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# Area B Slope Stability and Protection Geotechnical Data Report

University Endowment Lands

Project number: 60530081 (403.5)

April 2019

## Quality information

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April 5, 2019

## Revision History

| Revision | Revision date | Details | Authorized | Name | Position |
|---|---|---|---|---|---|
| A | October 2018 | Preliminary Draft for Review | Yes | Graham MacKenzie Walker | Project Manager |
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# Appendices

# 1. Introduction

AECOM Canada Ltd. (AECOM) was retained by the University Endowment Lands (UEL) to conduct geotechnical and hydrogeological investigations and analysis to support slope protection and stabilization studies in 'Area B' within UEL property. 'Area B' is generally defined as the single family residential neighborhood within the UEL bounded to the south by Chancellor Boulevard and on the north by NW Marine Drive.

As a part of the investigation, a geotechnical field investigation was carried out by AECOM and Golder Associate Ltd. (Golder). The objective of the geotechnical field investigation was to determine the subsurface and groundwater conditions within the 'Area B'. This report presents the factual results of the geotechnical field investigation and laboratory testing carried out by AECOM.

The report does not include assessment of potential soil and groundwater contamination nor possible bio-environmental considerations.

# 2. Site Description and Geology

The UEL is located north of University of British Columbia (UBC) Vancouver Campus, as shown in Figure 1. The site is bounded by Northwest (NW) Marine Drive to the west, Chancellor Boulevard to the south and Salish Creek to the east. Metro Vancouver Pacific Spirit Park lies along the north and northwest of the site beyond the extents of the roadways which includes a cliff and the foreshore.

The site is a developed single-family residential area. The existing ground elevation varies from approximately 45 m to 80 m above mean sea level (m ASL) within the UEL property. The existing site topography in general is gentle slope down towards the NW Marine Drive and Salish Creek. The slopes become more sever beyond the UEL property boundary and erosion has been observed north of the site by the sea cliff.

Surficial geology mapping (GSC Map 1486, Armstrong, J.E. and Hicock, S.R., 1976) indicates that the UEL property is underlain by Vashon Drift glacial deposits and Capilano sediments including "lodgement and minor flow till, lenses and interbeds of sub-stratified glaciofluvial sand to gravel, and lenses and interbeds of glaciolacustrine laminated stony silt, up to 25 m thick.

Below the Vashon Drift (till-like soil) is a thick sequence of older glaciofluvial Quaternary deposits known as the Quadra Sand that comprise fluvial channel fill and flood plain deposits of cross-bedded sands containing minor silt and gravel lenses and interbeds. This unit is exposed in the sea cliffs within the Point Grey Peninsula. The upper thick portion of the exposed Quadra Sand (Upper Sand unit – Q1) comprises horizontally stratified, cross-bedded fine to coarse sand and gravelly sand. The lower portion of the Quadra Sand unit consists of interbedded fine sand and laminated silt and clayey silt (Silt unit - Q2). The Silt unit overlies another sand unit (Lower Sand unit – Q1), which typically extends from about sea level at the cliff to about 20 m below the sea level. The Silt unit – Q2 has a lower permeability than Upper and Lower Sand unit – Q1.

# 3. Geotechnical Field Investigation

## 3.1 Overview

The geotechnical field investigation was performed partly by AECOM and partly by Golder in order to optimize resources with ongoing assessments occurring concurrently. AECOM conducted a geotechnical drilling program between August 13 and 20, 2018. Golder carried out drilling program between August 21 and 23, 2018. The approximate locations of all testholes are shown in Figures 2 and 3. Drilling of testholes SH18-03 to SH18-07, inclusive, was completed by AECOM. Testholes SH18-01 and SH18-02 were drilled by Golder but AECOM personnel were present at the time of drilling as a 'shadow observer'.

Drilling operations were executed in accordance with AECOM's drilling Standard Operating Procedures (SOP). A Job Safety Analysis (JSA) was completed to identify all hazards during drilling operations. Prior to drilling work, BC-1-Call was contacted and a private utility locator was retained to locate the underground utilities near the proposed testhole locations. All the testholes were hydro-vacuumed to approximately 2.1 m to 2.7 m below existing ground surface (m BGS) to avoid any undetected utilities prior to drilling. Prior to drill rig mobilization, the UEL, AECOM and a representative from Omega Environmental Drilling Ltd. (Omega) met on-site to review testhole locations and drill rig access. OneStop Traffic Control was retained to prepare traffic management plans and to provide traffic control at site during drilling program.

## 3.2 Sonic Drilling

A total of five (5) testholes were drilled by AECOM as a part of the geotechnical field investigation using sonic method (i.e. soil coring technique). Testholes were advanced using a rubber tracked vibratory sonic drill rig LS600, owned by Omega Environmental Drilling Ltd. Testholes were advanced to depths varying from approximately 50.6 m to 71.9 m BGS, and were terminated at the target depth.

Sonic drilling utilizes a dual-cased single tube core barrel system that employs high frequency mechanical vibration to obtain continuous core samples of the soils. The drilling technique involves vibrating the entire drill string at a frequency rate between 50 and 150 cycles per second, adjusted during drilling operation to suit the ground conditions encountered. The technique employs low speed rotational motion, coupled with downward pressure, to advance the drill string. Testhole advancement is achieved through the process of fracturing, shearing, and displacement depending on the type and consistency of the material encountered.

The soil entered the core barrel providing 114 mm diameter continuous core samples. Upon completion of each drill run, the outer steel casing (152 mm diameter) was advanced to the end of the run, the core barrel and drill rods were removed, and the continuous sonic core sample was vibrated out of the core barrel directly into a plastic sample bag before being transported into wooden core boxes. The core recovered from each testhole were labelled, logged in the field, and taken to the UEL work yard for storage, where the cores were further examined and photographed.

As a result of high frequency, sonic core sample length size shrinkage/ reduction or expansion was noted in some of the runs during sonic core extrusion. Sonic vibration from the drilling method does cause some disturbance of the soil structure, and can destroy secondary structure features within the soil strata of the continuous core samples that are retrieved. Both the core barrel and casing shoes have water jets to allow for cooling and lubrication of the bit, and to flush cuttings out of the testhole. Advancement of the drill string was typically carried out without addition of fluid to prevent additional disturbance and washing of the soils. Advancement of the casing was carried out behind the drill string with the assistance of water.

Standard Penetration Tests (SPTs) were conducted at selected depths to obtain relative penetration resistance of soils with depth in accordance with the SPT method ASTM D 1586. Split spoon sampler (50 mm outside diameter) without liner inside was used in the SPT. The sampler was 0.6 m long to collect more soil sample. Automatic hydraulic hammer (hammer energy efficiency of 67% - calibration results provided by Omega) was used in SPTs.

Upon completion of drilling, two nested standpipe piezometers were installed at selected depths in each testhole to monitor groundwater levels and/or perform field hydraulic conductivity tests. The standpipe is comprised of a solid 50 mm (2 inch) PVC pipe with a 3.05 m long slotted PVC screen at the bottom. A typical installation consists of installing deep standpipe to the target depth or backfilling the lower portion of the testhole with enviro-grout/coated bentonite chips, then lowering the standpipe to the target depth. Filter sand was placed to approximately 0.5 m above the top of the deep standpipe screened section. Bentonite chips and/or coated bentonite pellets were used above the sand to seal the upper section of the testhole prior to installing the shallow standpipe. Shallow standpipe was installed at target depth, then filter sand was placed to approximately 0.5 m above the top of the shallow standpipe screened section. Bentonite chips and/or coated bentonite pellets were used above the sand to seal the remaining upper section of the testhole to approximately 1.2 m BGS. Sand followed by approximately 0.1 m thick concrete was used to complete backfill the testhole. Testholes were backfilled and sealed in overall conformance with the BC Ministry of Environment Groundwater Protection Regulation pertaining to geotechnical testholes and monitoring wells.

The field work was carried out under full-time inspection of a member of AECOM geotechnical staff who visually examined and logged the subsoil and groundwater conditions encountered. Disturbed soil samples were collected from the split spoon samplers and sonic cores. These samples were collected for further examination, and laboratory testing. Where observed, water levels in testholes were noted; however, it should be recognized that these short-term observations may not reflect the long-term stabilized water levels across the site.

Testhole logs are included in Appendix A of this report. Classification of the soil conditions is in accordance with the Modified Unified Soil Classification System (MUSCS). A copy of the classification legend is attached in Appendix A, including AECOM's general statement: normal variability of subsurface conditions. Sonic core photographs are attached in Appendix B.

A summary of the field investigation program is presented in Table 3-1. Testhole locations and elevations of existing ground surface were surveyed on September 27, 2018.

**Table 3-1:** 1 **Field Investigation Program Summary**

| Testhole # | Location | UTM Coordinates NAD83 | | Ground Elevation (m ASL) | Testhole Depth (m BGS) | Standpipe Piezometer Depth (m BGS) | | Drilling Date(s) |
|---|---|---|---|---|---|---|---|---|
| | | Northing (m) | Easting (m) | | | Shallow (S) | Deep (D) | |
| SH18-03 | NW Marine Drive at Newton Wynd | 5457819.98 | 481513.19 | 67.42 | 68.9 | 47.1 | 68.9 | 8/16/2018 |
| SH18-04 | NW Marine Drive at Acadia Road | 5458242.82 | 481860.59 | 46.51 | 50.6 | 23.2 | 50.6 | 8/15/2018 |
| SH18-05 | Acadia Road at Newton Way | 5458261.48 | 482170.02 | 46.40 | 53.6 | 23.5 | 53.6 | 8/14/2018 |
| SH18-06 | Acadia Road | 5458176.28 | 482277.25 | 58.60 | 67.4 | 35.4 | 67.4 | 8/13/2018 |
| SH18-07 | UEL Works Yard | 5457962.31 | 482559.01 | 72.17 | 71.9 | 49.5 | 71.9 | 8/17&20/2018 |

*Notes:*
*Drilling depth is relative depth below the existing ground surface at the time of investigation.*
*The ground elevation is Geodetic Elevation.*

## 3.3 Groundwater Level Monitoring

Groundwater level monitoring activities were conducted by AECOM on October 19, 2018. Groundwater measurements were collected using a water level meter. Monitoring results are presented in Table 3-2. In addition to collecting water level measurements, pressure transducers capable of monitoring water levels and temperature were installed in SH18-03S, SH18-04S, SH18-05S, SH18-05D, SH18-06S, SH18-07S and SH18-07D. The pressure transducers were manufactured by Solinst Canada Ltd. They are capable of measuring water levels up to 20 m above the instrument (i.e., M20 model). A pressure transducer was also installed above the water table at SH18-07D to monitor barometric pressure. All dataloggers were programmed to start recording water levels at an hourly frequency beginning on October 21, 2018.

**Table 3-2: Groundwater Level Measurement Summary**

| Testhole # | Standpipe Piezometer # | Response Zone (m BGS) | Soil at Response Zone | Measured Groundwater Level on 10/19/2018 (m BGS) | Testhole Ground Elevation (m ASL) |
|---|---|---|---|---|---|
| SH18-03 | SH18-03S | 44.0 – 47.1 | Upper Sand unit – Q1 | 42.7 | 67.42 |
| | SH18-03D | 65.8 – 68.9 | Lower Sand unit – Q1 | 63.9 | |
| SH18-04 | SH18-04S | 20.1 – 23.2 | Upper Sand unit – Q1 | 22.2 | 46.51 |
| | SH18-04D | 47.5 – 50.6 | Lower Sand unit – Q1 | 44.3 | |
| SH18-05 | SH18-05S | 20.4 – 23.5 | Upper Sand unit – Q1 | 20.6 | 46.40 |
| | SH18-05D | 50.5 – 53.6 | Lower Sand unit – Q1 | 43.3 | |
| SH18-06 | SH18-06S | 32.3 – 35.4 | Upper Sand unit – Q1 | 32.1 | 58.60 |
| | SH18-06D | 64.3 – 67.4 | Lower Sand unit – Q1 | 55.0 | |
| SH18-07 | SH18-07S | 46.4 – 49.5 | Upper Sand unit – Q1 | 48.0 | 72.17 |
| | SH18-07D | 68.8 – 71.9 | Lower Sand unit – Q1 | 63.1 | |

# 4. Laboratory Testing

AECOM retained Golder to provide geotechnical laboratory testing services. Selected soil samples collected during the site investigation were tested in Golder material testing laboratory in Burnaby, BC for soil classification and to assess their engineering characteristics. The laboratory tests included the moisture content determination, plasticity (Atterberg limits) determination, and sieve and hydrometer grain size distribution analyses.

Results of laboratory tests from index testing (water content, Atterberg limit and grain size distribution) are summarized on the testhole logs in Appendix A. The laboratory test results are included in Appendix C.

# 5. Closure

We trust that the information presented in this factual Geotechnical Data Report meets your present requirements. Should you have any questions or concerns regarding the information presented, please do not hesitate to contact us.

# Figures


**PLAN**

0 50 100 m



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**PROJECT**

AREA B - SLOPE STABILITY AND PROTECTION

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UNIVERSITY ENDOWMENT LANDS
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NW MARINE DRIVE
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KEY PLAN

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1 OF 3

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N

TESTHOLE LOCATIONS

| | |
|---|---|
| *SH18-01 | N: 5458056.73<br>E: 481668.21 |
| *SH18-02 | N: 5458031.44<br>E: 481717.31 |
| SH18-03 | N: 5457819.98<br>E: 481513.19 |
| SH18-04 | N: 5458242.82<br>E: 481860.59 |
| SH18-05 | N: 5458261.48<br>E: 482170.02 |
| SH18-06 | N: 5458176.28<br>E: 482277.25 |
| SH18-07 | N: 5457962.31<br>E: 482559.01 |

* TESTHOLES COMPLETED BY GOLDER ASSOCIATES.

NOTE:
LOCATIONS OF SANITARY AND STORM INSPECTION CHAMBERS TO BE CONFIRMED IN FIELD BY CONTRACT ADMINISTRATOR. (TYPICAL)

**PLAN**

0 25 50 m

1:1000



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NW MARINE DRIVE
CLIFF EROSION
TESTHOLE LOCATION PLAN

**SHEET NUMBER**

2 OF 3

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## PLAN

0 25 50 m

1:1000

TESTHOLE LOCATIONS

| | |
|---|---|
| *SH18-01 | N: 5458056.73<br>E: 481668.21 |
| *SH18-02 | N: 5458031.44<br>E: 481717.31 |
| SH18-03 | N: 5457819.98<br>E: 481513.19 |
| SH18-04 | N: 5458242.82<br>E: 481860.59 |
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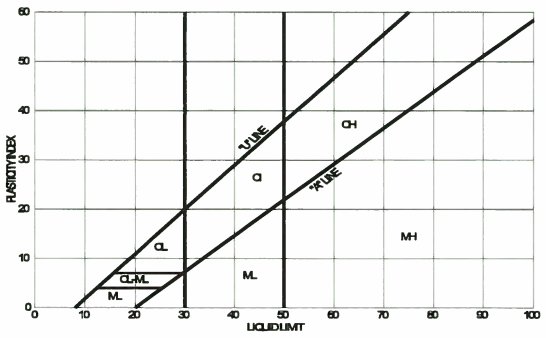
NW MARINE DRIVE
CLIFF EROSION
TESTHOLE LOCATION PLAN

**SHEET NUMBER**

3 OF 3

# Appendix A: Record of Testhole Logs

| MAJOR DIVISION | | | LOG SYMBOLS | MUCS | TYPICAL DESCRIPTION | LABORATORY CLASSIFICATION CRITERIA | |
|---|---|---|---|---|---|---|---|
| COARSE GRAINED | GRAVELS (MORE THAN HALF COARSE GRAINS LARGER THAN 4.75 mm) | CLEAN GRAVELS (LITTLE OR NO FINES) | | GW | WELL GRADED GRAVELS, LITTLE OR NO FINES | $C_U = \frac{D_{60}}{D_{10}} > 4$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$ | |
| | | | | GP | POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES | NOT MEETING ABOVE REQUIREMENTS | |
| | | DIRTY GRAVELS (WITH SOME FINES) | | GM | SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES | CONTENT OF FINES EXCEEDS 12% | ATTERBERG LIMITS BELOW 'A' LINE $W_P$ LESS THAN 4 |
| | | | | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES | | ATTERBERG LIMITS ABOVE 'A' LINE $W_P$ MORE THAN 7 |
| | SANDS (MORE THAN HALF COARSE GRAINS SMALLER THAN 4.75 mm) | CLEAN SANDS (LITTLE OR NO FINES) | | SW | WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES | $C_U = \frac{D_{60}}{D_{10}} > 6$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$ | |
| | | | | SP | POORLY GRADED SANDS, LITTLE OR NO FINES | NOT MEETING ABOVE REQUIREMENTS | |
| | | DIRTY SANDS (WITH SOME FINES) | | SM | SILTY SANDS, SAND-SILT MIXTURES | CONTENT OF FINES EXCEEDS 12% | ATTERBERG LIMITS BELOW 'A' LINE $W_P$ LESS THAN 4 |
| | | | | SC | CLAYEY SANDS, SAND-CLAY MIXTURES | | ATTERBERG LIMITS ABOVE 'A' LINE $W_P$ MORE THAN 7 |
| FINE GRAINED SOILS | SILTS (BELOW 'A' LINE NEGLIGIBLE ORGANIC CONTENT) | $W_L < 50$ | | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY | CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW) | |
| | | $W_L > 50$ | | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS | | |
| | CLAYS (ABOVE 'A' LINE NEGLIGIBLE ORGANIC CONTENT) | $W_L < 30$ | | CL | INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS | | |
| | | $30 < W_L < 50$ | | CI | INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS | | |
| | | $W_L > 50$ | | CH | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS | | |
| | ORGANIC SILTS & CLAYS (BELOW 'A' LINE) | $W_L < 50$ | | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY | | |
| | | $W_L > 50$ | | OH | ORGANIC CLAYS OF HIGH PLASTICITY | WHENEVER THE NATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER 'F'. E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY | |
| HIGHLY ORGANIC SOILS | | | | Pt | PEAT AND OTHER HIGHLY ORGANIC SOILS | STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE | |
| BEDROCK | | | | BR | SEE REPORT DESCRIPTION | | |




**SOIL COMPONENTS**

| FRACTION | | SIEVE SIZE (mm) PASSING | SIEVE SIZE (mm) RETAINED | DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS PERCENT | IDENTIFIER |
|---|---|---|---|---|---|
| GRAVEL | COARSE | 75 | 19 | 50 - 35 | AND |
| | FINE | 19 | 4.75 | 35 - 20 | ___Y |
| SAND | COARSE | 4.75 | 2.00 | 20 - 10 | SOME |
| | MEDIUM | 2.00 | 0.425 | 10 - 1 | TRACE |
| | FINE | 0.425 | 0.080 | | |
| SILT (non plastic) or CLAY (plastic) | | 0.080 | | | |

**OVERSIZE MATERIALS**

| ROUNDED OR SUBROUNDED | ANGULAR |
|---|---|
| COBBLES 75 mm to 200 mm<br>BOULDERS > 200 mm | ROCK FRAGMENTS > 75 mm<br>ROCKS > 0.75 $m^3$ IN VOLUME |

NOTE:
1. BOUNDARY CLASSIFICATION POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL MIXTURE WITH CLAY BINDER BETWEEN 5% AND 12%

# MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

JUNE, 1995

# 1. Explanation of Field and Laboratory Test Data

The field and laboratory test results, as shown on the logs, are briefly described below.

## 1.1 Natural Moisture Content and Atterberg Limits

The relationship between the natural moisture content and depth is significant in determining the subsurface moisture conditions. The Atterberg Limits for a sample should be compared to the natural moisture content and should be on the Plasticity Chart in order to determine their classification.

## 1.2 Soil Profile and Description

Each soil stratum is classified and described noting any special conditions. The Modified Unified Soils Classification System (MUSCS) is used. The soil profile refers to the existing ground level. When available, the existing ground elevation is shown. The soil symbols used are shown in detail on the soil classification chart.

## 1.3 Tests on Soil Samples

Laboratory and field tests on the logs are identified by the following:

**N** (Standard Penetration Test (SPT) Blow Count) - The SPT is conducted in the field to assess the in situ consistency of cohesive soils and the relative density of non-cohesive soils. The N value recorded is the number of blows from a 63.5 kg hammer dropped 760 mm which is required to drive a 51 mm split spoon sampler 300 mm into the soil.

**$SO_4$** (Water Soluble Sulphate Content) - Conducted primarily to determine requirements for the use of sulphate resistant cement. Further details on the water soluble sulphate content are given in Section 1.6.

**$\gamma_D$** (Dry Unit Weight) kN/m$^3$ and $\gamma_T$ (Total Unit Weight) kN/m$^3$.

**$Q_U$** (Unconfined Compressive Strength) kPa - May be used in determining allowable bearing capacity of the soil.

**$C_U$** (Undrained Shear Strength) kPa - This value is determined by an unconfined compression test and may also be used in determining the allowable bearing capacity of the soil.

**$C_{PEN}$** (Pocket Penetrometer Reading) kPa - Estimate of the undrained shear strength as determined by a pocket penetrometer.

The following tests may also be performed on selected soil samples and the results are given on the borehole logs: Grain Size Analysis; Standard or Modified Proctor Compaction Test; California Bearing Ratio; Unconfined Compression Test; Permeability Test; Consolidation Test; Triaxial Test

## 1.4 Soil Density and Consistency

The SPT test described above may be used to estimate the consistency of cohesive soils and the density of cohesionless soils. These approximate relationships are summarized in the following tables:

**Table 1.1**
**Cohesive Soils**

| N | Consistency | $C_U$ (kPa) (approx.) |
|---|---|---|
| 0 - 1 | Very Soft | <10 |
| 1 - 4 | Soft | 10 - 25 |
| 4 - 8 | Firm | 25 - 50 |
| 8 - 15 | Stiff | 50 - 100 |
| 15 - 30 | Very Stiff | 100 - 200 |
| 30 - 60 | Hard | 200 - 300 |
| >60 | Very Hard | >300 |

**Table 1.2**
**Cohesionless Soils**

| N | Density |
|---|---|
| 0 - 5 | Very Loose |
| 5 - 10 | Loose |
| 10 - 30 | Compact |
| 30 - 50 | Dense |
| >50 | Very Dense |

## 1.5 Sample Condition and Type

The depth, type, and condition of samples are indicated on the borehole logs by the following symbols:

## 1.6 Water Soluble Sulphate Concentration

The following table from CSA Standard A23.1-94 indicates the requirements for concrete subjected to sulphate attack based upon the percentage of water soluble sulphate as presented on the borehole logs. CSA Standard A23.1-94 should be read in conjunction with the table.

**Table 1.3**
**Requirements for Concrete Subjected to Sulphate Attack**

| Class of Exposure | Degree of Exposure | Water-Soluble Sulphate ($SO_4$) in Soil Sample % | Sulphate ($SO_4$) in Groundwater Samples mg/L | Minimum Specified 28 d Compressive Strength MPa† | Maximum Water/ Cementing Materials Ratio† | Portland Cement to be Used‡ |
|---|---|---|---|---|---|---|
| S-1 | Very severe | over 2.0 | over 10,000 | 35 | 0.40 | 50 |
| S-2 | Severe | 0.20 - 2.0 | 1,500 - 10,000 | 32 | 0.45 | 50 |
| S-3 | Moderate | 0.10 - 0.20 | 150 - 1,500 | 30 | 0.50 | 20§,40, or 50 |

* For sea water exposure see Clause 15.4
† See Clause 15.1.4
‡ See Clause 15.1.5
§ Type 20 cement with moderate sulphate resistance (see Clause 3.1.2)

## 1.7 Groundwater Table

The groundwater table is indicated by the equilibrium level of standing water in a standpipe installed in a borehole. This level is generally taken at least 24 hours after installation of the standpipe. The groundwater level is subject to seasonal variations and its highest level usually occurs in spring. The symbol on the borehole logs indicating the groundwater level is an inverted solid triangle (▼).

**AECOM Canada Ltd.**

**General Statement; Normal Variability Of Subsurface Conditions**

The scope of the investigation presented herein is limited to an investigation of the subsurface conditions as to suitability of the site for the proposed project. This report has been prepared to aid in the general evaluation of the site and to assist the design engineer in the conceptual design for the area. The description of the project presented in this report represents the understanding by the geotechnical engineer of the significant aspects of the project relevant to the design and construction of the subdivision, infrastructure and similar. In the event of any changes in the basic design or location of the structures, as outlined in this report or plan, AECOM should be given the opportunity to review the changes and to modify or reaffirm in writing the conclusions and recommendations of this report.

The analysis and recommendations represented in this report are based on the data obtained from the test holes drilled at the locations indicated on the site plans and from other information discussed herein. This report is based on the assumption that the subsurface conditions everywhere on the site are not significantly different from those encountered at the test locations. However, variations in soil conditions may exist between the test holes and, also, general groundwater levels and condition may fluctuate from time to time. The nature and extent of the variations may not become evident until construction. If subsurface conditions, different from those encountered in the test holes are observed or encountered during construction or appear to be present beneath or beyond the excavation, AECOM should be advised at once so that the conditions can be observed and reviewed and the recommendations reconsidered where necessary.

Since it is possible for conditions to vary from those identified at the test locations and from those assumed in the analysis and preparation of recommendations, a contingency fund should be included in the construction budget to allow for the possibility of variations which may result in modifications of the design and construction procedures.

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS / Total Unit Wt / Plastic MC Liquid | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FILL | | | | SILT, some sand, contains grass roots, moist, dark brown (TOPSOIL) | | | | | | |
| | FILL | | | | SAND coarse to fine, some gravel to gravelly, trace silt, compact, moist, reddish brown (FILL) | | | | | | 67 |
| 1 | | | | | SAND fine to medium, trace silt, trace gravel, compact, moist, grey | | 1 | | | | |
| | | | | | | | 2 | | | | 66 |
| 2 | SP | | | | | | | | | | |
| | | | | | | | 3 | | | | 65 |
| 3 | | | | | | | 4 | 16 | ◆ | Gravel = 2.1%, Sand = 89.9%, Fines content = 8% | |
| 4 | | | | | SAND fine to medium, trace silt, trace gravel, dense, moist, grey | | | | | | 64 |
| | | | | | | | | | | | 63 |
| 5 | | | | | | | 5 | 41 | ◆ | | |
| | | | | | | | | | | | 62 |
| 6 | | | | | | | | | | | |
| | SP | | | | | | | | | | 61 |
| 7 | | | | | | | | | | | |
| | | | | | | | | | | | 60 |
| 8 | | | | | | | 6 | 40 | ◆ | Gravel = 0.4%, Sand = 90.4%, Fines content = 9.2% | |
| | | | | | | | | | | | 59 |
| 9 | | | | | | | 7 | | | | |
| | | | | | | | | | | | 58 |
| | SP | | | | SAND fine to medium, trace to some silt, trace gravel, dense to very dense, dry to moist, grey | | | | | | |
| 10 | | | | | | | | | | | |

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100

■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21

Plastic MC Liquid 20 40 60 80 100

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 1 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | | | | | | | | | | 57 |
| 11 | | | | | | | 8 | 63 | ◆ | Gravel = 0%, Sand = 88.8%, Fines content = 11.2% | 56 |
| 12 | | | | | | | | | | | 55 |
| 13 | | | | | | | | | | | 54 |
| 14 | | | | | - brown-grey from 14 to 15.2 m BGS | | | | | | 53 |
| 15 | SP | | | | | | 9 | | | | 52 |
| 16 | | | | | | | | | | | 51 |
| 17 | | | | | | | | | | | 50 |
| 18 | | | | | | | | | | | 49 |
| 19 | | | | | | | | | | | 48 |
| 20 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 2 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | | | 47 |
| | | | | | | | 10 | | | Gravel = 1.1%, Sand = 91.6%, Fines content = 7.3% | |
| 21 | | | | | | | | | | | 46 |
| 22 | | | | | | | | | | | 45 |
| 23 | | | | | - yellowish colour from 23.2 to 23.8 m BGS | | | | | | 44 |
| 24 | | | | | | | | | | | 43 |
| 25 | SP | | | | | | 11 | | | | 42 |
| 26 | | | | | | | | | | | 41 |
| 27 | | | | | | | | | | | 40 |
| 28 | | | | | | | | | | | 39 |
| 29 | | | | | | | 12 | | | | 38 |
| 30 | | | | | | | | | | | |

AECOM

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|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 3 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | | | | 37 |
| 31 | | | | | - interbedded silty SAND and SILT from 32 to 33.8 m BGS | | | | | | 36 |
| 32 | | | | | | | | | | | 35 |
| 33 | | | | | | | 13 | | | Gravel = 0.7%, Sand = 90.1%, Fines content = 9.2% | 34 |
| 34 | | | | | | | | | | | 33 |
| 35 | SP | | | | | | | | | | 32 |
| 36 | | | | | | | | | | | 31 |
| 37 | | | | | | | 14 | | | | 30 |
| 38 | | | | | | | | | | | 29 |
| 39 | | | | | - dry from 38.4 to 41.5 m BGS | | | | | | 28 |
| 40 | | | | | | | | | | | |

AECOM

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|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 4 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|
| 40 | | | | | | | 27 |
| 41 | | | | | | | 26 |
| | | - interbedded silty SAND from 41.5 to 42.1 m BGS | | 15 | | | |
| 42 | | | | | | | 25 |
| 43 | | | | | | | 24 |
| 44 | SP | | | | | | 23 |
| 45 | | - SAND fine, some silt, trace clay below 45.1 m BGS | | 16 | | Gravel = 0%, Sand = 83.1%, Silt = 13.4%, Clay = 3.5% | 22 |
| 46 | | | | | | | 21 |
| 47 | | | | | | | |
| 48 | | | | | | | 20 |
| | | Clayey SILT, trace sand, low plastic, very stiff to hard, dry to moist, brown and grey | | | | | 19 |
| | | - Natural water content = 22.3%, Liquid limit = 27, Plastic limit = 19 | | 17 | | Gravel = 0%, Sand = 1.6%, Silt = 89.4%, Clay = 9% | |
| 49 | ML | | | | | | 18 |
| 50 | | - SAND fine, some silt, moist, light grey from 49.8 to 50.6 m BGS | | | | | |

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆
(Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■
($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

WELL INSTALLATION

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 5 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS / Total Unit Wt / Plastic MC Liquid | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | ML | | | | | | | | | | 17 |
| | | | | | SILT, trace sand, trace clay, low plastic, very stiff, moist, grey | | 18 | | | | |
| 51 | ML | | | | | | | | | | 16 |
| 52 | | | | | - Natural water content = 23.4%, Liquid limit = 22, Plastic limit = 19 | | 19 | | | Gravel = 0%, Sand = 8.7%, Silt = 85.1%, Clay = 6.2% | |
| | | | | | SAND fine, silty, trace clay, moist, grey | | | | | | 15 |
| 53 | SP | | | | | | | | | | |
| 54 | | | | | | | 20 | | | | 14 |
| | | | | | SAND fine, trace to some silt, trace gravel, dry to moist, grey | | | | | | |
| 55 | | | | | | | | | | | 13 |
| 56 | | | | | | | 21 | | | Gravel = 3%, Sand = 83.1%, Fines content = 13.9% | 12 |
| | | | | | - orange oxide staining at 56.5 m BGS | | | | | | 11 |
| 57 | SP | | | | | | | | | | |
| 58 | | | | | | | | | | | 10 |
| 59 | | | | | | | | | | | 9 |
| | | | | | | | 22 | | | | |
| 60 | | | | | - PULVERIZED SANDSTONE (?) very fine rock dust like, loose, dry, | | | | | | 8 |

AECOM

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|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 6 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | | | | | light grey, very hot to touch from 59.7 to 62.6 m BGS. Driller noted very hard to drill. | | | | | | 7 |
| 61 | | | | | | | | | | | 6 |
| 62 | | | | | | | 23 | | | | 5 |
| 63 | | | | | - moist to wet below 62.8 m<br>- yellowish colour from 62.8 to 64.2 m BGS | | | | | | 4 |
| 64 | SP | | | | | | | | | | 3 |
| 65 | | | | | | | 24 | | | | 2 |
| 66 | | | | | | | | | | | 1 |
| 67 | | | | | | | 25 | | | Gravel = 0%, Sand = 89%, Fines content = 11% | 0 |
| 68 | | | | | | | | | | | -1 |
| 69 | | | | | **END OF BOREHOLE AT 68.88 m BGS** | | | | | | -2 |
| 70 | | | | | Notes:<br>1. SPT hammer: Automatic Hydraulic<br>2. Soil description is primarily based on visual observation on site and/or laboratory test results.<br>3. Testhole hydrovacumed to a depth of 2.9 m BGS | | | | | | |

AECOM

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|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 7 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-03** |
| LOCATION: NW Marine Dr at Newton Wynd, UTM 10 U: 5457819.98 m N, 481513.19 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 67.42 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS / Total Unit Wt / Plastic MC Liquid | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 70 | | | | | 4. Testhole location was surveyed on September 27, 2018.<br>5. Two nested Standpipe Piezometers were installed as follows:<br><br>SH18-03S was installed at 47.1 m BGS, completion details are as follows:<br>- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' slotted screen length<br>- Concrete: 0 to 0.1 m BGS<br>- Sand: 0.1 to 1.2 m BGS<br>- Bentonite: 1.2 to 43.4 m BGS<br>- Sand: 43.4 to 47.1 m BGS<br>- Screen: 44.0 to 47.1 m BGS<br>- Depth to water: 42.7 m BGS measured on October 19, 2018<br><br>SH18-03D was installed at 68.9 m BGS, completeion details are as follows:<br>- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' Slotted Screen Length<br>- Concrete: 0 to 0.1 m BGS<br>- Sand: 0.1 to 1.2 m BGS<br>- Bentonite: 1.2 to 65.2 m BGS<br>- Sand: 65.2 to 68.9 m BGS<br>- Screen: 65.8 to 68.9 m BGS<br>- Depth to water: 63.9 m BGS measure on October 19, 2018 | | | | | | -3 |
| 71 | | | | | | | | | | | -4 |
| 72 | | | | | | | | | | | -5 |
| 73 | | | | | | | | | | | -6 |
| 74 | | | | | | | | | | | -7 |
| 75 | | | | | | | | | | | -8 |
| 76 | | | | | | | | | | | -9 |
| 77 | | | | | | | | | | | -10 |
| 78 | | | | | | | | | | | -11 |
| 79 | | | | | | | | | | | -12 |
| 80 | | | | | | | | | | | |

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100

■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21

Plastic MC Liquid 20 40 60 80 100

| | | |
|---|---|---|
| AECOM | LOGGED BY: NB | COMPLETION DEPTH: 68.88 m |
| | REVIEWED BY: YP | COMPLETION DATE: 8/16/18 |
| | PROJECT ENGINEER: Yadav Pathak | Page 8 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-04** |
| LOCATION: NW Marine Dr at Acadia Rd, UTM 10 U: 5458242.82 m N, 481860.59 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.51 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: Becker / Dynamic Cone / SPT (Standard Pen Test) (Blows/300mm) 0 20 40 60 80 100; Total Unit Wt (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FILL | | | | SILT, some sand, contains grass roots, moist, dark brown (TOPSOIL) | | | | | | 46 |
| | | | | | SAND fine to medium, some silt, trace gravel, compact, moist, brown (FILL) | | 1 | | | Gravel = 4%, Sand = 85.8%, Fines content = 10.2% | |
| 1 | | | | | - grey from 0.6 to 2.4 m BGS | | | | | | 45 |
| | FILL | | | | | | 2 | | | | |
| 2 | | | | | | | | | | | 44 |
| | | | | | SAND coarse to fine, trace silt, very dense, moist, brown | | 3 | 55 | ◆ | | |
| 3 | SP | | | | | | | | | | 43 |
| | | | | | | | 4 | | | Gravel = 0%, Sand = 95.5%, Fines content = 4.5% | |
| 4 | | | | | SAND fine to medium, trace to some silt, trace gravel, dense, moist, grey | | | | | | 42 |
| 5 | | | | | | | 5 | 43 | ◆ | | 41 |
| 6 | | | | | | | | | | | 40 |
| 7 | SP | | | | | | 6 | | | | 39 |
| | | | | | - streaks of orange oxidation from 7.6 to 14 m BGS | | | | | | |
| 8 | | | | | | | 7 | 34 | ◆ | | 38 |
| 9 | | | | | | | | | | | 37 |
| 10 | | | | | | | | | | | |

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 50.60 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/15/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 1 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-04** |
| LOCATION: NW Marine Dr at Acadia Rd, UTM 10 U: 5458242.82 m N, 481860.59 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.51 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 / ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 / Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | | | | | | | | | | 36 |
| 11 | | | | | | | 8 | 49 | ◆ | Gravel = 1.7%, Sand = 82.2%, Fines content = 16.1% | 35 |
| 12 | | | | | | | 9 | | | | 34 |
| 13 | | | | | | | | | | | 33 |
| 14 | | | | | | | | | | | 32 |
| 15 | SP | | | | | | | | | | 31 |
| 16 | | | | | | | | | | | 30 |
| 17 | | | | | | | 10 | | | | 29 |
| 18 | | | | | - moist to wet below 17.7 m | | | | | | 28 |
| 19 | | | | | | | | | | | 27 |
| 20 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 50.60 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/15/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 2 of 6 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-04** |
| LOCATION: NW Marine Dr at Acadia Rd, UTM 10 U: 5458242.82 m N, 481860.59 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.51 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100

| DEPTH (m) | USC | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|
| 20 | | | | | | | 26 |
| | | | | 11 | | Gravel = 0.7%, Sand = 87.9%, Fines content = 11.4% | |
| 21 | | | | | | | 25 |
| 22 | SP | | | | | | |
| | | - interbedded silty SAND, orange staining from 22.5 to 22.7 m BGS | | | | | 24 |
| 23 | | | | | | | 23 |
| | | | | 12 | | | |
| 24 | | Clayey SILT, some sand, low plastic, very stiff to hard, moist, grey | | | | | 22 |
| 25 | | | | | | | |
| | | - SAND fine, some silt, moist, grey with orange oxidation from 25.3 to 25.6 m BGS | | | | | 21 |
| | | - Natural water content = 25.5%, Liquid limit = 26, Plastic limit = 19 | | 13 | | Gravel = 0%, Sand = 10.8%, Silt = 79.5%, Clay = 9.7% | |
| 26 | ML | | | | | | 20 |
| 27 | | - SAND fine, some silt, moist, grey with orange oxidation from 27 to 27.3 m BGS | | | | | |
| | | - SAND fine, some silt, trace clay, moist, grey from 27.7 to 29 m BGS | | | | | 19 |
| 28 | | | | | | | |
| | | | | 14 | | Gravel = 0%, Sand = 77.5%, Silt = 19.3%, Clay = 3.2% | 18 |
| 29 | | SILT, some sand, trace clay, very stiff to hard, moist, grey | | | | | |
| | ML | - dark brown ORGANIC from 29.3 to 29.4 m BGS | | | | | 17 |
| 30 | | | | | | | |

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 50.60 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/15/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 3 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-04** |
| LOCATION: NW Marine Dr at Acadia Rd, UTM 10 U: 5458242.82 m N, 481860.59 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.51 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|
| 30 | | | | | | | 16 |
| 31 | ML | - Natural water content = 24.7%, Liquid limit = non-plastic, Plastic limit = non-plastic | | 15 | | Gravel = 0%, Sand = 19.4%, Silt = 77.5%, Clay = 3.1% | 15 |
| 32 | | SAND fine to medium, wet, yellowish grey (?) | | | | | 14 |
| 33 | | - Approximately 0.2 m thickness of soil recovered in the sonic core run from 32.3 to 35.4 m BGS. | | | | | 13 |
| 34 | SP | | | | | | 12 |
| 35 | | SAND fine to medium, some silt, trace gravel, moist, grey | | | | | 11 |
| 36 | | | | 16 | | Gravel = 1.7%, Sand = 81.9%, Fines content = 16.4% | 10 |
| 37 | | | | | | | 9 |
| 38 | SP | - dry from 37.5 to 38.4 m BGS | | | | | 8 |
| 39 | | | | | | | 7 |
| 40 | | | | 17 | | | |

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆
(Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■
($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

| | | |
|---|---|---|
| AECOM | LOGGED BY: NB | COMPLETION DEPTH: 50.60 m |
| | REVIEWED BY: YP | COMPLETION DATE: 8/15/18 |
| | PROJECT ENGINEER: Yadav Pathak | Page 4 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-04** |
| LOCATION: NW Marine Dr at Acadia Rd, UTM 10 U: 5458242.82 m N, 481860.59 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.51 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | | | 6 |
| 41 | | | | | | | | | | | 5 |
| 42 | | | | | - SILT, sandy, very stiff to hard, moist, brown and grey from 42.3 to 42.7 m BGS<br>- moist to wet below 42.7 m | | 18 | | | | 4 |
| 43 | | | | | | | | | | | 3 |
| 44 | | | | | | | | | | | 2 |
| 45 | SP | | | | | | 19 | | | Gravel = 0%, Sand = 87.1%, Fines content = 12.9% | 1 |
| 46 | | | | | | | | | | | 0 |
| 47 | | | | | | | | | | | -1 |
| 48 | | | | | | | 20 | | | | -2 |
| 49 | | | | | | | | | | | -3 |
| 50 | | | | | | | | | | | |

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 50.60 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/15/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 5 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-04** |
| LOCATION: NW Marine Dr at Acadia Rd, UTM 10 U: 5458242.82 m N, 481860.59 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.51 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS / Total Unit Wt / Plastic MC Liquid | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | SP | | | | - some gravel below 50.2 m | | 21 | | | Gravel = 22.2%, Sand = 60.2%, Fines content = 17.6% | -4 |
| | | | | | **END OF BOREHOLE AT 50.60 m BGS** | | | | | | |
| 51 | | | | | Notes:<br>1. SPT hammer: Automatic Hydraulic<br>2. Soil description is primarily based on visual observation on site and/or laboratory test results.<br>3. Testhole hydrovacumed to a depth of 2.4 m BGS<br>4. Testhole location was surveyed on September 27, 2018.<br>5. Two nested Standpipe Piezometers were installed as follows:<br><br>SH18-04S was installed at 23.2 m BGS, completion details are as follows:<br>- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' slotted screen length<br>- Concrete: 0 to 0.1 m BGS<br>- Sand: 0.1 to 1.2 m BGS<br>- Bentonite: 1.2 to 19.5 m BGS<br>- Sand: 19.5 to 23.2 m BGS<br>- Screen: 20.1 to 23.2 m BGS<br>- Depth to water: 22.2 m BGS measured on October 19, 2018<br><br>SH18-04D was installed at 47.5 m BGS, completeion details are as follows:<br>- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' Slotted Screen Length<br>- Concrete: 0 to 0.1 m BGS<br>- Sand: 0.1 to 1.2 m BGS<br>- Bentonite: 1.2 to 43.9 m BGS<br>- Sand: 43.9 to 47.5 m BGS<br>- Screen: 44.5 to 47.5 m BGS<br>- Bentonite: 47.5 to 50.6 m BGS<br>- Depth to water: 44.3 m BGS measure on October 19, 2018 | | | | | -5 |
| 52 | | | | | | | | | | | -6 |
| 53 | | | | | | | | | | | -7 |
| 54 | | | | | | | | | | | -8 |
| 55 | | | | | | | | | | | -9 |
| 56 | | | | | | | | | | | -10 |
| 57 | | | | | | | | | | | -11 |
| 58 | | | | | | | | | | | -12 |
| 59 | | | | | | | | | | | -13 |
| 60 | | | | | | | | | | | |

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 50.60 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/15/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 6 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-05** |
| LOCATION: Acadia Rd at Newton Way, UTM 10 U: 5458261.48 m N, 482170.02 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.40 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: Becker / Dynamic Cone / SPT (Standard Pen Test) (Blows/300mm) 0 20 40 60 80 100; Total Unit Wt (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FILL | | | | SILT, some sand, contains grass roots, moist, dark brown (TOPSOIL) | | | | | | 46 |
| | | | | | SAND coarse to fine, some gravel, trace silt, compact, moist, brown (FILL) | | 1 | | | | |
| 1 | FILL | | | | | | | | | | 45 |
| | | | | | | | 2 | | | | |
| 2 | | | | | SAND fine to medium, trace to some silt, trace gravel, compact to very dense, dry to moist, grey | | 3 | | | | 44 |
| | | | | | - SAND, some silt, some gravel from 2 to 3.5 m BGS | | | | | | |
| 3 | | | | | | | 4 | 42 | ◆ | Gravel = 15.1%, Sand = 72%, Fines content = 12.9% | 43 |
| 4 | | | | | | | | | | | |
| | | | | | | | 5 | | | | 42 |
| 5 | | | | | | | 6 | 17 | ◆ | Gravel = 0.2%, Sand = 85.1%, Fines content = 14.7% | |
| 6 | SP | | | | | | | | | | 41 |
| | | | | | | | | | | | 40 |
| 7 | | | | | | | | | | | 39 |
| 8 | | | | | | | 7 | 63 | ◆ | | 38 |
| 9 | | | | | | | | | | | |
| | | | | | | | 8 | | | | 37 |
| 10 | | | | | | | | | | | |

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 53.64 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/14/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 1 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-05** |
| LOCATION: Acadia Rd at Newton Way, UTM 10 U: 5458261.48 m N, 482170.02 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.40 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | | | | | | | | | | 36 |
| 11 | | | | | | | 9 | 93 | ◆ | Gravel = 0.5%, Sand = 87.4%, Fines content = 12.1% | 35 |
| 12 | | | | | | | | | | | 34 |
| 13 | | | | | | | | | | | 33 |
| 14 | | | | | - brown colour from 14.3 to 14.6 m BGS | | | | | | 32 |
| 15 | SP | | | | | | 10 | | | | 31 |
| 16 | | | | | | | | | | | 30 |
| 17 | | | | | | | | | | | 29 |
| 18 | | | | | - moist below 17.7 m | | | | | | 28 |
| 19 | | | | | | | 11 | | | | 27 |
| 20 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 53.64 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/14/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 2 of 6 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-05** |
| LOCATION: Acadia Rd at Newton Way, UTM 10 U: 5458261.48 m N, 482170.02 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.40 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | - moist to wet below 20.1 m | | | | | | 26 |
| 21 | | | | | | | | | | | 25 |
| 22 | SP | | | | | | | | | | 24 |
| 23 | | | | | | | 12 | | | Gravel = 0%, Sand = 91.3%, Fines content = 8.7% | 23 |
| 24 | | | | | SILT, some sand, trace clay, very stiff to hard, dry to moist, brown | | | | | | 22 |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | 13 | | | Gravel = 0%, Sand = 27.8%, Silt = 67.7%, Clay = 4.5% | 21 |
| 27 | ML | | | | - SAND fine, some silt, compact, moist, grey from 25.7 to 26.2 m BGS<br>- grey below 26.8 m | | | | | | 20 |
| 28 | | | | | - SAND fine, some silt, trace clay, compact, moist, grey from 27.4 to 27.7 m BGS | | 14 | | | Gravel = 0%, Sand = 69%, Silt = 28.5%, Clay = 2.5% | 19 |
| 29 | | | | | | | | | | | 18 |
| 30 | SP | | | | | | | | | | 17 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 53.64 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/14/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 3 of 6 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-05** |
| LOCATION: Acadia Rd at Newton Way, UTM 10 U: 5458261.48 m N, 482170.02 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.40 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SAND fine, some silt, trace gravel, moist, brown | | | | | | 16 |
| 31 | | | | | | | | | | | 15 |
| 32 | | | | | | | 15 | | | | 14 |
| | | | | | - grey below 32.3 m | | | | | | |
| 33 | | | | | | | | | | | 13 |
| 34 | | | | | - SAND and SILT, moist, grey from 33.8 to 34.4 m BGS | | | | | | 12 |
| 35 | SP | | | | | | 16 | | | Gravel = 1.1%, Sand = 80.1%, Fines content = 18.8% | 11 |
| 36 | | | | | - dry below 36 m | | | | | | 10 |
| 37 | | | | | | | | | | | 9 |
| 38 | | | | | | | | | | | 8 |
| | | | | | - moist below 38.4 m | | | | | | |
| 39 | | | | | | | 17 | | | | 7 |
| 40 | | | | | | | | | | | |

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 53.64 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/14/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 4 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-05** |
| LOCATION: Acadia Rd at Newton Way, UTM 10 U: 5458261.48 m N, 482170.02 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.40 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS / Total Unit Wt / Plastic MC Liquid | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | | | 6 |
| 41 | | | | | | | | | | | 5 |
| 42 | | | | | | | | | | | 4 |
| 43 | | | | | | | | | | | 3 |
| 44 | | | | | | | 18 | | | | 2 |
| 45 | SP | | | | - grey and brown to grey below 44.5 m | | | | | | 1 |
| 46 | | | | | | | | | | | 0 |
| 47 | | | | | | | 19 | | | | -1 |
| 48 | | | | | | | | | | | -2 |
| 49 | | | | | | | | | | | -3 |
| 50 | | | | | | | | | | | |

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100

■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21

Plastic MC Liquid 20 40 60 80 100

| | | |
|---|---|---|
| AECOM | LOGGED BY: NB | COMPLETION DEPTH: 53.64 m |
| | REVIEWED BY: YP | COMPLETION DATE: 8/14/18 |
| | PROJECT ENGINEER: Yadav Pathak | Page 5 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-05** |
| LOCATION: Acadia Rd at Newton Way, UTM 10 U: 5458261.48 m N, 482170.02 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 46.40 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | | | | | | | | | | | -4 |
| 51 | | | | | - moist to wet below 50.6 m | | 20 | | | | -5 |
| 52 | SP | | | | | | 21 | | | Gravel = 0%, Sand = 88.4%, Fines content = 11.6% | -6 |
| 53 | | | | | - SILT, some sand, trace clay, hard, dry to moist, brown with sulphur odour from 52.9 to 53.5 m BGS | | 22 | | | Gravel = 0%, Sand = 27.3%, Silt = 68.5%, Clay = 4.2% | -7 |
| 54 | | | | | **END OF TESTHOLE AT 53.64 m BGS** | | | | | | -8 |
| 55 | | | | | Notes:<br>1. SPT hammer: Automatic Hydraulic<br>2. Soil description is primarily based on visual observation on site and/or laboratory test results.<br>3. Testhole hydrovacumed to a depth of 2.7 m BGS<br>4. Testhole location was surveyed on September 27, 2018.<br>5. Two nested Standpipe Piezometers were installed as follows: | | | | | | -9 |
| 56 | | | | | SH18-05S was installed at 23.5 m BGS, completion details are as follows:<br>- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' slotted screen length<br>- Concrete: 0 to 0.1 m BGS<br>- Sand: 0.1 to 1.2 m BGS<br>- Bentonite: 1.2 to 19.8 m BGS<br>- Sand: 19.8 to 23.5 m BGS<br>- Screen: 20.4 to 23.5 m BGS<br>- Depth to water: 20.6 m BGS measured on October 19, 2018 | | | | | | -10 |
| 57 | | | | | SH18-05D was installed at 52.1 m BGS, completion details are as follows:<br>- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' Slotted Screen Length<br>- Concrete: 0 to 0.1 m BGS<br>- Sand: 0.1 to 1.2 m BGS<br>- Bentonite: 1.2 to 48.5 m BGS<br>- Sand: 48.5 to 52.1 m BGS<br>- Screen: 49.1 to 52.1 m BGS<br>- Bentonite: 52.1 to 53.6 m BGS<br>- Depth to water: 43.3 m BGS measure on October 19, 2018 | | | | | | -11 |
| 58 | | | | | | | | | | | -12 |
| 59 | | | | | | | | | | | -13 |
| 60 | | | | | | | | | | | |

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆
(Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■
($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 53.64 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/14/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 6 of 6 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS (✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100) | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FILL | | | | SILT, some sand, contains grass roots, moist, dark brown (TOPSOIL) | | | | | | 58 |
| | FILL | | | | SAND coarse to fine, some gravel, trace silt, compact, moist, reddish brown (FILL) | | 1 | | | Gravel = 13%, Sand = 84.5%, Fines content = 2.5% | |
| 1 | | | | | SAND fine, trace silt, compact, dry to moist, brown-grey | | 2 | | | | 57 |
| 2 | | | | | | | | | | | |
| | SP | | | | | | 3 | 26 | ◆ | Gravel = 0.4%, Sand = 94%, Fines content = 5.6% | 56 |
| 3 | | | | | | | | | | | |
| | | | | | | | 4 | | | | 55 |
| 4 | | | | | SAND fine to medium, some silt, some gravel, trace clay, contains cobbles, non-plastic, compact, moist, grey (TILL-like) | | | | | | |
| | | | | | | | 5 | | | | 54 |
| 5 | | | | | | | | | | | |
| | TILL | | | | - Natural water content = 11.2%, Liquid limit = non-plastic, Plastic limit = non-plastic | | 6 | 24 | ● ◆ | Gravel = 16.7%, Sand = 51.7%, Silt = 26.5%, Clay = 5.1% | 53 |
| 6 | | | | | | | | | | | |
| | | | | | Clayey SILT and SAND, trace gravel, low plastic, very hard, dry, light grey (TILL-like) | | 7 | | ● ⊢ | Gravel = 8.9%, Sand = 44.2%, Silt = 35.4%, Clay = 11.5% | 52 |
| | TILL | | | | - Core appeared as crumbled, semi-lithified fine sand. Driller noted very hard drilling. | | | | | | |
| 7 | | | | | - Natural water content = 6.1%, Liquid limit = 19, Plastic limit = 13 | | | | | | 51 |
| | | | | | SAND fine, trace silt, trace gravel, very dense, dry to moist, light grey | | | | | | |
| 8 | | | | | | | 8 | 78 | ◆ | | 50 |
| | SP | | | | | | | | | | |
| 9 | | | | | | | | | | | 49 |
| 10 | | | | | | | | | | | |

AECOM

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|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 1 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
|---|---|---|
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 / ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 / Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | | | | | | | | | | 48 |
| 11 | | | | | - brown and grey below 11 m BGS | | 9 | 106 | | Gravel = 6.2%, Sand = 84%, Fines content = 9.8% | 47 |
| 12 | | | | | | | 10 | | | | 46 |
| 13 | | | | | | | | | | | 45 |
| 14 | | | | | - interbedded SAND and SILT from 13.9 to 14 m BGS | | | | | | 44 |
| 15 | SP | | | | | | | | | | 43 |
| 16 | | | | | | | | | | | 42 |
| 17 | | | | | | | 11 | | | | 41 |
| 18 | | | | | | | | | | | 40 |
| 19 | | | | | | | | | | | 39 |
| 20 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
|---|---|
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 2 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | SAND medium to fine, trace silt, trace gravel, moist, grey | | | | | | 38 |
| 21 | | | | | | | 12 | | | | 37 |
| 22 | | | | | | | | | | | 36 |
| 23 | | | | | | | | | | | 35 |
| 24 | | | | | | | | | | | 34 |
| 25 | SP | | | | | | 13 | | | Gravel = 5.9%, Sand = 87.4%, Fines content = 6.7% | 33 |
| 26 | | | | | | | | | | | 32 |
| 27 | | | | | - dry from 27.1 to 27.7 m BGS | | | | | | 31 |
| 28 | | | | | | | | | | | 30 |
| 29 | | | | | - brown colour, suspected oxidation at 29.3 m BGS | | | | | | 29 |
| 30 | | | | | | | 14 | | | | |

AECOM

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|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 3 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆
(Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■
($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | | | 28 |
| 31 | SP | | | | | | | | | 27 |
| 32 | | | | | SAND fine to mediuim, some silt, moist, grey | | | | | 26 |
| 33 | | | | | | | 15 | | | 25 |
| 34 | SP | | | | | | | | | 24 |
| 35 | | | | | | | 16 | | Gravel = 0%, Sand = 89.4%, Fines content = 10.6% | 23 |
| 36 | | | | | SILT, trace to some sand, trace clay, low plastic, hard, dry to moist, brown-grey | | | | | 22 |
| 37 | | | | | | | 17 | | Gravel = 0%, Sand = 21.6%, Silt = 74.6%, Clay = 3.8% | 21 |
| 38 | ML | | | | - grey colour below 37.2 m | | 18 | | | 20 |
| 39 | | | | | | | | | | 19 |
| 40 | | | | | - Natural water content = 24.5%, Liquid limit = 22, Plastic limit = 21 | | 19 | | Gravel = 0%, Sand = 5.5%, Silt = 88%, Clay = 6.5% | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 4 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | | | 18 |
| | ML | | | | | | | | | | |
| 41 | | | | | SAND fine to medium, some silt, dry to moist, grey | | | | | | 17 |
| 42 | | | | | | | 20 | | | | |
| | | | | | | | | | | | 16 |
| 43 | | | | | | | | | | | |
| | | | | | | | | | | | 15 |
| 44 | | | | | - SILT and SAND, very dense, moist, grey from 44.2 to 44.5 m BGS | | | | | | |
| | | | | | | | | | | | 14 |
| 45 | | | | | | | | | | | |
| | SP | | | | | | | | | | 13 |
| 46 | | | | | | | 21 | | | | |
| | | | | | | | | | | | 12 |
| 47 | | | | | | | | | | | |
| | | | | | | | | | | | 11 |
| 48 | | | | | | | | | | | |
| | | | | | | | | | | | 10 |
| 49 | | | | | | | | | | | |
| | | | | | | | | | | | 9 |
| 50 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 5 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | | | | | | | | | | | 8 |
| 51 | | | | | | | | | | | 7 |
| 52 | | | | | | | | | | | 6 |
| 53 | | | | | | | | | | | 5 |
| 54 | | | | | | | | | | | 4 |
| 55 | SP | | | | - Silty SAND, brown and grey, suspected oxidation from 53.6 to 54.9 m BGS | | 22 | | | Gravel = 0%, Sand = 83.3%, Fines content = 16.7% | 3 |
| 56 | | | | | | | 23 | | | | 2 |
| 57 | | | | | | | | | | | 1 |
| 58 | | | | | | | 24 | | | | 0 |
| 59 | | | | | | | | | | | -1 |
| 60 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 6 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | | | | | | | | | | | -2 |
| 61 | | | | | | | 25 | | | | -3 |
| 62 | | | | | - moist to wet below 61.6 m | | | | | | -4 |
| 63 | SP | | | | - SILT, sandy, trace clay, hard, moist, brown, sulphur odour from 62.8 to 63.4 m BGS | | 26 | | | | -5 |
| 64 | | | | | | | | | | | -6 |
| 65 | | | | | | | | | | | -7 |
| 66 | | | | | | | | | | | -8 |
| 67 | | | | | | | 27 | | | Gravel = 0%, Sand = 79.2%, Fines content = 20.8% | -9 |
| 68 | | | | | **END OF TESTHOLE AT 67.36 m BGS** | | | | | | -10 |
| 69 | | | | | | | | | | | -11 |
| 70 | | | | | | | | | | | |

Notes:
1. SPT hammer: Automatic Hydraulic
2. Soil description is primarily based on visual observation on site and/or laboratory test results.
3. Testhole hydrovacumed to a depth of 2.4 m BGS.
4. Testhole location was surveyed on September 27, 2018.
5. Two nested Standpipe Piezometers were installed as follows:

SH18-06S was installed at 35.4 m BGS, completion details are as follows:
- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' slotted screen length
- Concrete: 0 to 0.1 m BGS
- Sand: 0.1 to 1.2 m BGS
- Bentonite: 1.2 to 31.4 m BGS

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 7 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-06** |
| LOCATION: Acadia Rd, UTM 10 U: 5458176.28 m N, 482277.25 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 58.60 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS / Total Unit Wt / Plastic MC Liquid | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 70 | | | | | - Sand: 31.4 to 35.4 m BGS<br>- Screen: 32.3 to 35.4 m BGS<br>- Depth to water: 32.1 m BGS measured on October 19, 2018<br><br>SH18-06D was installed at 67.3 m BGS, completion details are as follows:<br>- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' Slotted Screen Length<br>- Concrete: 0 to 0.1 m BGS<br>- Sand: 0.1 to 1.2 m BGS<br>- Bentonite: 1.2 to 35.4 m BGS<br>- Sand: 35.4 to 63.7 m BGS<br>- Screen: 64.3 to 67.3 m BGS<br>- Depth to water: 55.0 m BGS measure on October 19, 2018 | | | | | | -12 |
| 71 | | | | | | | | | | | -13 |
| 72 | | | | | | | | | | | -14 |
| 73 | | | | | | | | | | | -15 |
| 74 | | | | | | | | | | | -16 |
| 75 | | | | | | | | | | | -17 |
| 76 | | | | | | | | | | | -18 |
| 77 | | | | | | | | | | | -19 |
| 78 | | | | | | | | | | | -20 |
| 79 | | | | | | | | | | | -21 |
| 80 | | | | | | | | | | | |

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100

■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21

Plastic MC Liquid 20 40 60 80 100

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 67.36 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/13/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 8 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|
| 0 | FILL | SAND coarse to medium, trace silt, compact, moist, brown (FILL) | | | | | 72 |
| | | SILT, some clay to clayey, some sand, trace gravel, low plastic, contains wooden pieces, stiff, moist, grey (Till-like FILL) | | 1 | | | |
| 1 | FILL | | | | | | 71 |
| 2 | | | | 2 | | Gravel = 7.3%, Sand = 20.7%, Silt = 52%, Clay = 20% | |
| | | Silty CLAY and SAND, some gravel, contains cobbles, low plastic, hard, moist, grey (TILL-like) | | | | | 70 |
| 3 | | | | 3 | | | 69 |
| 4 | | - Natural water content = 14.7%, Liquid limit = 24, Plastic limit = 13 | | 4 | 14 | Gravel = 10.2%, Sand = 36.1%, Silt = 33.7%, Clay = 20% | 68 |
| | | | | 5 | | | |
| 5 | TILL | | | 6 | 89 | | 67 |
| 6 | | | | | | | 66 |
| 7 | | | | 7 | | | 65 |
| | | SAND fine to medium, trace to some silt, trace gravel, dense to very dense, moist, grey | | | | | |
| 8 | | | | 8 | 71 | Gravel = 8.8%, Sand = 79.4%, Fines content = 11.8% | 64 |
| 9 | SP | | | | | | 63 |
| 10 | | | | | | | |

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆ (Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■ ($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 1 of 8 |

AECOM

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | | | | | | | | | | 62 |
| | | | | | | | 9 | | | | |
| 11 | | | | | | | | | | | 61 |
| | | | | | | | 10 | 66 | ◆ | | |
| 12 | | | | | | | | | | | 60 |
| 13 | | | | | | | 11 | | | | 59 |
| 14 | | | | | | | | | | | 58 |
| 15 | SP | | | | | | | | | | 57 |
| 16 | | | | | | | | | | | 56 |
| | | | | | - SAND, silty, trace clay from 16.8 to 17.1 m BGS | | 12 | | | Gravel = 0%, Sand = 60.4%, Silt = 33.6%, Clay = 6% | |
| 17 | | | | | - dry from 17.1 to 34.4 m BGS | | | | | | 55 |
| 18 | | | | | | | | | | | 54 |
| 19 | | | | | | | | | | | 53 |
| 20 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 2 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | | | | | | | | | 52 |
| 21 | | | | | | | 13 | | | | 51 |
| 22 | | | | | | | | | | | 50 |
| 23 | | | | | | | | | | | 49 |
| 24 | | | | | | | | | | | 48 |
| 25 | SP | | | | - yellowish grey below 24.7 m | | 14 | | | | 47 |
| 26 | | | | | | | | | | | 46 |
| 27 | | | | | | | | | | | 45 |
| 28 | | | | | | | | | | | 44 |
| 29 | | | | | | | 15 | | | | 43 |
| 30 | | | | | | | | | | | |

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆
(Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■
($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 3 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | | | | 42 |
| 31 | | | | | | | | | | | 41 |
| 32 | | | | | | | 16 | | | | 40 |
| 33 | | | | | | | | | | | 39 |
| 34 | | | | | | | | | | | 38 |
| 35 | SP | | | | - moist below 35.7 m | | | | | | 37 |
| 36 | | | | | | | | | | | 36 |
| 37 | | | | | | | 17 | | | Gravel = 0%, Sand = 92.6%, Fines content = 7.4% | 35 |
| 38 | | | | | | | | | | | 34 |
| 39 | | | | | | | | | | | 33 |
| 40 | | | | | | | | | | | |

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆
(Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■
($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

| | | |
|---|---|---|
| AECOM | LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| | REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| | PROJECT ENGINEER: Yadav Pathak | Page 4 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | | | | | | | | | | | 32 |
| 41 | | | | | | | | | | | 31 |
| | | | | | | | 18 | | | | |
| 42 | | | | | | | | | | | 30 |
| 43 | | | | | | | | | | | 29 |
| 44 | | | | | | | | | | | 28 |
| 45 | SP | | | | | | | | | | 27 |
| 46 | | | | | | | | | | | 26 |
| | | | | | | | 19 | | | | |
| 47 | | | | | | | | | | | 25 |
| 48 | | | | | - wet below 48.2 m BGS | | | | | | 24 |
| | | | | | | | 20 | | | Gravel = 1.4%, Sand = 89.3%, Fines content = 9.3% | |
| 49 | | | | | | | | | | | 23 |
| 50 | | | | | | | | | | | |

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 5 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100 | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | SP | | | | | | | | | | 22 |
| | | | | | SILT, some clay, trace sand, very stiff, low plastic, dry to moist, brown | | | | | | |
| 51 | ML | | | | - Natural water content = 23.4%, Liquid limit = 27, Plastic limit = 22 | | 21 | | ● | Gravel = 0%, Sand = 3.5%, Silt = 77.5%, Clay = 19% | 21 |
| | | | | | SAND fine to medium, trace to some silt, moist to wet, yellowish grey | | | | | | |
| 52 | | | | | | | | | | | 20 |
| 53 | | | | | | | | | | | 19 |
| 54 | | | | | | | | | | | 18 |
| 55 | | | | | | | | | | | 17 |
| 56 | SP | | | | | | 22 | | | | 16 |
| 57 | | | | | | | | | | | 15 |
| 58 | | | | | | | | | | | 14 |
| 59 | | | | | | | | | | | 13 |
| 60 | | | | | | | | | | | |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 6 of 8 |

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS / Total Unit Wt / Plastic MC Liquid | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | | | | | | | | | | | 12 |
| 61 | | | | | - dry to moist from 61.3 to 62.8 m BGS | | 23 | | | Gravel = 0.1%, Sand = 81.5%, Fines content = 18.4% | 11 |
| 62 | | | | | | | | | | | 10 |
| 63 | | | | | - moist to wet below 62.8 m BGS | | | | | | 9 |
| 64 | | | | | | | | | | | 8 |
| 65 | SP | | | | | | 24 | | | | 7 |
| 66 | | | | | | | | | | | 6 |
| 67 | | | | | | | | | | | 5 |
| 68 | | | | | - SILT, trace clay, trace sand, very stiff to hard, brown to dark brown from 67.7 to 68 m BGS | | 25 | | | | 4 |
| 69 | | | | | | | | | | | 3 |
| 70 | | | | | | | | | | | |

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100

■ Total Unit Wt ■ ($kN/m^3$) 16 17 18 19 20 21

Plastic MC Liquid 20 40 60 80 100

| | | |
|---|---|---|
| AECOM | LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| | REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| | PROJECT ENGINEER: Yadav Pathak | Page 7 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

| | | |
|---|---|---|
| PROJECT: Area B Slope Stability and Protection | CLIENT: University Endowment Lands | TESTHOLE NO: **SH18-07** |
| LOCATION: UEL Works Yard, UTM 10 U: 5457962.31 m N, 482559.01 m E | | PROJECT NO.: 60530081 |
| CONTRACTOR: Omega Environmental Drilling Ltd. | METHOD: Vibratory Sonic | ELEVATION (m): 72.17 |

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

| DEPTH (m) | USC | SOIL SYMBOL | WELL INSTALLATION | WELL INSTALLATION | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE # | SPT (N) | PENETRATION TESTS | COMMENTS | ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 70 | | | | | | | | | | | 2 |
| 71 | SP | | | | | | 26 | | | Gravel = 0.4%, Sand = 90.6%, Fines content = 9% | 1 |
| 72 | | | | | **END OF BOREHOLE AT 71.93 m BGS** | | | | | | 0 |
| 73 | | | | | | | | | | | -1 |
| 74 | | | | | | | | | | | -2 |
| 75 | | | | | | | | | | | -3 |
| 76 | | | | | | | | | | | -4 |
| 77 | | | | | | | | | | | -5 |
| 78 | | | | | | | | | | | -6 |
| 79 | | | | | | | | | | | -7 |
| 80 | | | | | | | | | | | |

PENETRATION TESTS
✳ Becker ✳
◇ Dynamic Cone ◇
◆ SPT (Standard Pen Test) ◆
(Blows/300mm)
0 20 40 60 80 100
■ Total Unit Wt ■
($kN/m^3$)
16 17 18 19 20 21
Plastic MC Liquid
20 40 60 80 100

Notes:
1. SPT hammer: Automatic Hydraulic
2. Soil description is primarily based on visual observation on site and/or laboratory test results.
3. Testhole hydrovacumed to a depth of 2.1 m BGS
4. Testhole location was surveyed on September 27, 2018.
5. Two nested Standpipe Piezometers were installed as follows:

SH18-07S was installed at 49.5 m BGS, completion details are as follows:
- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' slotted screen length
- Concrete: 0 to 0.1 m BGS
- Sand: 0.1 to 1.2 m BGS
- Bentonite: 1.2 to 45.9 m BGS
- Sand: 45.9 to 49.5 m BGS
- Screen: 46.5 to 49.5 m BGS
- Depth to water: 48.0 m BGS measured on October 19, 2018

SH18-07D was installed at 71.9 m BGS, completion details are as follows:
- Flush Mount, 2" Diameter PVC Standpipe, Schedule 80, 10' Slotted Screen Length
- Concrete: 0 to 0.1 m BGS
- Sand: 0.1 to 1.2 m BGS
- Bentonite: 1.2 to 68.3 m BGS
- Sand: 68.3 to 71.9 m BGS
- Screen: 68.9 to 71.9 m BGS
- Depth to water: 63.1 m BGS measured on October 19, 2018

AECOM

| | |
|---|---|
| LOGGED BY: NB | COMPLETION DEPTH: 71.93 m |
| REVIEWED BY: YP | COMPLETION DATE: 8/20/18 |
| PROJECT ENGINEER: Yadav Pathak | Page 8 of 8 |

LOG OF TEST HOLE TESTHOLE LOGS_UEL_REV0.GPJ UMA WINN.GDT 4/5/19

# Appendix B: Sonic Soil Core Photograph Logs


**Box 1 and 2: 2.9 m to 7.9 m (9.5’ to 26’)**


**Box 3 and 4: 7.9 m to 14 m (26’ to 46’)**

## SH18-03 Core Photographs: Box 1 - 4 of 23: 2.9 m to 14 m (9.5’ to 46’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B1 | **Rev.** 0 |

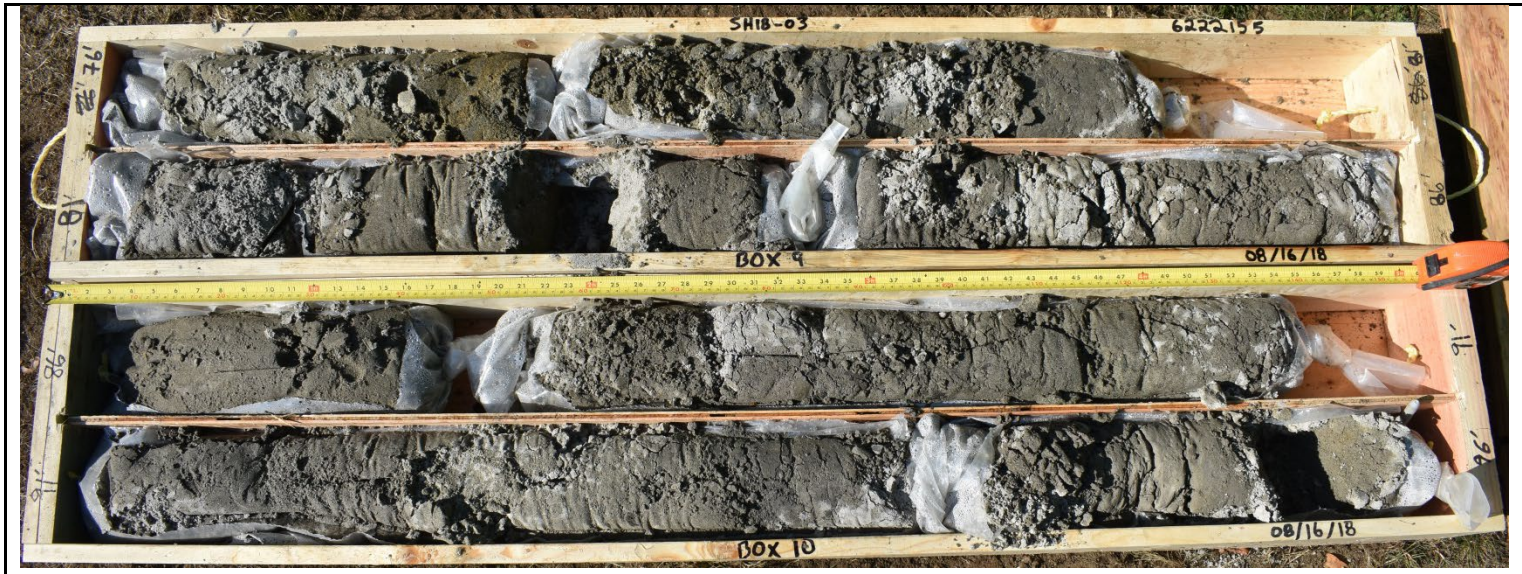
AECOM


**Box 5 and 6: 14 m to 18.6 m (46’ to 61’)**


**Box 7 and 8: 18.6 m to 23.1 m (61’ to 76’)**

## SH18-03 Core Photographs: Box 5 - 8 of 23: 14 m to 23.1 m (46’ to 76’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B2 | **Rev.** 0 |




**Box 9 and 10: 23.1 m to 29.3 m (76’ to 96’)**


**Box 11 and 12: 29.3 m to 35.4 m (96’ to 116’)**

## SH18-03 Core Photographs: Box 9 - 12 of 23: 23.1 m to 35.4 m (76’ to 116’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B3 | **Rev.** 0 |

AECOM


Box 13 and 14: 35.4 m to 41.5 m (116' to 136')

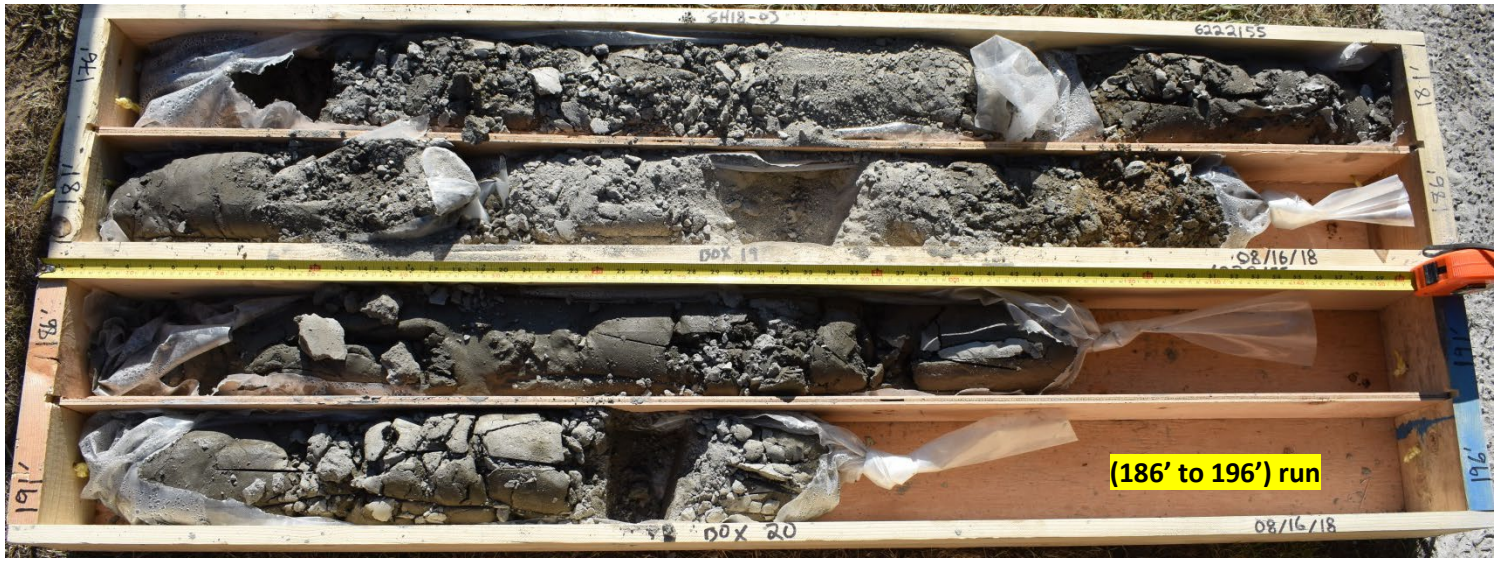

Box 15 and 16: 41.5 m to 47.5 m (136' to 156')

## SH18-03 Core Photographs: Box 13 - 16 of 23: 35.4 m to 47.5 m (116' to 156')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B4 | **Rev.** 0 |

AECOM


**Box 17 and 18: 47.5 m to 53.6 m (156’ to 176’)**

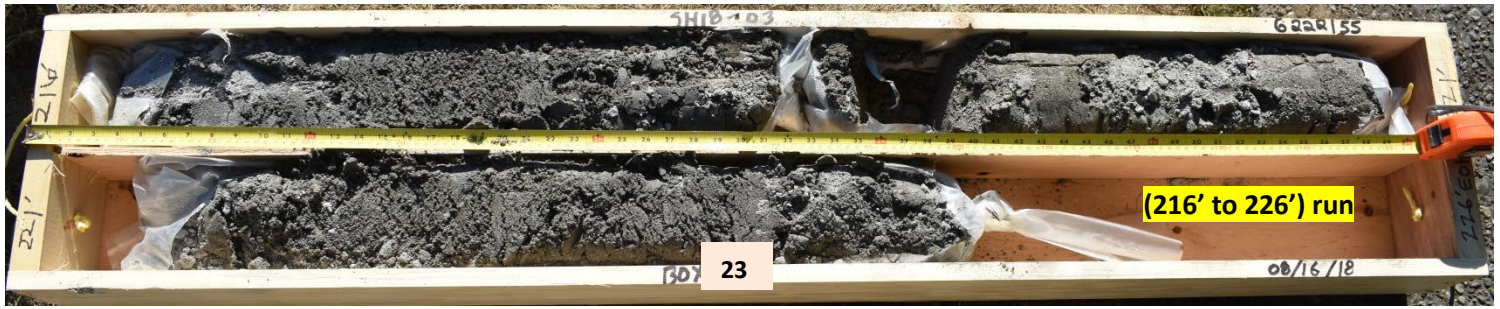



**Box 19 and 20: 53.6 m to 59.7 m (176’ to 196’)**

## SH18-03 Core Photographs: Box 17 - 20 of 23: 47.5 m to 59.7 m (156’ to 196’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B5 | **Rev.** 0 |


**Box 21 and 22: 59.7 m to 65.8 m (196' to 216')**



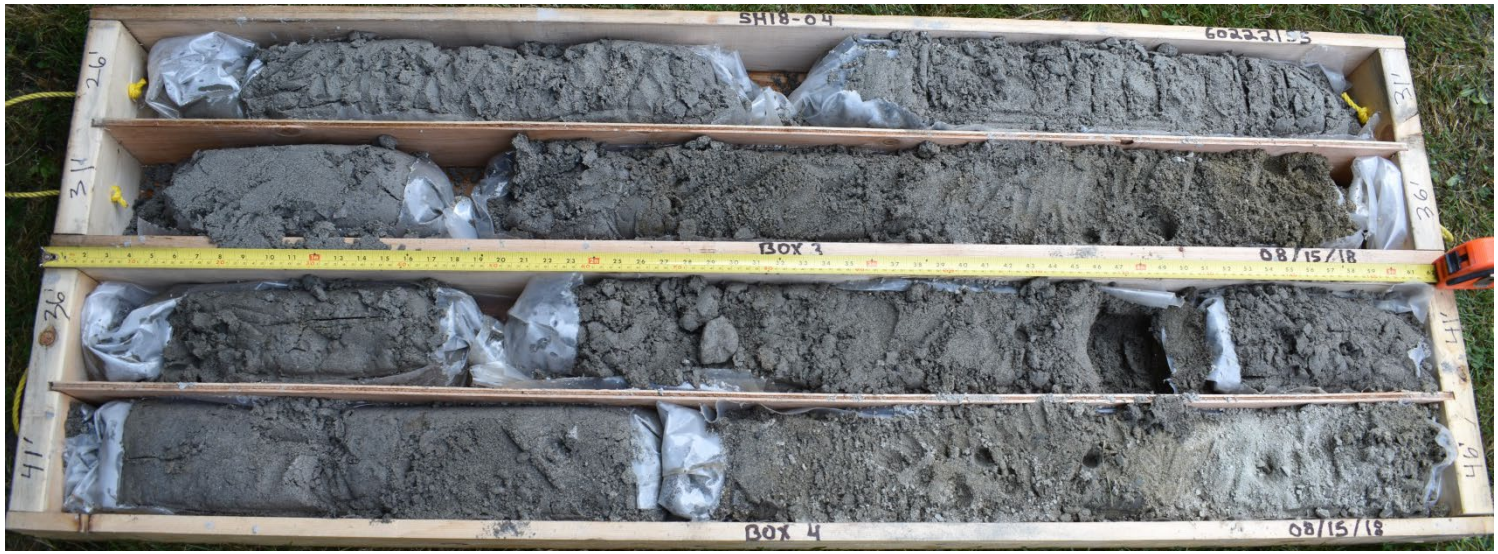

**Box 23: 65.8 m to 68.9 m (216' to 226')**

## SH18-03 Core Photographs: Box 21 - 23 of 23: 59.7 m to 68.9 m (196' to 226')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B6 | **Rev.** 0 |

AECOM


**Box 1 and 2: 2.4 m to 7.9 m (8’ to 26’)**




**Box 3 and 4: 7.9 m to 14 m (26’ to 46’)**

## SH18-04 Core Photographs: Box 1 - 4 of 15: 2.4 m to 14 m (8’ to 46’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B7 | **Rev.** 0 |

AECOM

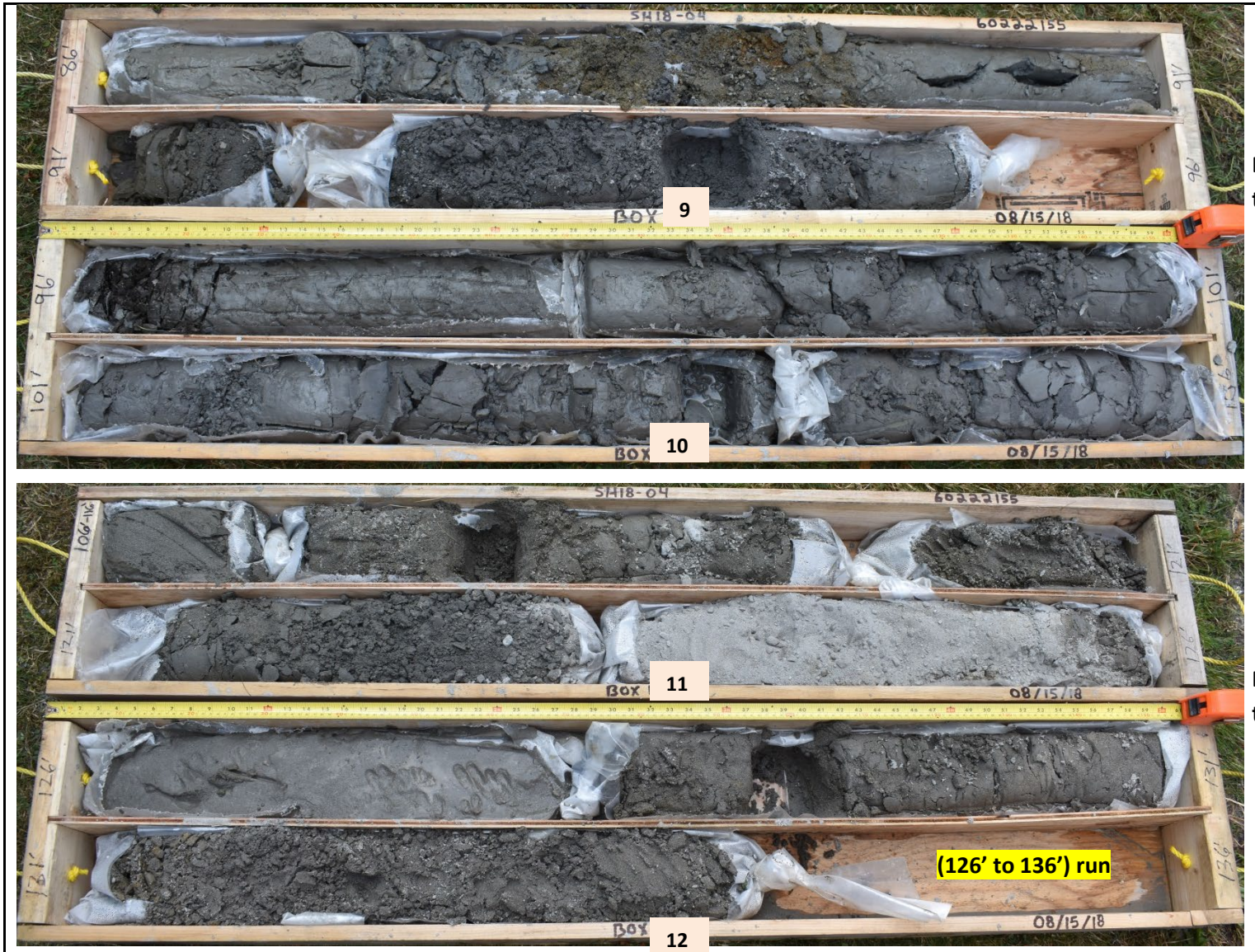

**Box 5 and 6: 14 m to 20.1 m (46’ to 66’)**


**Box 7 and 8: 20.1 m to 26.2 m (66’ to 86’)**

## SH18-04 Core Photographs: Box 5 - 8 of 15: 14 m to 26.2 m (46’ to 86’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B8 | **Rev.** 0 |

AECOM




**Box 9 and 10: 26.2 m to 32.3 m (86' to 106')**

***Note: no sample recovery between 32.3 m and 35.4 m (106' and 116')***

**Box 11 and 12: 35.4 m to 41.4 m (116' to 136')**

## SH18-04 Core Photographs: Box 9 - 12 of 15: 26.2 m to 41.4 m (86' to 136')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B9 | **Rev.** 0 |


**Box 13 and 14: 41.4 m to 47.5 m (136’ to 156’)**


**Box 15: 47.5 m to 50.6 m (156’ to 166’)**

## SH18-04 Core Photographs: Box 13 - 15 of 15: 41.4 m to 50.6 m (136’ to 166’)

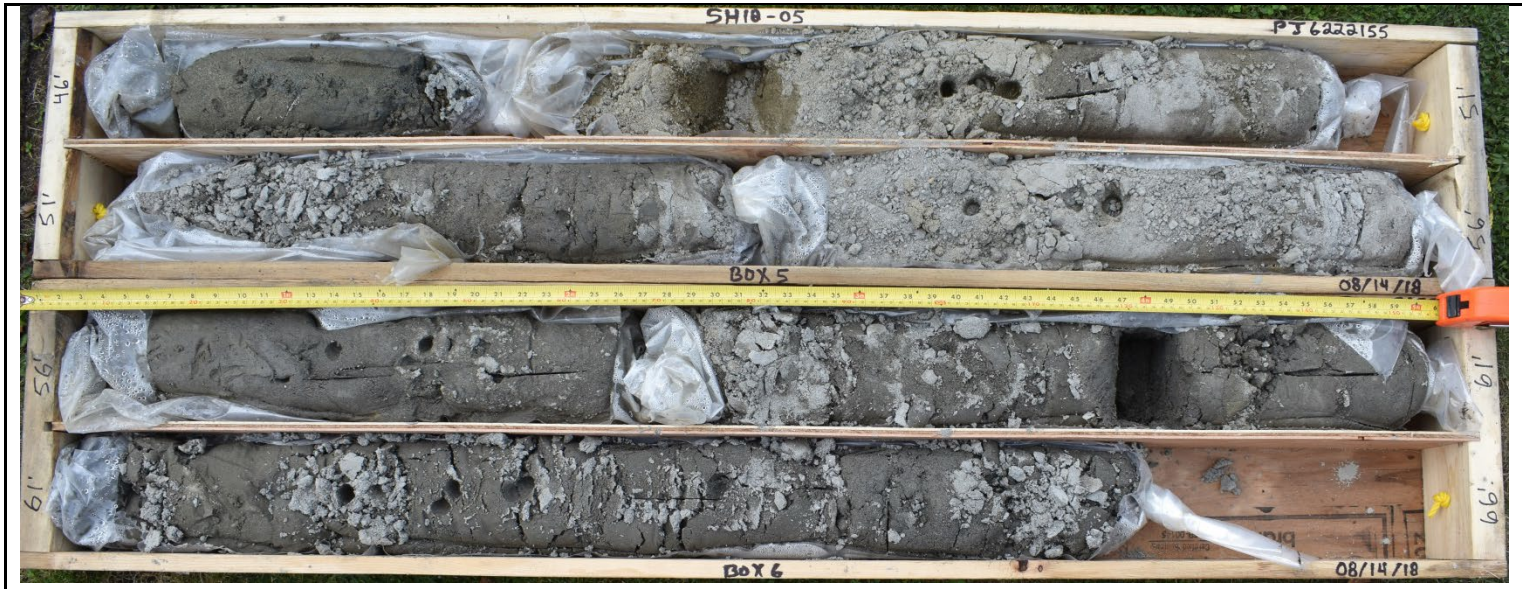
| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B10 | **Rev.** 0 |


**Box 1 and 2: 2.7 m to 7.9 m (9’ to 26’)**

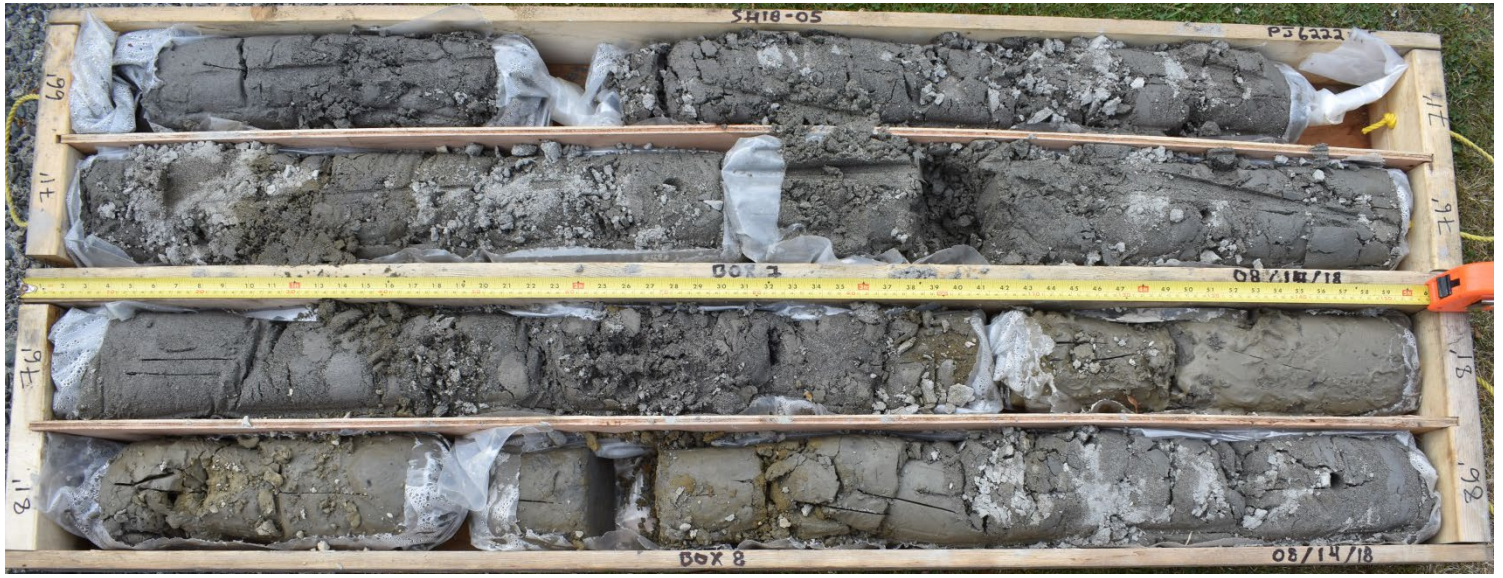

**Box 3 and 4: 7.9 m to 14 m (26’ to 46’)**

## SH18-05 Core Photographs: Box 1 - 4 of 17: 2.7 m to 14 m (9’ to 46’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B11 | **Rev.** 0 |




**Box 5 and 6: 14 m to 20.1 m (46’ to 66’)**




**Box 7 and 8: 20.1 m to 26.2 m (66’ to 86’)**

## SH18-05 Core Photographs: Box 5 - 8 of 17: 14 m to 26.2 m (46’ to 86’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B12 | **Rev.** 0 |

AECOM

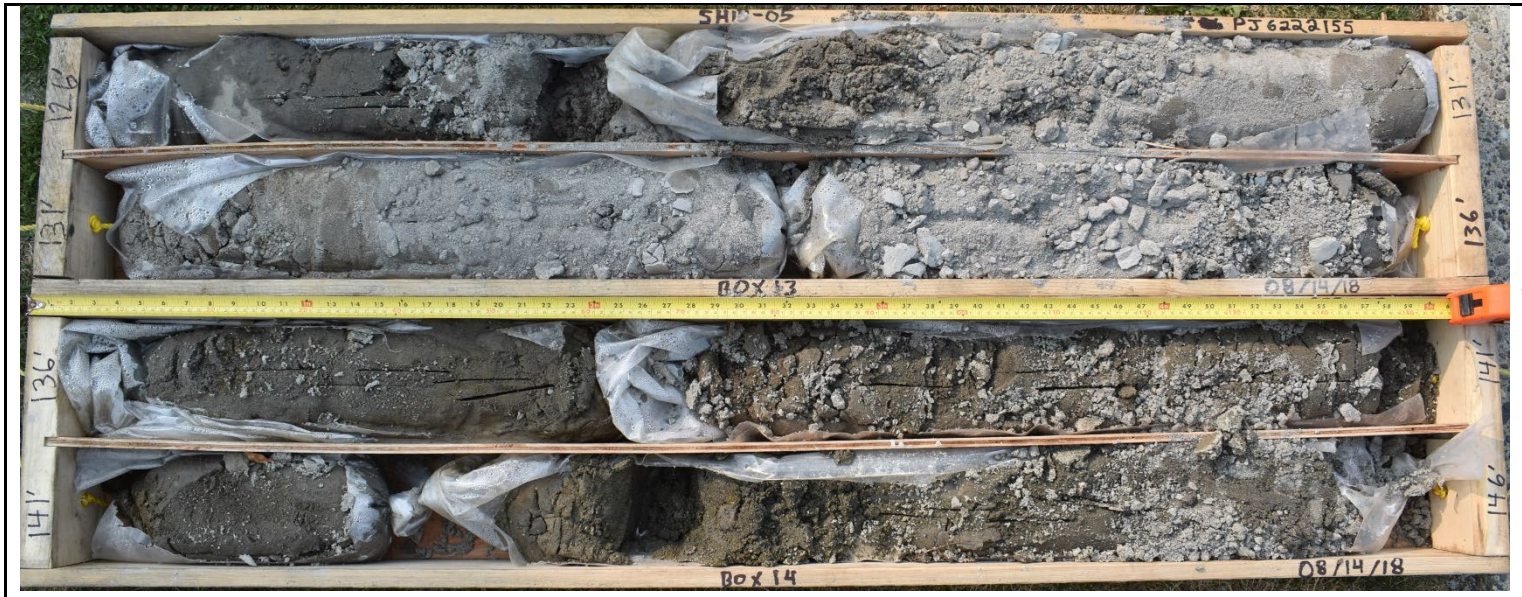

**Box 9 and 10: 26.2 m to 32.3 m (86' to 106')**

**Box 11 and 12: 32.3 m to 38.4 m (106' to 126')**

## SH18-05 Core Photographs: Box 9 - 12 of 17: 26.2 m to 38.4 m (86' to 126')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B13 | **Rev.** 0 |

AECOM




**Box 13 and 14: 38.4 m to 44.5 m (126’ to 146’)**


**Box 15 and 16: 44.5 m to 50.6 m (146’ to 166’)**

## SH18-05 Core Photographs: Box 13 - 16 of 17: 38.4 m to 50.6 m (126’ to 166’)

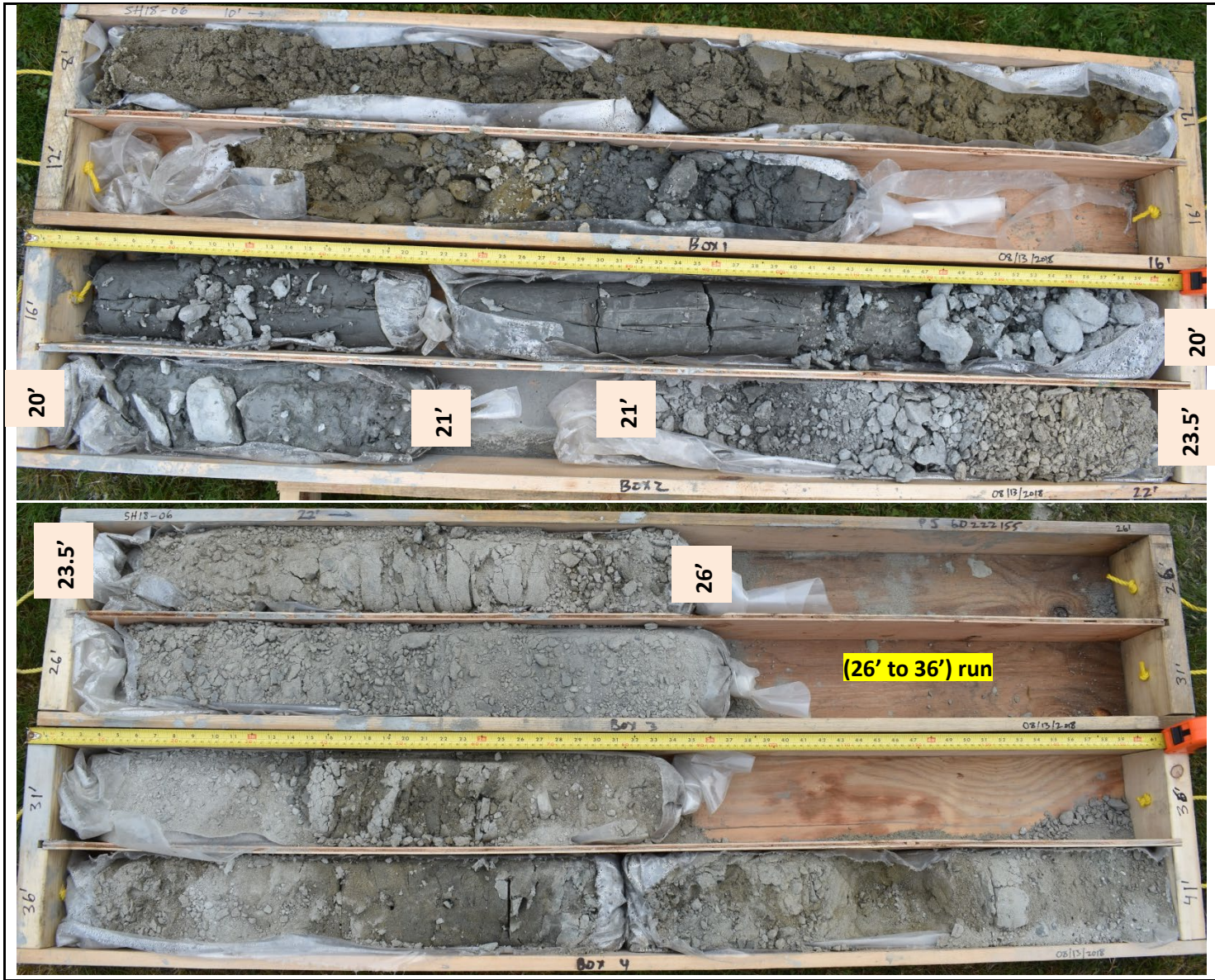
| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B14 | **Rev.** 0 |


**Box 17: 50.6 m to 53.6 m (166’ to 176’)**

## SH18-05 Core Photographs: Box 17 of 17: 50.6 m to 53.6 m (166’ to 176’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B15 | **Rev.** 0 |

AECOM




**Box 1 and 2: 2.4 m to 7.2 m (8' to 23.5')**

**Box 3 and 4: 7.2 m to 12.5 m (23.5' to 41')**

## SH18-06 Core Photographs: Box 1 - 4 of 23: 2.4 m to 12.5 m (8' to 41')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B16 | **Rev.** 0 |


Box 5 and 6: 12.5 m to 18.6 m (41' to 61')

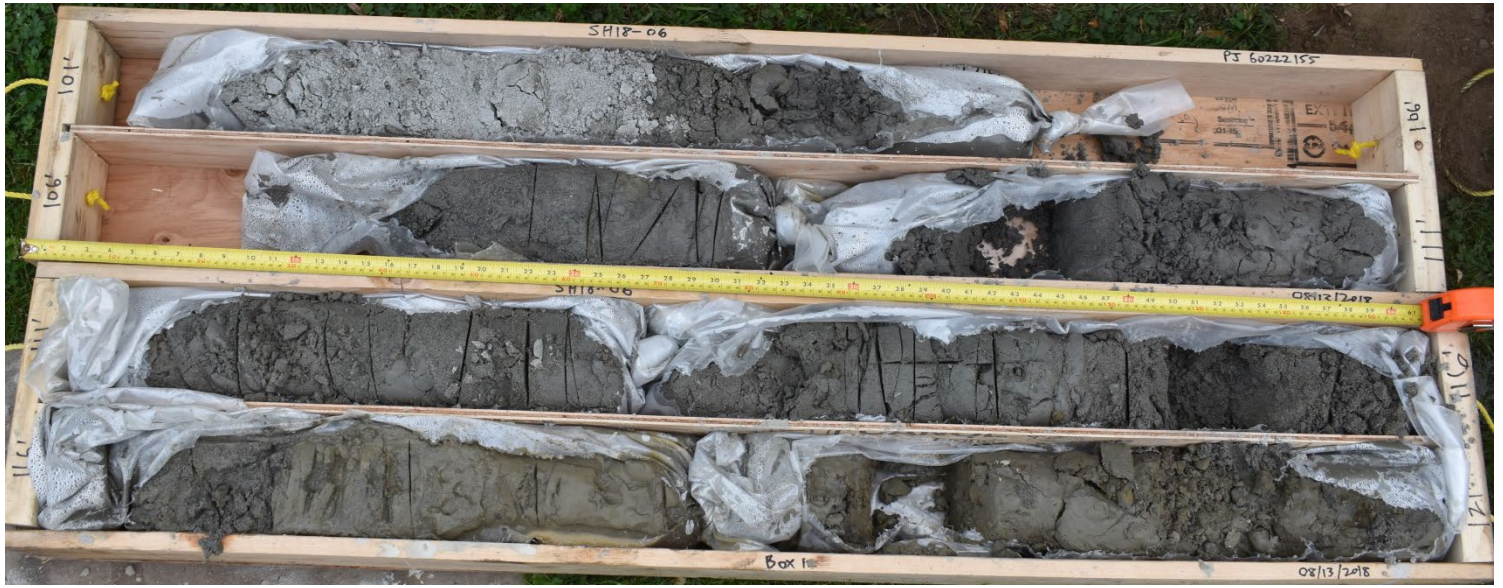

Box 7 and 8: 18.6 m to 24.7 m (61' to 81')

## SH18-06 Core Photographs: Box 5 - 8 of 23: 12.5 m to 24.7 m (41' to 81')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B17 | **Rev.** 0 |

AECOM


**Box 9 and 10: 24.7 m to 30.8 m (81’ to 101’)**




**Box 11 and 12: 30.8 m to 36.9 m (101’ to 121’)**

## SH18-06 Core Photographs: Box 9 - 12 of 23: 24.7 m to 36.9 m (81’ to 121’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B18 | **Rev.** 0 |

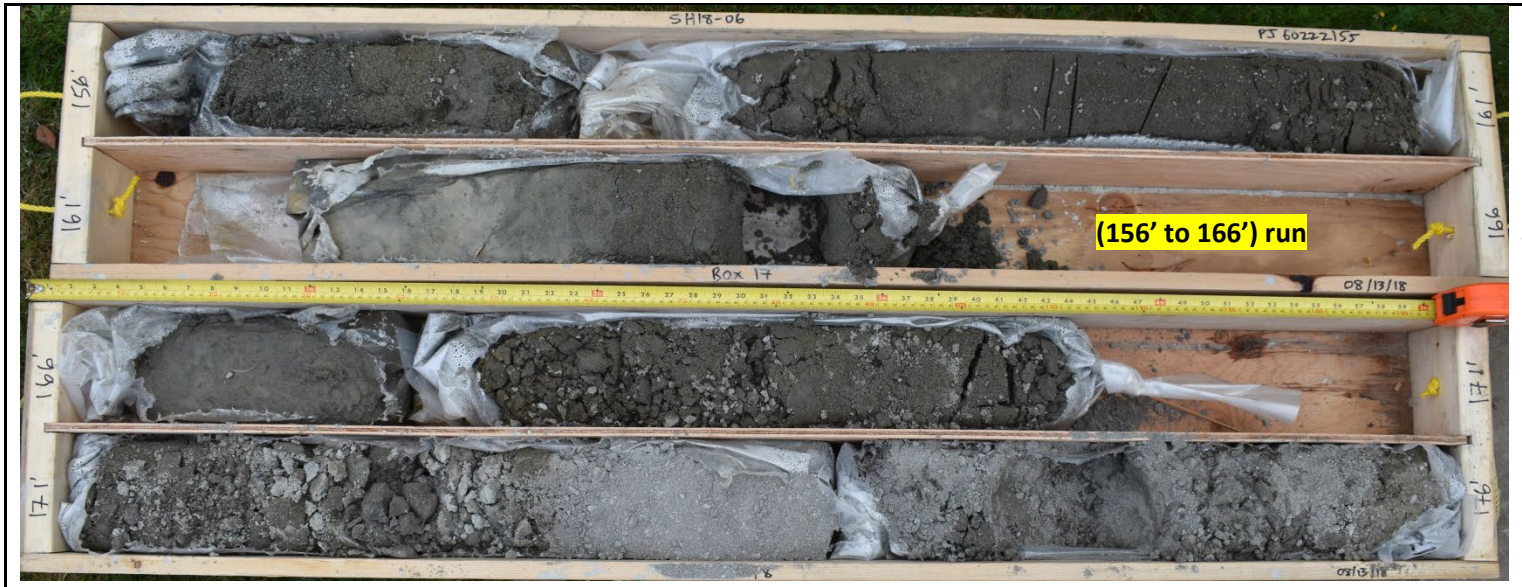
AECOM


**Box 13 and 14: 36.9 m to 41.5 m (121' to 136')**

**Box 15 and 16: 41.5 m to 47.6 m (136' to 156')**

## SH18-06 Core Photographs: Box 13 - 16 of 23: 36.9 m to 47.6 m (121' to 156')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B19 | **Rev.** 0 |




**Box 17 and 18: 47.6 m to 53.6 m (156' to 176')**


**Box 19 and 20: 53.6 m to 59.7 m (176' to 196')**

## SH18-06 Core Photographs: Box 17 - 20 of 23: 47.6 m to 59.7 m (156' to 196')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B20 | **Rev.** 0 |

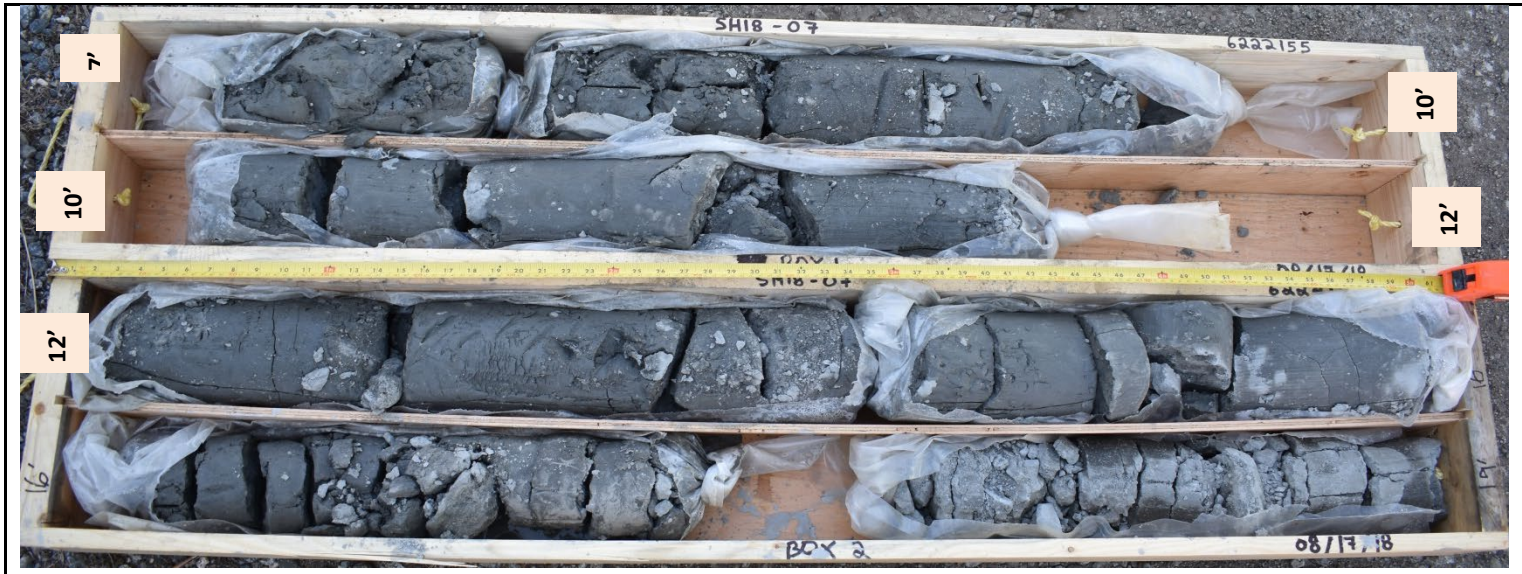

**Box 21: 59.7 m to 61.3 m (196' to 201')**


**Box 22 and 23: 61.3 m to 67.4 m (201' to 221')**

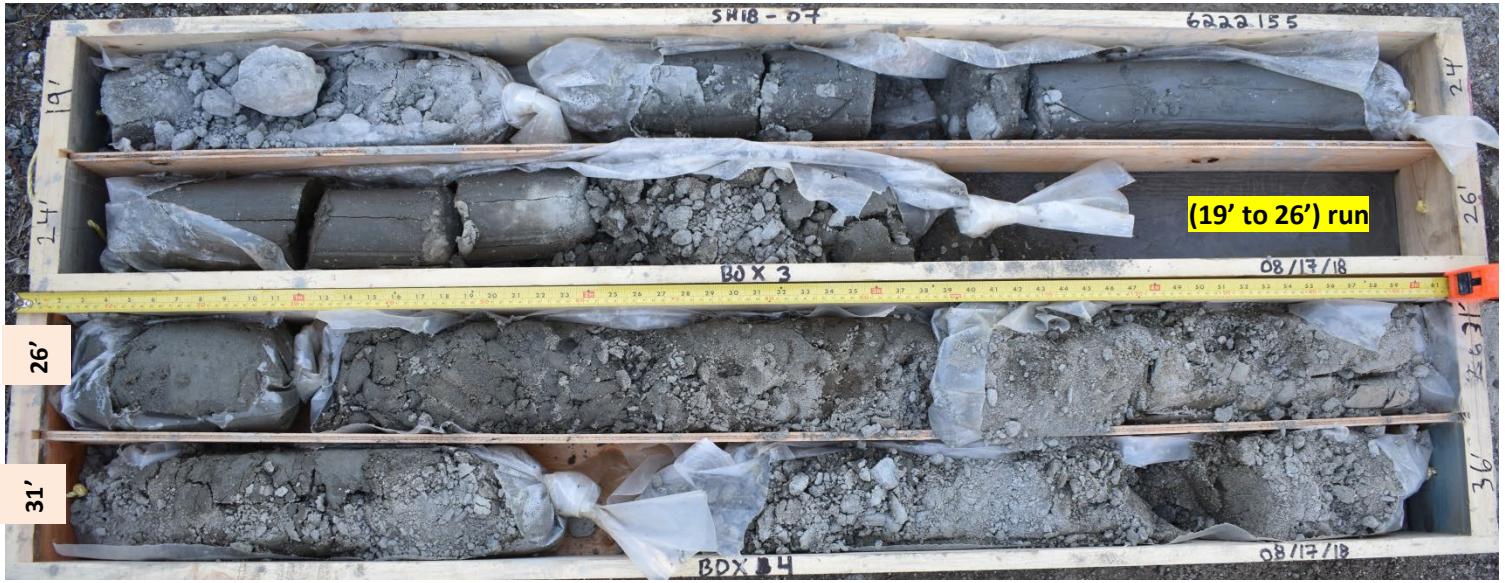
## SH18-06 Core Photographs: Box 21 - 23 of 23: 59.7 m to 67.4 m (196' to 221')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B21 | **Rev.** 0 |

AECOM




Box 1 and 2: 2.1 m to 5.8 m (7' to 19')



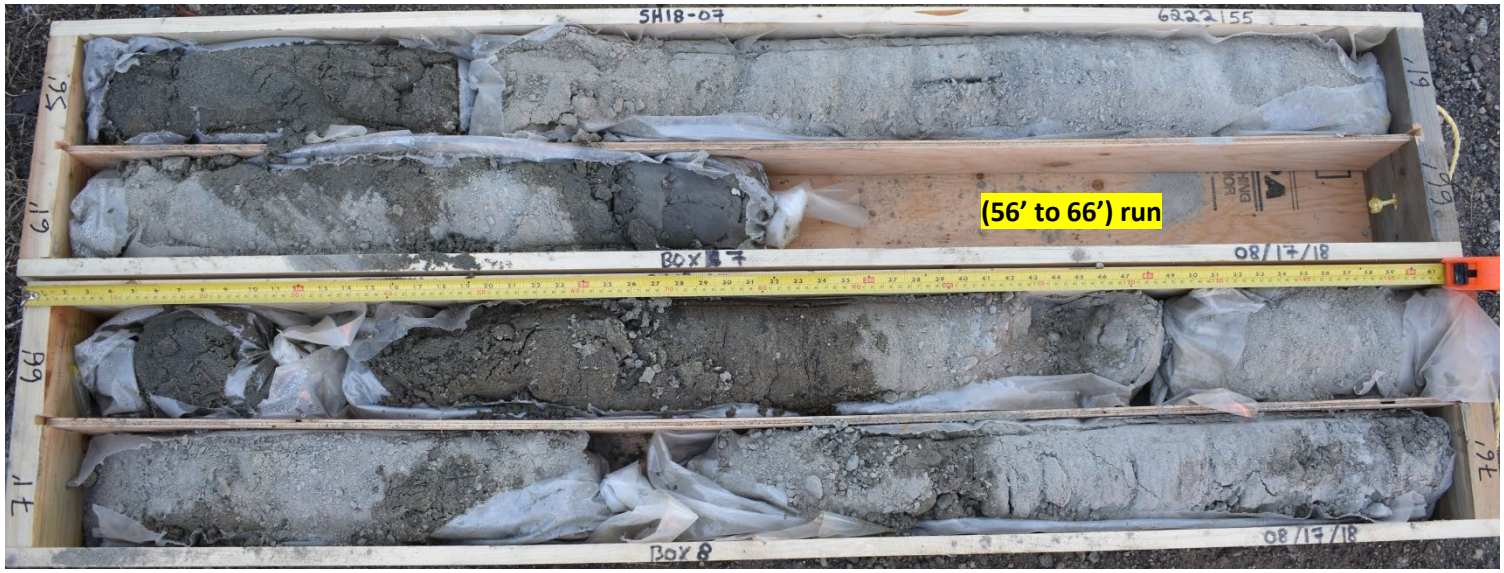

Box 3 and 4: 5.8 m to 11 m (19' to 36')

## SH18-07 Core Photographs: Box 1 - 4 of 24: 2.1 m to 11 m (7' to 36')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B22 | **Rev.** 0 |

AECOM


**Box 5 and 6: 11 m to 17.1 m (36' to 56')**




**Box 7 and 8: 17.1 m to 23.2 m (56' to 76')**

## SH18-07 Core Photographs: Box 5 - 8 of 24: 11 m to 23.2 m (36' to 76')

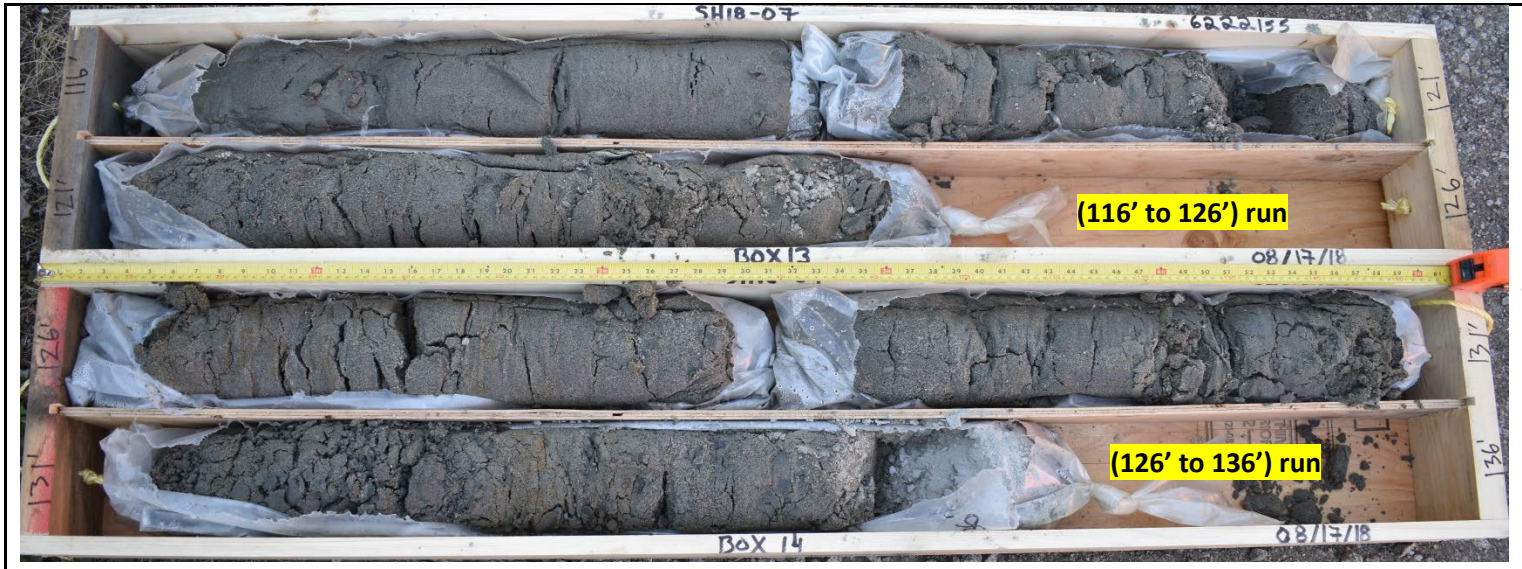
| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B23 | **Rev.** 0 |


**Box 9 and 10: 23.2 m to 29.3 m (76’ to 96’)**

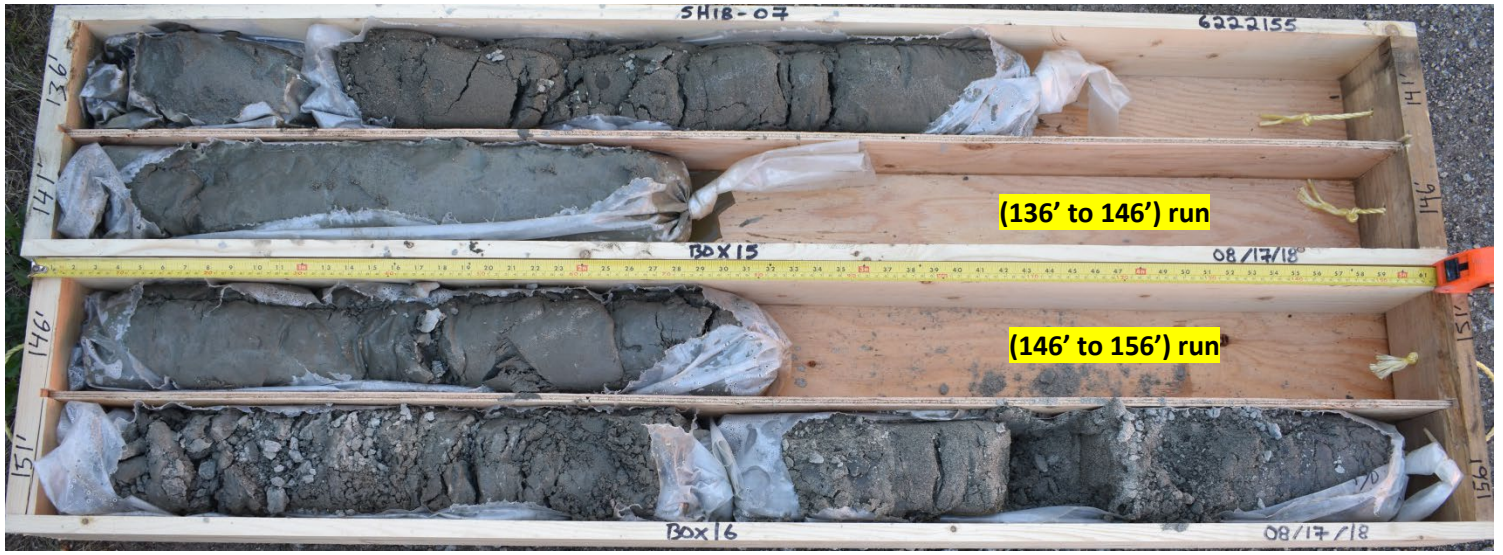

**Box 11 and 12: 29.3 m to 35.4 m (96’ to 116’)**

## SH18-07 Core Photographs: Box 9 - 12 of 24: 23.2 m to 35.4 m (76’ to 116’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B24 | **Rev.** 0 |




**Box 13 and 14: 35.4 m to 41.5 m (116' to 136')**




**Box 15 and 16: 41.5 m to 47.6 m (136' to 156')**

## SH18-07 Core Photographs: Box 13 - 16 of 24: 35.4 m to 47.6 m (116' to 156')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B25 | **Rev.** 0 |

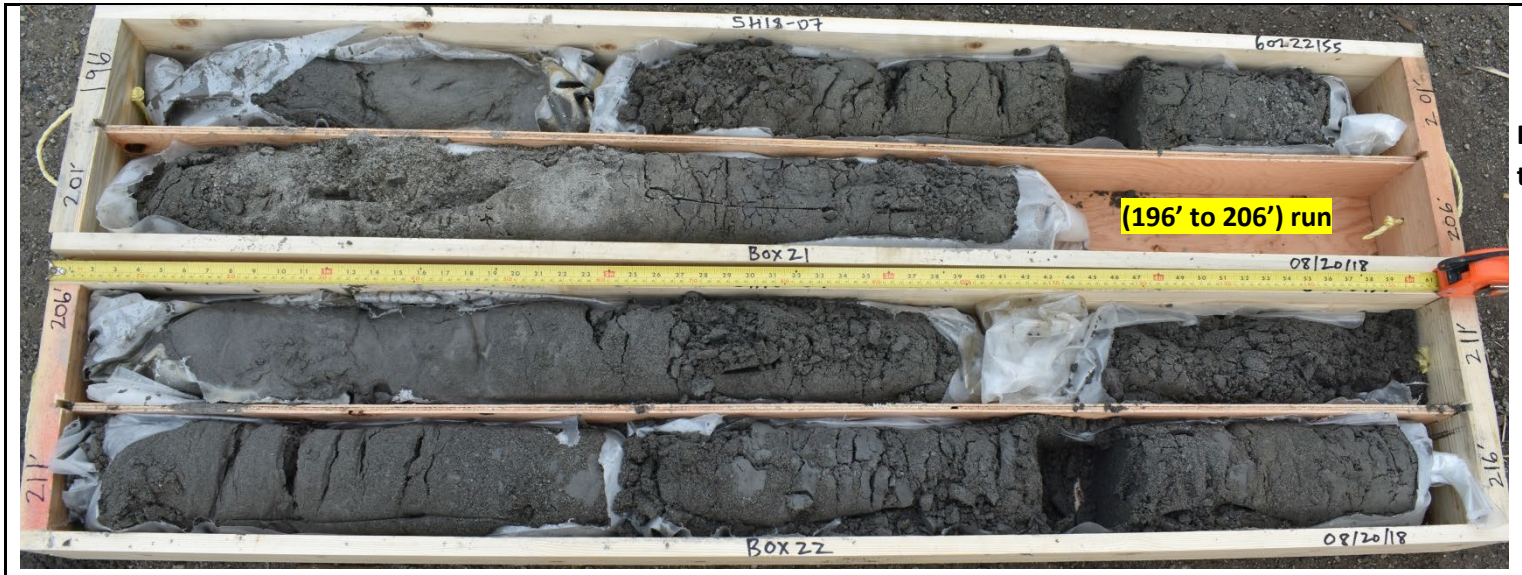
AECOM


**Box 17 and 18: 47.6 m to 53.6 m (156’ to 176’)**

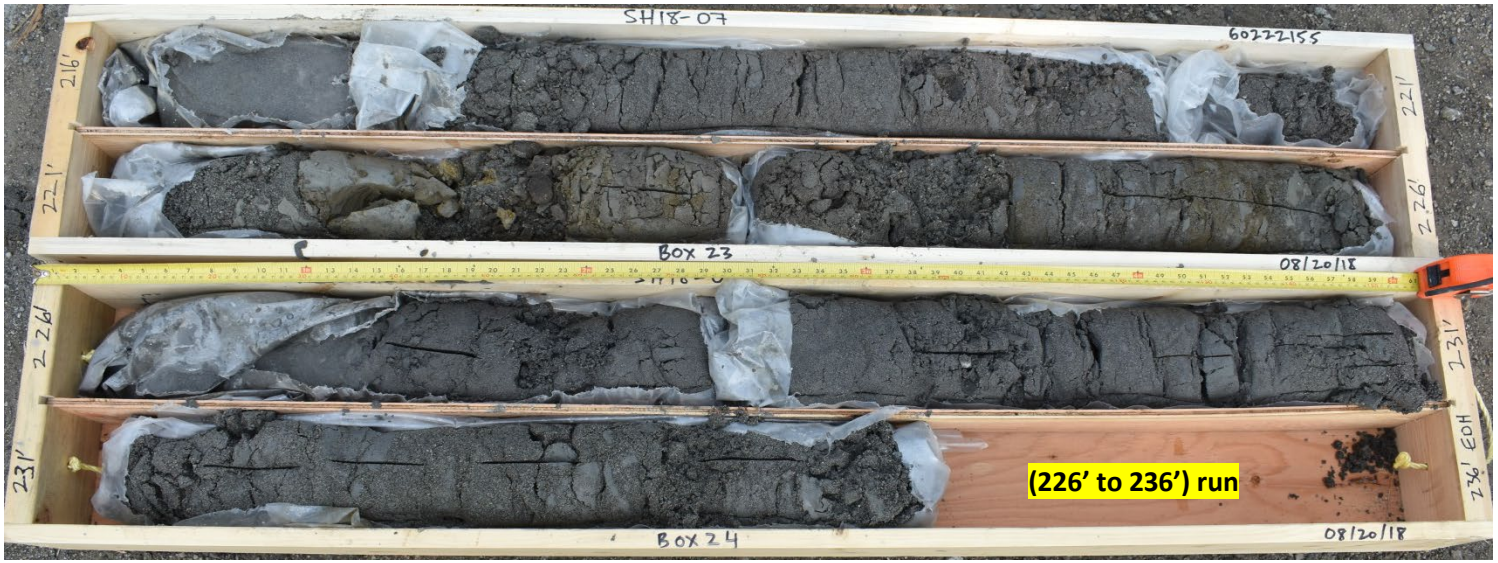

**Box 19 and 20: 53.6 m to 59.7 m (176’ to 196’)**

## SH18-07 Core Photographs: Box 17 - 20 of 24: 47.6 m to 59.7 m (156’ to 196’)

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B26 | **Rev.** 0 |




**Box 21 and 22: 59.7 m to 65.8 m (196' to 216')**




**Box 23 and 24: 65.8 m to 71.9 m (216' to 236')**

## SH18-07 Core Photographs: Box 21 - 24 of 24: 59.7 m to 71.9 m (196' to 236')

| | | |
|---|---|---|
| **Project Name:** Area B Slope Stability and Protection | **Site Location:** University Endowment Lands, Vancouver, BC | **Project Number:** 60530081 |
| **Date:** April 5, 2019 | **Figure No.**: B27 | **Rev.** 0 |

# Appendix C: Laboratory Test Results

# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

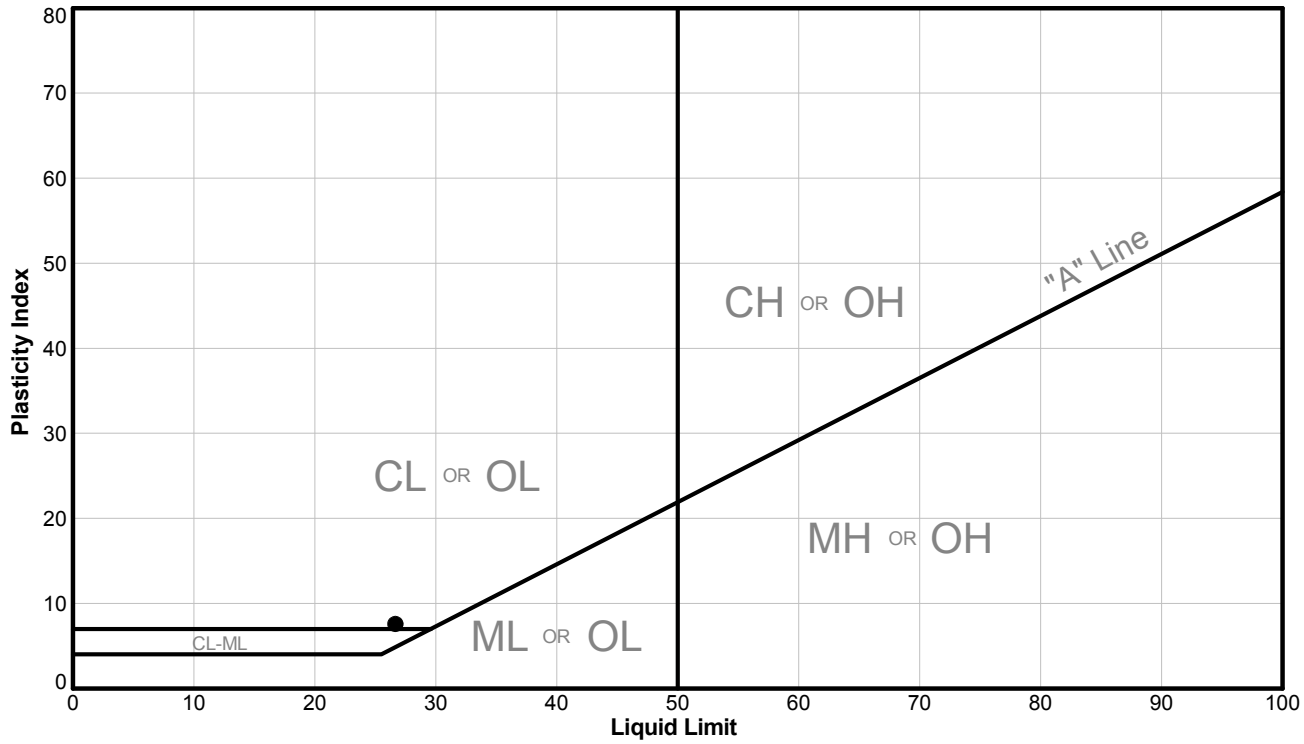
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-03** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **17** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 48.77 to 48.92 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |
|---|---|

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-03 | 17 | 48.77 | 48.92 | 100 | 27 | 19 | 8.0 | 22.3 | 0.4 |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| FF/SJ | 9/11/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |

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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

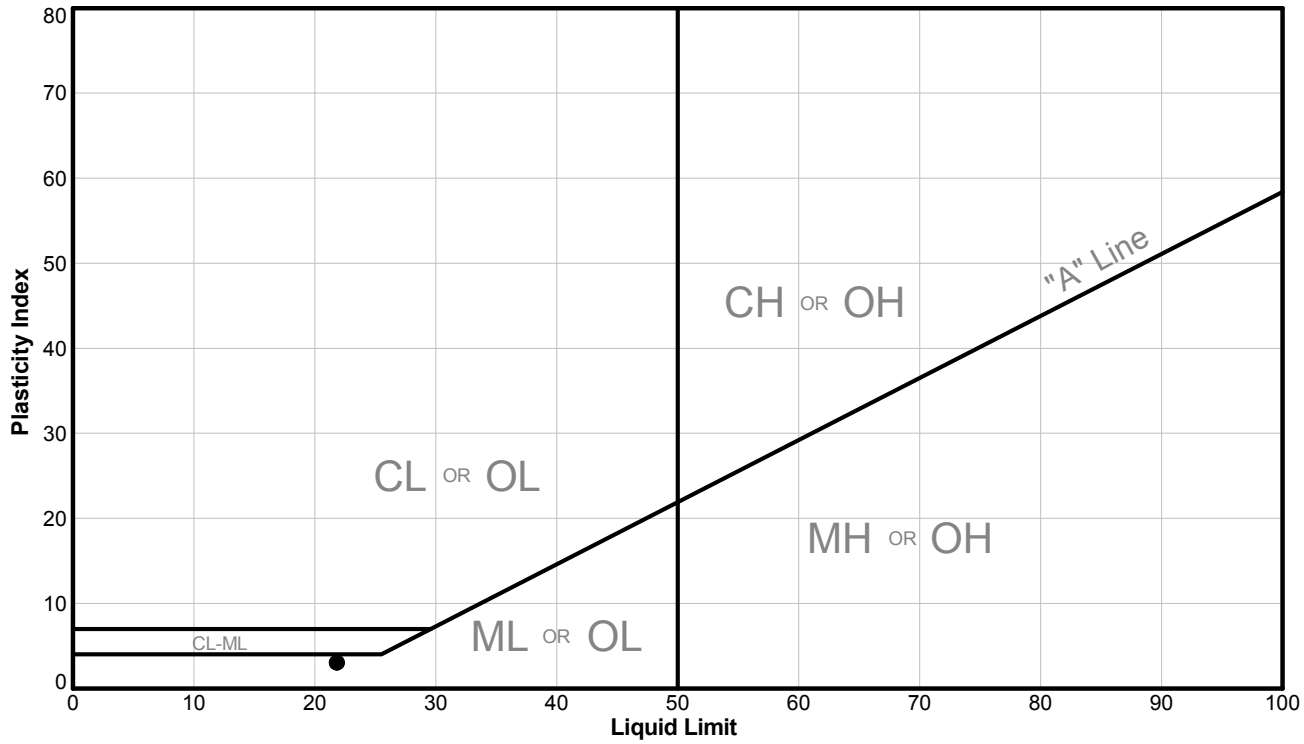
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-03** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **19** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 51.82 to 51.97 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| | |
|---|---|
| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-03 | 19 | 51.82 | 51.97 | 100 | 22 | 19 | 3.0 | 23.4 | 1.5 |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| | | | |
|---|---|---|---|
| **FF** | **9/12/2018** | **LH** | **9/19/2018** |
| Tech | Date | Checked | Date |



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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

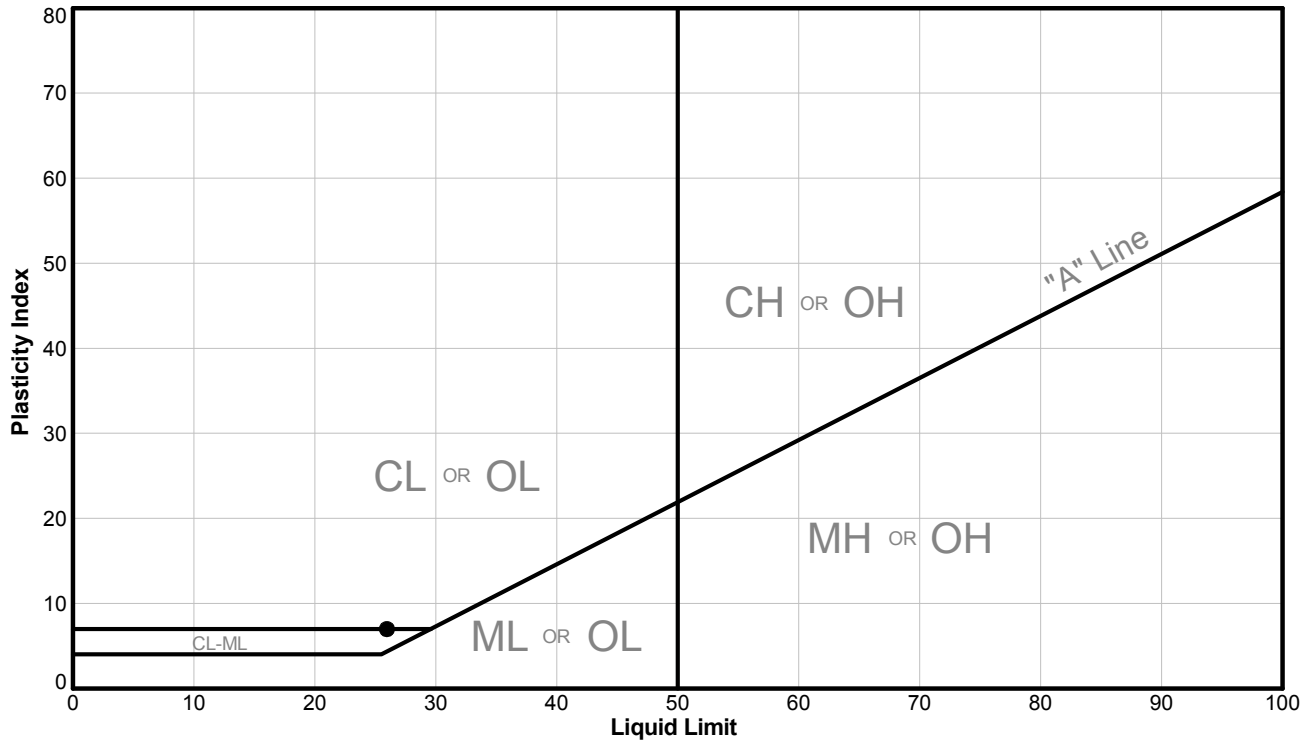
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-04** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **13** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 25.76 to 25.91 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |
|---|---|

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-04 | 13 | 25.76 | 25.91 | 97 | 26 | 19 | 7.0 | 25.5 | 0.9 |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| **SJ** | **9/13/2018** | **LH** | **9/19/2018** |
|---|---|---|---|
| Tech | Date | Checked | Date |



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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

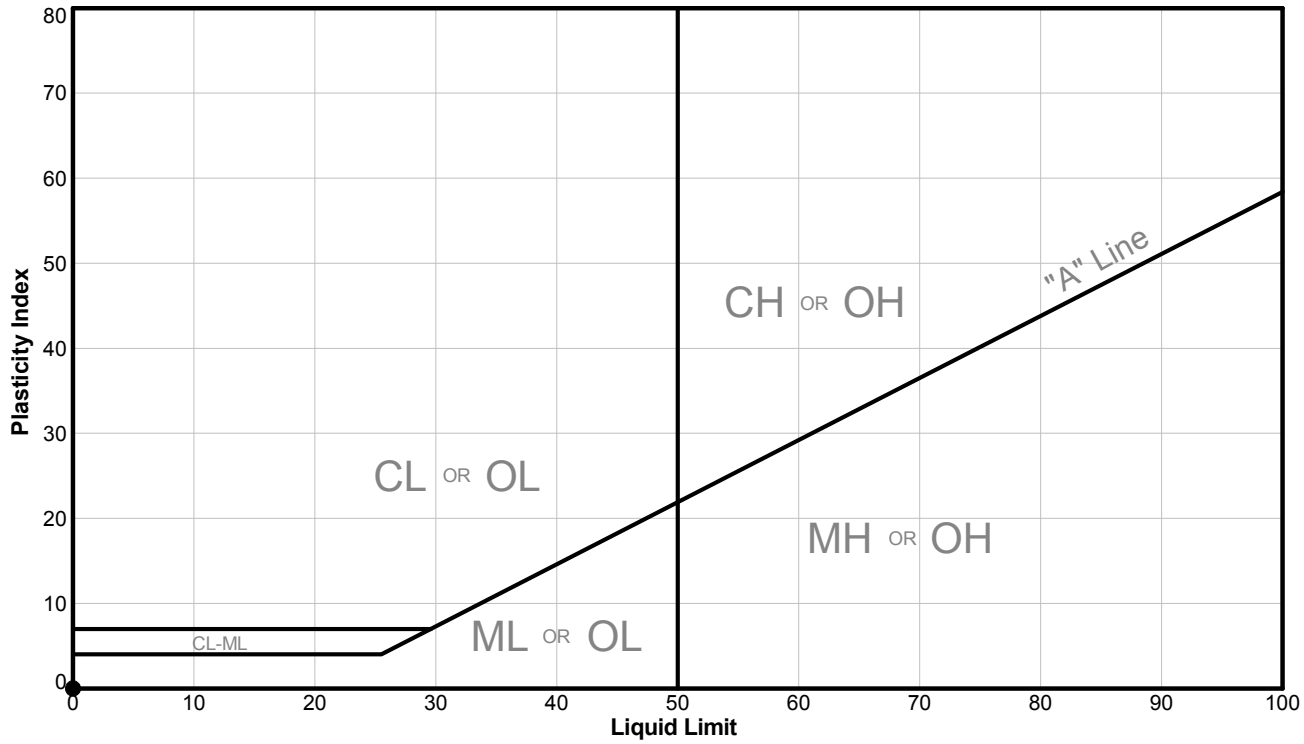
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-04** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **15** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 31.55 to 31.70 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| | |
|---|---|
| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-04 | 15 | 31.55 | 31.70 | 100 | NP | NP | NP | 24.7 | NP |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| FF | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

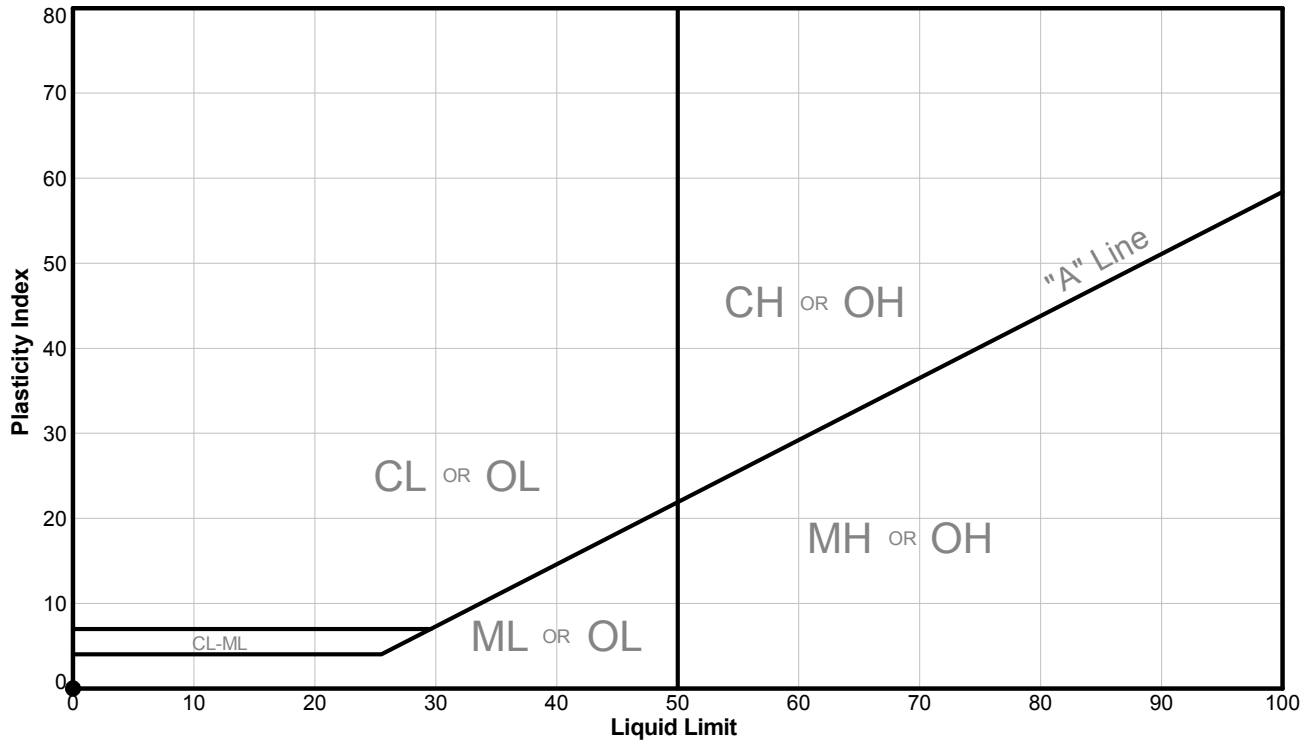
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-06** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **6** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 4.88 to 5.49 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| | |
|---|---|
| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-06 | 6 | 4.88 | 5.49 | 62 | NP | NP | NP | 11.2 | NP |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| FF | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

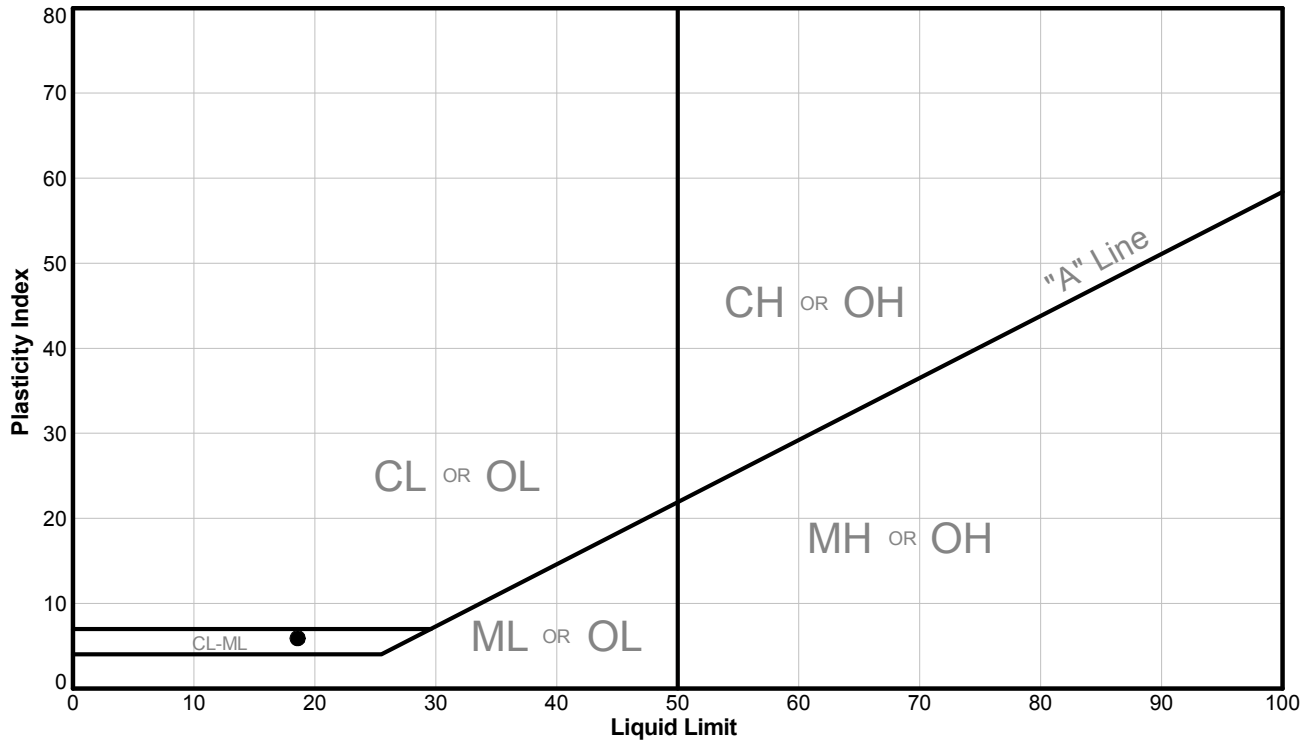
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-06** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **7** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 6.40 to 6.71 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| | |
|---|---|
| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-06 | 7 | 6.40 | 6.71 | 72 | 19 | 13 | 6.0 | 6.1 | -1.1 |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| | | | |
|---|---|---|---|
| **FF** | **9/13/2018** | **LH** | **9/19/2018** |
| Tech | Date | Checked | Date |



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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

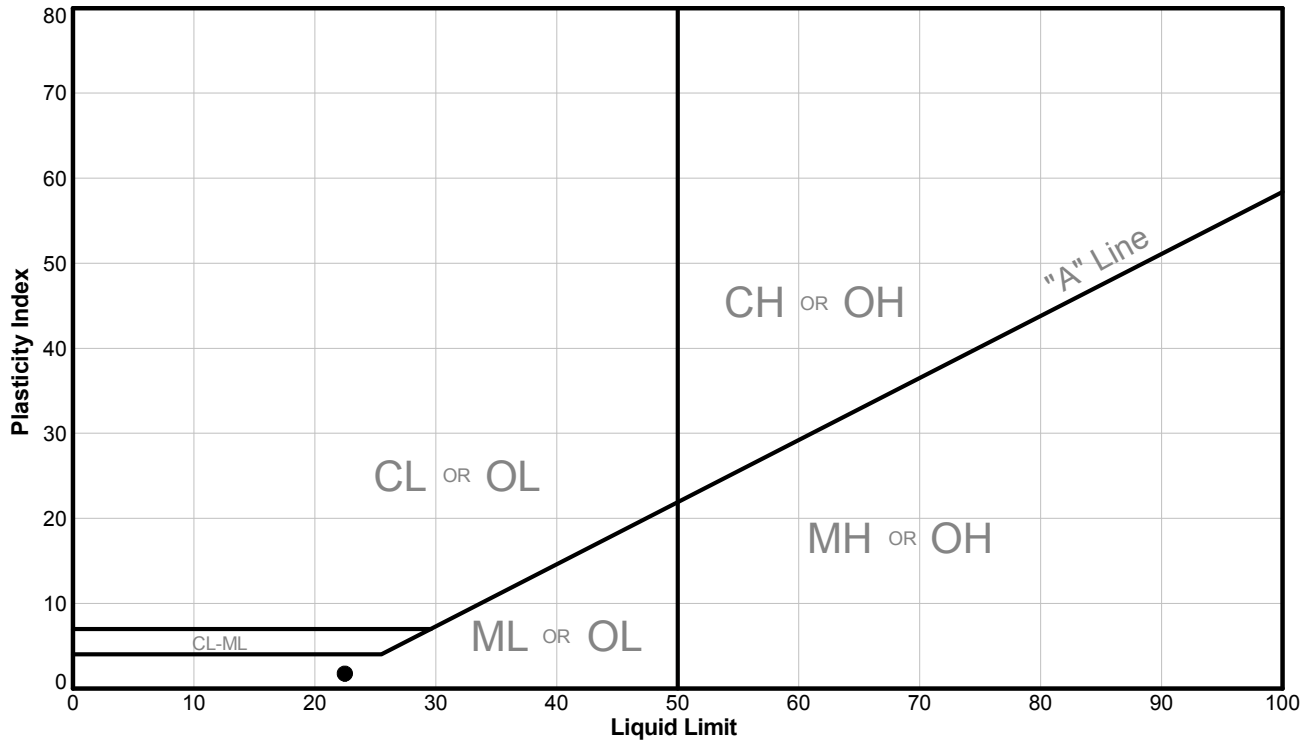
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-06** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **19** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 39.62 to 39.78 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| | |
|---|---|
| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-06 | 19 | 39.62 | 39.78 | 100 | 22 | 21 | 1.0 | 24.5 | 3.5 |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

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|---|---|---|---|
| Tech | Date | Checked | Date |



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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

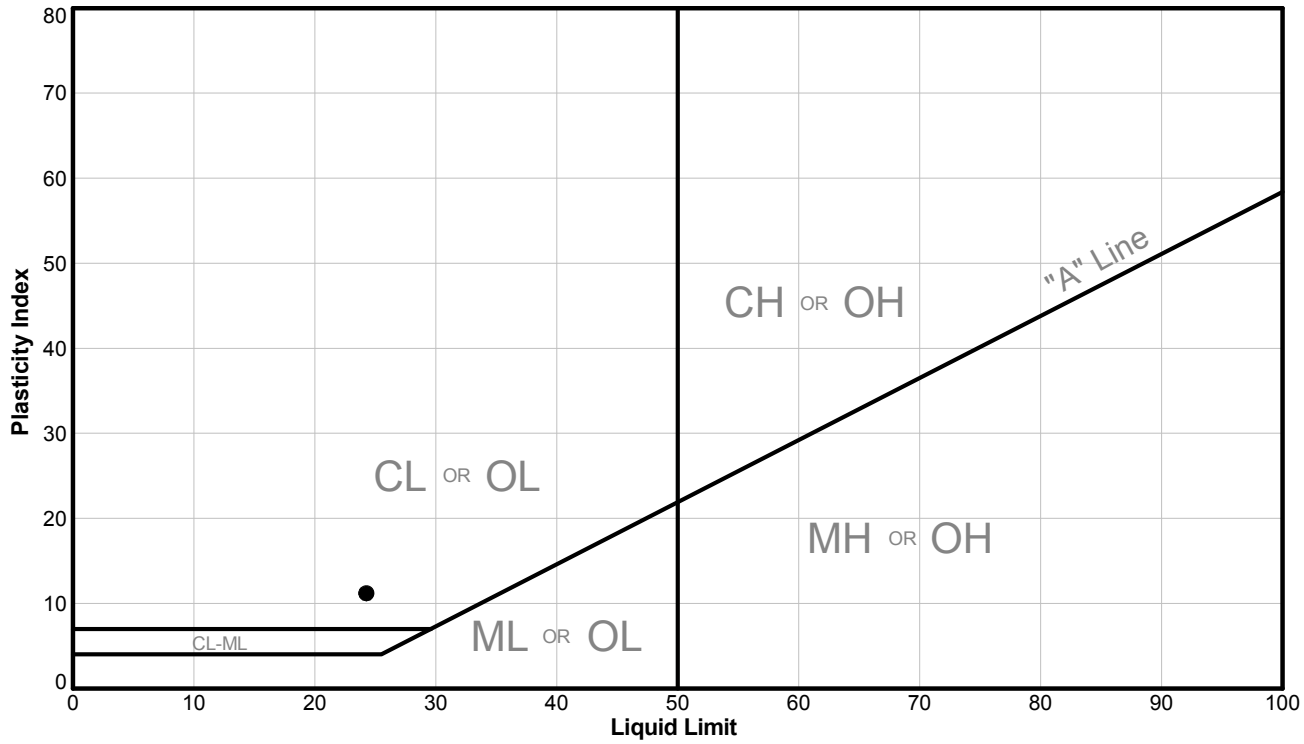
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-07** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **4** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 3.66 to 4.27 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |
|---|---|

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-07 | 4 | 3.66 | 4.27 | 75 | 24 | 13 | 11.0 | 14.7 | 0.2 |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| FF | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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# LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

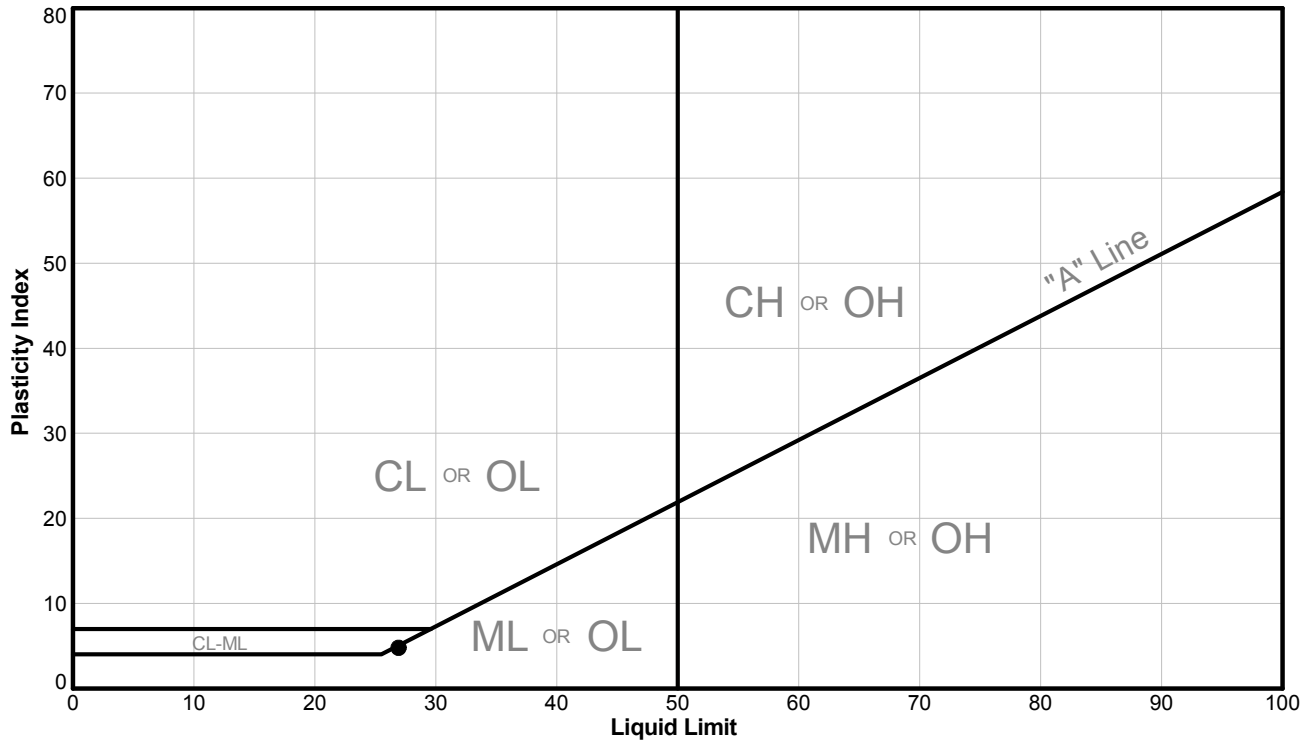
**ASTM D 4318-10**

| | | | |
|---|---|---|---|
| **Client:** | AECOM | **ID:** | **SH18-07** |
| **Project:** | Area B Slope Stability and Protection | **Sample No.:** | **21** |
| **Location:** | University Endowmwnt Lands, Vancouver, BC | **Depth Interval (m):** | 51.36 to 51.51 |
| **Project No.:** | 1895473 **Phase:** 1000 | **Lab Schedule No.:** | |

**Other Remarks:** **N/A**

| | |
|---|---|
| **Test Method: A-Multi Point** | **Preparation Method: Air Dried** |

**PLASTICITY CHART**




| Sym. | Sample Location | Sample / Specimen Number | Depth (m) | Bottom (m) | Percent Passing #40 Sieve (%) | Liquid Limit | Plastic Limit | Plasticity Index | Natural Water Content (%) | Liquidity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | SH18-07 | 21 | 51.36 | 51.51 | 100 | 27 | 22 | 5.0 | 23.4 | 0.3 |

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

***Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.***

| FF | 9/11/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |

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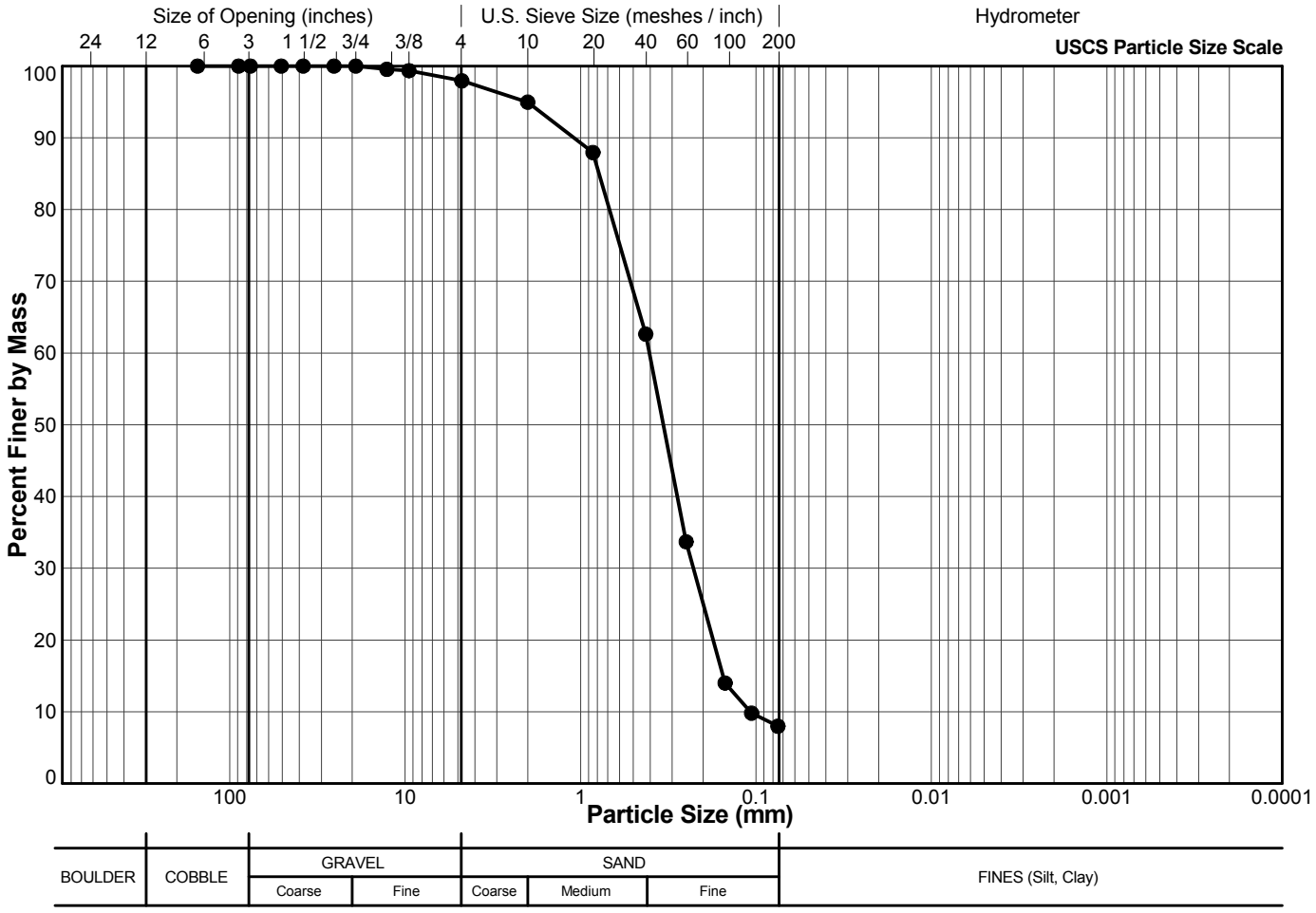
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 4
**Depth Interval (m):** 2.90 to 3.51
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 99.5 |
| 3/8" | 9.5 | | 99.4 |
| #4 US MESH | 4.75 | | 97.9 |
| #10 US MESH | 2 | | 95.0 |
| #20 US MESH | 0.85 | | 88.0 |
| #40 US MESH | 0.425 | | 62.6 |
| #60 US MESH | 0.25 | | 33.7 |
| #100 US MESH | 0.15 | | 14.0 |
| #140 US MESH | 0.106 | | 9.8 |
| #200 US MESH | 0.075 | | 8.0 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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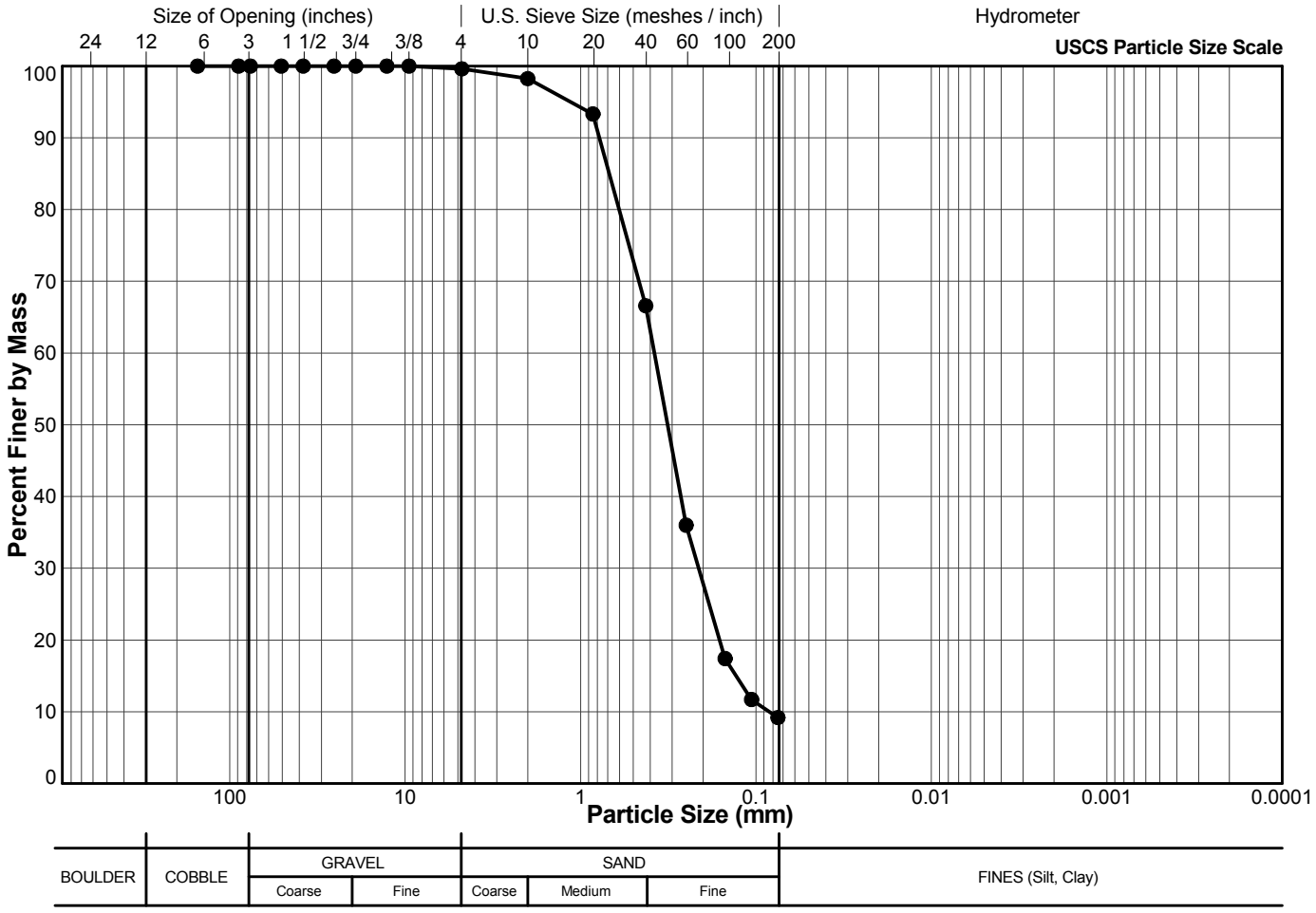
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 6
**Depth Interval (m):** 7.92 to 8.53
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 99.6 |
| #10 US MESH | 2 | | 98.3 |
| #20 US MESH | 0.85 | | 93.3 |
| #40 US MESH | 0.425 | | 66.6 |
| #60 US MESH | 0.25 | | 36.0 |
| #100 US MESH | 0.15 | | 17.4 |
| #140 US MESH | 0.106 | | 11.7 |
| #200 US MESH | 0.075 | | 9.2 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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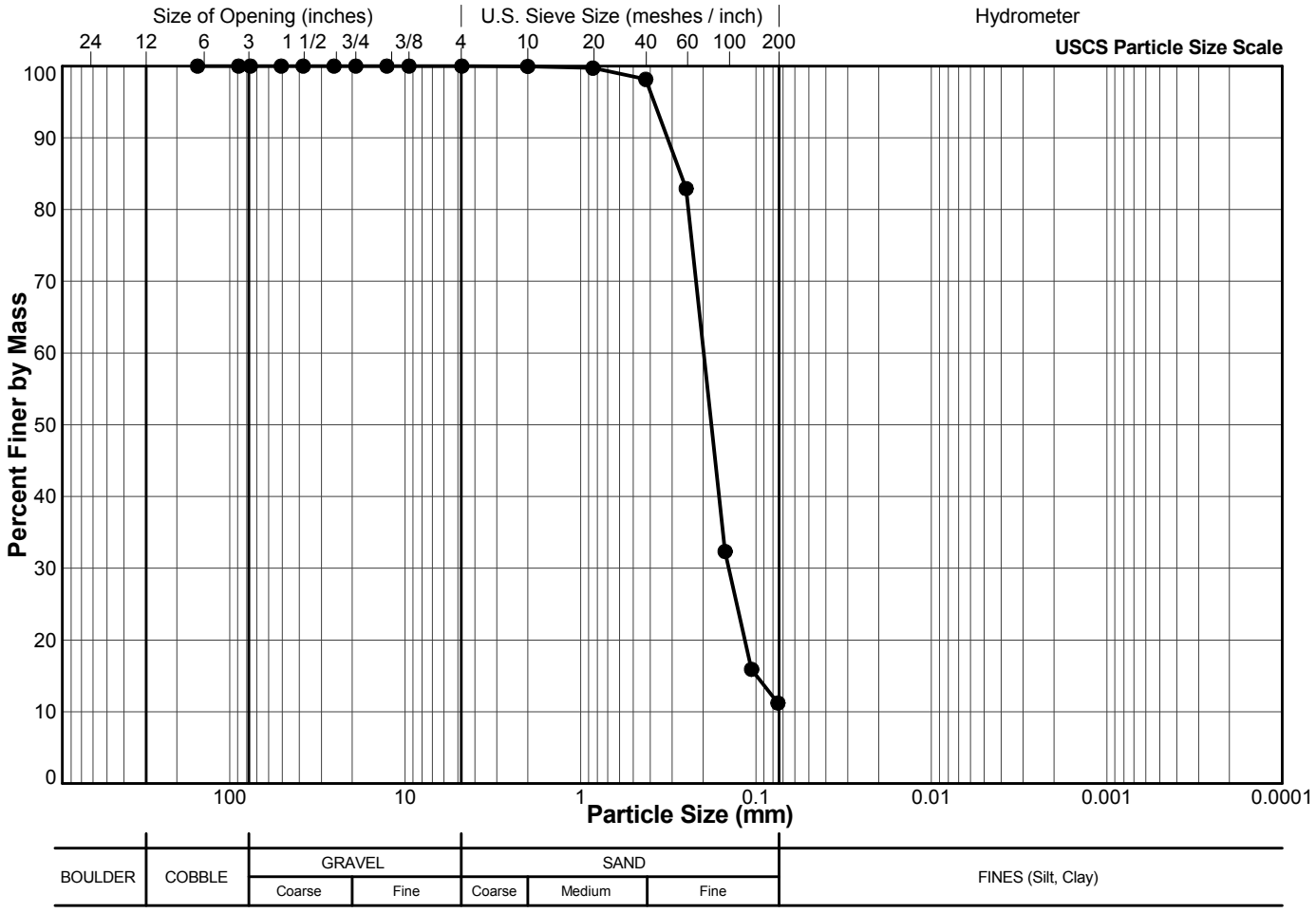
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 8
**Depth Interval (m):** 10.97 to 11.58
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 99.7 |
| #40 US MESH | 0.425 | | 98.2 |
| #60 US MESH | 0.25 | | 82.9 |
| #100 US MESH | 0.15 | | 32.3 |
| #140 US MESH | 0.106 | | 15.9 |
| #200 US MESH | 0.075 | | 11.2 |

| BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
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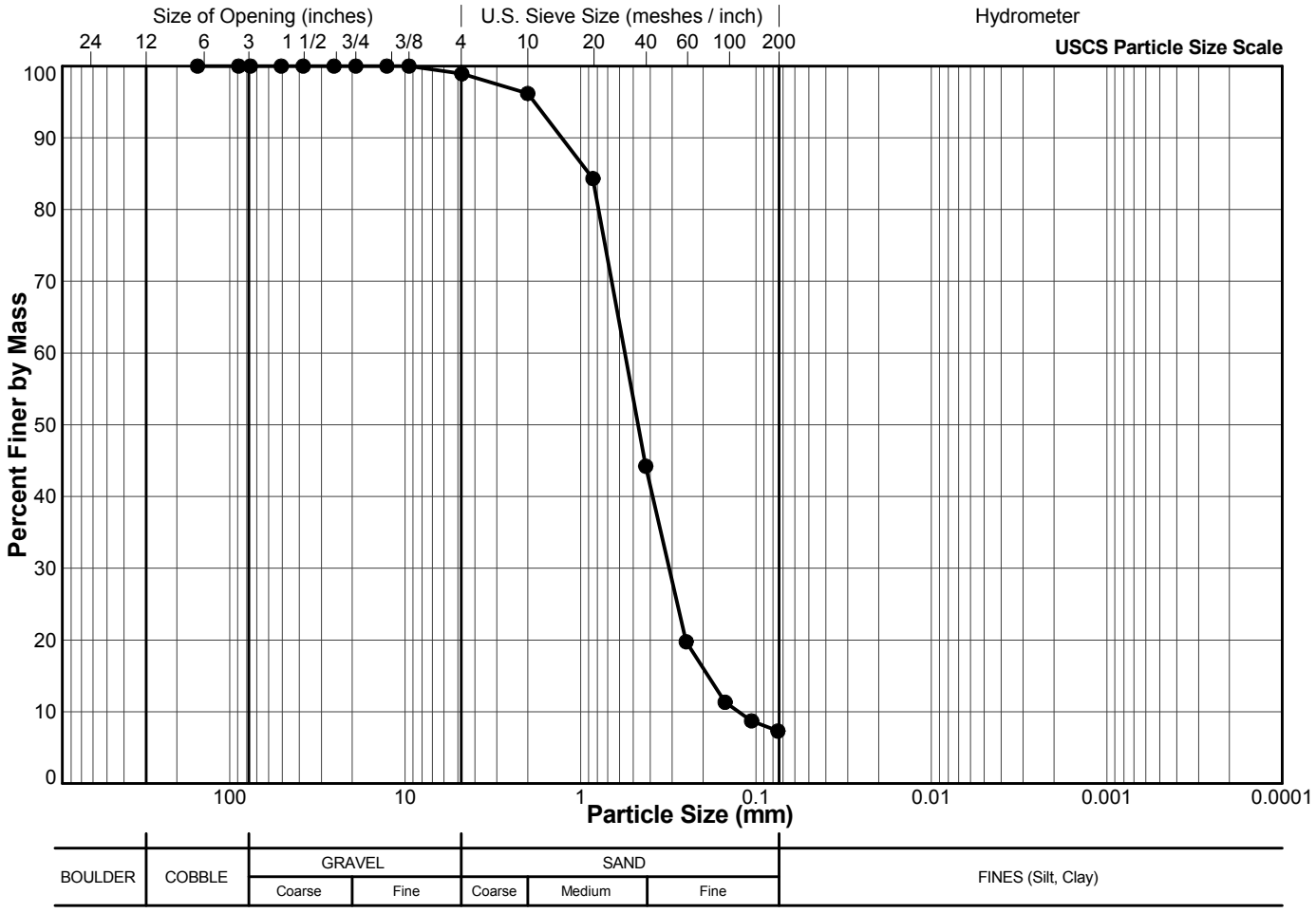
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 10
**Depth Interval (m):** 20.27 to 20.57
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 98.9 |
| #10 US MESH | 2 | | 96.2 |
| #20 US MESH | 0.85 | | 84.3 |
| #40 US MESH | 0.425 | | 44.2 |
| #60 US MESH | 0.25 | | 19.8 |
| #100 US MESH | 0.15 | | 11.3 |
| #140 US MESH | 0.106 | | 8.7 |
| #200 US MESH | 0.075 | | 7.3 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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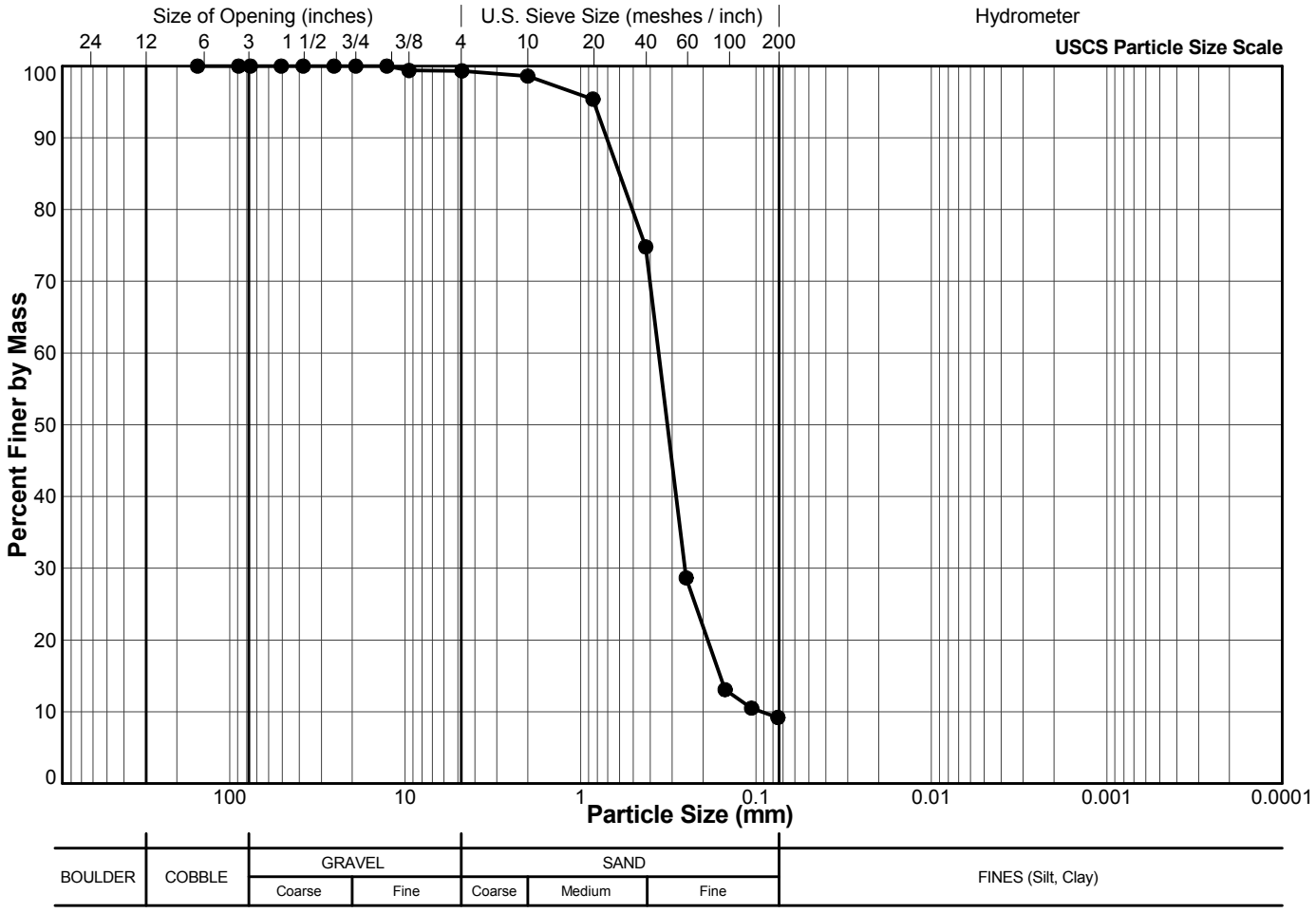
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 13
**Depth Interval (m):** 32.92 to 33.07
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 99.4 |
| #4 US MESH | 4.75 | | 99.3 |
| #10 US MESH | 2 | | 98.6 |
| #20 US MESH | 0.85 | | 95.4 |
| #40 US MESH | 0.425 | | 74.8 |
| #60 US MESH | 0.25 | | 28.7 |
| #100 US MESH | 0.15 | | 13.1 |
| #140 US MESH | 0.106 | | 10.5 |
| #200 US MESH | 0.075 | | 9.2 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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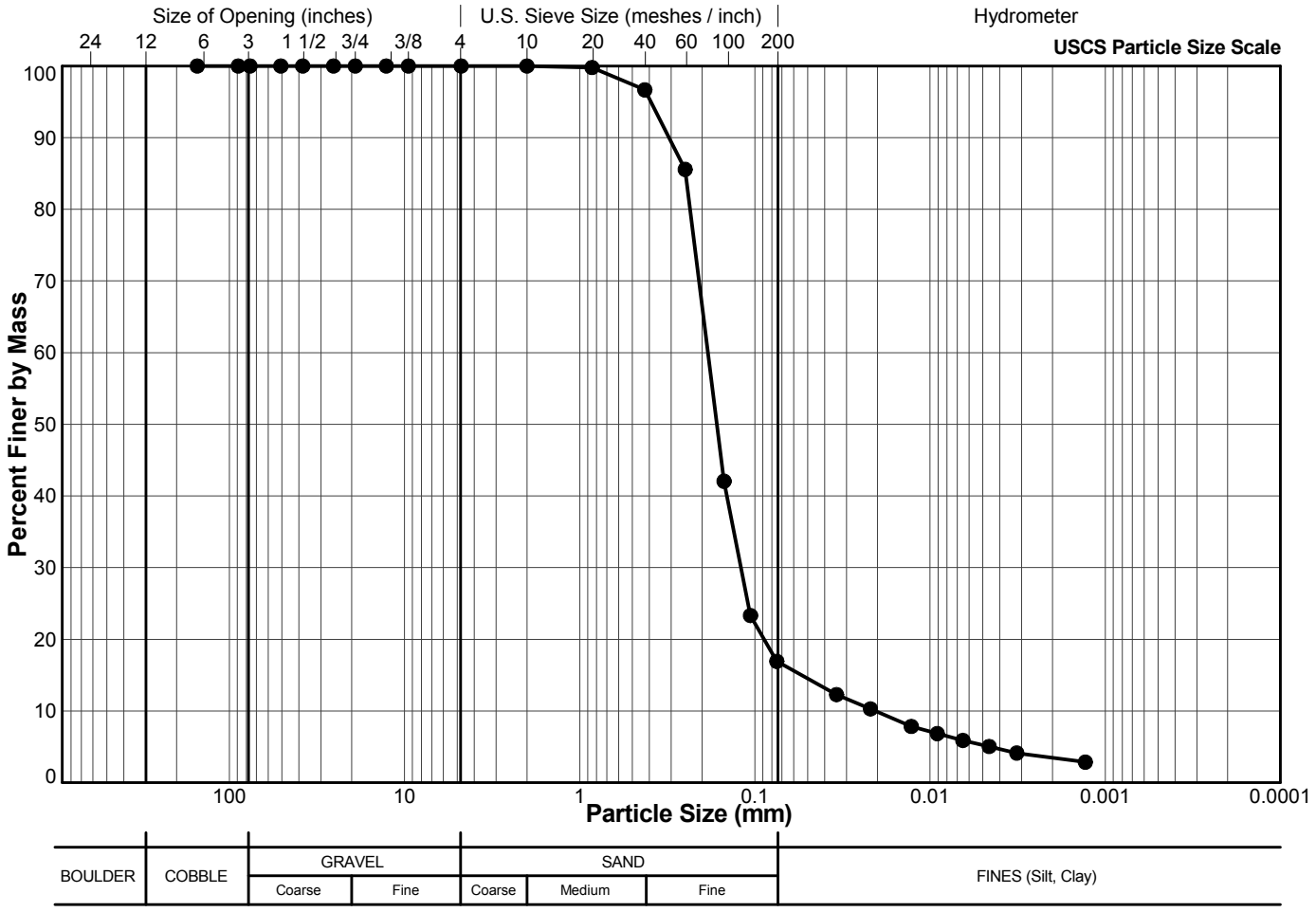
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 16
**Depth Interval (m):** 45.11 to 45.26
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 99.8 |
| #40 US MESH | 0.425 | | 96.7 |
| #60 US MESH | 0.25 | | 85.6 |
| #100 US MESH | 0.15 | | 42.1 |
| #140 US MESH | 0.106 | | 23.3 |
| #200 US MESH | 0.075 | | 16.9 |
| | | 0.0342 | 12.3 |
| | | 0.0219 | 10.3 |
| | | 0.0128 | 7.8 |
| | | 0.0091 | 6.8 |
| | | 0.0065 | 5.9 |
| | | 0.0046 | 5.0 |
| | | 0.0032 | 4.1 |
| | | 0.0013 | 2.9 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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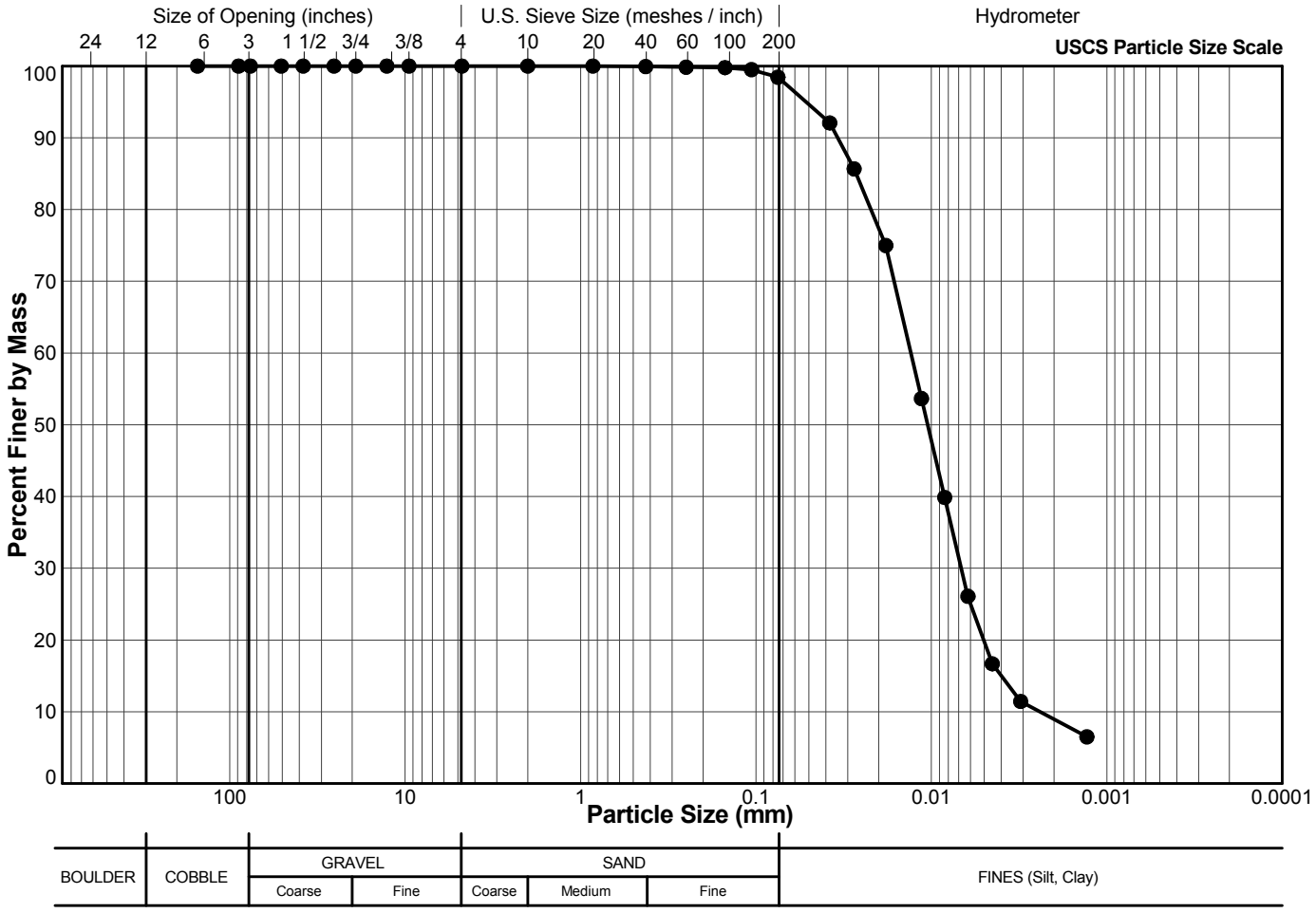
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 17
**Depth Interval (m):** 48.77 to 48.92
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 99.9 |
| #60 US MESH | 0.25 | | 99.8 |
| #100 US MESH | 0.15 | | 99.8 |
| #140 US MESH | 0.106 | | 99.5 |
| #200 US MESH | 0.075 | | 98.4 |
| | | 0.0380 | 92.1 |
| | | 0.0276 | 85.7 |
| | | 0.0182 | 75.0 |
| | | 0.0114 | 53.7 |
| | | 0.0084 | 39.9 |
| | | 0.0062 | 26.1 |
| | | 0.0045 | 16.7 |
| | | 0.0031 | 11.4 |
| | | 0.0013 | 6.5 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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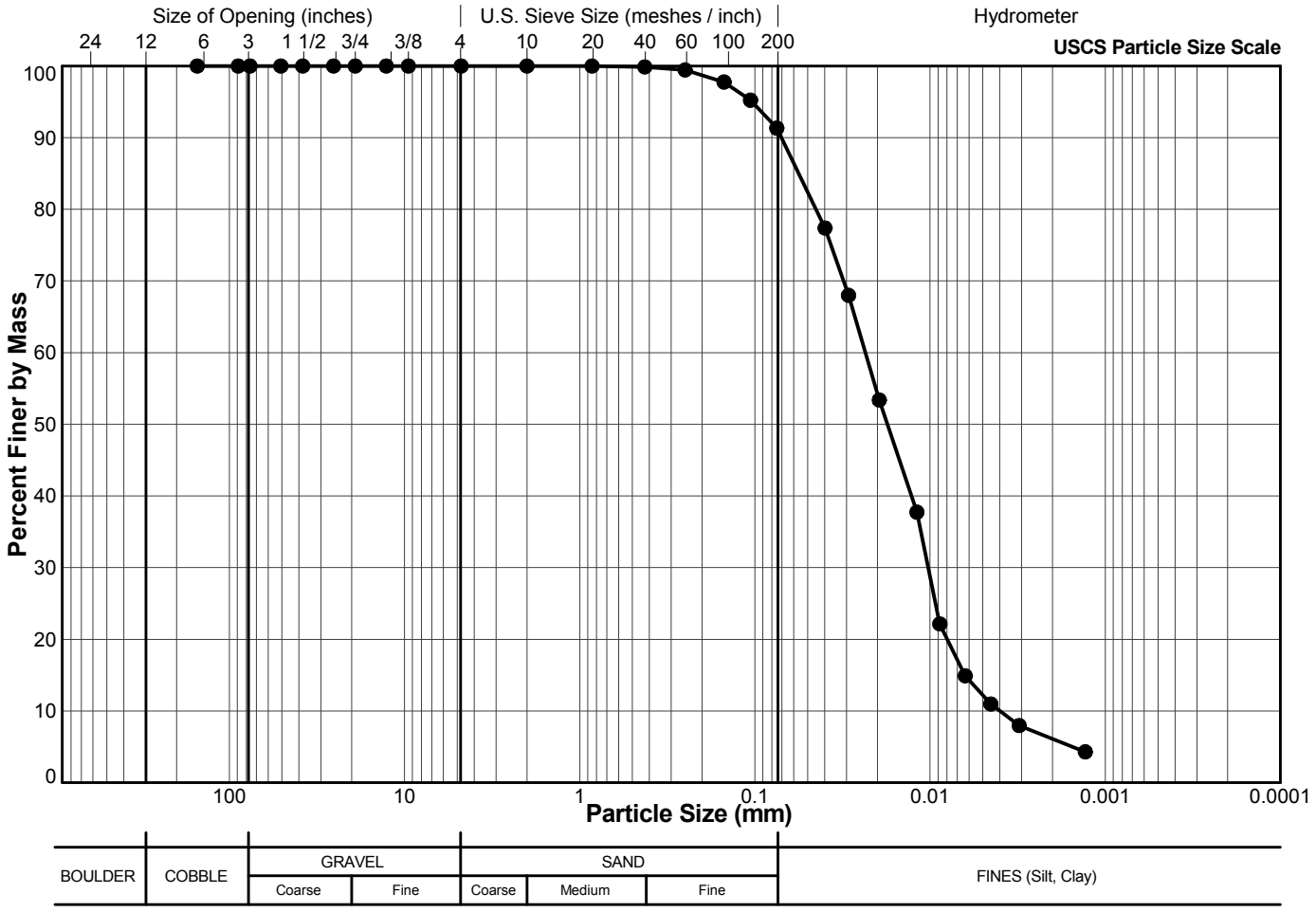
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 19
**Depth Interval (m):** 51.82 to 51.97
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 99.9 |
| #60 US MESH | 0.25 | | 99.5 |
| #100 US MESH | 0.15 | | 97.8 |
| #140 US MESH | 0.106 | | 95.2 |
| #200 US MESH | 0.075 | | 91.3 |
| | | 0.0398 | 77.4 |
| | | 0.0292 | 68.0 |
| | | 0.0195 | 53.4 |
| | | 0.0119 | 37.7 |
| | | 0.0088 | 22.1 |
| | | 0.0063 | 14.9 |
| | | 0.0045 | 11.0 |
| | | 0.0031 | 8.0 |
| | | 0.0013 | 4.3 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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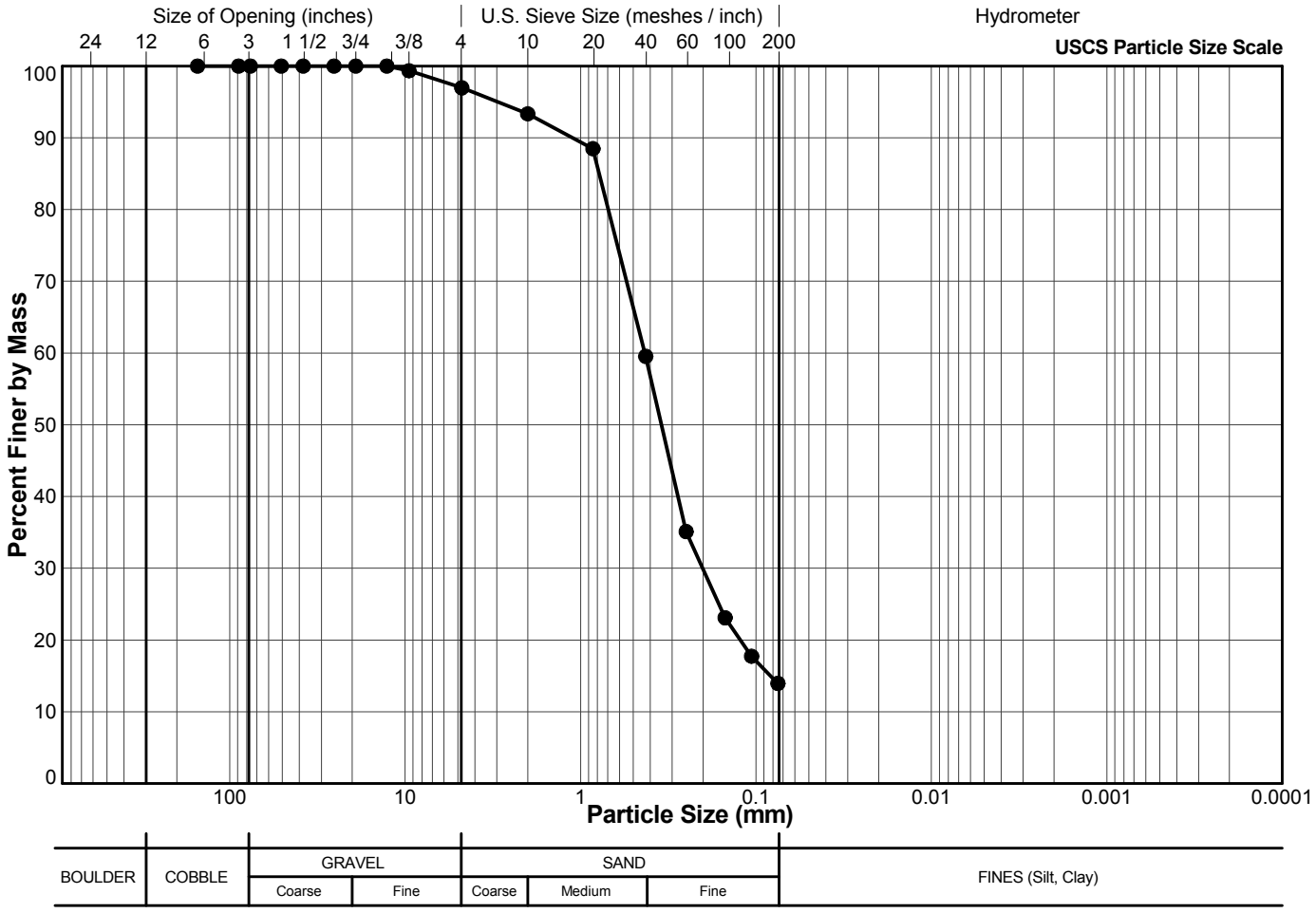
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 21
**Depth Interval (m):** 56.08 to 56.24
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 99.4 |
| #4 US MESH | 4.75 | | 97.0 |
| #10 US MESH | 2 | | 93.3 |
| #20 US MESH | 0.85 | | 88.5 |
| #40 US MESH | 0.425 | | 59.5 |
| #60 US MESH | 0.25 | | 35.1 |
| #100 US MESH | 0.15 | | 23.1 |
| #140 US MESH | 0.106 | | 17.7 |
| #200 US MESH | 0.075 | | 13.9 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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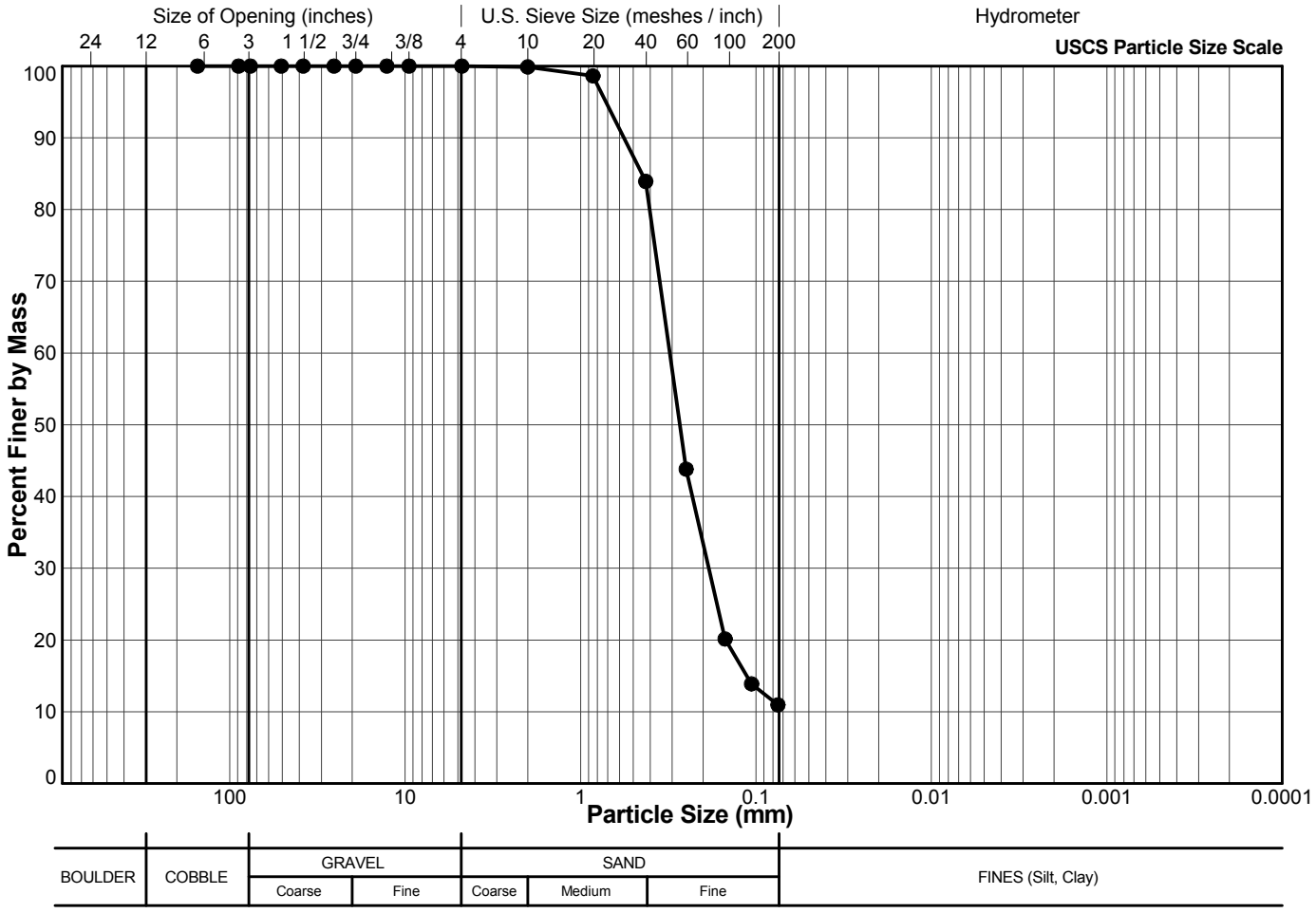
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-03
**Sample No.:** 25
**Depth Interval (m):** 66.75 to 66.90
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 99.9 |
| #20 US MESH | 0.85 | | 98.6 |
| #40 US MESH | 0.425 | | 83.9 |
| #60 US MESH | 0.25 | | 43.8 |
| #100 US MESH | 0.15 | | 20.1 |
| #140 US MESH | 0.106 | | 13.9 |
| #200 US MESH | 0.075 | | 11.0 |

| BH | 9/12/2018 | LH | 9/19/2018 |
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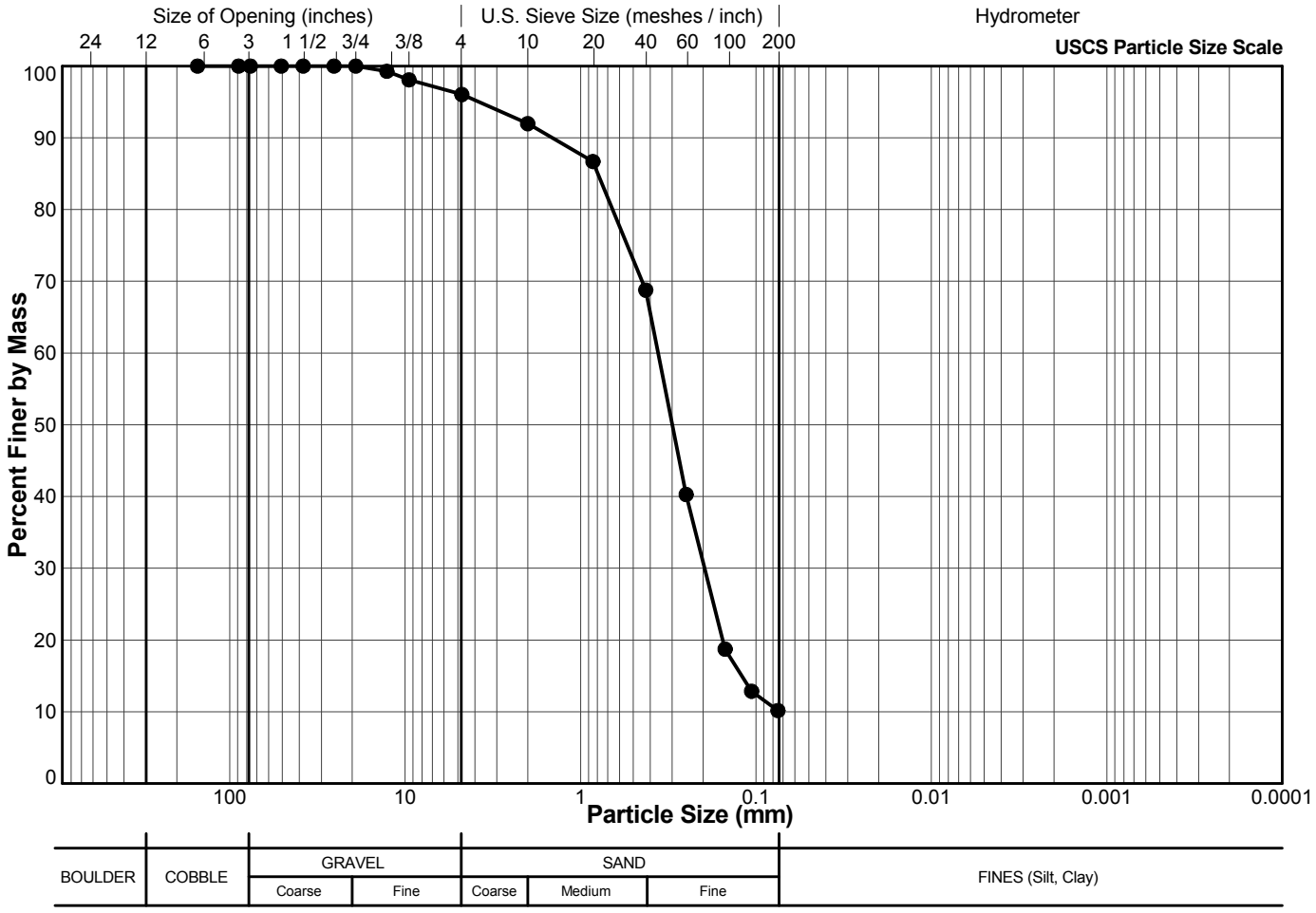
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 1
**Depth Interval (m):** 0.30 to 0.61
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 99.3 |
| 3/8" | 9.5 | | 98.1 |
| #4 US MESH | 4.75 | | 96.0 |
| #10 US MESH | 2 | | 92.0 |
| #20 US MESH | 0.85 | | 86.7 |
| #40 US MESH | 0.425 | | 68.8 |
| #60 US MESH | 0.25 | | 40.3 |
| #100 US MESH | 0.15 | | 18.7 |
| #140 US MESH | 0.106 | | 12.9 |
| #200 US MESH | 0.075 | | 10.2 |

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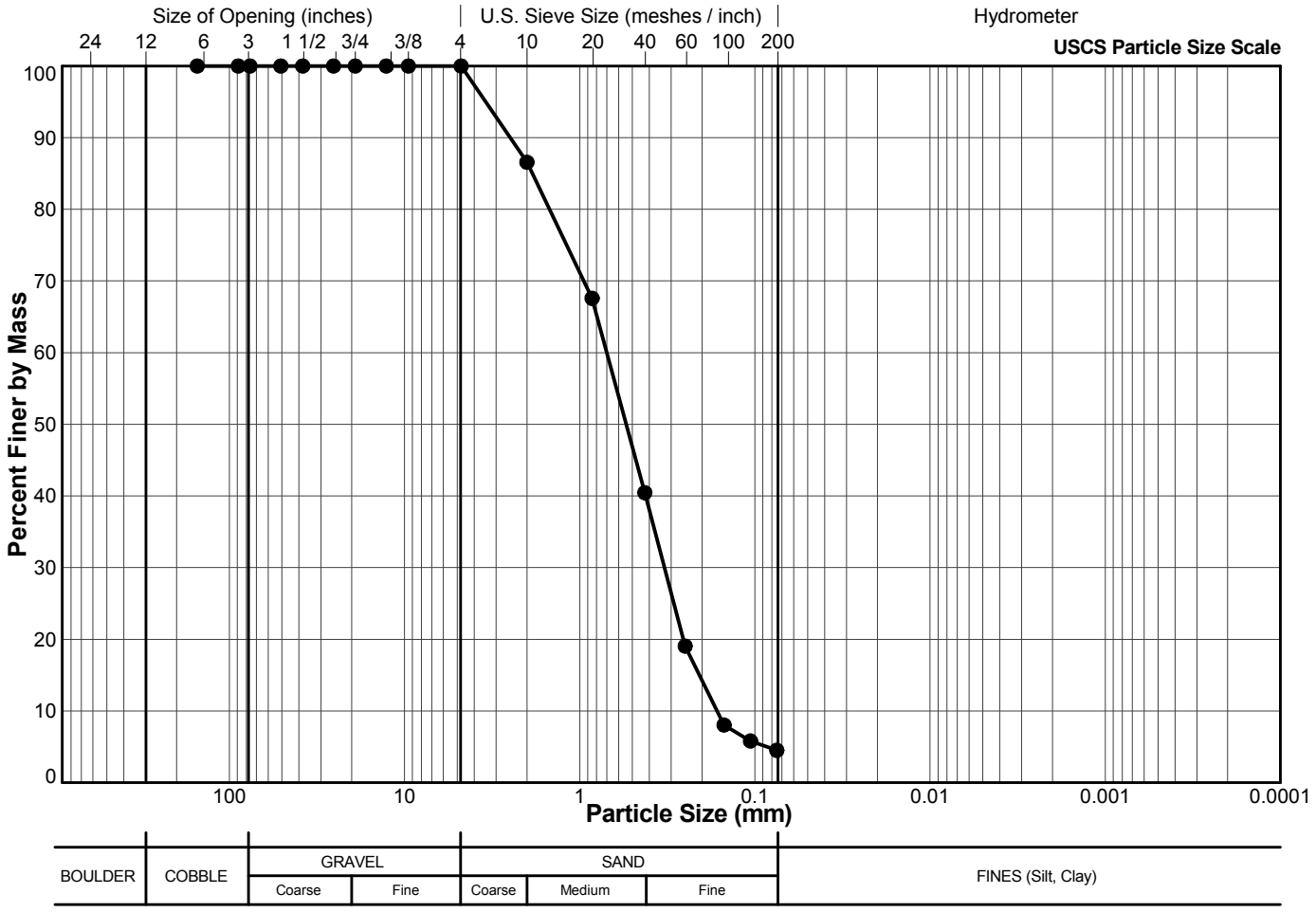
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 4
**Depth Interval (m):** 3.66 to 3.81
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 86.6 |
| #20 US MESH | 0.85 | | 67.6 |
| #40 US MESH | 0.425 | | 40.5 |
| #60 US MESH | 0.25 | | 19.1 |
| #100 US MESH | 0.15 | | 8.0 |
| #140 US MESH | 0.106 | | 5.8 |
| #200 US MESH | 0.075 | | 4.5 |

| BH | 9/13/2018 | LH | 9/19/2018 |
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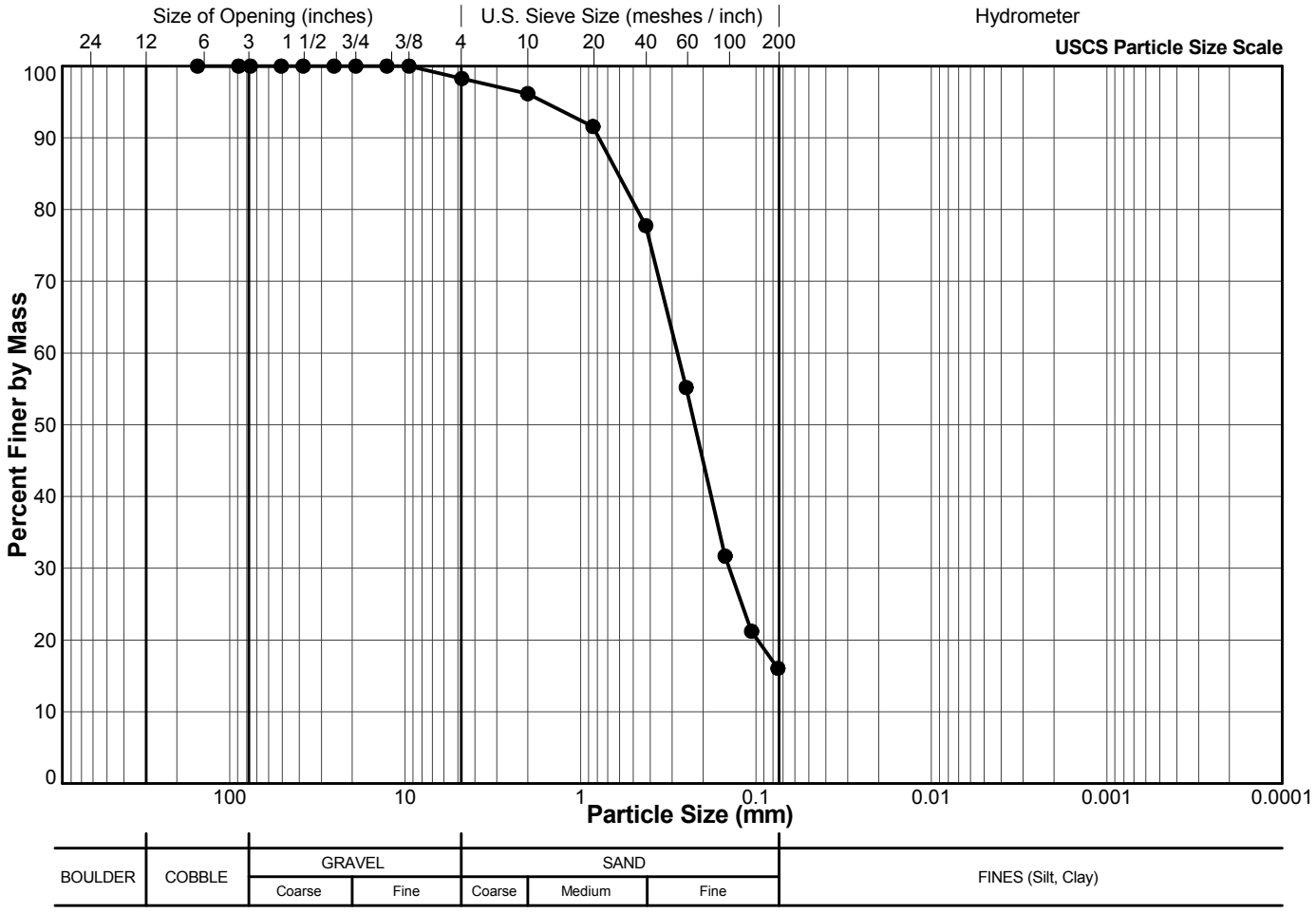
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 8
**Depth Interval (m):** 10.97 to 11.58
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 98.3 |
| #10 US MESH | 2 | | 96.2 |
| #20 US MESH | 0.85 | | 91.6 |
| #40 US MESH | 0.425 | | 77.8 |
| #60 US MESH | 0.25 | | 55.2 |
| #100 US MESH | 0.15 | | 31.7 |
| #140 US MESH | 0.106 | | 21.2 |
| #200 US MESH | 0.075 | | 16.1 |

| BH | 9/13/2018 | LH | 9/19/2018 |
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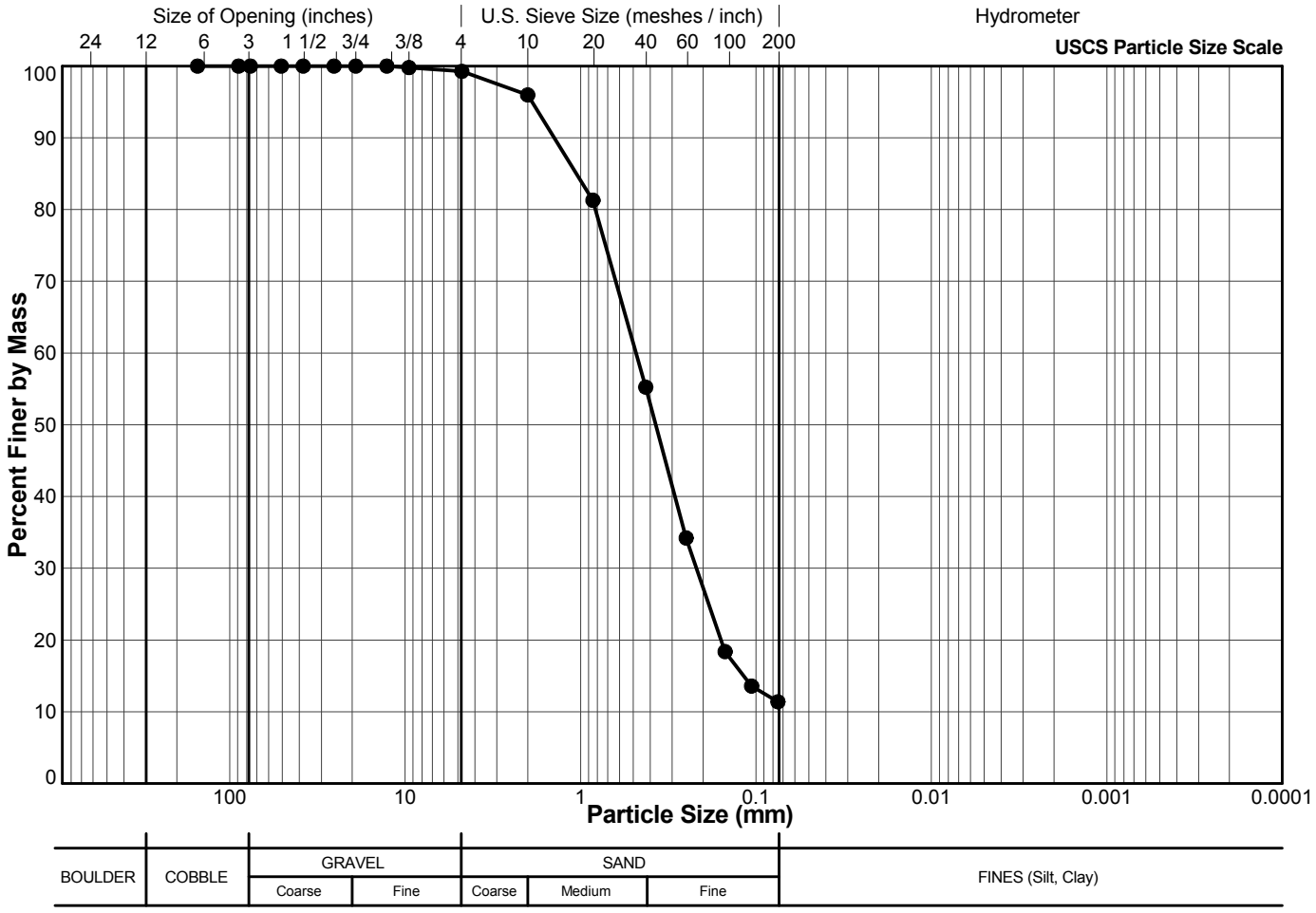
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 11
**Depth Interval (m):** 20.42 to 20.57
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 99.8 |
| #4 US MESH | 4.75 | | 99.3 |
| #10 US MESH | 2 | | 96.0 |
| #20 US MESH | 0.85 | | 81.3 |
| #40 US MESH | 0.425 | | 55.2 |
| #60 US MESH | 0.25 | | 34.2 |
| #100 US MESH | 0.15 | | 18.4 |
| #140 US MESH | 0.106 | | 13.6 |
| #200 US MESH | 0.075 | | 11.4 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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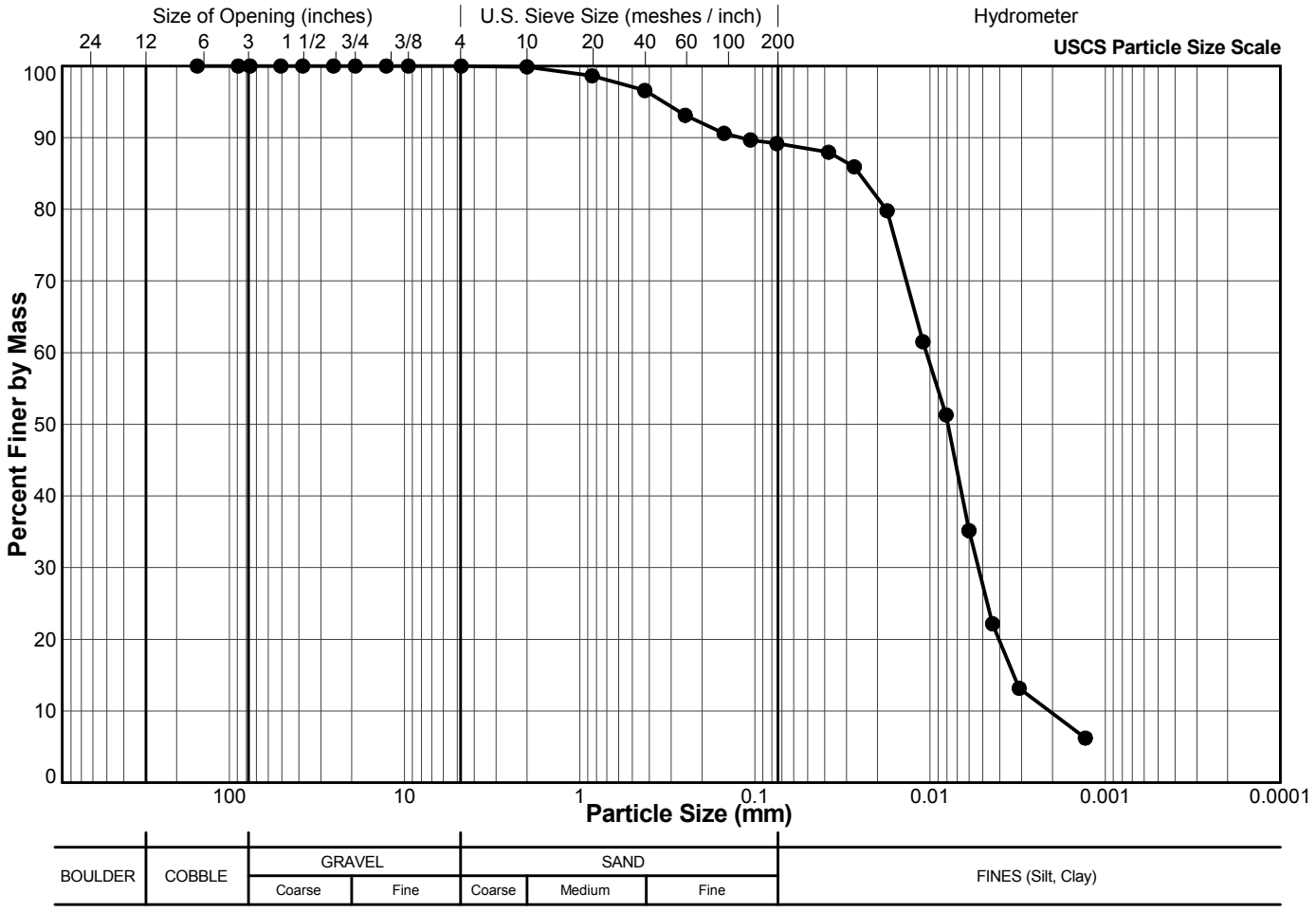
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 13
**Depth Interval (m):** 25.76 to 25.91
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 99.9 |
| #20 US MESH | 0.85 | | 98.6 |
| #40 US MESH | 0.425 | | 96.6 |
| #60 US MESH | 0.25 | | 93.1 |
| #100 US MESH | 0.15 | | 90.6 |
| #140 US MESH | 0.106 | | 89.7 |
| #200 US MESH | 0.075 | | 89.2 |
| | | 0.0380 | 88.0 |
| | | 0.0271 | 85.9 |
| | | 0.0176 | 79.8 |
| | | 0.0110 | 61.5 |
| | | 0.0081 | 51.3 |
| | | 0.0060 | 35.2 |
| | | 0.0044 | 22.2 |
| | | 0.0031 | 13.2 |
| | | 0.0013 | 6.2 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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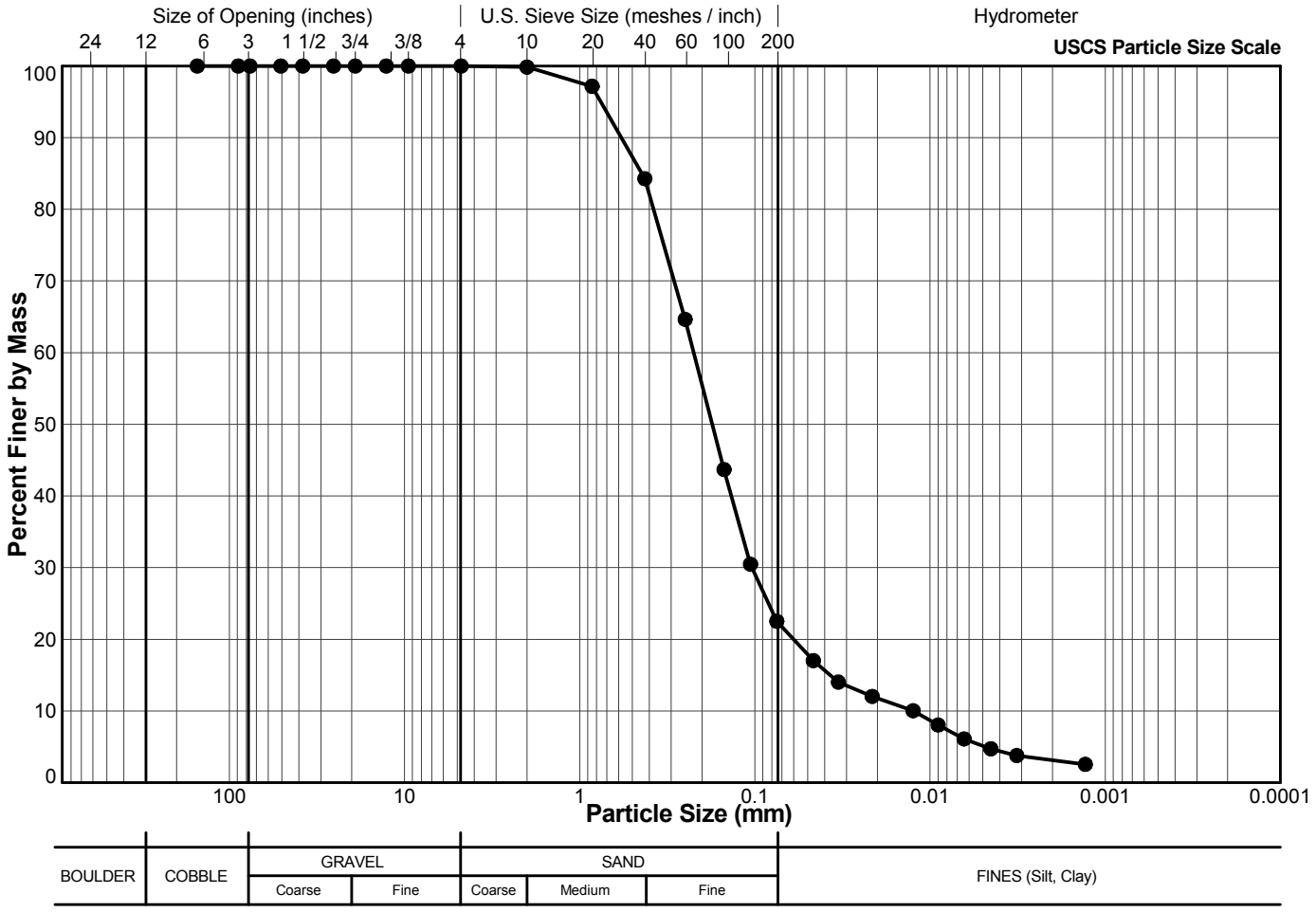
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 14
**Depth Interval (m):** 28.50 to 28.65
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 99.9 |
| #20 US MESH | 0.85 | | 97.2 |
| #40 US MESH | 0.425 | | 84.3 |
| #60 US MESH | 0.25 | | 64.6 |
| #100 US MESH | 0.15 | | 43.7 |
| #140 US MESH | 0.106 | | 30.5 |
| #200 US MESH | 0.075 | | 22.5 |
| | | 0.0464 | 17.0 |
| | | 0.0334 | 14.0 |
| | | 0.0214 | 12.0 |
| | | 0.0125 | 10.0 |
| | | 0.0090 | 8.0 |
| | | 0.0064 | 6.1 |
| | | 0.0045 | 4.7 |
| | | 0.0032 | 3.8 |
| | | 0.0013 | 2.6 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
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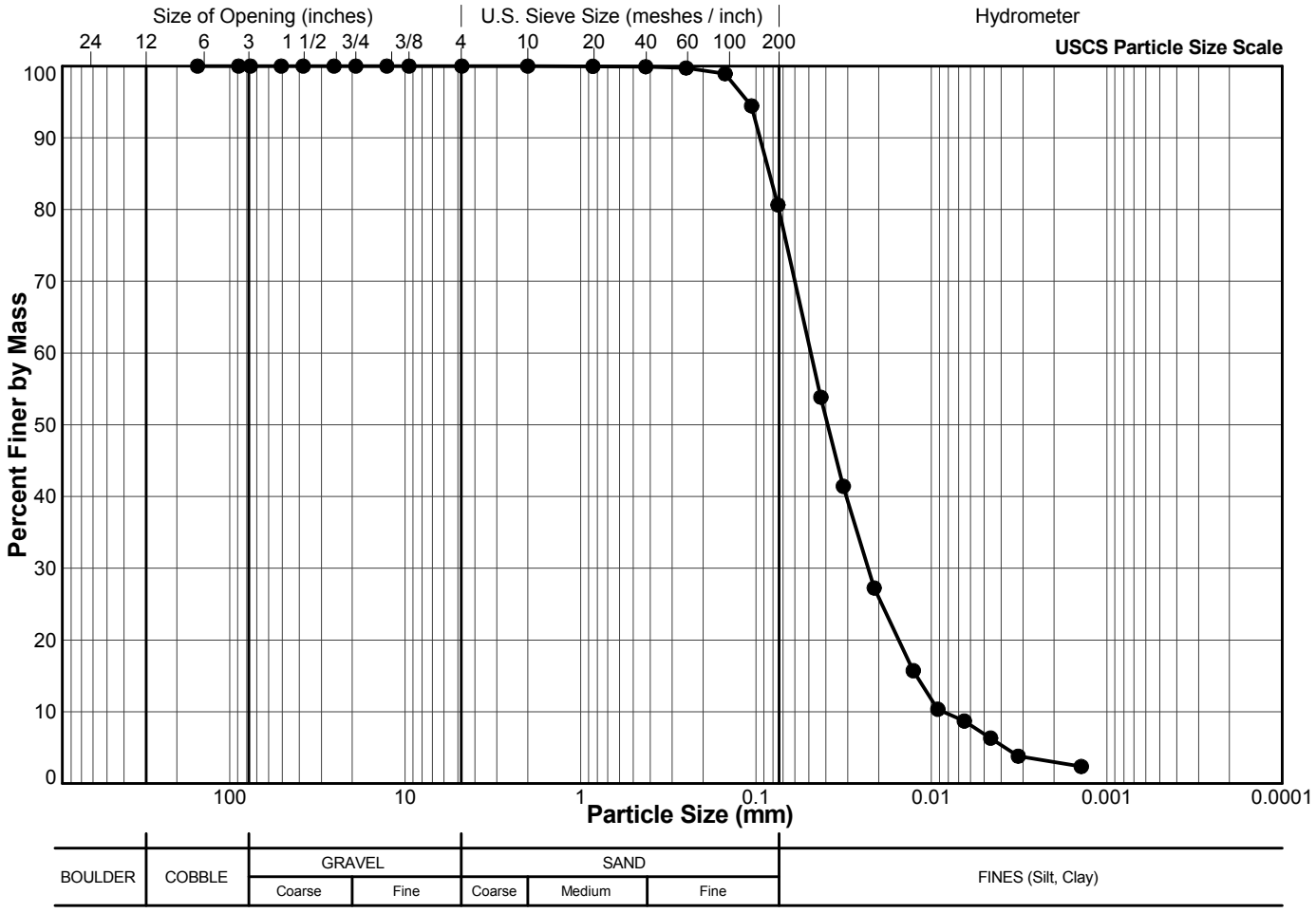
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 15
**Depth Interval (m):** 31.55 to 31.70
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 99.9 |
| #60 US MESH | 0.25 | | 99.7 |
| #100 US MESH | 0.15 | | 98.9 |
| #140 US MESH | 0.106 | | 94.4 |
| #200 US MESH | 0.075 | | 80.6 |
| | | 0.0427 | 53.8 |
| | | 0.0318 | 41.4 |
| | | 0.0212 | 27.3 |
| | | 0.0127 | 15.7 |
| | | 0.0092 | 10.3 |
| | | 0.0065 | 8.7 |
| | | 0.0046 | 6.3 |
| | | 0.0032 | 3.8 |
| | | 0.0014 | 2.4 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
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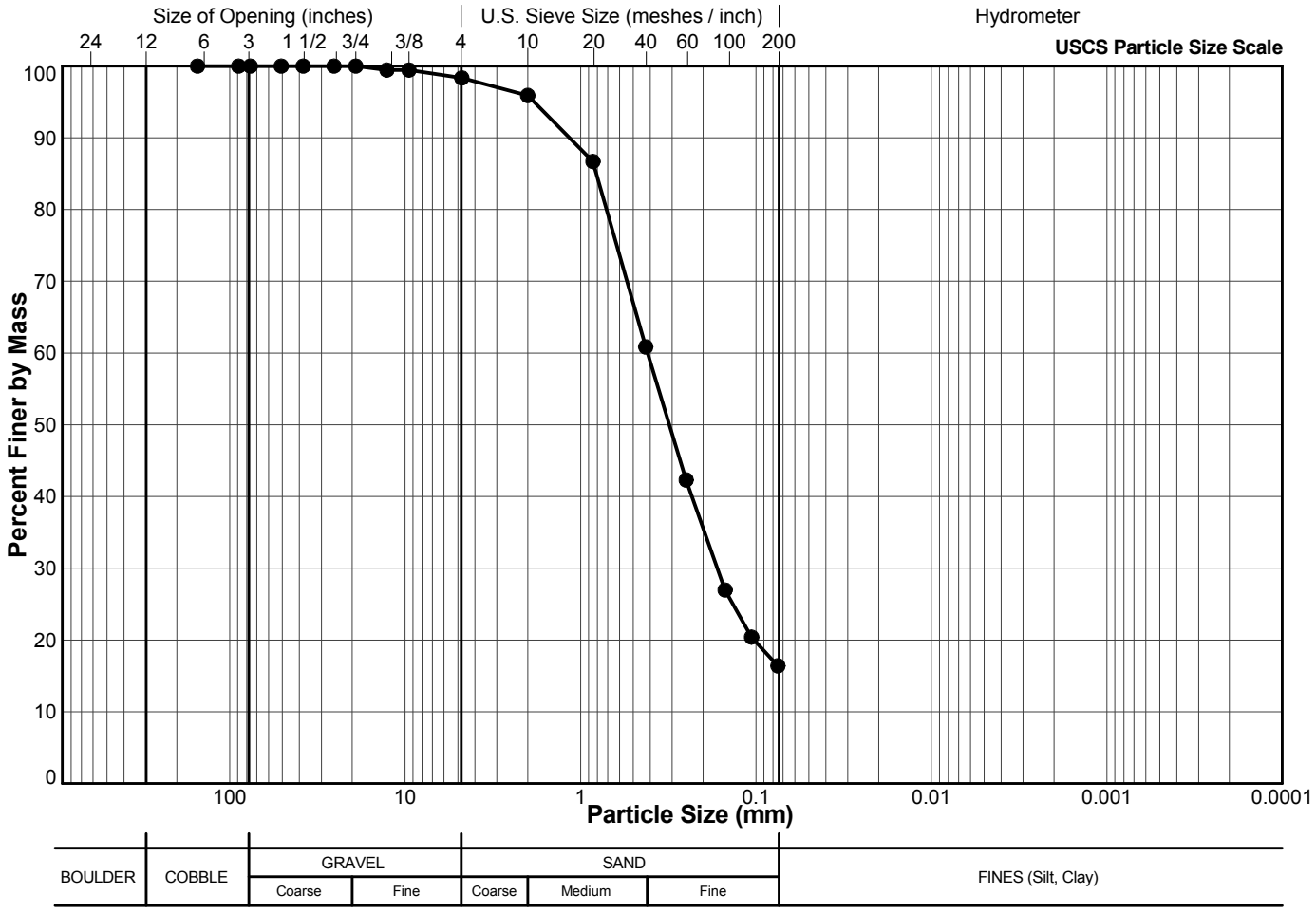
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 16
**Depth Interval (m):** 35.66 to 35.81
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 99.4 |
| 3/8" | 9.5 | | 99.4 |
| #4 US MESH | 4.75 | | 98.3 |
| #10 US MESH | 2 | | 95.9 |
| #20 US MESH | 0.85 | | 86.7 |
| #40 US MESH | 0.425 | | 60.9 |
| #60 US MESH | 0.25 | | 42.3 |
| #100 US MESH | 0.15 | | 27.0 |
| #140 US MESH | 0.106 | | 20.4 |
| #200 US MESH | 0.075 | | 16.4 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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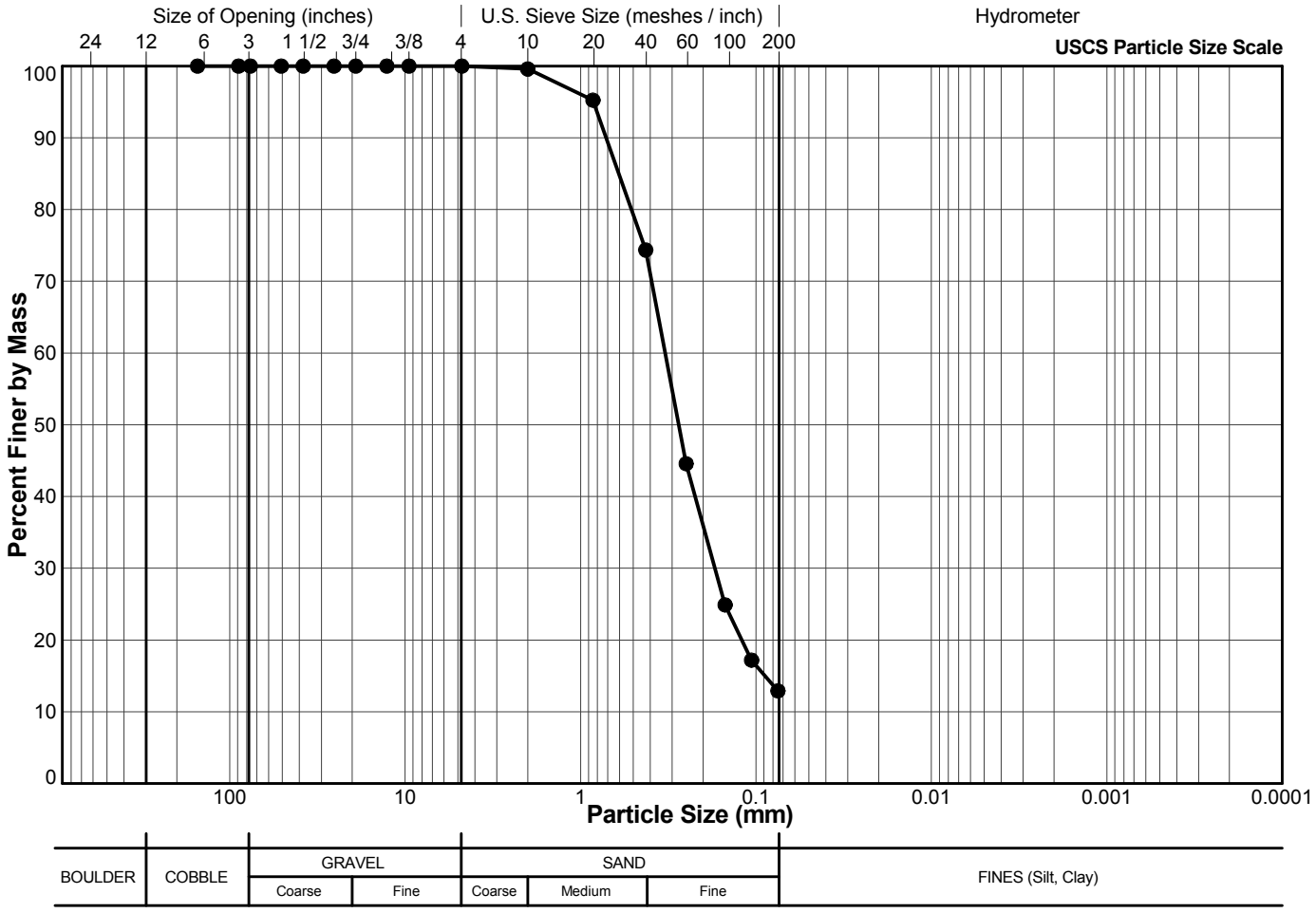
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 19
**Depth Interval (m):** 44.81 to 44.96
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 99.6 |
| #20 US MESH | 0.85 | | 95.3 |
| #40 US MESH | 0.425 | | 74.4 |
| #60 US MESH | 0.25 | | 44.6 |
| #100 US MESH | 0.15 | | 24.9 |
| #140 US MESH | 0.106 | | 17.2 |
| #200 US MESH | 0.075 | | 12.9 |

| BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
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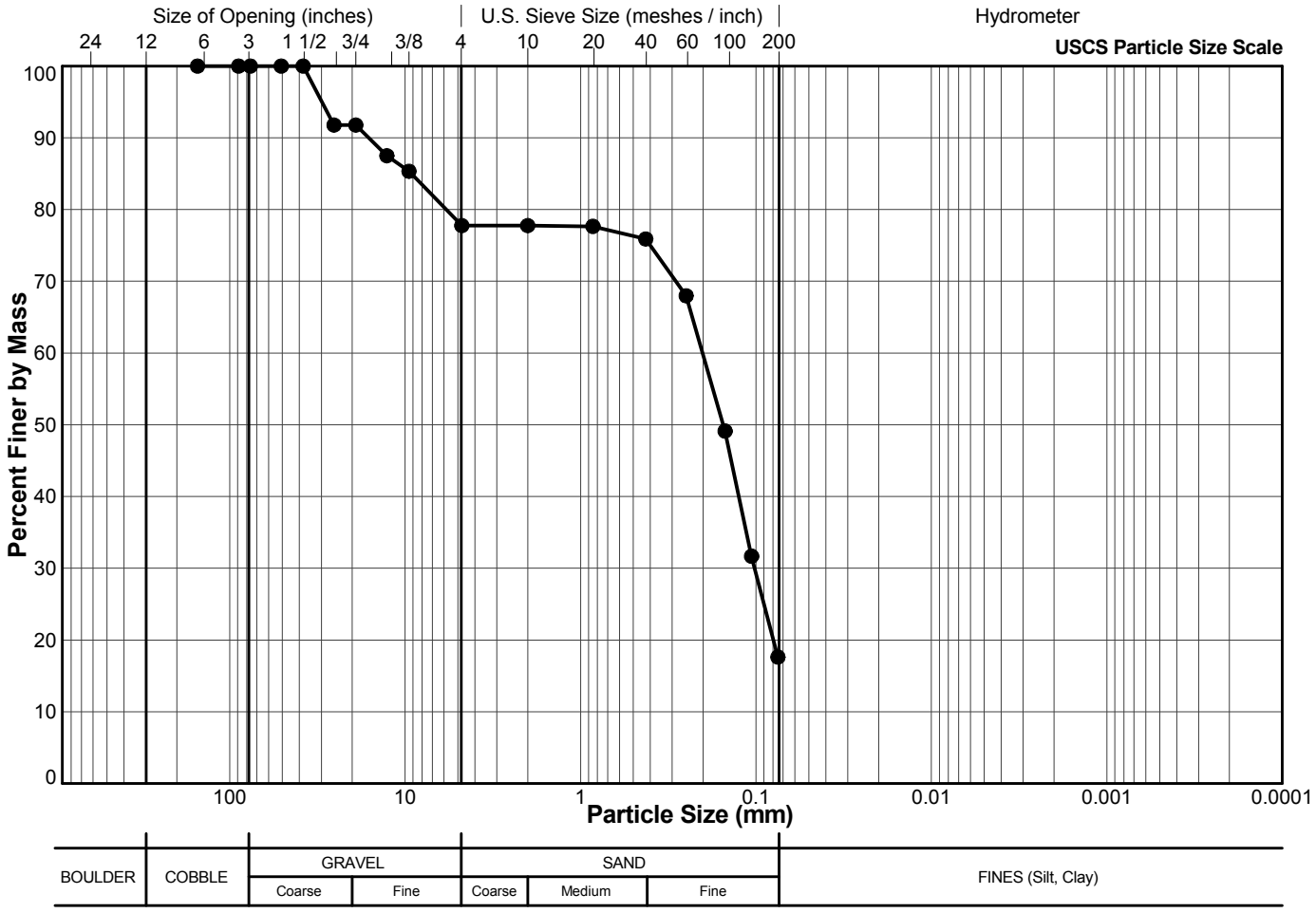
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-04
**Sample No.:** 21
**Depth Interval (m):** 50.29 to 50.44
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 91.8 |
| 3/4" | 19.1 | | 91.8 |
| 1/2" | 12.7 | | 87.5 |
| 3/8" | 9.5 | | 85.3 |
| #4 US MESH | 4.75 | | 77.8 |
| #10 US MESH | 2 | | 77.8 |
| #20 US MESH | 0.85 | | 77.7 |
| #40 US MESH | 0.425 | | 75.9 |
| #60 US MESH | 0.25 | | 68.0 |
| #100 US MESH | 0.15 | | 49.1 |
| #140 US MESH | 0.106 | | 31.7 |
| #200 US MESH | 0.075 | | 17.6 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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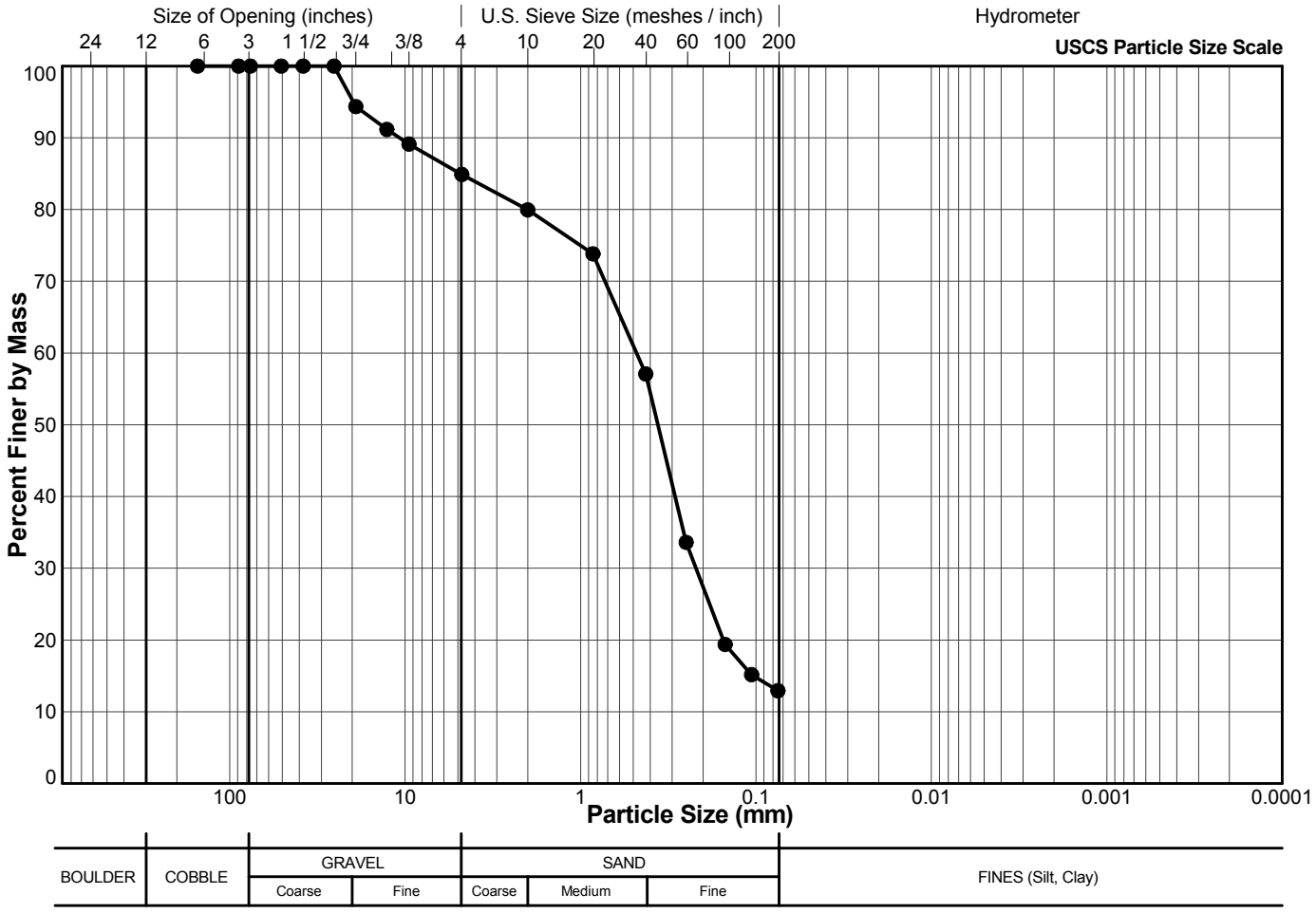
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 4
**Depth Interval (m):** 2.74 to 3.35
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 94.4 |
| 1/2" | 12.7 | | 91.2 |
| 3/8" | 9.5 | | 89.1 |
| #4 US MESH | 4.75 | | 84.9 |
| #10 US MESH | 2 | | 80.0 |
| #20 US MESH | 0.85 | | 73.8 |
| #40 US MESH | 0.425 | | 57.1 |
| #60 US MESH | 0.25 | | 33.6 |
| #100 US MESH | 0.15 | | 19.4 |
| #140 US MESH | 0.106 | | 15.2 |
| #200 US MESH | 0.075 | | 12.9 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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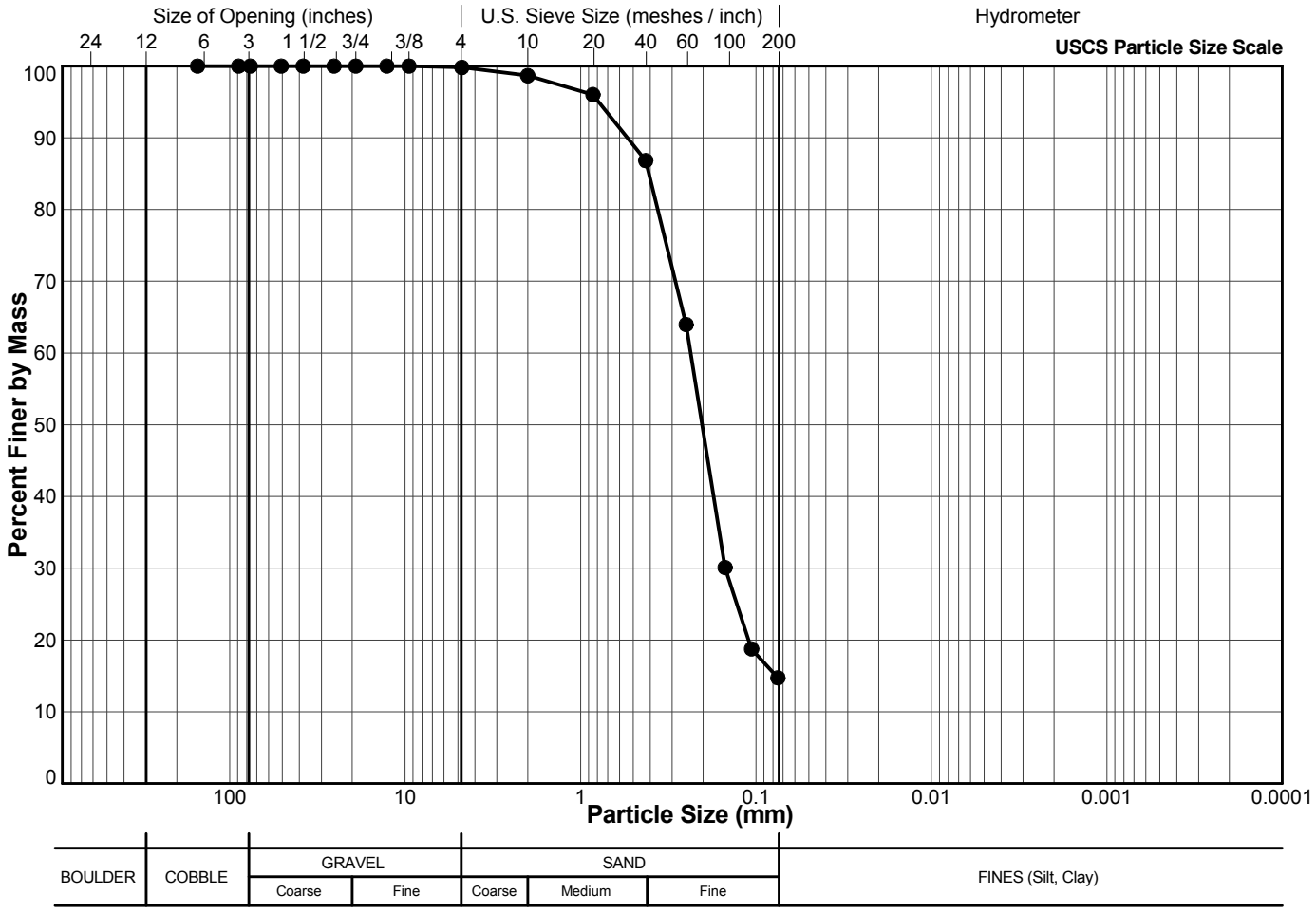
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 6
**Depth Interval (m):** 4.88 to 5.49
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 99.8 |
| #10 US MESH | 2 | | 98.7 |
| #20 US MESH | 0.85 | | 96.0 |
| #40 US MESH | 0.425 | | 86.8 |
| #60 US MESH | 0.25 | | 64.0 |
| #100 US MESH | 0.15 | | 30.1 |
| #140 US MESH | 0.106 | | 18.8 |
| #200 US MESH | 0.075 | | 14.7 |

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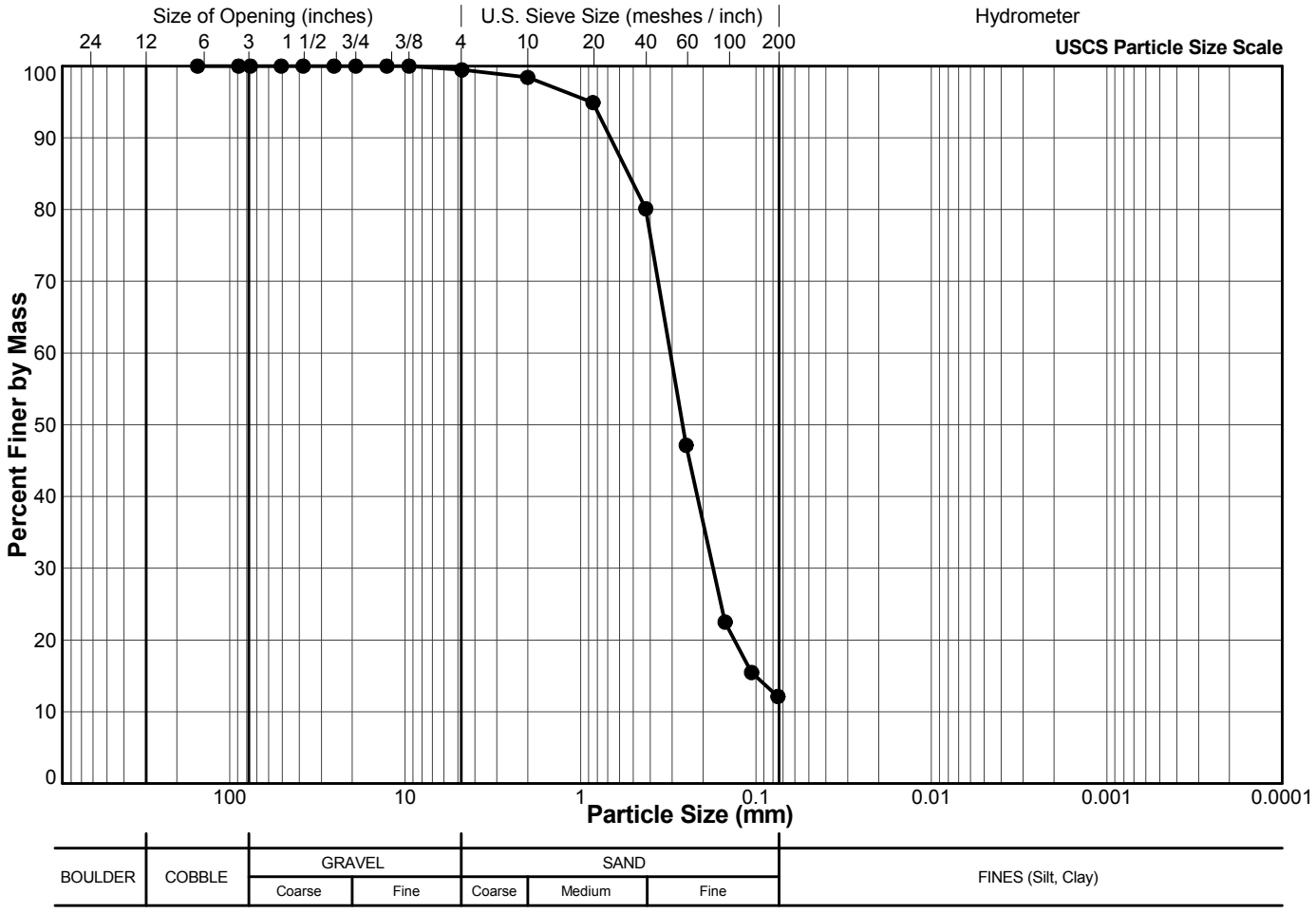
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 9
**Depth Interval (m):** 10.97 to 11.58
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 99.5 |
| #10 US MESH | 2 | | 98.4 |
| #20 US MESH | 0.85 | | 94.9 |
| #40 US MESH | 0.425 | | 80.1 |
| #60 US MESH | 0.25 | | 47.1 |
| #100 US MESH | 0.15 | | 22.5 |
| #140 US MESH | 0.106 | | 15.5 |
| #200 US MESH | 0.075 | | 12.1 |

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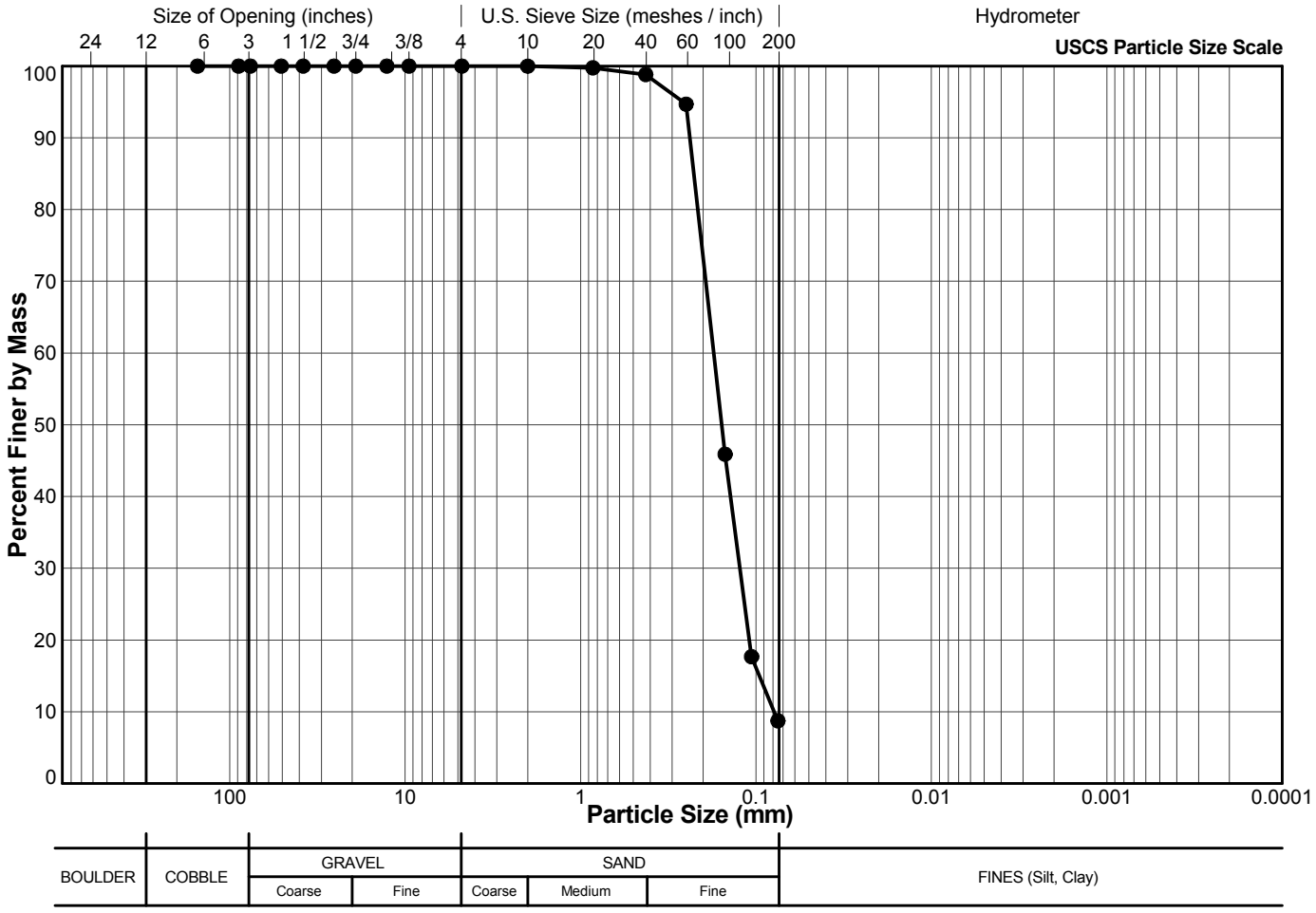
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 12
**Depth Interval (m):** 22.56 to 22.71
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 99.8 |
| #40 US MESH | 0.425 | | 98.8 |
| #60 US MESH | 0.25 | | 94.7 |
| #100 US MESH | 0.15 | | 45.9 |
| #140 US MESH | 0.106 | | 17.7 |
| #200 US MESH | 0.075 | | 8.7 |

| BH | 9/12/2018 | LH | 9/19/2018 |
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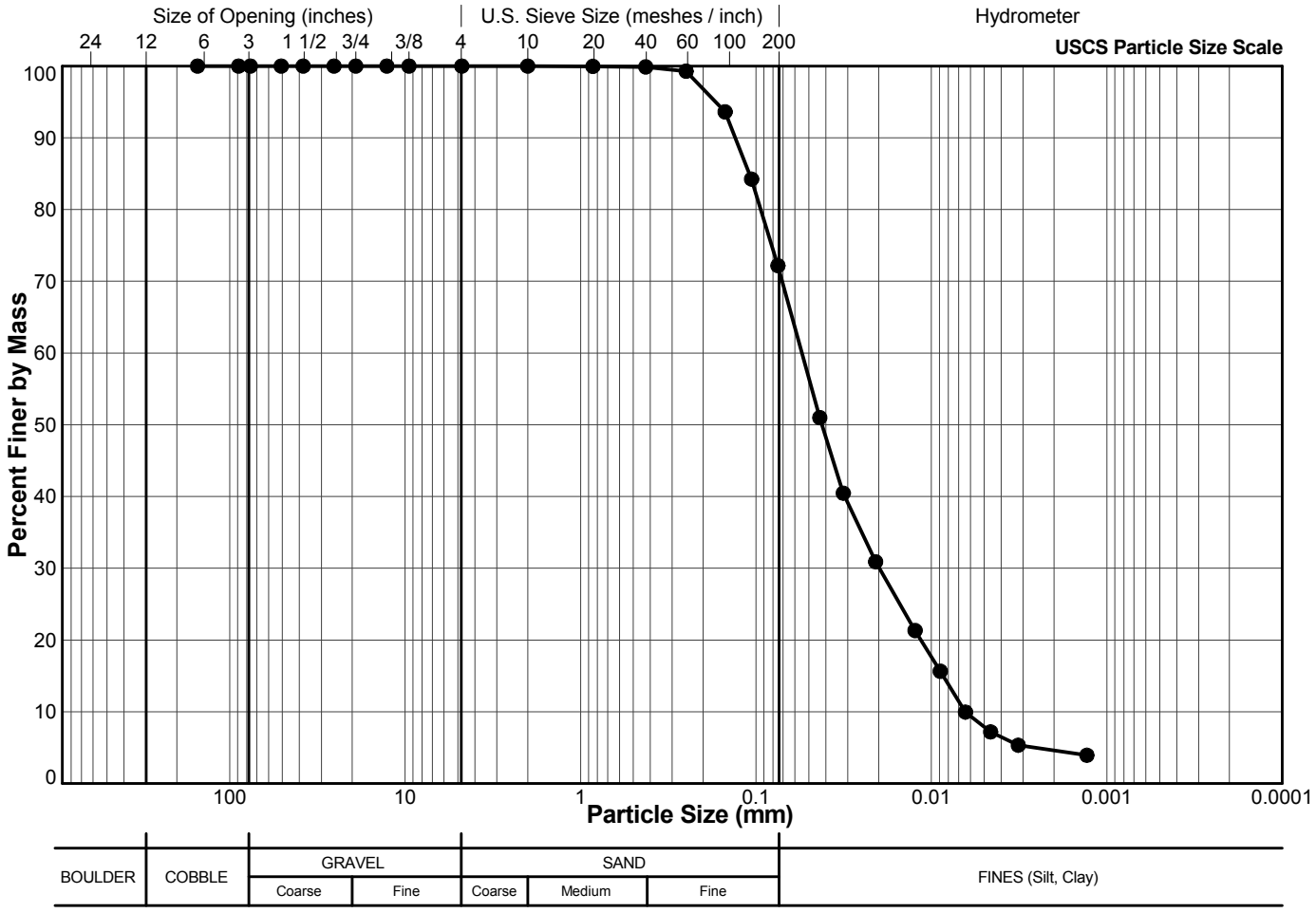
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 13
**Depth Interval (m):** 25.30 to 25.45
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 99.9 |
| #60 US MESH | 0.25 | | 99.3 |
| #100 US MESH | 0.15 | | 93.6 |
| #140 US MESH | 0.106 | | 84.2 |
| #200 US MESH | 0.075 | | 72.2 |
| | | 0.0433 | 51.0 |
| | | 0.0318 | 40.5 |
| | | 0.0208 | 30.9 |
| | | 0.0124 | 21.3 |
| | | 0.0089 | 15.6 |
| | | 0.0064 | 10.0 |
| | | 0.0046 | 7.2 |
| | | 0.0032 | 5.3 |
| | | 0.0013 | 3.9 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
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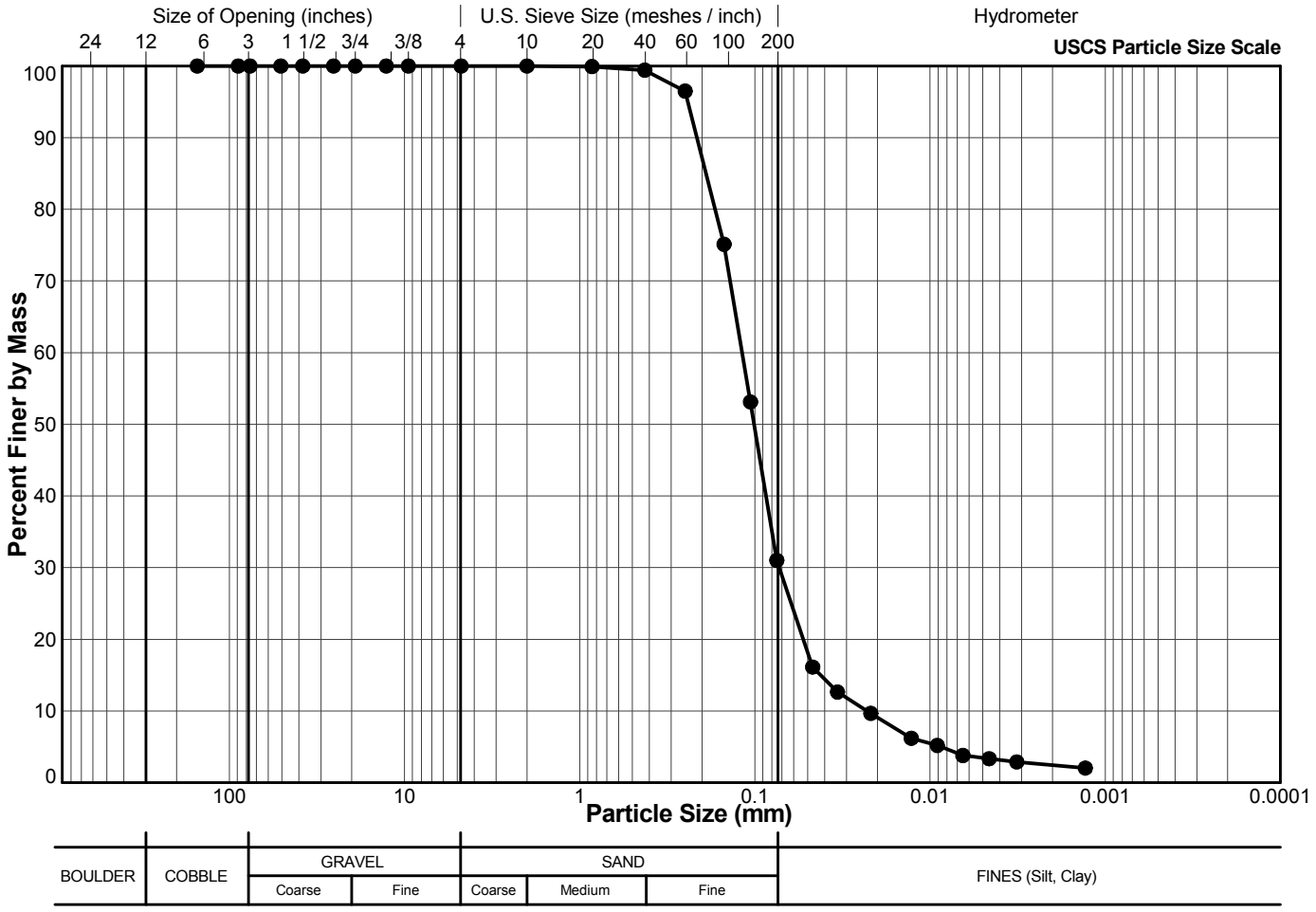
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 14
**Depth Interval (m):** 27.43 to 27.58
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 99.9 |
| #40 US MESH | 0.425 | | 99.4 |
| #60 US MESH | 0.25 | | 96.5 |
| #100 US MESH | 0.15 | | 75.1 |
| #140 US MESH | 0.106 | | 53.1 |
| #200 US MESH | 0.075 | | 31.0 |
| | | 0.0468 | 16.1 |
| | | 0.0338 | 12.6 |
| | | 0.0218 | 9.7 |
| | | 0.0128 | 6.2 |
| | | 0.0091 | 5.2 |
| | | 0.0065 | 3.8 |
| | | 0.0046 | 3.3 |
| | | 0.0032 | 2.9 |
| | | 0.0013 | 2.0 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
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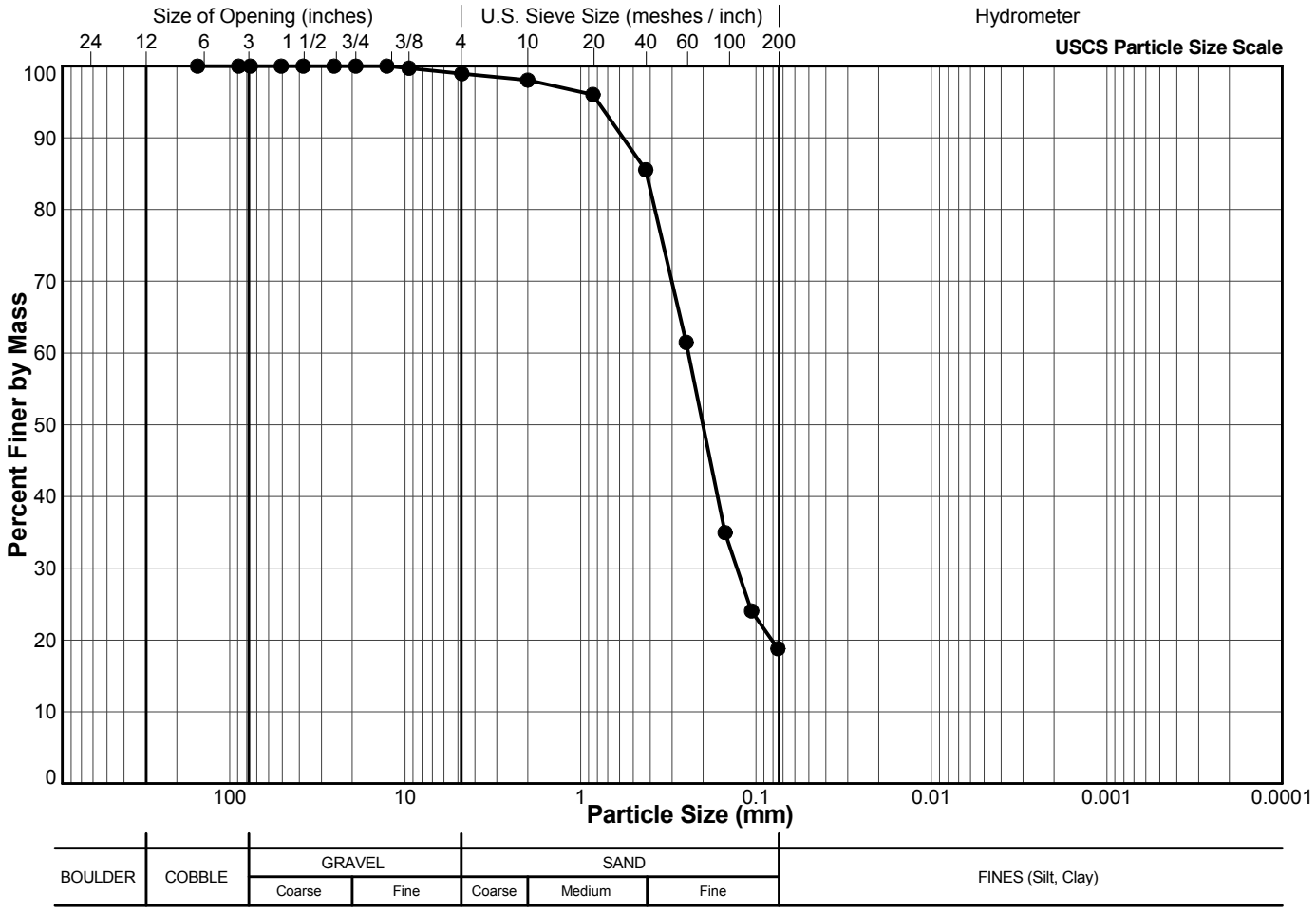
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 16
**Depth Interval (m):** 34.75 to 34.90
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 99.7 |
| #4 US MESH | 4.75 | | 98.9 |
| #10 US MESH | 2 | | 98.0 |
| #20 US MESH | 0.85 | | 96.0 |
| #40 US MESH | 0.425 | | 85.5 |
| #60 US MESH | 0.25 | | 61.5 |
| #100 US MESH | 0.15 | | 35.0 |
| #140 US MESH | 0.106 | | 24.1 |
| #200 US MESH | 0.075 | | 18.8 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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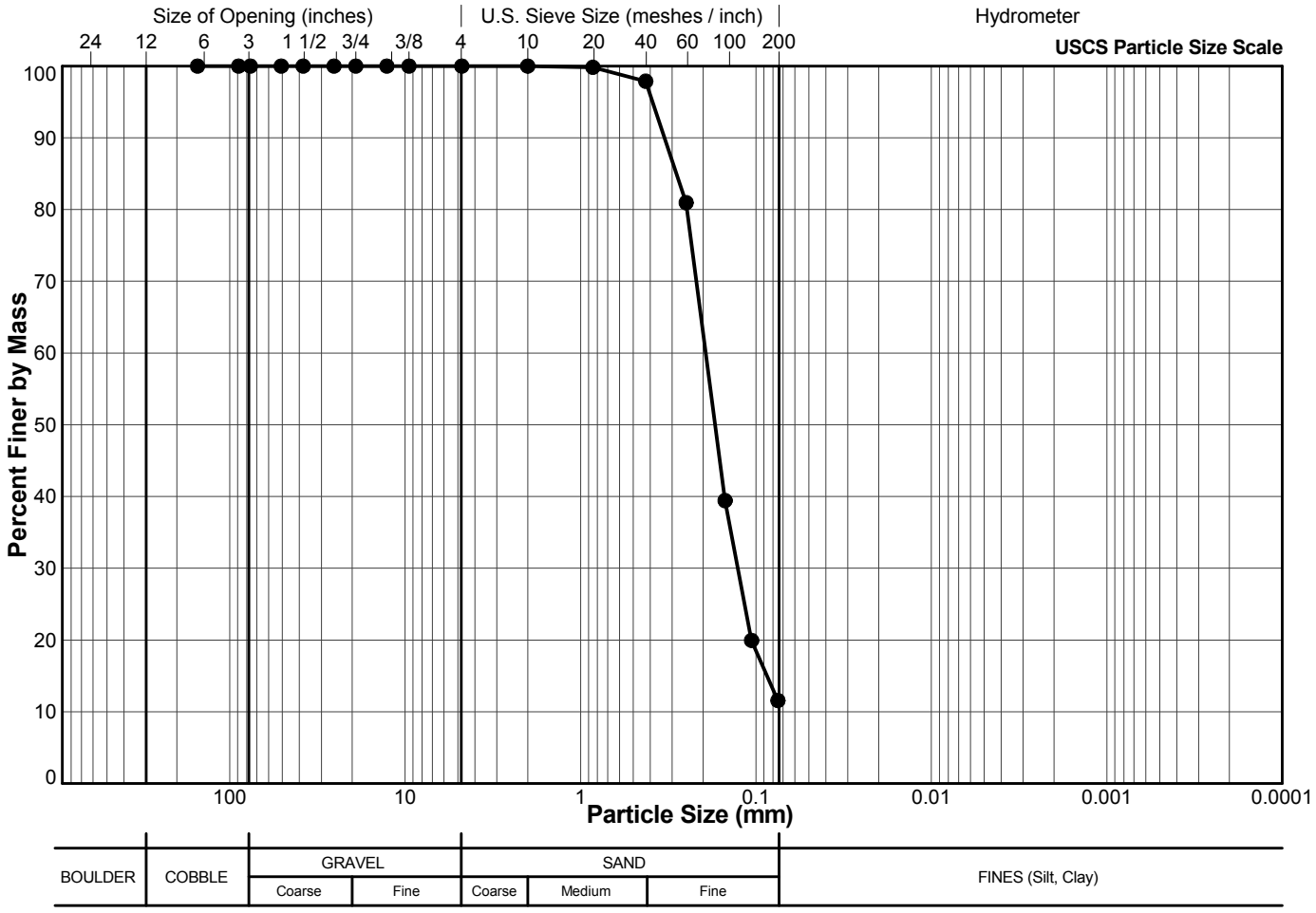
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 21
**Depth Interval (m):** 51.51 to 51.66
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 99.8 |
| #40 US MESH | 0.425 | | 97.9 |
| #60 US MESH | 0.25 | | 81.0 |
| #100 US MESH | 0.15 | | 39.4 |
| #140 US MESH | 0.106 | | 19.9 |
| #200 US MESH | 0.075 | | 11.6 |

| BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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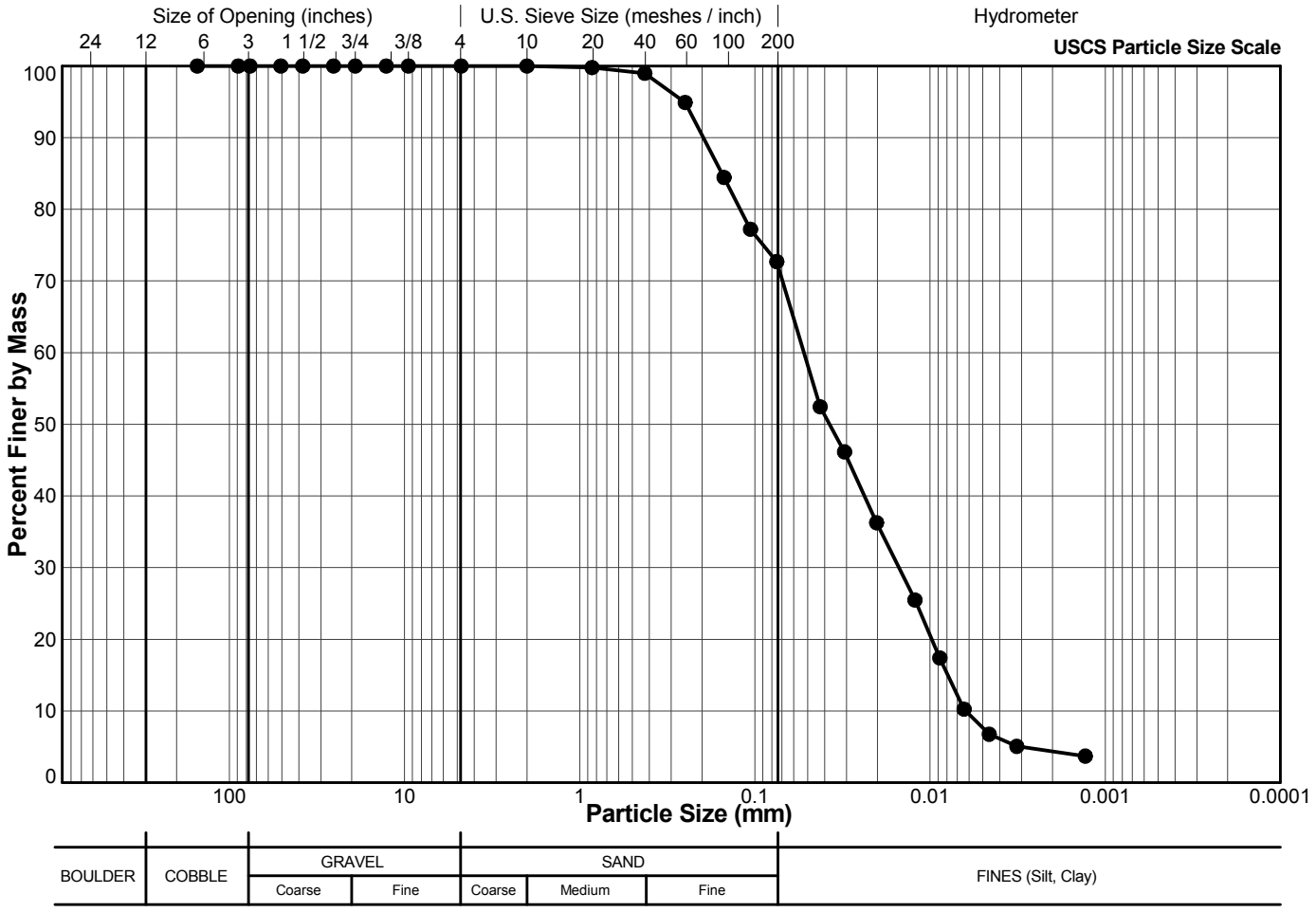
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-05
**Sample No.:** 22
**Depth Interval (m):** 53.19 to 53.34
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 99.8 |
| #40 US MESH | 0.425 | | 99.0 |
| #60 US MESH | 0.25 | | 94.9 |
| #100 US MESH | 0.15 | | 84.5 |
| #140 US MESH | 0.106 | | 77.2 |
| #200 US MESH | 0.075 | | 72.7 |
| | | 0.0424 | 52.5 |
| | | 0.0308 | 46.2 |
| | | 0.0202 | 36.3 |
| | | 0.0122 | 25.5 |
| | | 0.0088 | 17.4 |
| | | 0.0064 | 10.3 |
| | | 0.0046 | 6.8 |
| | | 0.0032 | 5.1 |
| | | 0.0013 | 3.7 |

| DC/BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
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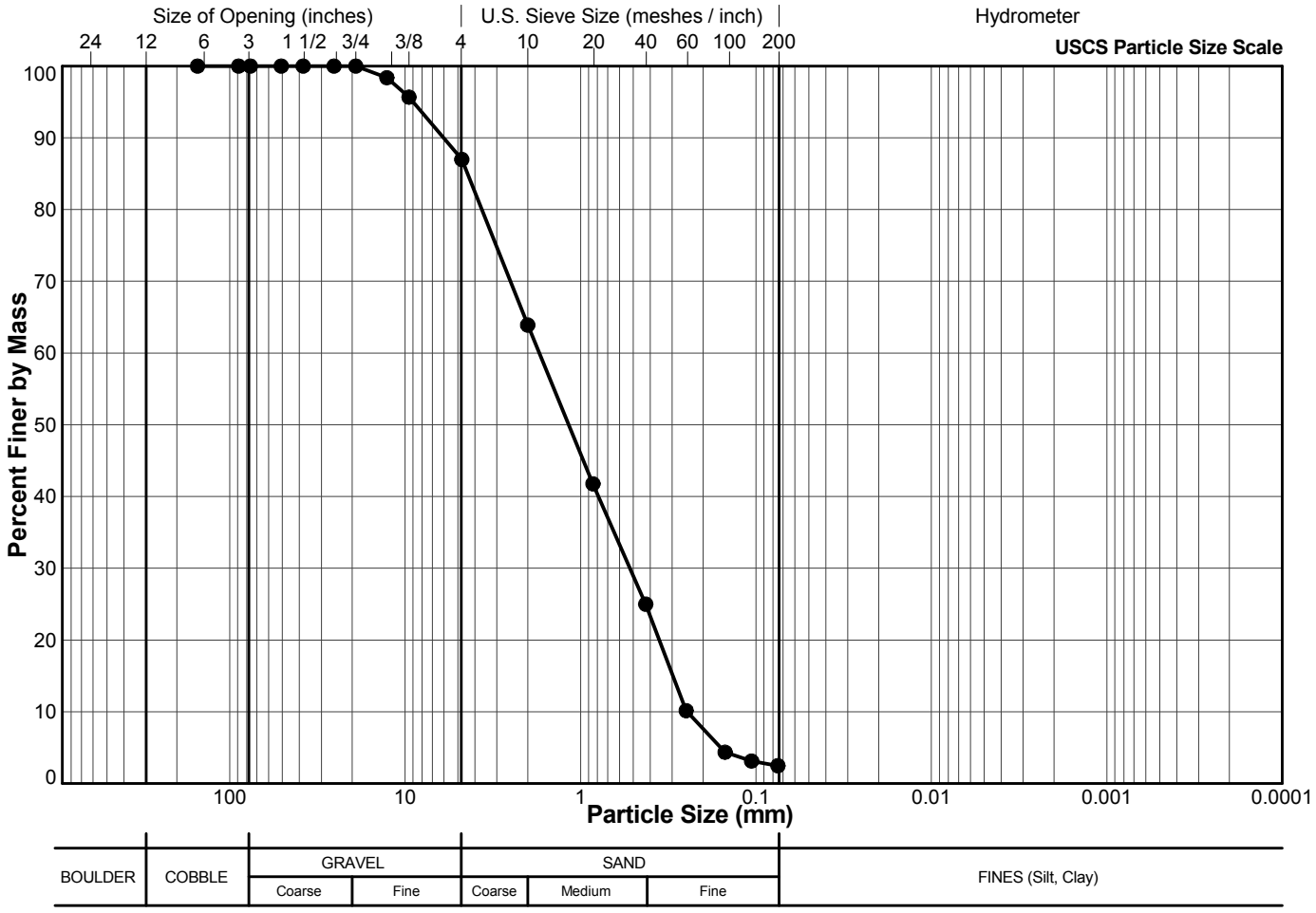
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 1
**Depth Interval (m):** 0.46 to 0.76
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 98.4 |
| 3/8" | 9.5 | | 95.7 |
| #4 US MESH | 4.75 | | 87.0 |
| #10 US MESH | 2 | | 63.9 |
| #20 US MESH | 0.85 | | 41.8 |
| #40 US MESH | 0.425 | | 25.0 |
| #60 US MESH | 0.25 | | 10.2 |
| #100 US MESH | 0.15 | | 4.4 |
| #140 US MESH | 0.106 | | 3.1 |
| #200 US MESH | 0.075 | | 2.5 |

| BH | 9/13/2018 | LH | 9/19/2018 |
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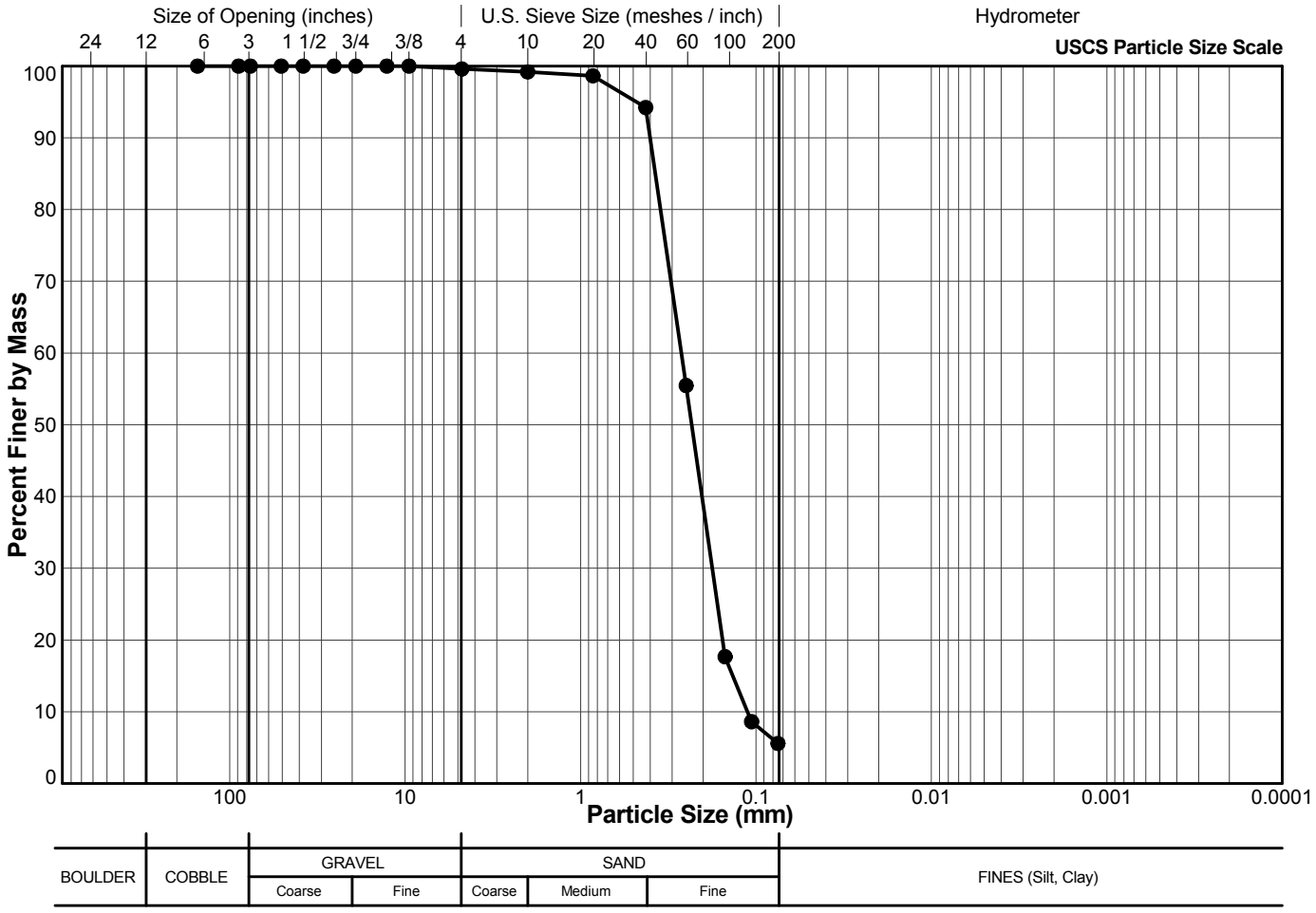
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 3
**Depth Interval (m):** 2.44 to 3.05
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 99.6 |
| #10 US MESH | 2 | | 99.2 |
| #20 US MESH | 0.85 | | 98.6 |
| #40 US MESH | 0.425 | | 94.2 |
| #60 US MESH | 0.25 | | 55.5 |
| #100 US MESH | 0.15 | | 17.7 |
| #140 US MESH | 0.106 | | 8.6 |
| #200 US MESH | 0.075 | | 5.6 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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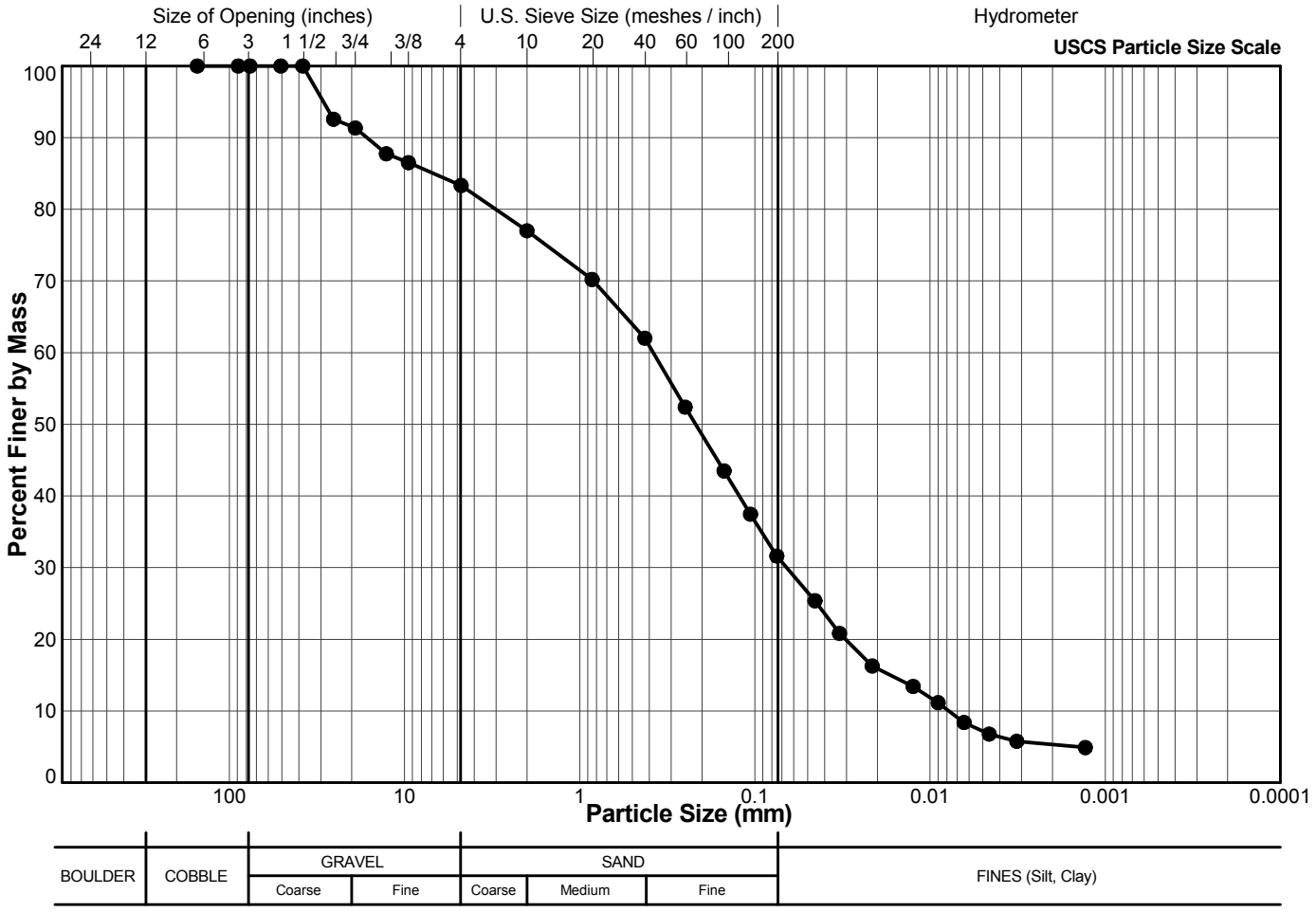
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 6
**Depth Interval (m):** 4.88 to 5.49
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 92.6 |
| 3/4" | 19.1 | | 91.3 |
| 1/2" | 12.7 | | 87.8 |
| 3/8" | 9.5 | | 86.5 |
| #4 US MESH | 4.75 | | 83.3 |
| #10 US MESH | 2 | | 77.0 |
| #20 US MESH | 0.85 | | 70.2 |
| #40 US MESH | 0.425 | | 62.0 |
| #60 US MESH | 0.25 | | 52.4 |
| #100 US MESH | 0.15 | | 43.5 |
| #140 US MESH | 0.106 | | 37.5 |
| #200 US MESH | 0.075 | | 31.6 |
| | | 0.0454 | 25.4 |
| | | 0.0329 | 20.8 |
| | | 0.0214 | 16.3 |
| | | 0.0125 | 13.4 |
| | | 0.0090 | 11.1 |
| | | 0.0064 | 8.4 |
| | | 0.0046 | 6.8 |
| | | 0.0032 | 5.8 |
| | | 0.0013 | 4.9 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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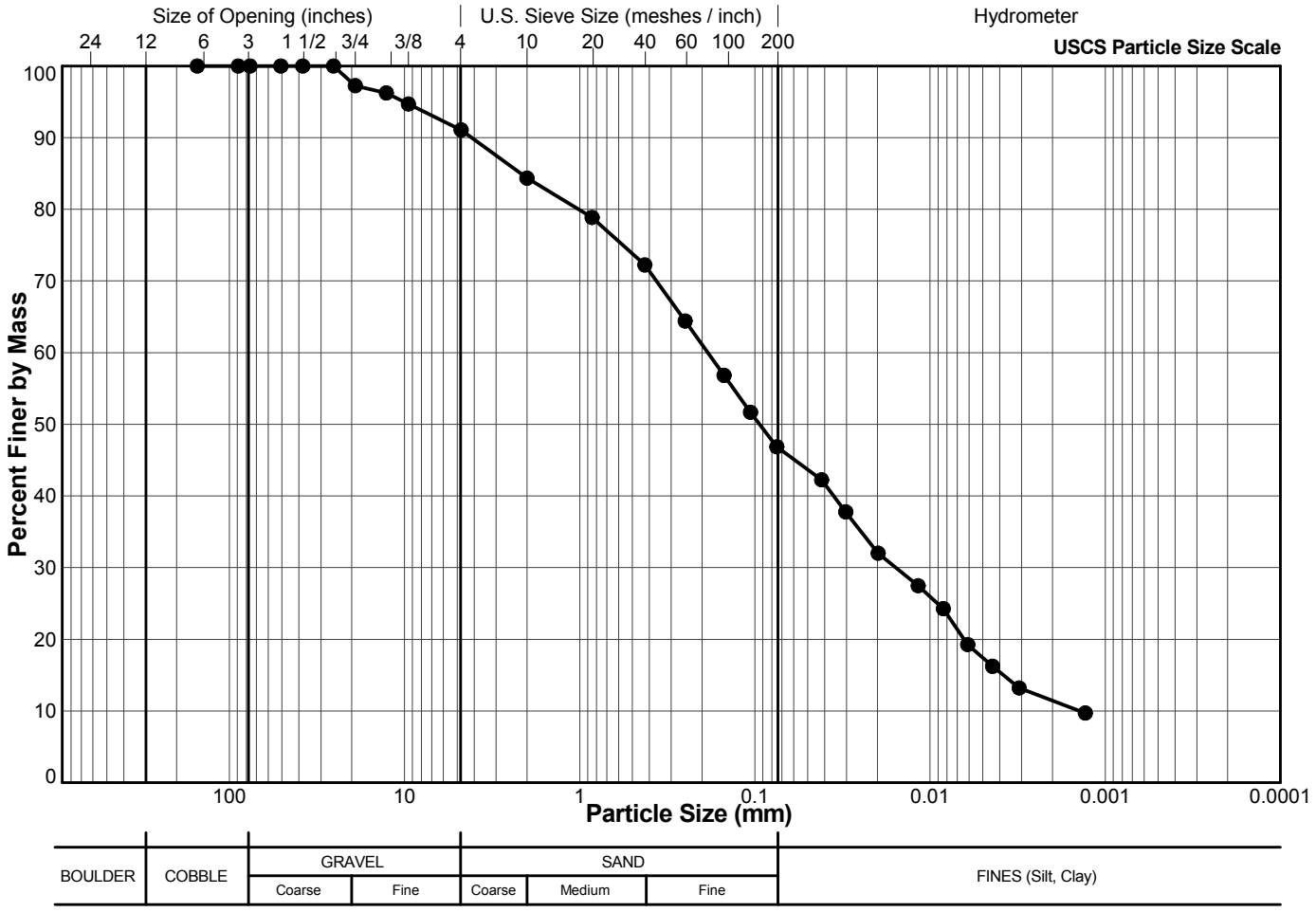
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 7
**Depth Interval (m):** 6.40 to 6.71
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 97.3 |
| 1/2" | 12.7 | | 96.2 |
| 3/8" | 9.5 | | 94.7 |
| #4 US MESH | 4.75 | | 91.1 |
| #10 US MESH | 2 | | 84.4 |
| #20 US MESH | 0.85 | | 78.9 |
| #40 US MESH | 0.425 | | 72.2 |
| #60 US MESH | 0.25 | | 64.4 |
| #100 US MESH | 0.15 | | 56.8 |
| #140 US MESH | 0.106 | | 51.7 |
| #200 US MESH | 0.075 | | 46.9 |
| | | 0.0416 | 42.3 |
| | | 0.0303 | 37.8 |
| | | 0.0198 | 32.0 |
| | | 0.0117 | 27.5 |
| | | 0.0084 | 24.3 |
| | | 0.0061 | 19.3 |
| | | 0.0044 | 16.2 |
| | | 0.0031 | 13.2 |
| | | 0.0013 | 9.7 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
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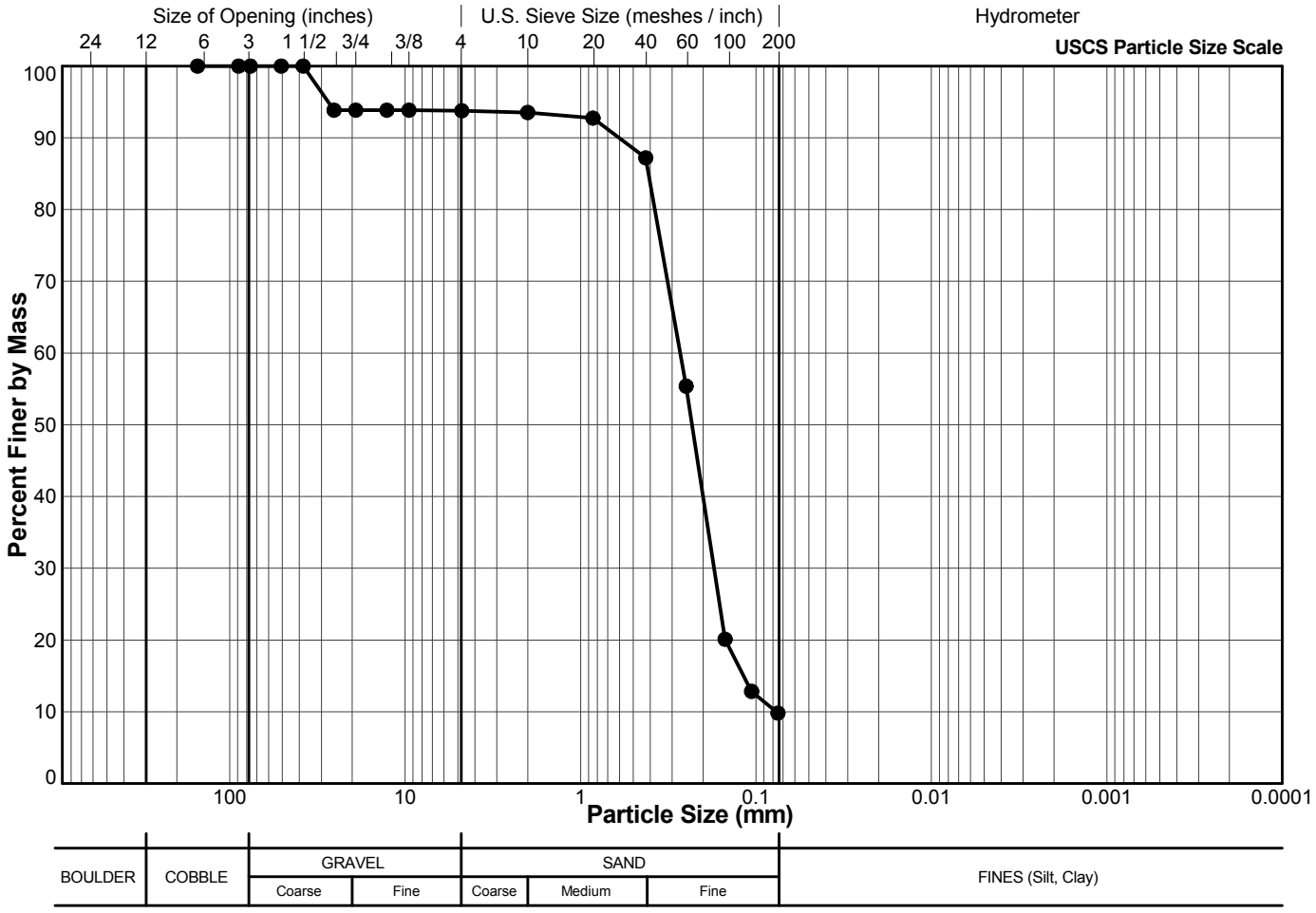
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 9
**Depth Interval (m):** 10.97 to 11.58
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 93.9 |
| 3/4" | 19.1 | | 93.9 |
| 1/2" | 12.7 | | 93.9 |
| 3/8" | 9.5 | | 93.9 |
| #4 US MESH | 4.75 | | 93.8 |
| #10 US MESH | 2 | | 93.5 |
| #20 US MESH | 0.85 | | 92.8 |
| #40 US MESH | 0.425 | | 87.2 |
| #60 US MESH | 0.25 | | 55.4 |
| #100 US MESH | 0.15 | | 20.1 |
| #140 US MESH | 0.106 | | 12.8 |
| #200 US MESH | 0.075 | | 9.8 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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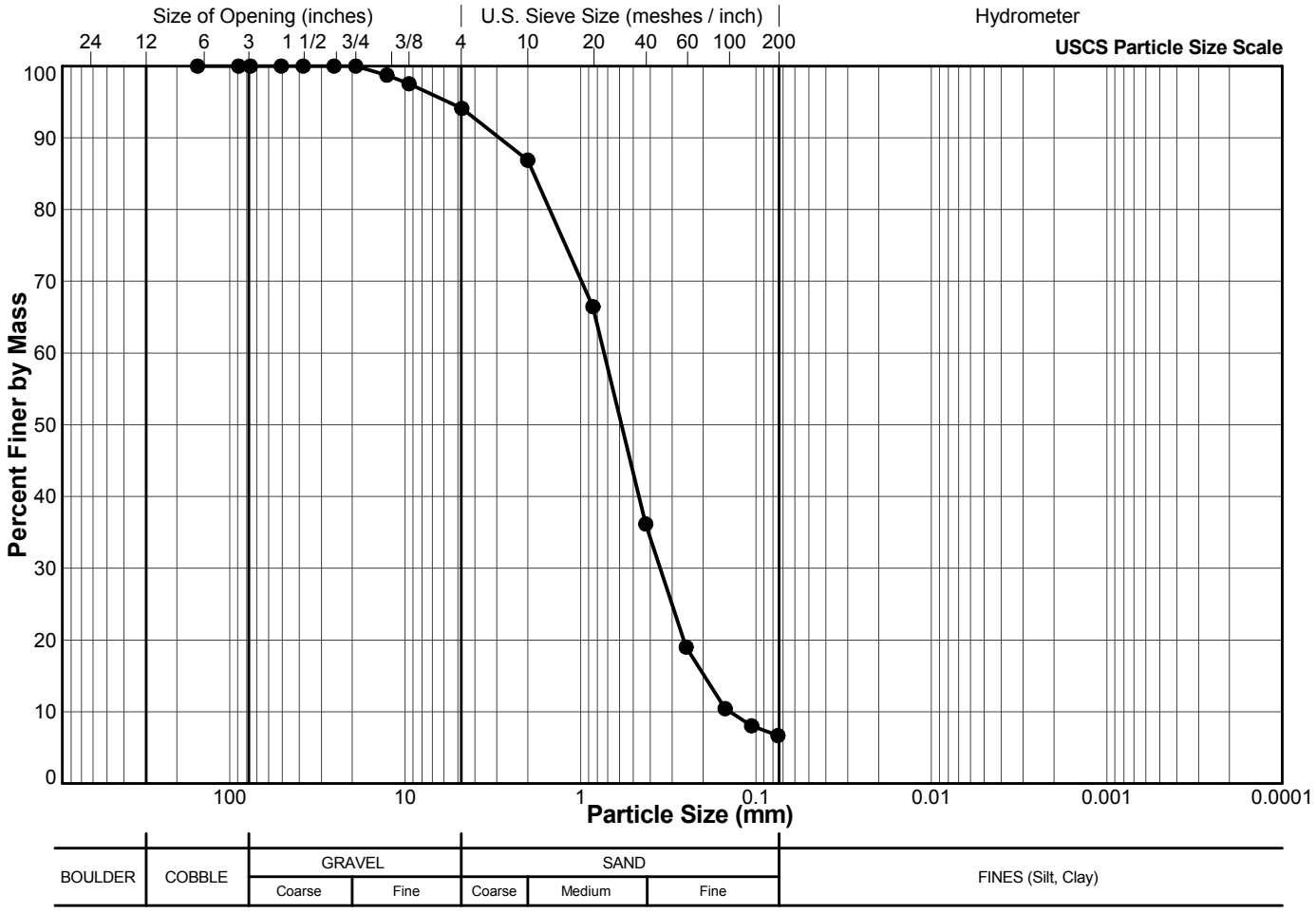
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 13
**Depth Interval (m):** 24.69 to 24.99
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 98.7 |
| 3/8" | 9.5 | | 97.5 |
| #4 US MESH | 4.75 | | 94.1 |
| #10 US MESH | 2 | | 86.9 |
| #20 US MESH | 0.85 | | 66.5 |
| #40 US MESH | 0.425 | | 36.2 |
| #60 US MESH | 0.25 | | 19.0 |
| #100 US MESH | 0.15 | | 10.4 |
| #140 US MESH | 0.106 | | 8.0 |
| #200 US MESH | 0.075 | | 6.7 |

| BH | 9/13/2018 | LH | 9/19/2018 |
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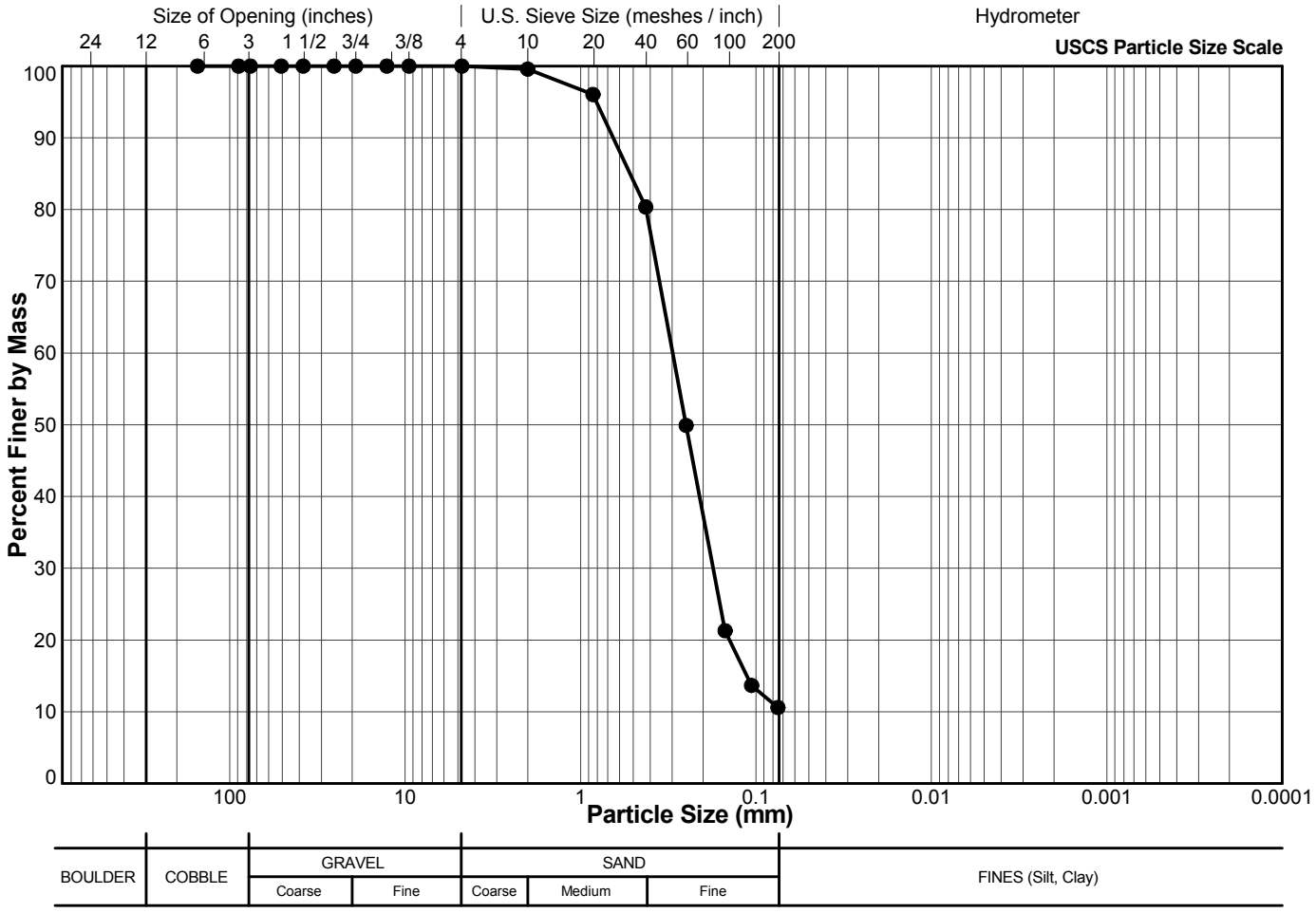
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 16
**Depth Interval (m):** 35.20 to 35.36
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 99.6 |
| #20 US MESH | 0.85 | | 96.0 |
| #40 US MESH | 0.425 | | 80.4 |
| #60 US MESH | 0.25 | | 49.9 |
| #100 US MESH | 0.15 | | 21.3 |
| #140 US MESH | 0.106 | | 13.7 |
| #200 US MESH | 0.075 | | 10.6 |

| BH | 9/12/2018 | LH | 9/19/2018 |
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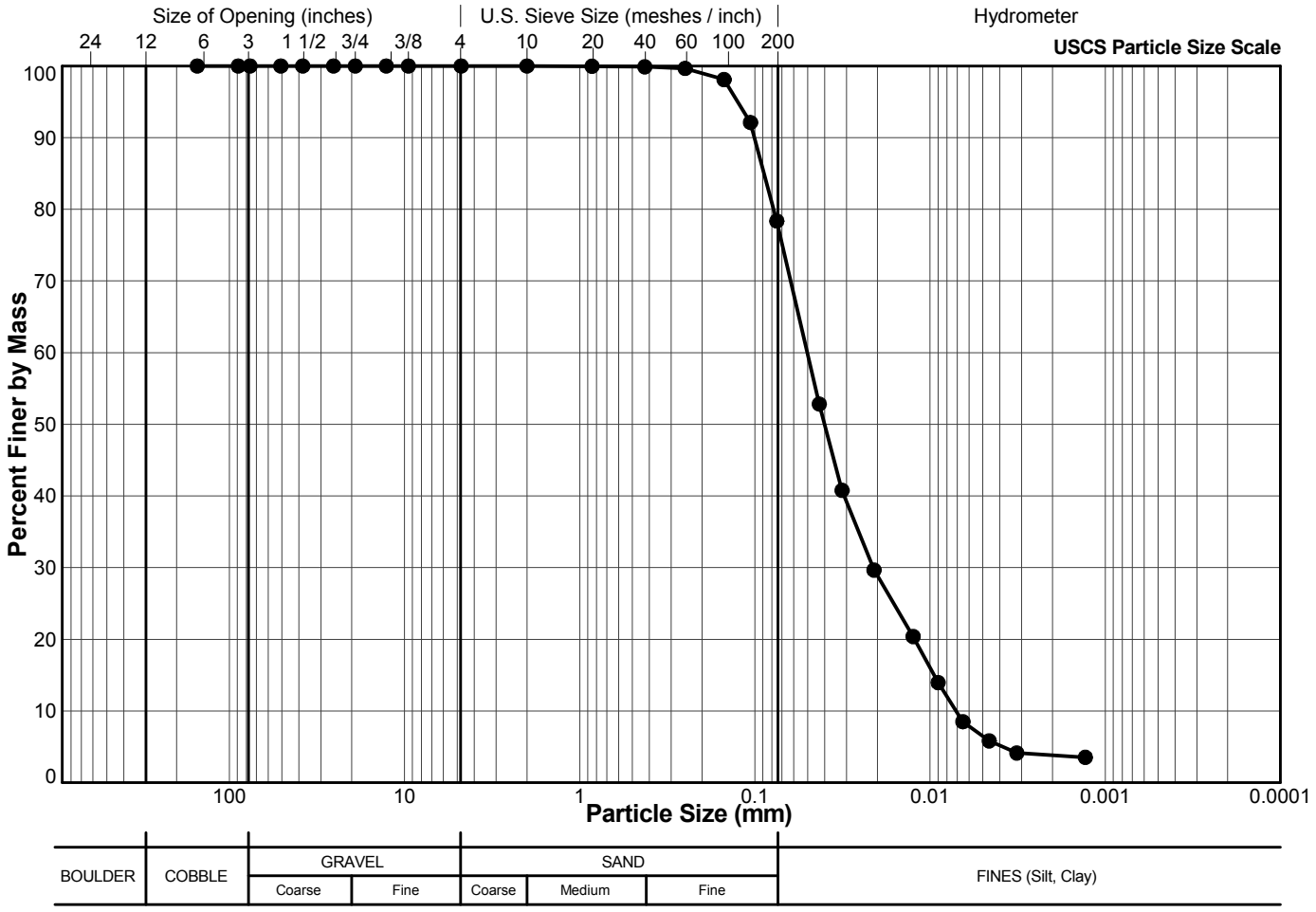
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 17
**Depth Interval (m):** 36.27 to 36.42
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 99.9 |
| #60 US MESH | 0.25 | | 99.7 |
| #100 US MESH | 0.15 | | 98.1 |
| #140 US MESH | 0.106 | | 92.1 |
| #200 US MESH | 0.075 | | 78.4 |
| | | 0.0429 | 52.8 |
| | | 0.0318 | 40.8 |
| | | 0.0209 | 29.7 |
| | | 0.0125 | 20.4 |
| | | 0.0090 | 14.0 |
| | | 0.0065 | 8.5 |
| | | 0.0046 | 5.8 |
| | | 0.0032 | 4.1 |
| | | 0.0013 | 3.5 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
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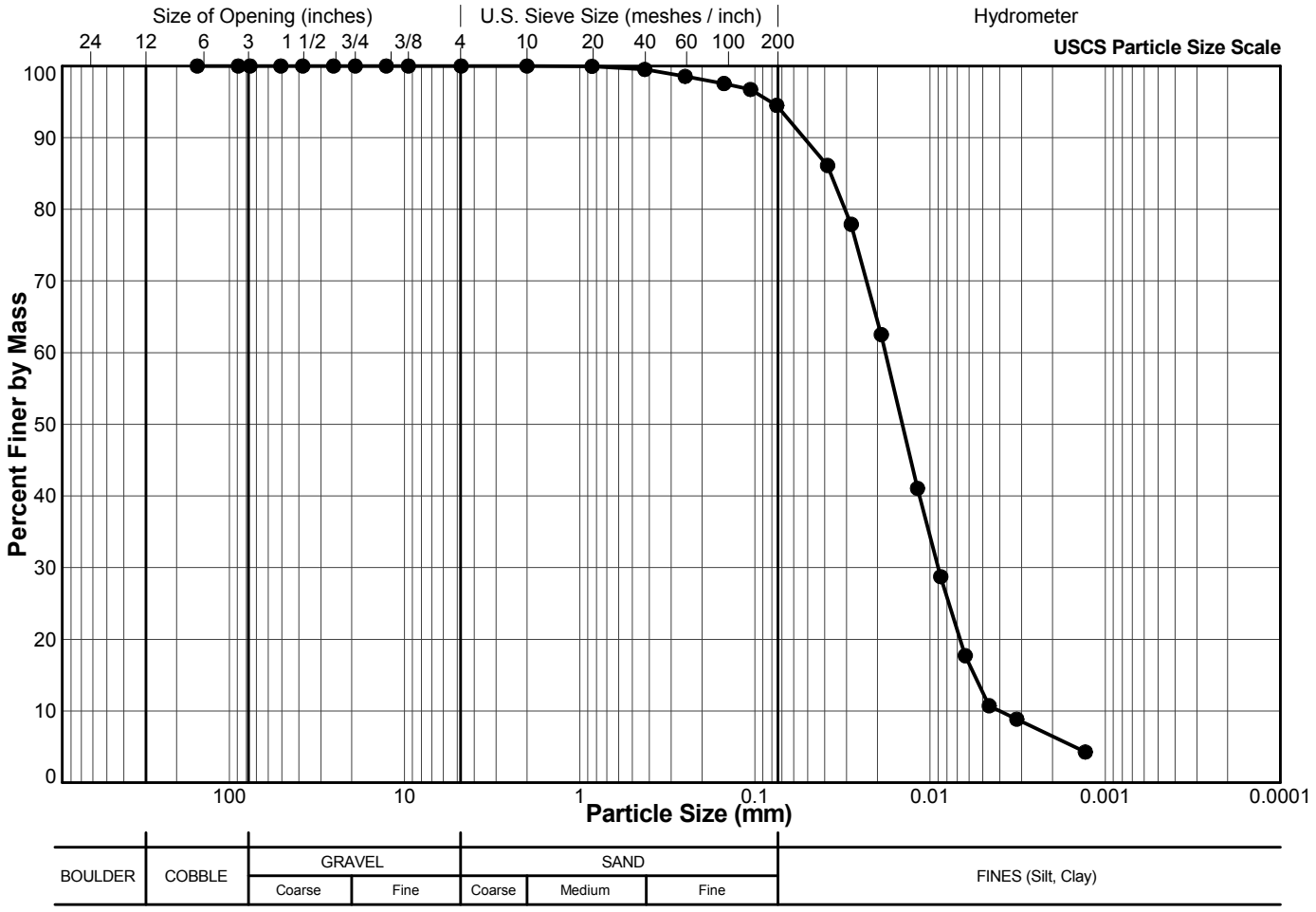
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 19
**Depth Interval (m):** 39.62 to 39.78
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 99.5 |
| #60 US MESH | 0.25 | | 98.5 |
| #100 US MESH | 0.15 | | 97.6 |
| #140 US MESH | 0.106 | | 96.7 |
| #200 US MESH | 0.075 | | 94.5 |
| | | 0.0385 | 86.1 |
| | | 0.0282 | 77.9 |
| | | 0.0190 | 62.5 |
| | | 0.0118 | 41.1 |
| | | 0.0087 | 28.7 |
| | | 0.0063 | 17.7 |
| | | 0.0046 | 10.7 |
| | | 0.0032 | 8.9 |
| | | 0.0013 | 4.3 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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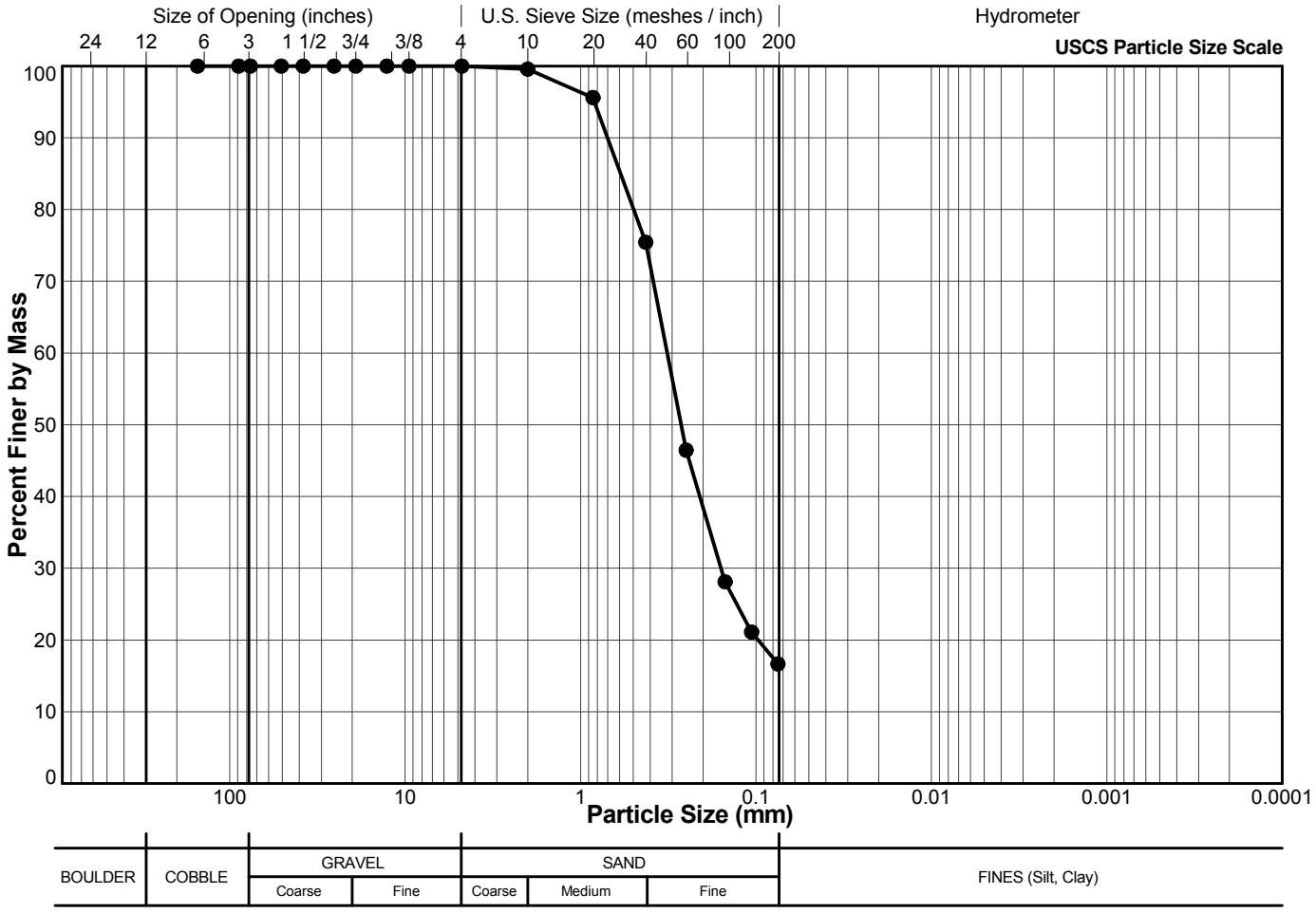
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 22
**Depth Interval (m):** 50.29 to 50.60
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 99.6 |
| #20 US MESH | 0.85 | | 95.6 |
| #40 US MESH | 0.425 | | 75.4 |
| #60 US MESH | 0.25 | | 46.5 |
| #100 US MESH | 0.15 | | 28.1 |
| #140 US MESH | 0.106 | | 21.1 |
| #200 US MESH | 0.075 | | 16.7 |

| BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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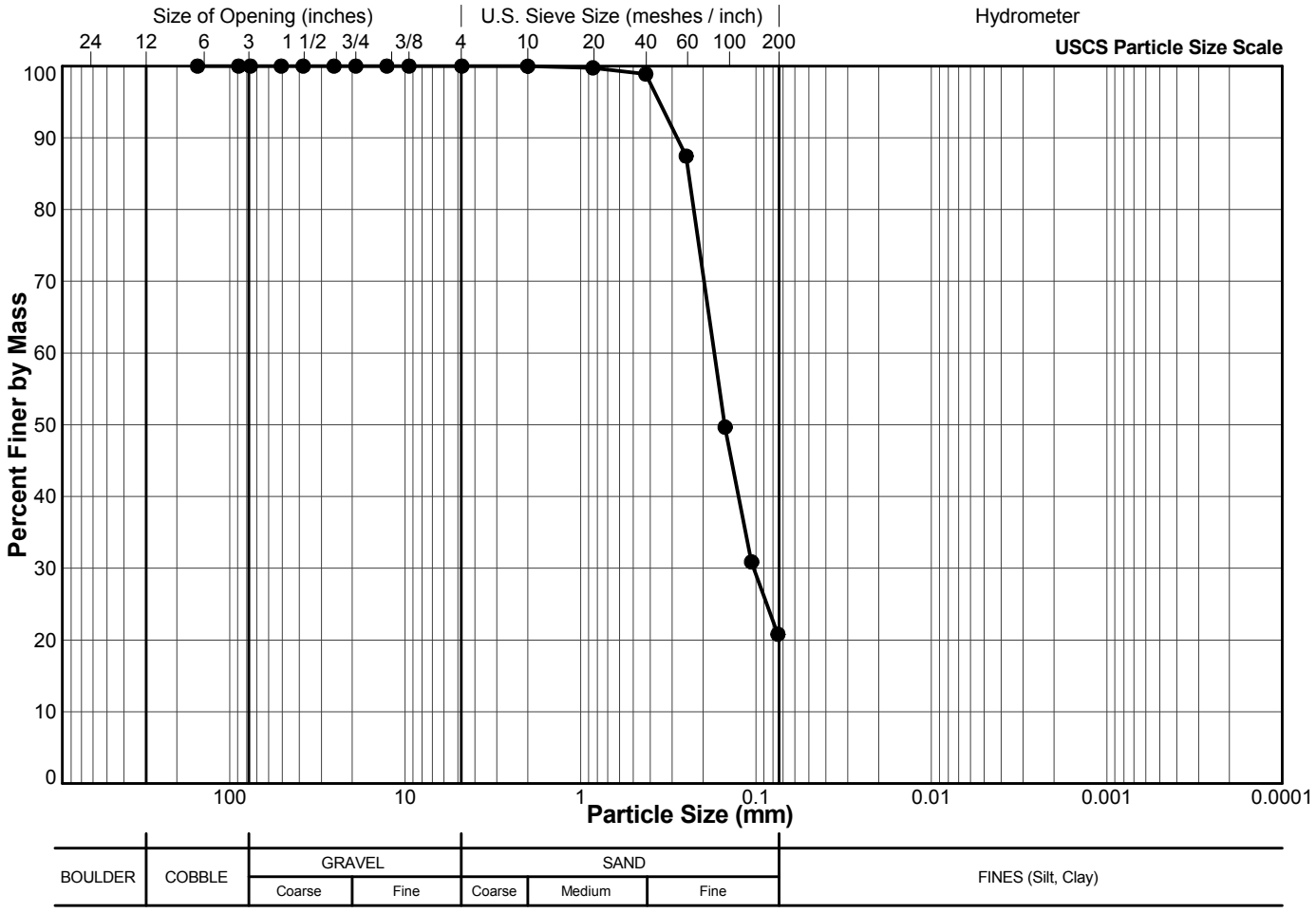
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-06
**Sample No.:** 27
**Depth Interval (m):** 67.21 to 67.36
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 99.8 |
| #40 US MESH | 0.425 | | 98.9 |
| #60 US MESH | 0.25 | | 87.5 |
| #100 US MESH | 0.15 | | 49.7 |
| #140 US MESH | 0.106 | | 30.9 |
| #200 US MESH | 0.075 | | 20.8 |

| BH | 9/12/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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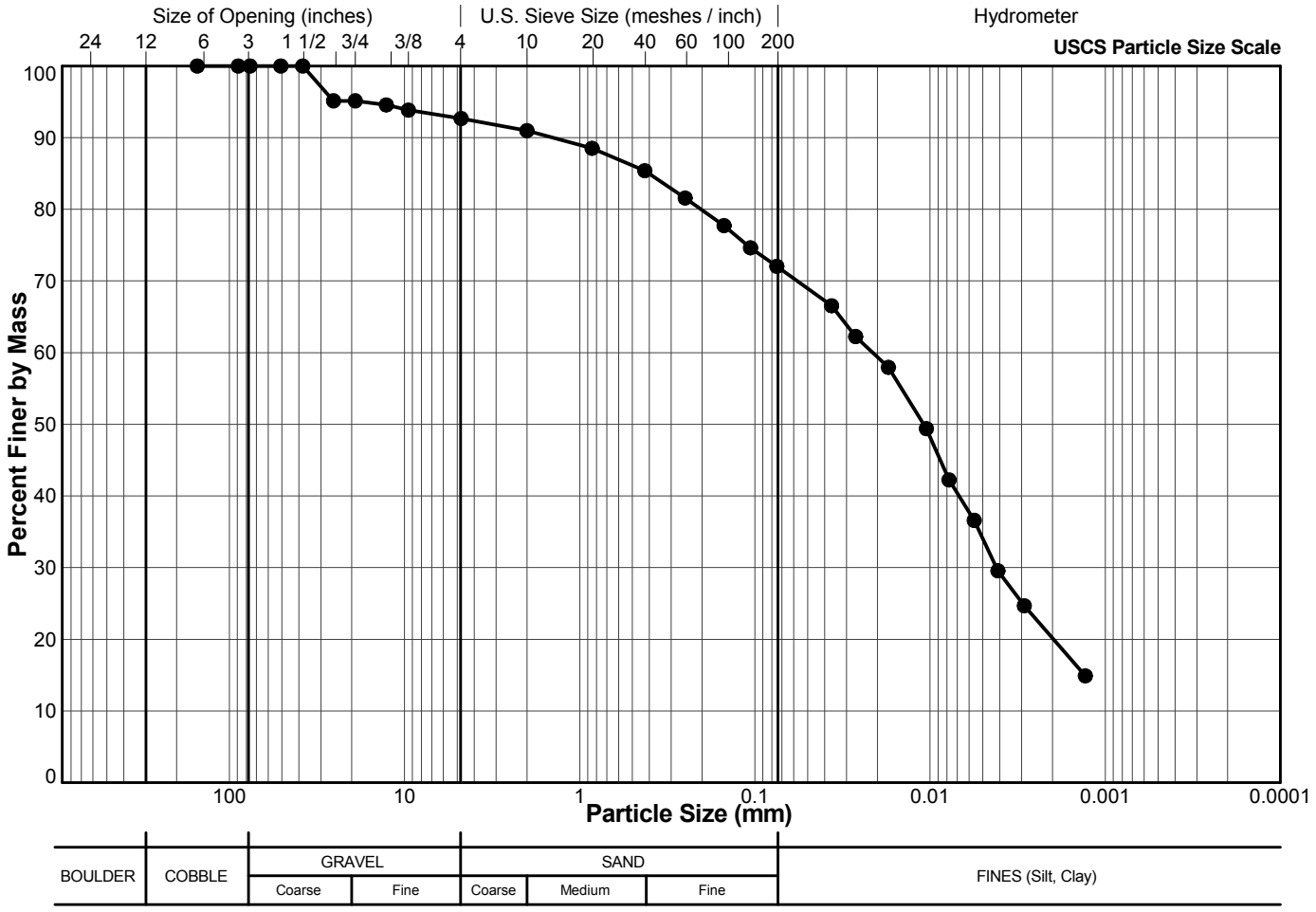
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 2
**Depth Interval (m):** 1.83 to 2.13
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 95.1 |
| 3/4" | 19.1 | | 95.1 |
| 1/2" | 12.7 | | 94.6 |
| 3/8" | 9.5 | | 93.8 |
| #4 US MESH | 4.75 | | 92.7 |
| #10 US MESH | 2 | | 91.0 |
| #20 US MESH | 0.85 | | 88.5 |
| #40 US MESH | 0.425 | | 85.4 |
| #60 US MESH | 0.25 | | 81.6 |
| #100 US MESH | 0.15 | | 77.7 |
| #140 US MESH | 0.106 | | 74.6 |
| #200 US MESH | 0.075 | | 72.0 |
| | | 0.0365 | 66.5 |
| | | 0.0266 | 62.2 |
| | | 0.0173 | 58.0 |
| | | 0.0105 | 49.4 |
| | | 0.0078 | 42.2 |
| | | 0.0056 | 36.6 |
| | | 0.0041 | 29.6 |
| | | 0.0029 | 24.7 |
| | | 0.0013 | 14.9 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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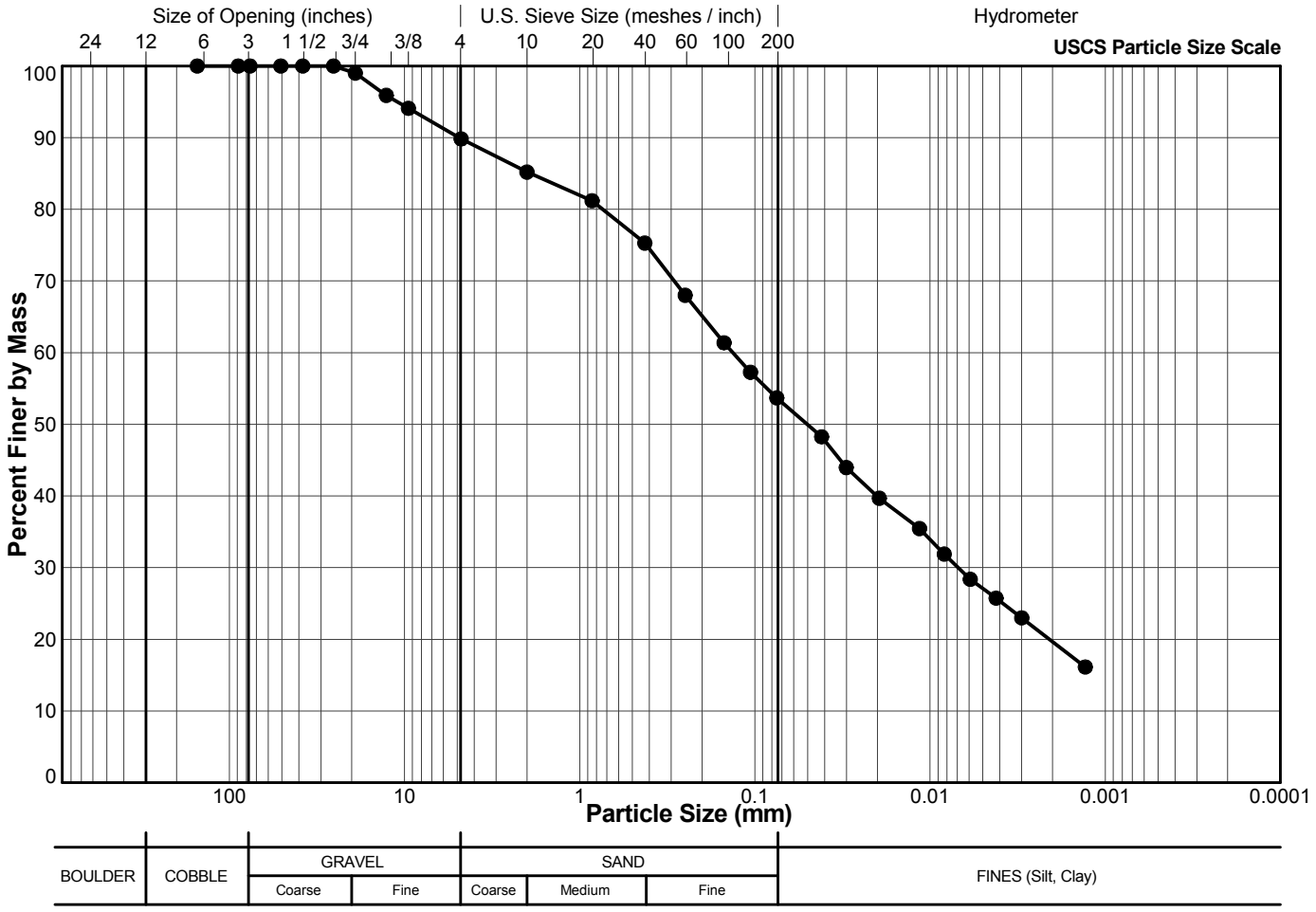
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 4
**Depth Interval (m):** 3.66 to 4.27
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 99.0 |
| 1/2" | 12.7 | | 95.9 |
| 3/8" | 9.5 | | 94.1 |
| #4 US MESH | 4.75 | | 89.8 |
| #10 US MESH | 2 | | 85.2 |
| #20 US MESH | 0.85 | | 81.2 |
| #40 US MESH | 0.425 | | 75.3 |
| #60 US MESH | 0.25 | | 68.0 |
| #100 US MESH | 0.15 | | 61.4 |
| #140 US MESH | 0.106 | | 57.3 |
| #200 US MESH | 0.075 | | 53.7 |
| | | 0.0416 | 48.3 |
| | | 0.0301 | 44.0 |
| | | 0.0195 | 39.7 |
| | | 0.0115 | 35.5 |
| | | 0.0083 | 31.9 |
| | | 0.0059 | 28.4 |
| | | 0.0042 | 25.7 |
| | | 0.0030 | 23.0 |
| | | 0.0013 | 16.1 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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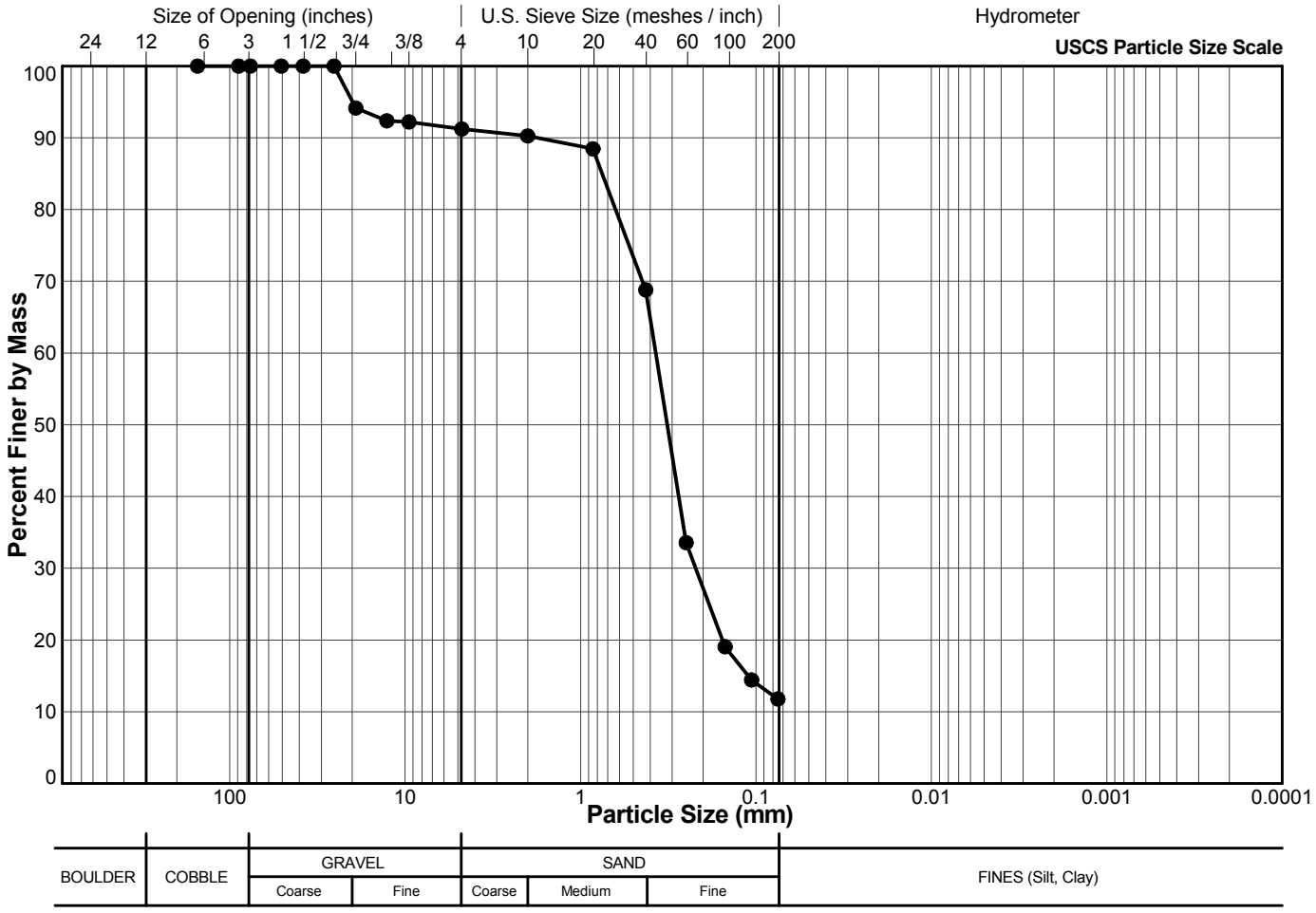
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 8
**Depth Interval (m):** 7.92 to 8.53
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 94.1 |
| 1/2" | 12.7 | | 92.4 |
| 3/8" | 9.5 | | 92.2 |
| #4 US MESH | 4.75 | | 91.2 |
| #10 US MESH | 2 | | 90.3 |
| #20 US MESH | 0.85 | | 88.5 |
| #40 US MESH | 0.425 | | 68.8 |
| #60 US MESH | 0.25 | | 33.6 |
| #100 US MESH | 0.15 | | 19.1 |
| #140 US MESH | 0.106 | | 14.4 |
| #200 US MESH | 0.075 | | 11.8 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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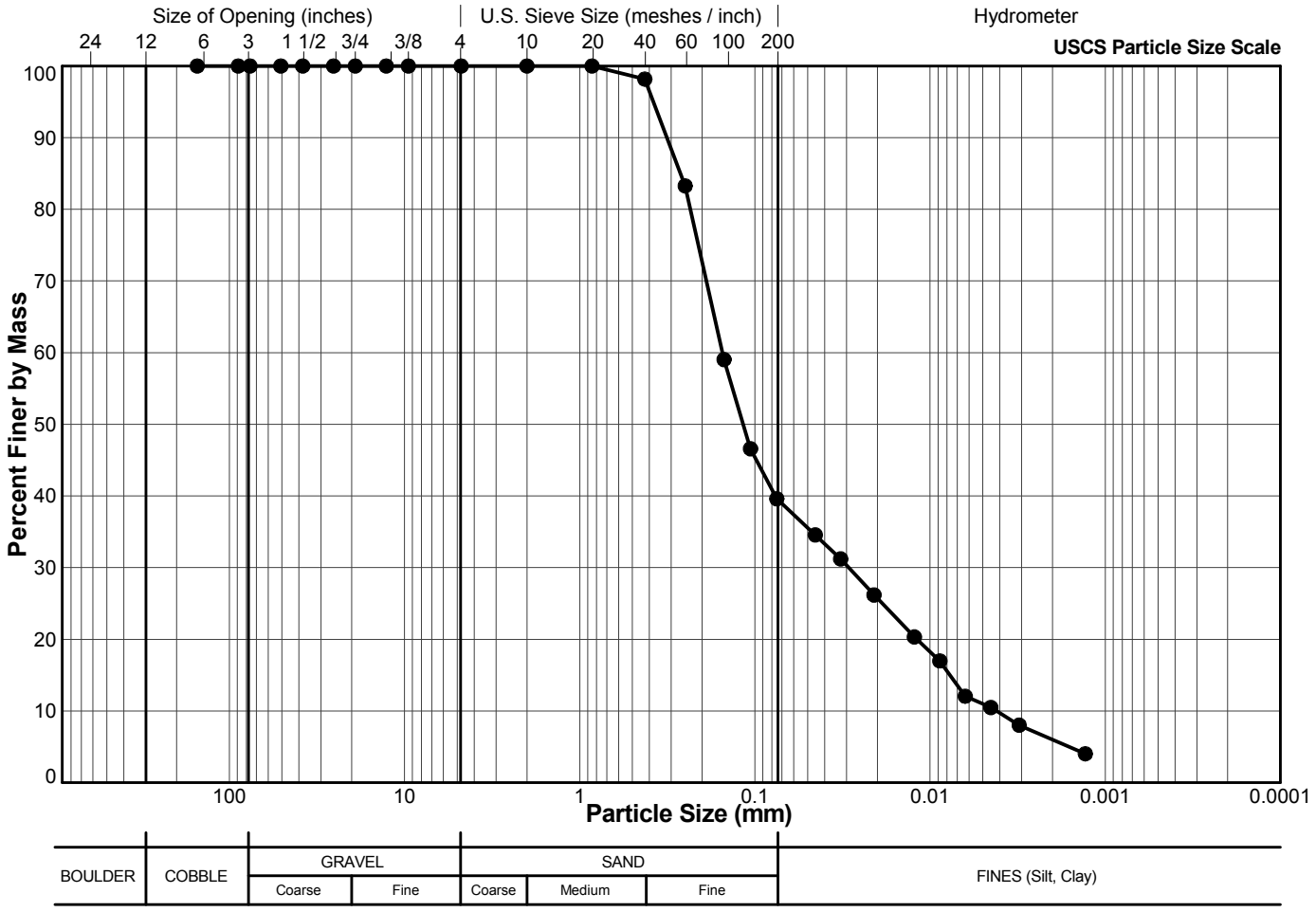
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 12
**Depth Interval (m):** 16.76 to 16.92
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 98.2 |
| #60 US MESH | 0.25 | | 83.3 |
| #100 US MESH | 0.15 | | 59.0 |
| #140 US MESH | 0.106 | | 46.6 |
| #200 US MESH | 0.075 | | 39.6 |
| | | 0.0452 | 34.6 |
| | | 0.0324 | 31.2 |
| | | 0.0209 | 26.2 |
| | | 0.0123 | 20.3 |
| | | 0.0088 | 17.0 |
| | | 0.0063 | 12.1 |
| | | 0.0045 | 10.5 |
| | | 0.0031 | 8.0 |
| | | 0.0013 | 4.0 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
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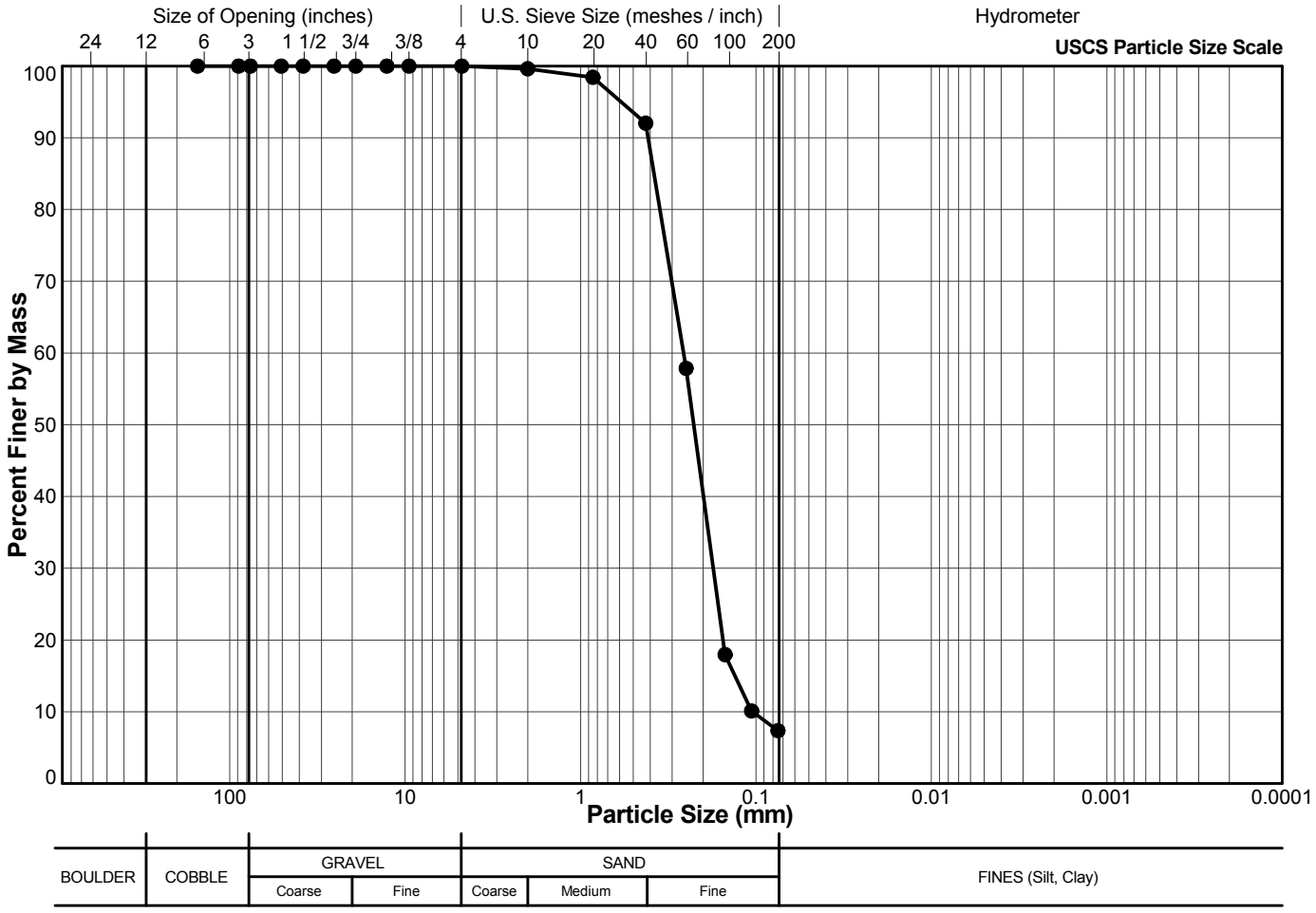
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 17
**Depth Interval (m):** 36.73 to 36.88
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 99.6 |
| #20 US MESH | 0.85 | | 98.4 |
| #40 US MESH | 0.425 | | 92.0 |
| #60 US MESH | 0.25 | | 57.9 |
| #100 US MESH | 0.15 | | 18.0 |
| #140 US MESH | 0.106 | | 10.1 |
| #200 US MESH | 0.075 | | 7.4 |

| BH | 9/12/2018 | LH | 9/19/2018 |
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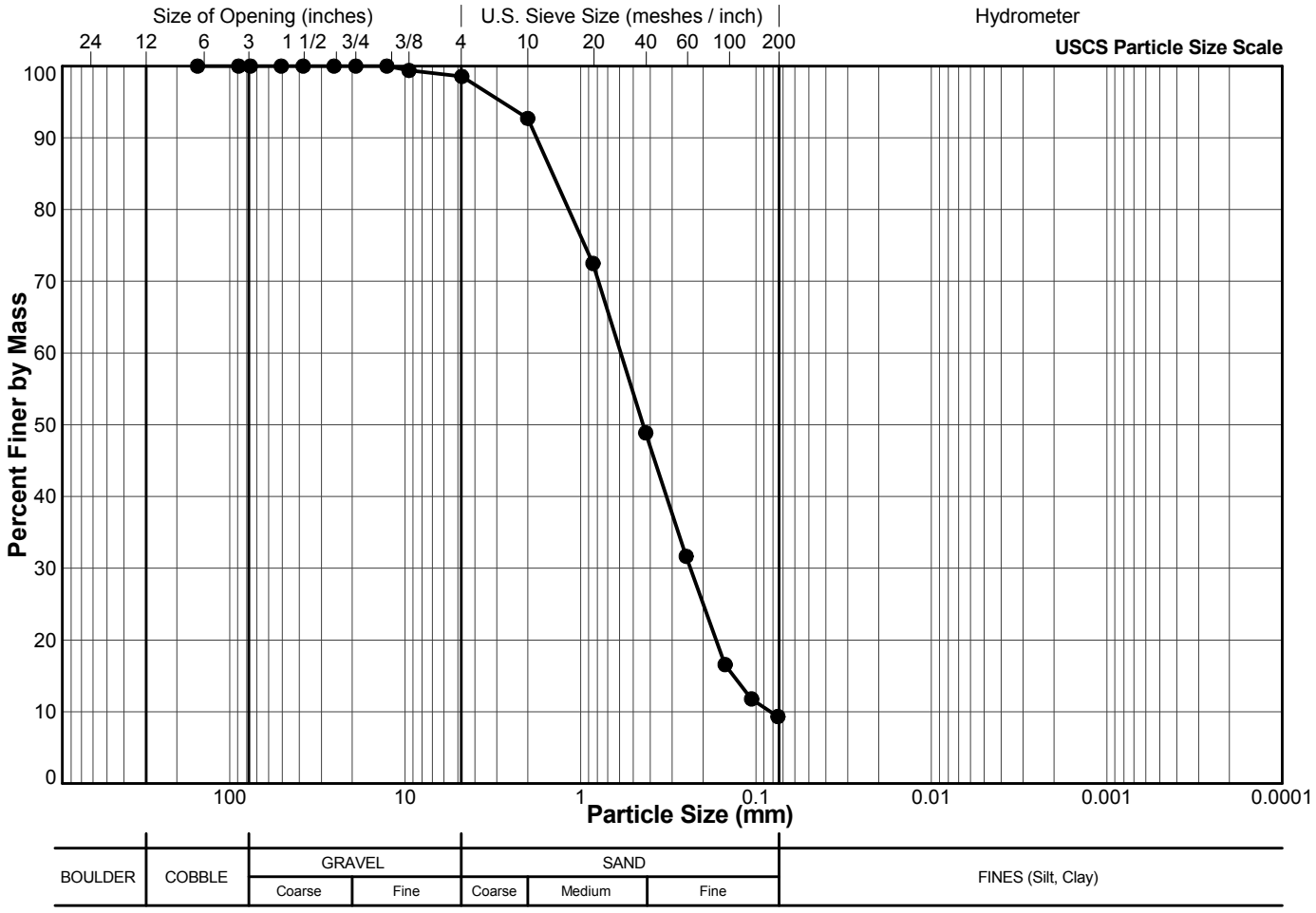
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 20
**Depth Interval (m):** 48.77 to 49.07
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 99.4 |
| #4 US MESH | 4.75 | | 98.6 |
| #10 US MESH | 2 | | 92.7 |
| #20 US MESH | 0.85 | | 72.5 |
| #40 US MESH | 0.425 | | 48.9 |
| #60 US MESH | 0.25 | | 31.7 |
| #100 US MESH | 0.15 | | 16.6 |
| #140 US MESH | 0.106 | | 11.8 |
| #200 US MESH | 0.075 | | 9.3 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
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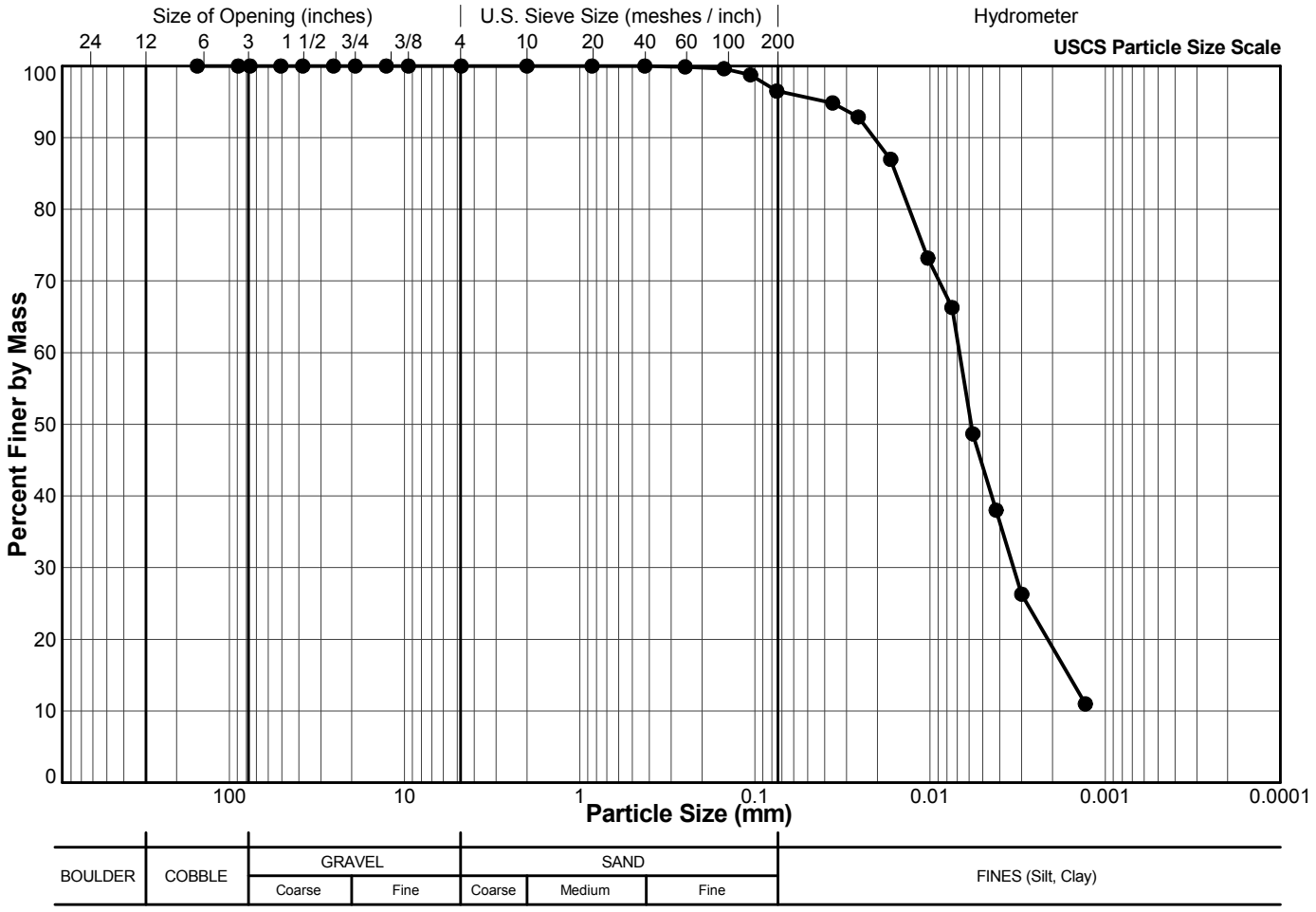
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D 422**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 21
**Depth Interval (m):** 51.36 to 51.51
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 100.0 |
| #10 US MESH | 2 | | 100.0 |
| #20 US MESH | 0.85 | | 100.0 |
| #40 US MESH | 0.425 | | 100.0 |
| #60 US MESH | 0.25 | | 99.9 |
| #100 US MESH | 0.15 | | 99.6 |
| #140 US MESH | 0.106 | | 98.8 |
| #200 US MESH | 0.075 | | 96.5 |
| | | 0.0360 | 94.8 |
| | | 0.0257 | 92.9 |
| | | 0.0168 | 87.0 |
| | | 0.0103 | 73.2 |
| | | 0.0075 | 66.3 |
| | | 0.0057 | 48.7 |
| | | 0.0042 | 38.0 |
| | | 0.0030 | 26.3 |
| | | 0.0013 | 11.0 |

| DC/BH | 9/13/2018 | LH | 9/19/2018 |
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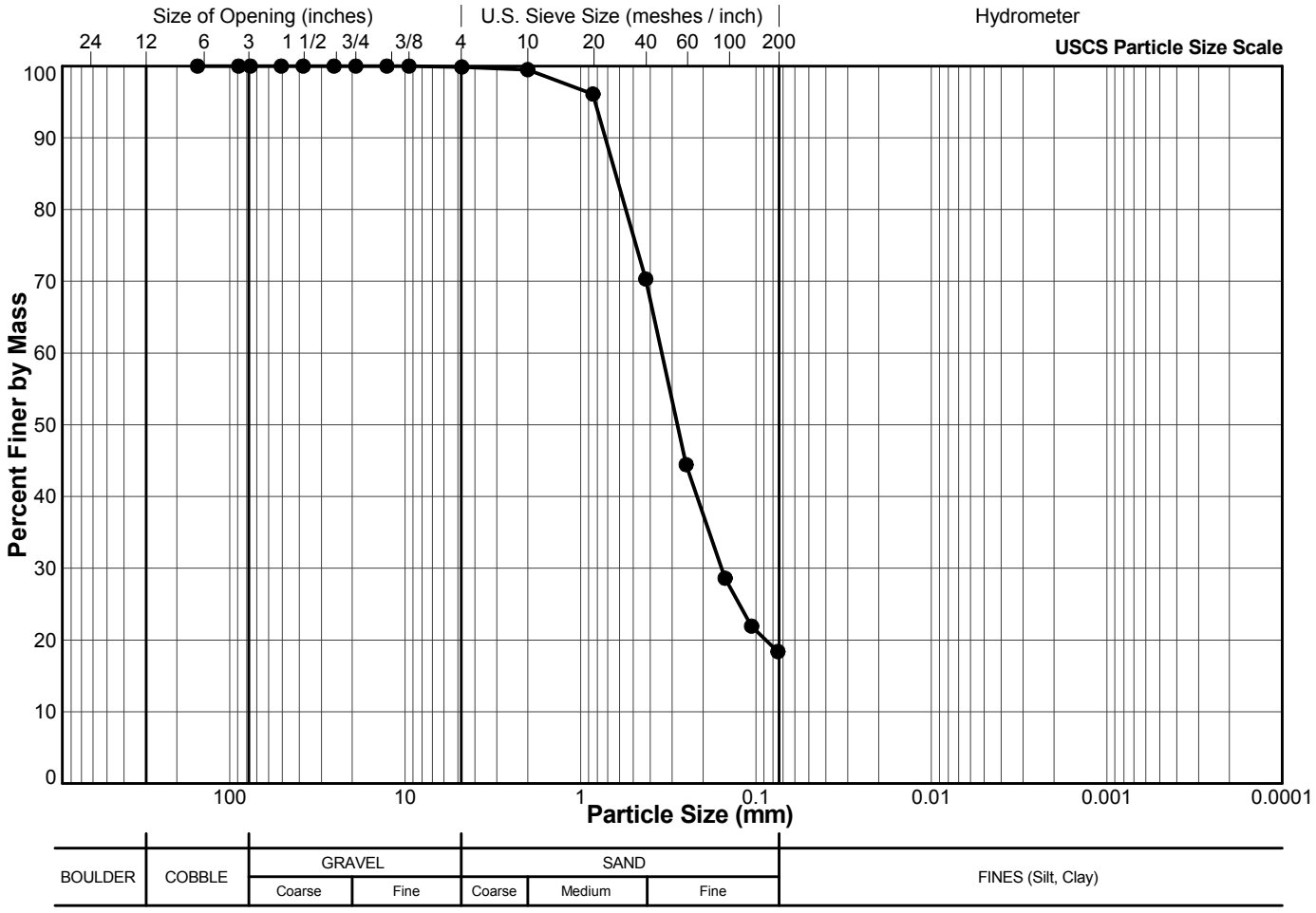
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 23
**Depth Interval (m):** 60.96 to 61.11
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 99.9 |
| #10 US MESH | 2 | | 99.5 |
| #20 US MESH | 0.85 | | 96.1 |
| #40 US MESH | 0.425 | | 70.3 |
| #60 US MESH | 0.25 | | 44.4 |
| #100 US MESH | 0.15 | | 28.6 |
| #140 US MESH | 0.106 | | 21.9 |
| #200 US MESH | 0.075 | | 18.4 |

| BH | 9/13/2018 | LH | 9/19/2018 |
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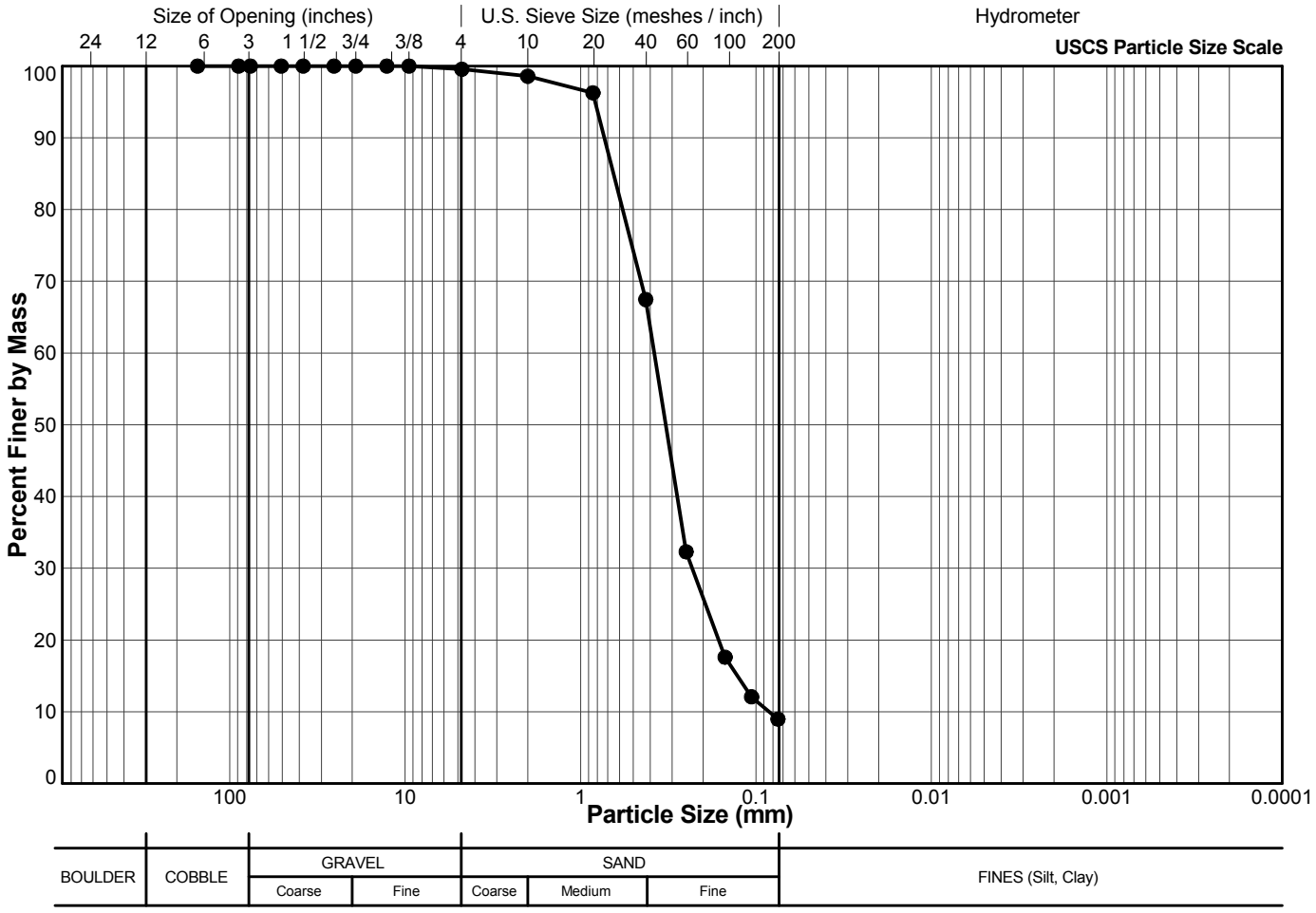
# SUMMARY OF PARTICLE SIZE DISTRIBUTION

**ASTM D6913**

**Client:** AECOM
**Project:** Area B Slope Stability and Protection
**Location:** University Endowmwnt Lands, Vancouver, BC
**Project No.:** 1895473 **Phase:** 1000

**Sample Location:** SH18-07
**Sample No.:** 26
**Depth Interval (m):** 71.32 to 71.48
**Lab Schedule No.:**




## Legend

| Sieve Size (USS) | (mm) | Particle Size (mm) | Percent Passing |
|---|---|---|---|
| 6" | 152.4 | | 100.0 |
| 3.5" | 88.9 | | 100.0 |
| 3" | 76.2 | | 100.0 |
| 2" | 50.8 | | 100.0 |
| 1 1/2" | 38.1 | | 100.0 |
| 1" | 25.4 | | 100.0 |
| 3/4" | 19.1 | | 100.0 |
| 1/2" | 12.7 | | 100.0 |
| 3/8" | 9.5 | | 100.0 |
| #4 US MESH | 4.75 | | 99.6 |
| #10 US MESH | 2 | | 98.6 |
| #20 US MESH | 0.85 | | 96.3 |
| #40 US MESH | 0.425 | | 67.5 |
| #60 US MESH | 0.25 | | 32.3 |
| #100 US MESH | 0.15 | | 17.6 |
| #140 US MESH | 0.106 | | 12.1 |
| #200 US MESH | 0.075 | | 9.0 |

| BH | 9/13/2018 | LH | 9/19/2018 |
|---|---|---|---|
| Tech | Date | Checked | Date |



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