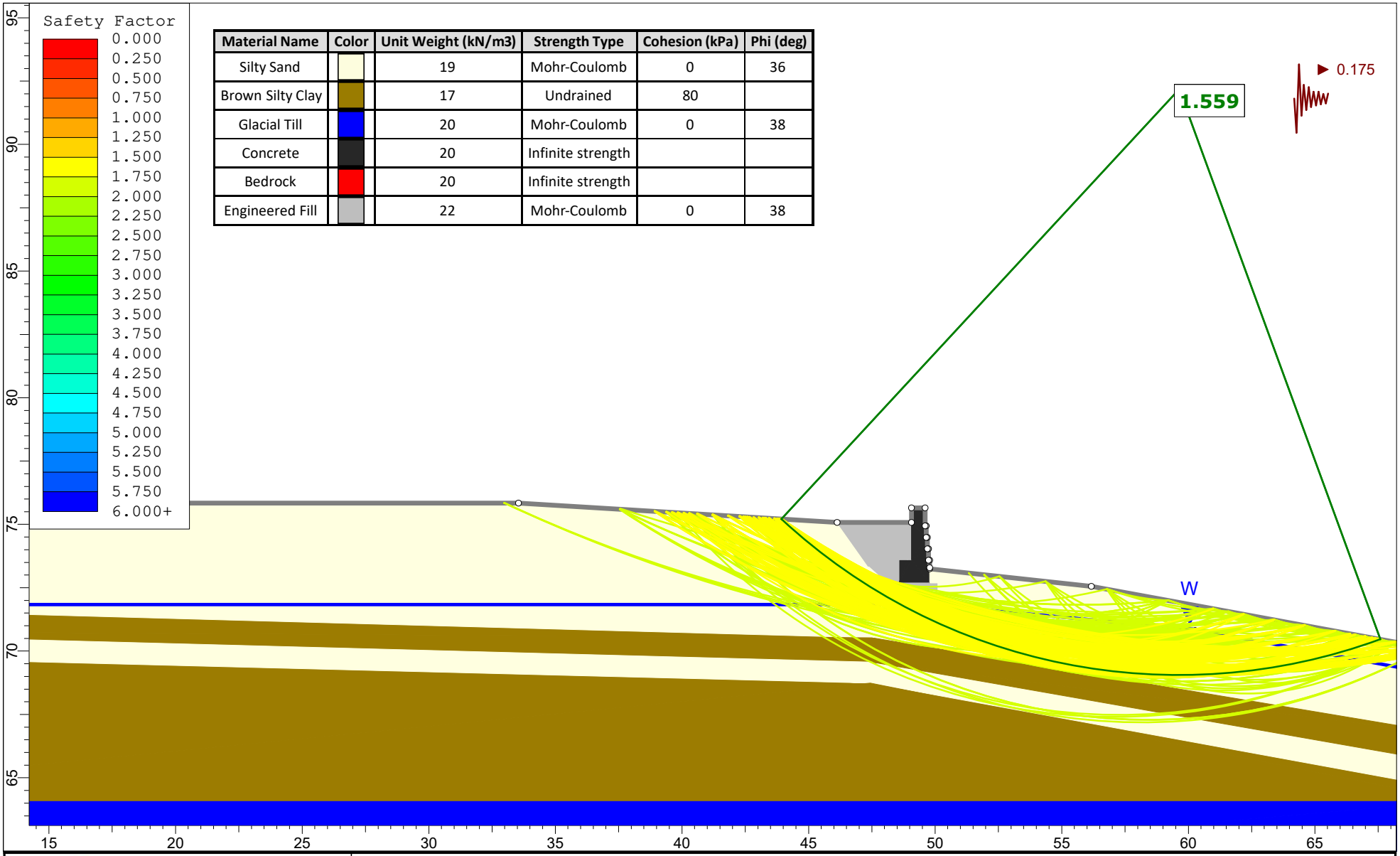
| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Wall 15 - Static Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 |
| Brown Silty Clay | | 17 | Undrained | 80 | |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Bedrock | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |

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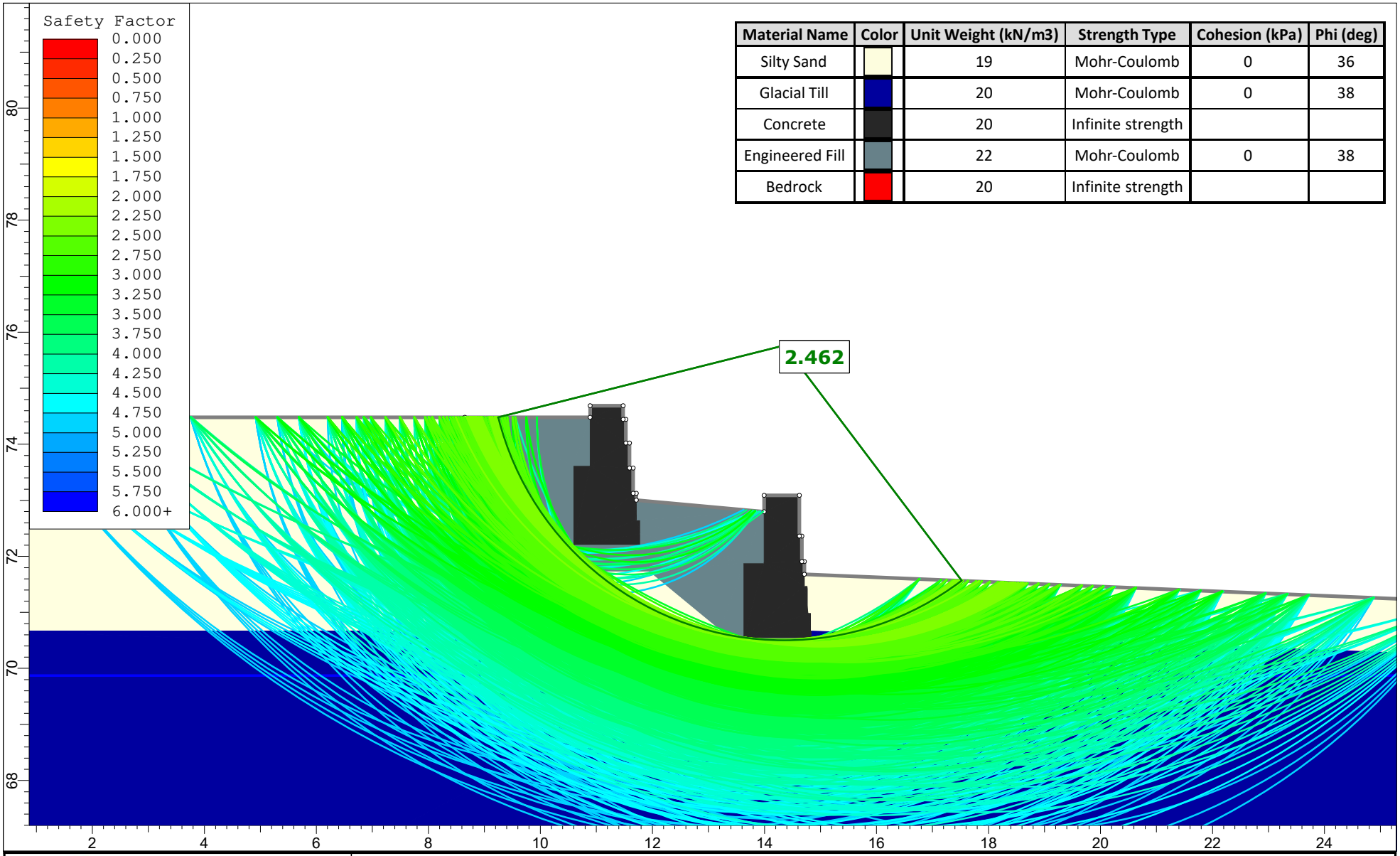
| | | | |
|---|---|---|---|
| ***Project*** | **NCD - New Civic Hospital Campus Development** | | |
| ***Figure No.*** | **Retaining Wall 15 - Seismic Conditions** | | |
| ***Drawn By*** | Pratheep Thirumoolan | ***Comany*** | Paterson Group |
| ***Date*** | 01/2026 | ***File Name*** | New Civic - Retaining Wall Global Stability Analysis |

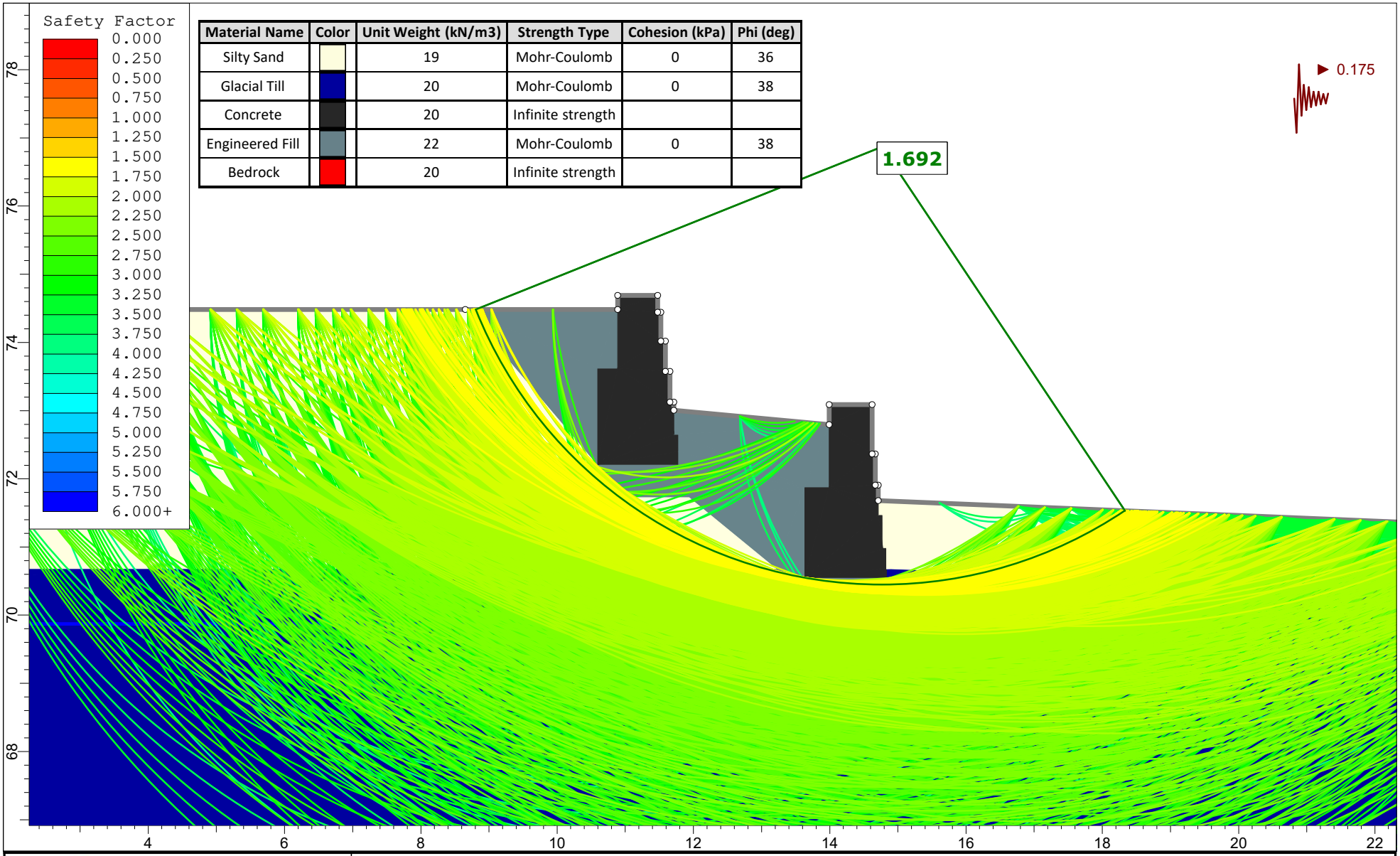



| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |
| Bedrock | | 20 | Infinite strength | | |

PATERSON GROUP

SLIDEINTERPRET 9.025

| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Walls 18A and 18B - Static Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




| Material Name | Color | Unit Weight (kN/m3) | Strength Type | Cohesion (kPa) | Phi (deg) |
|---|---|---|---|---|---|
| Silty Sand | | 19 | Mohr-Coulomb | 0 | 36 |
| Glacial Till | | 20 | Mohr-Coulomb | 0 | 38 |
| Concrete | | 20 | Infinite strength | | |
| Engineered Fill | | 22 | Mohr-Coulomb | 0 | 38 |
| Bedrock | | 20 | Infinite strength | | |

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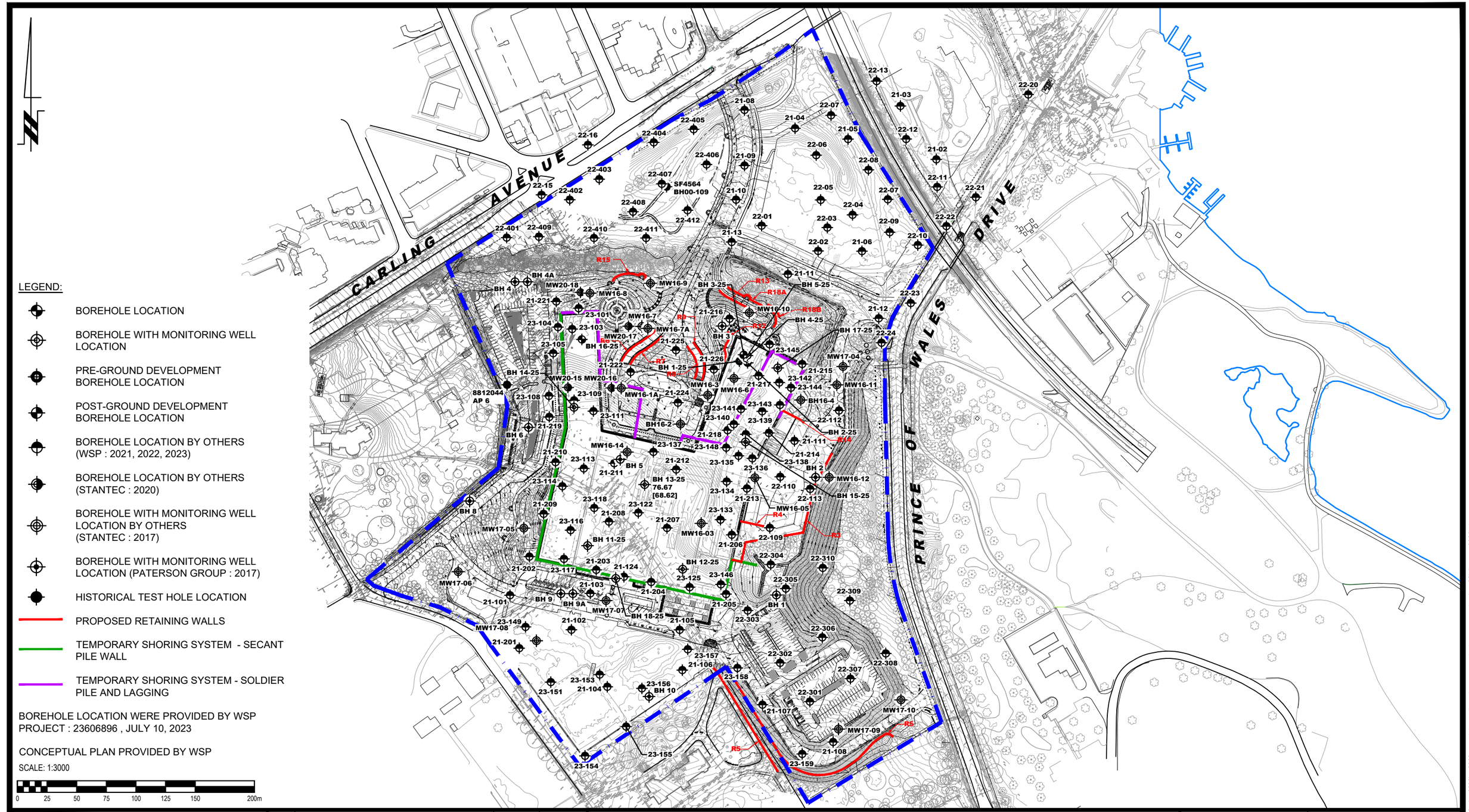
SLIDEINTERPRET 9.025

| | | | |
|---|---|---|---|
| *Project* | **NCD - New Civic Hospital Campus Development** | | |
| *Figure No.* | **Retaining Walls 18A and 18B - Seismic Conditions** | | |
| *Drawn By* | Pratheep Thirumoolan | *Comany* | Paterson Group |
| *Date* | 01/2026 | *File Name* | New Civic - Retaining Wall Global Stability Analysis |




LEGEND:

- BOREHOLE LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- PRE-GROUND DEVELOPMENT BOREHOLE LOCATION
- POST-GROUND DEVELOPMENT BOREHOLE LOCATION
- BOREHOLE LOCATION BY OTHERS (WSP : 2021, 2022, 2023)
- BOREHOLE LOCATION BY OTHERS (STANTEC : 2020)
- BOREHOLE WITH MONITORING WELL LOCATION BY OTHERS (STANTEC : 2017)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP : 2017)
- HISTORICAL TEST HOLE LOCATION
- PROPOSED RETAINING WALLS
- TEMPORARY SHORING SYSTEM - SECANT PILE WALL
- TEMPORARY SHORING SYSTEM - SOLDIER PILE AND LAGGING

BOREHOLE LOCATION WERE PROVIDED BY WSP
PROJECT : 23606896 , JULY 10, 2023

CONCEPTUAL PLAN PROVIDED BY WSP

SCALE: 1:3000

0 25 50 75 100 125 150 200m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

| NO. | REVISIONS | DATE | INITIAL |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 2 | UPDATED CONCEPTUAL PLAN | 29/10/2025 | PT |
| 1 | ADDED 2025 BH 11-25 TO BH 18-25 BOREHOLE LOCATION | 02/09/2025 | JV |

PCL - ED
GEOTECHNICAL INVESTIGATION
THE OTTAWA HOSPITAL - CIVIC CAMPUS REDEVELOPMENT PROJECT
900 CARLING AVENUE
OTTAWA, ONTARIO

Title:
# RETAINING WALLS AND TEMPORARY SHORING SYSTEM PLAN

| | |
|---|---|
| Scale: 1:3000 | Date: 05/2025 |
| Drawn by: ZS | Report No.: PG6982-1 |
| Checked by: PT | Dwg. No.: PG6982-5 |
| Approved by: JV | Revision No.: 2 |

11x17

p:\autocad drawings\geotechnical\pg69xx\pg6982\pg6982-5-retaining walls and temporary shoring systems plan (rev.02) (january 2026).dwg