

GEOTECHNICAL DESIGN REPORT
INTERSTATE 395/ROUTE 9 CONNECTOR
OVER EATON BROOK, BRIDGE NO. 6646
MAINEDOT WIN 018915.00
BREWER, MAINE

by Haley & Aldrich, Inc.
Portland, Maine

for Maine Department of Transportation
Augusta, Maine

File No. 132076-003
August 2021





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Attention: Laura Krusinski, P.E.
Senior Geotechnical Engineer

Subject: Geotechnical Design Report
Interstate 395/Route 9 Connector over Eaton Brook, Bridge No. 6646
MaineDOT WIN 018915.00
Brewer, Maine

Ladies and Gentlemen:

We are pleased to submit herewith our report entitled, "Geotechnical Design Report, Interstate 395/Route 9 Connector Bridge over Eaton Brook No. 6646, MaineDOT WIN 018915.00, Brewer, Maine." This Geotechnical Design Report (GDR) has been prepared in accordance with our proposal, dated 22 January 2021 and executed by your Richard J. Crawford on 5 February 2021, and the provisions of our General Consultant Agreement (GCA) with the Maine Department of Transportation (MaineDOT), No. CT20150706000000000010.

Introduction

This GDR presents the results of preliminary (Phase I) and final design (Phase II) phase subsurface investigation and laboratory testing programs, technical evaluations completed by Haley & Aldrich, Inc. (Haley & Aldrich) on behalf of MaineDOT, and provides geotechnical design recommendations for the proposed bridge that will carry northbound (NB) and southbound (SB) vehicular traffic on the proposed Interstate 395/Route 9 Connector (Connector) over Eaton Brook in Brewer, Maine (see Figure 1, Project Locus).

Please note that geotechnical design recommendations and construction considerations for the Connector have been provided under separate cover.

HORIZONTAL COORDINATE SYSTEM, ELEVATION DATUM, AND BASELINE STATIONING

Plan locations of test borings are reported as northing and easting coordinates relative to the Maine State Plane Coordinate System, North American Datum of 1983 (NAD 83), Maine 2000 Central Zone. The project elevation datum and elevations referenced herein are in feet and reference the North American Vertical Datum of 1988 (NAVD 88). The Connector baseline developed by MaineDOT for the proposed horizontal alignment is summarized below:

- Interstate 395/Route 9 Connector: Sta. 137+00 to Sta. 144+50

PROJECT LOCATION AND EXISTING SITE CONDITIONS

The proposed Connector bridge will carry NB and SB vehicular traffic over Eaton Brook in Brewer, Maine.

The project site predominantly consists of a lightly-wooded, undeveloped area. Existing site grades along the Connector alignment generally slope down towards Eaton Brook. The existing ground surface slopes down from approximately El. 95 at Sta. 137+00 to approximately El. 75 near Eaton Brook. The ground surface at the low point in Eaton Brook is approximately El. 70 near Sta. 141+00. To the north of Eaton Brook the ground surface slopes up from approximately El. 76 at Sta. 141+25 to approximately El. 83 at Sta. 144+00.

PROPOSED BRIDGE STRUCTURE

During preliminary design, MaineDOT developed and evaluated multiple bridge alternatives considering several factors including but not limited to overall project cost, maintenance of traffic, and future bridge maintenance. The bridge replacement alternative recommended by MaineDOT in the Preliminary Design Report (PDR) consists of a 121-ft long, single-span bridge that is supported on two pile-supported, cast-in-place (CIP) concrete integral abutments at the stations and elevations summarized below.

Substructure	Station at Centerline of Connector Alignment (ft)	Approximate Bottom of Abutment Elevation (ft, NAVD 88)
Abutment 1	Sta. 140+30	El. 80.5
Abutment 2	Sta. 141+51	El. 79

The bridge superstructure will be constructed using metalized steel plate girders (five beam lines) running parallel to the long dimension of the bridge, with an 8-in. thick CIP concrete deck and a 3-in. thick hot mix asphalt surface that are separated by a ¼-in. thick high performance waterproofing membrane. The bridge structure will be approximately 43-ft wide (shoulder-to-shoulder) and will consist of two, 12-ft wide travel lanes and two, 8-ft wide shoulders.

Based on our review of profile and cross section drawings developed by MaineDOT for the recommended bridge and Connector alternatives, we anticipate that the existing site grades along the Connector will need to be raised by approximately 18 to 14 ft in the vicinity of Abutments 1 and 2, respectively, to meet proposed finish grades.

Existing and proposed site conditions are shown on Figure 2, Site and Subsurface Exploration Location Plan.

Geologic Setting

Based on our review of the Maine Geological Survey's (MGS's) Surficial Geology Map of the Veazie Quadrangle, Maine (2011), surficial geology mapped in the vicinity of Eaton Brook consists of stream alluvium and Presumpscot Formation.

Marine Deposit clays and silts (part of the Presumpscot Formation) were encountered in the Phase I and Phase II explorations completed at the site. Marine Deposit soils typically consist of silty clay and clayey silt with some samples showing traces of organics. Stream alluvium was not encountered in any of the Phase I and Phase II explorations but may be present to some extent within the limits of Eaton Brook.

Deposits of Glacial Till were also encountered in the Phase I and Phase II explorations underlying the surficial Marine Deposits. The Glacial Till unit primarily consists of stiff to hard silt with varying amounts of sand and gravel with some minor portions consisting of well graded sand with varying amounts of silt and gravel.

According to MGS's Bedrock Geology Map of the Veazie Quadrangle (2011), bedrock within the site is primarily mapped as siltstone and/or claystone slate of the Brewer Formation. Mapped subordinate rock types consist of fine-grained calcareous quartz-rich meta-arenite and noncalcareous feldspathic metawacke. Thin beds of dark gray to gray-black metalimestone may also be present. The Brewer Formation is Silurian to Ordovician in age. Rock core samples collected in recent explorations at the site consisted of Phyllite and Siltstone with moderate to steeply dipping beds and intermittent calcite veins.

Please refer to subsequent sections of this GDR for more specific information on the soil and bedrock conditions encountered in the Phase I and Phase II explorations.

Subsurface Exploration Programs

PRELIMINARY DESIGN PHASE (PHASE I) SUBSURFACE INVESTIGATION

Haley & Aldrich completed a preliminary design phase (Phase I) subsurface exploration program at the site in November 2018. The Phase I subsurface investigation consisted of four bridge test borings, designated BB-BEB-101 through BB-BEB-104, and one highway test boring, designated HB-BE-123, which were drilled in the vicinity of the proposed bridge abutments (bridge test borings) and along the Connector north of Eaton Brook (highway test boring).

The test boring locations were laid out in the field by Haley & Aldrich using global positioning system (GPS) survey equipment prior to the start of drilling. "As-drilled" test boring locations and ground surface elevations were determined in the field by MaineDOT using GPS survey equipment upon the completion of drilling and were provided to Haley & Aldrich. The Phase I test boring locations and ground surface elevations are summarized in Table I and are shown on Figure 2.

The test borings were drilled by New England Boring Contractors (NEBC) of Hermon, Maine using a Mobile Drill B-53 track-mounted drill rig. Test borings were advanced to depths ranging from

approximately 22 to 71 ft below existing ground surface (BGS) using 4-in. (HW-size) inside diameter (ID) steel casing.

Soil samples were generally collected continuously through the existing fill soils and at standard, 5-ft intervals thereafter, by driving a 1-3/8-in. inside diameter (ID) split-spoon sampler with a 140-lb hammer dropped from a height of 30 in., as indicated on the test boring logs. The number of hammer blows required to advance the sampler through each 6-in. interval was recorded and is provided on the logs. The uncorrected standard penetration test (SPT) N-value (N-uncorrected) is defined as the total number of blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval. The drill rig was equipped with a calibrated automatic hammer per MaineDOT requirements. The energy-corrected SPT N-value (N_{60}), which is equal to the uncorrected N-value multiplied by the hammer efficiency factor (0.906; 90.6 percent theoretical hammer efficiency) divided by 0.6, is also provided on the logs.

In-situ vane shear tests were typically conducted within the marine clay deposit in each test boring. Vane shear tests were conducted with either a 65 mm by 130 mm or a 55 mm by 110 mm Geonor rectangular vane attached to a 2-ft long, 12-mm diameter rod extension, attached to a string of 5/8-in. outside diameter (OD) hollow chrome-moly rods. At each in-situ vane shear test location, the vane was pushed (by hand) until the bottom of the vane was approximately 1 to 2 ft below the bottom of the borehole. The vane was then rotated at a rate of about 90 degrees per minute using a calibrated torque wrench. Results of the vane shear testing are provided on the test boring logs. Results of the vane shear testing, including raw torque values and calibrated shear strengths, are provided on the individual test boring logs in Appendix A.

A total of nine, relatively undisturbed samples of marine clay were obtained from test borings BB-BEB-101 through BB-BEB-104. The samples were obtained by advancing a 3-in. OD thin-wall Shelby tube into the clay using a piston sampler.

Two test borings, BB-BEB-101 and BB-BEB-104, were advanced approximately 15 and 11 ft into bedrock, respectively, using a 2.0-in. (NQ-size) ID diamond-tipped core barrel.

One observation well was installed in the completed borehole BB-BEB-102 to provide information on the static groundwater levels at the site. The observation well consisted of 2-in. ID, machine-slotted PVC pipe and solid PVC riser pipe extending approximately 3 ft above existing ground surface. The well screen was installed in both the glacial till and marine clay deposit. The observation well was outfitted with a steel guardpipe and lock/cap assembly. The observation well installation and groundwater monitoring reports are provided in Appendix C.

All soil and bedrock samples were collected and preserved in glass jars and wooden boxes, respectively. The soil and rock samples that were not submitted for laboratory testing are currently being stored at the Haley & Aldrich storage facility in Portland, Maine and are available for review upon request.

The Phase I drilling, sampling and in-situ testing was performed in accordance with MaineDOT specifications.

FINAL DESIGN PHASE (PHASE II) SUBSURFACE INVESTIGATION

Test Borings

Haley & Aldrich completed a design phase (Phase II) subsurface exploration program at the site in October 2020 and January 2021. The Phase II subsurface investigation consisted of six bridge test borings, designated BB-BEB-201 through BB-BEB-205 (including BB-BEB-204A), and two highway test borings, designated HB-BE-221 and HB-BE-222, which were drilled at/near the ends of the abutment wingwalls (bridge test borings) and along the Connector, south and north of Eaton Brook (highway test borings).

The Phase II test borings were laid out in the field by MaineDOT using GPS survey equipment prior to the start of drilling. “As-drilled” test boring locations and ground surface elevations were determined in the field by MaineDOT using GPS survey equipment upon the completion of drilling and were provided to Haley & Aldrich. The Phase II test boring locations and ground surface elevations are summarized in Table I and are shown on Figure 2.

The Phase II test borings were drilled NEBC of Hermon, Maine using a Mobile Drill B-53 track-mounted drill rig. Test borings were advanced to depths ranging from approximately 17 to 90 ft BGS using similar means and methods that were used to drill, sample and conduct in-situ testing in the Phase I test borings. The hammer efficiency factors for the automatic hammer used to drive the split-spoon sampler was 0.852 (85.2 percent theoretical hammer efficiency) as shown on the test boring logs.

In-situ vane shear tests were typically conducted within the marine clay deposit in each test boring using similar means and methods that were used during the Phase I subsurface exploration program.

A total of six, relatively undisturbed samples of marine clay, were obtained from test borings BB-BEB-202, BB-BEB-204, BB-BEB-204A, and BB-BEB-205. through BB-BEB-104 using similar means and methods that were used during Phase I.

Test borings BB-BEB-201, BB-BEB-202 and BB-BEB-204A were advanced approximately 10 to 14 ft into bedrock using a 2.0-in. (NQ-size) ID diamond-tipped core barrel.

Soil and bedrock samples were collected and preserved in glass jars and wooden boxes, respectively. The soil and bedrock samples that were not submitted for laboratory testing are currently being stored at the Haley & Aldrich storage facility in Portland, Maine and are available for review upon request.

The Phase II drilling and sampling activities were performed in accordance with MaineDOT requirements.

Cone Penetration Testing

A total of four piezocone (CPT) and three seismic piezocone (sCPT) penetrometer tests, designated CPT-114 through CPT-116 (including CPT-115B) and sCPT-101 and sCPT-102 (including sCPT-101B), were

completed along the proposed Connector alignment, north and south of Eaton Brook, on 27 and 29 October 2020 by ConeTec, Inc. of West Berlin, New Jersey. The CPT and sCPT exploration locations are shown on Figure 2. The penetrometer was pushed into and through the naturally-deposited soils using a Mobile Drill B-51 track-mounted rig. The explorations were terminated on refusal surfaces at depths ranging from approximately 7 to 32 ft BGS. Upon completion of the test boring explorations (described in the preceding section of this report) the depths of the refusal surfaces were compared to the subsurface conditions encountered in nearby test borings and were judged by Haley & Aldrich to be glacial till soils. Shear wave velocity (V_s) measurements were obtained within the overburden soils in SCPT-101 and SCPT-102 at approximate 3-ft to 5-ft intervals. The results of the testing at each CPT and sCPT location are included in Appendix B and are also summarized in subsequent sections of this report. The CPTs and sCPTs were performed in accordance with American Society for Testing Materials (ASTM) D5778.

Generalized Subsurface Conditions

The subsurface conditions present at the site generally consist of a thin layer of topsoil overlying naturally-deposited marine silt/clay, glacial till and bedrock. Refer to Table II for a detailed summary of the soil units and encountered thicknesses at each test boring location. A general description of each soil/bedrock unit is provided separately, below. Detailed soil and bedrock descriptions are provided on the test boring logs included Appendix A. Refer to Figure 3, Interpretive Subsurface Profile, for a graphical representation of the subsurface conditions present along the proposed Connector/bridge alignment.

Geologic Unit	Approximate Encountered Thickness (ft)	Generalized Description
Topsoil	0.1 to 0.6	A layer of topsoil was encountered at the ground surface. <i>(encountered test borings BB-BEB-103, -104, -201, -202, -205, HB-BE-221 and HB-BE-222)</i>
Marine Deposit	7 to 27	Very soft to stiff clayey SILT and silty CLAY, trace organics <i>(encountered in each test boring)</i>
Glacial Till	10 to 63	Medium dense to very dense fine to coarse SAND with variable amounts of silt and gravel; dense to very dense fine GRAVEL with variable amounts of silt and sand; stiff to hard SILT with variable amounts of sand and gravel <i>(encountered in each test boring)</i>
Weathered Bedrock	5 to 10	Very dense GRAVEL with variable amounts of silt and sand <i>(encountered in test borings BB-BEB-202 and BB-BEB-204A)</i>
Bedrock		Top of bedrock surface encountered at depths ranging from approximately 37 to 80 ft BGS (El. 37 to El. -3.2) and generally slopes down from south to north along the Connector alignment. The top of bedrock surface is variable perpendicular to the Connector baseline (east-west direction).

Please note that soil descriptions provided on the test boring logs do not represent actual field conditions other than at the specific test boring locations. The actual conditions encountered between test boring locations may vary from those described herein.

BEDROCK CONDITIONS

As stated previously, approximately 10 to 15 ft of bedrock was cored in the test borings. The sampled and recovered bedrock generally consisted of the following:

- Hard, fresh to moderately weathered, brown-gray to gray, aphanitic, PHYLLITE. Primary joints dip low to vertical angles and are very close to closely spaced, tight to open.
- Soft to hard, fresh to moderately weathered, gray, aphanitic, SILTSTONE. Primary joints dip steep and low angles and are moderate to closely spaced, tight to open.

Rock quality designation (RQD) is a common parameter that is used to help assess the competency of sampled bedrock. RQD is defined as the sum of pieces of recovered bedrock greater than 4 in. in length divided by the total length of the bedrock core run. RQD values for the PHYLLITE encountered at the site ranged from 0 to 82 percent (average of 33 percent) indicating variable rock quality; from very poor to good (average = very poor).

Detailed bedrock core data and descriptions are provided on Table III and on the boring logs in Appendix A. Photographs of the recovered bedrock core samples are also provided for reference in Appendix A.

GROUNDWATER CONDITIONS

As discussed previously, one observation well was installed in completed borehole BB-BEB-102 to provide information on the static groundwater levels at the site. The measured water levels during the period 19 December 2018 to 15 June 2021 ranged from approximately 0.2 to 1.7 ft above ground surface (El. 75.5 to El. 77.0). Elevated water levels (i.e., those that were measured above existing ground surface) were also encountered during drilling of test borings BB-BEB-101, BB-BEB-103, BB-BEB-104, and BB-BEB-201 through BB-BEB-205. These elevated water levels were typically observed at the end of drilling while pulling casing or immediately after pulling casing and consisted of water seeping out of the top of the borehole. In two borings, the elevated water levels were noted while drilling through the glacial till, at depths from 46 to 48 ft (in BB-BEB-103) and from 35 to 37 ft (in BB-BEB-201).

In general, water levels may fluctuate with season, precipitation, local soil/bedrock conditions, and excavation means and methods. Therefore, water levels may vary from those summarized above, provided on the testing boring logs included in Appendix A and shown on the groundwater monitoring report included in Appendix C.

Geotechnical Laboratory Testing Program

Phase I and Phase II laboratory testing programs were conducted by Haley & Aldrich on representative soil and rock samples to aid in soil classification and determination of engineering soil properties. Laboratory testing was performed in accordance with applicable ASTM testing procedures by GeoTesting Express, Inc. of Acton, Massachusetts. A summary of the lab test results is provided below.

Laboratory Test	ASTM Test Designation	Geologic Unit	No. of Tests	Range in Test Results ¹
Moisture Content	ASTM D 2216	Marine Deposit	7	29% < WC < 37%
Atterberg Limits	ASTM D 4318		7	32% < LL < 38% 17% < PL < 20% 15% < PI < 19%
Consolidated-Undrained Triaxial Shear	ASTM D 4767		6	392 psf < S _u < 554 psf
One-Dimensional Consolidation	ASTM D 2435 Method B		6	1,600 psf < σ_{vm} < 7,181 psf 0.017 < RR < 0.025 0.112 < CR < 0.216
Consolidated-Undrained Direct Simple Shear	ASTM D6528		1	S _u = 396 psf

Notes:

¹ WC = Moisture Content; LL = Liquid Limit; PL = Plastic Limit; PI = Plasticity Index; S_u = undrained shear strength; σ_{vm} = maximum past pressure; RR = recompression ratio; CR = virgin compression ratio; psf = pounds per square foot.

All laboratory test results are shown on the test boring logs included in Appendix A and complete results are provided in Appendix D.

Geotechnical Evaluations and Design Recommendations

Geotechnical design recommendations, as discussed and provided herein, were developed in accordance with the following documents:

- AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, Ninth Edition, 2020, referred to herein as AASHTO LRFD,
- MaineDOT Bridge Design Guide (BDG), August 2003, with Interim Revisions through June 2018, referred to herein as Bridge Design Guide.

Engineering calculations that support the design recommendations outlined in this report are provided for reference in Appendix E.

SEISMIC SITE CLASS AND DESIGN PARAMETERS

Site class was determined in accordance with AASHTO LRFD Section 3.10.3.1 using Method A and the shear wave velocity data from seismic piezocone penetration tests sCPT-101 and sCPT-102. The measured range in shear wave velocity for each soil unit present at the site is summarized below.

Soil Unit	Approximate Range in Encountered Thickness (ft)	Range in Measured Shear Wave Velocity (ft/sec)
Marine Clay	8 to 18	212 to 832 (avg. = 455)
Glacial Till	2 to 14	739 to 1,125 (avg. = 960)

Please recall that the sCPT explorations were terminated on refusal surfaces within the glacial till stratum at depths of less than 100 ft BGS, which is the total soil/bedrock thickness that is used to determine Site Class in accordance with AASHTO LRFD. Because the sCPT explorations were terminated in glacial till, no shear wave velocity data was collected in bedrock, which is present at the site at depths ranging from approximately 37 to 80 ft BGS at/near the bridge abutment locations. As a result of not having site-specific shear wave velocity data for bedrock and having only limited data in the glacial till, Haley & Aldrich assumed that the shear wave velocity of the material below the sCPT refusal depth to a depth of 100 ft BGS is equal to the shear wave velocity measured at the bottom of each sCPT exploration, which in our opinion is conservative.

Based on the nature and thickness of the overburden soils and depth to bedrock at the site, we recommend the site be considered "Site Class D." Spectral accelerations were determined based on the geographic site location and the recommended "Site Class D" designation using the United States Geological Survey (USGS) software application Seismic Design Parameters v. 2.0, which is based on a seismic event having a 7 percent probability of exceedance in 75 years (approximate 1,000-year return period). The recommended values are summarized below.

Design Parameter	Design Value
Site factor for short-period range of acceleration response spectrum, F_a =	1.6
Site factor for long-period range of acceleration response spectrum, F_v =	2.4
Site factor at zero-period on acceleration response spectrum, F_{pga} =	1.6
Horizontal response spectral acceleration coeff. at 0.2-s period on rock, S_s (g) =	0.143
Horizontal response spectral acceleration coeff. at 1.0-s period on rock, S_1 (g) =	0.043
Peak seismic ground acceleration coeff. on rock, PGA (g) =	0.066
Horizontal response spectral acceleration coeff. at 0.2-s period modified by F_a , S_{DS} (g) =	0.23
Horizontal response spectral acceleration coeff. at 1.0-s period modified by F_v , S_{D1} (g) =	0.10
Peak seismic ground acceleration coefficient modified by F_{pga} , A_s (g) =	0.11

In accordance with AASHTO LRFD Section 3.10.6, the site falls within Seismic Zone 1 based on the calculated value of S_{D1} (i.e., $0.10 < 0.15$ = Seismic Zone 1 from AASHTO LRFD Table 3.10.6.1). Soils present at the location of the proposed bridge generally consist of marine deposit and glacial till, which are generally comprised of silty CLAY and clayey SILT. Because of this, it is our opinion that the soils at the site are not susceptible to liquefaction during the design earthquake event.

APPROACH EMBANKMENTS

Subsurface soil conditions along the proposed bridge alignment will affect the planning and design of the construction of the new embankments. As previously stated, maximum raises in grade of approximately 18 ft are anticipated to construct the bridge approach embankments. Global embankment stability and settlement analyses were conducted to assess the feasibility of constructing the approach embankments using normal weight earthfill over the compressible and low strength marine deposit soils present at the site.

Design Soil Properties

Geotechnical design recommendations for the approach embankments were controlled by the engineering properties of the marine silt/clay deposit. For staged embankment construction and global stability evaluations, undrained shear strength (S_u) profiles and strength gain (ΔS_u) after construction staging were established. Internal friction angle (drained) values were also estimated.

Field vane (FV), laboratory direct simple shear (DSS), and isotropically-consolidated undrained triaxial compression (CIUC) tests were performed to directly measure the undrained shear strength of the marine clay. As stated above, CPT testing was conducted, which can be used to estimate the undrained shear strength of the soil. However, the undrained shear strength values derived from the CPTs using “default” ConeTec values for correlation parameters (i.e., $N_{kt}=12.5$ and $N_{du}=6.0$) did not match well with the direct in-situ (FV) and laboratory (DSS and CIUC) derived undrained shear strength measurements. Undrained shear strength values derived from CPTs as compared to those derived from in-situ vane shear strength testing is discussed in more detail below.

The soil present along a global stability failure surface undergoes different modes of failure depending on its orientation. The three main failure modes are triaxial compression at the top of the failure surface (where oriented near-vertically), direct simple shear at the bottom of the failure surface (where oriented near-horizontal), and triaxial extension at the toe of the failure surface (where oriented near-vertically). Anisotropic undrained shear strength can be defined in a limit equilibrium software program. If there is insufficient information to continuously define the undrained shear strength versus failure surface orientation, an “average” design undrained shear strength based on the average of the triaxial compression and extension or the direct simple shear undrained strength can be used. Due to the absence of triaxial extension undrained shear strength data, it is not possible to define the design undrained shear strength based on triaxial testing. On the other hand, field vane undrained shear strengths appear to match well with the direct simple shear strengths. For this reason and because of the larger data set, the field vane data was used to define undrained shear strength profiles for the marine clay. Plots of design undrained shear strength versus elevation are included in Appendix E. Laboratory data sheets and plots of undrained shear strength for the entire Connector alignment are

included in our report titled “Geotechnical Design Report, Interstate 395/Route 9 Connector Highway, MaineDOT WIN 018915.00, Brewer-Eddington, Maine” dated 30 August 2021 (Highway Report).

Because approach embankments immediately behind the proposed bridge abutments cannot be constructed to full-height in a single stage, staged embankment construction is necessary to meet temporary and permanent global stability factors of safety (static and pseudo-static), and post-construction settlement requirements. Under temporary staging, partial fill heights are placed, and settlements are allowed to occur, and the underlying soils gain strength as excess pore pressures dissipate. Strength gain is a function of the added overburden stress from fill placement and the degree to which excess pore pressures have dissipated. For the marine clay, the undrained shear strength gain (ΔS_u) was estimated to be the increase in overburden stress from fill placement multiplied by 0.21 and again by 0.90. The 0.21 factor is based on field vane shear strength data and preconsolidation pressure data from consolidation tests. The 0.90 factor assumes that 90 percent average degree of consolidation will be achieved (i.e., 90 percent of the excess pore pressure has dissipated) prior to placement of the second stage of fill. Detailed calculations for determining undrained shear strength gain in the marine clay are included in Appendix H of the Highway Report.

Post-construction settlement caused by compression of marine clay soils under the proposed embankments was considered in design. For this project, post-construction settlement is composed of time-dependent primary consolidation and secondary compression. Where present, the marine silt will likely undergo immediate settlement during construction and is therefore of less concern as this settlement will likely occur prior to final paving. Laboratory consolidation tests were performed on marine clay specimens trimmed from Shelby tube samples. Compressibility parameters, rate of consolidation, and stress history (i.e., preconsolidation pressure) were then calculated from the consolidation test data. Strain-based field compressibility parameters, CR and RR, were calculated from strain versus log applied stress curves using the method outlined by Holtz and Kovacs. Strain-based coefficients of secondary compression (C_{α}) were evaluated from strain versus time plots.

Preconsolidation pressure was calculated from the test data using strain-energy method (Becker et al., 1987). Coefficients of consolidation were taken from reported values in laboratory result summaries, which were based on the square root of time method (Taylor). Plots of CR, RR, and stress history are included in Appendix E and are also described in subsequent sections of this report as is post-construction embankment settlement criteria.

Over-excavation (into stage 1 normal weight earthfill) and use of lightweight fill is considered necessary along each approach embankment to meet minimum, permanent global stability factors of safety (static and pseudo-static) and post-construction settlement criteria. Based on preliminary pricing exercises and discussions with MaineDOT during design development, foamed glass aggregate (FGA) lightweight fill was selected for use on this project. FGA properties used in the technical evaluations assumed a total unit weight of 15 pounds per cubic ft (pcf) and an internal friction angle of 45 degrees. Determination of over-excavation depths and lightweight fill thickness are presented and summarized in the calculations in Appendix E.

Prefabricated vertical drains (PVDs) will be required for staged embankment construction to accelerate pore pressure dissipation, strength gain and settlement. PVDs rely on horizontal drainage paths rather

than vertical. CPT pore pressure dissipation testing indicated horizontal coefficients of consolidation (c_h) that were approximately ten times the vertical (c_v). Based on the marine clay sample descriptions and our experience on other projects where Presumpscot Formation clays were present, the more likely ratio between horizontal and vertical coefficients of consolidation is approximately 2. Therefore, PVD spacing calculations are based on the method developed by Yeung (1997), using a c_h/c_v ratio of 2.

CPT Correlation Factors

CPT estimates of undrained shear strength use correlations with net tip resistance, q_t , or the measured excess pore pressure, d_u . The correlation factors are N_{kt} and N_{du} for net q_t and net d_u , respectively. ConeTec provided estimates of undrained shear strength based on $N_{kt}=12.5$ and $N_{du}=6.0$. As stated above, these “default” values resulted in S_u values that did not match well with the site-specific in-situ FV, CIUC, and DSS S_u data. Typical values for N_{kt} in soft intact clays range from 10 to 20 (ConeTec Application Guide).

Site-specific N_{kt} and N_{du} values were developed for this project using field and laboratory undrained shear strength test results. For each CPT location, the nearest boring with FV, CIUC, or DSS undrained shear strength testing was identified. For each undrained shear strength test in the nearest test boring, the depth of the test was matched with the net q_t and net d_u values from the nearest CPT sounding. Data pairs of undrained shear strength and net q_t or net d_u were then plotted and the slope of the best fit line determined, which represents the site-specific N_{kt} or N_{du} . The N_{kt} and N_{du} values were calculated specifically for the undrained shear strength values determined from in-situ vane shear testing (S_{uFV}) because of the significant amount of S_{uFV} data and because S_{uFV} data was used to define marine clay strength in global stability evaluations. The calculated N_{kt} from the S_{uFV} data ranged from 18.6 to 23.1 depending on whether the profile consisted of silt or clay, silt only, or clay only. The calculated N_{du} from the S_{uFV} data ranged from 12.5 to 15.4. An S_{uFV} N_{kt} value of 21.3 and S_{uFV} N_{du} equal to 13.6 were selected for use in designing the approach embankments based on the average of the values for silt or clay, silt only, or clay only. The CPT undrained shear strength profiles based on these N_{kt} and N_{du} values were plotted in Appendix H of the Highway Report. In our opinion, there was not sufficient DSS undrained shear strength data and corresponding/nearby CPT data to calculate reliable N_{kt} and N_{du} values.

Global Embankment Stability

Embankment construction using normal weight earthfill can cause excessive vertical and lateral strains, potentially resulting in shear failure of the foundation soil and subsequent failure of the embankments. A series of computer-assisted, two-dimensional global stability evaluations were performed using the computer program Slide 8.0 by Rocscience to evaluate the likelihood of global stability failures along the approach embankments.

Static and pseudo-static stability evaluations were conducted in each of the raise-in-grade section described below, at locations where, based on our review of proposed grading plans, significant raises in grade are being proposed and/or low undrained shear strength soil conditions were present below the embankments.

As previously discussed, soil properties were developed based on in-situ testing, laboratory testing, and CPT testing. In addition, a 250 psf live load surcharge was assumed to act over the embankment width in each model (permanent condition only).

The following physical and strength properties were used to complete the global stability evaluations:

Material	Unit Weight (pcf)	Friction Angle (degrees)	Undrained Shear Strength (psf)
New Embankment Fill	125	32	0
Lightweight Fill	15	45	0
Concrete	infinite strength		
Riprap	140	45	0
Roadway Base and Subbase Material	136	32	0
Marine Deposit (clay) – above El. 67 (at bridge)	115	0	700
Marine Deposit (clay) – El. 67 to El. 65 (at bridge)	115	0	500
Marine Deposit (clay) – below El. 65 (at bridge)	115	0	375
Marine Deposit (clay) – above El. 70 (north of bridge)	115	0	700
Marine Deposit (clay) – El. 70 to El. 68 (north of bridge)	115	0	550
Marine Deposit (clay) – below El. 68 (north of bridge)	115	0	450
Marine Deposit (clay) – (south of bridge)	115	0	1,000
Marine Deposit (silt)	115	28	0
Glacial Till	130	36	0
Bedrock	infinite strength		

Notes:

Soil properties vary by location and were based on borings at the specific locations evaluated. Refer to Appendix E for the values used at each section. Undrained shear strength of the marine clay deposit was based on field vanes, CPTs, and laboratory strength testing, with results grouped/interpreted by area. Refer to Appendix E for design profiles of undrained shear strength vs elevation.

The factor of safety for pseudo-static load cases was calculated using a horizontal acceleration coefficient, k_h , equal to one half of the acceleration coefficient, A_s . A value of $A_s/2$ was selected in accordance with AASHTO LRFD guidance in Section 11.6.5.2.2; the reduction from A_s is due to soil slope flexibility and the fact that the peak ground acceleration during an earthquake lasts only for a short period of time.

The minimum required factor of safety as specified by both AASHTO LRFD, and the MaineDOT BDG is 1.3 for embankments under static conditions which do not support structures and is 1.5 for embankments under static conditions which do support structures (permanent condition). The minimum required factor of safety for embankments subjected to pseudo-static loading is 1.1 in accordance with FHWA GEC No. 3 (FHWA-NHI-11-032).

The results of global stability evaluations for the proposed approach embankments in the vicinity of Eaton Brook Bridge are discussed below and summarized in Table IV.

Elastic and Consolidation Settlement

Settlement due to the placement of normal weight earthfill and lightweight fill for the bridge approach embankments was evaluated using a proprietary settlement spreadsheet developed by Haley & Aldrich. The cross sections that we analyzed for final design were judged to be the critical sections within each raise-in-grade area based on proposed embankment heights and the thickness of compressible marine deposit soils.

The marine deposit consolidation parameters that were used in the final design settlement analyses are summarized below.

Property	Sta. 138+00 to Sta. 143+50
Preconsolidation Pressure in Upper Clay (P_c) ¹	3,000 psf (El. 70) to 900 psf (El. 60)
Preconsolidation Pressure in Lower Clay (P_c) ¹	Normally consolidated below El. 60
Virgin Compression Ratio (CR)	0.18
Recompression Ratio (RR)	0.02
Coefficient of Consolidation (c_v)	9.49×10^{-7} ft ² /sec
Secondary Compression Index (c_{ae})	0.004

Notes:

¹ Refer to Appendix E for plots of preconsolidation pressure versus elevation.

The project criteria for post-construction total settlement for highway and bridge structures as provided by MaineDOT are as follows:

- Highway Embankments and Highway Culverts
 - 4 in. from 0 to 20 years
 - 4 in. from 20 years to 75 years
 - Total of 8 in. from 0 to 75 years
- Within 200 ft of Bridges
 - 2 in. from 0 to 5 years
 - 2 in. from 5 to 20 years
 - 2 in. from 20 to 75 years
 - Total of 6 in. from 0 to 75 years

In areas with fill over compressible marine deposit soils, PVDs and staged embankment construction were included in settlement evaluations, if needed, to achieve the post-construction settlement criteria.

At some sections, PVDs and staged construction were not necessary to meet post-construction settlement performance and minimum global stability factor of safety requirements. Single-drainage conditions were assumed at these sections in time rate of settlement evaluations.

Settlement evaluation results for the proposed approach embankment are discussed below and summarized in Table IV.

Results of Embankment Evaluations

Final design embankment global stability and settlement evaluations for the approach embankment were completed using the following stepped approach.

1. Critical cross sections in each area (significant raises in grade and/or the presence of low undrained shear strength soil conditions) and cross sections at potential transition points were identified.
2. At each selected cross section, global stability for the temporary case was evaluated to determine whether the embankment could be constructed to the proposed finished grade in a single stage. If the factor of safety for the critical failure surface (critical factor of safety) was found to be less than 1.15, which was judged by Haley & Aldrich and MaineDOT to be the minimum required under temporary conditions, then evaluations were performed to determine the maximum fill height that could be safely placed during the first stage of fill placement such that the critical factor of safety was maintained at 1.15 or greater.
3. Settlement evaluations were then performed to determine post-construction settlement of both single-stage and two-stage embankments with normal weight fill only. If the post-construction settlement criteria (described above) was not met, then the minimum thickness of lightweight fill was determined such that the settlement criteria was achieved. Please note that based on discussions with MaineDOT, it is not desirable to have two preload/surcharge durations due to the proposed construction schedule. Because of this, we did not evaluate the feasibility a second stage of normal weight embankment fill and a second preload/surcharge duration.
4. Global stability for the permanent case was then evaluated, accounting for the final embankment geometry, lightweight fill thickness determined in Step 3 above, presence of the pavement section, 250 psf traffic live load surcharge, and increase in clay strength due to pore pressure dissipation during the first stage of fill. If the factor of safety was less than 1.3 or 1.5 (static, without or with a structure, respectively) or 1.1 (seismic), then the minimum thickness of lightweight fill was increased until an acceptable factor of safety was calculated.

Based on the results of the global stability and settlement evaluations, it is our opinion that construction of the proposed approach embankments using only normal weight earthfill is not technically feasible between Sta. 139+50 to Sta. 141+90 (i.e., lightweight fill is required). Refer to Table IV for a summary of the results of final design evaluations and Appendix E for supporting calculations.

Based on the results of these evaluations, special embankment construction is required between Sta. 138+00 and Sta. 143+50. We recommend the following within this area:

- Ground improvement consisting of PVDs and staged preload/surcharge.
- PVDs installed 5 ft on-center and arranged in a triangular pattern.
- Place normal weight fill to a maximum height of 15 ft during the first stage of the preload/surcharge program at Abutment 1. Place first stage of normal weight fill at Abutment 2 to the final roadway design elevation.
- As stated above, place FGA lightweight fill between Sta. 139+50 to Sta. 141+90 to the thicknesses shown on Figures 4 and 5.

- A robust instrumentation program (i.e., settlement platforms, inclinometers, and piezometers) will be required to monitor embankment performance (see section below).
- If possible, we recommend that bridge abutment piles be driven after 90 percent of primary consolidation is complete.

BRIDGE ABUTMENT FOUNDATION SUPPORT

Based on our discussions with MaineDOT, it is our understanding that the preferred bridge abutment foundation support alternative consists of HP14x117 steel H-piles (H-piles) with a maximum factored axial compressive pile load (demand) equal to 408 kips (Strength Limit State). As discussed below and based on the subsurface conditions present at the site, the H-piles will likely need to be driven through the marine clay and glacial till strata to gain the majority of their resistance through end bearing in/on bedrock. Additional H-pile evaluations and recommendations are provided below.

Downdrag

Downdrag occurs due to relative vertical displacement between a pile and the surrounding soil. In accordance with AASHTO LRFD Section 3.11.8, where the relative displacement exceeds 0.4 in., downdrag is likely to be fully developed. Because the results of the settlement evaluations predict up to approximately 6 in. of post-construction settlement, full mobilization of downdrag forces on the piles will occur. For the downdrag evaluations, the pile displacement was assumed to be zero (i.e., end bearing piles with no elastic pile compression). The estimated pile-soil relative displacements exceeded 0.4 in. along the upper approximately 28 ft (Abutment 1) to 32 ft (Abutment 2) of the pile located below the bottom of the abutment pile caps. Therefore, downdrag was assumed to be fully mobilized within these zones. The downdrag load was calculated using static analysis methods and the load factors shown below. The α method and Nordlund/Thurman methods were used in cohesive and in cohesionless soils, respectively, in accordance with guidance provided in AASHTO LRFD. The calculated downdrag loads are summarized in below.

Substructure Location	Load Factor	HP14x117 Factored Downdrag Load (kips) ¹
Abutment 1	1.05 (granular)	77
Abutment 2	1.40 (cohesive)	96

Notes:

¹ The "box" area of the H-pile was used to compute the surface area of the pile subjected to downdrag loading.

Corrosion and Deterioration

The geotechnical engineering design of the proposed piles included consideration of corrosion in accordance with AASHTO LRFD Section 10.7.5. Based on visual review of the soil samples and our experience on similar projects with similar soil conditions, it is our opinion that the in-situ soils have low

corrosive potential. Therefore, the net factored pile resistance recommended in the following sections of this GDR does not include a reduction in pile cross-sectional area for steel degradation.

Axial Compression Pile Resistance

As discussed previously, it is our opinion that based on the subsurface soil conditions present at the site, the abutment piles will be driven to/into bedrock and resistance provided through a combination of skin friction in the glacial till stratum and end bearing resistance in/on bedrock.

Structural Resistance

The structural axial compressive resistance of HP14x117 steel H-piles was calculated in accordance with AASHTO LRFD Sections 6.9.2 and 6.9.4. The structural resistance factor (Section 6.5.4.2) for axial resistance of piles in compression and subject to damage due to severe driving where use of a pile tip is necessary is 0.50. In addition, resistance factors for Service and Extreme Limit State loading are 1.0. Therefore, the nominal and factored structural resistance of the HP14x117 steel H-pile section (with $F_y = 50$ ksi) at the Service, Strength and Extreme Event Limit States for the proposed substructures (Abutment No. 1 and Abutment No. 2) is summarized below.

Steel H-pile Section	Nominal Structural Resistance (kips)	Factored Structural Resistance (kips)		
		Service Limit State ($\phi=1.0$)	Strength Limit State ($\phi=0.50$)	Extreme Limit State ($\phi=1.0$)
HP14x117	1,722	1,722	861	1,722

Drivability Resistance

The engineering design of the proposed abutment piles also included consideration of drivability resistance in accordance with AASHTO LRFD Section 10.7.8. The drivability evaluations were conducted using the computer program GRL WEAP 2010 developed by GRL Engineers, Inc. The drivability analyses were conducted to determine the following: 1) if the piles could be impact driven through the stiff to hard/very dense glacial till to bedrock; 2) the nominal resistance that could be achieved using hammer sizes typically used by local pile driving contractors without damaging or overstressing the piles while keeping the penetration resistance below 15 blows per inch (bpi), which is the upper limit of penetration resistance allowed by MaineDOT.

The drivability evaluations were conducted assuming that a Delmag D36-32 single acting diesel hammer with a maximum rated energy equal to 90,560 ft-lbs. will be used to install the piles. The Delmag D36-32 hammer has a ratchet style fuel pump with four settings, which are designed to limit the ram stroke to 5.2 ft (fuel setting 1), 7.0 ft (fuel setting 2), 8.8 ft (fuel setting 3), and 11.4 ft (fuel setting 4; maximum). Drivability evaluations were completed at each proposed substructure location based on the subsurface conditions present at the site and

assuming a ram stroke of 7 ft (fuel setting 2). The drivability resistance for the HP14x117 steel H-piles at each substructure location is summarized below.

Substructure Location	Steel H-pile Section	Drivability Resistance (kips)	
		Nominal	Factored ($\phi_{dyn}=0.65$)
Abutment 1	HP14x117	825	536
Abutment 2			

Our evaluations show that at the nominal drivability resistance at each substructure location, as summarized above, the maximum compressive driving stress values ranged from approximately 28 to 39 ksi and the predicted penetration resistances ranged from 8 to 11 bpi, both of which are well below the AASHTO LRFD limit of 45 ksi (90 percent of F_y for 50 ksi steel piles) and the MaineDOT penetration resistance limit of 15 bpi.

Please keep in mind that the drivability resistances summarized above are based on an assumed pile hammer size and the assumption that the piles penetrate through the entire soil overburden and end bear in/on bedrock. If the actual, factored axial compressive pile loads vary, or if the actual pile-hammer system used to install the piles is different than the assumed system, additional evaluations will be required to determine the nominal and factored drivability resistances that can be achieved at a reasonable penetration resistance without overstressing the piles.

Summary and Recommended Axial Compressive Pile Resistance

The factored axial compressive pile resistance is controlled by the lesser of the Strength Limit State drivability and structural resistances since the piles will be installed using impact hammers and the minimum nominal resistance will be confirmed using dynamic testing. The abutment factored resistances (structural and drivability) are summarized below.

Substructure Location	Steel H-pile Section	Factored Structural Resistance (kips)	Factored Drivability Resistance (kips)	Governing Factored Resistance (kips)	Factored Downdrag Load (kips)	Net Factored Resistance (kips)
Abutment 1	HP14x117	861	536	536	77	459
Abutment 2					96	440

As shown in the table above, the factored Strength Limit State axial compressive pile resistance is controlled by the drivability resistance. Therefore, we recommend that a factored Strength I Limit State axial compressive resistance equal to 536 kips (maximum) be used for design of the abutments using HP14x117 steel H-piles.

Pile Embedment, Spacing, Clearance, and Pile Material

We recommend that minimum pile spacing, clearance and embedment (into the abutment pile caps) meet the requirements of AASHTO LRFD Section 10.7.1.2. We also recommend that the piles be equipped with a pile tip in accordance with MaineDOT Standard Specification 501.048. Based on the potential for hard driving and sloping bedrock, we recommend the pile tips consist of a HP-77750-B manufactured by Associated Pile & Fitting, or a Rock Injector HP-80500 manufactured by Associated Pile & Fitting or approved equal. We also recommend that the pile tips be fabricated from cast steel conforming to ASTM A148 Grade 90/60.

Estimated Pile Lengths

As stated above, abutment piles will be driven to/into bedrock and the axial compressive pile resistance provided through a combination of side frictional resistance in the glacial till stratum and end bearing resistances in/on bedrock. Based on the proposed top of pile elevations and the variation in the top of bedrock surface across each abutment, recommended pile lengths delivered to the site are summarized below.

Substructure Location	Pile No.	Proposed Top of Pile Elevation (ft, NAVD 88)	Est. Top of Bedrock Elevation ¹ (ft, NAVD 88)	Est. Pile Tip Elevation ² (ft, NAVD 88)	Approximate In-Place Pile Length (ft)	Recommended Delivered Pile Length (ft)
Abutment 1	1	82.4	2	1	81.4	85
	2		6	5	77.4	80
	3		10	9	73.4	75
	4		14	13	69.4	70
	5		19	18	64.4	65
Abutment 2	1	80.6	15	15	65.6	70
	2		10	9	71.6	75
	3		6	5	75.6	80
	4		1	0	80.6	85
	5		-3	-4	84.6	85

Notes:

¹ Values shown based on linear interpolation between test borings BB-BEB-201 and BB-BEB-202 (Abut. 1) and between BB-BEB-104 and BB-BEB-204 (Abut. 2) and rounded down to the nearest 1-ft increment.

² Values shown based on the assumption that piles tips are advanced 1 ft below the estimated top of bedrock.

Please note that the recommended delivered pile lengths presented above do not account for an additional pile length, equal to three pile diameters or 5 ft, whichever is greater to accommodate dynamic pile load test instrumentation that is required by Standard Specification Section 501.046 Dynamic Pile Tests. As stated in the following sections of this report, we recommend that a minimum of two piles, located on opposite ends of each abutment, be dynamically tested during construction (four total) to confirm that the minimum required nominal compressive resistance is achieved.

ABUTMENT DESIGN

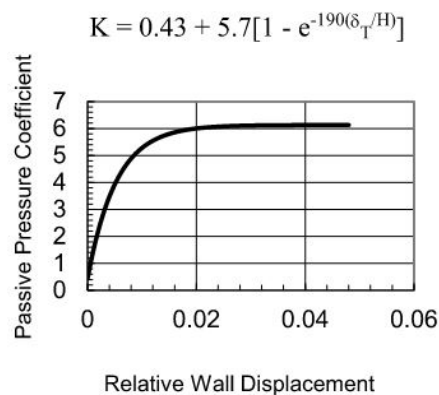
As stated above, the Connector Bridge will be a fully integral structure. Because of that, thermal expansion of the structure will cause the abutments to move towards the backfill, which will result in lateral earth pressures that vary between at-rest and full passive conditions. The actual magnitude of lateral earth pressure developed by the backfill is dependent on the backfill material type(s), the backfill material's in-place properties and the ratio of lateral abutment movement to the abutment height.

As stated herein, we recommend that approach embankments be constructed and abutments backfilled using a combination of Soil Type 4 (e.g., Granular Borrow) as specified in BDG Table 3-3 and FGA lightweight fill (required to achieve acceptable longitudinal factors of safety at abutments). A 5 and 4-ft thickness of foamed glass aggregate lightweight fill is recommended at Abutment 1 and Abutment 2, respectively, and the top of the lightweight fill cell will be coincident with the bottom of pavement section. We recommend that the following material properties be used when calculating lateral passive earth pressures for abutment design:

- Granular Borrow: total unit weight = 125 pcf; internal angle of friction = 32 deg.
- Foamed Glass Aggregate: total unit weight = 15 pcf; internal angle of friction = 45 deg.

We also recommend that the abutment design include a drainage system in accordance with the requirements of BDG Sections 5.4.1.9 and 5.4.2.13 to intercept any groundwater and direct it to a suitable discharge point that does not adversely affect the performance of the abutments. Using a free-draining backfill material and providing adequate drainage will substantially reduce the potential for unbalanced hydrostatic pressures from developing.

In accordance with current MaineDOT Bridge Program standard practice, we recommend that the lateral earth pressure be calculated using a "movement-dependent" coefficient per AASHTO LRFD Article C3.11.5.4 and FHWA NHI-06-089. We recommend using the more stringent of the methodology developed by the Massachusetts Department of Transportation (MassDOT) as outlined below or FHWA NHI-06-089, Figure 10-4.



Plot of Passive Pressure Coefficient, K, vs. Relative Wall Displacement, δ_T/H (MassDOT).

It is our understanding that the above referenced methodology developed by MassDOT is based on results of full-scale wall tests completed by the University of Massachusetts. According to the MassDOT LRFD Bridge Manual, the results of the tests show “reasonable agreement between the predicted average passive earth pressure response of MassDOT’s standard compared gravel borrow and the curves of K versus δ_T/H for dense sand found” in other design manuals. Considering that AASHTO LRFD does not provide a load factor for passive earth pressure, we understand that the MaineDOT Bridge Program’s standard practice for integral abutment design considers a load factor equal to 1.5 to calculate factored passive lateral earth pressures.

Additional lateral earth pressures due to live load surcharge are required in accordance with AASHTO LRFD Section 3.11.6.4 and BDG Section 3.6.8 for abutments if an approach slab is not included. When an approach slab is specified, reduction, not elimination of the surcharge load is permitted in accordance with AASHTO LRFD Section 3.11.6.5. We recommend that the live load surcharge be estimated as a uniform horizontal earth pressure due to an equivalent height of soil that is related to the abutment and wingwall heights and the location and orientation of vehicular traffic relative to the back of the wall, as presented in BDG Table 3-4.

If determined applicable by MaineDOT, the abutments should be designed for a uniform lateral load to account for seismic soil loading in accordance with AASHTO LRFD Section A.11.3.1 (Mononobe-Okabe Method). Based on the seismic site class (Site Class “C”), we recommend using a seismic active earth pressure coefficient, K_{AE} , of 0.33 and 0.32 for design of Abutments 1 and 2, respectively. Please note that the soil pressure calculated using K_{AE} includes both the static and seismic lateral earth loads.

FROST PROTECTION

The minimum depth of embedment/cover for footings or other below grade structures was evaluated in accordance with Section 5.2.1 of the MaineDOT BDG. Based on a design freezing index equal to 1,650 freezing degree-days, we recommend that the abutments bear a minimum of 4.5 ft below the lowest adjacent ground surface exposed to freezing. This frost depth used an average depth for granular soils (embankment fill) and cohesive soils (marine clay at ground surface).

Construction Considerations

INSTRUMENTATION

As recommended herein, the performance of the preload/surcharge program for the bridge approach embankments should be monitored using geotechnical instrumentation. Instrumentation is needed to evaluate the performance of the preload/surcharging during the hold period, and to ultimately determine when the intent of the preload/surcharge program has been met and the hold period is complete (and when the second stage of embankment construction can begin). Recall that the staged embankment design relies, in part, on an increase in clay strength. Therefore, it is critical that the embankment performance be monitored closely during construction.

In addition, we recommend that instrumentation (i.e., inclinometers) installed at/near the toe of the new embankments be used monitor lateral movement of the foundation soils. If excessive lateral movements are measured during or after embankment fill placement, it may be necessary to temporarily slow or stop embankment construction, or even remove some amount of previously placed fill.

Based on the subsurface conditions present and the proposed embankment heights, we recommend that the following types of instrumentation be installed prior to the start of embankment fill placement:

- Settlement platforms should be installed prior to PV drain installation, generally along the centerline of the new embankments. The platforms should be surveyed before, during and after fill placement so that settlement vs. time information can be collected and evaluated.
- Vibrating wire piezometers should be installed and initialized after PV drain installation and prior to the start of preload/surcharge fill placement. The piezometers will be used to establish baseline pore water pressure levels and help assess pore pressure dissipation and time-rate of consolidation during and after embankment fill placement.
- Inclinometers should be installed at/near the toe of the new embankments prior to the start of preload/surcharge fill placement. The inclinometers should be read during and after fill placement to monitor lateral deformation vs. depth.

Instrumentation locations, details, and special provisions will be provided in the contract documents.

Consideration should also be given to performing additional borings (with in-situ FV testing), CPTs, and laboratory strength testing at/near the end of the first stage embankment construction to confirm that the minimum required marine clay strength gain has been achieved prior to placing the second stage of fill.

DYNAMIC PILE LOAD TESTING PROGRAM

The Contractor will be required to confirm the minimum required nominal pile resistances in the field using dynamic testing methods. The piles should be driven to a nominal resistance equal to the maximum factored axial compressive pile load divided by a resistance factor equal to 0.65 in accordance with AASHTO LRFD Table 10.5.5.2.3-1 (i.e., 825 kips = 536 kips/0.65). We recommend that Contractor perform two dynamic pile load tests with 24-hour (minimum) restrike tests at each substructure location (four total) to evaluate hammer system efficiencies, driving stresses in the pile, and the nominal resistance of the piles. We recommend that the dynamic testing be completed prior to production pile driving and that CAPWAP analysis be performed on each pile installed during the dynamic test program (four total). The CAPWAP results will be used to finalize driving criteria for the production piles to assure that the piles achieve the necessary resistance without being overstressed.

Limitations

This report is prepared for the exclusive use of MaineDOT relative to the subject project. There are no intended beneficiaries other than MaineDOT. Haley & Aldrich shall owe no duty whatsoever to any other person or entity on account of the Agreement or the report. Use of this report by any person or entity other than MaineDOT for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from MaineDOT and Haley & Aldrich. Use of this report by such other person or entity without the written authorization of MaineDOT and Haley & Aldrich shall be at such other person's or entities sole risk and shall be without legal exposure or liability to Haley & Aldrich.

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The information provided herein is based, in part, upon the data obtained from the referenced subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations then appear, it may be necessary to reevaluate the recommendations of this report.

It is our understanding that this report may be included as a reference document in the documents that will be provided to the prospective Contractors for bidding. Please note that the recommendations included herein are superseded by the information contained in the documents and that the information contained in the documents takes precedence over the information provided in this report.

Closure

We appreciate the opportunity to continue to provide MaineDOT services on this project. Please do not hesitate to contact us if you have any questions or comments.

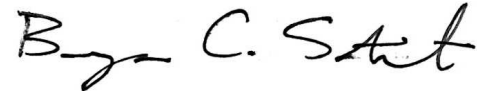
Sincerely yours,
HALEY & ALDRICH, INC.



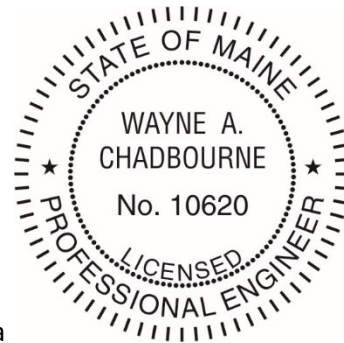
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Principal – Lead Quality Control Engineer



Bryan C. Steinert, P.E.
Senior Project Manager



Enclosures:

Table I –	Subsurface Exploration Location Data
Table II –	Subsurface Exploration Subsurface Data
Table III –	Subsurface Exploration Bedrock Core Data
Table IV –	Results of Settlement and Global stability Evaluations
Figure 1 –	Project Locus
Figure 2 –	Site and Subsurface Exploration Location Plan
Figure 3 –	Interpretive Subsurface Profile
Figures 4-5 –	Special Embankment Construction Plans
Appendix A –	Test Boring Logs and Rock Core Photographs
Appendix B –	Cone Penetration Testing Report
Appendix C –	Observation Well Installation and Groundwater Monitoring Reports
Appendix D –	Laboratory Test Results
Appendix E –	Geotechnical Design Calculations

TABLE I

Subsurface Exploration Location Data

Interstate 395/Route 9 Connector over Eaton Brook, Bridge No. 6646

MaineDOT WIN No. 018915.00

Brewer, Maine

Haley & Aldrich, Inc. File No.: 132076-007

Test Boring No. ¹	Ground Surface Elevation (ft) ³	Station ⁴	Offset Distance (ft) & Direction ⁵	Horizontal Coordinates ²	
				Northing (Y)	Easting (X)
BB-BEB-101	74.3	140+43	1 RT	470,494	1,751,005
BB-BEB-102	75.3	140+39	102 LT	470,562	1,750,928
BB-BEB-103	74.1	140+38	98 RT	470,424	1,751,072
BB-BEB-104	75.9	141+45	16 LT	470,579	1,751,064
HB-BE-123	82.3	144+07	3 LT	470,760	1,751,254
BB-BEB-201	74.8	140+09	30 LT	470,491	1,750,960
BB-BEB-202	74.5	140+28	20 RT	470,470	1,751,008
BB-BEB-203	76.0	141+53	52 LT	470,610	1,751,043
BB-BEB-204	76.7	141+48	26 RT	470,553	1,751,096
BB-BEB-204A	76.6	141+48	23 RT	470,555	1,751,094
BB-BEB-205	77.4	141+57	47 RT	470,545	1,751,117
HB-BE-221	77.7	139+34	3 RT	470,414	1,750,932
HB-BE-222	76.5	141+93	6 LT	470,607	1,751,104

Notes:¹ Test boring locations are shown on Figure 2, Site and Subsurface Exploration Location Plan.² As-drilled coordinates of test borings were determined by MaineDOT using GPS survey equipment, are measured in feet and reference NAD83, Maine 2000 Central Zone coordinate system.³ Ground surface elevations at test boring locations were determined in the field by MaineDOT using GPS survey equipment, are measured in feet and reference the North American Vertical Datum of 1988 (NAVD 88).⁴ Station and offset information shown are approximate and are relative to the I-395/Route 9 Connector baseline and were determined by Haley & Aldrich based on information provided by MaineDOT and rounded to the nearest foot.⁵ LT = offset distance toward left direction; RT = offset distance toward right direction; ft = feet.

	Individual	Date
Prepared By:	SSM	2/8/2021
Checked By:	BCS	7/6/2021
Reviewed By:	WAC	8/27/2021

TABLE II
Subsurface Exploration Subsurface Data
Interstate 395/Route 9 Connector over Eaton Brook, Bridge No. 6646
MaineDOT WIN No. 018915.00
Brewer, Maine

Haley & Aldrich, Inc. File No.: 132076-007

Test Boring No. ¹	Ground Surface Elevation ² (ft)	Stratigraphy Data ^{2,3,4}											Bottom of Exploration Depth (ft)	Elevation of Bottom of Exploration ²
		Topsoil/Marine Deposit			Glacial Till			Weathered Bedrock			Bedrock			
		Depth to Top (ft)	Elev. of Top (ft)	Thickness (ft)	Depth to Top (ft)	Elev. of Top (ft)	Thickness (ft)	Depth to Top (ft)	Elev. of Top (ft)	Thickness (ft)	Depth to Top (ft)	Elev. of Top (ft)		
BB-BEB-101	74.3	0.0	74.3	17.9	17.9	56.4	19.1	NE	NE	NE	37.0	37.3	52.0	22.3
BB-BEB-102	75.3	0.0	75.3	14.8	14.8	60.5	> 12.2	--	--	--	--	--	27.0	48.3
BB-BEB-103	74.1	0.0	74.1	27.0	27.0	47.1	> 23.3	--	--	--	--	--	50.3	23.8
BB-BEB-104	75.9	0.0	75.9	19.4	19.4	56.5	40.6	NE	NE	NE	60.0	15.9	70.6	5.3
HB-BE-123	82.3	0.0	82.3	10.7	10.7	71.6	> 10.8	--	--	--	--	--	21.5	60.8
BB-BEB-201	74.8	0.0	74.8	10.1	10.1	64.7	62.9	NE	NE	NE	73.0	1.8	86.1	-11.3
BB-BEB-202	74.5	0.0	74.5	18.2	18.2	56.3	31.9	50.1	24.4	4.9	55.0	19.5	68.7	5.8
BB-BEB-203	76.0	0.0	76.0	21.8	21.8	54.2	32.4	NE	NE	NE	54.2	21.8	60.0	16.0
BB-BEB-204	76.7	0.0	76.7	16.9	16.9	59.8	> 3.1	--	--	--	--	--	20.0	56.7
BB-BEB-204A	76.6	0.0	76.6	16.9	16.9	59.7	53.1	70.0	6.6	9.8	79.8	-3.2	90.1	-13.5
BB-BEB-205	77.4	0.0	77.4	14.7	14.7	62.7	56.2	NE	NE	NE	70.9	6.5	75.0	2.4
HB-BE-221	77.7	0.0	77.7	6.9	6.9	70.8	> 10.1	--	--	--	--	--	17.0	60.7
HB-BE-222	76.5	0.0	76.5	19.7	19.7	56.8	> 10.8	--	--	--	--	--	30.5	46.0

Notes:
¹ Test boring locations are shown on Figure 2, Site and Subsurface Exploration Location Plan.
² Ground surface elevations at test boring locations were determined in the field by MaineDOT using GPS survey equipment, are measured in feet and reference the North American Vertical Datum of 1988 (NAVD 88).
³ "NE" indicates stratum was not encountered in test boring.
⁴ "--" indicates presence and thickness of stratum could not be determined because soil and rock samples were not collected or because test boring was not drilled deep enough to determine full thickness or presence of stratum; stratum thickness greater than value shown.

	Individual	Date
Prepared By:	SSM	2/8/2021
Checked By:	BCS	7/6/2021
Reviewed By:	WAC	8/27/2021

TABLE III
Subsurface Exploration Bedrock Core Data
Interstate 395/Route 9 Connector over Eaton Brook, Bridge No. 6646
MaineDOT WIN No. 018915.00
Brewer, Maine

Haley & Aldrich, Inc. File No.: 132076-007

Test Boring No. ¹	Ground Surface Elevation ² (ft)	Bedrock Core Diameter (in.)	Run				Total Core Recovery ^{3,6}		Rock Quality Designation ^{4,5,6}			Physical Rock Parameters		Lithologic, Rock Mass and Discontinuity Description	
			No.	Depth Below Ground Surface (ft)			Total Length (ft)	Recovered Length (ft)	%	Length (ft)	%	Designation	Weathering		Estimated Field Strength
				Top	Bottom	Midpoint									
BB-BEB-101	74.3	NQ (1.875")	R1	37.0	42.8	39.9	5.8	2.0	34%	0.0	0%	Very Poor	Fresh to Mod.	Hard	Brown-grey, aphanitic, PHYLLITE, discontinuities dipping at horizontal to vertical angles (0 to 90 degrees from horizontal axis), spacing very close to close (<2 in. to 12 in.), discontinuity aperatures are tight to open. Occasional calcite veins, pitting, slightly weathered joint surfaces and fractured zones
			R2	42.8	45.4	44.1	2.6	1.0	38%	0.0	0%	Very Poor	Fresh to Mod.	Hard	
			R3	45.4	48.0	46.7	2.6	1.2	45%	0.0	0%	Very Poor	Fresh to Mod.	Hard	
			R4	48.0	50.0	49.0	2.0	1.8	92%	0.8	38%	Very Poor	Fresh to Mod.	Hard	
			R5	50.0	52.0	51.0	2.0	2.0	100%	0.0	0%	Very Poor	Moderate	Hard	
BB-BEB-104	75.9	NQ (1.875")	R1	60.0	60.7	60.4	0.7	0.6	83%	0.0	0%	Very Poor	Fresh to Mod.	Hard	Grey, aphanitic, PHYLLITE, discontinuities dipping at horizontal to vertical angles (0 to 90 degrees from horizontal axis), spacing very close to close (<2 in. to 12 in.), discontinuity aperatures are tight to open. Occasional calcite veins, pitting, slightly weathered joint surfaces and fractured zones
			R2	60.7	65.6	63.2	4.9	3.8	78%	0.0	0%	Very Poor	Fresh to Mod.	Hard	
			R3	65.6	70.6	68.1	5.0	5.0	100%	3.1	62%	Fair	Fresh to Slightly	Hard	
BB-BEB-201	74.8	NQ (1.875")	R1	75.0	77.5	76.3	2.5	2.2	87%	1.3	53%	Fair	Slight to Mod.	Hard	Grey, aphanitic, SILTSTONE, discontinuities dipping at steep angles (85 degrees from horizontal axis), spacing close to moderate (12 in. to 36 in.), discontinuity aperatures are tight to open. Occasional calcite veins
			R2	77.5	81.5	79.5	4.0	4.2	106%	2.4	61%	Fair	Slight to Mod.	Hard	
			R3	81.5	86.1	83.8	4.6	4.5	98%	3.8	82%	Good	Slight	Hard	
BB-BEB-202	74.5	NQ (1.875")	R2	55.0	58.6	56.8	3.6	2.3	63%	0.6	16%	Very Poor	Fresh to Slightly	Mod. Hard	Grey, aphanitic, SILTSTONE, discontinuities dipping at low to steep angles (5 to 85 degrees from horizontal axis), spacing close to moderate (12 in. to 36 in.), discontinuity aperatures are tight to open, rough, planar. Occasional calcite veins, Secondary horizontal to low angle joints, close, tight to open. 1-in. diameter quartz intrusion, highly fractured zones
			R3	58.6	59.9	59.3	1.3	0.8	58%	0.0	0%	Very Poor	Fresh to Slightly	Mod. Hard	
			R4	59.9	61.9	60.9	2.0	1.5	75%	0.0	0%	Very Poor	Fresh to Slightly	Mod. Hard	
			R5	61.9	63.9	62.9	2.0	1.8	92%	1.2	58%	Fair	Slight to Mod.	Mod. Hard	
			R6	63.9	66.7	65.3	2.8	3.2	114%	1.7	62%	Fair	Slight to Mod.	Mod. Hard	
			R7	66.7	68.7	67.7	2.0	2.3	116%	1.1	54%	Fair	Slight to Mod.	Mod. Hard	
BB-BEB-204A	76.6	NQ (1.875")	R1	80.1	85.1	82.6	5.0	5.0	100%	3.6	72%	Fair	Slight to Mod.	Soft to Mod. Hard	Grey, aphanitic, SILTSTONE, discontinuities dipping at moderate to steep angles (5 to 85 degrees from horizontal axis), spacing close to moderate (12 in. to 36 in.), discontinuity aperatures are tight to open, rough. Occasional calcite veins, highly fractured zones
			R2	85.1	90.1	87.6	5.0	5.0	100%	3.9	78%	Good	Fresh	Mod. Hard to Hard	

Notes:

- ¹ Test boring locations are shown on Figure 2, Site and Subsurface Exploration Location Plan.
- ² Ground surface elevations at test boring locations were determined in the field by MaineDOT using GPS survey equipment, are measured in feet and reference the North American Vertical Datum of 1988 (NAVD 88).
- ³ TCR = total core recovery. Total core recovery is the length of core recovered divided by the length of the run.
- ⁴ RQD = rock quality designation. RQD is the total length of intact, full-diameter core pieces recovered with a length greater than or equal to twice the core diameter (i.e., length of at least 4 in.) measured along the core axis. The percent RQD is the total length of RQD measured versus the run length. Note that vertical discontinuities are not included in determination of RQD.
- ⁵ Designation based on RQD in accordance with MaineDOT Geotechnical Section "Key to Soil and Rock Descriptions and Terms" Field Identification Information.
- ⁶ TCR and RQD percentages that exceed 100 percent include portions of previous core runs that were not originally recovered.

	Individual	Date
Prepared By:	SSM	2/8/2021
Checked By:	BCS	7/6/2021
Reviewed By:	WAC	8/27/2021

TABLE IV
Results of Settlement and Global Stability Evaluations
Interstate 395 / Route 9 Connector over Eaton Brook, Bridge No. 6646
MaineDOT WIN No. 018915.00
Brewer, Maine

Haley & Aldrich, Inc. File No.: 132076-007

Area	Baseline	Station	Explorations Used	Clay Thickness Range (ft)	Estimated Embankment Height at CL (ft)	Estimated Maximum Embankment Height (ft)	Max. Height First Stage Fill to Meet Temp Global Stability (ft)	Temp Global Stability FS (>1.15)	Settlement Criteria (Bridge Approach, Highway)	First Stage Preload/ Surcharge Height (ft)	LWF Thickness Required to Meet Settlement Requirement (ft)	Permanent Stability FS Static/Seismic (>1.3/1.5 static and 1.0 seismic)	LWF Thickness Required to Meet Permanent Global	Over-Excavation Depth for LWF (ft)	Anticipated Magnitude of Settlement During Preload/ Surcharge Period (in.)	Anticipated Post-Construction Settlement (in.)	One Stage or Two Stage	What Controls Design for Two-Stage Areas?
2	Mainline	140+00 longitudinal	BB-BEB-101, BB-BEB-202, HB-BE-221	6.9 - 18.2	18.1	18.1	15	1.17	Bridge Approach	15	NA	1.54 / 1.26	5	4	9.1	0-5 yrs: 1.2 5-20 yrs: 0.5 20-75 yrs: 0.5	Two	Longitudinal Global Stability
2	Mainline	140+00 transverse	BB-BEB-101, BB-BEB-102, BB-BEB-103, BB-BEB-202	14.8 - 23.1	18.1	18.1	NA	1.36	Bridge Approach	see longitudinal above		1.89 / 1.53	NA ^{Note 5}	NA	see longitudinal above		Two	Longitudinal Global Stability
2	Mainline	142+00 longitudinal	BB-BEB-104, HB-BE-123, HB-BE-222	10.7 - 19.7	13.0	13.1	NA	1.16	Bridge Approach	14	NA	1.60 / 1.37	4	6	8.4	0-5 yrs: 0.2 5-20 yrs: 0.5 20-75 yrs: 0.5	Two	Longitudinal Global Stability
2	Mainline	142+00 transverse	BB-BEB-104, BB-BEB-203, BB-BEB-204/204A, BB-BEB-205	14.7 - 21.8	13.0	13.1	NA	1.45	Bridge Approach	see longitudinal above		2.10 / 1.68	NA ^{Note 5}	NA	see longitudinal above		Two	Longitudinal Global Stability
2	Mainline	143+00	CPT-116	16.7	9.2	10.1	NA	--	Bridge Approach	10.1	NA	--	NA	NA	5.2	0-5 yrs: 1.4 5-20 yrs: 0.5 20-75 yrs: 0.5	One	NA

Notes:

- ¹ Refer to Appendix E for design calculations.
- ² Factor of safety of 1.3 required in the transverse direction (static), 1.5 required in the longitudinal direction (static), and 1.0 required for pseudo-static.
- ³ 5-ft Prefabricated Vertical Drain spacing and 9-month preload/surcharge hold period assumed.
- ⁴ LWF = Lightweight Fill
- ⁵ Lightweight fill not required for transverse stability. Lightweight fill included in model based on longitudinal requirement.

Settlement Criteria:

Highway Embankments and Highway Culverts

0 - 20 yrs: 4 in.

20 to 75 hrs: 4 in.

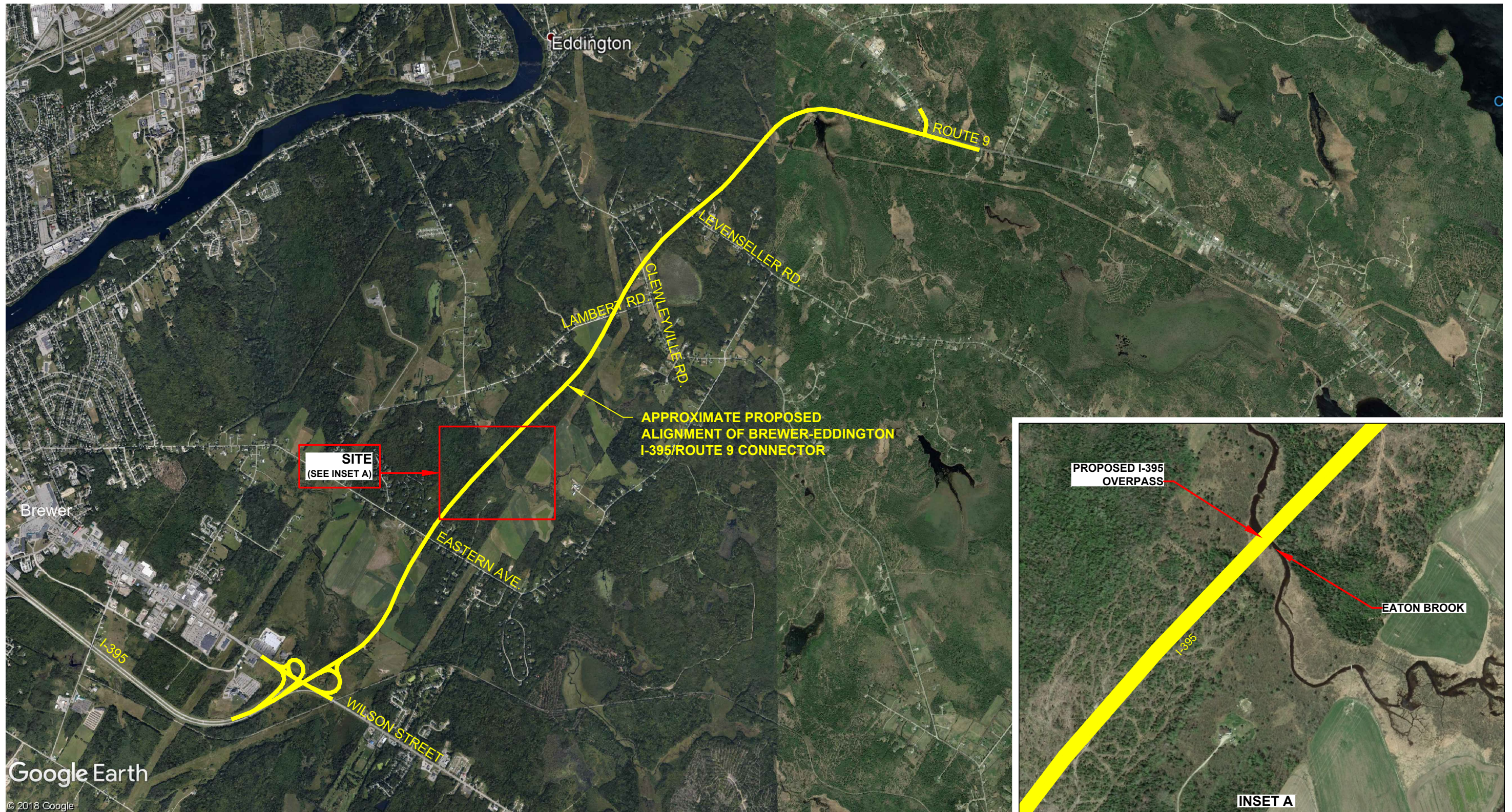
Bridge Approaches (within 200 ft of bridges)

0 - 5 yrs: 2 in.

5 - 20 yrs: 2 in.

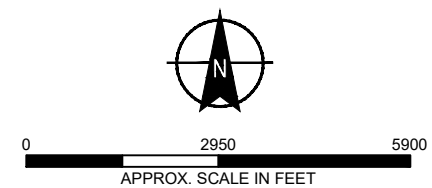
20 -75 hrs: 2 in.

	Individual	Date
Prepared By:	EAF	7/7/2021
Checked By:	JL	7/8/2021
Reviewed By:	WAC	8/27/2021



NOTES

1. IMAGE TAKEN FROM GOOGLE EARTH IMAGES, 2018.



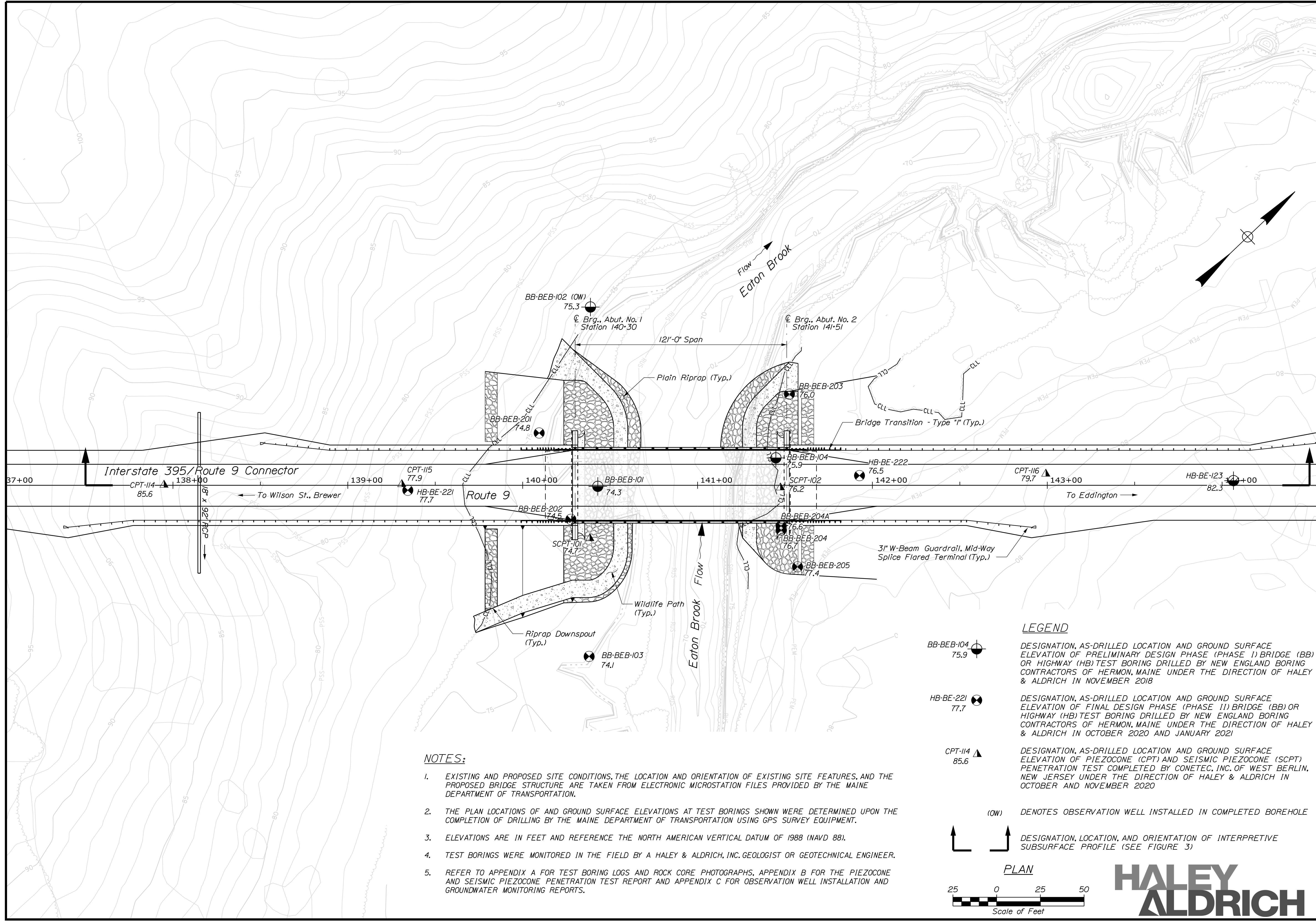
**HALEY
ALDRICH**

INTERSTATE 395/ROUTE 9 CONNECTOR OVER
EATON BROOK, BRIDGE No. 6646
MAINEDOT WIN 018915.00
BREWER, MAINE

PROJECT LOCUS

SCALE: AS SHOWN
AUGUST 2021

FIGURE 1

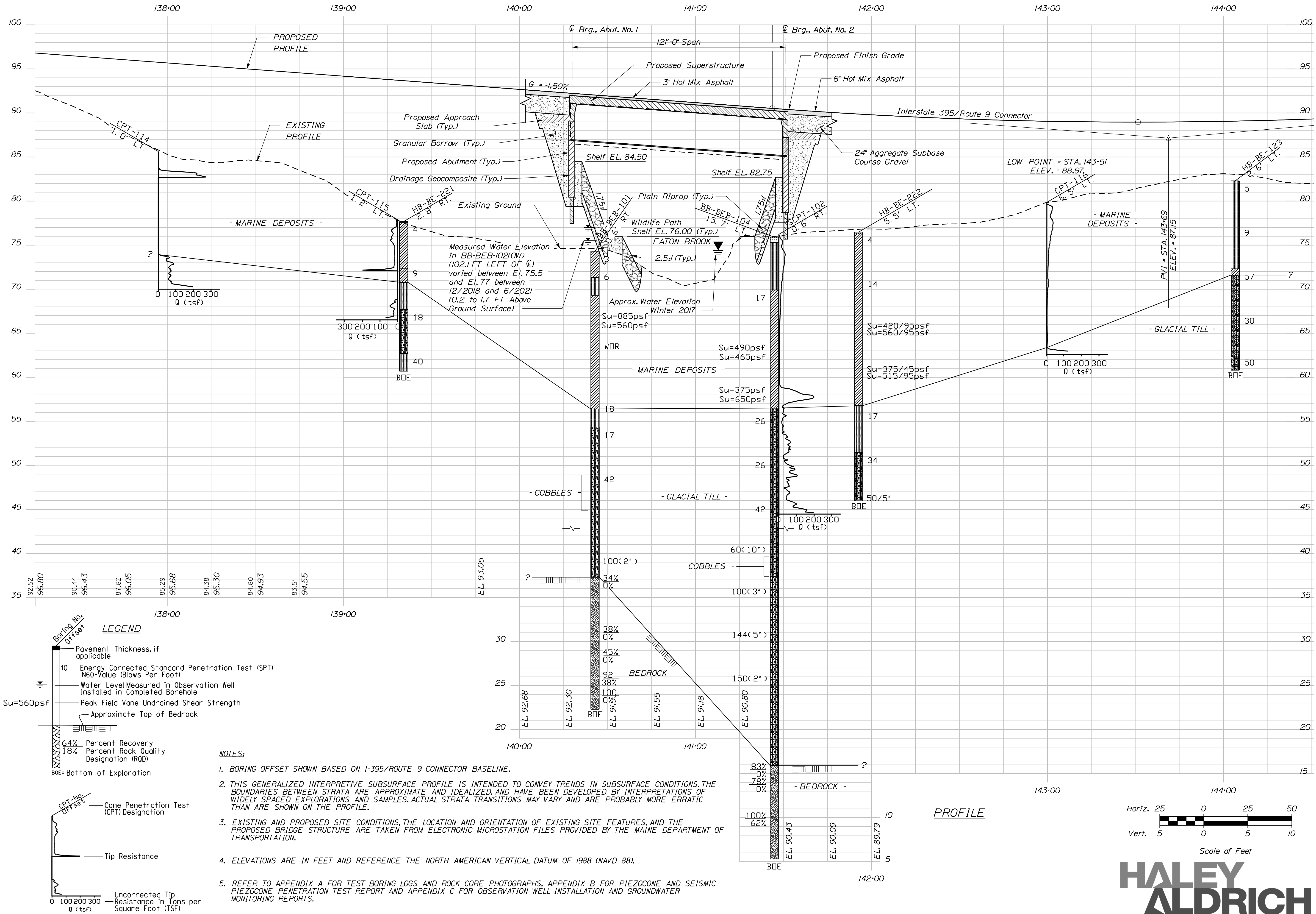


Date:8/27/2021

Username:

Division:

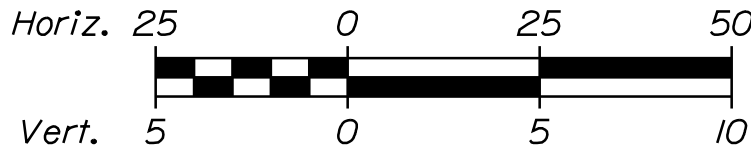
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NOTES:

- BORING OFFSET SHOWN BASED ON I-395/ROUTE 9 CONNECTOR BASELINE.
- THIS GENERALIZED INTERPRETIVE SUBSURFACE PROFILE IS INTENDED TO CONVEY TRENDS IN SUBSURFACE CONDITIONS. THE BOUNDARIES BETWEEN STRATA ARE APPROXIMATE AND IDEALIZED, AND HAVE BEEN DEVELOPED BY INTERPRETATIONS OF WIDELY SPACED EXPLORATIONS AND SAMPLES. ACTUAL STRATA TRANSITIONS MAY VARY AND ARE PROBABLY MORE ERRATIC THAN ARE SHOWN ON THE PROFILE.
- EXISTING AND PROPOSED SITE CONDITIONS, THE LOCATION AND ORIENTATION OF EXISTING SITE FEATURES, AND THE PROPOSED BRIDGE STRUCTURE ARE TAKEN FROM ELECTRONIC MICROSTATION FILES PROVIDED BY THE MAINE DEPARTMENT OF TRANSPORTATION.
- ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
- REFER TO APPENDIX A FOR TEST BORING LOGS AND ROCK CORE PHOTOGRAPHS, APPENDIX B FOR PIEZOCONE AND SEISMIC PIEZOCONE PENETRATION TEST REPORT AND APPENDIX C FOR OBSERVATION WELL INSTALLATION AND GROUNDWATER MONITORING REPORTS.

PROFILE

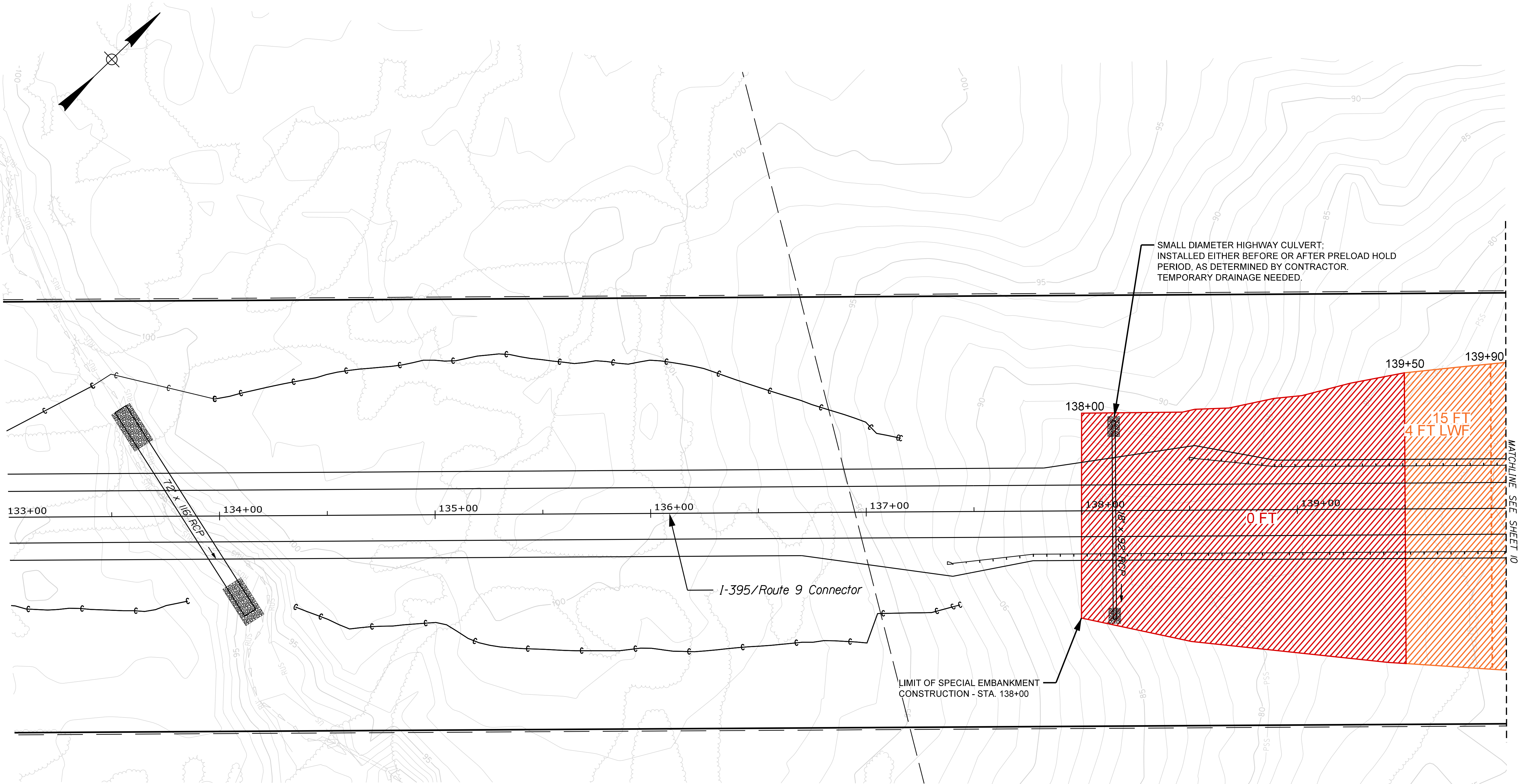


HALEY ALDRICH

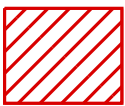
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I-395/ROUTE 9 CONNECTOR OVER EATON BROOK, BRIDGE No. 6646 BREWSTER, PENOBSCOT COUNTY		INTERPRETIVE SUBSURFACE PROFILE		FIGURE 3		OF 5	
PROJ. MANAGER	DATE	BY	DATE	SIGNATURE	P.E. NUMBER	DATE	
DESIGNED-DETAILED	5-9-20	K. POST	8-27-21				
CHECKED-REVIEWED	8-27-21	M. CHAMBERLAIN					
DESIGNED-DETAILED							
REVISIONS 1							
REVISIONS 2							
REVISIONS 3							
REVISIONS 4							
FIELD CHANGES							

Username: Date:8/27/2021

Filename: ... \103_Eaton Brook SpecialEmbankment Plans.dgn



LEGEND



SINGLE STAGE EMBANKMENT CONSTRUCTION WITH NORMAL WEIGHT FILL; CLEAR AND STABILIZE SITE (GRUBBING NOT REQUIRED). PLACE DRAINAGE MATERIAL (2 FT THICK, MIN.). INSTALL PREFABRICATED VERTICAL DRAINS ON APPROX. 5 FT SPACING (TRIANGULAR PATTERN). PLACE NORMAL WEIGHT FILL IN LIFTS TO THE DISTANCE ABOVE/BELOW FINISHED ROADWAY GRADE INDICATED. WAIT 6 TO 8 MONTHS (APPROX.). EXCAVATE AS NEEDED TO PLACE 3 FT PAVEMENT SECTION TO FINAL ROADWAY GRADE.

-2 FT.

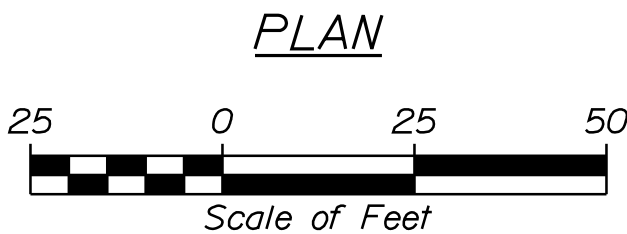
HEIGHT OF STAGE I PRELOAD/SURCHARGE FILL RELATIVE TO FINISHED ROADWAY
• INDICATES FILL ABOVE FINISHED ROADWAY GRADE (SURCHARGE).
- INDICATES FILL BELOW FINISHED ROADWAY GRADE (PRELOAD).



TWO STAGE EMBANKMENT CONSTRUCTION WITH LIGHTWEIGHT FILL; CLEAR AND STABILIZE SITE (GRUBBING NOT REQUIRED). PLACE DRAINAGE MATERIAL (2 FT THICK, MIN.). INSTALL PREFABRICATED VERTICAL DRAINS ON APPROX. 5 FT SPACING (TRIANGULAR PATTERN). PLACE NORMAL WEIGHT FILL IN LIFTS UP TO THE MAXIMUM HEIGHT ABOVE EXISTING GRADE INDICATED (FIRST STAGE). WAIT 9 MONTHS (APPROX.). OVER-EXCAVATE NORMAL WEIGHT FILL AS INDICATED. PLACE FGA LIGHTWEIGHT FILL TO 3 FT BELOW FINAL ROADWAY GRADE (SECOND STAGE). PLACE 3 FT PAVEMENT SECTION TO FINAL ROADWAY GRADE.

15' 4 TO 6 FT OVER-EXC
4 FT LWF

HEIGHT OF STAGE I PRELOAD FILL, RELATIVE TO FINISHED ROADWAY GRADE.
RANGE IN OVER-EXCAVATION INTO STAGE I PRELOAD FILL.
THICKNESS OF FGA LIGHTWEIGHT FILL.



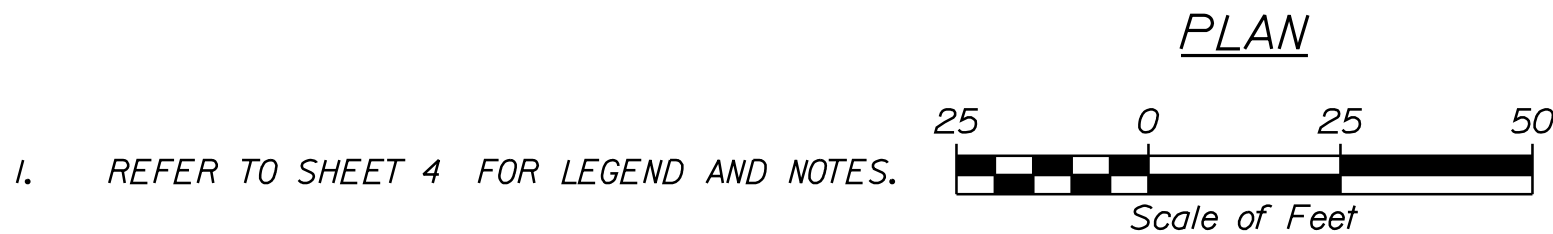
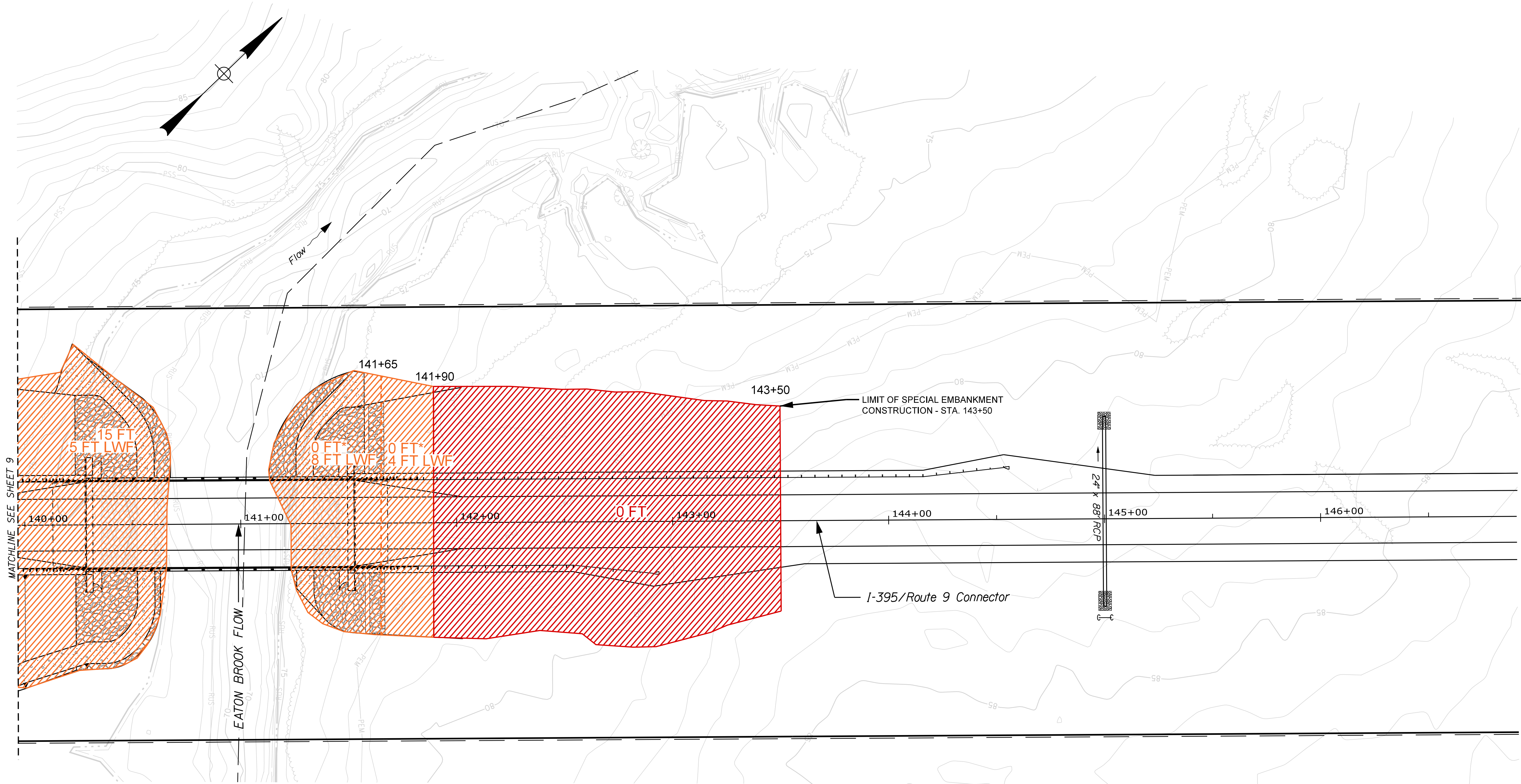
HALEY ALDRICH

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
1891500
WIN
018915.00
BRIDGE NO.
BRIDGE PLANS

PROJ. MANAGER	DATE	BY	DATE	SIGNATURE
DESIGN-DETAILED	5-9-20	K. POST	8-27-21	
CHECKED-REVIEWED		B. STEINERT		
DESIGN-DETAILED		W. CHADBOURNE		
DESIGN-DETAILED				
REVISIONS 1				P.E. NUMBER
REVISIONS 2				DATE
REVISIONS 3				
REVISIONS 4				
FIELD CHANGES				

I-395/ROUTE 9 CONNECTOR OVER EATON BROOK, BRIDGE No. 6646 BREWER, PENOBSCOT COUNTY
SPECIAL EMBANKMENT CONSTRUCTION PLAN (1 OF 2)

FIGURE
4
OF 5




I-395/ROUTE 9 CONNECTOR OVER EATON BROOK, BRIDGE No. 6646 BREWER, PENOBSCOT COUNTY SPECIAL EMBANKMENT CONSTRUCTION PLAN (2 OF 2)	STATE OF MAINE DEPARTMENT OF TRANSPORTATION		1891500	
	BRIDGE NO.		WIN	
	018915.00		BRIDGE PLANS	
	FIGURE		5	
PROJ. MANAGER		M. WIGHT	BY	DATE
DESIGN-DETAILED		B. STERNET	K. POST	5-9-20
CHECKED-REVIEWED		B. STERNET	W. CHADBOURNE	8-27-21
DESIGN-DETAILED				
REVISIONS 1				
REVISIONS 2				
REVISIONS 3				
REVISIONS 4				
FIELD CHANGES				
			SIGNATURE	
			P.E. NUMBER	
			DATE	

APPENDIX A

Test Boring Logs and Rock Core Photographs

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-101 WIN: 18915.00				
Driller: New England Boring Contractors		Elevation (ft.): 74.3		Auger ID/OD: --						
Operator: B. Enos		Datum: NAVD 88		Sampler: Split-Spoon 1.375 in. ID						
Logged By: N. Klausmeyer		Rig Type: Mobile B-53 Rubber Track		Hammer Wt./Fall: SS-140#/30; HW-140#/24						
Date Start/Finish: 11/1/18-11/5/18		Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID						
Boring Location: Sta. 140+42.9; 0.6 RT		Casing ID/OD: HW-4.0 in. ID		Water Level*: +5.0 ft (Artesian)						
Hammer Efficiency Factor: 0.9057		Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>								
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _{u(lab)} = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test										
Depth (ft.)	Sample Information							Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows			
0	1D	24/12	0.0 - 2.0	WOH/1/1/2	2	3	HW PUSH		Grey with brown mottling, wet, soft, Silty CLAY, trace organics (roots) -MARINE DEPOSITS-(CL)	C#1P-17 Cu#12-1 Su=549 psf LL=55 PL=19 PI=16 WC=31 CL
	2D/A	24/24	2.0 - 4.0	2/2/2/2	4	6		71.3	Grey with brown mottling, wet, soft, Silty CLAY, trace organics (roots) -MARINE DEPOSIT-(CL)	
									Grey-brown, wet, medium stiff, Clayey SILT, trace organics (roots) -MARINE DEPOSIT-(ML)	
5	1U	24/23	5.0 - 7.0					69.3	Grey, wet, Silty CLAY -MARINE DEPOSIT-(CL)	
	V1		7.6 - 8.0	Su=885/95 psf					55x110 mm vane raw torque readings: V1: 19.0/2.0 ft-lbs V2: 12.0/1.5 ft-lbs	
	V2		8.6 - 9.0	Su=560/70 psf						
10	3D	24/24	10.0 - 12.0	WOR/WOR/WOR/WOR					Grey with black streaks, wet, medium stiff, Silty CLAY -MARINE DEPOSIT-(CL)	
15	2U	24/22	15.0 - 17.0						Grey, wet, Silty CLAY -MARINE DEPOSIT-(CL)	
	4D	24/22	17.0 - 19.0	WOR/2/10/18	12	18				
	MV		17.0 - 17.0						Note: Attempted field vane shear test at 17.0 ft, no penetration.	
								56.4	Grey, wet, very stiff, Clayey SILT, trace fine sand, trace fine gravel, well bonded -GLACIAL TILL-(ML)	
20	5D	24/15	20.0 - 22.0	3/4/7/6	11	17	33		Grey, wet, very stiff, Clayey SILT, little fine to coarse sand, trace fine gravel, moderately bonded -GLACIAL TILL-(ML)	
							45			
							46			
							64		Note: Drill action and wash water indicate granular material.	
25							111			
Remarks: Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Page 1 of 3 Boring No.: BB-BEB-101

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/1-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-101 WIN: 18915.00					
Driller: New England Boring Contractors		Elevation (ft.): 74.3		Auger ID/OD: --							
Operator: B. Enos		Datum: NAVD 88		Sampler: Split-Spoon 1.375 in. ID							
Logged By: N. Klausmeyer		Rig Type: Mobile B-53 Rubber Track		Hammer Wt./Fall: SS-140#/30; HW-140#/24							
Date Start/Finish: 11/1/18-11/5/18		Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID							
Boring Location: Sta. 140+42.9; 0.6 RT		Casing ID/OD: HW-4.0 in. ID		Water Level*: +5.0 ft (Artesian)							
Hammer Efficiency Factor: 0.9057		Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>									
<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt </div> <div> R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person </div> <div> S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{u(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected </div> <div> T_y = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test </div> </div>											
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
25	6D	24/11	25.0 - 27.0	15/15/13/15	28	42	64	49.3		Grey, wet, dense, fine to coarse SAND, some silt, well graded, loosely bonded -GLACIAL TILL-(SW) Note: Drill action and wash water indicate granular material. Note: Boulder encountered from 29.4 to 30.4 ft. Note: Drill action and wash water continues to indicate granular material from 30.4 to 35 ft. Grey-brown, wet, very dense, fine to coarse SAND, some fine to coarse gravel, little silt, well graded, well bonded -GLACIAL TILL-(SW) Note: Drill action and wash water continues to indicate granular material from 35.7 to 37 ft. Advanced rollerbit to 37 ft, begin NQ rock core at 37 ft.	
							55				
							52				
							47				
							50 1/4"				
30							-				
							-				
							26				
							31				
							141				
35	7D	8/6	35.0 - 35.7	13/100(2")			200/8	37.3	Top of Bedrock at El. 37.3 R1: Brown-grey, aphanitic PHYLLITE, hard, fresh to moderate weathering. Joints dipping at low to vertical angles, very close to close, tight to open, occasional light brown silt infilling. Rock Quality=Poor Recovery=34% R1 Core Times (min:sec): 37.0-38.0' (3:14); 38.0-39.0' (5:14); 39.0-40.0' (3:01); 40.0-41.0' (2:44); 41.0-42.0' (3:11); 42.0-42.8' (2:14) Note: Noticeable water loss while coring. R2: Brown-grey, aphanitic PHYLLITE, hard, fresh to moderate weathering. Joints dipping at low to vertical angles, very close to close, tight to open, some light brown/red-brown fine-grained silt coatings/calcite coatings on some joint surfaces, calcite/quartzite flakes. Rock Quality=Very Poor Recovery=38% R2 Core Times (min:sec): 42.8-43.8' (2:41); 43.8-44.8' (2:37) R3: Brown-grey, aphanitic PHYLLITE, hard, fresh to moderate weathering, occasional pitting. Joints dipping at low to vertical angles, very close to close, tight to open, occasional light brown silt coatings on joint surfaces. Rock Quality=Very Poor Recovery=45% R3 Core Times (min:sec): 45.4-46.0 (0:56); 46.0-47.0' (2:41);		
							RC				
	R1	69.6/24	37.0 - 42.8	RQD = 0%			NQ CORE				
40											
	R2	31.2/12	42.8 - 45.4	RQD = 0%							
45	R3	31.2/14	45.4 - 48.0	RQD = 0%							
	R4	24/22	48.0 - 50.0	RQD = 38%							
50											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 2 of 3	
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: BB-BEB-101	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/1-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-101 WIN: 18915.00							
Driller: New England Boring Contractors				Elevation (ft.): 74.3				Auger ID/OD: --							
Operator: B. Enos				Datum: NAVD 88				Sampler: Split-Spoon 1.375 in. ID							
Logged By: N. Klausmeyer				Rig Type: Mobile B-53 Rubber Track				Hammer Wt./Fall: SS-140#/30; HW-140#/24							
Date Start/Finish: 11/1/18-11/5/18				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID							
Boring Location: Sta. 140+42.9; 0.6 RT				Casing ID/OD: HW-4.0 in. ID				Water Level*: +5.0 ft (Artesian)							
Hammer Efficiency Factor: 0.9057				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>											
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person				S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _u (lab) = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected				T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test			
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.				
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)							
50	R5	24/24	50.0 - 52.0	RQD = 0%			NQ CORE	22.3	 <p>47.0-48.0 (4.36) R4: Grey, aphanitic PHYLLITE, hard, moderately weathered grading to fresh. Primary joints dipping at low to moderate angles. Secondary joints dipping at steep to vertical angles, very close to close, tight to open, occasional light brown silt coatings on joint surfaces, occasional calcite/quartzite stringers up to 0.5 in. thickness throughout run, occasional pitting throughout run. Rock Quality=Poor Recovery=92% R4 Core Times (min:sec): 48.0-49.0' (2:41); 49.0-50.0' (2:47) R5: Grey-brown, aphanitic PHYLLITE, hard, moderate weathering. Primary joints dipping at horizontal to low angles. Secondary joint set dipping at steep to vertical angles, very close to close, tight to open, occasional light brown and red-brown silt coatings on joint surfaces, some calcite/quartzite stringers up to 0.5 in. thickness throughout run, occasional pitting throughout run. Rock Quality=Very Poor Recovery=100% R5 Core Times (min:sec): 50.0-51.0' (2:27); 51.0-52.0' (3:21) Note: Noticeable water loss during coring.</p> <p>Bottom of Exploration at 52.0 feet below ground surface.</p>						
75															
Remarks:															
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-102 WIN: 18915.00					
Driller: New England Boring Contractors			Elevation (ft.): 75.3		Auger ID/OD: --						
Operator: B. Enos			Datum: NAVD 88		Sampler: Split-Spoon 1.375 in. ID						
Logged By: N. Klausmeyer			Rig Type: Mobile B-53 Rubber Track		Hammer Wt./Fall: SS-140#/30; HW-140#/24						
Date Start/Finish: 11/6/18-11/7/18			Drilling Method: SSA/HW Drive		Core Barrel: --						
Boring Location: Sta. 140+38.9; 101.9 LT			Casing ID/OD: HW-4.0 in. ID		Water Level*: --						
Hammer Efficiency Factor: 0.9057			Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>								
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0	1D	18/9	0.0 - 1.5	WOH/WOH/2	2	3	HW PUSH			Brown grading to grey-brown, wet, soft, Silty CLAY, little organics -MARINE DEPOSIT-(CL) Grey-brown, wet, Silty CLAY Grey with light brown mottling, wet, medium stiff, Silty CLAY, trace organics -MARINE DEPOSIT-(CL) Note: Attempted field vane shear test at 4.0 ft, no penetration. 55x110 mm vane raw torque readings: V1: 14.0/2.0 ft-lbs V2: 13.0/2.5 ft-lbs	
	1U	24/20	2.0 - 4.0								
	2D	24/24	4.0 - 6.0	WOH/2/1/2	3	5					
5	MV		4.0 - 4.0								
10	2U	24/23	10.0 - 12.0								
	V1		12.6 - 13.0	Su=650/95 psf							
	V2		13.6 - 14.0	Su=605/117 psf							
15	3D	24/14	15.0 - 17.0	8/3/3/4	6	9			Grey, wet, stiff, fine Sandy SILT, little clay, trace medium to coarse sand, trace fine gravel -GLACIAL TILL-(ML) Note: Drill action and wash water indicate granular material. Grey, wet, hard, SILT, little fine to coarse sand, trace fine gravel, well bonded -GLACIAL TILL-(ML) Note: Drill action and wash water indicate granular material.		
							9				
							26				
							51				
20	4D	24/12	20.0 - 22.0	11/11/24/20	35	53	RC				
25											
Remarks: 1. Observation well installed in completed borehole. See Observation Well Installation Report and Groundwater Monitoring Report for details.											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 2 Boring No.: BB-BEB-102	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/1-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-102 WIN: 18915.00																																																																																																																																																																																																					
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-103 WIN: 18915.00				
Driller: New England Boring Contractors				Elevation (ft.): 74.1				Auger ID/OD: --				
Operator: B. Enos				Datum: NAVD 88				Sampler: Split-Spoon 1.375 in. ID				
Logged By: N. Klausmeyer				Rig Type: Mobile B-53 Rubber Track				Hammer Wt./Fall: SS-140#/30; HW-140#/24				
Date Start/Finish: 11/5/18-11/6/18				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID				
Boring Location: Sta. 140+38.1; 97.9 RT				Casing ID/OD: HW-4.0 in. ID				Water Level*: --				
Hammer Efficiency Factor: 0.9057				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>								
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	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows					
0	1D	24/10	0.0 - 2.0	WOH/WOH/1/3	1	2	HW WOR	74.0		-ORGANIC DEPOSIT- Grey-brown, wet, soft, Silty CLAY, trace organics (roots) -MARINE DEPOSIT-(CL)	C#1P-14 CU#15-1 Su=392 psf LL=38 PL=19 PI=19 WC=36 CL	
5	2D	24/20	5.0 - 7.0	WOH/WOH/WOH/1			10					Grey with occasional brown pockets, wet, very soft, Silty CLAY, little organics (roots) -MARINE DEPOSIT-(CL)
							11					
							28					
							35					
							37					
10	1U	24/24	10.0 - 12.0				38					Grey, wet, Silty CLAY
							24					
	V1		12.6 - 13.0	Su=325/23 psf			24					
	V2		13.6 - 14.0	Su=280/23 psf			20					55x110 mm vane raw torque readings: V1: 7.0/0.5 ft-lbs V2: 6.0/0.5 ft-lbs
							19					
15	3D	24/24	15.0 - 17.0	WOR/WOR/WOR/WOR			22					Grey with black streaks, wet, soft, Silty CLAY -MARINE DEPOSIT-(CL)
							28					
							17					
							14					
							18					
20	2U	24/24	20.0 - 22.0				51					Grey, wet, Silty CLAY
							52					
	V3		22.6 - 23.0	Su=375/45 psf			41					
	MW		23.0 - 23.1				42			55x110mm vane raw torque readings: V3: 8.0/1.0 ft-lbs Note: Attempted field vane shear test at 23.0 ft, 1-in. penetration.		
25							55	51.0		23.1		
Remarks: Stratification lines represent approximate boundaries between soil types; transitions may be gradual.												
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Page 1 of 3 Boring No.: BB-BEB-103		

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector				Boring No.: BB-BEB-103			
				Location: Brewer and Eddington, Maine				WIN: 18915.00			
Driller: New England Boring Contractors				Elevation (ft.): 74.1				Auger ID/OD: --			
Operator: B. Enos				Datum: NAVD 88				Sampler: Split-Spoon 1.375 in. ID			
Logged By: N. Klausmeyer				Rig Type: Mobile B-53 Rubber Track				Hammer Wt./Fall: SS-140#/30; HW-140#/24			
Date Start/Finish: 11/5/18-11/6/18				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID			
Boring Location: Sta. 140+38.1; 97.9 RT				Casing ID/OD: HW-4.0 in. ID				Water Level*: --			
Hammer Efficiency Factor: 0.9057				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>							
<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt </div> <div> R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person </div> <div> S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{u(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected </div> <div> T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test </div> </div>											
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
25	4D	24/10	25.0 - 27.0	8/12/32/33	44	66	59	47.1			
							61				
							129				
							143				
							171				
30							RC				
	R1	60/0	31.1 - 36.1	RQD = 0%			NQ	43.0			
							CORE	41.9			
								40.5			
								38.0			
35											
	5D	24/11	36.1 - 38.1	12/15/14/19	29	44	RC				
40	6D	24/20	40.0 - 42.0	6/9/14/33	23	35		31.6			
45	7D	24/20	45.0 - 47.0	12/13/19/18	32	48					
50											
Remarks: Stratification lines represent approximate boundaries between soil types; transitions may be gradual. * Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.											

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/1-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-103 WIN: 18915.00			
Driller: New England Boring Contractors				Elevation (ft.): 74.1				Auger ID/OD: --			
Operator: B. Enos				Datum: NAVD 88				Sampler: Split-Spoon 1.375 in. ID			
Logged By: N. Klausmeyer				Rig Type: Mobile B-53 Rubber Track				Hammer Wt./Fall: SS-140#/30; HW-140#/24			
Date Start/Finish: 11/5/18-11/6/18				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID			
Boring Location: Sta. 140+38.1; 97.9 RT				Casing ID/OD: HW-4.0 in. ID				Water Level*: --			
Hammer Efficiency Factor: 0.9057				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person				S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _{u(lab)} = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected			
				T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test							
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
50	8D	4/5	50.0 - 50.3	97(4")				23.8	Yellow-brown, wet, very dense, Silty fine GRAVEL, little fine to coarse sand, poorly-graded, moderately bonded -GLACIAL TILL/WEATHERED BEDROCK-(GM) Bottom of Exploration at 50.3 feet below ground surface.		
75											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.											
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.											
Page 3 of 3										Boring No.: BB-BEB-103	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-104 WIN: 18915.00				
Driller: New England Boring Contractors				Elevation (ft.): 75.9				Auger ID/OD: --				
Operator: B. Enos				Datum: NAVD 88				Sampler: Split-Spoon 1.375 in. ID				
Logged By: N. Klausmeyer				Rig Type: Mobile B-53 Rubber Track				Hammer Wt./Fall: SS-140#/30; HW-140#/24				
Date Start/Finish: 11/7/18-11/8/18				Drilling Method: SSA/HW Drive				Core Barrel: --				
Boring Location: Sta. 141+44.8; 15.7 LT				Casing ID/OD: HW-4.0 in. ID				Water Level*: Artesian				
Hammer Efficiency Factor: 0.9057				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>								
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) $S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test												
Depth (ft.)	Sample Information								Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows					
0	1D/A	24/15	0.0 - 2.0	WOH/WOH/1/3	1	2	HW PUSH	75.3		Dark brown grading to grey-brown, wet, very soft, SILT, little organics (roots, wood chips) -TOPSOIL-(OL)	C#1P-15 CU#13-1 Su=442 psf LL=35 PL=20 PI=15 WC=34 CL	
										Grey-brown with red-brown mottling, moist, soft, Clayey SILT, trace organics -MARINE DEPOSIT-(ML)		
5	1U	12/10	5.0 - 6.0				49	70.9		Grey-brown mottled, wet, Silty CLAY		
	2D	24/22	6.0 - 8.0	4/5/6/8	11	17	45	69.9		Grey with light brown mottling, wet, very stiff, Silty CLAY, trace organics -MARINE DEPOSIT-(CL)		
							40					
							24					
							14					
10	2U	24/21	10.0 - 12.0				26			Grey-brown, wet, Silty CLAY		
							16					
	V1		12.6 - 13.0	Su=490/45 psf			23					
	V2		13.6 - 14.0	Su=465/45 psf			17			55x110mm vane raw torque readings: V1: 10.5/1.0 ft-lbs V2: 10.0/1.0 ft-lbs		
							18					
15	3U	24/24	15.0 - 17.0				19			Grey, wet, Silty CLAY		
							24					
	V3		17.6 - 18.0	Su=375/45 psf			27					
	V4		18.6 - 19.0	Su=650/140 psf			25			55x110mm vane raw torque readings: V3: 8.0/1.0 ft-lbs V4: 14.0/3.0 ft-lbs		
							61					
20	3D	24/1	20.0 - 22.0	17/7/10/7	17	26	39	56.5		Grey, wet, very stiff, SILT, little fine to coarse sand, little fine gravel, loosely bonded -GLACIAL TILL-(ML) Note: Pushed gravel, low recovery. Note: Drill action and wash water indicate granular material.		
							63					
							52					
							60					
25							71					
Remarks: Stratification lines represent approximate boundaries between soil types; transitions may be gradual.												
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Page 1 of 3 Boring No.: BB-BEB-104		

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-104 WIN: 18915.00							
Driller: New England Boring Contractors				Elevation (ft.): 75.9				Auger ID/OD: --							
Operator: B. Enos				Datum: NAVD 88				Sampler: Split-Spoon 1.375 in. ID							
Logged By: N. Klausmeyer				Rig Type: Mobile B-53 Rubber Track				Hammer Wt./Fall: SS-140#/30; HW-140#/24							
Date Start/Finish: 11/7/18-11/8/18				Drilling Method: SSA/HW Drive				Core Barrel: --							
Boring Location: Sta. 141+44.8; 15.7 LT				Casing ID/OD: HW-4.0 in. ID				Water Level*: Artesian							
Hammer Efficiency Factor: 0.9057				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>											
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person				S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _{u(lab)} = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected				T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test			
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.				
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)							
25	4D	24/9	25.0 - 27.0	3/7/10/11	17	26	51		Grey, wet, very stiff, SILT, little coarse to fine sand, little coarse to fine gravel, well bonded -GLACIAL TILL-(ML)						
							89								
							116								
							216								
							109								
30	5D	24/24	30.0 - 32.0	10/14/14/15	28	42	130				Grey, wet, hard, SILT, some fine to coarse sand, trace fine gravel, well bonded -GLACIAL TILL-(ML) Note: Drill action and wash water continue to indicate granular material. Grey, wet, hard, SILT, trace fine to medium sand, well bonded -GLACIAL TILL-(ML) Note: Encountered cobbles/boulders from 36.3 to 38.5 ft.				
							106								
							117								
							105								
							149								
35	6D	16/14	35.0 - 36.3	9/10/50(4")			245						Grey, wet, very dense, fine GRAVEL, little silt, little fine to coarse sand, poorly-graded, well bonded -GLACIAL TILL/WEATHERED BEDROCK-(GM) Note: Drill action and was water continue to indicate granular material. Yellow-brown with some grey, wet, very dense, fine to coarse GRAVEL, fine to coarse sand, little silt, well graded, well bonded -GLACIAL TILL/WEATHERED BEDROCK-(GM) Note: Drill action and was water continue to indicate granular material.		
							150/4								
							RC								
40	7D	9/6	40.0 - 40.8	44/100(3")				Grey, wet, very dense, fine GRAVEL, little silt, little fine to coarse sand, poorly-graded, well bonded -GLACIAL TILL/WEATHERED BEDROCK-(GM) Note: Drill action and was water continue to indicate granular material. Yellow-brown with some grey, wet, very dense, fine to coarse GRAVEL, fine to coarse sand, little silt, well graded, well bonded -GLACIAL TILL/WEATHERED BEDROCK-(GM) Note: Drill action and was water continue to indicate granular material.							
45	8D	5/5	45.0 - 45.4	144(5")						Grey, wet, very dense, fine GRAVEL, little silt, little fine to coarse sand, poorly-graded, well bonded -GLACIAL TILL/WEATHERED BEDROCK-(GM) Note: Drill action and was water continue to indicate granular material. Yellow-brown with some grey, wet, very dense, fine to coarse GRAVEL, fine to coarse sand, little silt, well graded, well bonded -GLACIAL TILL/WEATHERED BEDROCK-(GM) Note: Drill action and was water continue to indicate granular material.					
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/1-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-104 WIN: 18915.00					
Driller: New England Boring Contractors		Elevation (ft.): 75.9		Auger ID/OD: --							
Operator: B. Enos		Datum: NAVD 88		Sampler: Split-Spoon 1.375 in. ID							
Logged By: N. Klausmeyer		Rig Type: Mobile B-53 Rubber Track		Hammer Wt./Fall: SS-140#/30; HW-140#/24							
Date Start/Finish: 11/7/18-11/8/18		Drilling Method: SSA/HW Drive		Core Barrel: --							
Boring Location: Sta. 141+44.8; 15.7 LT		Casing ID/OD: HW-4.0 in. ID		Water Level*: Artesian							
Hammer Efficiency Factor: 0.9057		Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>									
<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt </div> <div> R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person </div> <div> S_U = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{U(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected </div> <div> T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test </div> </div>											
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
50	9D	2/2	50.0 - 50.2	150(2")			RC				
55											
60	R1 R2	8.4/7 58.8/46	60.0 - 60.7 60.7 - 65.6	RQD = 0% RQD = 0%			NO CORE	15.9			
65	R3	60/60	65.6 - 70.6	RQD = 62%							
70								5.3			
75											
Bottom of Exploration at 70.6 feet below ground surface.											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.											
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.											

Maine Department of Transportation				Project: Route 9/I-395 Connector		Boring No.: HB-BE-123				
Soil/Rock Exploration Log US CUSTOMARY UNITS				Location: Brewer and Eddington, Maine		WIN: 18915.00				
Driller: New England Boring Contractors		Elevation (ft.): 82.3		Auger ID/OD: --						
Operator: B. Enos		Datum: NAVD 88		Sampler: Split-Spoon 1.375 in. ID						
Logged By: N. Klausmeyer		Rig Type: Mobile B-53 Rubber Track		Hammer Wt./Fall: SS-140#/30; HW-140#/30						
Date Start/Finish: 11-8-18/11-8-18		Drilling Method: SSA/HW Drive		Core Barrel: --						
Boring Location: Sta. 144+06.5; 2.6 LT		Casing ID/OD: HW-4.0 in. ID		Water Level*: --						
Hammer Efficiency Factor: 0.9057		Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>								
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _{u(lab)} = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test										
Depth (ft.)	Sample Information							Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows			
0	1D	24/12	0.0 - 2.0	WOH/1/2/6	3	5	3			G#513341 A-4(0)
							27			
							44			
							49			
							66			
5	2D	24/24	5.0 - 7.0	1/3/3/5	6	9	37			
							53			
							69			
							70			
	3D/A	24/12	10.0 - 12.0	1/4/34/24	38	57	38			
10	MV		10.0 - 10.0				51			
							67			
							71			
							76			
							59			
15	4D	24/4	15.0 - 17.0	15/10/10/11	20	30	61			
							71			
							128			
							131			
							84			
20	5D	18/6	20.0 - 21.5	7/14/19	33	50	OPEN			
							62.3			
							60.8			
25										
Remarks: Stratification lines represent approximate boundaries between soil types; transitions may be gradual. * Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										
Page 1 of 1 Boring No.: HB-BE-123										

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-201 WIN: 18915.00	
Driller: New England Boring Contractors			Elevation (ft.): 74.8		Auger ID/OD: --		
Operator: M. Porter			Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID		
Logged By: J. Fletcher			Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#/16		
Date Start/Finish: 10-27-2020/10-27-2020			Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID		
Boring Location: Sta. 140+09.4, 29.9 LT			Casing ID/OD: HW-4.0 in. ID		Water Level*: Artesian		
Hammer Efficiency Factor: 0.852			Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>				
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) $S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test							

Depth (ft.)	Sample Information							Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows				
0	ID	24/2	0.0 - 2.0	WOR/WOR/WOR/ WOR			SSA	74.6		-ROOTMAT-	
5	V1		5.6 - 6.0	Su=855/155 psf			22	64.7		55x110mm vane raw torque readings: V1: 220/40 in-lbs V2: 160/30 in-lbs	
10	MU		10.0 - 12.0				41			Note: Attempted tube, no penetration. Grey, wet, medium dense, fine to medium SAND, some silt, little gravel, moderately bonded -GLACIAL TILL-(SM)	
15	MD		15.0 - 17.0	6/5/7/7	12	17	70			No Recovery, possible cobble	
20	MD		20.0 - 22.0	12/18/17/17	35	50	HW			No Recovery, possible cobble	
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

 * Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Page 1 of 4

Boring No.: BB-BEB-201

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-201 WIN: 18915.00							
Driller: New England Boring Contractors				Elevation (ft.): 74.8				Auger ID/OD: --							
Operator: M. Porter				Datum: NAVD 88				Sampler: Split Spoon 1.375 in. ID							
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track				Hammer Wt./Fall: SS-140#/30; HW-300#/16							
Date Start/Finish: 10-27-2020/10-27-2020				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID							
Boring Location: Sta. 140+09.4, 29.9 LT				Casing ID/OD: HW-4.0 in. ID				Water Level*: Artesian							
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>											
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person				S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _{u(lab)} = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected				T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test			
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.				
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing	Elevation (ft.)							
25	3D	24/9	25.0 - 27.0	7/8/11/19	19	27	HW		Grey, wet, medium dense, fine to medium SAND, some silt, trace coarse sand and gravel, moderately bonded -GLACIAL TILL-(SM)						
30	4D	24/13	30.0 - 32.0	31/37/40/48	77	109		44.8	Grey, wet, very dense, fine to coarse Sandy GRAVEL, little silt, well bonded -GLACIAL TILL-(GP-GM)						
35	5D	5/1	35.0 - 35.4	105(5")				39.8	Grey, wet, very dense, GRAVEL, little fine to coarse sand, trace silt -GLACIAL TILL-(GP) Note: Artesian pressure.						
40	6D	19.2/11	40.0 - 41.6	42/44/57/50(1")	101	143		34.8	Brown, wet, very dense, fine to coarse SAND, some gravel, trace silt, well bonded -GLACIAL TILL-(SP)						
45	7D	1/1	45.0 - 45.1	50(1")					Similar to 6D -GLACIAL TILL-(SP)						
50															
Remarks: 															
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 2 of 4 Boring No.: BB-BEB-201					

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-201 WIN: 18915.00							
Driller: New England Boring Contractors				Elevation (ft.): 74.8				Auger ID/OD: --							
Operator: M. Porter				Datum: NAVD 88				Sampler: Split Spoon 1.375 in. ID							
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track				Hammer Wt./Fall: SS-140#/30; HW-300#/16							
Date Start/Finish: 10-27-2020/10-27-2020				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID							
Boring Location: Sta. 140+09.4, 29.9 LT				Casing ID/OD: HW-4.0 in. ID				Water Level*: Artesian							
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>											
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person				S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _{u(lab)} = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected				T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test			
Depth (ft.)	Sample Information									Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.			
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing	Blows	Elevation (ft.)						
50	8D	2/1	50.0 - 50.2	156(2")				HW							
55	MD	1/0	55.0 - 55.1	50(1")											
60	MD	2/0	60.0 - 60.2	115(2")											
65	9D	2/2	65.0 - 65.2	91(2")											
70	MD	1/1	70.0 - 70.1	102(1")											
75															
Remarks: Stratification lines represent approximate boundaries between soil types; transitions may be gradual.															
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Page 3 of 4 Boring No.: BB-BEB-201					

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-201 WIN: 18915.00							
Driller: New England Boring Contractors				Elevation (ft.): 74.8				Auger ID/OD: --							
Operator: M. Porter				Datum: NAVD 88				Sampler: Split Spoon 1.375 in. ID							
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track				Hammer Wt./Fall: SS-140#/30; HW-300#/16							
Date Start/Finish: 10-27-2020/10-27-2020				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID							
Boring Location: Sta. 140+09.4, 29.9 LT				Casing ID/OD: HW-4.0 in. ID				Water Level*: Artesian							
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>											
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	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)							
75	R1	30/26	75.0 - 77.5	RQD = 53%			NO CORE			R1: Grey, aphanitic, SILTSTONE, hard, slightly to moderately weathered. Joints dipping at steep angles, close to moderate, tight to open, calcite veins. Rock Quality=Fair Recovery=87% -BREWER FORMATION- R1 Core Times (min:sec): 75.0-76.0' (2:17); 76.0-77.5' (2:22) R2: Grey, aphanitic, SILTSTONE, hard, slight to moderately weathered. Joints dipping at steep angles, close spacing, tight, calcite veins. Rock Quality=Fair Recovery=106% Note: R2 recovery and RQD includes portion of R1 that was not initially recovered. -BREWER FORMATION- R2 Core Times (min:sec): 77.5-78.5' (2:11); 78.5-79.5' (2:23); 79.5-80.5' (2:41); 80.5-81.5' (1:57) R3: Grey, aphanitic, SILTSTONE, hard, slightly weathered. Joints dipping at steep angles, moderate spacing, tight, calcite veins. Rock Quality=Good Recovery=98% -BREWER FORMATION- R3 Core Times (min:sec): 81.5-82.5' (1:51); 82.5-83.5' (2:38); 83.5-84.5' (2:28); 84.5-85.5' (2:25); 85.5-86.1' (2:41)					
	R2	48/51	77.5 - 81.5	RQD = 61%											
80															
	R3	55.2/54	81.5 - 86.1	RQD = 82%											
85															
90															
95															
100															
Remarks:															
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.															
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Maine Department of Transportation						Project: Route 9/I-395 Connector				Boring No.: BB-BEB-202																																																																																																																																																																																																																																					
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Shear Strength (psf) or RQD (%)</th><th>N-uncorrected</th><th>N₆₀</th><th>Casing Blows</th><th>Elevation (ft.)</th></tr></thead><tbody><tr><td>0</td><td>1D/A</td><td>24/10</td><td>0.0 - 2.0</td><td>WOH/WOH/1/1</td><td></td><td></td><td>SSA</td><td>74.4</td><td rowspan="10"><p>Brown, wet, very soft, SILT, trace fine sand, organics/roots -TOPSOIL/ROOTMAT-(OL)</p><p>Grey, wet, very soft, Silty CLAY, high plasticity -MARINE DEPOSIT-(CL)</p><p>55x110mm vane raw torque readings: V1: 210/40 in-lbs V2: 140/20 in-lbs</p><p>Grey, wet, soft to medium stiff, Silty CLAY, medium plasticity -MARINE DEPOSIT-(CL) 55x110mm vane raw torque readings: V3: 110/15 in-lbs V4: 90/15 in-lbs</p><p>Similar to 2D -MARINE DEPOSIT-(CL) 55x110mm vane raw torque readings: V5: 110/20 in-lbs</p><p>Grey, wet, loose to medium dense, fine to medium SAND, little silt, trace coarse sand, trace gravel, loosely bonded -GLACIAL TILL-(SP) Note: Attempted field vane shear test at 18.6 ft, no penetration.</p><p>Grey, wet, medium stiff, SILT, little fine to medium sand, little gravel, trace coarse sand, moderately bonded -GLACIAL TILL-(ML)</p></td><td rowspan="10">C#IP-2 CU#2 Su=554psf LL=36 PL=18 PI=18 WC=32.7 CL</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td>1U</td><td>24/24</td><td>5.0 - 7.0</td><td></td><td></td><td></td><td>3</td><td></td></tr><tr><td></td><td>V1</td><td></td><td>7.6 - 8.0</td><td>Su=815/155 psf</td><td></td><td></td><td>4</td><td></td></tr><tr><td></td><td>V2</td><td></td><td>8.6 - 9.0</td><td>Su=545/80 psf</td><td></td><td></td><td>5</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>5</td><td></td></tr><tr><td>10</td><td>2D V3</td><td>24/24</td><td>10.0 - 12.0 10.6 - 11.0</td><td>Su=425/60 psf</td><td></td><td></td><td>WOH</td><td></td></tr><tr><td></td><td>V4</td><td></td><td>11.6 - 12.0</td><td>Su=350/60 psf</td><td></td><td></td><td>WOH</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>6</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>6</td><td></td></tr><tr><td>15</td><td>2U</td><td>24/24</td><td>15.0 - 17.0</td><td></td><td></td><td></td><td>5</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td><td></td></tr><tr><td></td><td>3D/A V5</td><td>24/17</td><td>17.0 - 19.0 17.6 - 18.0</td><td>WOR/WOR/3/10 Su=425/80 psf</td><td></td><td></td><td>15</td><td></td></tr><tr><td></td><td>MV</td><td></td><td>18.6 - 19.0</td><td></td><td></td><td></td><td>29</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>23</td><td></td></tr><tr><td>20</td><td>4D</td><td>24/14</td><td>20.0 - 22.0</td><td>2/3/2/7</td><td>5</td><td>7</td><td>30</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>37</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>49</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>50</td><td></td></tr><tr><td>25</td><td></td><td></td><td></td><td></td><td></td><td></td><td>54</td><td></td></tr></tbody></table>												Depth (ft.)	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Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)	0	1D/A	24/10	0.0 - 2.0	WOH/WOH/1/1			SSA	74.4	<p>Brown, wet, very soft, SILT, trace fine sand, organics/roots -TOPSOIL/ROOTMAT-(OL)</p> <p>Grey, wet, very soft, Silty CLAY, high plasticity -MARINE DEPOSIT-(CL)</p> <p>55x110mm vane raw torque readings: V1: 210/40 in-lbs V2: 140/20 in-lbs</p> <p>Grey, wet, soft to medium stiff, Silty CLAY, medium plasticity -MARINE DEPOSIT-(CL) 55x110mm vane raw torque readings: V3: 110/15 in-lbs V4: 90/15 in-lbs</p> <p>Similar to 2D -MARINE DEPOSIT-(CL) 55x110mm vane raw torque readings: V5: 110/20 in-lbs</p> <p>Grey, wet, loose to medium dense, fine to medium SAND, little silt, trace coarse sand, trace gravel, loosely bonded -GLACIAL TILL-(SP) Note: Attempted field vane shear test at 18.6 ft, no penetration.</p> <p>Grey, wet, medium stiff, SILT, little fine to medium sand, little gravel, trace coarse sand, moderately bonded -GLACIAL TILL-(ML)</p>	C#IP-2 CU#2 Su=554psf LL=36 PL=18 PI=18 WC=32.7 CL																												5	1U	24/24	5.0 - 7.0				3			V1		7.6 - 8.0	Su=815/155 psf			4			V2		8.6 - 9.0	Su=545/80 psf			5									5		10	2D V3	24/24	10.0 - 12.0 10.6 - 11.0	Su=425/60 psf			WOH			V4		11.6 - 12.0	Su=350/60 psf			WOH									1									6									6		15	2U	24/24	15.0 - 17.0				5									3			3D/A V5	24/17	17.0 - 19.0 17.6 - 18.0	WOR/WOR/3/10 Su=425/80 psf			15			MV		18.6 - 19.0				29									23		20	4D	24/14	20.0 - 22.0	2/3/2/7	5	7	30									37									49									50		25							54	
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-202 WIN: 18915.00					
Driller: New England Boring Contractors			Elevation (ft.): 74.5		Auger ID/OD: --						
Operator: M. Porter			Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID						
Logged By: J. Fletcher			Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#						
Date Start/Finish: 10-27-2020/10-27-2020			Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID						
Boring Location: Sta. 140+27.6, 19.5 RT			Casing ID/OD: HW-4.0 in. ID		Water Level*: Artesian						
Hammer Efficiency Factor: 0.852			Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>								
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt											
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Depth (ft.)	Sample Information							Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows				Elevation (ft.)
25	5D	8/3	25.0 - 25.7	36/50(2")			207	49.5		Grey, wet, very dense, Silty fine to medium SAND, little gravel, moderately bonded -GLACIAL TILL-(SM)	
							109				
							154				
							168				
							184				
30	6D	24/14	30.0 - 32.0	8/6/6/6	12	17	HW	44.5		Grey-brown, wet, stiff, SILT, trace fine to coarse sand, trace gravel, well bonded -GLACIAL TILL-(ML)	
							131				
							195				
							235				
							90				
35	R1	48/-	35.0 - 39.0				NQ CORE	39.9		Note: Boulder and cobbles encountered from 34.6 to 39.0 ft. Boulder from 35.0 to 35.7; cobbles from 35.7 to 39.0 ft, largest cobble approximately 0.3 ft. R1 Core Times (min:sec): 35.0-36.0' (3:13); 36.0-37.0' (4:21); 37.0-38.0' (3:29); 38.0-39.0' (4:31) -COBBLES/BOULDERS-	
40	7D	2/2	40.0 - 40.2	50(2")				34.5		Grey, wet, very dense, Gravelly fine to coarse SAND, little silt, loosely bonded -GLACIAL TILL-(SW-SM)	
							149				
							158				
							183				
							188				
45	8D	1/1	45.0 - 45.1	103(1")				29.5		Grey, wet, very dense, medium to coarse SAND, little fine sand and gravel, loosely bonded -GLACIAL TILL-(SW)	
							201				
							276				
							275				
							321				
50								407			
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 2 of 4 Boring No.: BB-BEB-202	
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-202 WIN: 18915.00					
Driller: New England Boring Contractors			Elevation (ft.): 74.5		Auger ID/OD: --						
Operator: M. Porter			Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID						
Logged By: J. Fletcher			Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#						
Date Start/Finish: 10-27-2020/10-27-2020			Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID						
Boring Location: Sta. 140+27.6, 19.5 RT			Casing ID/OD: HW-4.0 in. ID		Water Level*: Artesian						
Hammer Efficiency Factor: 0.852 <small> Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt </small>				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/> <small> R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person </small>				<small> S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{u(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test </small>			
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
50	9D	2/2	50.0 - 50.2	108(2")			439	24.4		Similar to 8D, weathered rock at 50.0 ft Dark grey, wet, very dense, GRAVEL, well bonded -WEATHERED BEDROCK-(GP) Top of Bedrock El. 19.5 R2: Grey, aphanitic, SILTSTONE, moderately hard, fresh to slightly weathered. Joints dipping at steep and low angles, close to moderate spacing, tight to open, rough, planar. Rock Quality=Very Poor Recovery=63% -BREWER FORMATION- R2 Core Times (min:sec): 55.0-56.0' (2:00); 56.0-57.0' (2:16); 57.0-58.0' (2:37); 58.0-58.6' (1:26) R3: Grey, aphanitic, SILTSTONE, moderately hard, fresh to slightly weathered, highly fractured throughout. Rock Quality=Very Poor Recovery=58% -BREWER FORMATION- R3 Core Times (min:sec): 58.6-59.9' (1:41) R4: Similar to R3. Rock Quality=Very Poor Recovery=75% -BREWER FORMATION- R4 Core Times (min:sec): 59.9-60.9' (2:03); 60.9-61.9' (3:46) R5: Grey, aphanitic, SILTSTONE, moderately hard, slightly to moderately weathered. Joints steep angle, moderate spacing, smooth, rough, planar, tight to open, calcite veins. Secondary horizontal to low angle joints, close, tight to open. Rock Quality=Fair Recovery=92% -BREWER FORMATION- R5 Core Times (min:sec): 61.9-62.9' (2:42); 62.9-63.9' (3:24) R6: Similar to R5. Rock Quality=Fair Recovery=114% Note: R6 recovery and RQD includes portions of previous core runs not initially recovered. -BREWER FORMATION- R6 Core Times (min:sec): 63.9-64.9' (2:07); 64.9-65.9' (2:44); 65.9-66.7 (2:52) R7: Similar to R6, 1-in. diameter quartz intrusion. Rock Quality=Fair Recovery=116% Note: R7 recovery and RQD includes portions of previous core runs not initially recovered. -BREWER FORMATION-	
55	10D	1/1	55.0 - 55.1	100(1")				19.5			
	R2	43.2/27	55.0 - 58.6	RQD = 16%			NQ CORE				
	R3	15.6/9	58.6 - 59.9	RQD = 0%							
	R4	24/18	59.9 - 61.9	RQD = 0%							
60											
	R5	24/22	61.9 - 63.9	RQD = 58%							
	R6	33.6/38	63.9 - 66.7	RQD = 62%							
65											
	R7	24/28	66.7 - 68.7	RQD = 54%							
70											
75											
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-203 WIN: 18915.00														
Driller: New England Boring Contractors			Elevation (ft.): 76.0		Auger ID/OD: --															
Operator: M. Porter			Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID															
Logged By: J. Fletcher			Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#/16															
Date Start/Finish: 01-14-2021/01-14-2021			Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID															
Boring Location: Sta. 141+52.6, 52.1 LT			Casing ID/OD: HW-4.0 in. ID		Water Level*: Artesian															
Hammer Efficiency Factor: 0.852			Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>																	
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0	ID	24/1	0.0 - 2.0	WOR/WOR/WOR/ WOR			SSA			Grey, wet, very soft, Silty CLAY, low plasticity -MARINE DEPOSIT-(CL)										
5	2D	24/17	5.0 - 7.0	3/4/5/5	9	13	12						Grey-brown mottled, wet, stiff, Silty CLAY, trace sand, trace organics, low plasticity -MARINE DEPOSIT-(CL)							
							19													
							28													
							27													
							25													
10	3D MV	24/24	10.0 - 12.0 10.6 - 11.0	WOH/WOH/WOH/ WOH			34									Grey, wet, very soft, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL) Note: Attempted field vane shear test, no penetration.				
							24													
							22													
							16													
							10													
15	4D V1	24/24	15.0 - 17.0 15.6 - 16.0	Su=375/45 psf			2												Grey, wet, soft, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL) 55x110 mm vane raw torque readings: V1: 8/1 ft-lbs V2: 8/1 ft-lbs	
	V2		16.6 - 17.0	Su=375/45 psf			1													
							WOR													
							1													
							2													
20	5D/A V3	24/24	20.0 - 22.0 20.6 - 21.0	WOR/WOR/WOR/3 Su=280/45 psf			6			Grey, wet, soft, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL) 55x110 mm vane raw torque readings: V3: 6/1 ft-lbs Note: Attempted field vane shear test, no penetration.										
	MV		21.6 - 22.0				9													
							25													
							18													
							10													
25													Grey, wet, soft, Silty CLAY, some gravel, trace sand -GLACIAL TILL-(CL)							
Remarks:																				
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.																				
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.																				

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-203 WIN: 18915.00						
Driller: New England Boring Contractors				Elevation (ft.): 76.0				Auger ID/OD: --						
Operator: M. Porter				Datum: NAVD 88				Sampler: Split Spoon 1.375 in. ID						
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track				Hammer Wt./Fall: SS-140#/30; HW-300#/16						
Date Start/Finish: 01-14-2021/01-14-2021				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID						
Boring Location: Sta. 141+52.6, 52.1 LT				Casing ID/OD: HW-4.0 in. ID				Water Level*: Artesian						
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>										
<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt </div> <div> R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person </div> <div> S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{u(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected </div> <div> T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test </div> </div>														
Depth (ft.)	Sample Information								Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.		
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows							
25	6D	24/6	25.0 - 27.0	14/7/9/12	16	23	24	51.0		Grey, wet, medium dense, fine SAND, little gravel, little silt, trace medium to coarse sand, moderately bonded -GLACIAL TILL-(SP)				
							31							
							33							
							30							
							30							
30							29							
							51							
							26							
							30							
							68							
35	7D	24/15	35.0 - 37.0	34/42/22/32	64	91	32						Grey, wet, very dense, fine SAND, some gravel, trace medium to coarse sand, trace silt, moderately bonded -GLACIAL TILL-(GP)	
							32							
							26							
							29							
							30							
40							83							
							161							
							129							
							201							
							225							
45	8D	2/1	45.0 - 45.2	52(2")			RC	31.0			Grey, wet, very dense, GRAVEL, some fine to medium sand, trace silt, well graded, loosely bonded -GLACIAL TILL-(GP)			
50														
Remarks:														
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 2 of 3				
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: BB-BEB-203				

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS						Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine			Boring No.: BB-BEB-203 WIN: 18915.00																																																																																																																																																																																																																																																																		
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Boring Location: Sta. 141+52.6, 52.1 LT				Casing ID/OD: HW-4.0 in. ID			Water Level*: Artesian																																																																																																																																																																																																																																																																				
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-204 WIN: 18915.00			
Driller: New England Boring Contractors		Elevation (ft.): 76.7		Auger ID/OD: --					
Operator: M. Porter		Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID					
Logged By: J. Fletcher		Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#/16					
Date Start/Finish: 01-06-2021/01-06-2021		Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID					
Boring Location: Sta. 141+47.7, 25.6 RT		Casing ID/OD: HW-4.0 in. ID		Water Level*: Artesian					
Hammer Efficiency Factor: 0.852		Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _u (lab) = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test									
Depth (ft.)	Sample Information							Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows		
0	1D	24/7	0.0 - 2.0	WOR/4/4/2	8	11	SSA	Grey-brown mottled, moist, medium stiff, Silty CLAY, low plasticity (0.5 in. frost) -MARINE DEPOSIT-(CL)	LL=34 PL=18 PI=16 WC=29.3 CL
5	1U	24/21.6	5.0 - 7.0				9	Grey-brown mottled, wet, very soft, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL)	
	2D MV	24/24	7.0 - 9.0 7.6 - 8.0	WOR/WOR/WOR/2			19	Grey-brown mottled, wet, very soft, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL) Note: Attempted field vane shear test, no penetration.	
							21		
10	2U	24/12	10.0 - 12.0				34		
							HW		
	3D V1 V2	24/24	12.0 - 14.0 12.6 - 13.0 13.6 - 14.0	Su=465/45 psf Su=420/45 psf			13 12	Grey, wet, soft, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL) 55x110 mm vane raw torque readings: V1: 10/1 ft-lbs V2: 9/1 ft-lbs	
15	4D/A	24/17	15.0 - 17.0	WOR/3/4/3	7	10	10	Similar to 3D, except stiff -MARINE DEPOSIT-(CL)	
							39		
							35		
20							34	Grey, wet, medium stiff, Silty CLAY, little gravel, little fine sand, loosely bonded -GLACIAL TILL-(CL)	
							93		
							162		
25								Bottom of Exploration at 20.0 feet below ground surface. Note: Terminate boring, casing broke off in borehole. Move boring location and drill BB-BEB-204A.	

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: BB-BEB-204

[illegible]

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS						Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: BB-BEB-204A WIN: 18915.00	
Driller: New England Boring Contractors				Elevation (ft.): 76.6		Auger ID/OD: --			
Operator: M. Porter				Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID			
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#/16			
Date Start/Finish: 01-07-2021/01-07-2021				Drilling Method: SSA/HW Drive		Core Barrel: NQ-2.0 in. ID			
Boring Location: Sta. 141+47.7, 23.3 RT				Casing ID/OD: HW-4.0 in. ID		Water Level*: 0.4 ft			
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>					
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person		Su = Peak/Remolded Field Vane Undrained Shear Strength (psf) Su(lab) = Lab Vane Undrained Shear Strength (psf) qp = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N60 = SPT N-uncorrected Corrected for Hammer Efficiency N60 = (Hammer Efficiency Factor/60%)*N-uncorrected		Tv = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test	
Sample Information									
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N60	Casing Blows	Elevation (ft.)	Laboratory Testing Results/ AASHTO and Unified Class.
25	1D	24/11	25.0 - 27.0	14/15/16/16	31	44	34	51.6	Grey, wet, hard, SILT, some fine sand, little gravel, moderately bonded -GLACIAL TILL-(ML)
							26		
							24		
							28		
							49		
30	2D	24/3	30.0 - 32.0	13/14/17/17	31	44	NW		Grey, wet, hard, SILT, some gravel, trace fine sand, moderately bonded -GLACIAL TILL-(ML) Note: Spin NW casing from 30.0 to 79.8 ft.
35	3D	24/15	35.0 - 37.0	12/14/18/20	32	45			Grey, wet, hard, SILT, little fine sand, little gravel, well bonded -GLACIAL TILL-(ML) Note: Casing broke off in borehole. Advanced casing retriever, removed casing and redrilled boring.
40									
45	4D	24/17	42.0 - 44.0	20/22/23/32	45	64		34.6	Grey-brown, wet, very dense, GRAVEL, some silt, trace fine to medium sand, well bonded -GLACIAL TILL-(GP)
50									
Remarks:									
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.									
Page 2 of 4									
Boring No.: BB-BEB-204A									

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-204A WIN: 18915.00							
Driller: New England Boring Contractors				Elevation (ft.): 76.6				Auger ID/OD: --							
Operator: M. Porter				Datum: NAVD 88				Sampler: Split Spoon 1.375 in. ID							
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track				Hammer Wt./Fall: SS-140#/30; HW-300#/16							
Date Start/Finish: 01-07-2021/01-07-2021				Drilling Method: SSA/HW Drive				Core Barrel: NQ-2.0 in. ID							
Boring Location: Sta. 141+47.7, 23.3 RT				Casing ID/OD: HW-4.0 in. ID				Water Level*: 0.4 ft							
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>											
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person				S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _{u(lab)} = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected				T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test			
Depth (ft.)	Sample Information									Graphic Log	Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.			
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)							
50	5D	6/5	50.0 - 50.5	101(6")			NW			Grey-brown, wet, very dense, GRAVEL, little sand, little silt, moderately to well bonded -GLACIAL TILL-(GP)					
55	6D	8/7	55.0 - 55.7	44/50(2")											
60	7D	2/1	60.0 - 60.2	51(2")											
65	8D	4/1	65.0 - 65.3	53(4")											
70	9D	7/5	70.0 - 70.6	69/50(1")				6.6							
75															
Remarks:															
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.															
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.															

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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector		Boring No.: BB-BEB-205		
				Location: Brewer and Eddington, Maine		WIN: 18915.00		
Driller: New England Boring Contractors		Elevation (ft.): 77.4		Auger ID/OD: --				
Operator: M. Porter		Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID				
Logged By: J. Fletcher		Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#/16				
Date Start/Finish: 01-12-2021/01-13-2021		Drilling Method: SSA/HW Drive		Core Barrel: --				
Boring Location: Sta. 141+57.2, 46.6 RT		Casing ID/OD: HW-4.0 in. ID		Water Level*: Artesian				
Hammer Efficiency Factor: 0.852		Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>						
<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> <p>Definitions:</p> <p>D = Split Spoon Sample</p> <p>MD = Unsuccessful Split Spoon Sample Attempt</p> <p>U = Thin Wall Tube Sample</p> <p>MU = Unsuccessful Thin Wall Tube Sample Attempt</p> <p>V = Field Vane Shear Test, PP = Pocket Penetrometer</p> <p>MV = Unsuccessful Field Vane Shear Test Attempt</p> </div> <div> <p>R = Rock Core Sample</p> <p>SSA = Solid Stem Auger</p> <p>HSA = Hollow Stem Auger</p> <p>RC = Roller Cone</p> <p>WOH = Weight of 140lb. Hammer</p> <p>WOR/C = Weight of Rods or Casing</p> <p>WO1P = Weight of One Person</p> </div> <div> <p>S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)</p> <p>S_{u(lab)} = Lab Vane Undrained Shear Strength (psf)</p> <p>q_p = Unconfined Compressive Strength (ksf)</p> <p>N-uncorrected = Raw Field SPT N-value</p> <p>Hammer Efficiency Factor = Rig Specific Annual Calibration Value</p> <p>N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency</p> <p>N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected</p> </div> <div> <p>T_v = Pocket Torvane Shear Strength (psf)</p> <p>WC = Water Content, percent</p> <p>LL = Liquid Limit</p> <p>PL = Plastic Limit</p> <p>PI = Plasticity Index</p> <p>G = Grain Size Analysis</p> <p>C = Consolidation Test</p> </div> </div>								
Depth (ft.)	Sample Information							
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)
0	1D	24/8	0.0 - 2.0	WOR/1/2/4	3	4	SSA	76.9
5								
5	2D	24/24	5.0 - 7.0	1/3/2/3	5	7	16	
10								
10	1U	24/22.5	10.0 - 12.0				28	
15							22	
	3D	24/24	12.0 - 14.0	Su=420/45 psf			17	
20			12.6 - 13.0					
	V1		13.6 - 14.0	Su=515/95 psf			29	
25							38	
15	4D	24/5	15.0 - 17.0	11/9/10/6	19	27	38	62.7
20							45	
							56	
							43	
							96	
20	5D	24/6	20.0 - 22.0	24/14/14/13	28	40	63	57.4
25							65	
							89	
							65	
							90	
<div style="display: flex;"> <div style="flex: 1; border-right: 1px solid black; padding-right: 5px;"> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Graphic Log</p> </div> <div style="flex: 2; padding: 5px;"> <p>Visual Description and Remarks</p> <p>Brown, moist, very soft, SILT, trace fine sand (1 in. frost) -TOPSOIL-(OL)</p> <p>Grey-brown, moist, soft, Silty CLAY, low plasticity -MARINE DEPOSIT-(CL)</p> <p>Grey, trace brown, wet, medium stiff, Silty CLAY, high plasticity -MARINE DEPOSIT-(CL)</p> <p>Grey, wet, soft to medium stiff, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL)</p> <p>55x110 mm vane raw torque readings: V1: 9/1 ft-lbs V2: 11/2 ft-lbs</p> <p>Grey, wet, medium dense, GRAVEL, some medium to coarse sand, trace fine sand and silt, moderately bonded -GLACIAL TILL-(GW)</p> <p>Grey, wet, hard, SILT, some gravel, some fine to medium sand, trace coarse sand, well bonded -GLACIAL TILL-(ML)</p> </div> <div style="flex: 0.5; border-left: 1px solid black; padding-left: 5px; text-align: center;"> <p>Laboratory Testing Results/AASHTO and Unified Class.</p> <p>C#IP-1 CU#1 Su=426psf LL=34 PL=18 PI=16 WC=36.8 CL</p> </div> </div>								
Remarks:								
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.							Page 1 of 4	
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.							Boring No.: BB-BEB-205	


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60	9D	1/1	60.0 - 60.1	50(1")						No Recovery, very dense																																																																																																																																																																																																																																																																																																																			
70	10D	1/1	70.0 - 70.1	50(1")			RC	6.5		Brown-grey, wet, very dense, GRAVEL -GLACIAL TILL-(GP) Note: Top of probable bedrock at 70.9 ft based on drill action. Top of Probable Bedrock at El. 6.5 Note: Drill wash water return contained silt and sand. Advanced roller bit to 75.0 ft to confirm bedrock. -PROBABLE BEDROCK-																																																																																																																																																																																																																																																																																																																			
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: BB-BEB-205 WIN: 18915.00									
Driller: New England Boring Contractors				Elevation (ft.) 77.4				Auger ID/OD: --									
Operator: M. Porter				Datum: NAVD 88				Sampler: Split Spoon 1.375 in. ID									
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track				Hammer Wt./Fall: SS-140#/30; HW-300#/#									
Date Start/Finish: 01-12-2021/01-13-2021				Drilling Method: SSA/HW Drive				Core Barrel: --									
Boring Location: Sta. 141+57.2, 46.6 RT				Casing ID/OD: HW-4.0 in. ID				Water Level*: Artesian									
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>													
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt				R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140 lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person				Su = Peak/Remolded Field Vane Undrained Shear Strength (psf) Su(lab) = Lab Vane Undrained Shear Strength (psf) qp = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N60 = SPT N-uncorrected Corrected for Hammer Efficiency N60 = (Hammer Efficiency Factor/60%)*N-uncorrected				Tv = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test					
Sample Information												Graphic Log		Visual Description and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows ((6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N60	Casing Blows	Elevation (ft.)									
75								2.4	Bottom of Exploration at 75.0 feet below ground surface.								
80																	
85																	
90																	
95																	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine				Boring No.: HB-BE-221 WIN: 18915.00																																																																																																																																																																																																																																																																																																																							
Driller: New England Boring Contractors				Elevation (ft.): 77.7				Auger ID/OD: --																																																																																																																																																																																																																																																																																																																							
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Date Start/Finish: 10-29-2020/10-29-2020				Drilling Method: SSA/HW Drive				Core Barrel: --																																																																																																																																																																																																																																																																																																																							
Boring Location: Sta. 139+34.3, 2.8 RT				Casing ID/OD: HW-4.0 in. ID				Water Level*: 3.7 ft																																																																																																																																																																																																																																																																																																																							
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>																																																																																																																																																																																																																																																																																																																											
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Shear Strength (psf) or RQD (%)</th><th>N-uncorrected</th><th>N₆₀</th><th>Casing Blows</th><th>Elevation (ft.)</th></tr><tr><td>0</td><td>1D</td><td>24/13</td><td>0.0 - 2.0</td><td>WOH/1/2/3</td><td>3</td><td>4</td><td>SSA</td><td>77.6</td><td rowspan="10"></td><td>Brown, moist, very soft, SILT, trace fine sand, organics -TOPSOIL/ROOTMAT-(OL)</td><td rowspan="10"></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Grey-brown mottled, moist, soft, Silty CLAY -MARINE DEPOSIT-(CL)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td>2D/A</td><td>24/22</td><td>5.0 - 7.0</td><td>2/3/3/10</td><td>6</td><td>9</td><td>23</td><td>72.4</td><td>Similar to 1DB</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Similar to above except grey, stiff CLAY -MARINE DEPOSIT-(CL) Note: Sand seam at transition.</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>70.8</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Grey, moist, loose, fine SAND, some silt, trace gravel, loosely bonded -GLACIAL TILL-(SM)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>42</td><td></td></tr><tr><td>10</td><td>3D</td><td>24/3</td><td>10.0 - 12.0</td><td>8/6/7/10</td><td>13</td><td>18</td><td>56</td><td>67.7</td><td>Grey, wet, medium dense, Silty GRAVEL, little fine to coarse sand, loosely bonded -GLACIAL TILL-(GM)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>15</td><td>4D</td><td>24/14</td><td>15.0 - 17.0</td><td>14/15/13/14</td><td>28</td><td>40</td><td></td><td>62.7</td><td>Grey, wet, dense, fine to medium SAND, some silt, some gravel, trace coarse sand, moderately bonded -GLACIAL TILL-(SM)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>25</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>												Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)	0	1D	24/13	0.0 - 2.0	WOH/1/2/3	3	4	SSA	77.6		Brown, moist, very soft, SILT, trace fine sand, organics -TOPSOIL/ROOTMAT-(OL)											Grey-brown mottled, moist, soft, Silty CLAY -MARINE DEPOSIT-(CL)																															5	2D/A	24/22	5.0 - 7.0	2/3/3/10	6	9	23	72.4	Similar to 1DB										Similar to above except grey, stiff CLAY -MARINE DEPOSIT-(CL) Note: Sand seam at transition.									70.8											Grey, moist, loose, fine SAND, some silt, trace gravel, loosely bonded -GLACIAL TILL-(SM)									42		10	3D	24/3	10.0 - 12.0	8/6/7/10	13	18	56	67.7	Grey, wet, medium dense, Silty GRAVEL, little fine to coarse sand, loosely bonded -GLACIAL TILL-(GM)																																																			15	4D	24/14	15.0 - 17.0	14/15/13/14	28	40		62.7	Grey, wet, dense, fine to medium SAND, some silt, some gravel, trace coarse sand, moderately bonded -GLACIAL TILL-(SM)																																																			20																																																							25										
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* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-BE-221																																																																																																																																																																																																																																																																																																																					

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/I-395 Connector Location: Brewer and Eddington, Maine		Boring No.: HB-BE-222 WIN: 18915.00			
Driller: New England Boring Contractors		Elevation (ft.): 76.5		Auger ID/OD: --					
Operator: M. Porter		Datum: NAVD 88		Sampler: Split Spoon 1.375 in. ID					
Logged By: J. Fletcher		Rig Type: Mobile B-53 Track		Hammer Wt./Fall: SS-140#/30; HW-300#/16					
Date Start/Finish: 01-14-2021/01-15-2021		Drilling Method: SSA/HW Drive		Core Barrel: --					
Boring Location: Sta. 141+92.6, 5.5 LT		Casing ID/OD: HW-4.0 in. ID		Water Level*: 9.6 ft					
Hammer Efficiency Factor: 0.852		Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>							
<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div> <p>Definitions:</p> <p>D = Split Spoon Sample</p> <p>MD = Unsuccessful Split Spoon Sample Attempt</p> <p>U = Thin Wall Tube Sample</p> <p>MU = Unsuccessful Thin Wall Tube Sample Attempt</p> <p>V = Field Vane Shear Test, PP = Pocket Penetrometer</p> <p>MV = Unsuccessful Field Vane Shear Test Attempt</p> </div> <div> <p>R = Rock Core Sample</p> <p>SSA = Solid Stem Auger</p> <p>HSA = Hollow Stem Auger</p> <p>RC = Roller Cone</p> <p>WOH = Weight of 140lb. Hammer</p> <p>WOR/C = Weight of Rods or Casing</p> <p>WO1P = Weight of One Person</p> </div> <div> <p>S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)</p> <p>S_{u(lab)} = Lab Vane Undrained Shear Strength (psf)</p> <p>q_p = Unconfined Compressive Strength (ksf)</p> <p>N-uncorrected = Raw Field SPT N-value</p> <p>Hammer Efficiency Factor = Rig Specific Annual Calibration Value</p> <p>N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency</p> <p>N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected</p> </div> <div> <p>T_v = Pocket Torvane Shear Strength (psf)</p> <p>WC = Water Content, percent</p> <p>LL = Liquid Limit</p> <p>PL = Plastic Limit</p> <p>PI = Plasticity Index</p> <p>G = Grain Size Analysis</p> <p>C = Consolidation Test</p> </div> </div>									
Depth (ft.)	Sample Information							Visual Description and Remarks	Laboratory Testing Results/AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows		
0	1D/A	24/6	0.0 - 2.0	2 1/2/4	3	4	SSA	76.3	<div style="display: flex;"> <div style="flex: 1;"> <p>Brown, moist, soft, SILT, trace sand, organics, 2 in. frost -TOPSOIL-(OL)</p> <p>Brown, moist, soft, Silty CLAY, low plasticity -MARINE DEPOSIT-(CL)</p> <p>Grey-brown mottled, moist, stiff, Silty CLAY, low plasticity -MARINE DEPOSIT-(CL)</p> <p>Note: Attempted field vane shear test, no penetration.</p> <p>Grey, wet, soft to medium stiff, Silty CLAY, high plasticity -MARINE DEPOSIT-(CL)</p> <p>55x110 mm vane raw torque readings: V1: 9/2 ft-lbs V2: 12/2 ft-lbs</p> <p>Grey, wet, soft to medium stiff, Silty CLAY, moderate plasticity -MARINE DEPOSIT-(CL)</p> <p>55x110 mm vane raw torque readings: V3: 8/1 ft-lbs V4: 11/2 ft-lbs</p> <p>Grey, wet, medium dense, fine SAND, some silt, little medium to coarse sand, loosely bonded -GLACIAL TILL-(SM)</p> </div> <div style="flex: 0.5; border-left: 1px solid black; border-right: 1px solid black; text-align: center;"> <p>Graphic Log</p> </div> </div>
5	2D MV	24/22	5.0 - 7.0 5.6 - 6.0	3/4/6/7	10	14	19		
							16		
							16		
							18		
							19		
10	3D V1	24/24	10.0 - 12.0 10.6 - 11.0	Push thru vane Su=420/95 psf			28		
	V2		11.6 - 12.0	Su=560/95 psf			18		
							18		
							17		
							16		
15	4D V3	24/24	15.0 - 17.0 15.6 - 16.0	Push thru vane Su=375/45 psf			17		
	V4		16.6 - 17.0	Su=515/95 psf			12		
							9		
							9		
							18		
20	5D	24/12	20.0 - 22.0	17/8/4/5	12	17	33	56.8	
							14		
							25		
							24		
25							58		
Remarks:									
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.								Page 1 of 2 Boring No.: HB-BE-222	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: Route 9/1-395 Connector Location: Brewer and Eddington, Maine				Boring No.: HB-BE-222 WIN: 18915.00					
Driller: New England Boring Contractors				Elevation (ft.) 76.5				Auger ID/OD: --					
Operator: M. Porter				Datum: NAVD 88				Sampler: Split Spoon 1.375 in. ID					
Logged By: J. Fletcher				Rig Type: Mobile B-53 Track				Hammer Wt./Fall: SS-140#/30; HW-300#/#					
Date Start/Finish: 01-14-2021/01-15-2021				Drilling Method: SSA/HW Drive				Core Barrel: --					
Boring Location: Sta. 141+92.6, 5.5 LT				Casing ID/OD: HW-4.0 in. ID				Water Level*: 9.6 ft					
Hammer Efficiency Factor: 0.852				Hammer Type: Automatic <input checked="" type="checkbox"/> Hydraulic <input type="checkbox"/> Rope & Cathead <input type="checkbox"/>									
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Sample Information													
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows ((6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N60	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.		
25	6D	24/2	25.0 - 27.0	15/11/13/14	24	34	HW	51.5		Grey, wet, dense, GRAVEL, some silty clay, trace fine to medium sand, well graded, moderately bonded -GLACIAL TILL-(GM) Note: Boulder/cobble from 27.2 to 28.2 ft.			
30	7D	1/1	30.4 - 30.5	50(1")				46.1 46.0		Grey, wet, very dense, GRAVEL, trace coarse sand, poorly graded -GLACIAL TILL-(GP) Bottom of Exploration at 30.5 feet below ground surface. No Refusal			
35													
40													
45													
50													
Remarks:													
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 2 of 2			
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-BE-222			

ROCK CORE PHOTOGRAPHS
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Top Row: BB-BEBT1-101, Run No. R1 31.0 (left) to 36.0 (right)-

Top Middle Row: BB-BEBT1-101, Run No. R2 36.0 (left) to 41.0 (right)

Bottom Middle Row: BB-BEB-101, Run No. R1 37.0 (left) to 42.8 (middle-left), Run No. R2 42.8 (middle-left) to 45.4 (middle right), Run No. R3 45.4 (middle-right) to 48.0 (right)

Bottom Row: BB-BEB-101, Run No. R4 48.0 (left) to 50.0 (middle), Run No. R5 50.0 (middle) to 52.0 (right)

Haley & Aldrich Inc.

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Top Row: HB-BE-146, Run No. R1 13.0 (left) to 15.2, Run No. R2 15.2 to 17.0, Run No. R3 17.0 to 21.0,
Run No. R4 21.0 to 22.0 (right)

Top Middle Row: HB-BE-149, Run No. R1 10.0 (left) to 14.9 (right)

Bottom Middle Row: BB-BEB-104, Run No. R1 60.0 (left) to 60.7 (middle), Run No. R2 60.7 (middle) to 65.6 (right)

Bottom Row: BB-BEB-104, Run No. R3 65.6 (left) to 70.6 (right)

**ROCK CORE PHOTOGRAPHS
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Top Row: BB-BEB-202, Run No. R2 55.0 (left) to 58.6 (middle-left), Run No. R3 58.6 (middle-left) to 59.9 (middle-right), Run No. R4 59.9 (middle-right) to 61.9 (right)

Top Middle Row: BB-BEB-202, Run No. R5 61.9 (left) to 63.9 (middle), Run No. R6 63.9 (middle) to 66.7 (right)

Bottom Middle Row: BB-BEB-202, Run No. R6 continued 63.9 (left) to 66.7 (middle-left), Run No. R7 66.7 (middle-left) to 68.7 (right)

Bottom Row: BB-BEB-201, Run No. R1 75.0 (left) to 77.5 (middle), Run No. R2 77.5 (middle) to 81.5 (page2)

ROCK CORE PHOTOGRAPHS
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Top Row: BB-BEB-201, Run No. R2 continued 77.5 (page1) to 81.5 (middle), Run No. R3 81.5 (middle) to 86.1 (right)
Top Middle Row: BB-BEB-201, Run No. R3 continued 81.5 (left) to 86.1 (middle); BB-BEBT1-202, Run No. R1 40.0 (middle) to 45.0 (right)
~~**Bottom Middle Row:** BB-BEBT1-201, Run No. R1 40.6 (left) to 42.9 (middle), Run No. R2 42.9 (middle) to 45.0 (right)~~
~~**Bottom Row:** BB-BEBT1-201, Run No. R2 continued 42.9 (left) to 45.0 (middle), Run No. R3 45.0 (middle) to 46.6 (right)~~

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~~Top Row: BB-ELAR-202, Run No. R2 13.5 (left) to 14.5 (right)~~
Top Middle Row: BB-BEB-204A, Run No. R1 80.1 (left) to 85.1 (right)
Bottom Middle Row: BB-BEB-204A, Run No. R2 85.1 (left) to 90.1 (right)
Bottom Row: BB-BEB-204A, Run No. R2 continued 85.1 (left) to 90.1 (right)

APPENDIX B

Cone Penetration Test Report

PRESENTATION OF SITE INVESTIGATION RESULTS

I-395 & Route 9 Connector Brewer & Eddington, Maine

Prepared for:

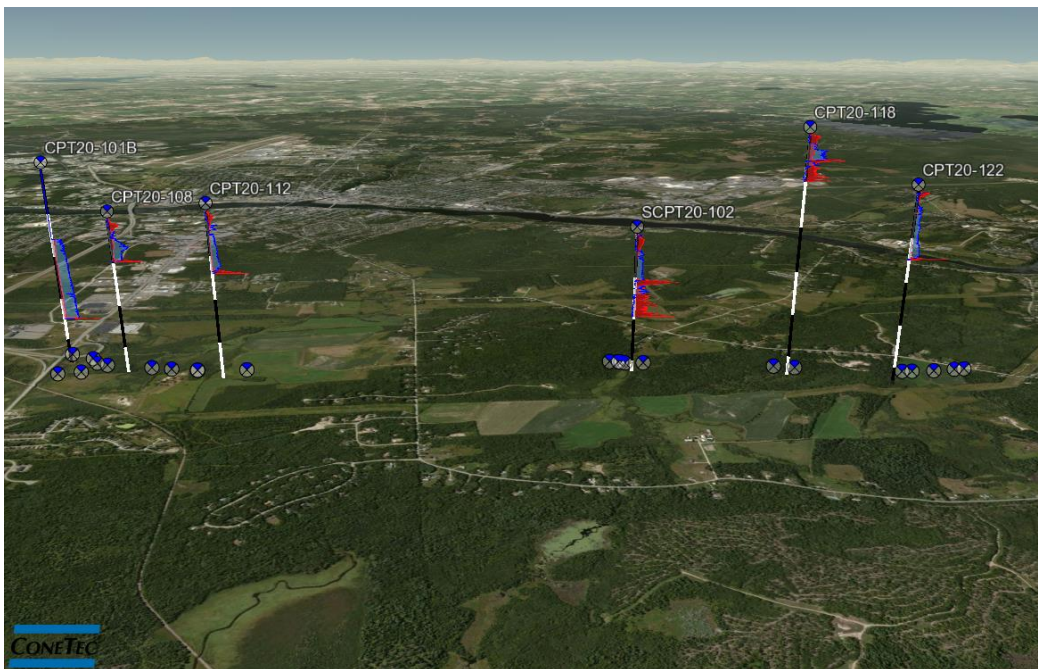
Haley & Aldrich

ConeTec Job No: 20-53-21525

Project Start Date: 26-Oct-2020

Project End Date: 2-Nov-2020

Report Date: 20-Nov-2020



Prepared by:

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Introduction

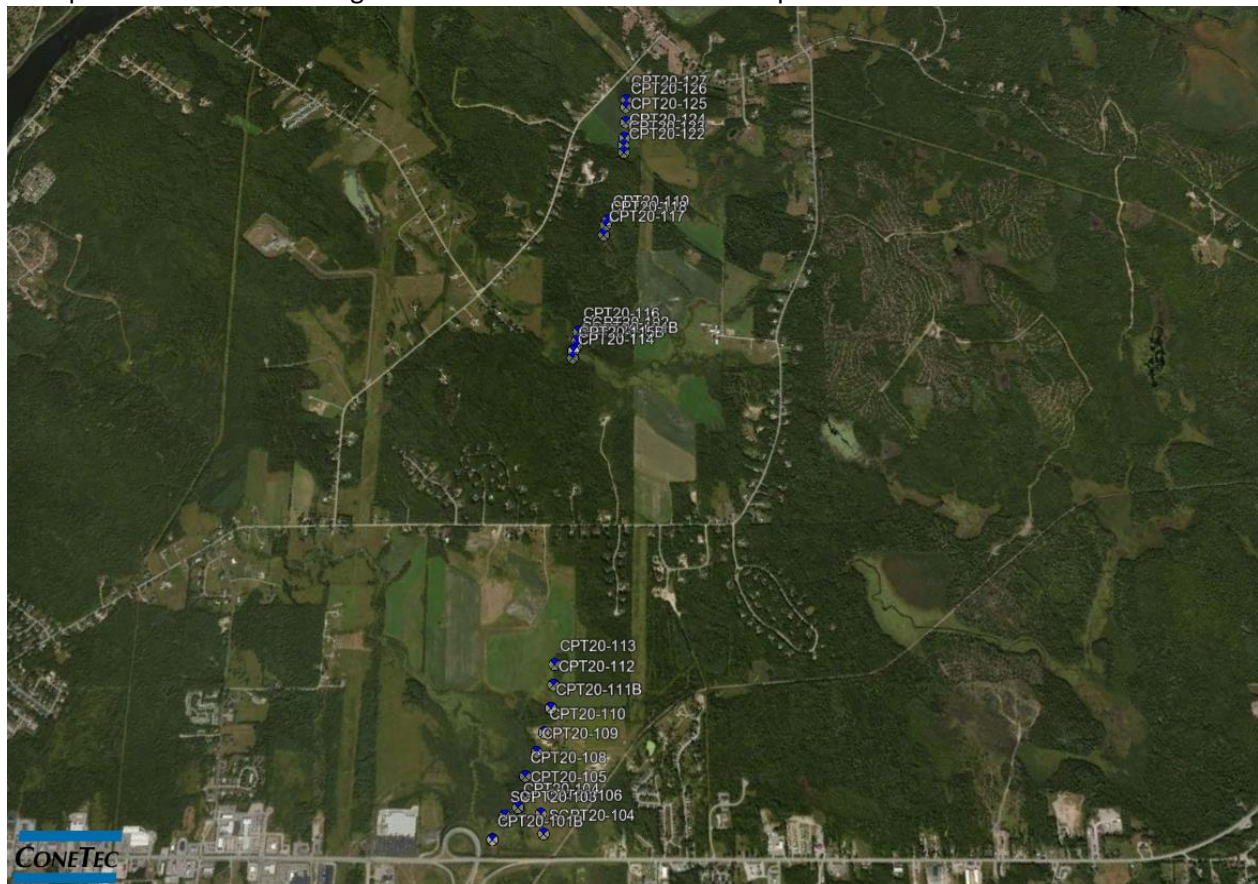
The enclosed report presents the results of a piezocone penetration testing (CPTu or CPT) and seismic piezocone penetration testing (SCPTu or SCPT) program carried out for the I-395 and Route 9 Connector located in Brewer and Eddington, Maine. The site investigation program was conducted by ConeTec Inc. (ConeTec), under contract to Haley & Aldrich of Portland, Maine.

A total of 25 cone penetration tests and 5 seismic cone penetration tests were completed at 26 locations (several locations were offset or drilled out and attempted again due to shallow refusal). The CPT and SCPT program was performed to evaluate the subsurface soil conditions. CPT and SCPT sounding locations were selected and numbered under supervision of Haley & Aldrich personnel (Dave Dearden).

Project Information

Project	
Client	Haley & Aldrich
Project	I-395 & Route 9 Connector, Brewer & Eddington, ME
ConeTec project number	20-53-21525

A map from CESIUM including the CPT and SCPT test locations is presented below.



Rig Description	Deployment System	Test Type
Mobile B51	Track mounted drill rig (single cylinder)	CPT and SCPT

Coordinates		
Test Type	Collection Method	EPSG Number
CPT and SCPT	GPS (Handheld)	WGS 84 / Lat and Long (Decimal Degrees)

Cone Penetration Test (CPT)	
Depth reference	Ground surface at the time of the investigation.
Tip and sleeve data offset	0.1 meter. This has been accounted for in the CPT data files.
Pore pressure dissipation (PPD) tests	Eight pore pressure dissipation tests were completed primarily to determine the phreatic surface and consolidation characteristics.
Additional plots	Advanced, Seismic and Soil Behavior Type (SBT) scatter plots are included in the data release package.

Cone Penetrometers Used for this Project						
Cone Description	Cone Number	Cross Sectional Area (cm ²)	Sleeve Area (cm ²)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
524:T375F10U500	524	15	225	375	10	500
Cone 524 was used for each sounding.						

Calculated Geotechnical Parameters Tables	
Additional information	<p>The Normalized Soil Behavior Type Chart based on Q_{tn} (SBT Q_{tn}) (Robertson, 2009) was used to classify the soil for this project. A detailed set of calculated CPT parameters have been generated and are provided in Excel format files in the release folder. The CPT parameter calculations are based on values of corrected tip resistance (q_t) sleeve friction (f_s) and pore pressure (u_2).</p> <p>Effective stresses are calculated based on unit weights that have been assigned to the individual soil behavior type zones and the assumed equilibrium pore pressure profile.</p> <p>Soils were classified as either drained or undrained based on the Q_{tn} Normalized Soil Behavior Type Chart (Robertson, 2009). Calculations for both drained and undrained parameters were included for materials that classified as silt mixtures (zone 4).</p>

Limitations

This report has been prepared for the exclusive use of Haley & Aldrich (Client) for the project titled "I-395 & Route 9 Connector, Brewer & Eddington, ME". The report's contents may not be relied upon by any other party without the express written permission of ConeTec. ConeTec has provided site investigation services, prepared the factual data reporting and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

Cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd., a subsidiary of ConeTec.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm² and 15 cm² tip base area configurations in order to maximize signal resolution for various soil conditions. The specific piezocone used for each test is described in the CPT summary table presented in the first appendix. The 15 cm² penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm² piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 mm diameter over a length of 32 mm with tapered leading and trailing edges) located at a distance of 585 mm above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u₂" position (ASTM Type 2). The filter is 6 mm thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meet or exceed those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

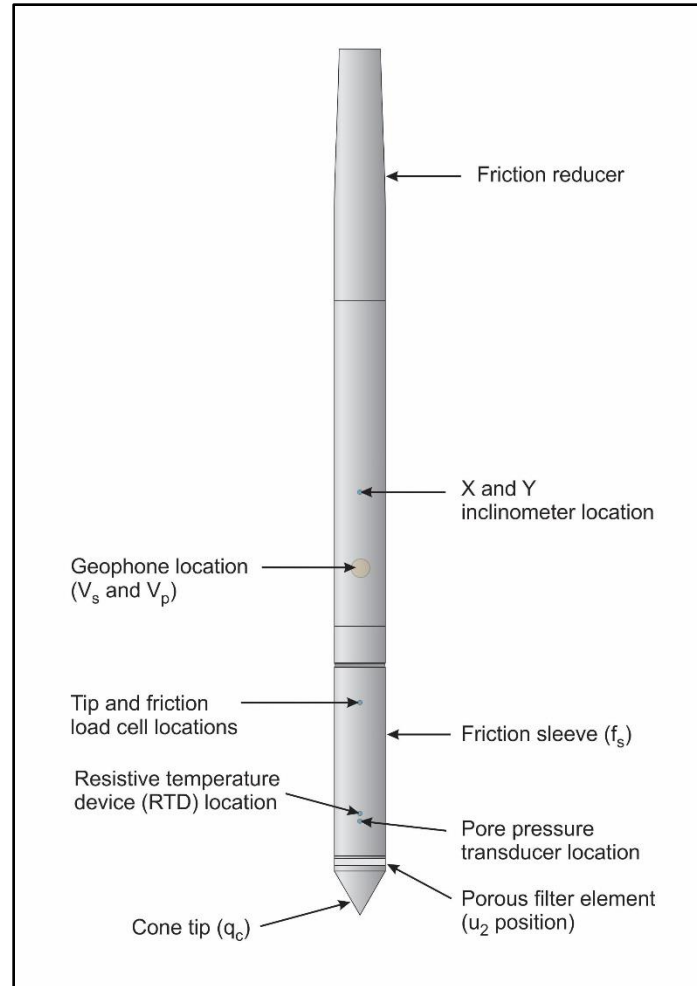


Figure CPTu. Piezocone Penetrometer (15 cm²)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a 16 bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording interval is 2.5 cm; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with either glycerin or silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of 2 cm/s, within acceptable tolerances. Typically one meter length rods with an outer diameter of 1.5 inches are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson et al. (1986) and Robertson (1990, 2009). It should be noted that it is not always possible to accurately identify a soil behavior based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behavior type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al. (1986):

$$q_t = q_c + (1-a) \cdot u_2$$

where: q_t is the corrected tip resistance

q_c is the recorded tip resistance

u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)

a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (R_f) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of files with calculated geotechnical parameters were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the methods used is also included in the data release folder.

For additional information on CPTu interpretations and calculated geotechnical parameters, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM, West Conshohocken, US.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, "Cone Penetration Testing in Geotechnical Practice", Blackie Academic and Professional.

Mayne, P.W., 2013, "Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests", Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420.

Mayne, P.W. and Peuchen, J., 2012, "Unit weight trends with cone resistance in soft to firm clays", Geotechnical and Geophysical Site Characterization 4, Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, "Interpretation of geotechnical parameters from seismic piezocone tests", CPT'14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, "Use of Piezometer Cone Data", Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, "Soil Classification Using the Cone Penetration Test", Canadian Geotechnical Journal, Volume 27: 151-158.

Robertson, P.K., 2009, "Interpretation of cone penetration tests – a unified approach", Canadian Geotechnical Journal, Volume 46: 1337-1355.

Shear wave velocity (V_s) testing is performed in conjunction with the piezocone penetration test (SCPTu) in order to collect interval velocities. For some projects seismic compression wave velocity (V_p) testing is also performed.

ConeTec's piezocone penetrometers are manufactured with a horizontally active geophone (28 hertz) that is rigidly mounted in the body of the cone penetrometer, 0.2 meters behind the cone tip.

Shear waves are typically generated by using an impact hammer horizontally striking a beam that is held in place by a normal load. In some instances an auger source or an imbedded impulsive source maybe used for both shear waves and compression waves. The hammer and beam act as a contact trigger that initiates the recording of the seismic wave traces. For impulsive devices an accelerometer trigger may be used. The traces are recorded using an up-hole integrated digital oscilloscope which is part of the SCPTu data acquisition system. An illustration of the shear wave testing configuration is presented in Figure SCPTu-1.

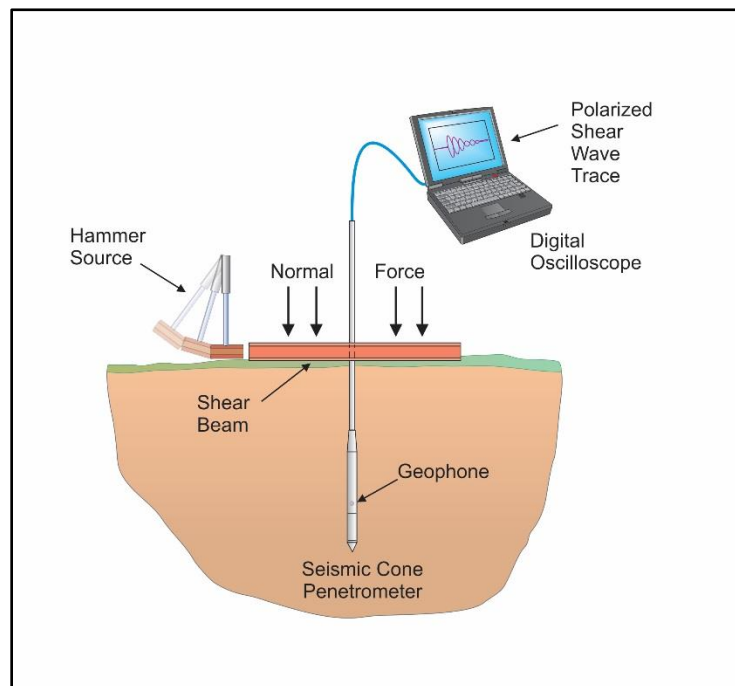


Figure SCPTu-1. Illustration of the SCPTu system

All testing is performed in accordance to ConeTec's SCPTu operating procedures which are in general accordance with the current ASTM 5778 and ASTM D7400 standards.

Prior to the start of a SCPTu sounding, the procedures described in the Cone Penetration Test section are followed. In addition, the active axis of the geophone is aligned parallel to the beam (or source) and the horizontal offset between the cone and the source is measured and recorded.

Prior to recording seismic waves at each test depth, cone penetration is stopped and the rods are decoupled from the rig to avoid transmission of rig energy down the rods. Typically, five wave traces for each orientation are recorded for quality control purposes and uncertainty analysis. After reviewing wave traces for consistency the cone is pushed to the next test depth (typically one meter intervals or as requested by the client). Figure SCPTu-2 presents an illustration of a SCPTu test.

For additional information on seismic cone penetration testing refer to Robertson et. al. (1986).

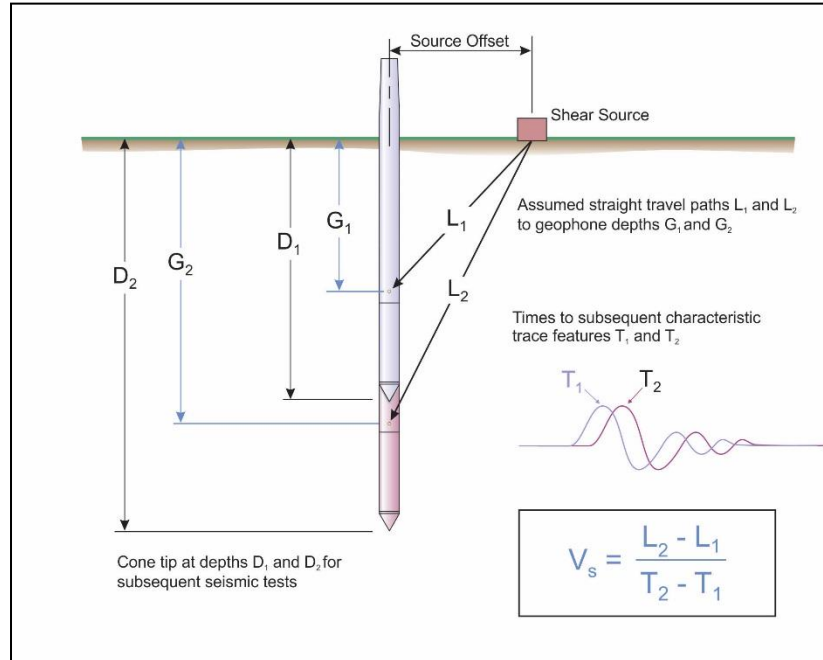


Figure SCPTu-2. Illustration of a seismic cone penetration test

Calculation of the interval velocities are performed by visually picking a common feature (e.g. the first characteristic peak, trough, or crossover) on all of the recorded wave sets and taking the difference in ray path divided by the time difference between subsequent features. Ray path is defined as the straight line distance from the seismic source to the geophone, accounting for beam offset, source depth and geophone offset from the cone tip.

For all SCPTu soundings that have achieved a depth of at least 100 feet (30 meters), the average shear wave velocity to a depth of 100 feet (\bar{v}_s) has been calculated using the following equation presented in ASCE (2010).

$$\bar{v}_s = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{v_{si}}}$$

where: \bar{v}_s = average shear wave velocity ft/s (m/s)
 d_i = the thickness of any layer between 0 and 100 ft (30 m)
 v_{si} = the shear wave velocity in ft/s (m/s)
 $\sum_{i=1}^n d_i = 100 \text{ ft (30 m)}$

Average shear wave velocity, \bar{v}_s is also referenced to V_{s100} or V_{s30} .

The layer travel times refers to the travel times propagating in the vertical direction, not the measured travel times from an offset source.

Tabular results and SCPTu plots are presented in the relevant appendix.

References

American Society of Civil Engineers (ASCE), 2010, "Minimum Design Loads for Buildings and Other Structures", Standard ASCE/SEI 7-10, American Society of Civil Engineers, ISBN 978-0-7844-1085-1, Reston, Virginia.

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM, West Conshohocken, US.

ASTM D7400-14, 2014, "Standard Test Methods for Downhole Seismic Testing", ASTM, West Conshohocken, US.

Robertson, P.K., Campanella, R.G., Gillespie D and Rice, A., 1986, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8: 791-803.

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

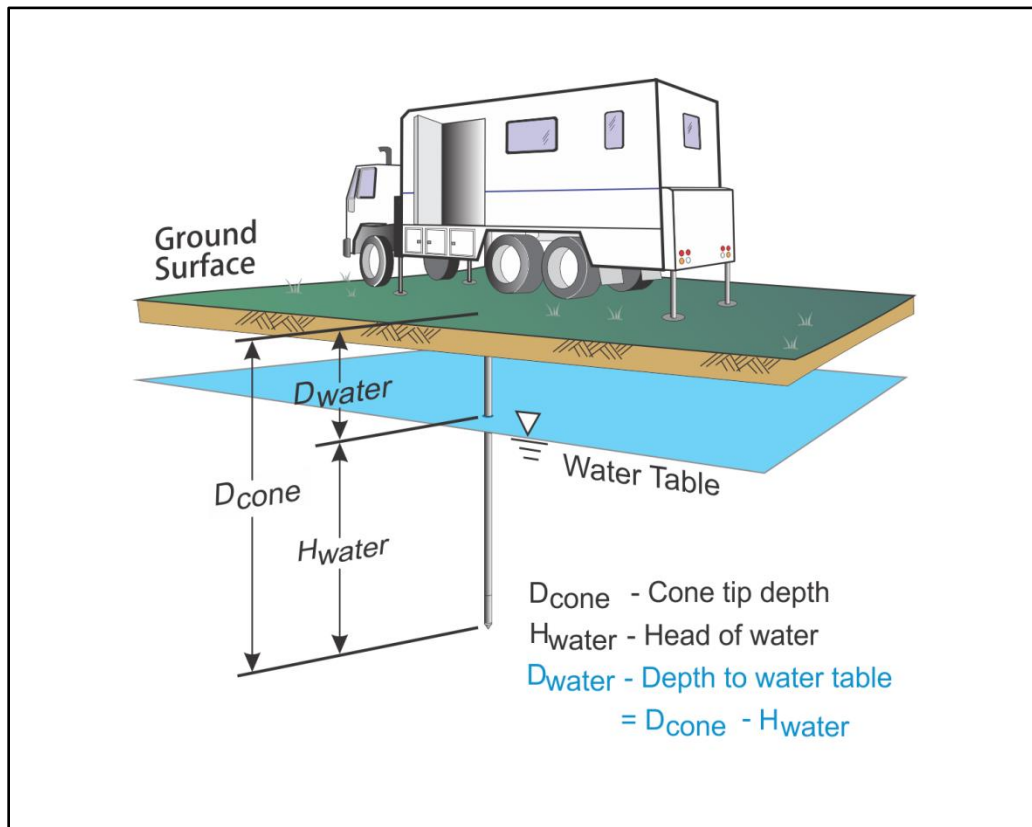


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behavior.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

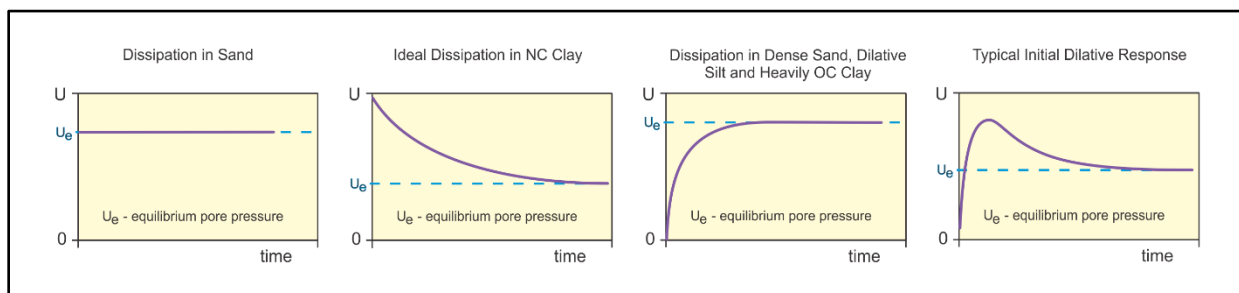


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve in Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100} . In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100} . A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T^*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

- T^* is the dimensionless time factor (Table Time Factor)
 a is the radius of the cone
 I_r is the rigidity index
 t is the time at the degree of consolidation

Table Time Factor. T^* versus degree of dissipation (Teh and Houlsby (1991))

Degree of Dissipation (%)	20	30	40	50	60	70	80
$T^* (u_2)$	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50} , dissipation tests must be taken to a pressure less than u_{50} . The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100} . To estimate u_{50} , both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby (1991)), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50} . In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r , the equilibrium pore pressure and the effect of an initial dilatatory response on calculating t_{50} , other methods should be applied to confirm the results for c_h .

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

References

Burns, S.E. and Mayne, P.W., 1998, "Monotonic and dilatatory pore pressure decay during piezocone tests", Canadian Geotechnical Journal 26 (4): 1063-1073.

Burns, S.E. and Mayne, P.W., 2002, "Analytical cavity expansion-critical state model cone dissipation in fine-grained soils", Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, "The piezometer probe: a useful investigation tool", Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, "Estimating coefficient of consolidation from piezocone tests", Canadian Geotechnical Journal, 29(4): 551-557.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, "An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils", Canadian Geotechnical Journal, 36(2): 369-381.

Teh, C.I., and Houlsby, G.T., 1991, "An analytical study of the cone penetration test in clay", Geotechnique, 41(1): 17-34.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Advanced Cone Penetration Test Plots with I_c , $S_u(N_{kt})$, Φ and $N1(60)I_c$
- Seismic Cone Penetration Test Plots
- Seismic Cone Penetration Test Shear Wave (V_s) Traces
- Seismic Cone Penetration Test Tabular Results
- Soil Behavior Type (SBT) Scatter Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Start Date: 26-Oct-2020
End Date: 02-Nov-2020

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface ¹ (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Latitude ² (°)	Longitude ² (°)	Refer to Notation Number
CPT20-101	20-53-21525_CP101	01-Nov-2020	524:T375F10U500		1.97		44.77144	-68.72026	5
CPT20-101B	20-53-21525_CP101B	02-Nov-2020	524:T375F10U500	17.0	57.17		44.77142	-68.72029	4
SCPT20-101	20-53-21525_SP101	27-Oct-2020	524:T375F10U500	3.5	8.45	3	44.78975	-68.69922	3
SCPT20-101B	20-53-21525_SP101B	28-Oct-2020	524:T375F10U500	3.5	21.33	9	44.78983	-68.69899	3
SCPT20-102	20-53-21525_SP102	29-Oct-2020	524:T375F10U500	6.0	31.58	15	44.79006	-68.69877	3
SCPT20-103	20-53-21525_SP103	01-Nov-2020	524:T375F10U500	4.0	34.20	13	44.77205	-68.71887	3
CPT20-104	20-53-21525_CP104	01-Nov-2020	524:T375F10U500	2.5	16.73		44.77203	-68.71788	3
SCPT20-104	20-53-21525_SP104	01-Nov-2020	524:T375F10U500	5.0	18.04	8	44.77043	-68.71722	4
CPT20-105	20-53-21525_CP105	01-Nov-2020	524:T375F10U500	2.5	13.45		44.77231	-68.71711	
CPT20-106	20-53-21525_CP106	01-Nov-2020	524:T375F10U500	2.5	11.73		44.77124	-68.71678	3
CPT20-108	20-53-21525_CP108	01-Nov-2020	524:T375F10U500	3.0	15.91		44.77305	-68.71653	3
CPT20-109	20-53-21525_CP109	26-Oct-2020	524:T375F10U500	2.5	14.11		44.77371	-68.71513	3
CPT20-110	20-53-21525_CP110	26-Oct-2020	524:T375F10U500	2.0	14.44		44.77429	-68.71409	3
CPT20-111	20-53-21525_CP111	26-Oct-2020	524:T375F10U500	2.0	4.02		44.77508	-68.71296	3
CPT20-111B	20-53-21525_CP111B	26-Oct-2020	524:T375F10U500	2.0	6.73		44.77509	-68.71294	3
CPT20-112	20-53-21525_CP112	26-Oct-2020	524:T375F10U500	3.0	22.88		44.77594	-68.71206	3
CPT20-113	20-53-21525_CP113	26-Oct-2020	524:T375F10U500	3.5	19.77		44.77673	-68.71133	3
CPT20-114	20-53-21525_CP114	27-Oct-2020	524:T375F10U500	3.0	15.34		44.78939	-68.69967	3
CPT20-115	20-53-21525_CP115	27-Oct-2020	524:T375F10U500	5.0	11.16		44.78969	-68.69938	3
CPT20-115B	20-53-21525_CP115B	27-Oct-2020	524:T375F10U500	5.0	6.56		44.78971	-68.69936	3
CPT20-116	20-53-21525_CP116	29-Oct-2020	524:T375F10U500	5.0	16.73		44.79045	-68.69834	3



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Start Date: 26-Oct-2020
End Date: 02-Nov-2020

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface ¹ (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Latitude ² (°)	Longitude ² (°)	Refer to Notation Number
CPT20-117	20-53-21525_CP117	29-Oct-2020	524:T375F10U500	2.0	5.66		44.79429	-68.69303	3
CPT20-118	20-53-21525_CP118	29-Oct-2020	524:T375F10U500	2.5	16.16		44.79470	-68.69252	3
CPT20-119	20-53-21525_CP119	29-Oct-2020	524:T375F10U500	4.0	14.35		44.79490	-68.69217	3
CPT20-122	20-53-21525_CP122	30-Oct-2020	524:T375F10U500	3.0	24.28		44.79780	-68.68837	3
CPT20-123	20-53-21525_CP123	30-Oct-2020	524:T375F10U500	3.0	14.68		44.79816	-68.68809	3
CPT20-124	20-53-21525_CP124	30-Oct-2020	524:T375F10U500	3.0	11.40		44.79850	-68.68774	3
CPT20-125	20-53-21525_CP125	30-Oct-2020	524:T375F10U500	3.0	10.25		44.79925	-68.68700	3
CPT20-126	20-53-21525_CP126	30-Oct-2020	524:T375F10U500	2.0	8.20		44.80002	-68.68636	3
CPT20-127	20-53-21525_CP127	30-Oct-2020	524:T375F10U500	2.0	4.51		44.80037	-68.68603	3
Totals	30 soundings				471.78	48			

1. The assumed phreatic surface was based on pore pressure dissipation tests. Hydrostatic data were used for the calculated parameters.
2. Coordinates were acquired using a handheld GPS Receiver in datum: WGS 84 Lat / Long Decimal Degrees.
3. The assumed phreatic surface was estimated from the dynamic pore pressure data.
4. The assumed phreatic surface was estimated from elevation datum provided by Google Earth Pro.
5. No phreatic surface detected.



Haley & Aldrich

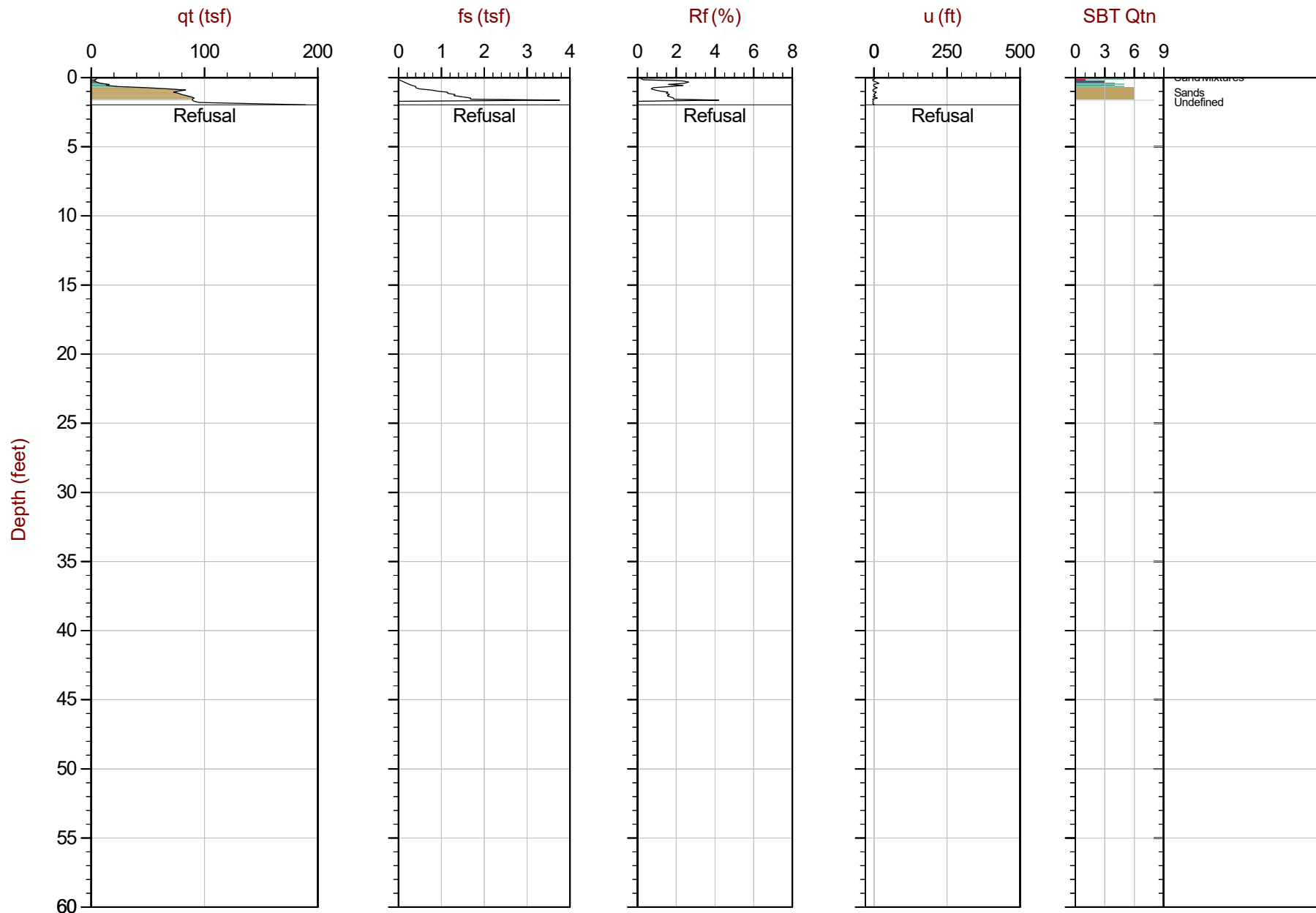
Job No: 20-53-21525

Date: 2020-11-01 07:33

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-101

Cone: 524:T375F10U500



Max Depth: 0.600 m / 1.97 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP101.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77144 ° Long: -68.72026 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

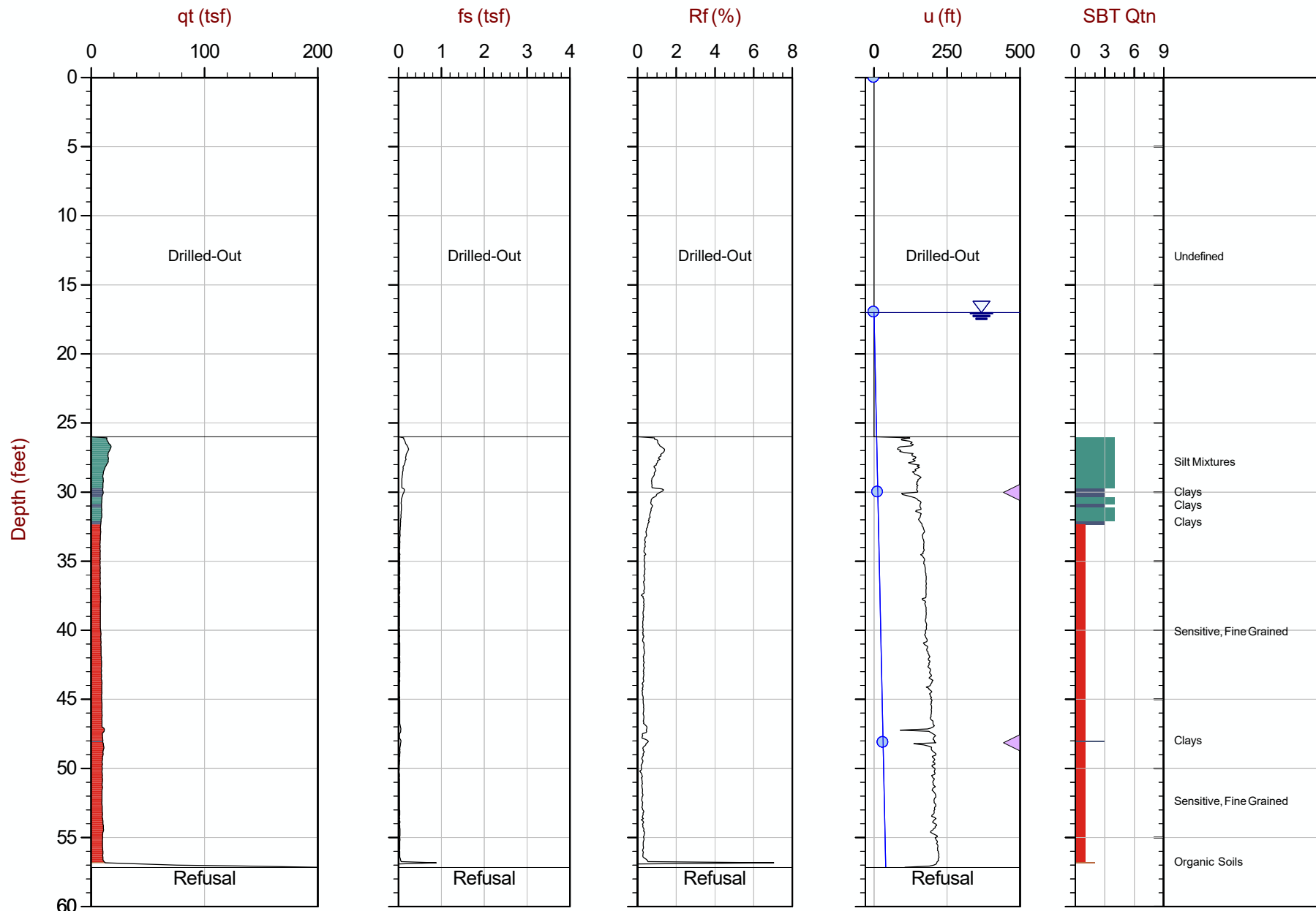
Job No: 20-53-21525

Date: 2020-11-02 10:10

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-101B

Cone: 524:T375F10U500



Max Depth: 17.425 m / 57.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP101B.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77142 ° Long: -68.72029 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

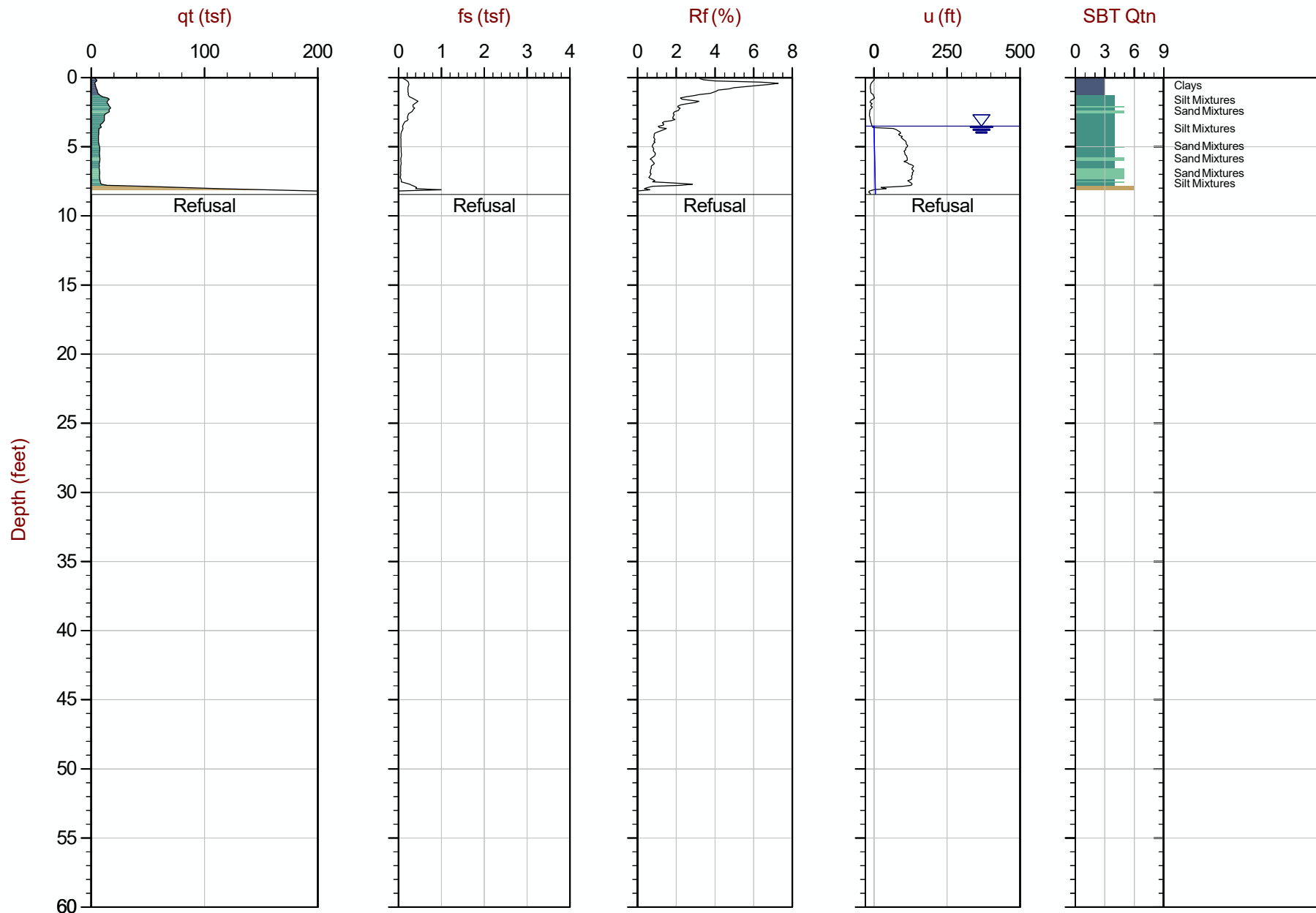
Job No: 20-53-21525

Date: 2020-10-27 14:05

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101

Cone: 524:T375F10U500



Max Depth: 2.575 m / 8.45 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP101.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78975 ° Long: -68.69922 °

Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

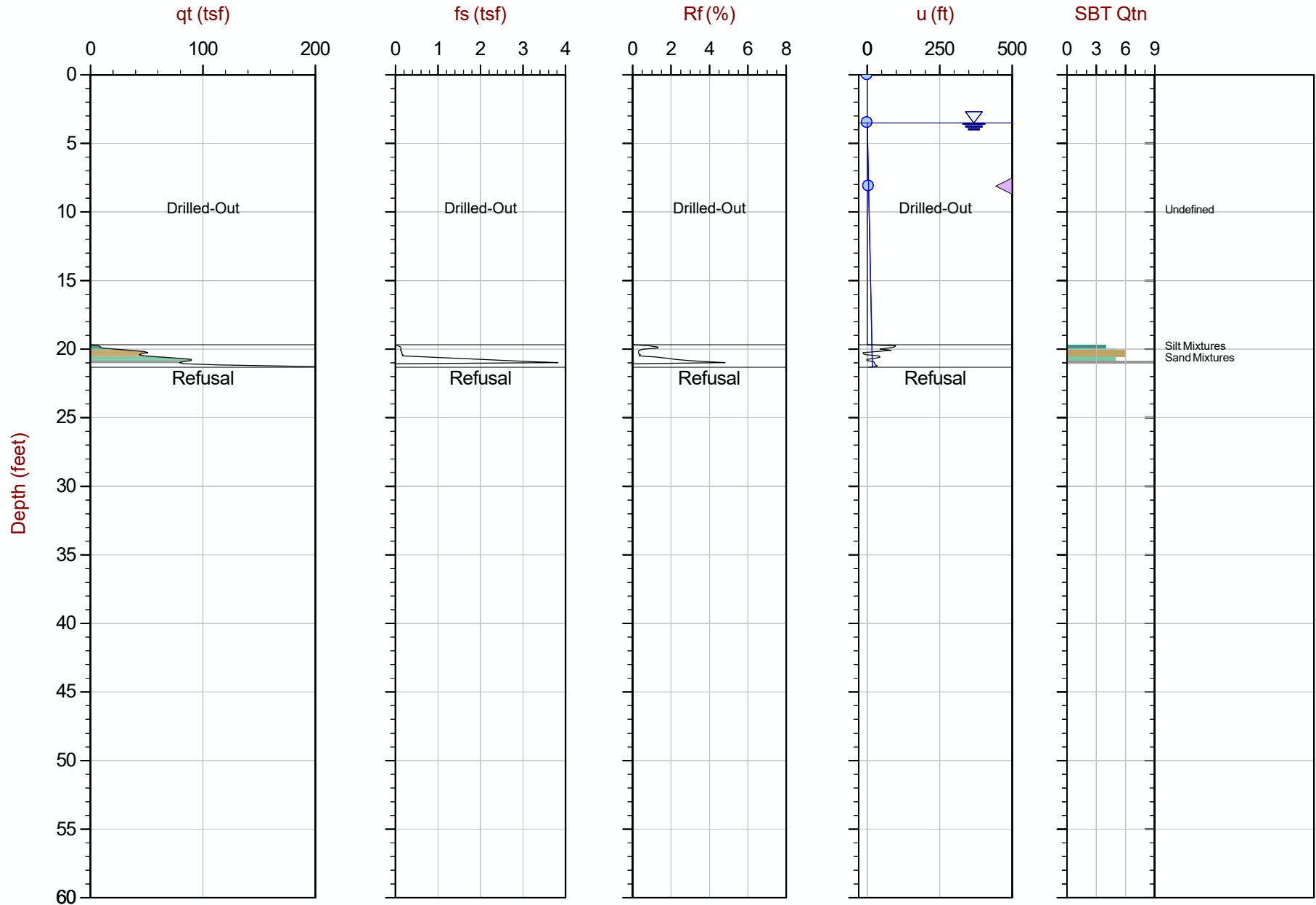
Job No: 20-53-21525

Date: 2020-10-28 08:27

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101B

Cone: 524:T375F10U500



Max Depth: 6.500 m / 21.33 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP101B.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78983 ° Long: -68.69899 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

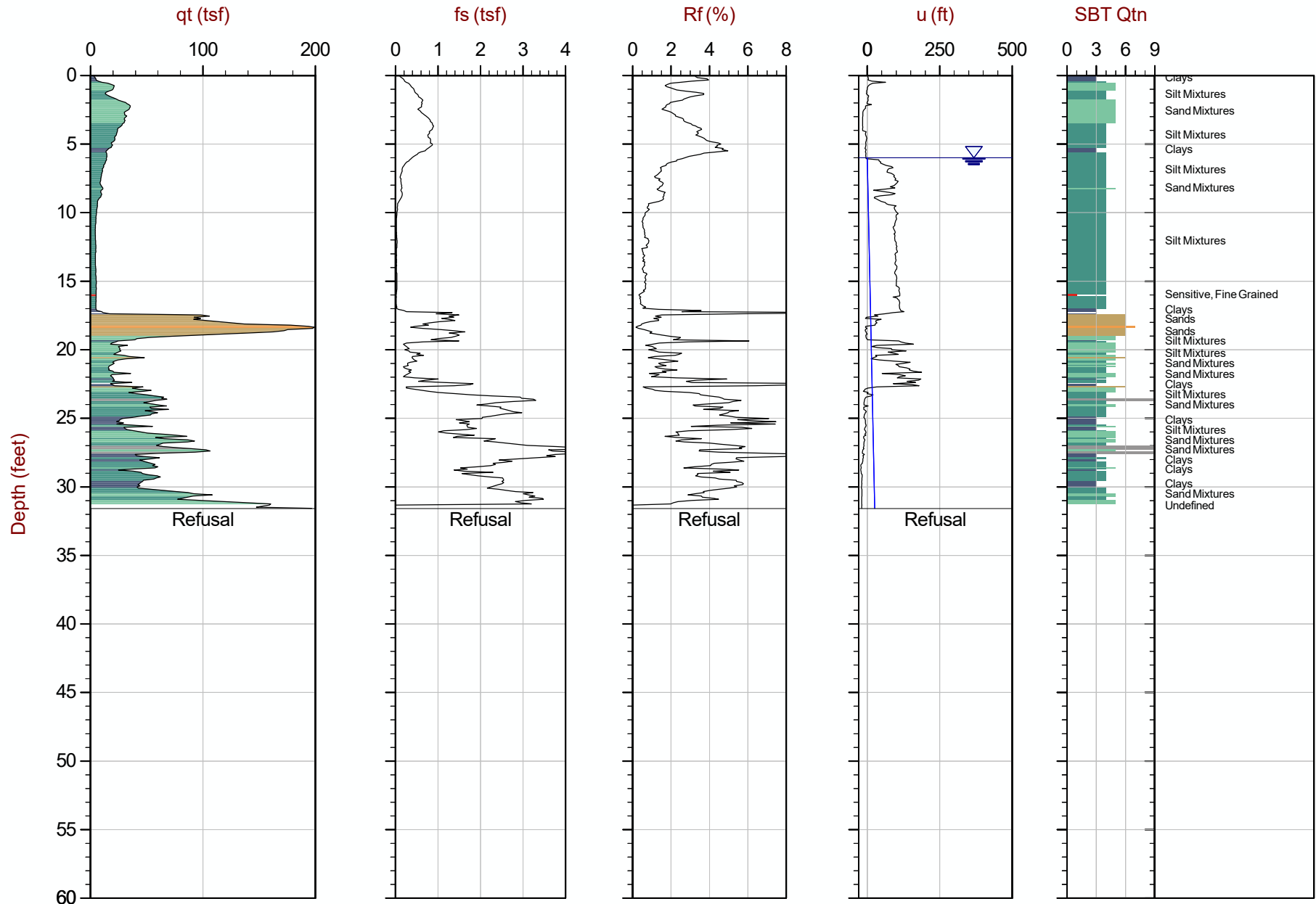
Job No: 20-53-21525

Date: 2020-10-29 08:44

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-102

Cone: 524:T375F10U500



Max Depth: 9.625 m / 31.58 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP102.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79006 ° Long: -68.69877 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

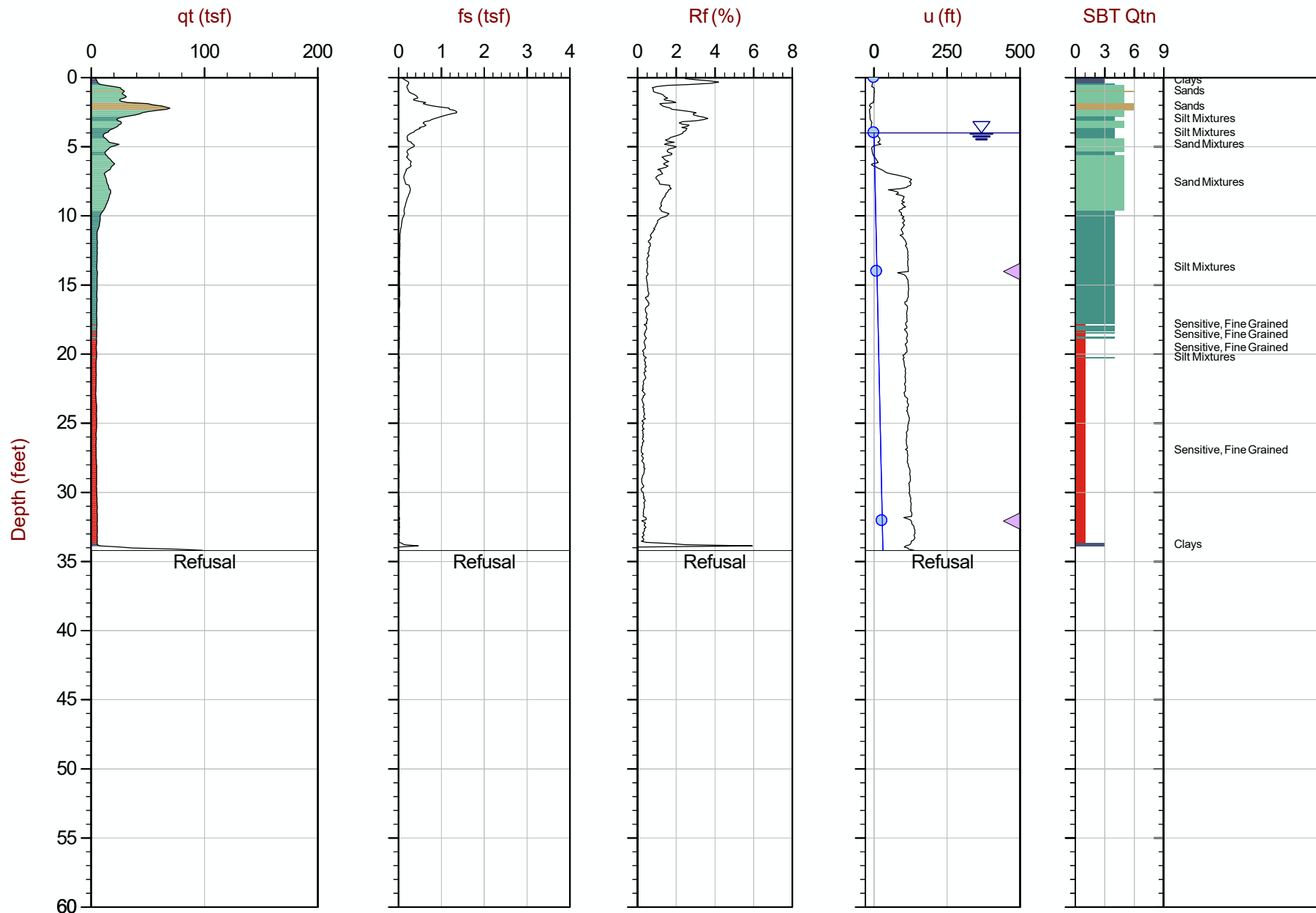
Job No: 20-53-21525

Date: 2020-11-01 12:46

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-103

Cone: 524:T375F10U500



Max Depth: 10.425 m / 34.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP103.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77204 ° Long: -68.71887 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

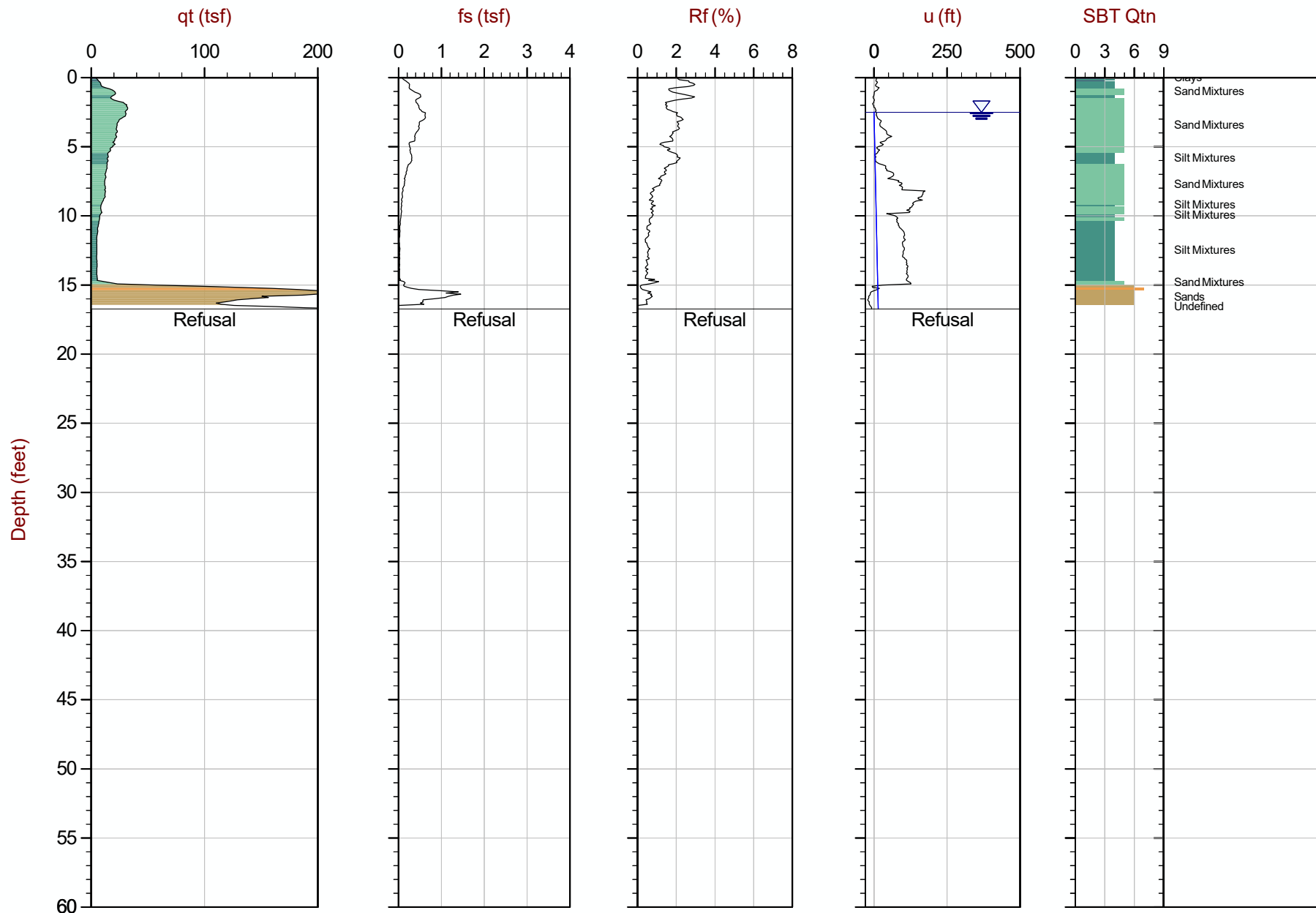
Job No: 20-53-21525

Date: 2020-11-01 12:07

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-104

Cone: 524:T375F10U500



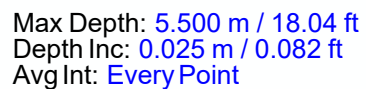
Max Depth: 5.100 m / 16.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP104.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77203 ° Long: -68.71788 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



File: 20-53-21525_SP104.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: Lat: 44.77043 ° Long: -68.71722 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

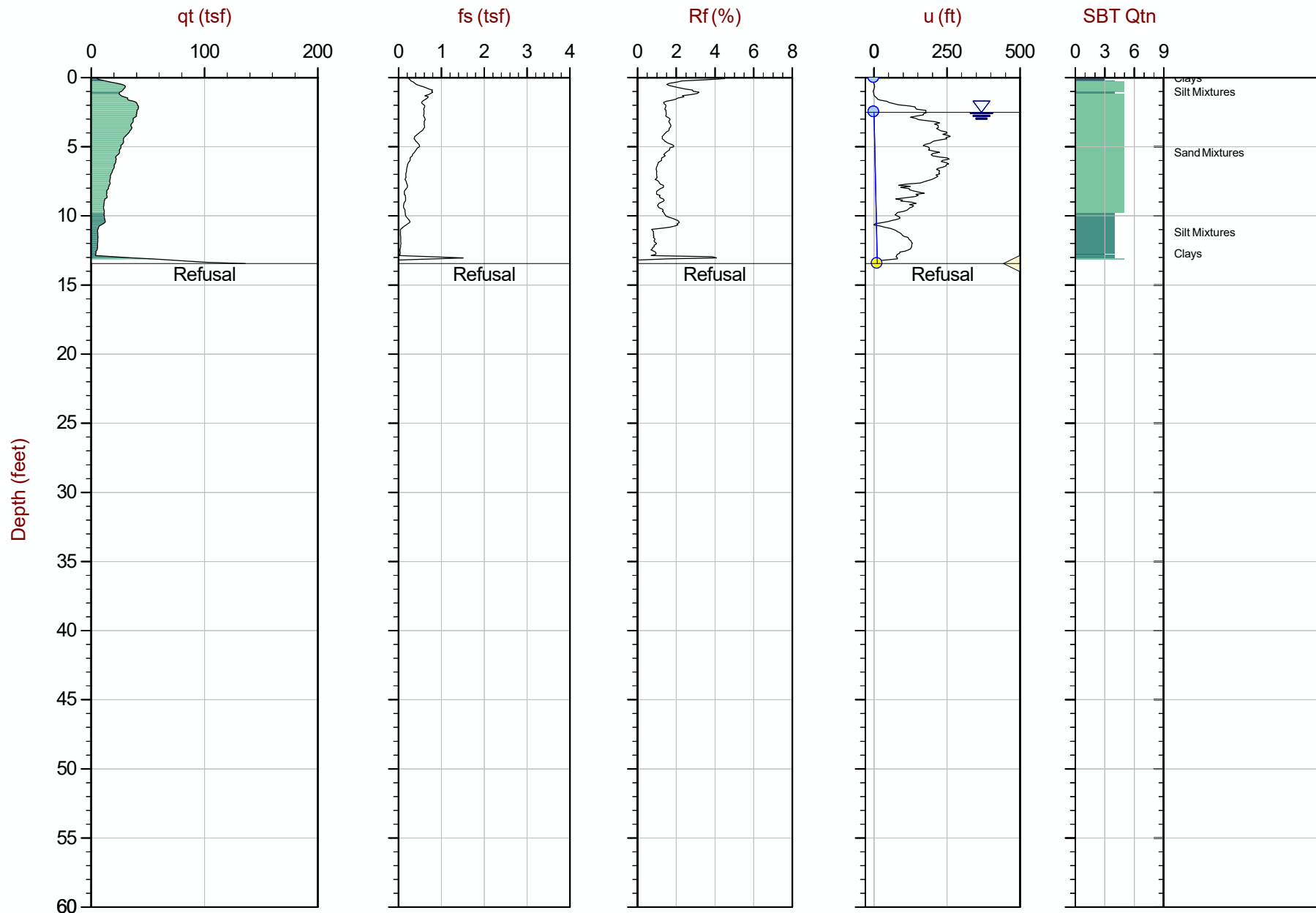
Job No: 20-53-21525

Date: 2020-11-01 10:13

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-105

Cone: 524:T375F10U500



Max Depth: 4.100 m / 13.45 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP105.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77231 ° Long: -68.71711 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

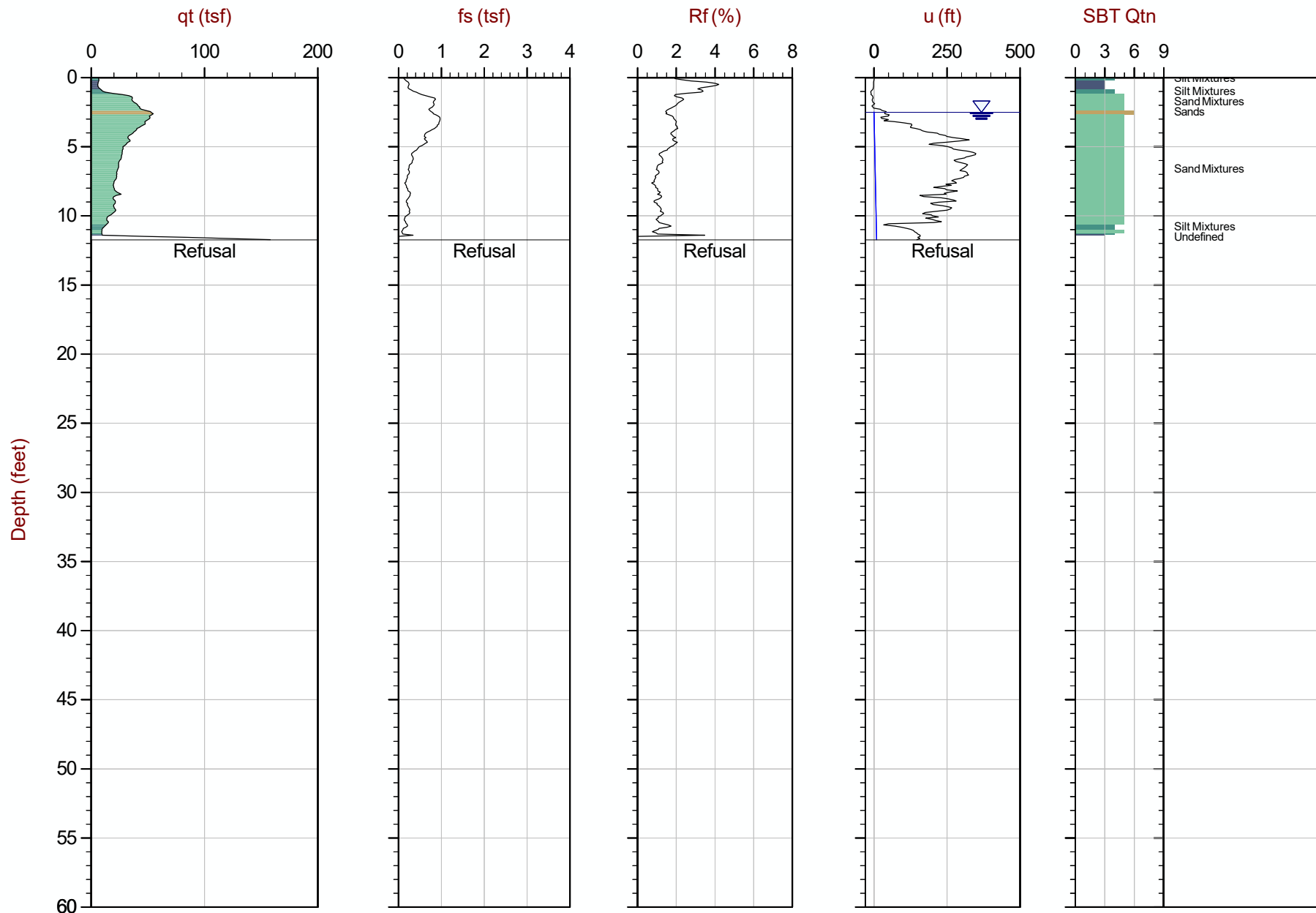
Job No: 20-53-21525

Date: 2020-11-01 09:22

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-106

Cone: 524:T375F10U500



Max Depth: 3.575 m / 11.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP106.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77124 ° Long: -68.71678 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

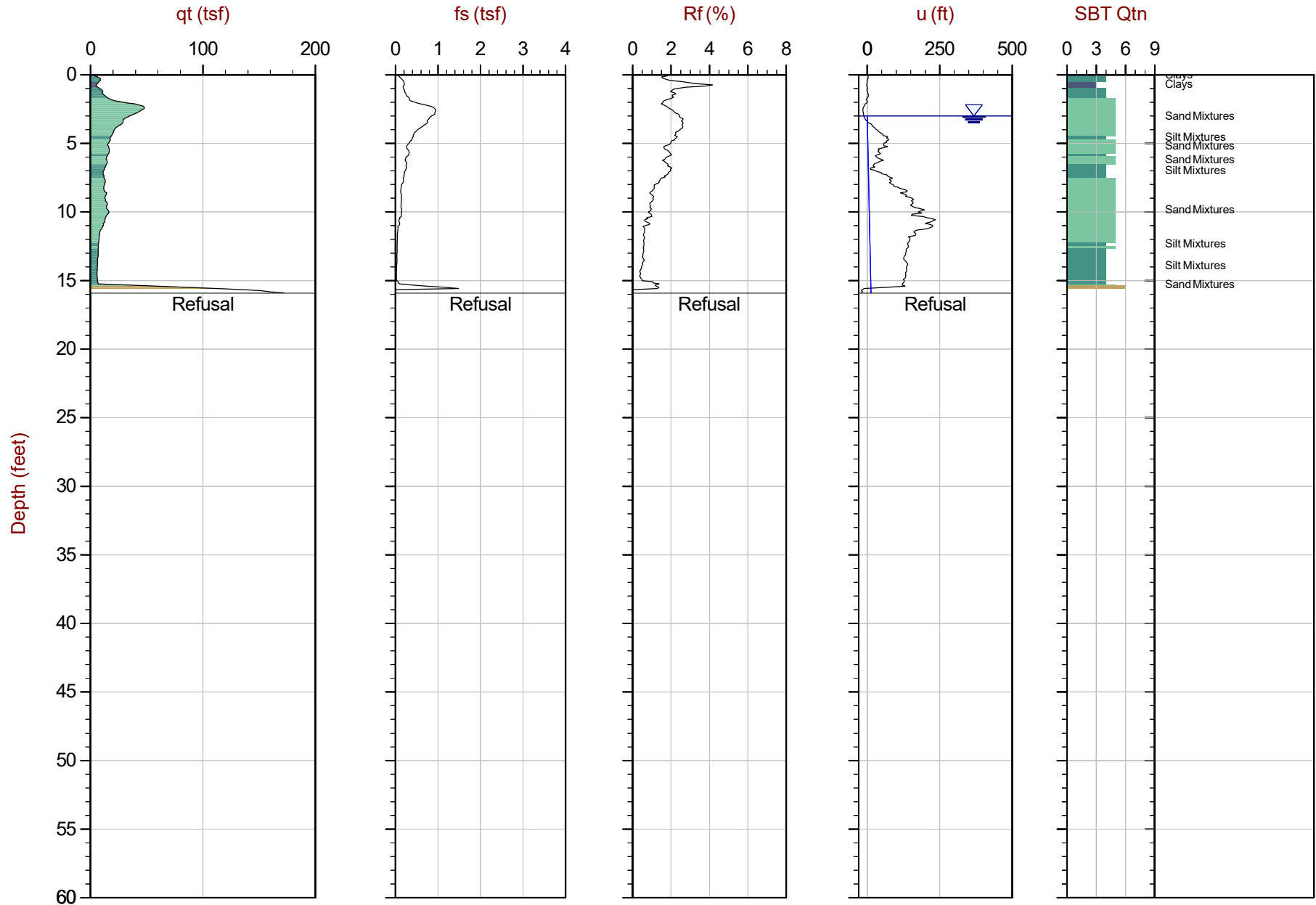
Job No: 20-53-21525

Date: 2020-11-01 11:13

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-108

Cone: 524:T375F10U500



Max Depth: 4.850 m / 15.91 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP108.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77305 ° Long: -68.71653 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

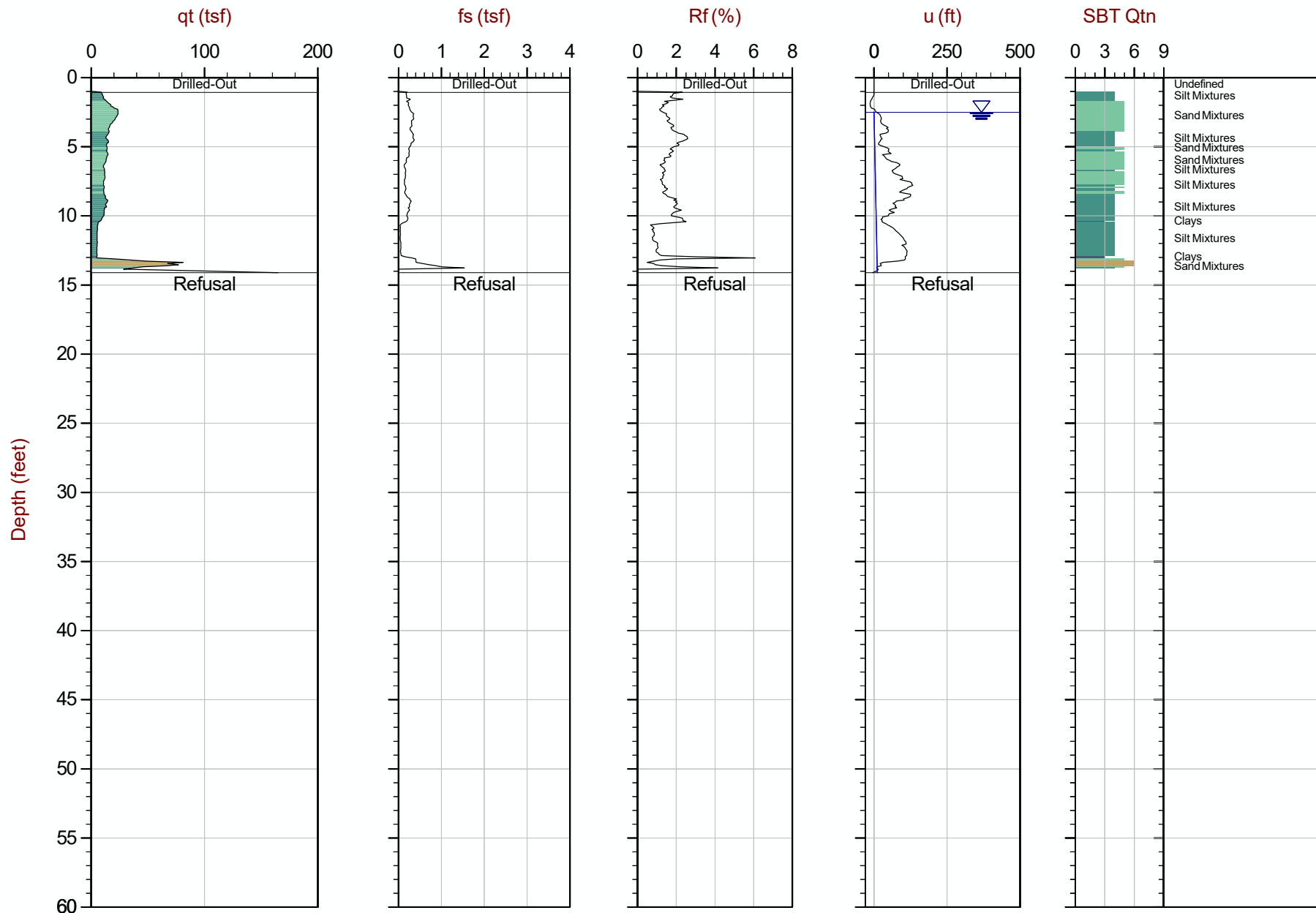
Job No: 20-53-21525

Date: 2020-10-26 09:58

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-109

Cone: 524:T375F10U500



Max Depth: 4.300 m / 14.11 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP109.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77371 ° Long: -68.71513 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

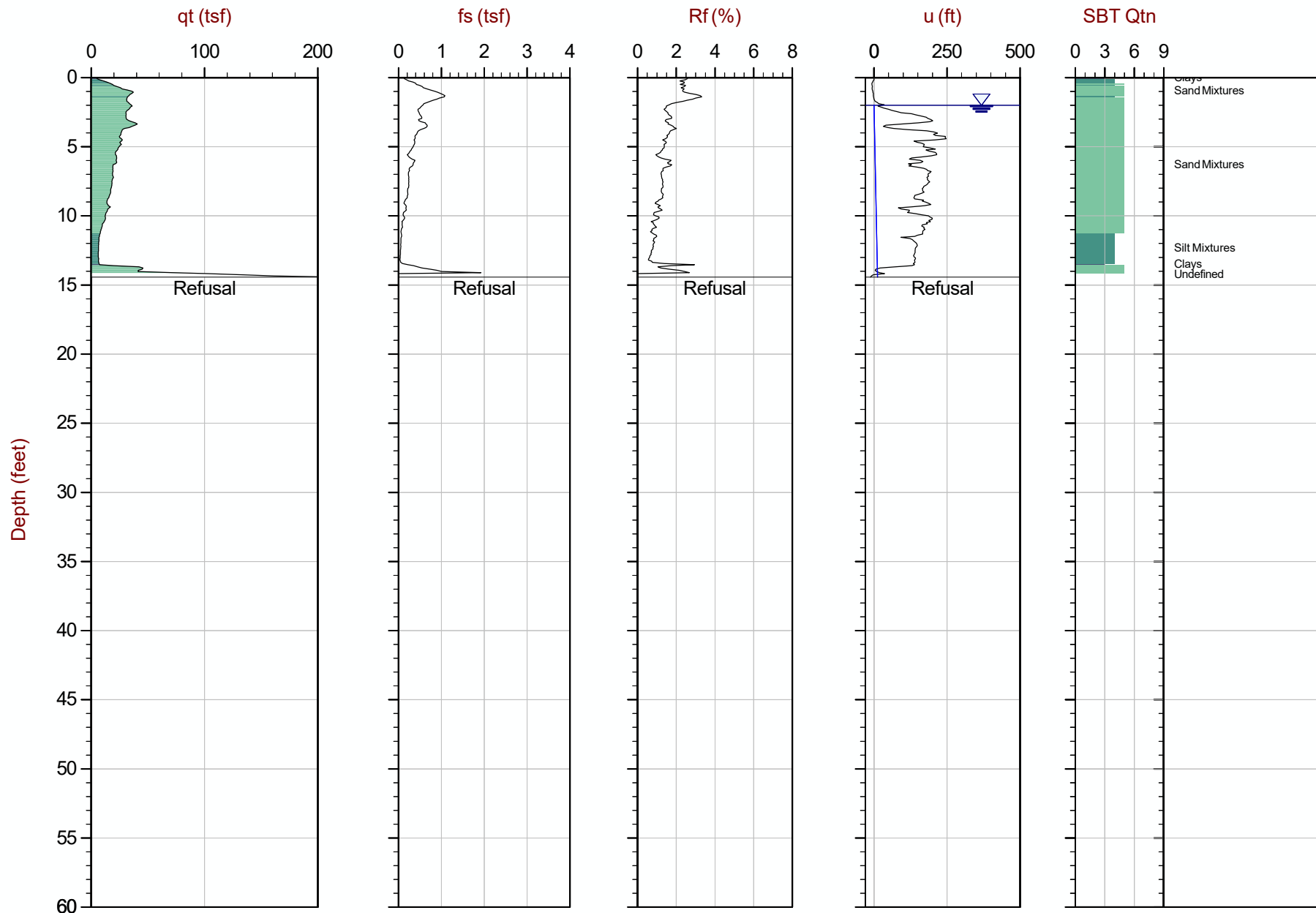
Job No: 20-53-21525

Date: 2020-10-26 11:12

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-110

Cone: 524:T375F10U500



Max Depth: 4.400 m / 14.44 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP110.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77429 ° Long: -68.71409 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

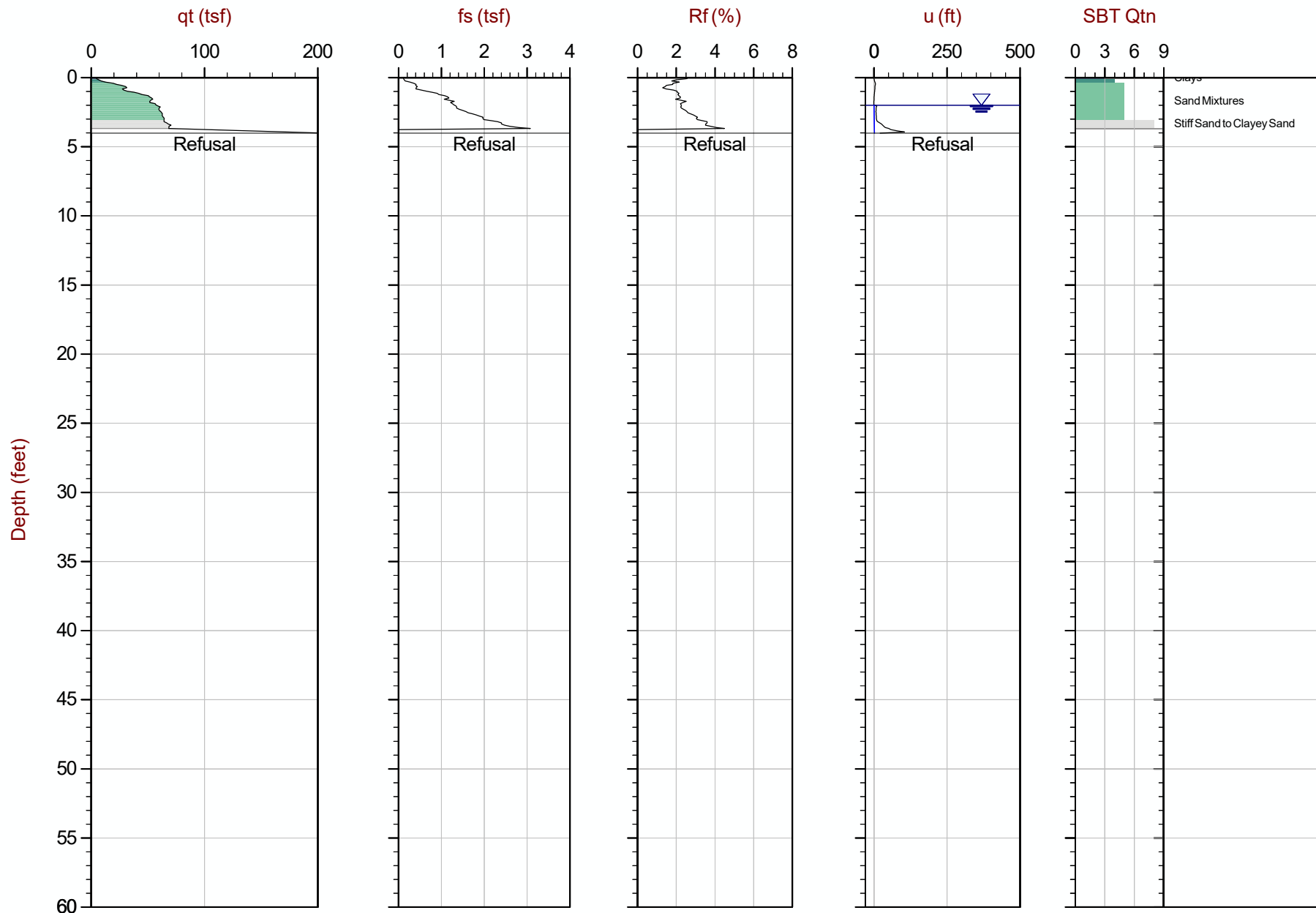
Job No: 20-53-21525

Date: 2020-10-26 12:14

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-111

Cone: 524:T375F10U500



Max Depth: 1.225 m / 4.02 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP111.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77508 ° Long: -68.71296 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

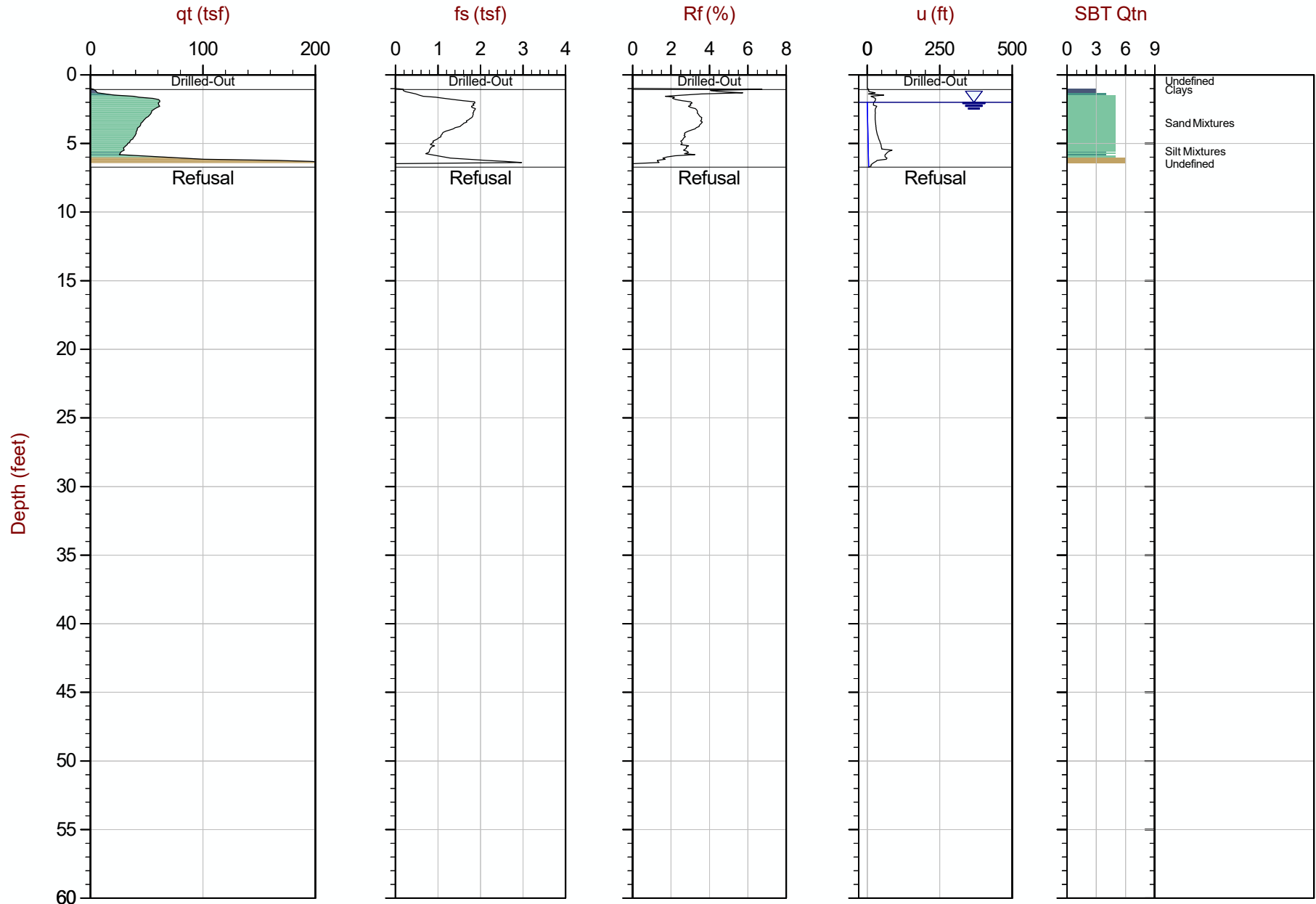
Job No: 20-53-21525

Date: 2020-10-26 12:35

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-111B

Cone: 524:T375F10U500



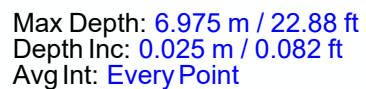
Max Depth: 2.050 m / 6.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP111B.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77509 ° Long: -68.71294 °

Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



File: 20-53-21525_CP112.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77594 ° Long: -68.71206 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

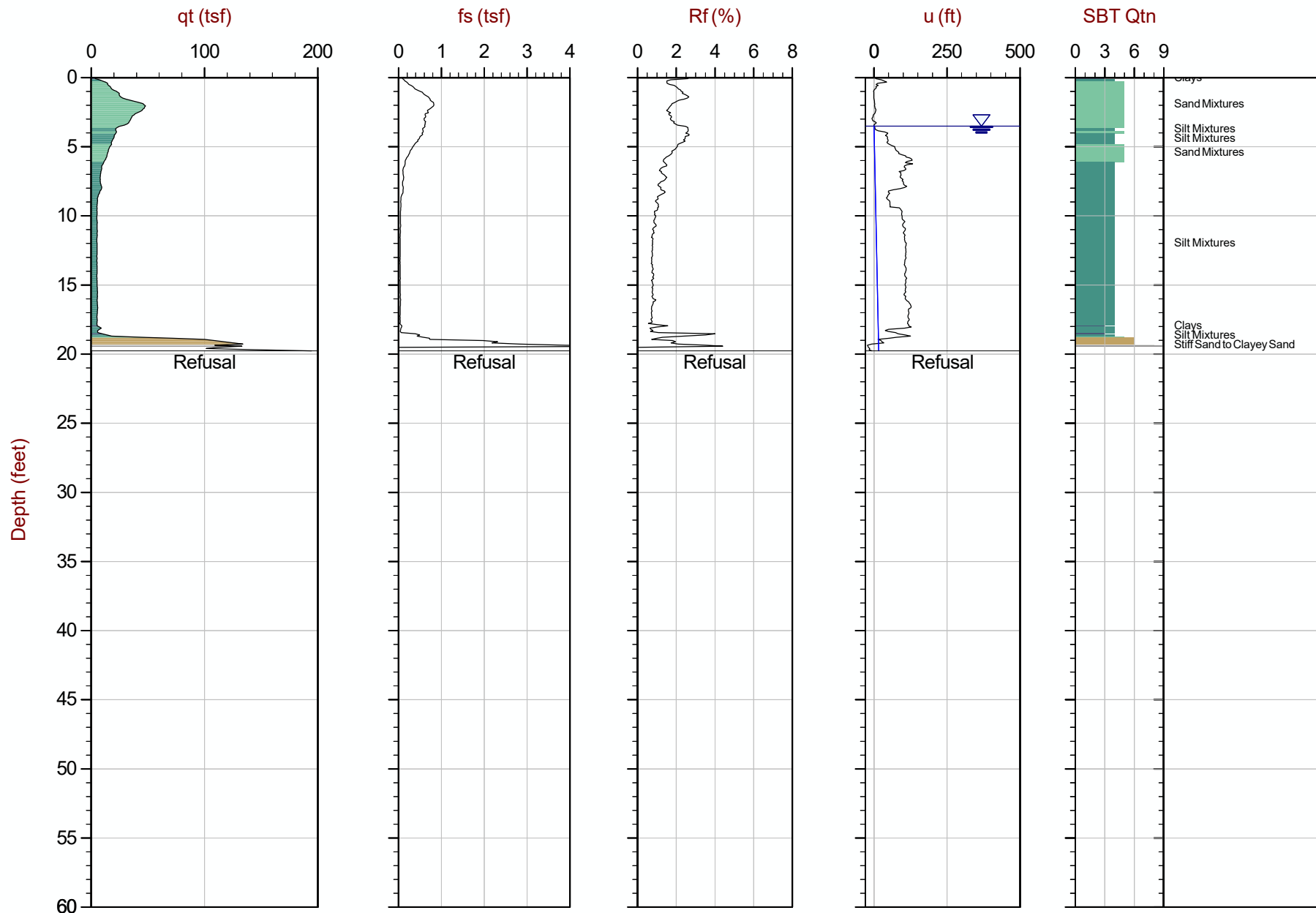
Job No: 20-53-21525

Date: 2020-10-26 14:50

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-113

Cone: 524:T375F10U500



Max Depth: 6.025 m / 19.77 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP113.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77673 ° Long: -68.71133 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

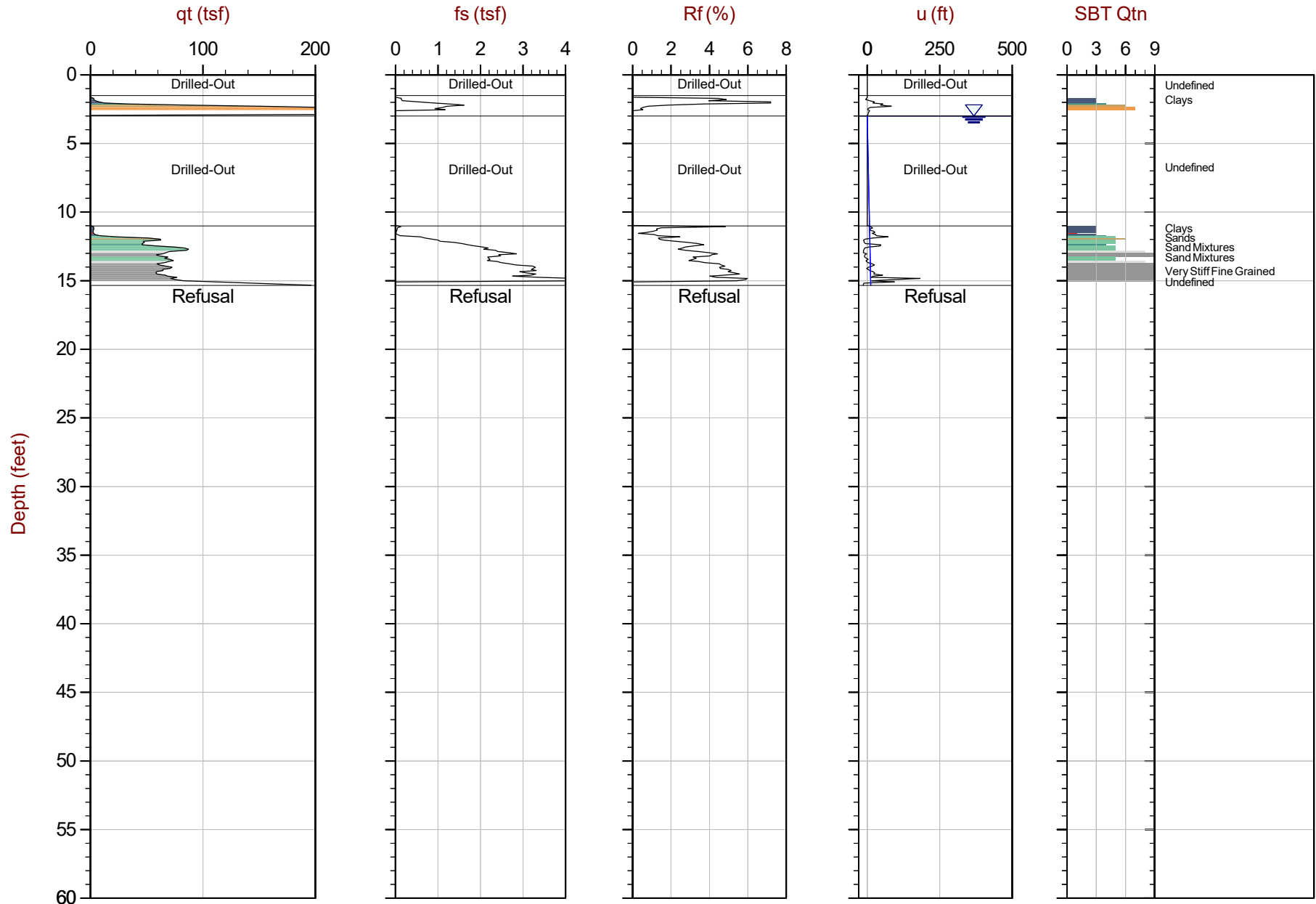
Job No: 20-53-21525

Date: 2020-10-27 10:25

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-114

Cone: 524:T375F10U500



Max Depth: 4.675 m / 15.34 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP114.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78939 ° Long: -68.69967 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

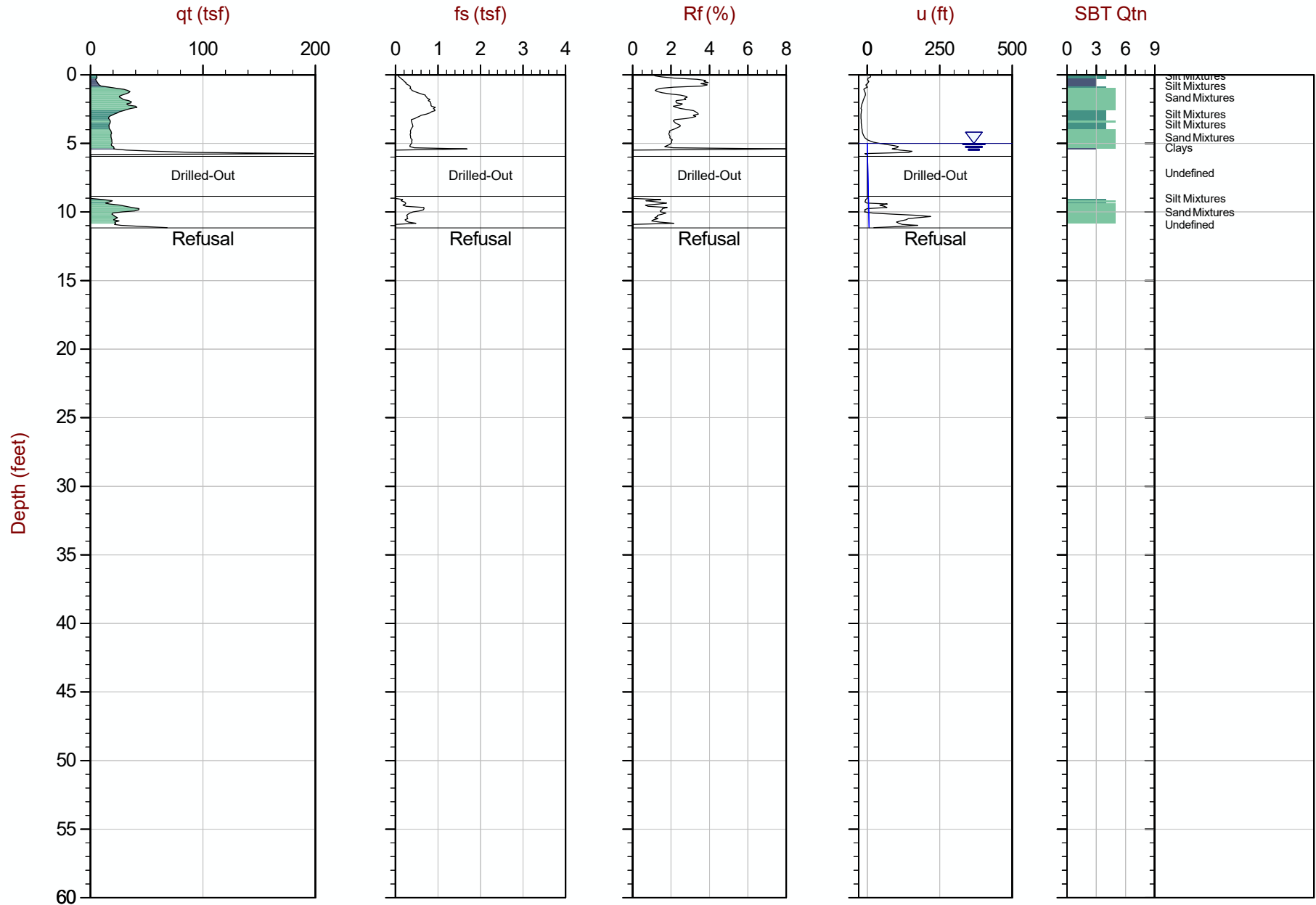
Job No: 20-53-21525

Date: 2020-10-27 12:04

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-115

Cone: 524:T375F10U500



Max Depth: 3.400 m / 11.15 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP115.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78969 ° Long: -68.69938 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

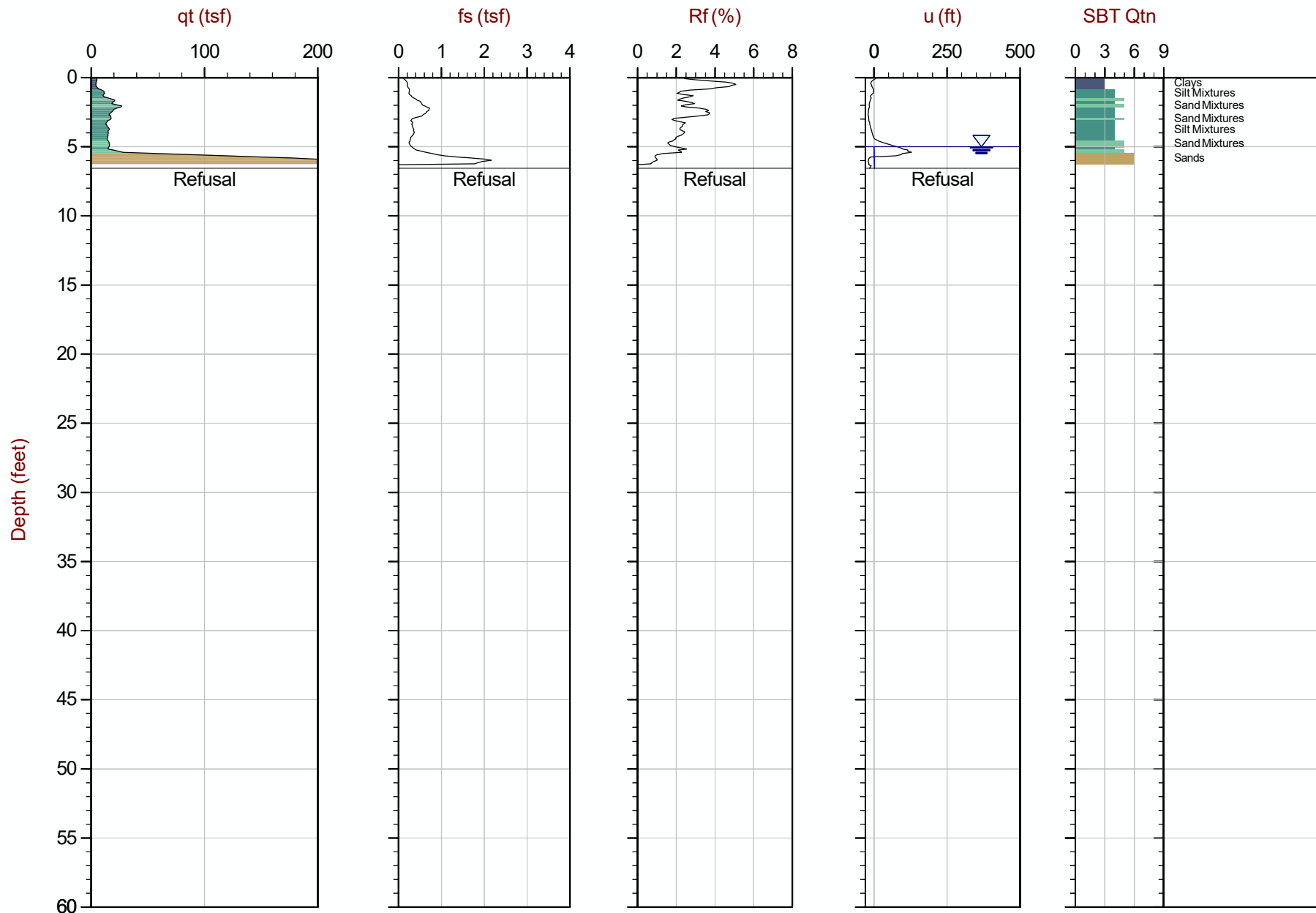
Job No: 20-53-21525

Date: 2020-10-27 13:16

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-115B

Cone: 524:T375F10U500



Max Depth: 2.000 m / 6.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP115B.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78971 ° Long: -68.69936 °

Hydrostatic Line ● Ueq ● Assumed Ueq ▲ PPD, Ueq achieved ▼ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

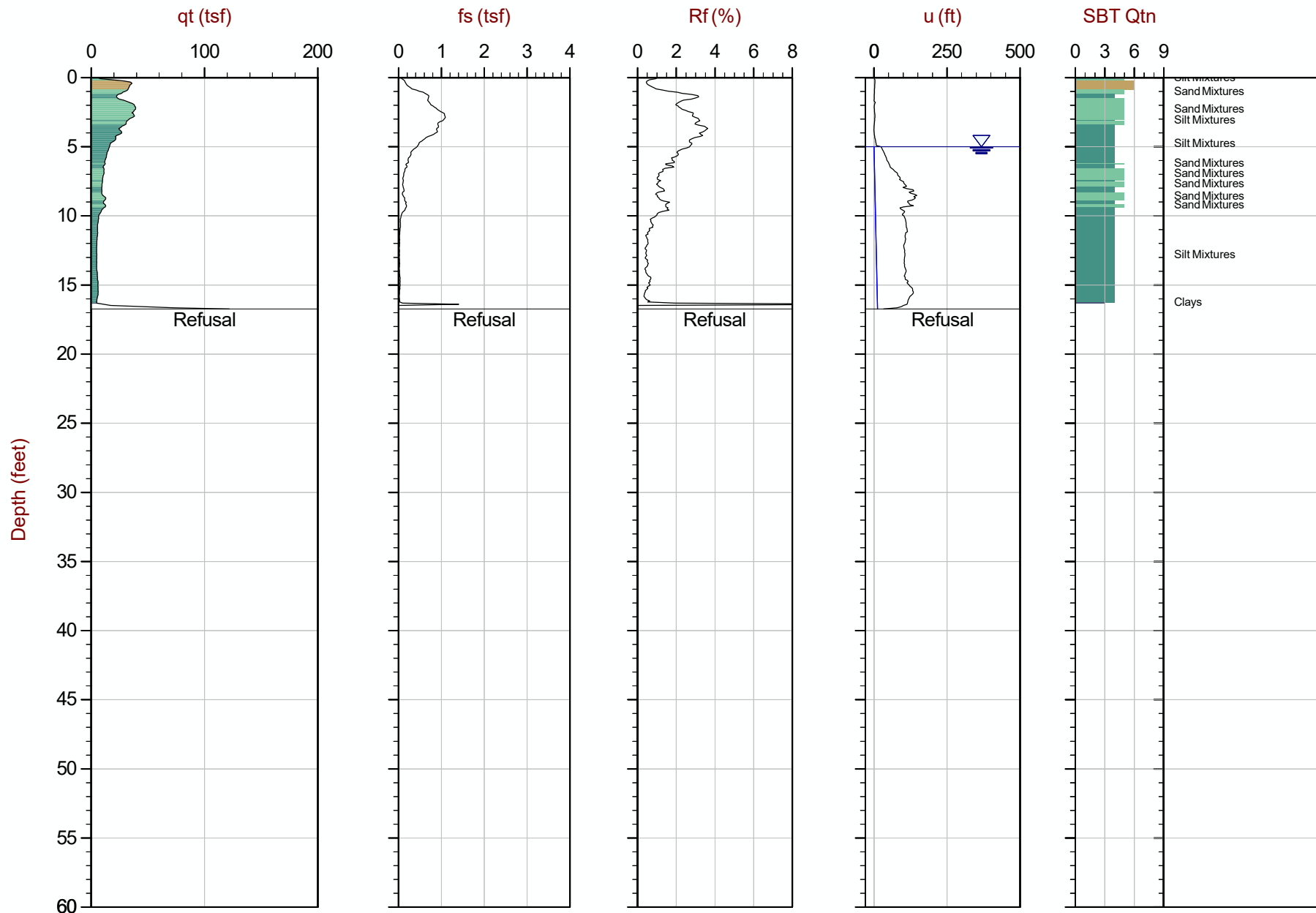
Job No: 20-53-21525

Date: 2020-10-29 10:24

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-116

Cone: 524:T375F10U500



Max Depth: 5.100 m / 16.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP116.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79045 ° Long: -68.69834 °

Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

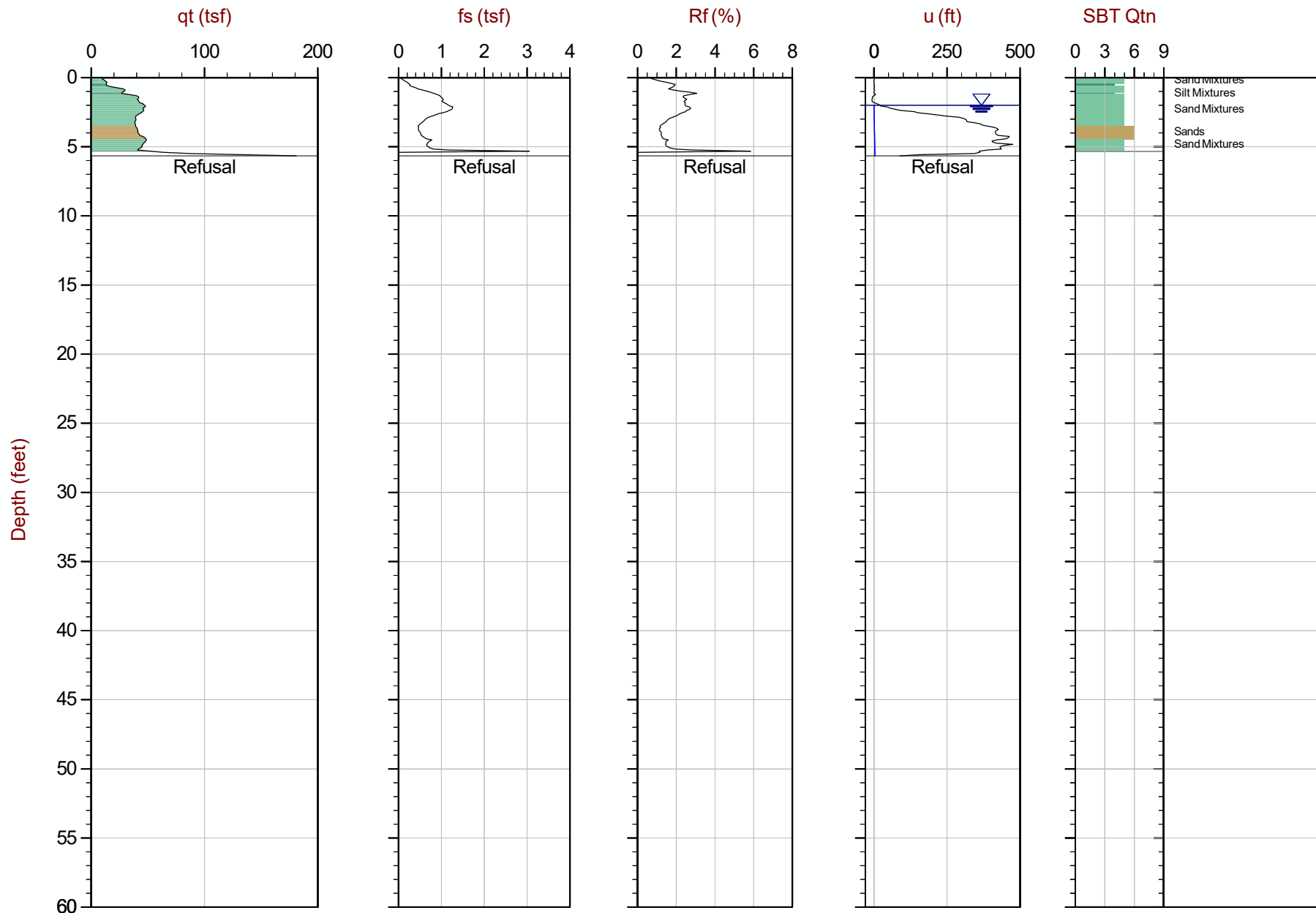
Job No: 20-53-21525

Date: 2020-10-29 11:34

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-117

Cone: 524:T375F10U500



Max Depth: 1.725 m / 5.66 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP117.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79429 ° Long: -68.69303 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

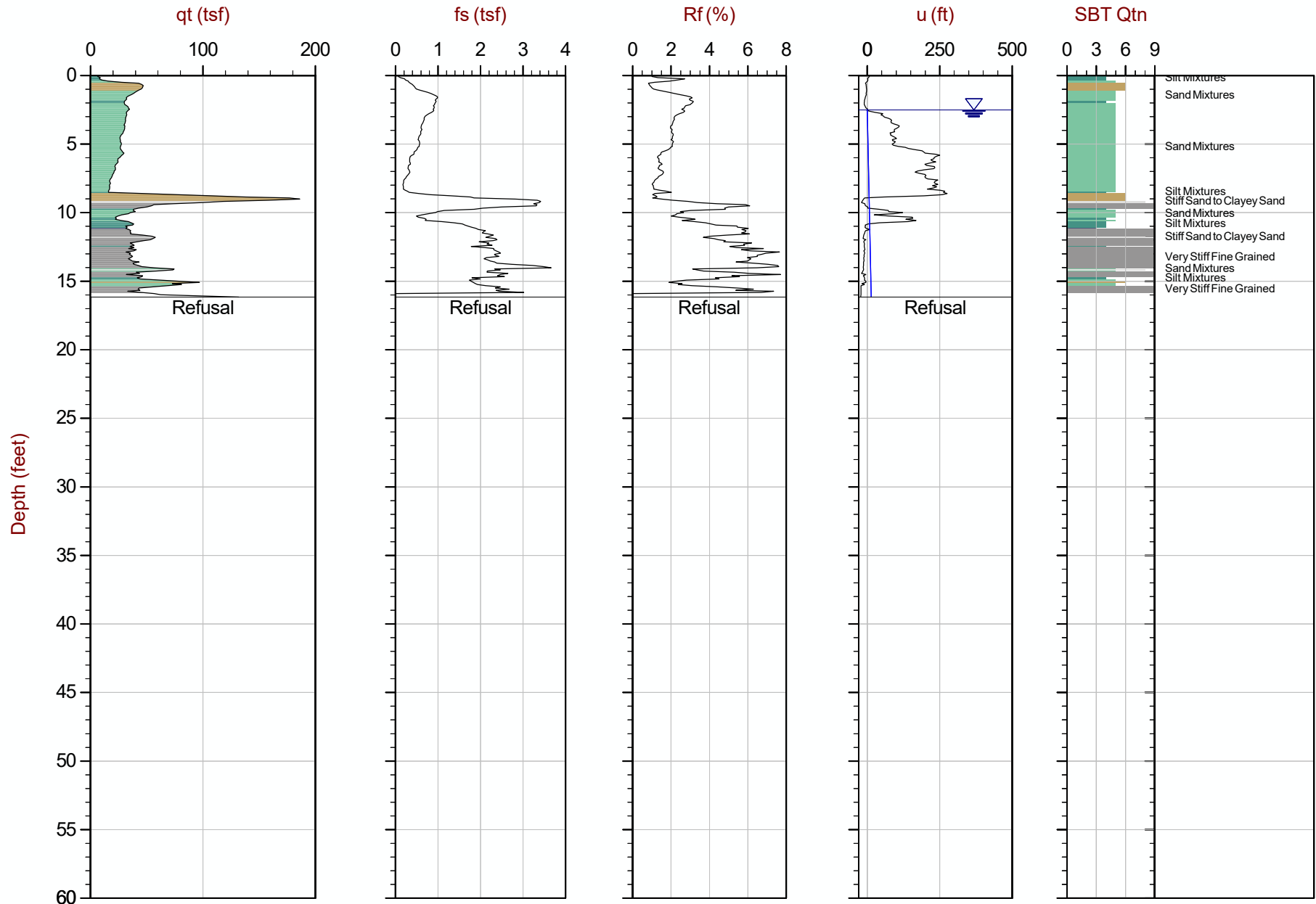
Job No: 20-53-21525

Date: 2020-10-29 12:05

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-118

Cone: 524:T375F10U500



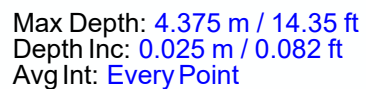
Max Depth: 4.925 m / 16.16 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP118.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79470 ° Long: -68.69252 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



File: 20-53-21525_CP119.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: Lat: 44.79490 ° Long: -68.69217 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

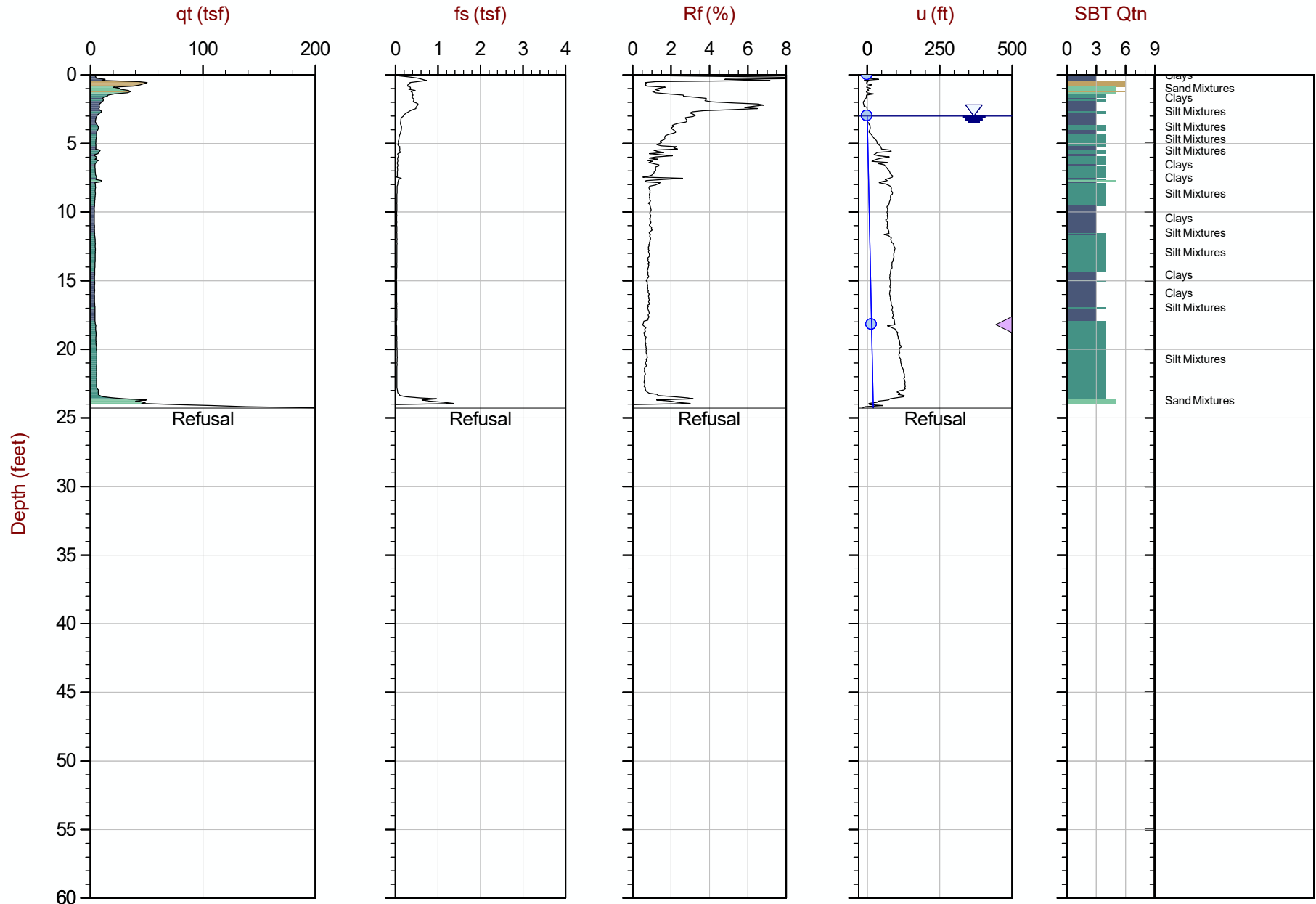
Job No: 20-53-21525

Date: 2020-10-30 12:58

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-122

Cone: 524:T375F10U500



Max Depth: 7.400 m / 24.28 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP122.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79780 ° Long: -68.68837 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

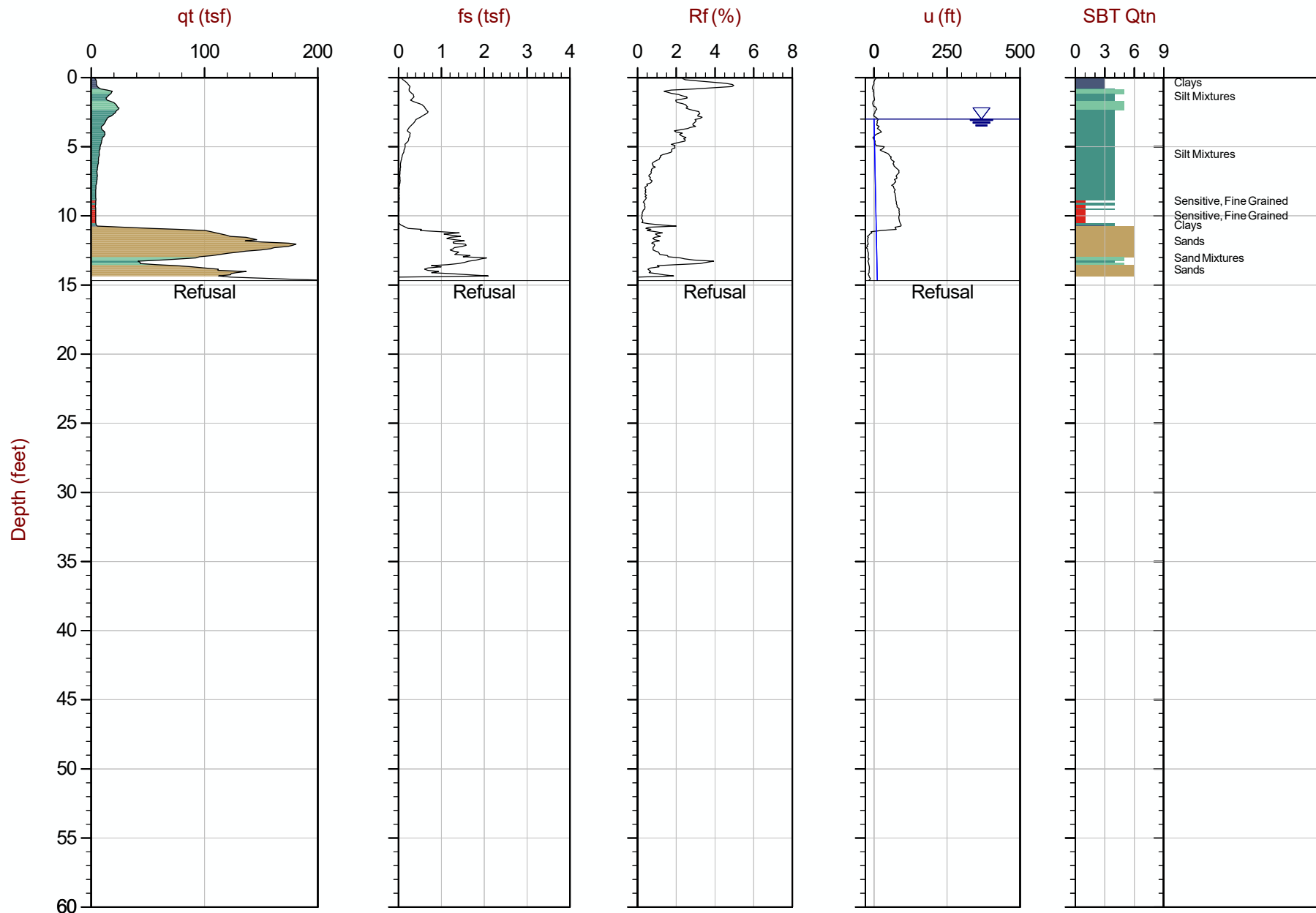
Job No: 20-53-21525

Date: 2020-10-30 11:30

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-123

Cone: 524:T375F10U500



Max Depth: 4.475 m / 14.68 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP123.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79816 ° Long: -68.68809 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

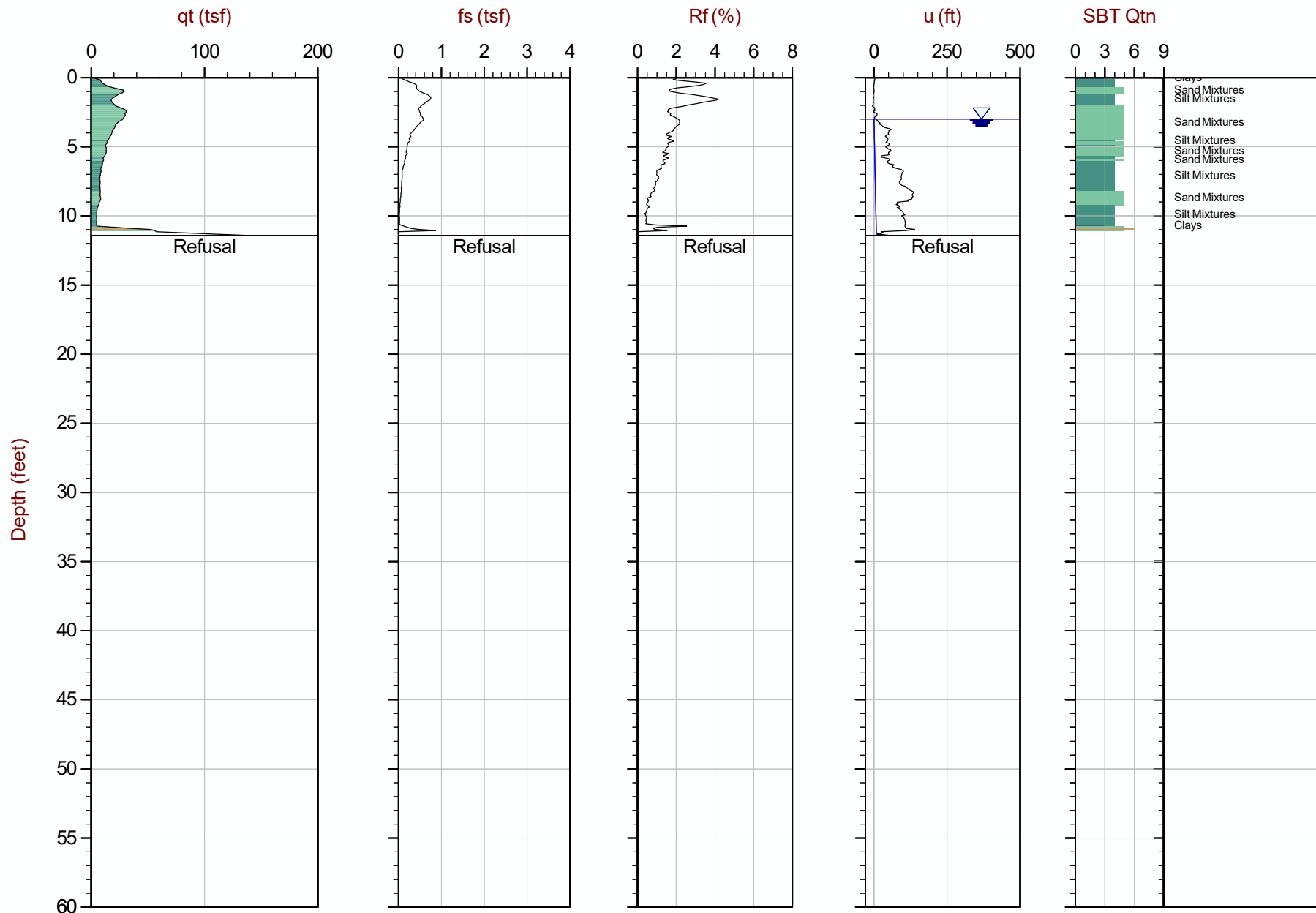
Job No: 20-53-21525

Date: 2020-10-30 10:46

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-124

Cone: 524:T375F10U500



Max Depth: 3.475 m / 11.40 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP124.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79850 ° Long: -68.68774 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

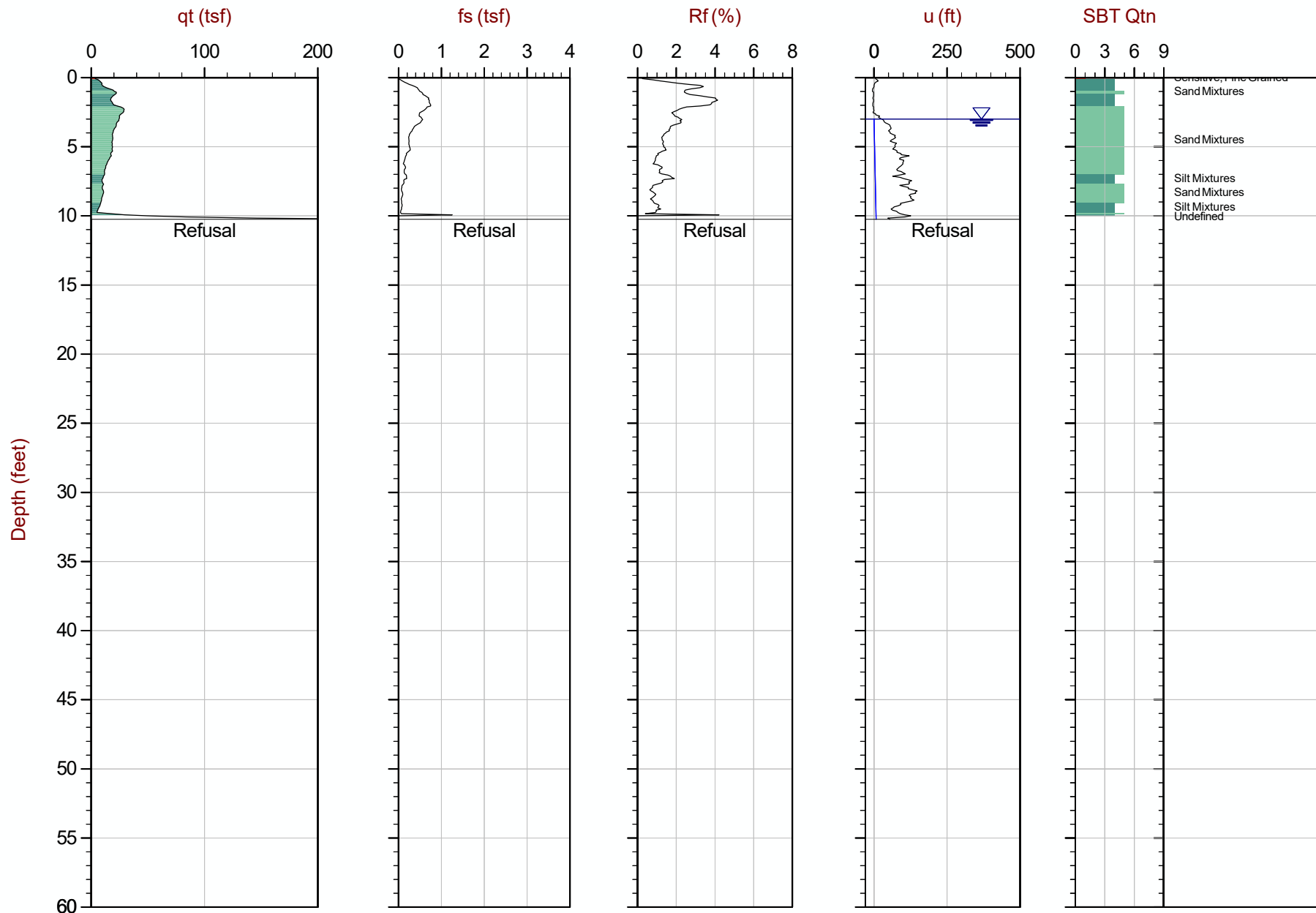
Job No: 20-53-21525

Date: 2020-10-30 10:15

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-125

Cone: 524:T375F10U500



Max Depth: 3.125 m / 10.25 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP125.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79925 ° Long: -68.68700 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

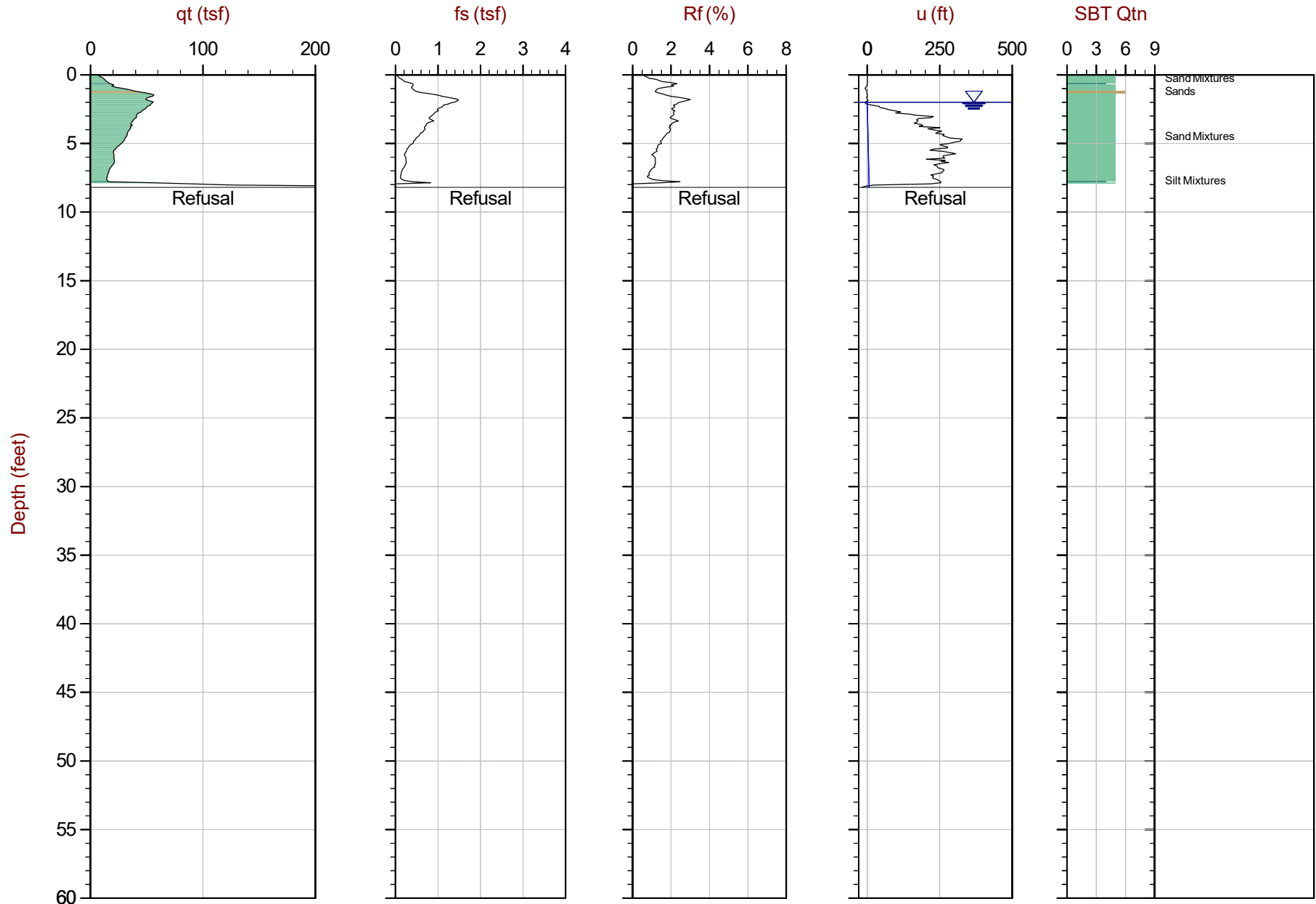
Job No: 20-53-21525

Date: 2020-10-30 09:44

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-126

Cone: 524:T375F10U500



Max Depth: 2.500 m / 8.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP126.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.80002 ° Long: -68.68636 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

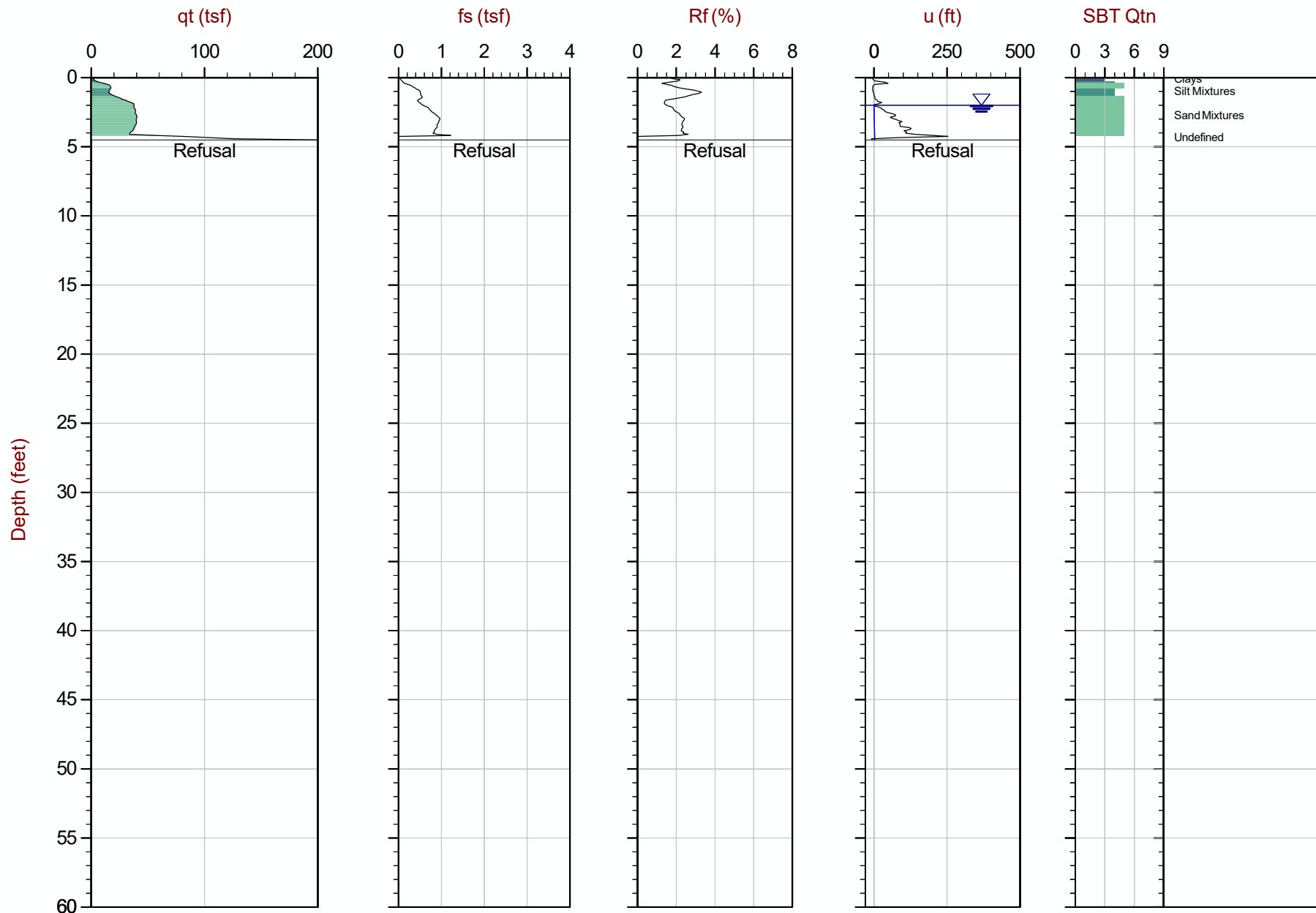
Job No: 20-53-21525

Date: 2020-10-30 09:11

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-127

Cone: 524:T375F10U500



Max Depth: 1.375 m / 4.51 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP127.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.80037 ° Long: -68.68603 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Advanced Cone Penetration Plots with I_c , $S_u(N_{kt})$, Φ and $N_{1(60)I_c}$



Haley & Aldrich

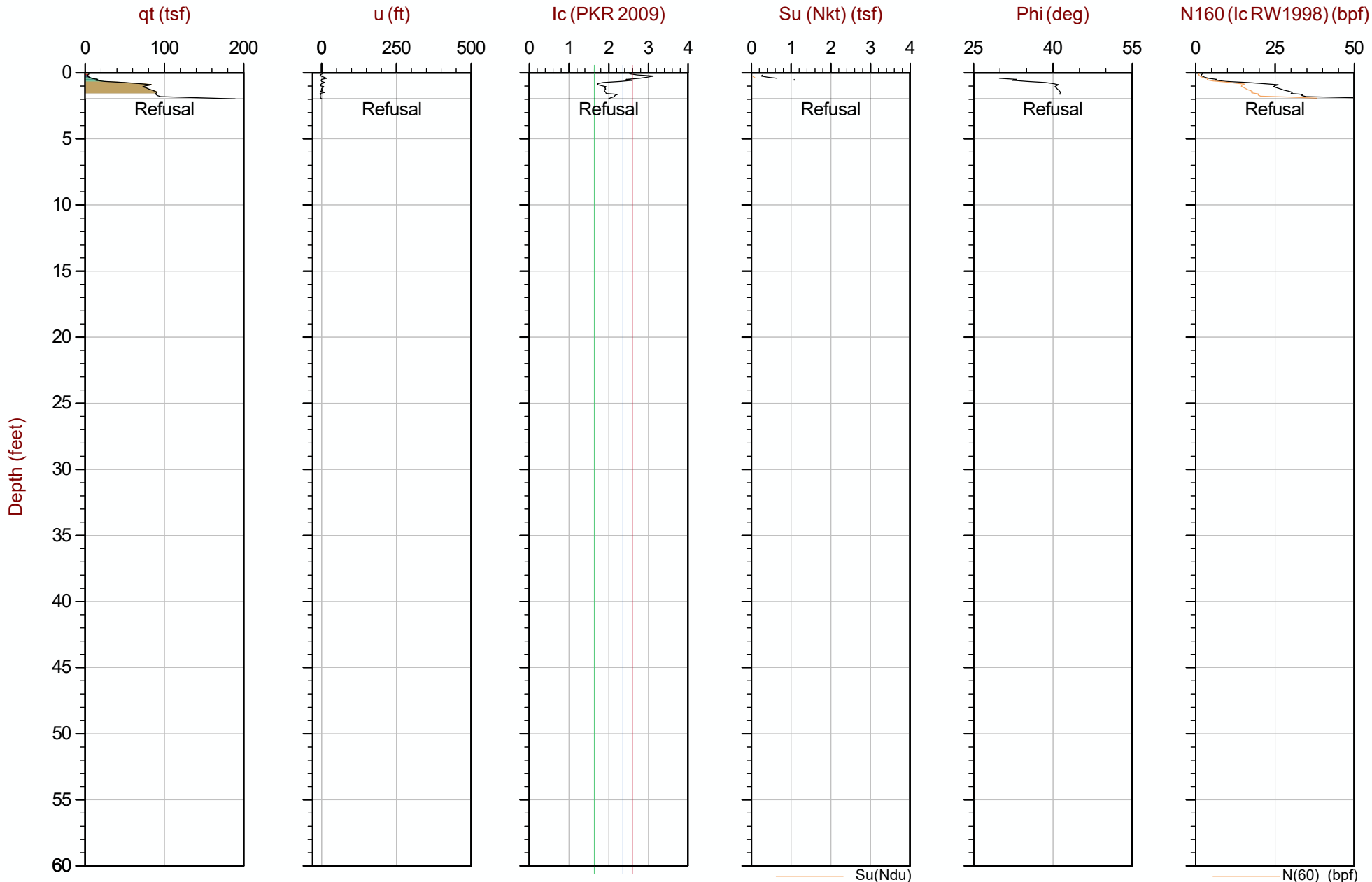
Job No: 20-53-21525

Date: 2020-11-01 07:33

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-101

Cone: 524:T375F10U500



Max Depth: 0.600 m / 1.97 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP101.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77144 ° Long: -68.72026 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

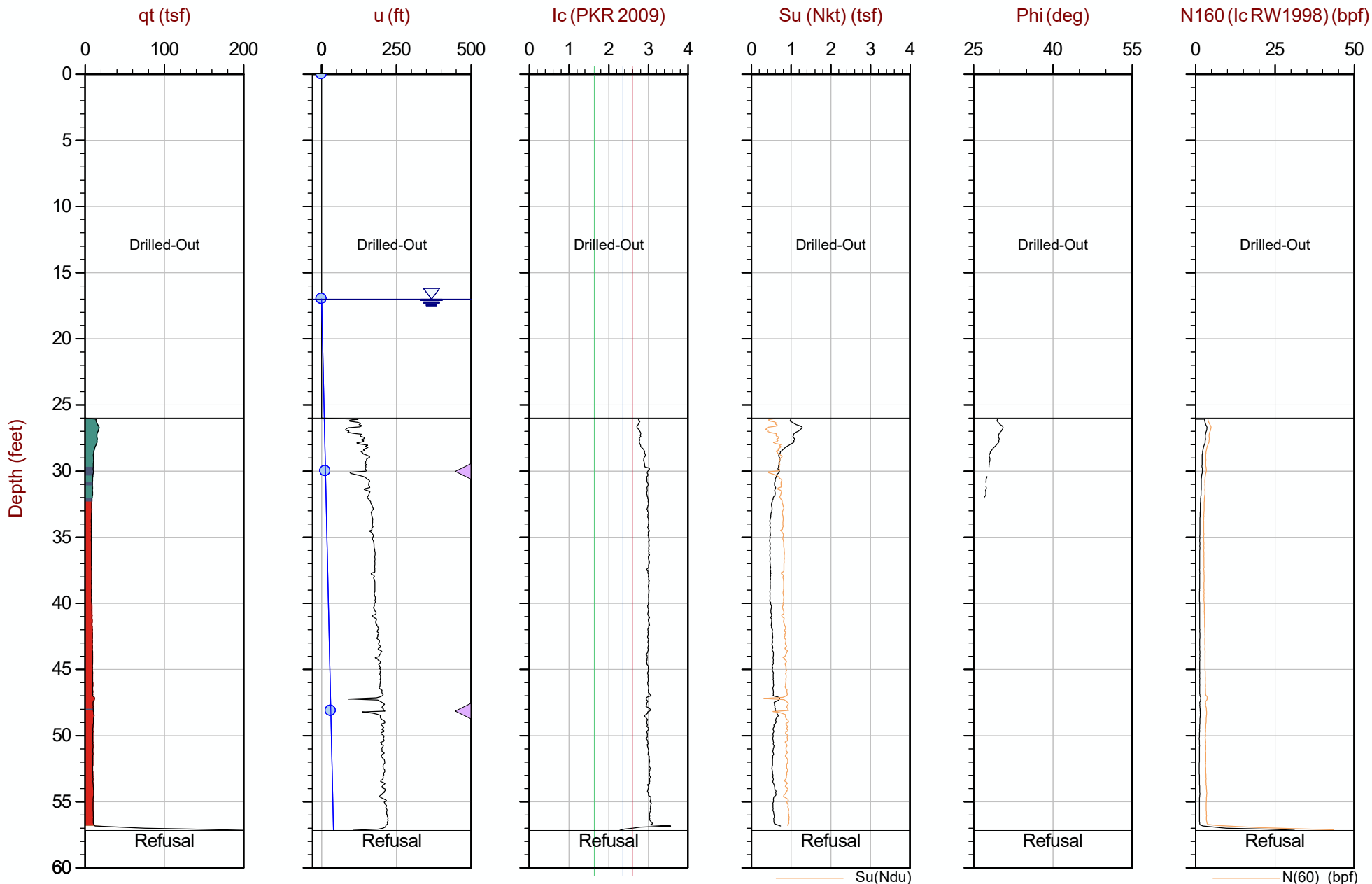
Job No: 20-53-21525

Date: 2020-11-02 10:10

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-101B

Cone: 524:T375F10U500



Max Depth: 17.425 m / 57.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_CP101B.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77142 ° Long: -68.72029 °

Hydrostatic Line ● Ueq ● Assumed Ueq ▲ PPD, Ueq achieved ▲ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

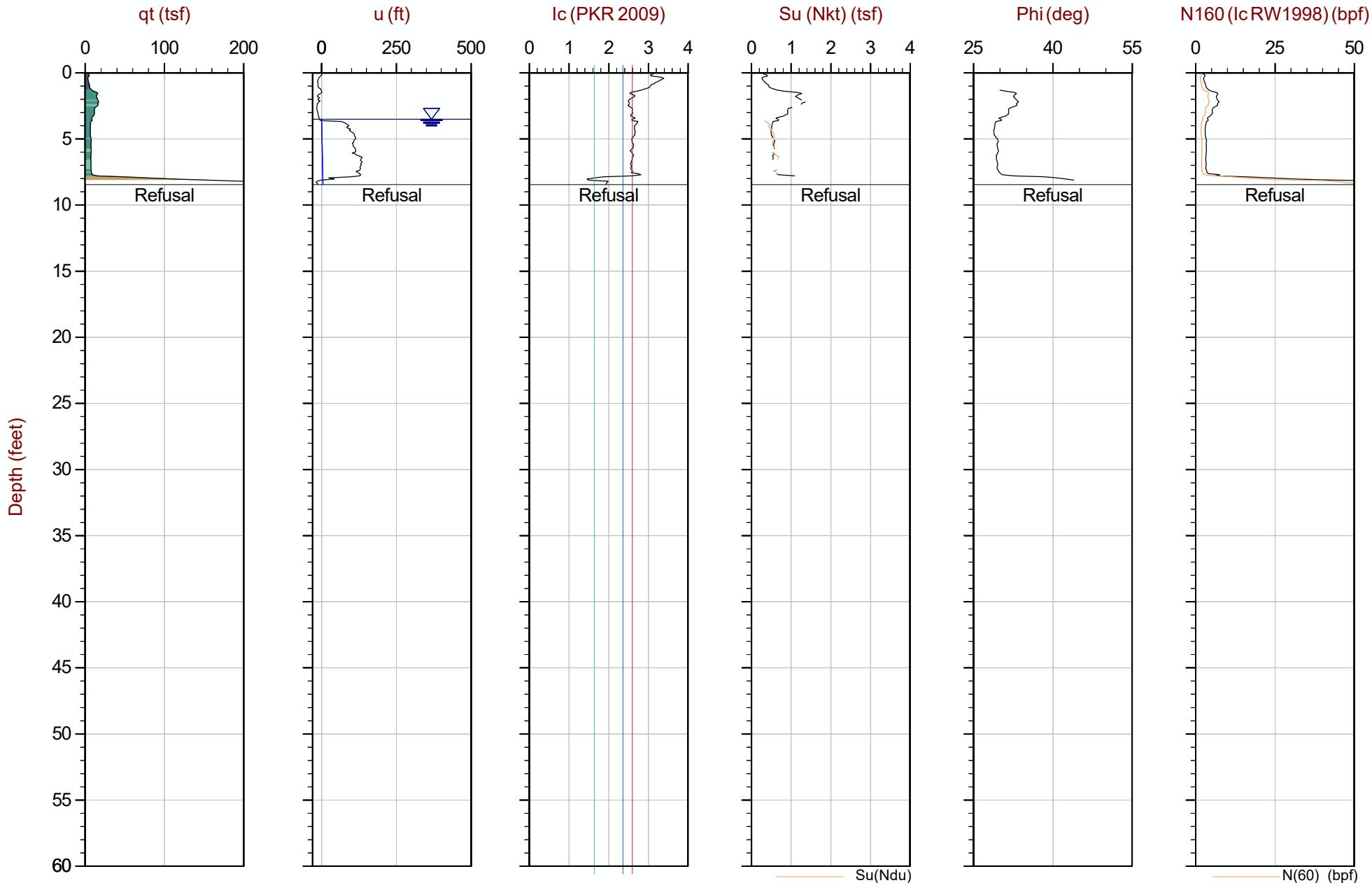
Job No: 20-53-21525

Date: 2020-10-27 14:05

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101

Cone: 524:T375F10U500



Max Depth: 2.575 m / 8.45 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP101.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78975 ° Long: -68.69922 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

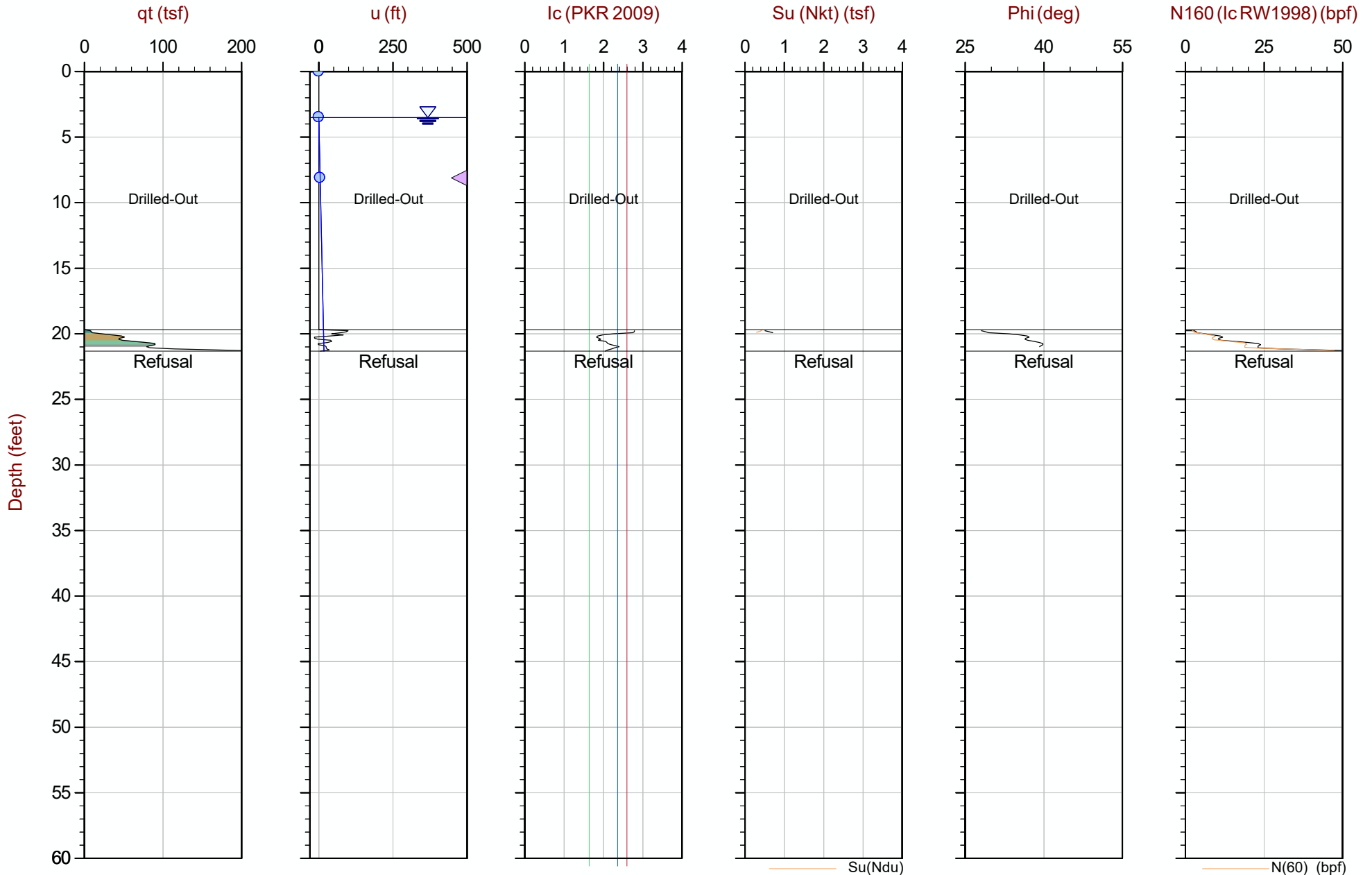
Job No: 20-53-21525

Date: 2020-10-28 08:27

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101B

Cone: 524:T375F10U500



Max Depth: 6.500 m / 21.33 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP101B.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78983 ° Long: -68.69899 °

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

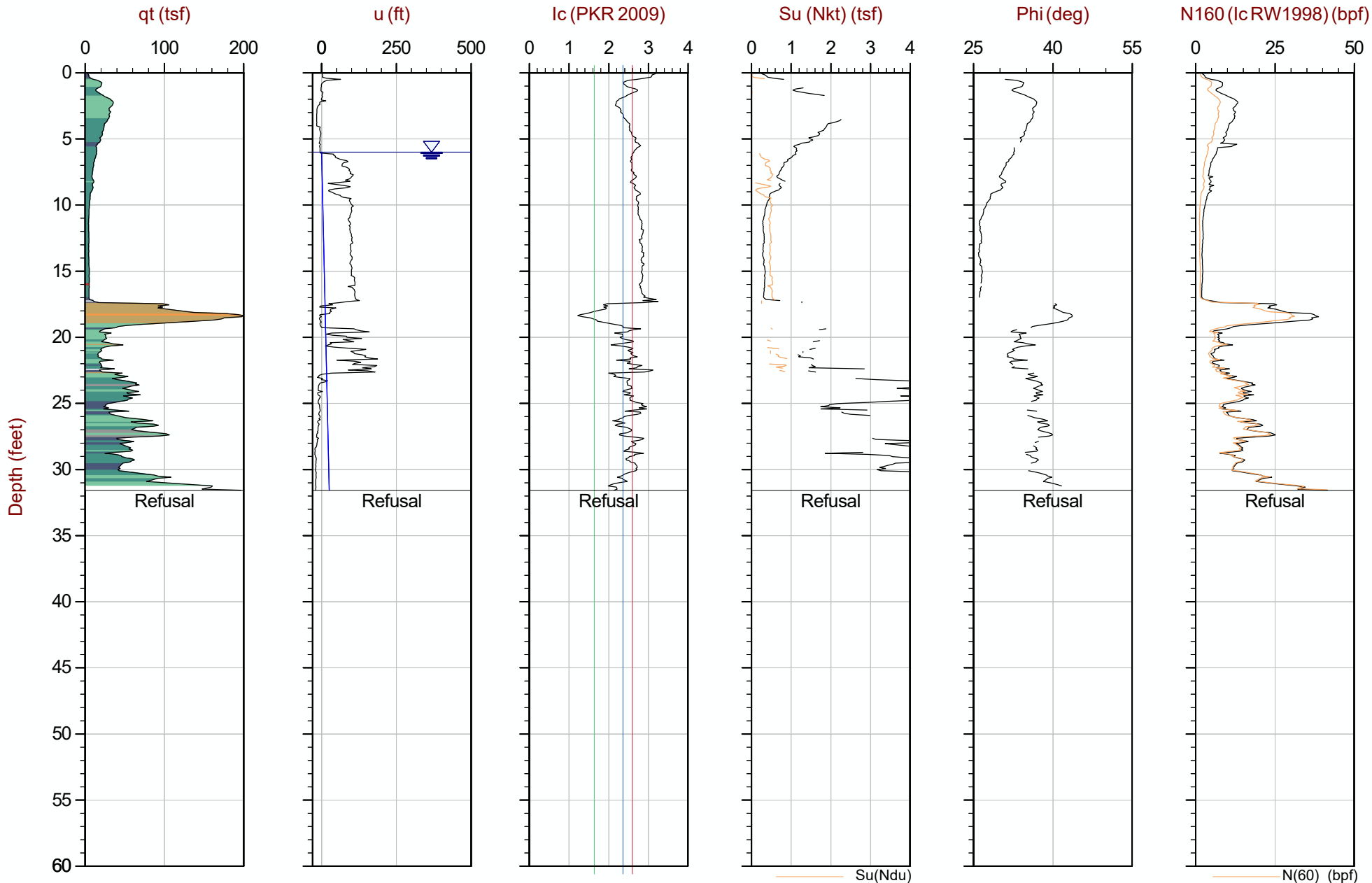
Job No: 20-53-21525

Date: 2020-10-29 08:44

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-102

Cone: 524:T375F10U500



Max Depth: 9.625 m / 31.58 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP102.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79006 ° Long: -68.69877 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

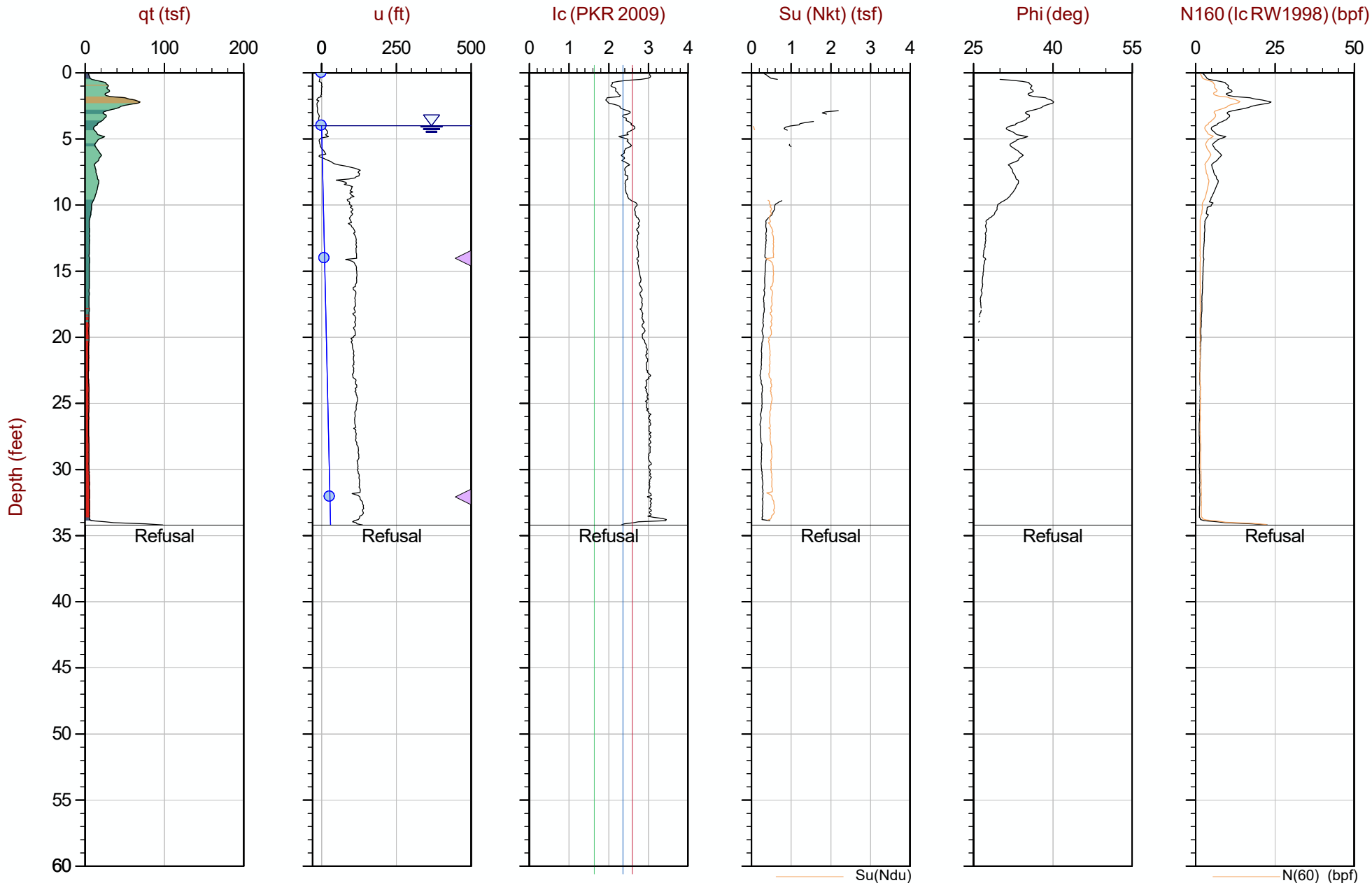
Job No: 20-53-21525

Date: 2020-11-01 12:46

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-103

Cone: 524:T375F10U500



Max Depth: 10.425 m / 34.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 SP103.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77204 ° Long: -68.71887 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

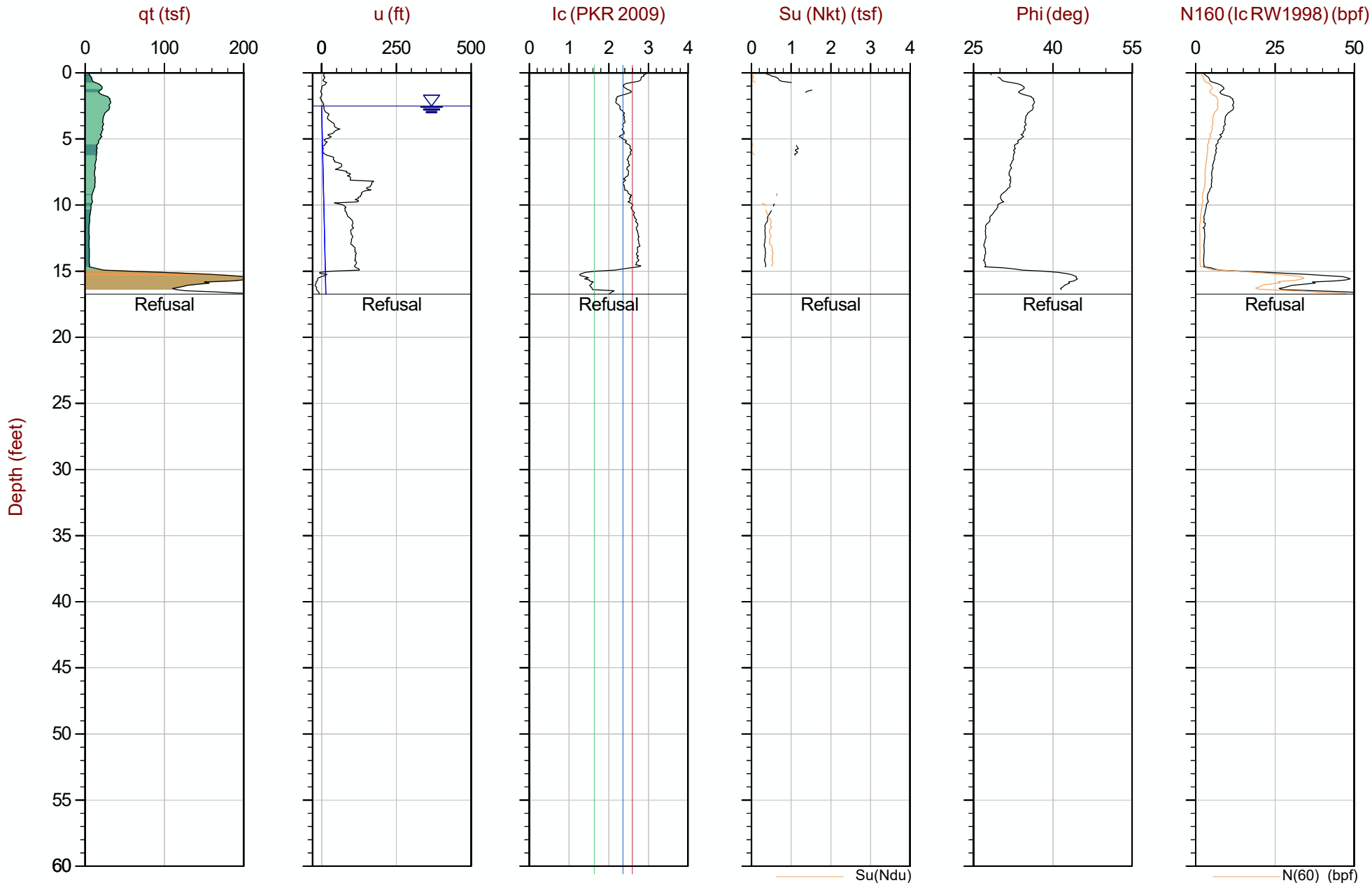
Job No: 20-53-21525

Date: 2020-11-01 12:07

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-104

Cone: 524:T375F10U500



Max Depth: 5.100 m / 16.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP104.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77203 ° Long: -68.71788 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

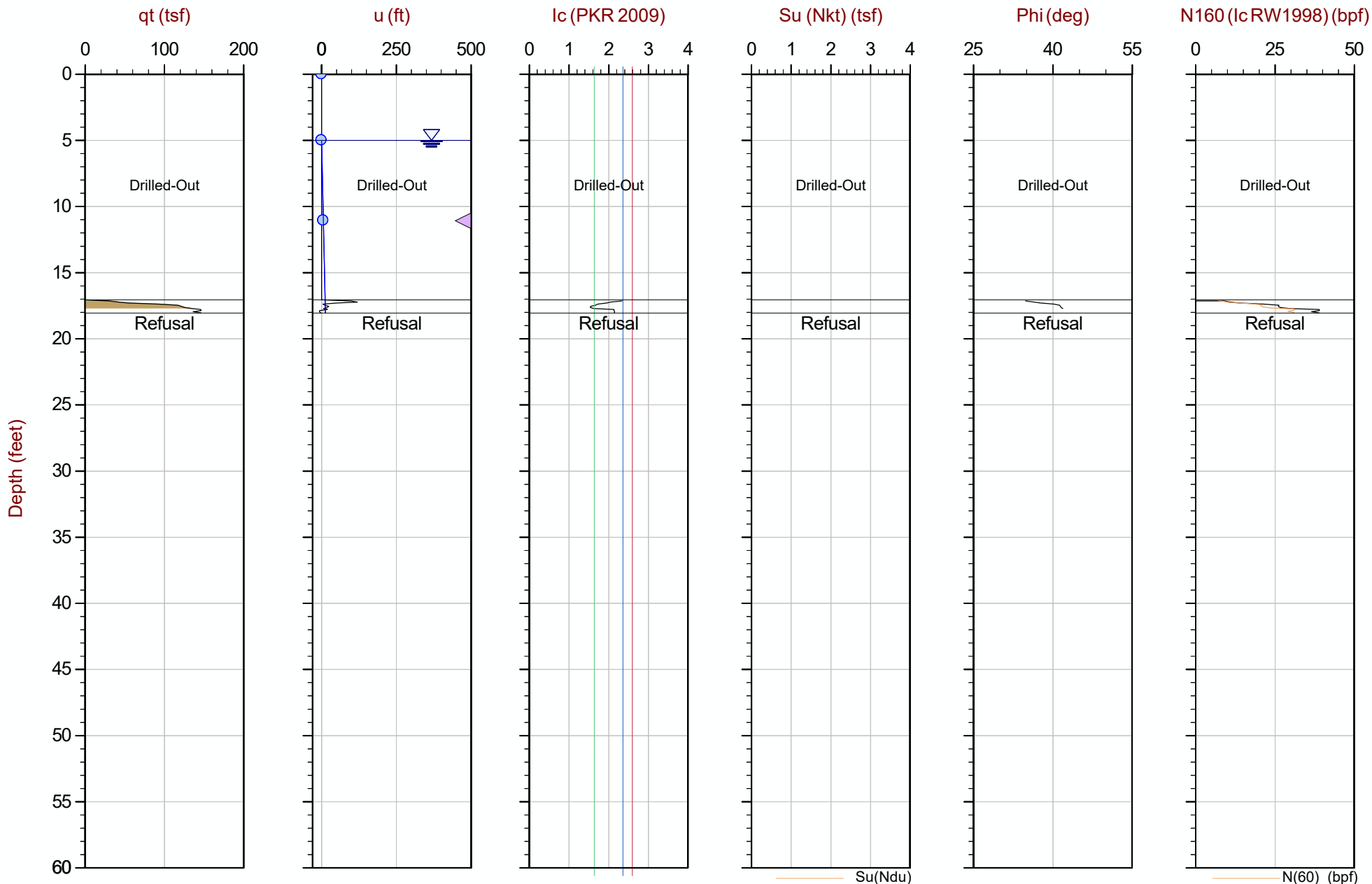
Job No: 20-53-21525

Date: 2020-11-01 08:08

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-104

Cone: 524:T375F10U500



Max Depth: 5.500 m / 18.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP104.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77043 ° Long: -68.71722 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ◀ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

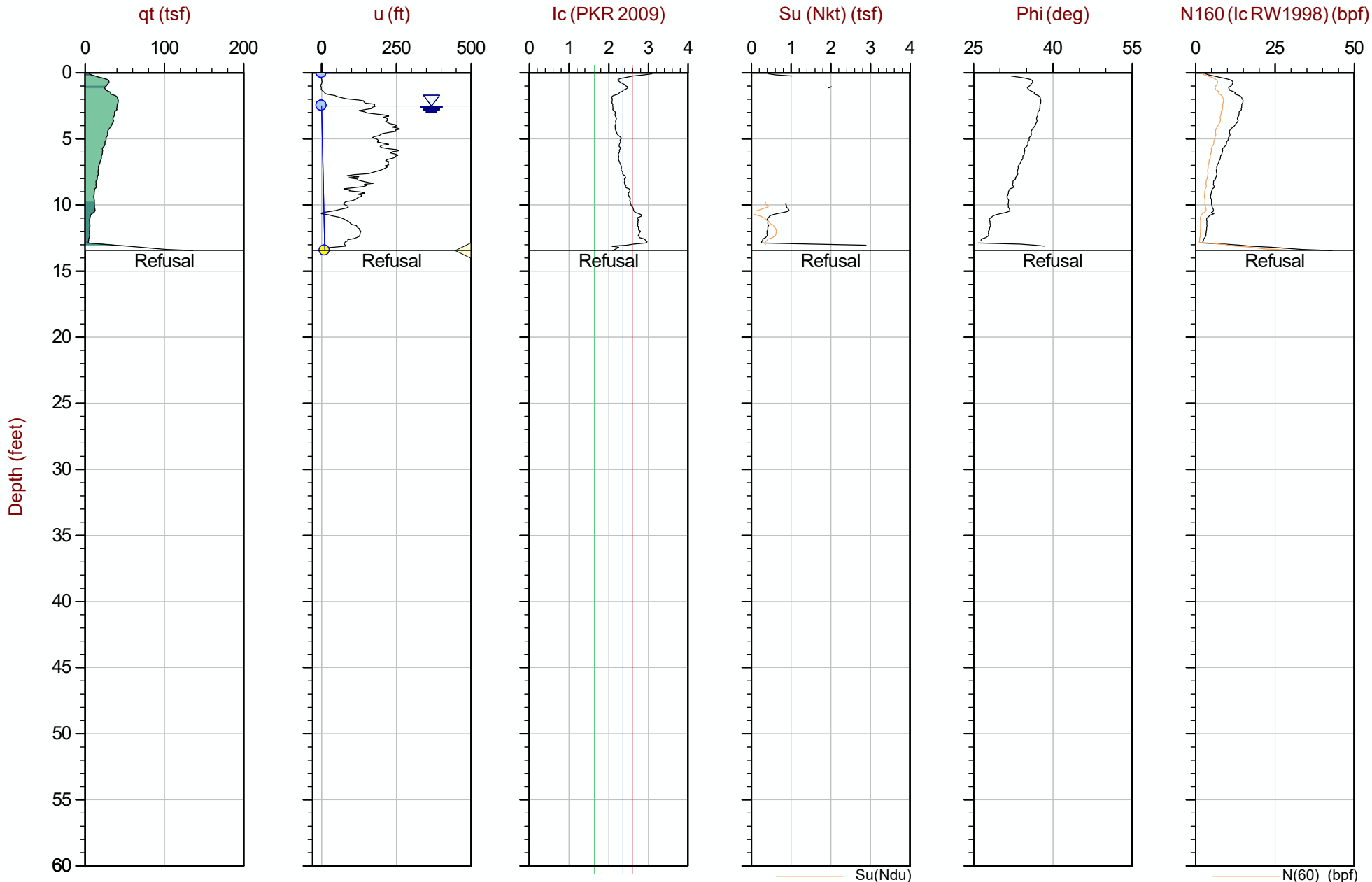
Job No: 20-53-21525

Date: 2020-11-01 10:13

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-105

Cone: 524:T375F10U500



Max Depth: 4.100 m / 13.45 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP105.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77231 ° Long: -68.71711 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

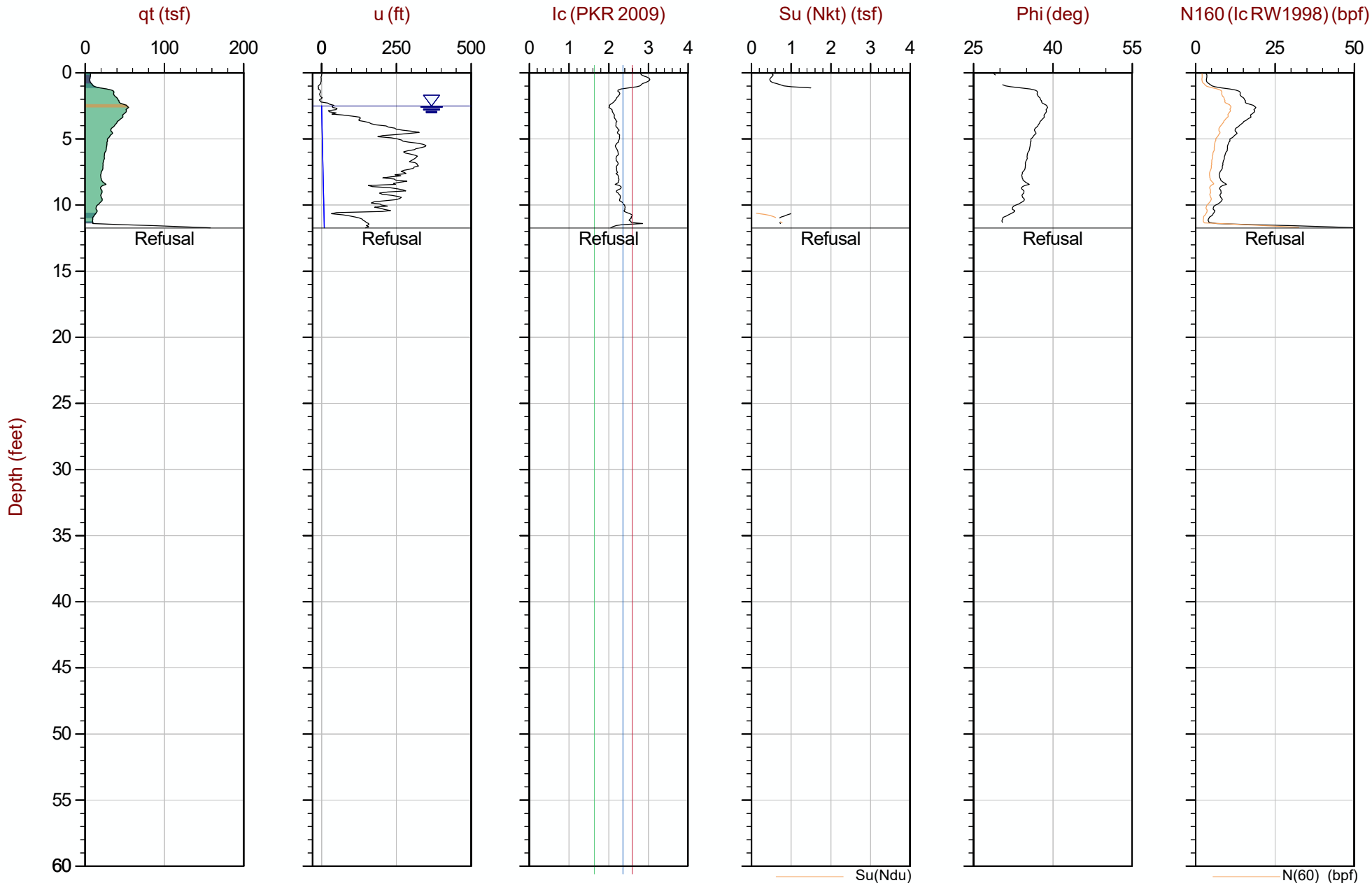
Job No: 20-53-21525

Date: 2020-11-01 09:22

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-106

Cone: 524:T375F10U500



Max Depth: 3.575 m / 11.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP106.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77124 ° Long: -68.71678 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

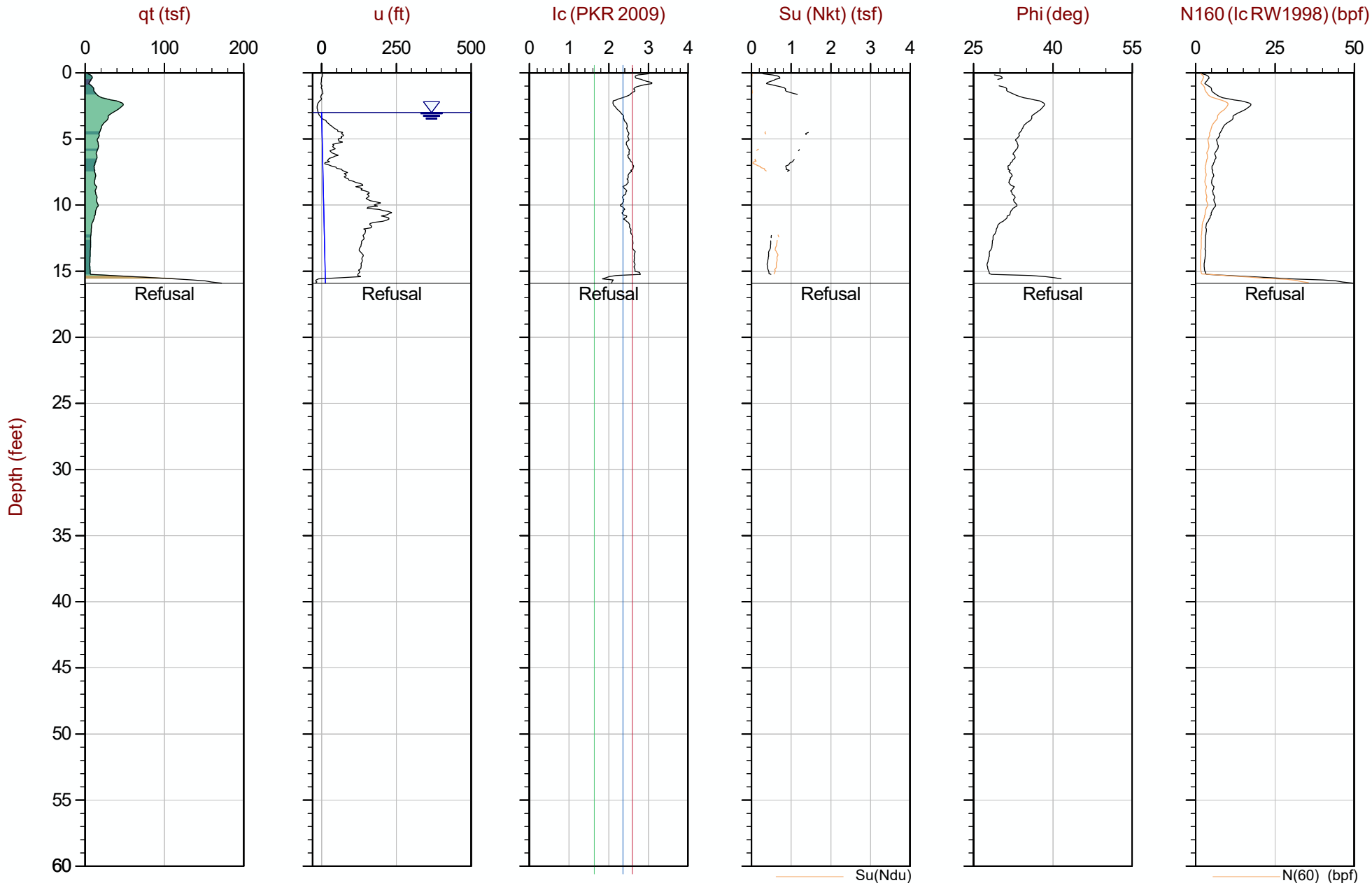
Job No: 20-53-21525

Date: 2020-11-01 11:13

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-108

Cone: 524:T375F10U500



Max Depth: 4.850 m / 15.91 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP108.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77305 ° Long: -68.71653 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ▲ PPD, Ueq achieved ▼ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

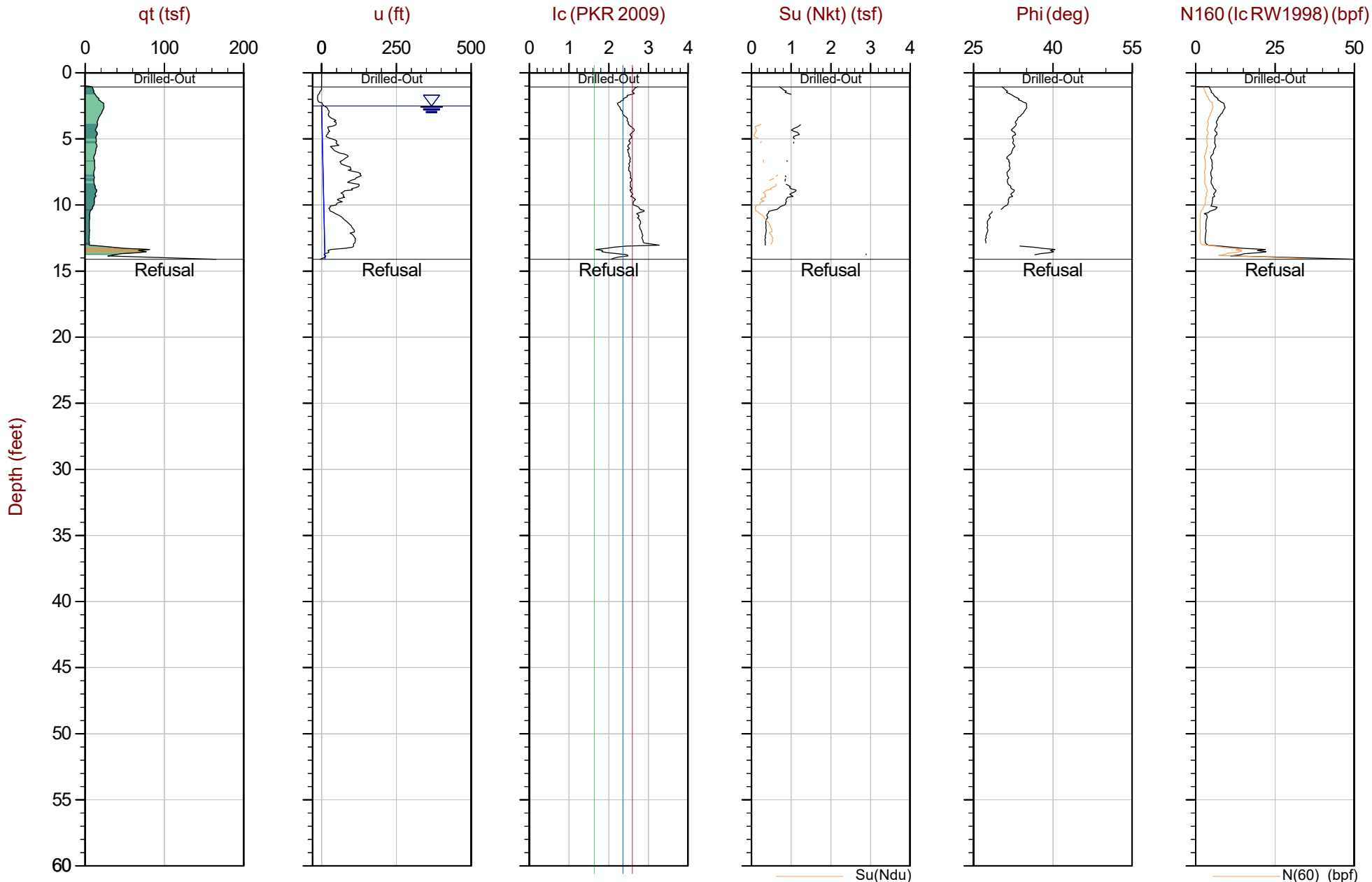
Job No: 20-53-21525

Date: 2020-10-26 09:58

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-109

Cone: 524:T375F10U500



Max Depth: 4.300 m / 14.11 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP109.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77371 ° Long: -68.71513 °

Hydrostatic Line ● Ueq ● Assumed Ueq ▲ PPD, Ueq achieved ▼ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

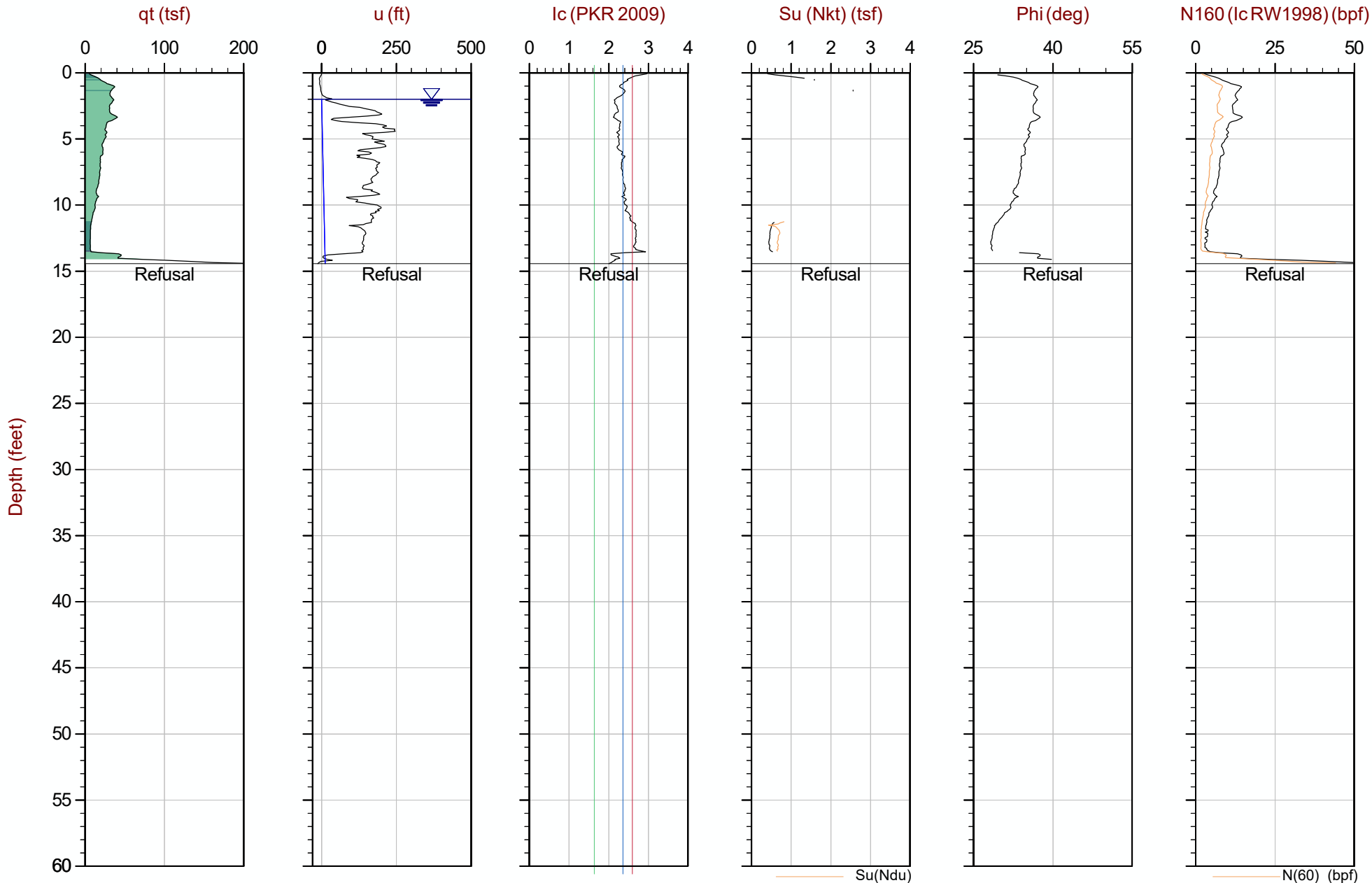
Job No: 20-53-21525

Date: 2020-10-26 11:12

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-110

Cone: 524:T375F10U500



Max Depth: 4.400 m / 14.44 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP110.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77429 ° Long: -68.71409 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

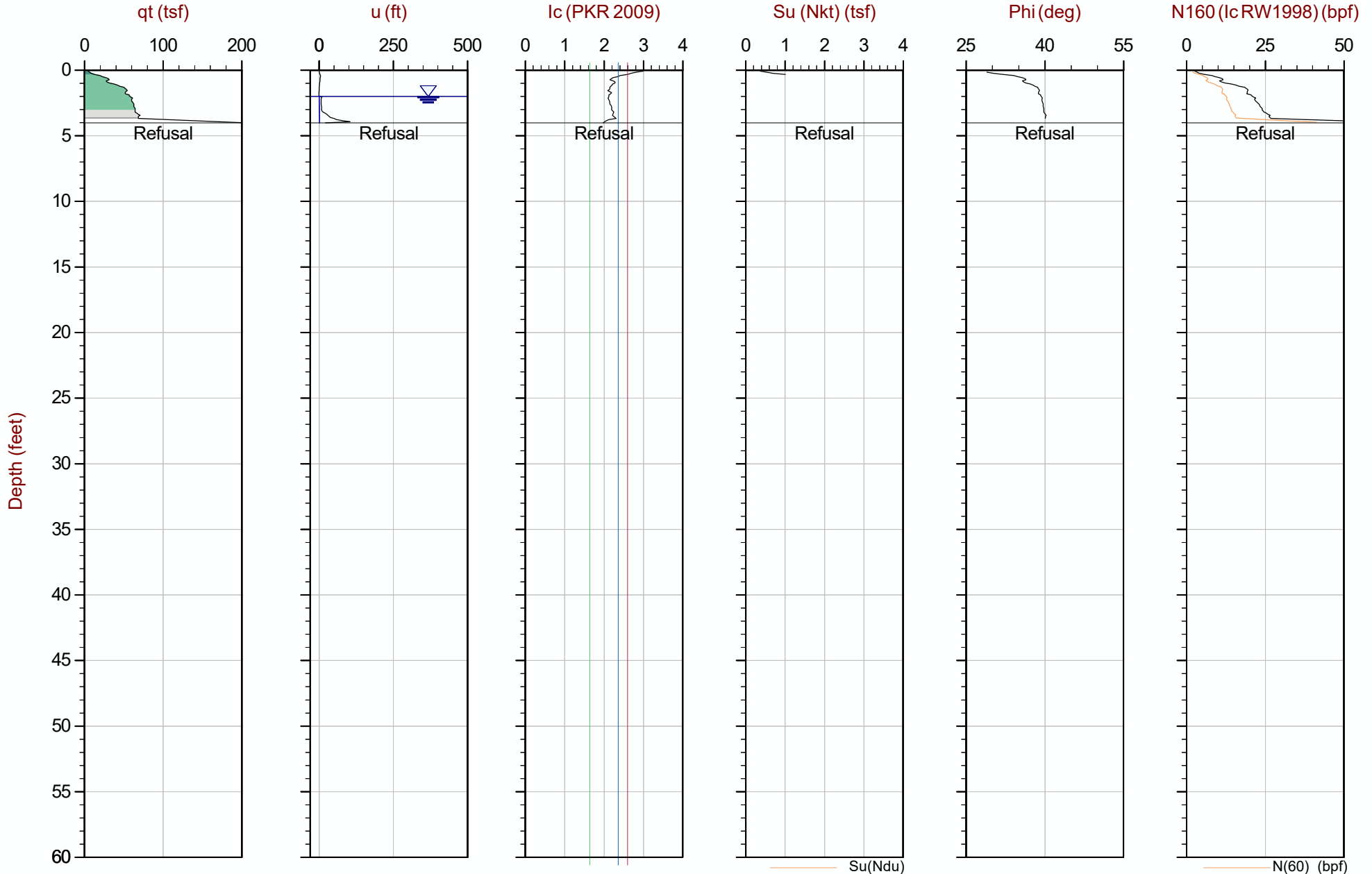
Job No: 20-53-21525

Date: 2020-10-26 12:14

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-111

Cone: 524:T375F10U500



Max Depth: 1.225 m / 4.02 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP111.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77508 ° Long: -68.71296 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

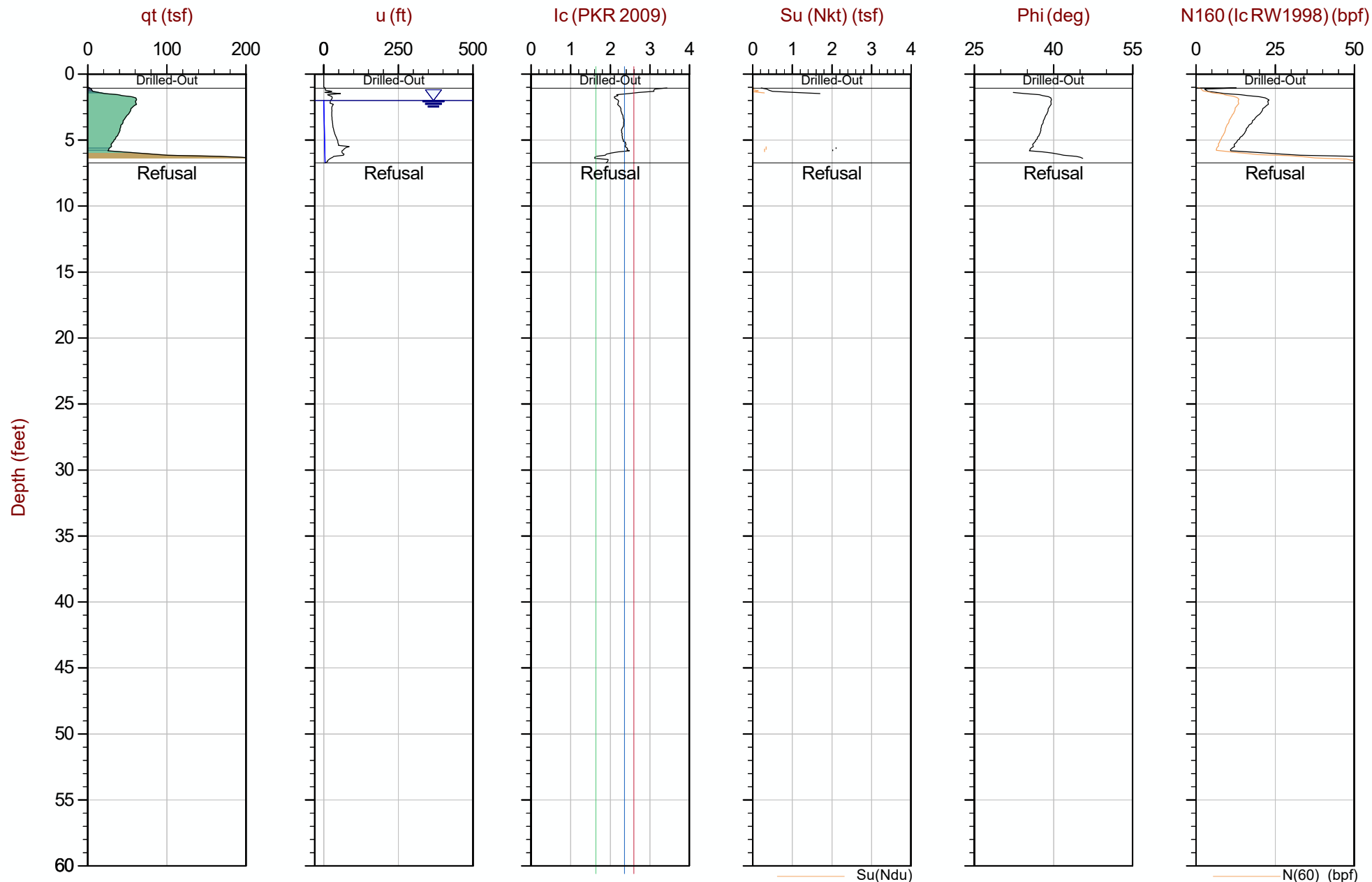
Job No: 20-53-21525

Date: 2020-10-26 12:35

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-111B

Cone: 524:T375F10U500



Max Depth: 2.050 m / 6.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP111B.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77509 ° Long: -68.71294 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

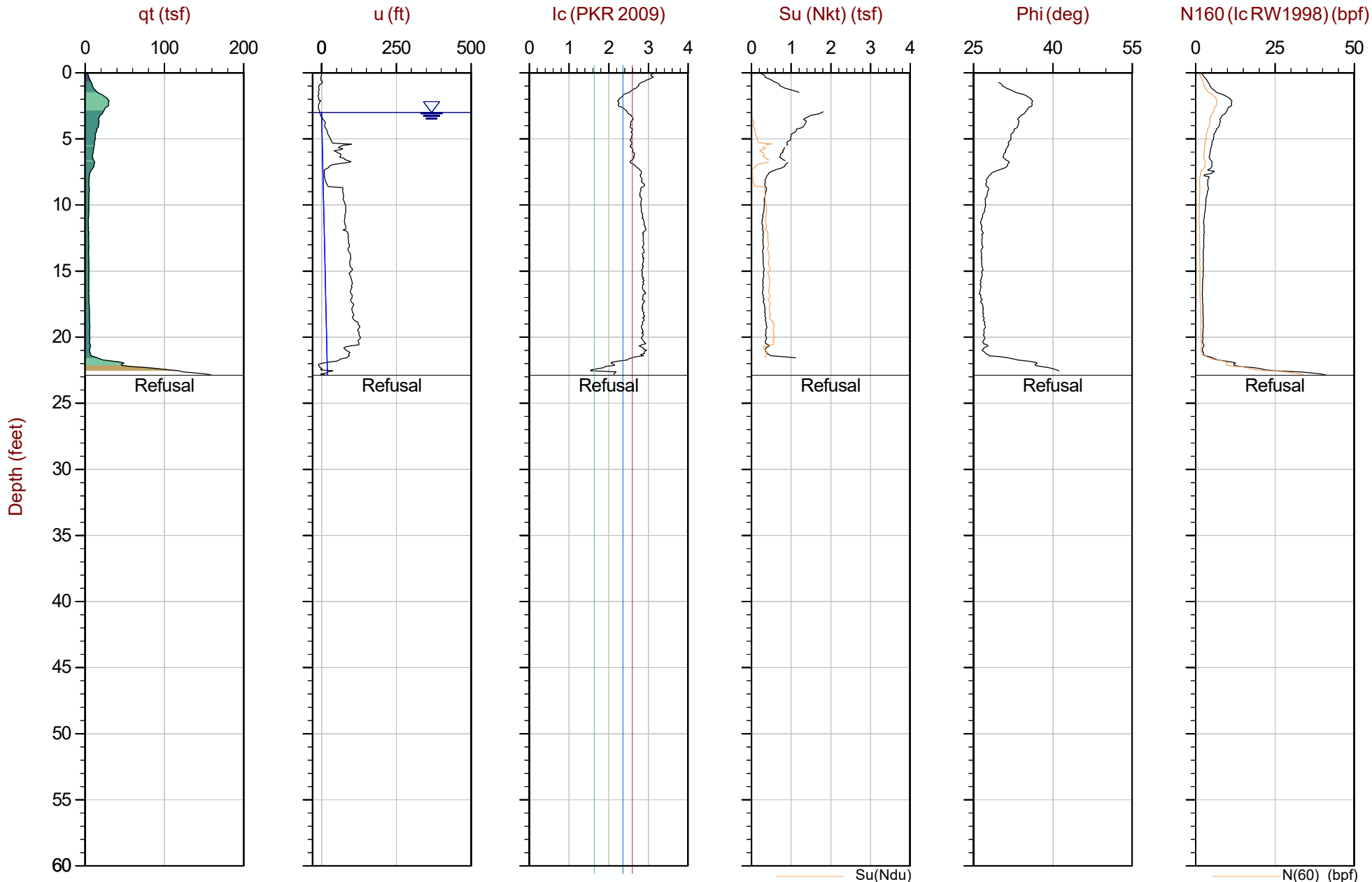
Job No: 20-53-21525

Date: 2020-10-26 13:32

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-112

Cone: 524:T375F10U500



Max Depth: 6.975 m / 22.88 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP112.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77594 ° Long: -68.71206 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

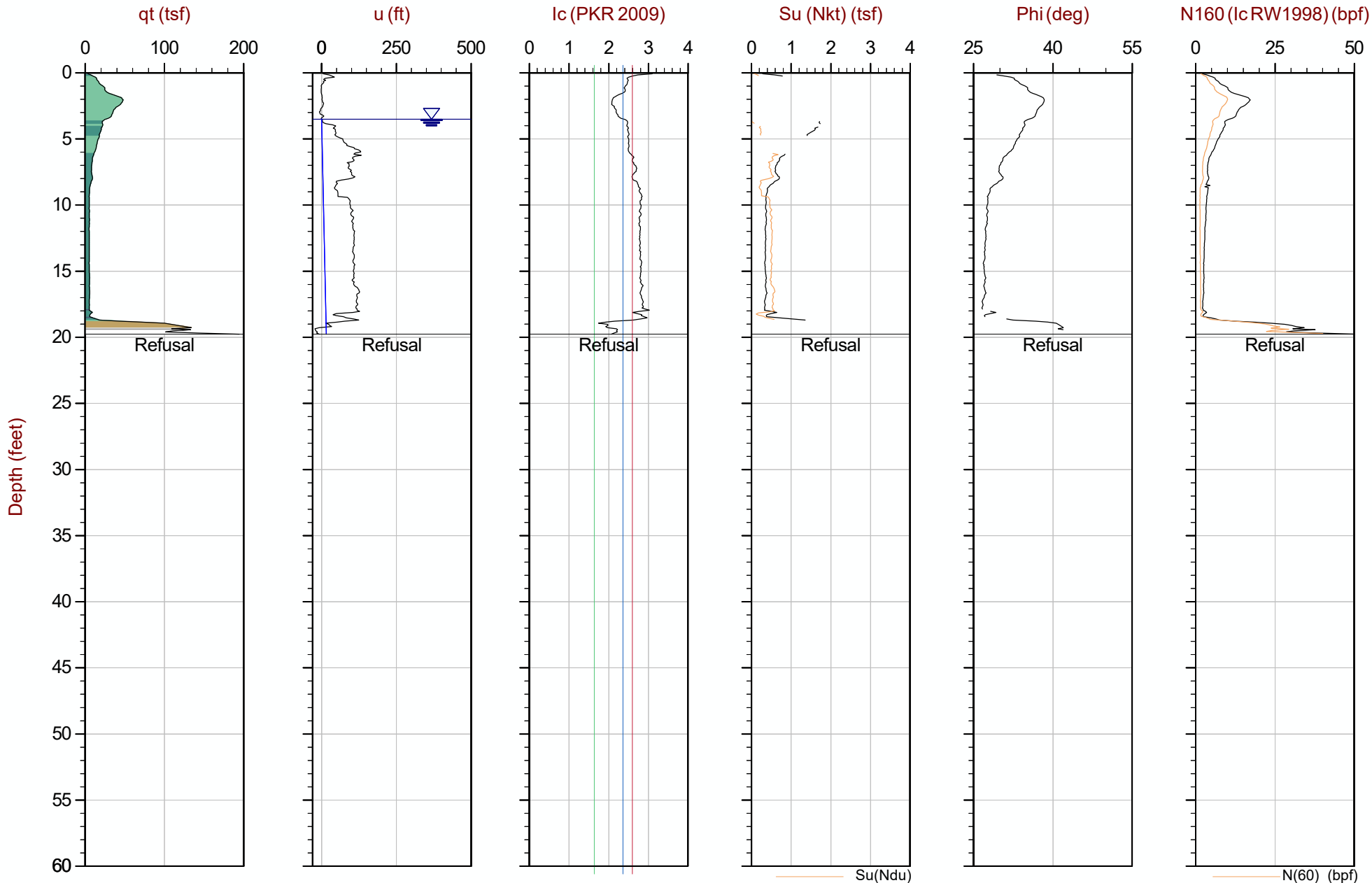
Job No: 20-53-21525

Date: 2020-10-26 14:50

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-113

Cone: 524:T375F10U500



Max Depth: 6.025 m / 19.77 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP113.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77673 ° Long: -68.71133 °

— Hydrostatic Line ● Ueq ● Assumed Ueq ◀ PPD, Ueq achieved ▶ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

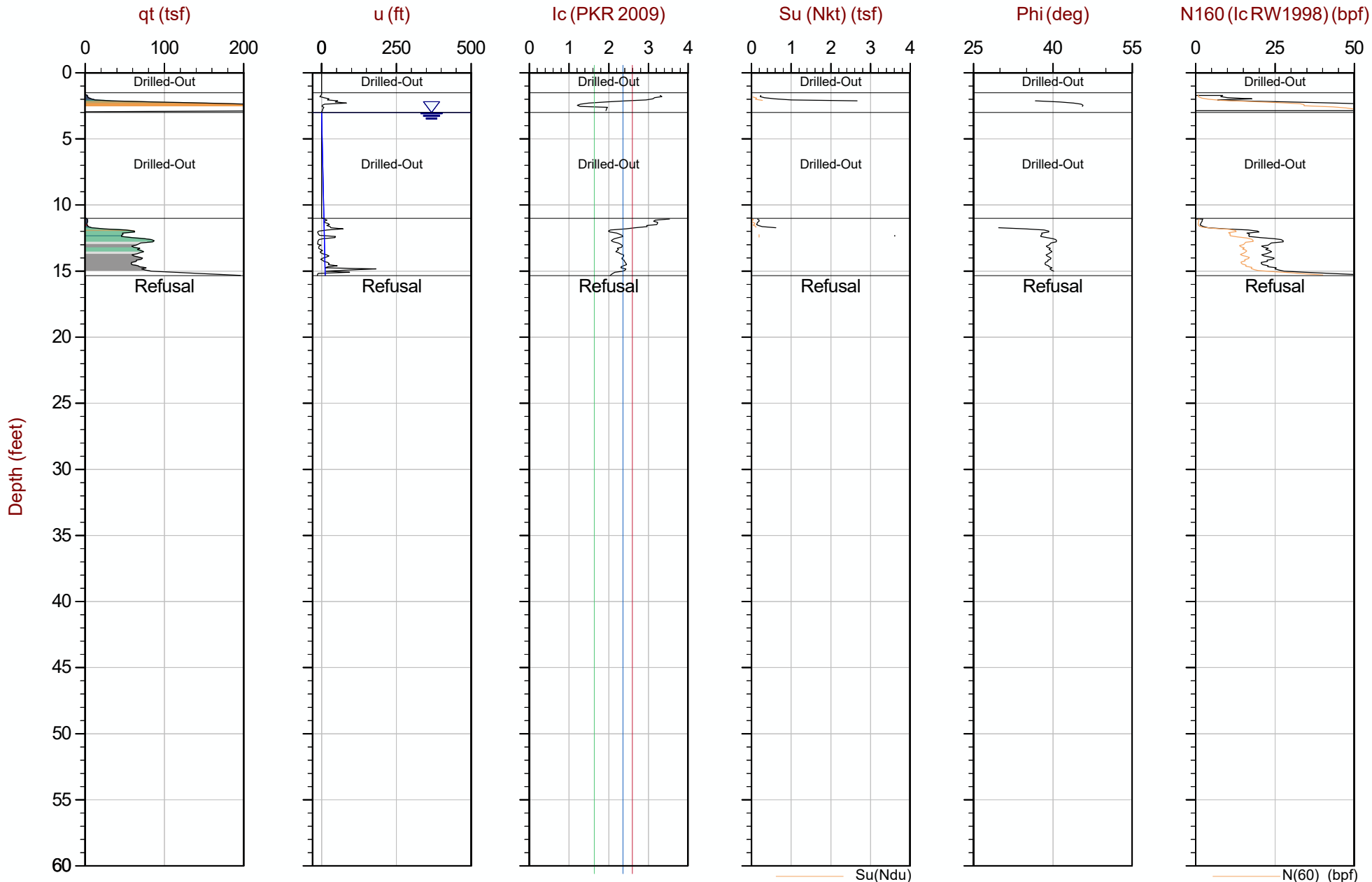
Job No: 20-53-21525

Date: 2020-10-27 10:25

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-114

Cone: 524:T375F10U500



Max Depth: 4.675 m / 15.34 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP114.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78939 ° Long: -68.69967 °

Hydrostatic Line ● Ueq ● Assumed Ueq ▲ PPD, Ueq achieved ▼ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

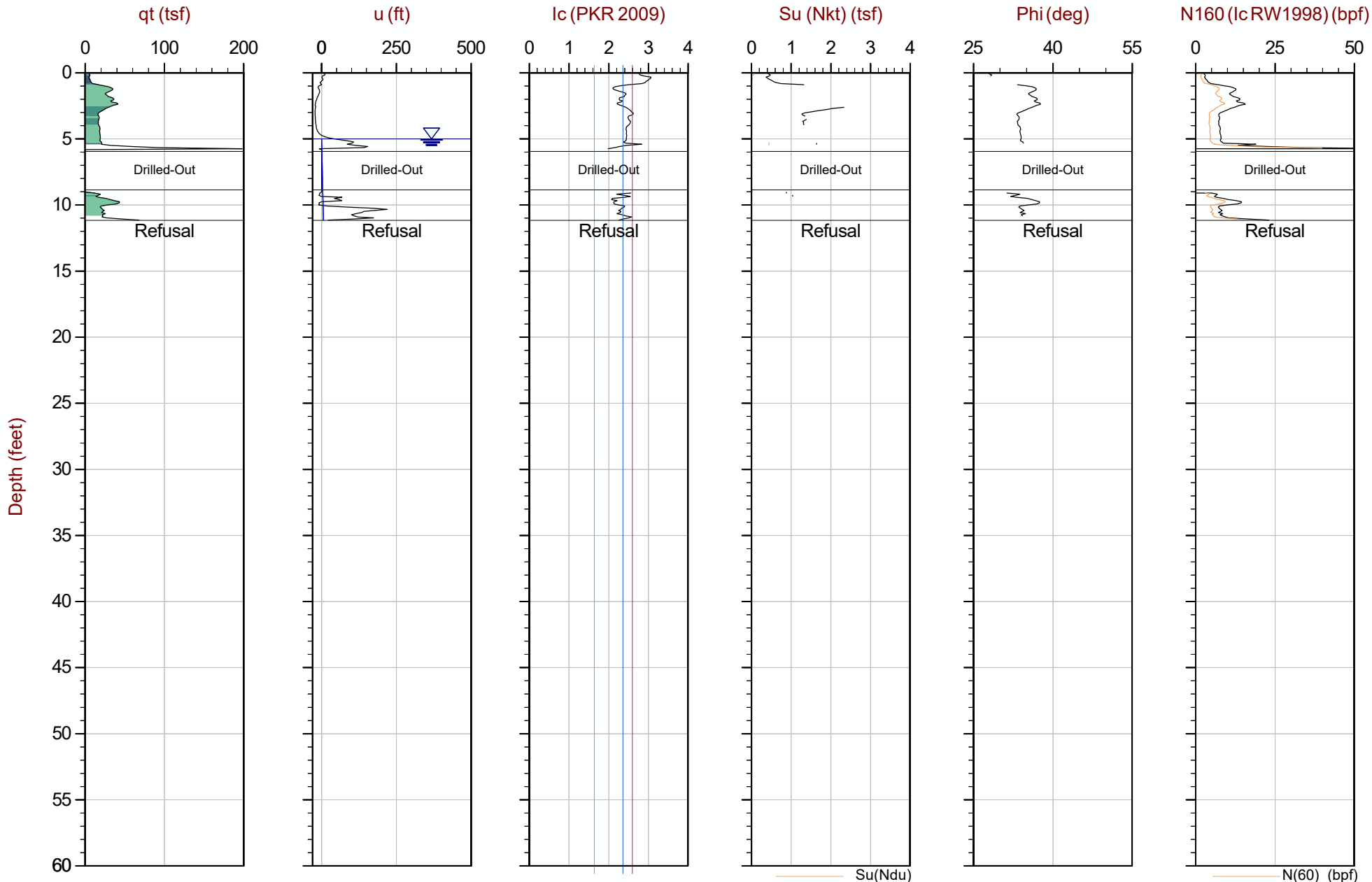
Job No: 20-53-21525

Date: 2020-10-27 12:04

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-115

Cone: 524:T375F10U500



Max Depth: 3.400 m / 11.15 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP115.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78969 ° Long: -68.69938 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

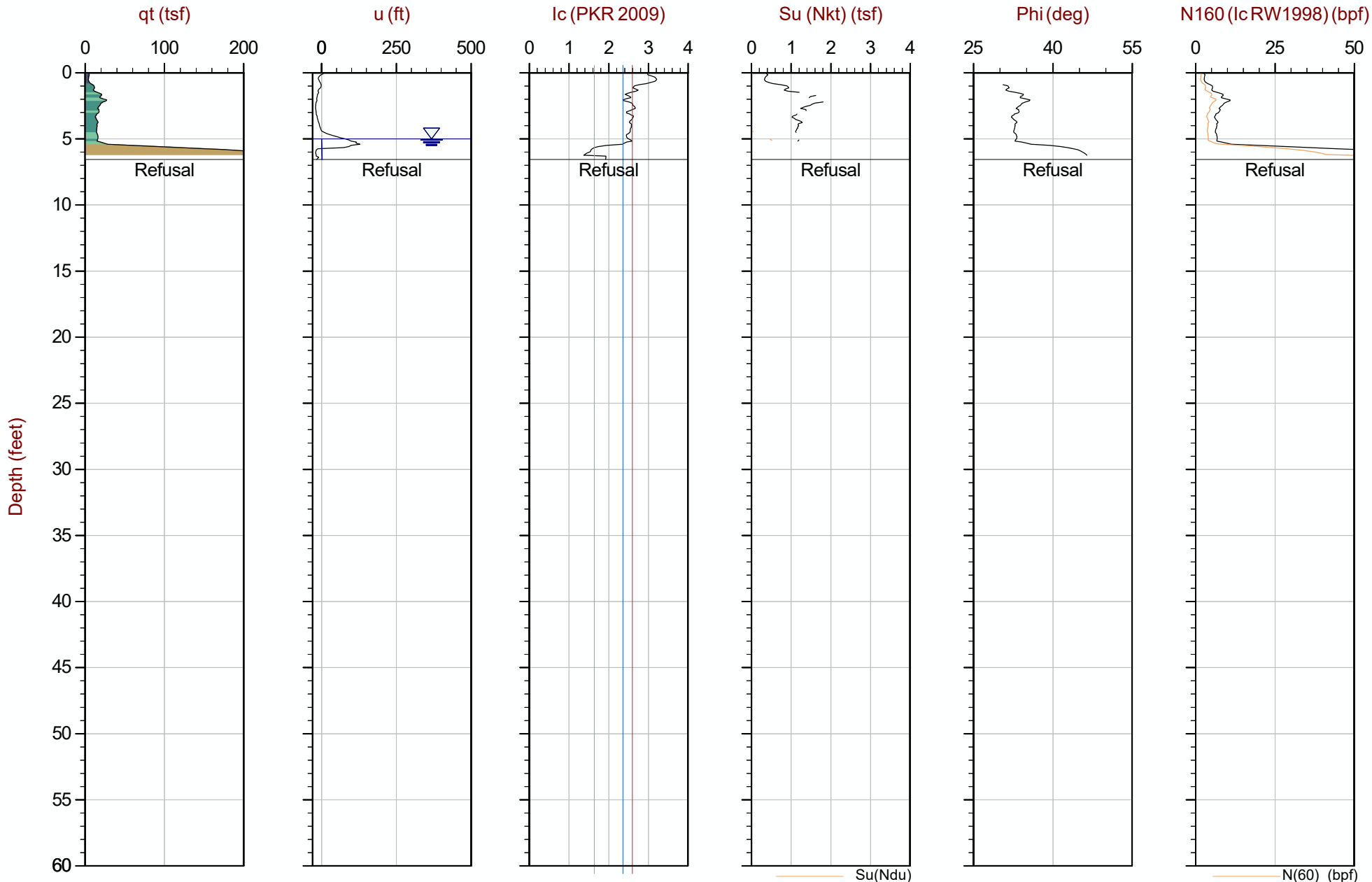
Job No: 20-53-21525

Date: 2020-10-27 13:16

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-115B

Cone: 524:T375F10U500



Max Depth: 2.000 m / 6.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP115B.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78971 ° Long: -68.69936 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

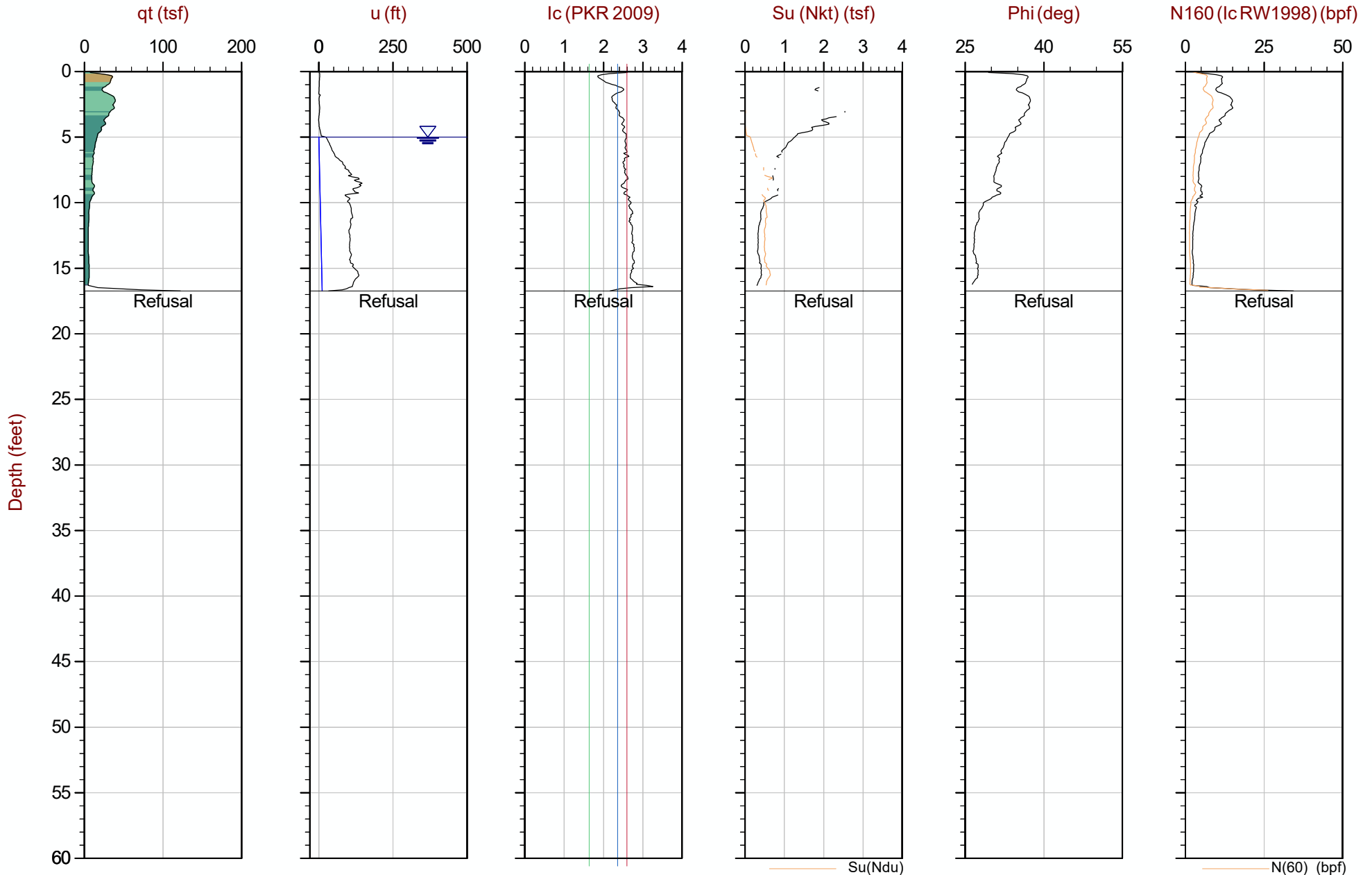
Job No: 20-53-21525

Date: 2020-10-29 10:24

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-116

Cone: 524:T375F10U500



Max Depth: 5.100 m / 16.73 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP116.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79045 ° Long: -68.69834 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

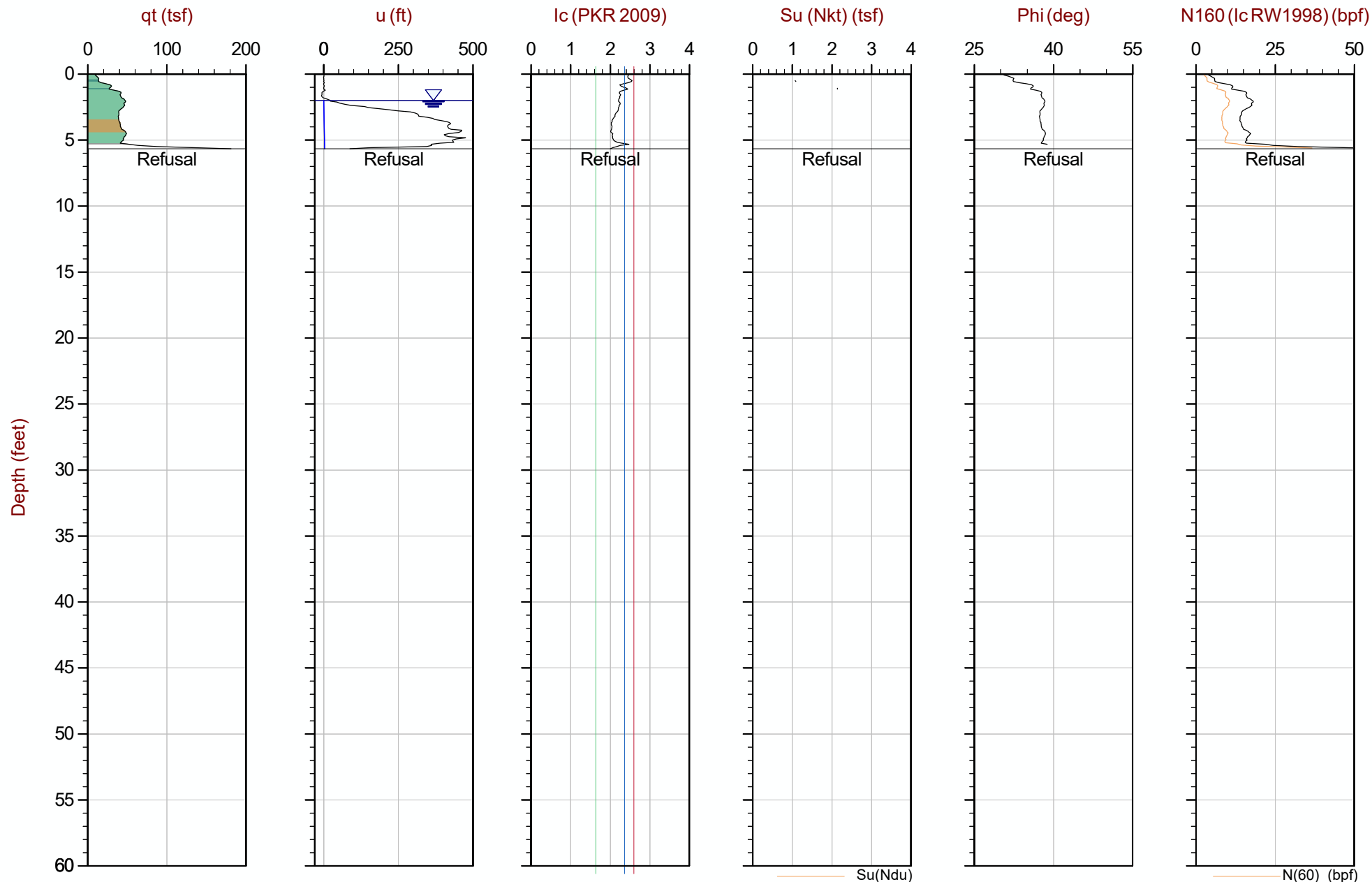
Job No: 20-53-21525

Date: 2020-10-29 11:34

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-117

Cone: 524:T375F10U500



Max Depth: 1.725 m / 5.66 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP117.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79429 ° Long: -68.69303 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

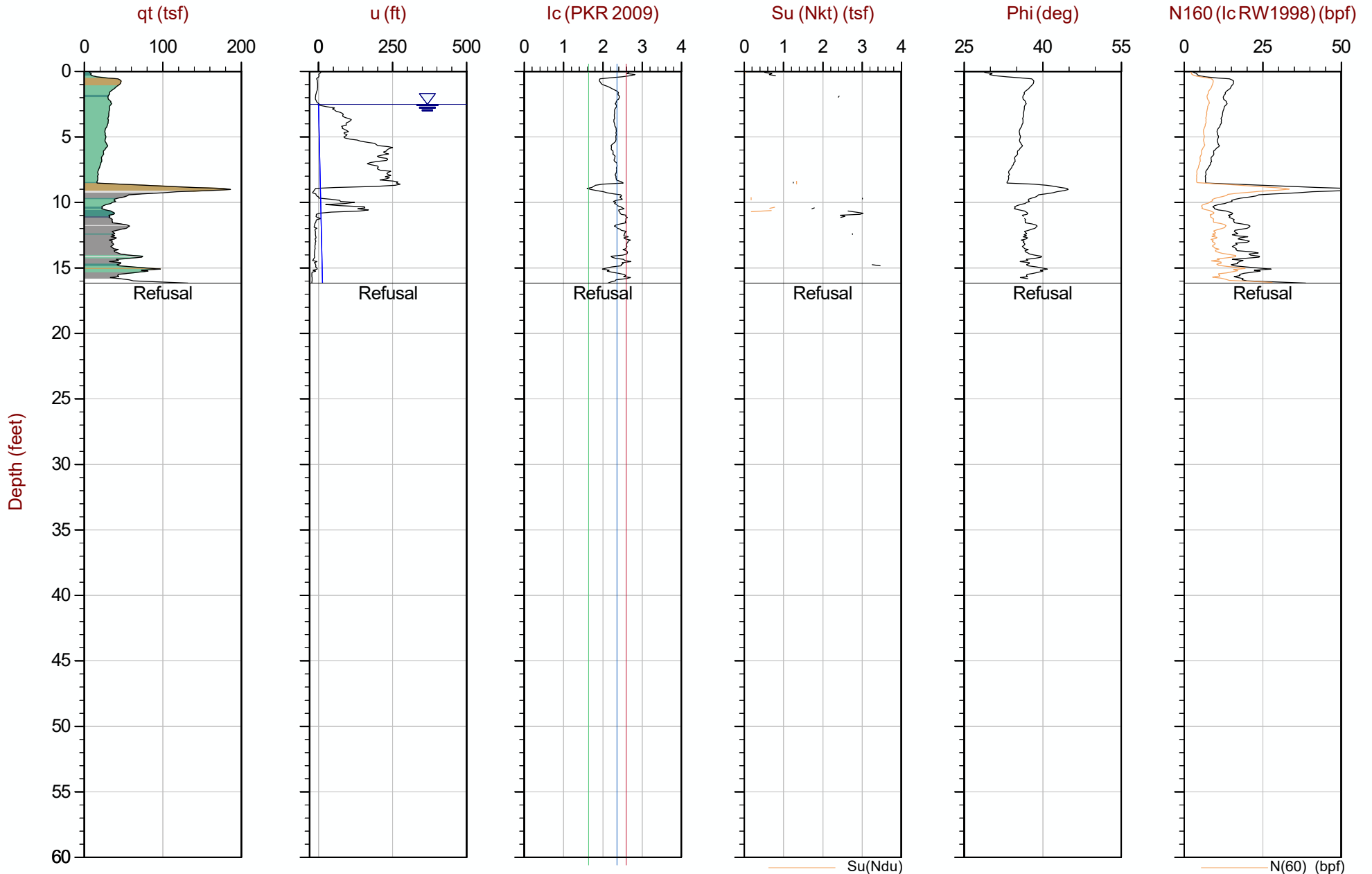
Job No: 20-53-21525

Date: 2020-10-29 12:05

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-118

Cone: 524:T375F10U500



Max Depth: 4.925 m / 16.16 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP118.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79470 ° Long: -68.69252 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

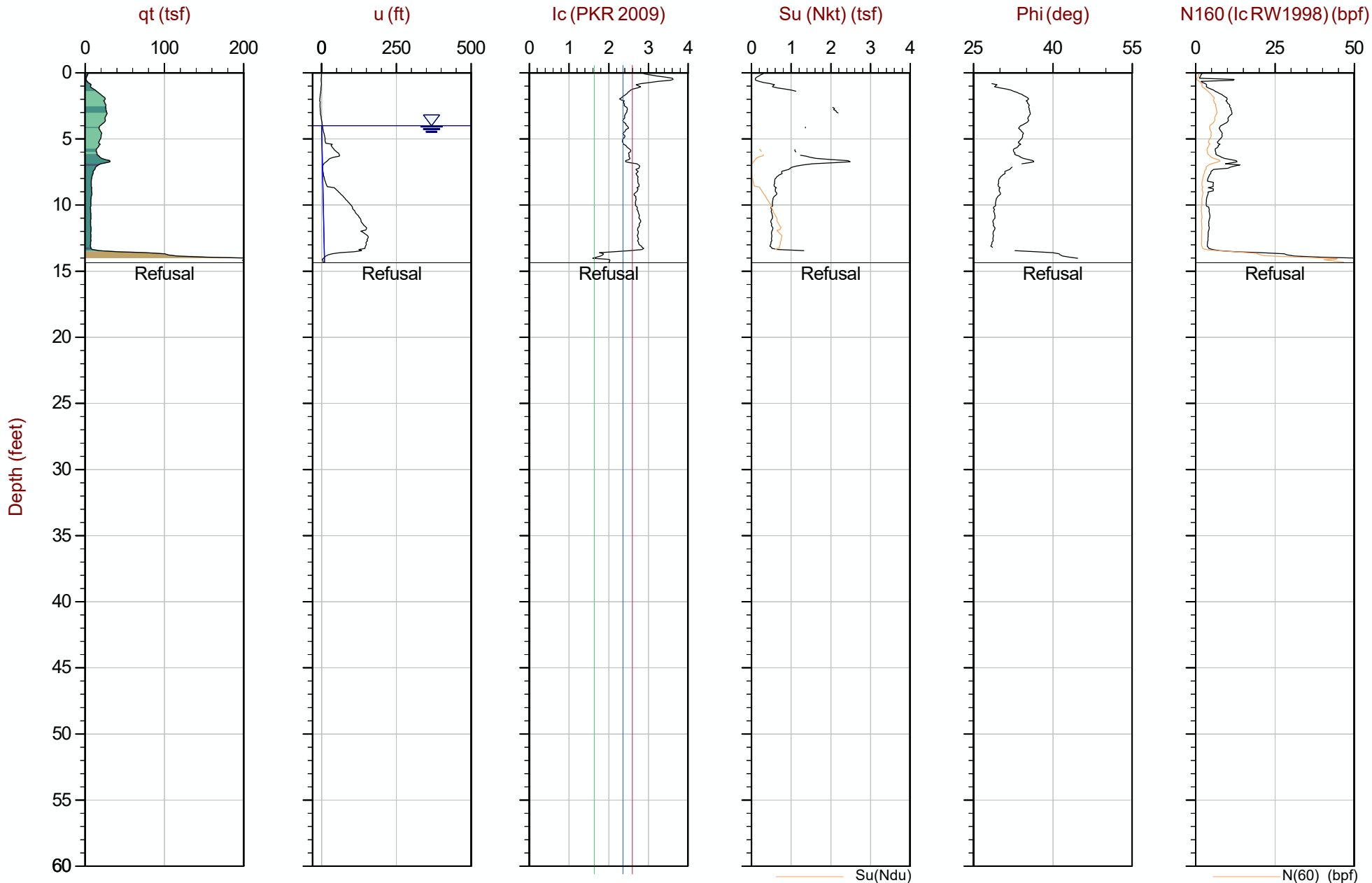
Job No: 20-53-21525

Date: 2020-10-29 13:17

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-119

Cone: 524:T375F10U500



Max Depth: 4.375 m / 14.35 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP119.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79490 ° Long: -68.69217 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

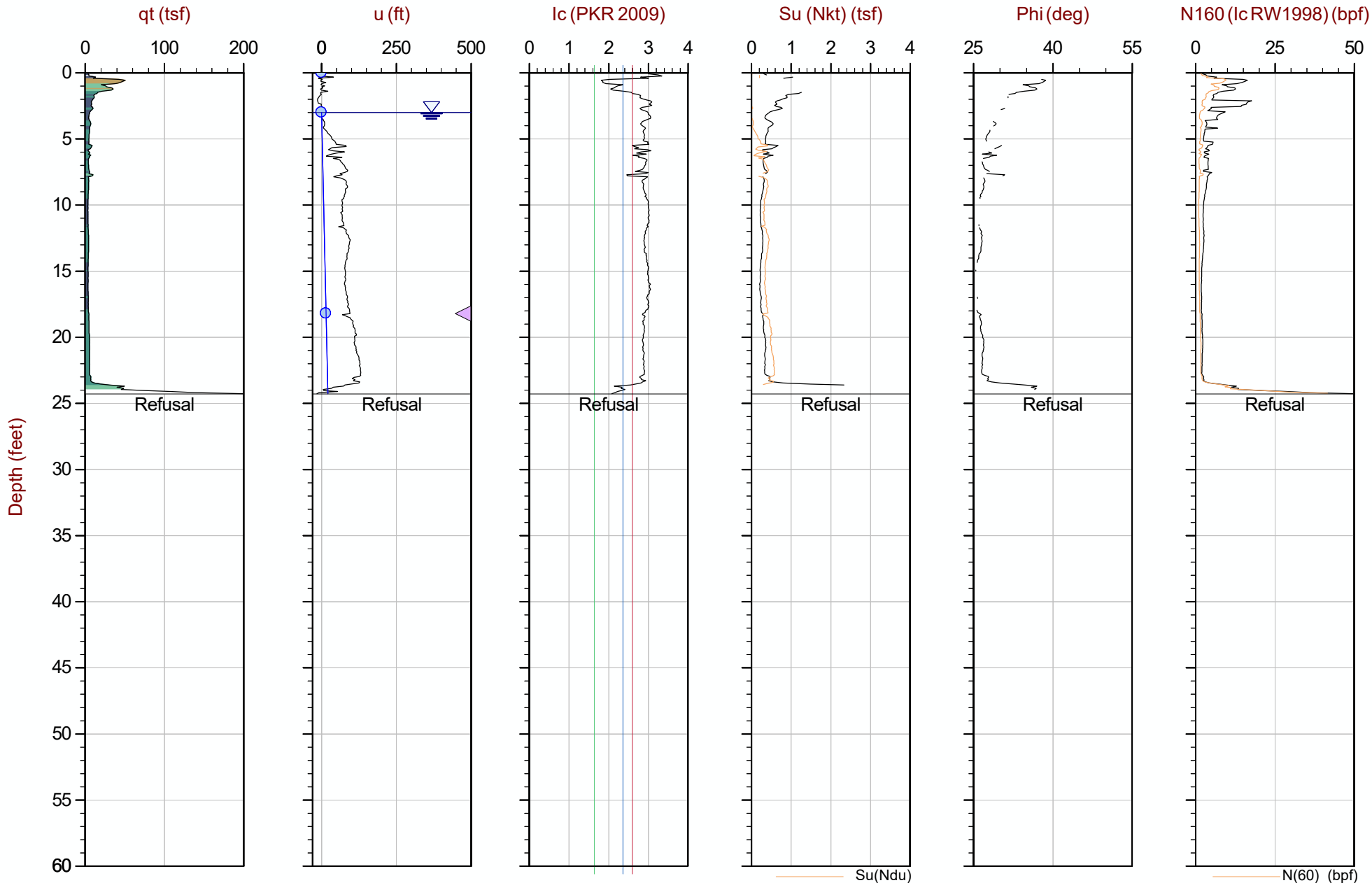
Job No: 20-53-21525

Date: 2020-10-30 12:58

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-122

Cone: 524:T375F10U500



Max Depth: 7.400 m / 24.28 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP122.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79780 ° Long: -68.68837 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

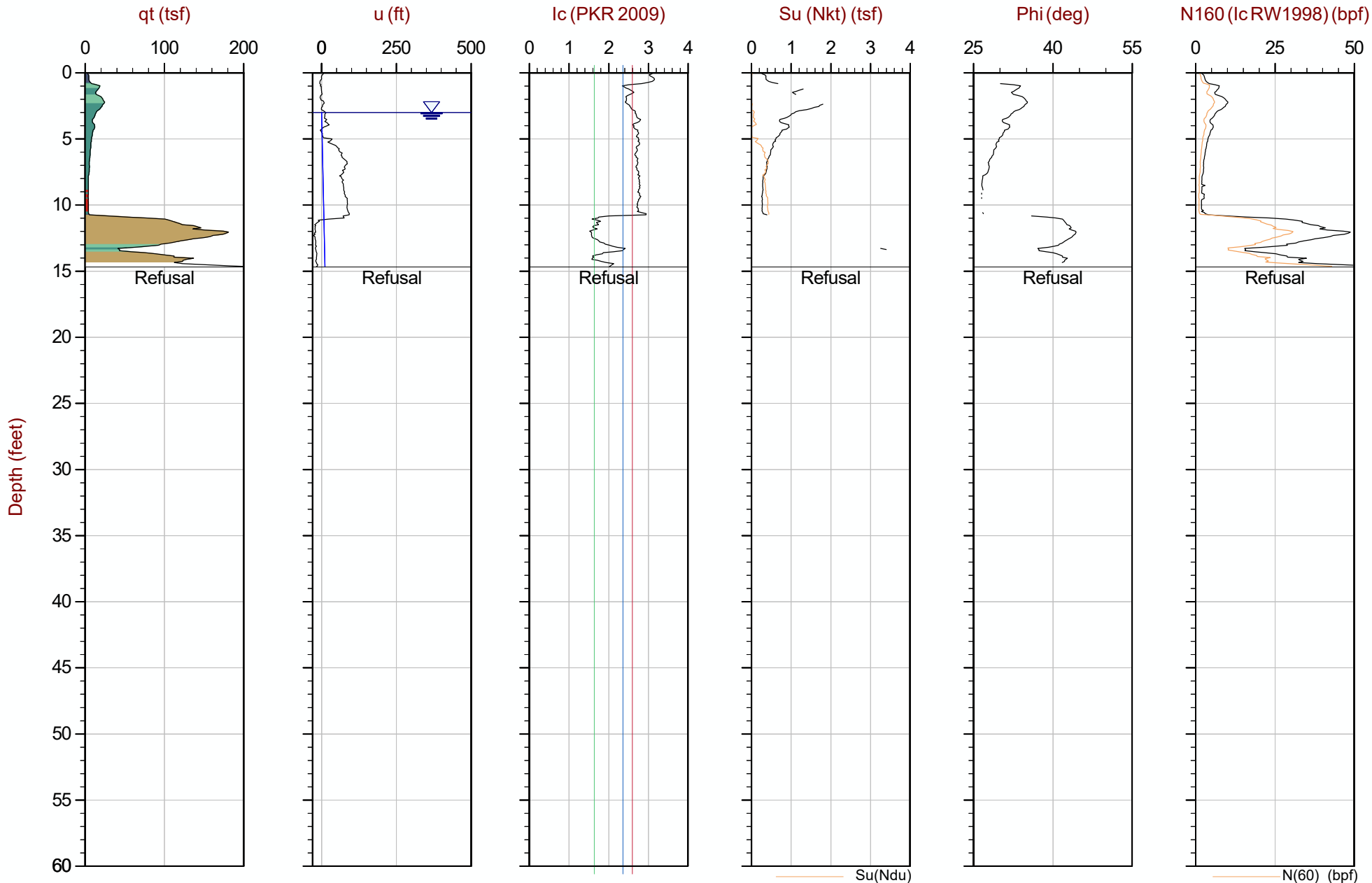
Job No: 20-53-21525

Date: 2020-10-30 11:30

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-123

Cone: 524:T375F10U500



Max Depth: 4.475 m / 14.68 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP123.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79816 ° Long: -68.68809 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

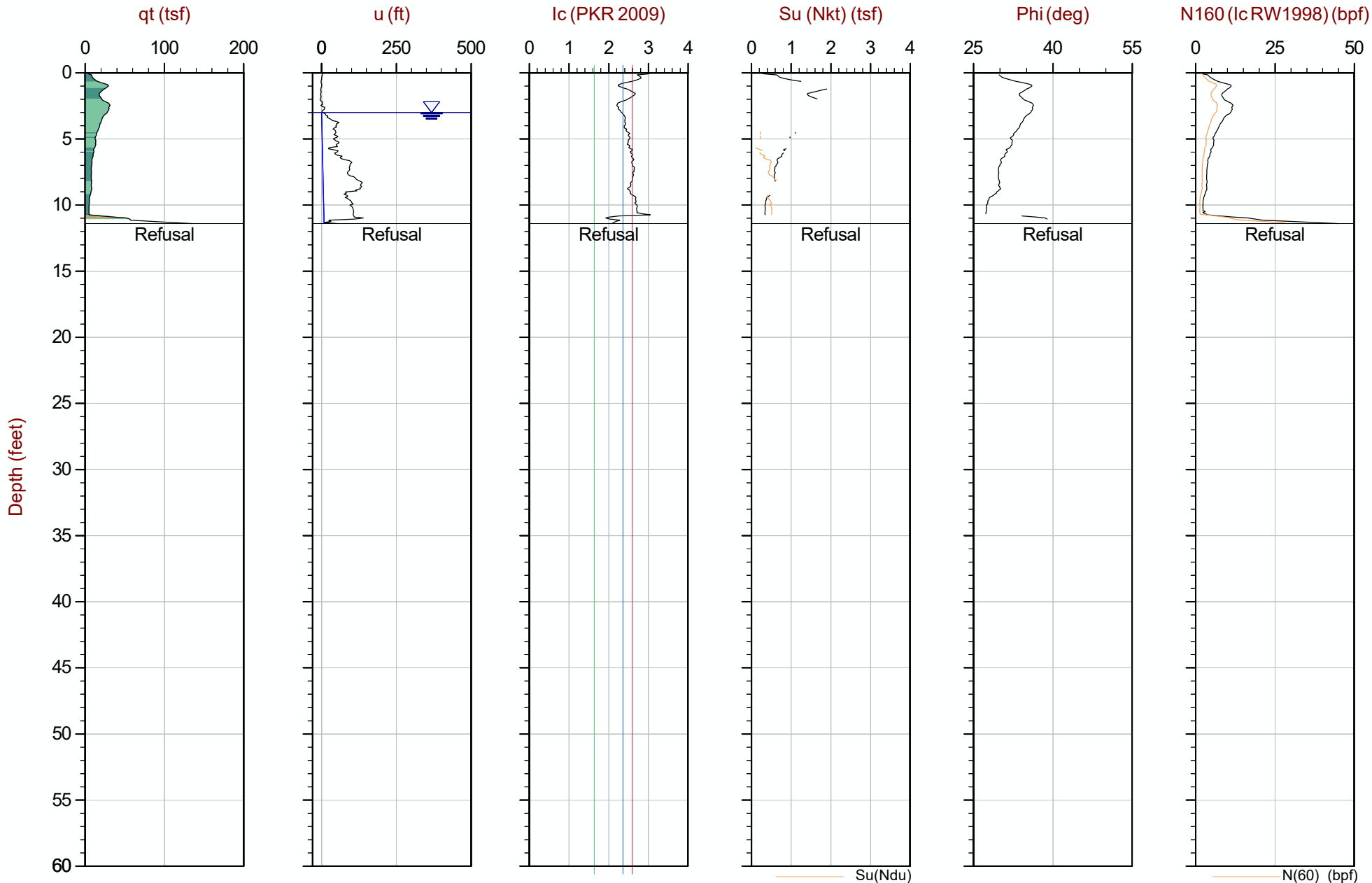
Job No: 20-53-21525

Date: 2020-10-30 10:46

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-124

Cone: 524:T375F10U500



Max Depth: 3.475 m / 11.40 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP124.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79850 ° Long: -68.68774 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

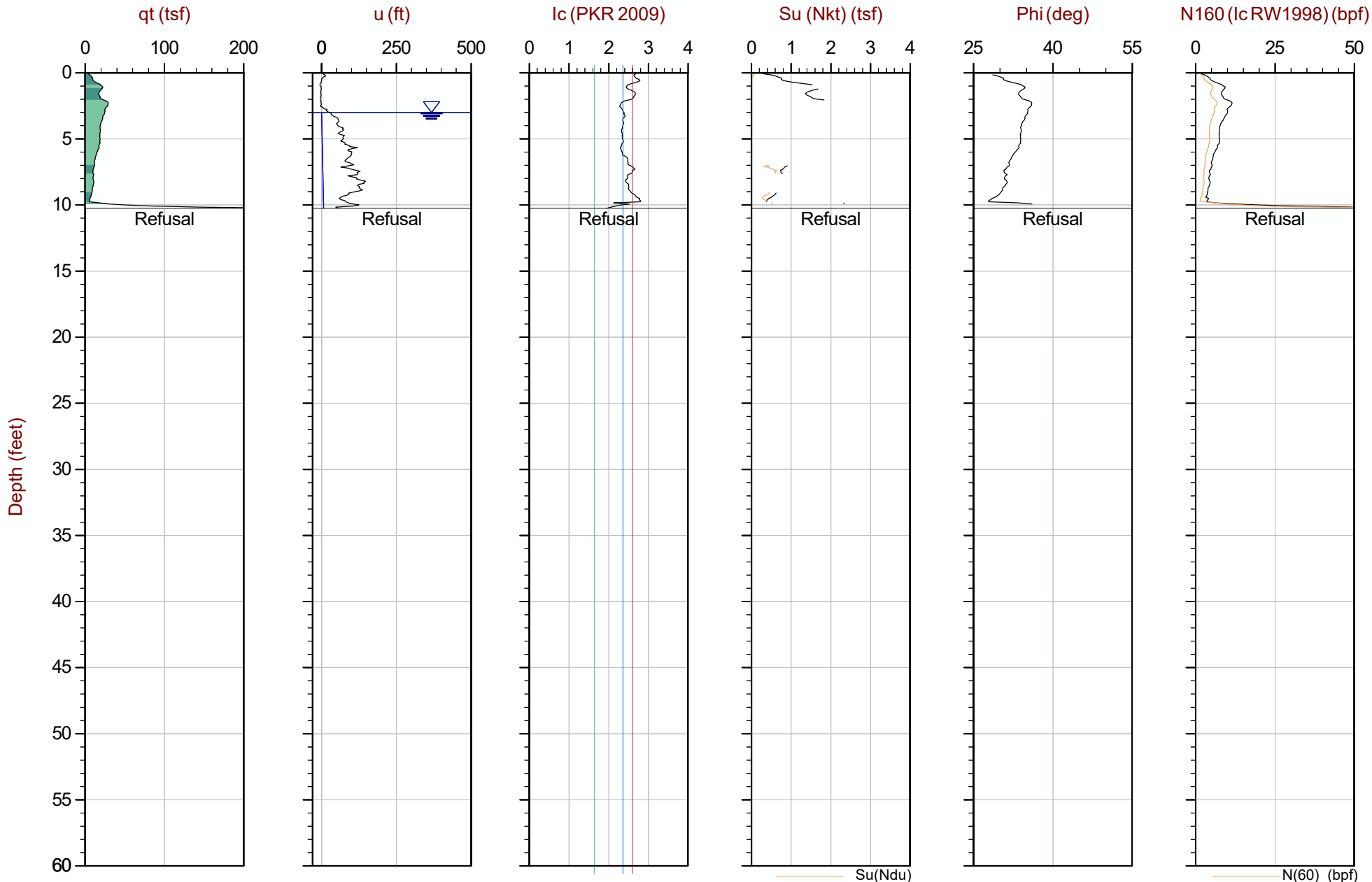
Job No: 20-53-21525

Date: 2020-10-30 10:15

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-125

Cone: 524:T375F10U500



Max Depth: 3.125 m / 10.25 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP125.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79925 ° Long: -68.68700 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

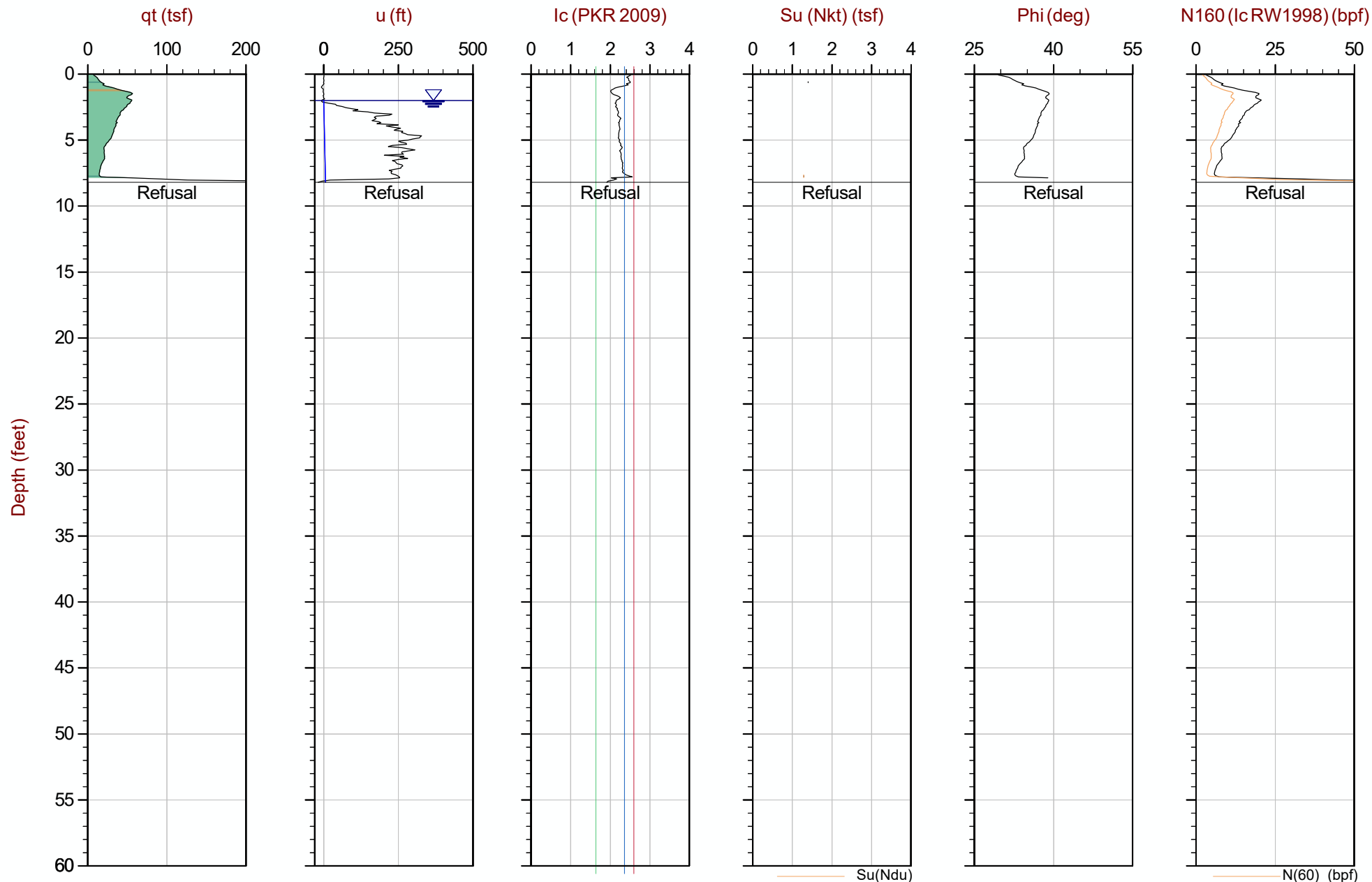
Job No: 20-53-21525

Date: 2020-10-30 09:44

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-126

Cone: 524:T375F10U500



Max Depth: 2.500 m / 8.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP126.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.80002 ° Long: -68.68636 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

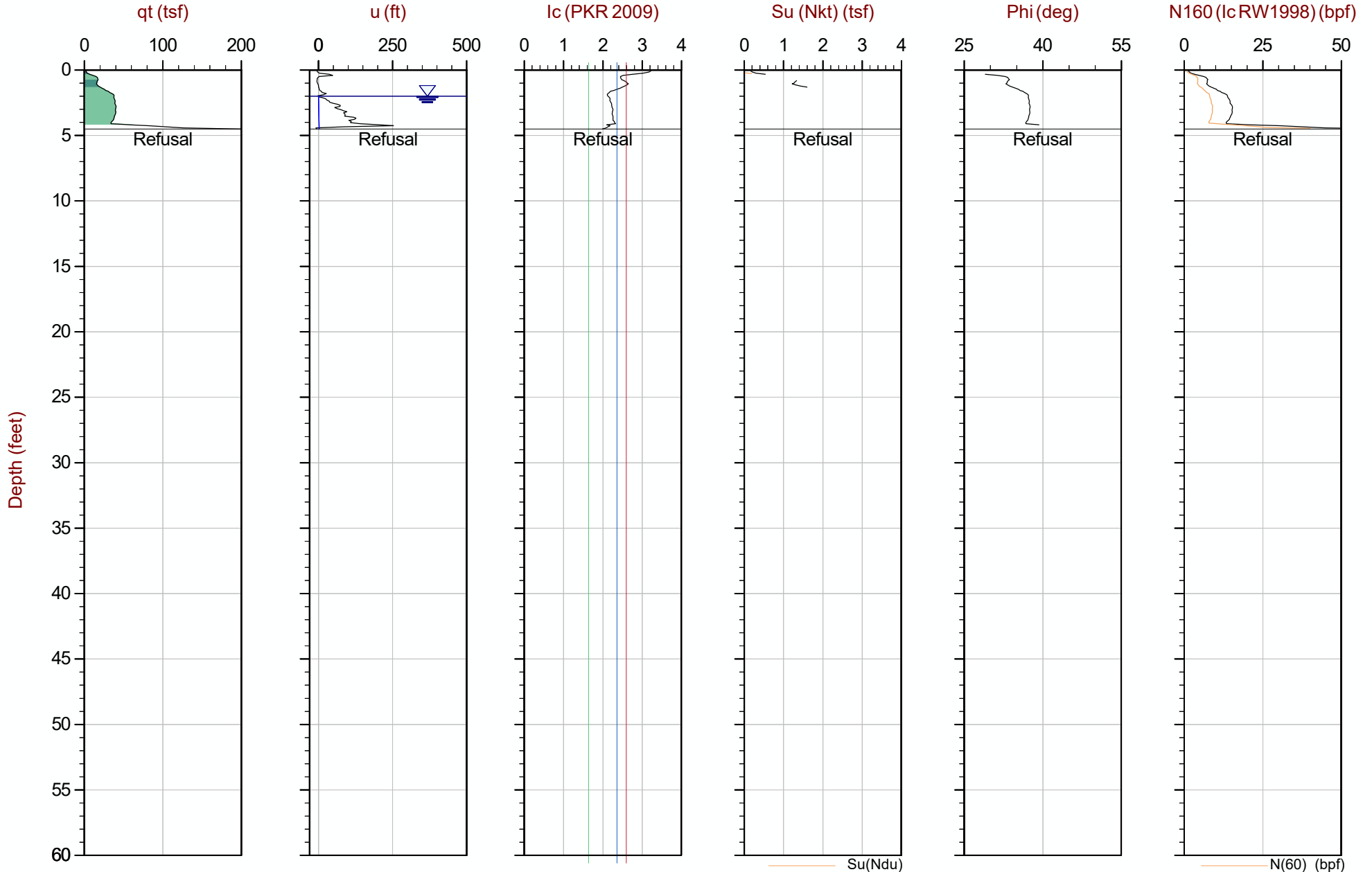
Job No: 20-53-21525

Date: 2020-10-30 09:11

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-127

Cone: 524:T375F10U500



Max Depth: 1.375 m / 4.51 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525 CP127.COR
Unit Wt: SBTQn(PKR2009)
Su Nkt/Ndu: 12.5 / 6.0

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.80037 ° Long: -68.68603 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Plots



Haley & Aldrich

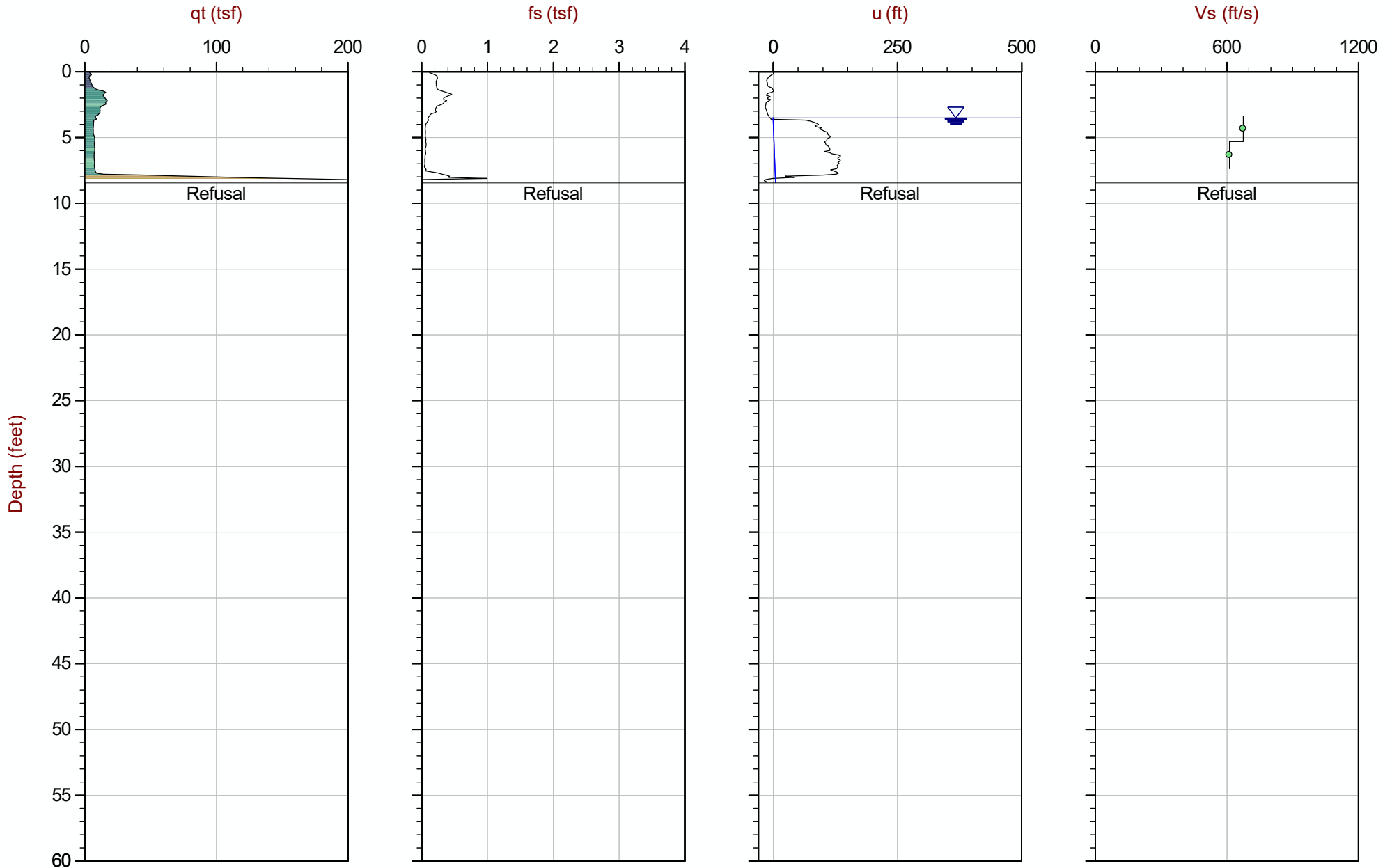
Job No: 20-53-21525

Date: 2020-10-27 14:05

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101

Cone: 524:T375F10U500



Max Depth: 2.575 m / 8.45 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP101.COR
Unit Wt: SBTQn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78975 ° Long: -68.69922 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

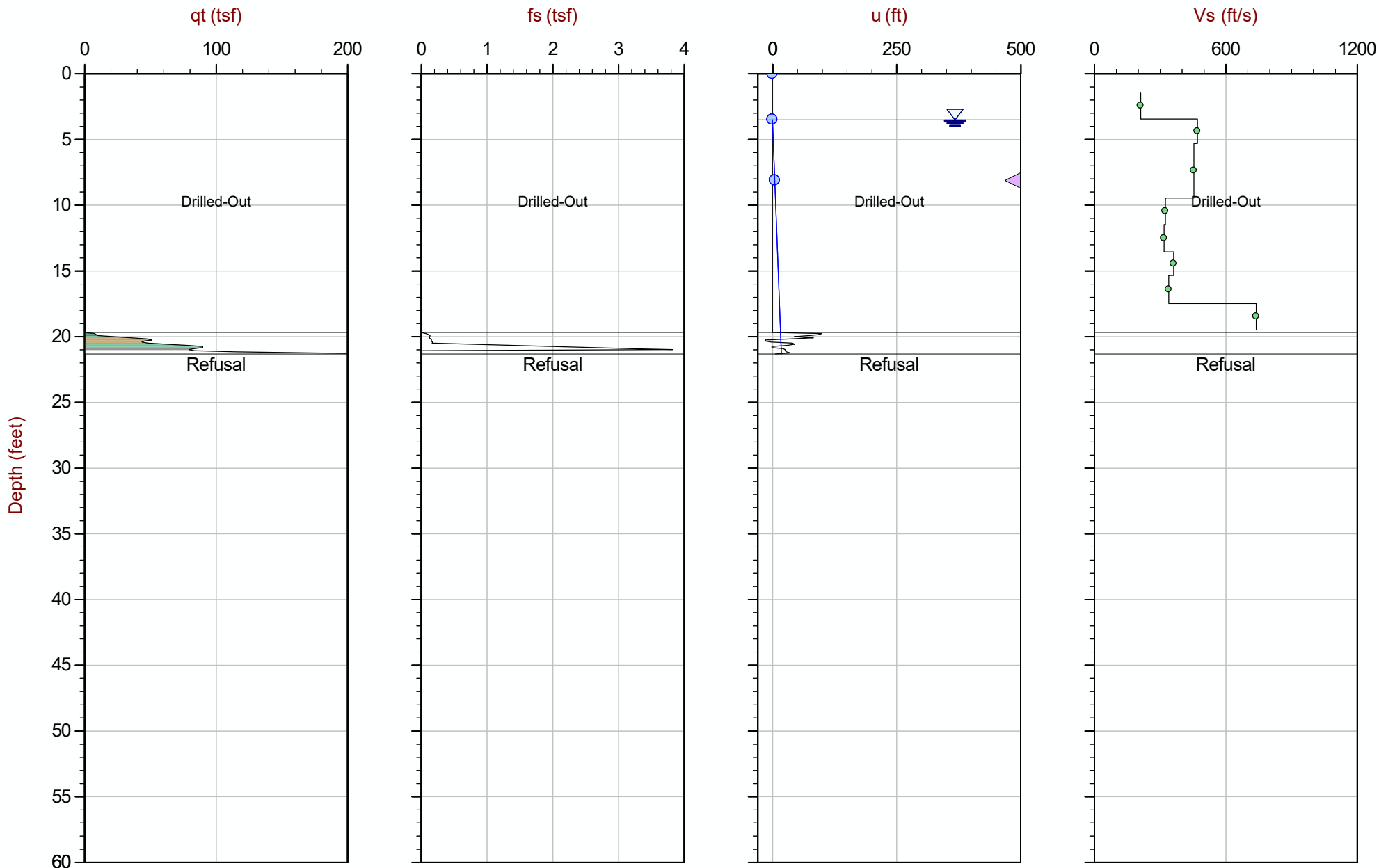
Job No: 20-53-21525

Date: 2020-10-28 08:27

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101B

Cone: 524:T375F10U500



Max Depth: 6.500 m / 21.33 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP101B.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.78983 ° Long: -68.69899 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

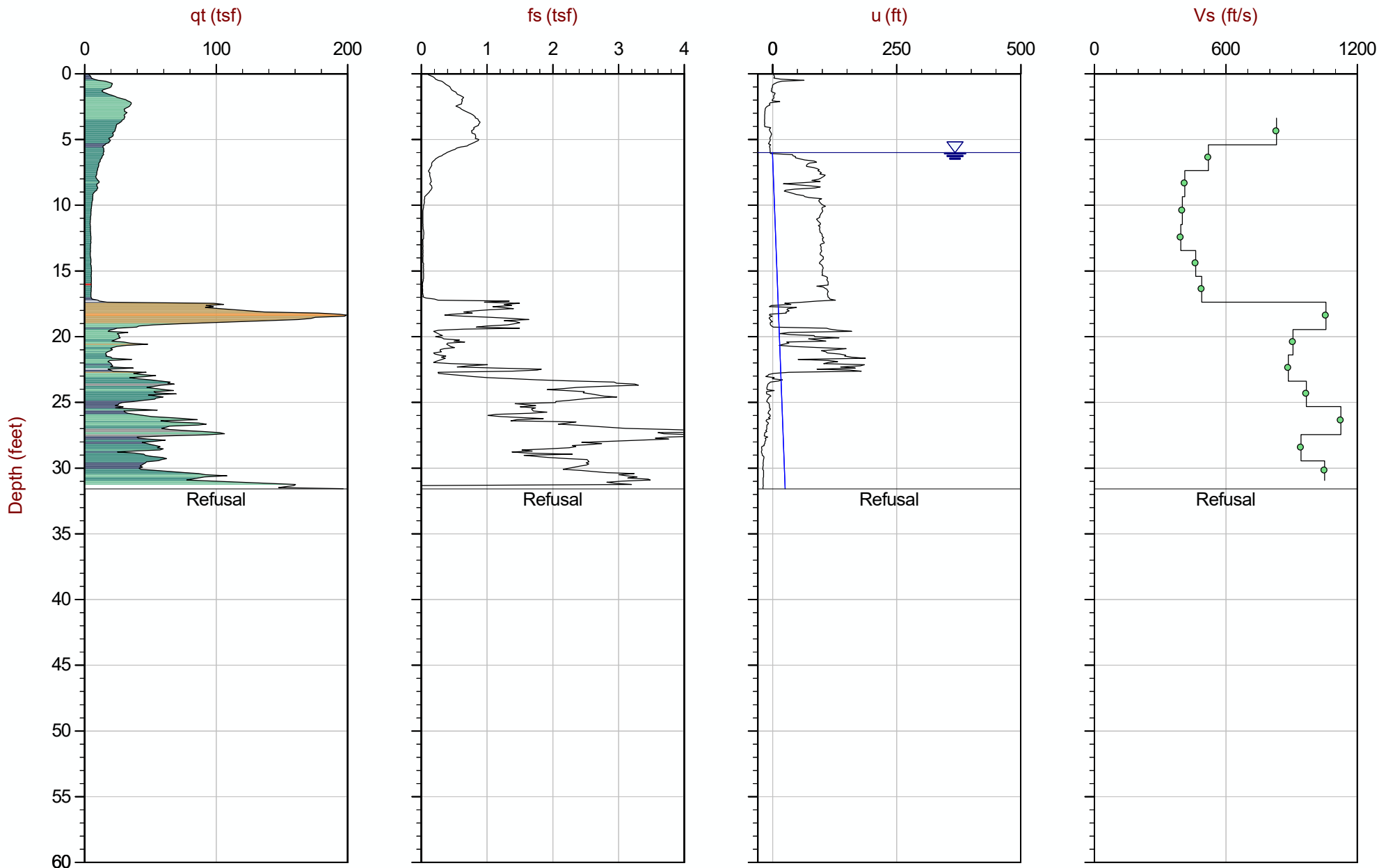
Job No: 20-53-21525

Date: 2020-10-29 08:44

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-102

Cone: 524:T375F10U500



Max Depth: 9.625 m / 31.58 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP102.COR
Unit Wt: SBTQn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.79006 ° Long: -68.69877 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

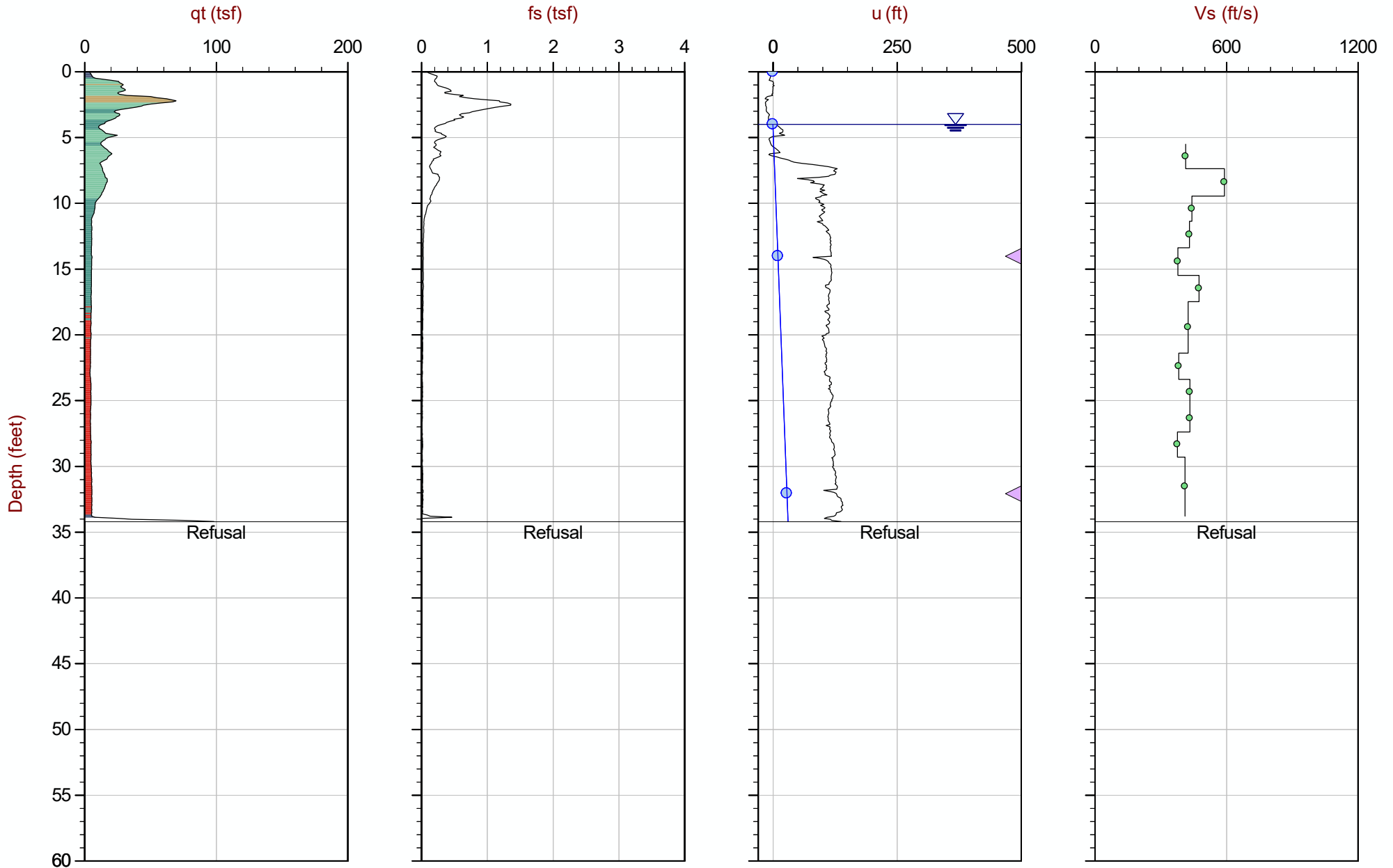
Job No: 20-53-21525

Date: 2020-11-01 12:46

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-103

Cone: 524:T375F10U500



Max Depth: 10.425 m / 34.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP103.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77204 ° Long: -68.71887 °

Hydrostatic Line ● Ueq ● Assumed Ueq ▲ PPD, Ueq achieved ▲ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Haley & Aldrich

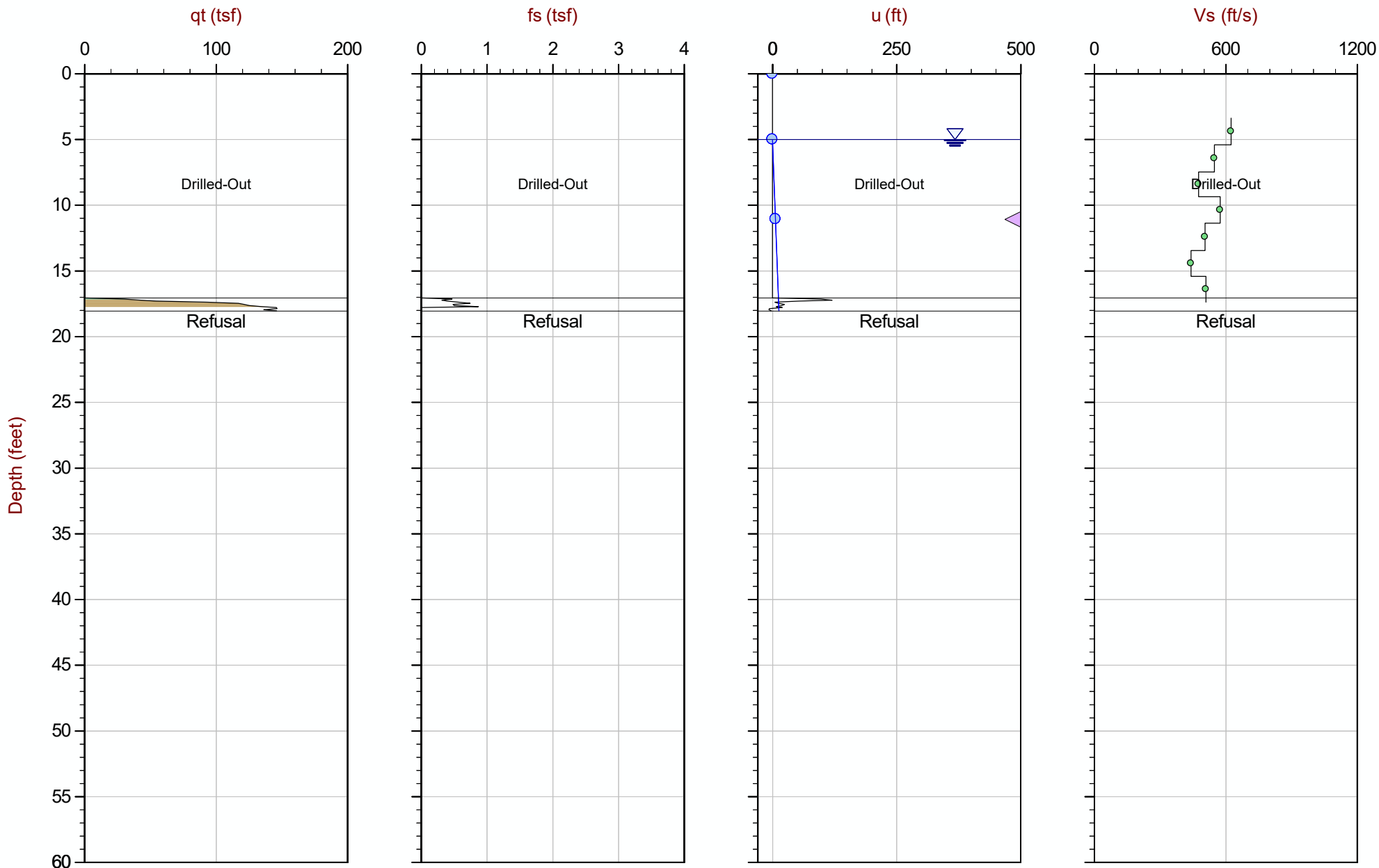
Job No: 20-53-21525

Date: 2020-11-01 08:08

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-104

Cone: 524:T375F10U500



Max Depth: 5.500 m / 18.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-53-21525_SP104.COR
Unit Wt: SBTQn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Lat: 44.77043 ° Long: -68.71722 °

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Shear Wave (V_s) Traces



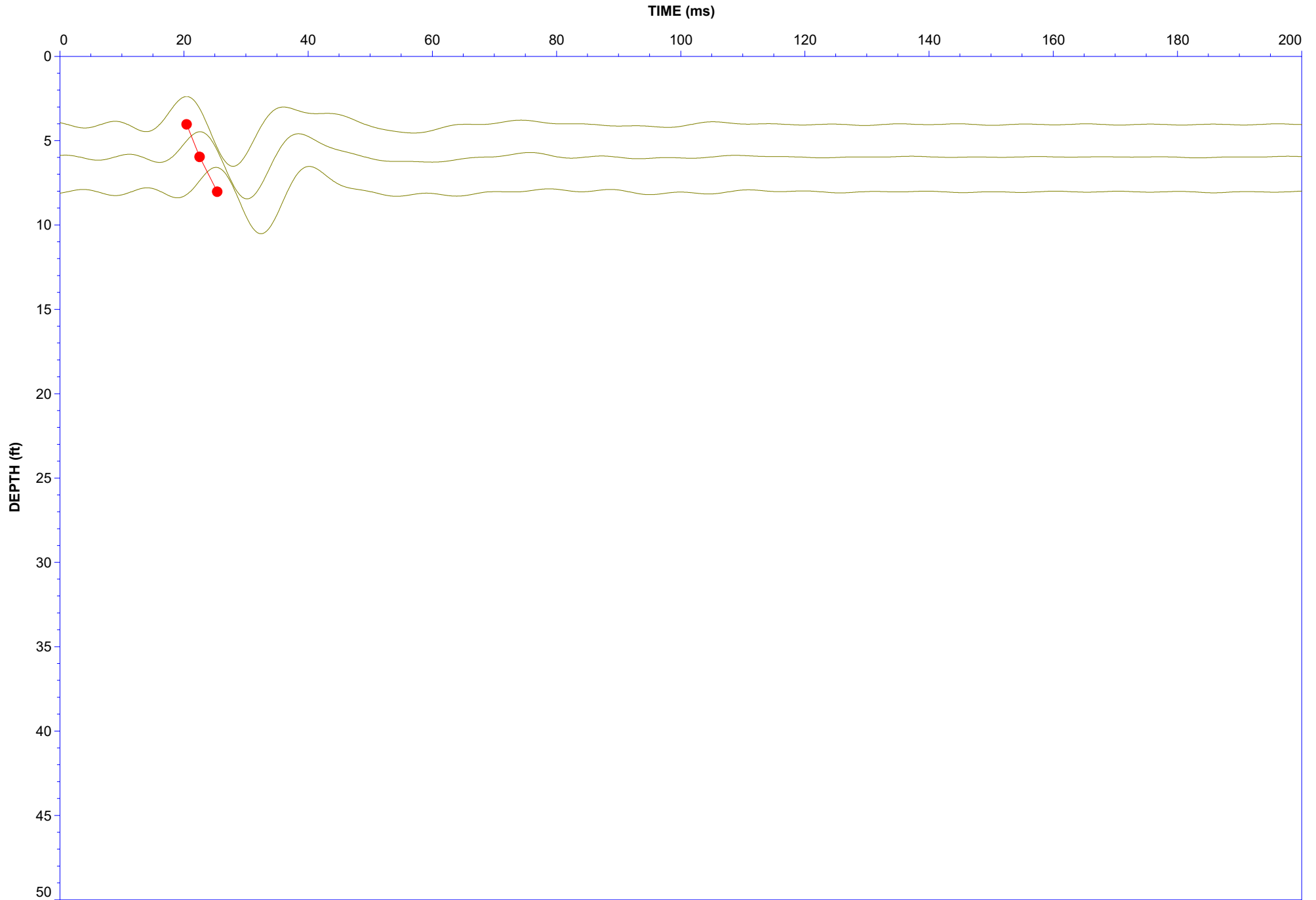
Job No: 20-53-21525
Date: 27-Oct-2020

Client: Haley & Aldrich

Project: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101

Filter: 10-100hz





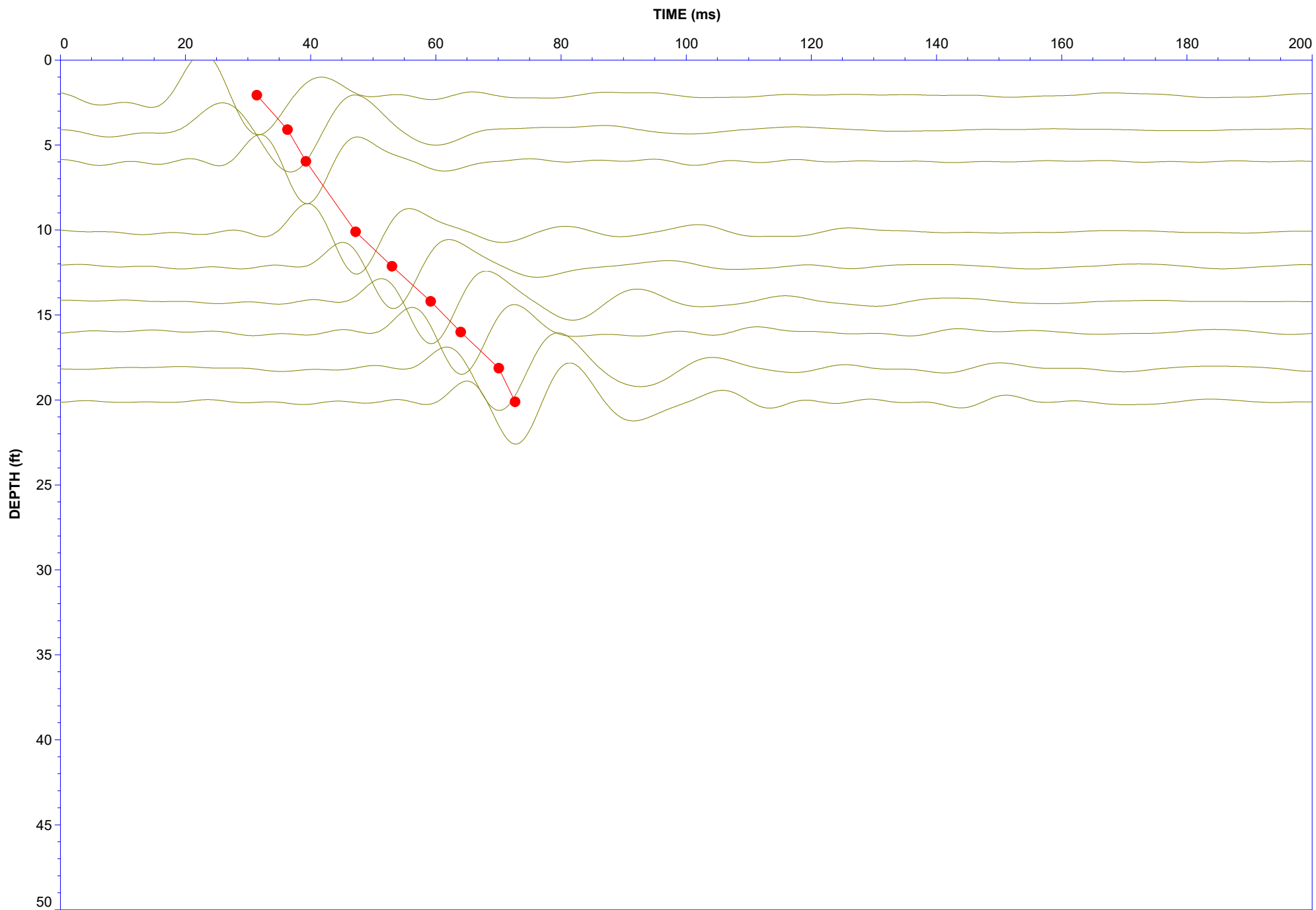
Job No: 20-53-21525
Date: 28-Oct-2020

Client: Haley & Aldrich

Project: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101B

Filter: 10-100hz





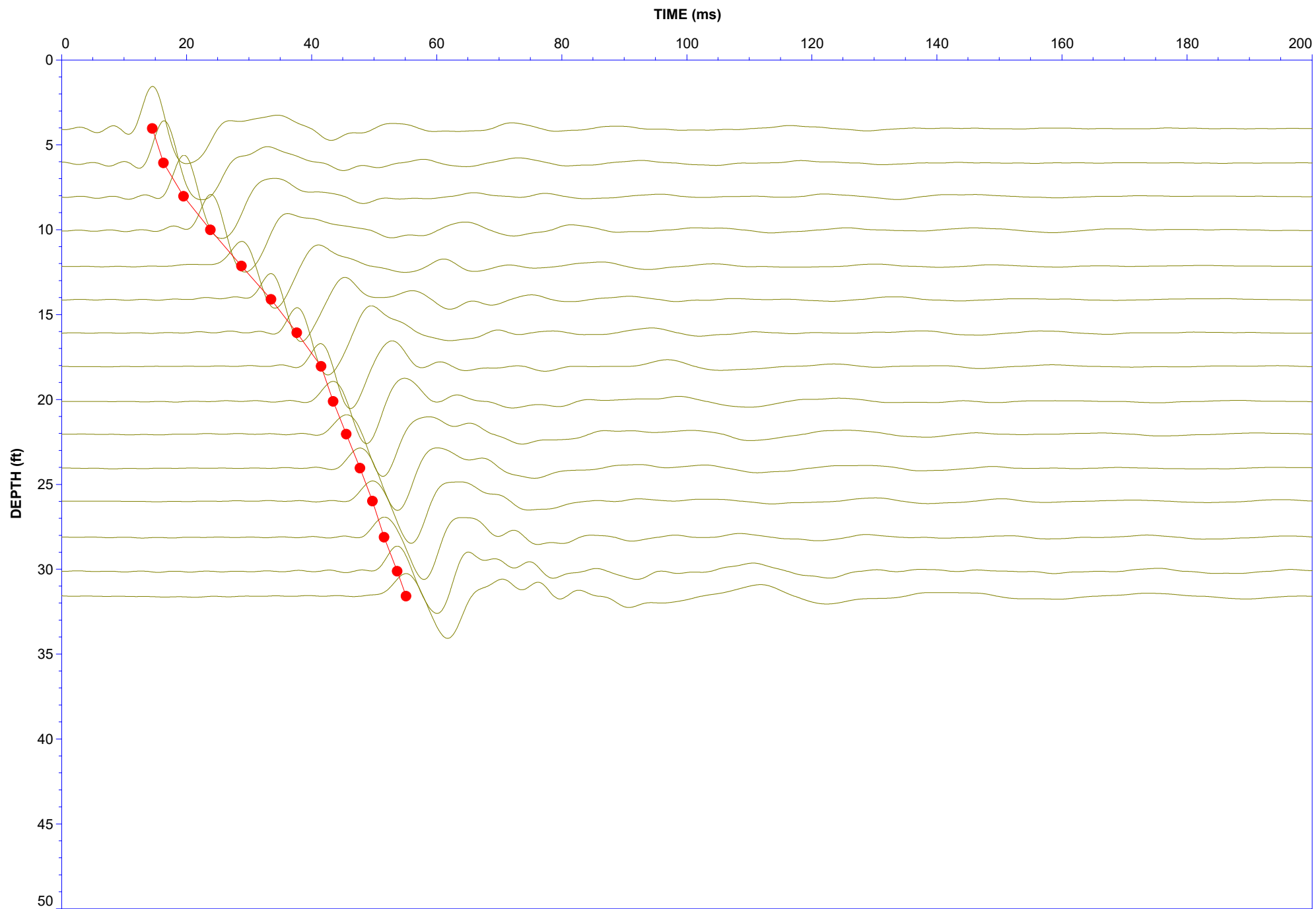
Job No: 20-53-21525
Date: 29-Oct-2020

Client: Haley & Aldrich

Project: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-102

Filter: 20-200hz





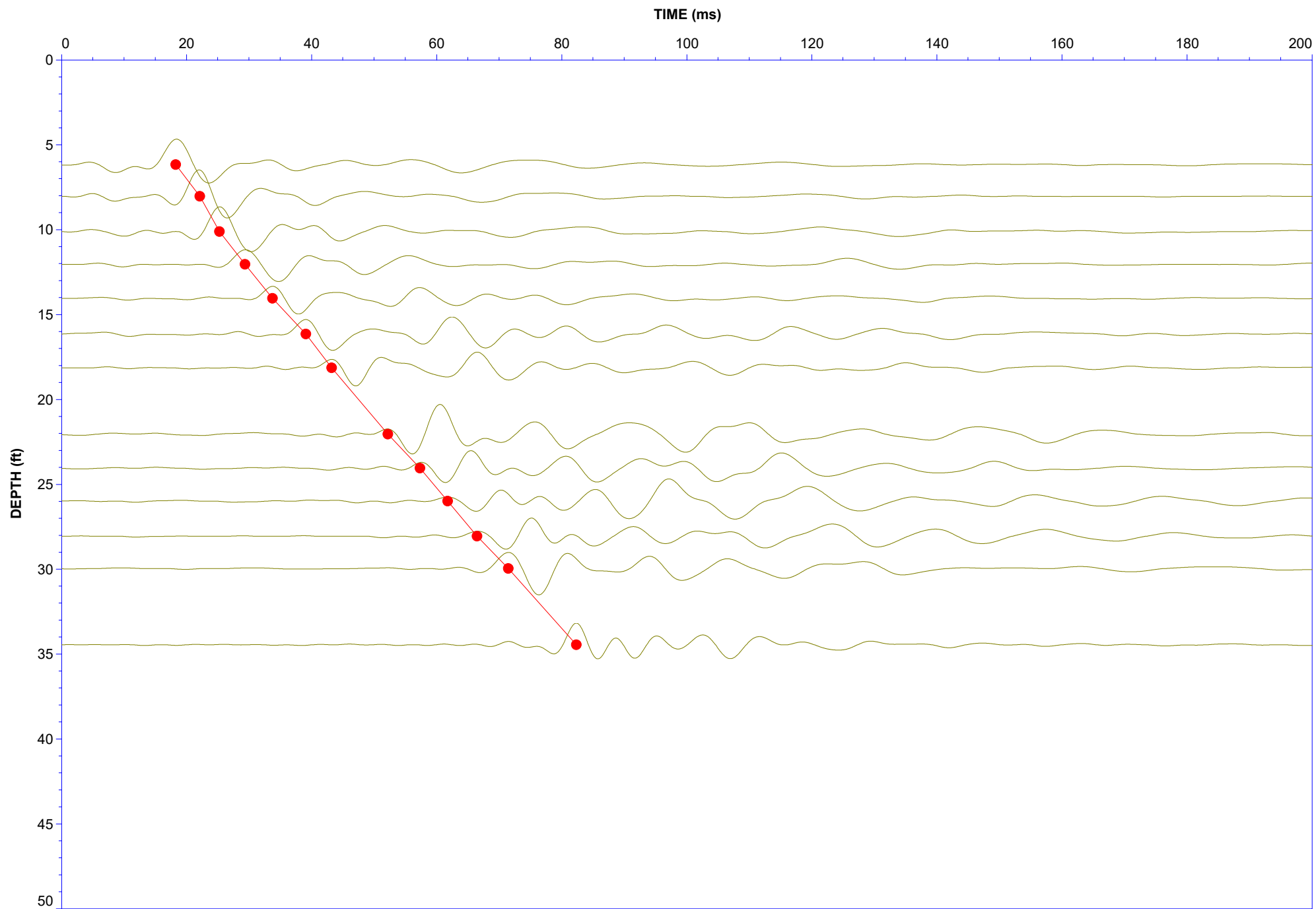
Job No: 20-53-21525
Date: 1-Nov-2020

Client: Haley & Aldrich

Project: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-103

Filter: 20-200hz





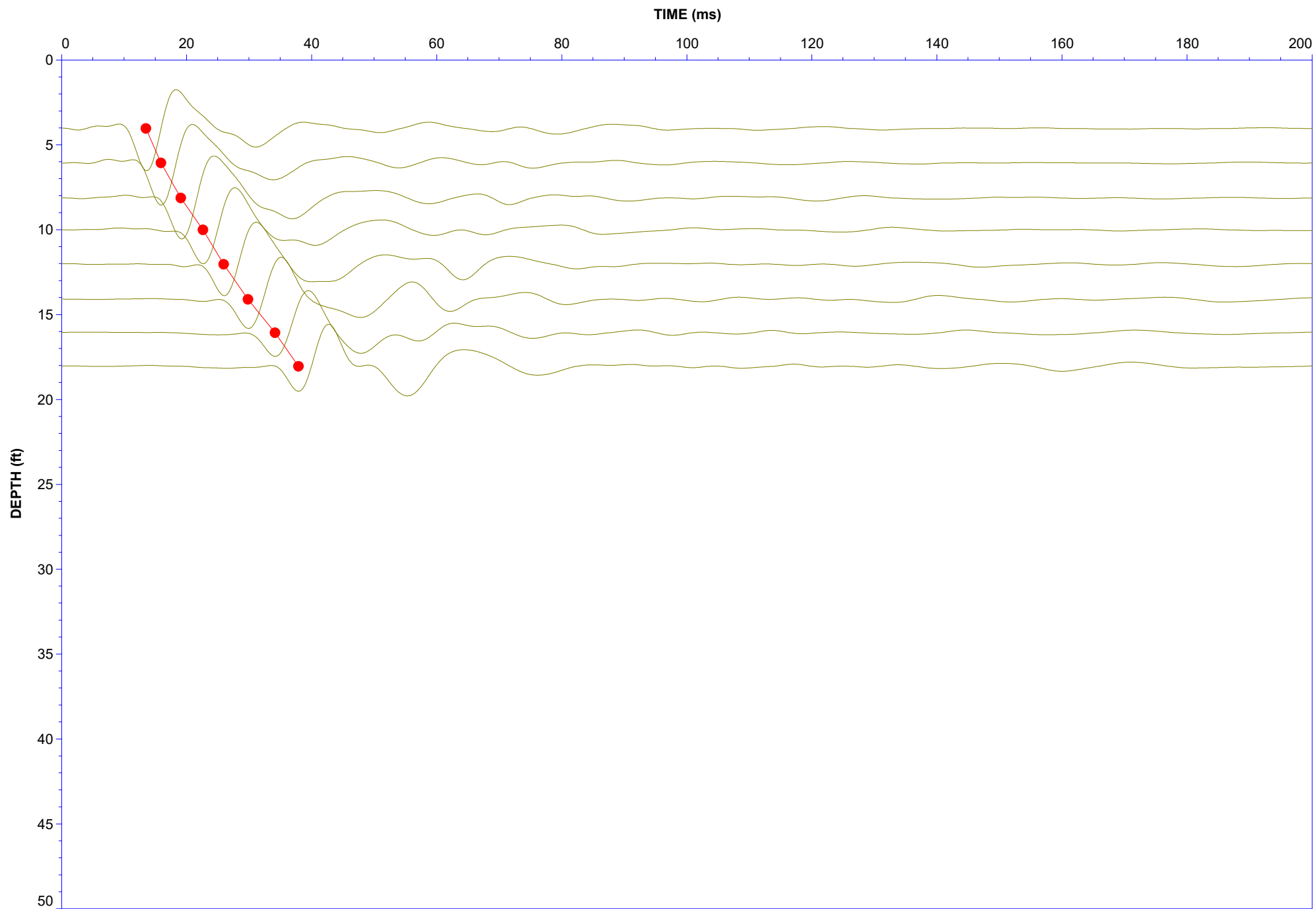
Job No: 20-53-21525
Date: 1-Nov-2020

Client: Haley & Aldrich

Project: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-104

Filter: 20-200hz



Seismic Cone Penetration Test Tabular Results



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Sounding ID: SCPT20-101
Date: 27-Oct-2020

Seismic Source: Beam
Source Offset (ft): 3.98
Source Depth (ft): 0
Geophone Offset (ft): 0.66

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - V_s

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.04	3.38	5.22			
5.97	5.31	6.64	1.42	2.10	675
8.04	7.38	8.39	1.75	2.85	612



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Sounding ID: SCPT20-101B
Date: 28-Oct-2020

Seismic Source: Beam
Source Offset (ft): 3.98
Source Depth (ft): 0
Geophone Offset (ft): 0.66

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - V_s

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
2.07	1.41	4.22			
4.10	3.44	5.26	1.04	4.92	212
5.97	5.31	6.64	1.38	2.92	471
10.10	9.45	10.25	3.61	7.93	455
12.14	11.48	12.15	1.90	5.84	325
14.21	13.55	14.12	1.97	6.17	319
16.01	15.35	15.86	1.74	4.81	362
18.14	17.49	17.93	2.07	6.09	340
20.11	19.46	19.86	1.92	2.60	739



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Sounding ID: SCPT20-102
Date: 29-Oct-2020

Seismic Source: Beam
Source Offset (ft): 3.98
Source Depth (ft): 0
Geophone Offset (ft): 0.66

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - V_s

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.04	3.38	5.22			
6.07	5.41	6.72	1.50	1.80	832
8.04	7.38	8.39	1.67	3.20	521
10.01	9.35	10.16	1.78	4.30	413
12.14	11.48	12.15	1.99	4.95	402
14.11	13.45	14.03	1.87	4.75	395
16.08	15.42	15.93	1.90	4.10	463
18.04	17.39	17.84	1.91	3.90	490
20.11	19.46	19.86	2.02	1.91	1057
22.05	21.39	21.76	1.90	2.09	907
24.05	23.39	23.73	1.97	2.22	886
25.98	25.33	25.64	1.91	1.97	968
28.12	27.46	27.75	2.11	1.87	1125
30.12	29.46	29.73	1.98	2.10	943
31.59	30.94	31.19	1.46	1.39	1051



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Sounding ID: SCPT20-103
Date: 01-Nov-2020

Seismic Source: Beam
Source Offset (ft): 3.98
Source Depth (ft): 0
Geophone Offset (ft): 0.66

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - V_s

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
6.17	5.51	6.80			
8.04	7.38	8.39	1.59	3.84	414
10.10	9.45	10.25	1.87	3.16	591
12.04	11.38	12.06	1.81	4.08	443
14.04	13.39	13.96	1.90	4.42	431
16.14	15.49	15.99	2.02	5.34	379
18.14	17.49	17.93	1.95	4.10	475
22.05	21.39	21.76	3.82	9.00	425
24.05	23.39	23.73	1.97	5.15	383
25.98	25.33	25.64	1.91	4.41	433
28.05	27.39	27.68	2.04	4.72	433
29.95	29.30	29.57	1.88	5.01	376
34.45	33.79	34.03	4.46	10.86	411



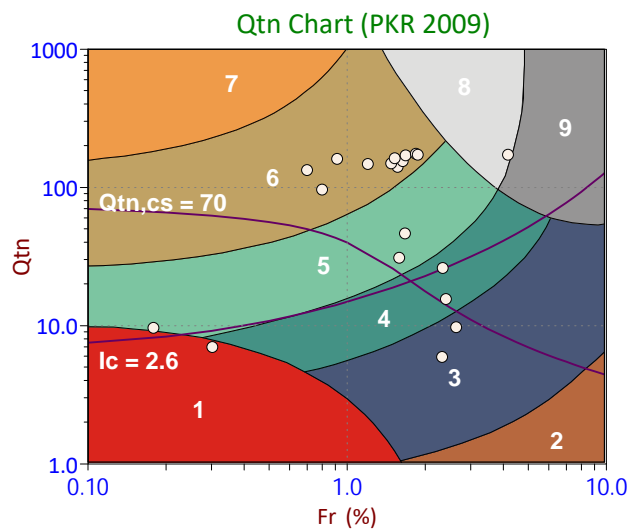
Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Sounding ID: SCPT20-104
Date: 01-Nov-2020

Seismic Source: Beam
Source Offset (ft): 3.98
Source Depth (ft): 0
Geophone Offset (ft): 0.66

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - V_s

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.04	3.38	5.22			
6.07	5.41	6.72	1.50	2.40	624
8.14	7.48	8.47	1.75	3.20	548
10.01	9.35	10.16	1.69	3.55	476
12.04	11.38	12.06	1.90	3.30	575
14.11	13.45	14.03	1.97	3.90	505
16.08	15.42	15.93	1.90	4.30	441
18.04	17.39	17.84	1.91	3.75	510

Soil Behavior Type (SBT) Scatter Plots

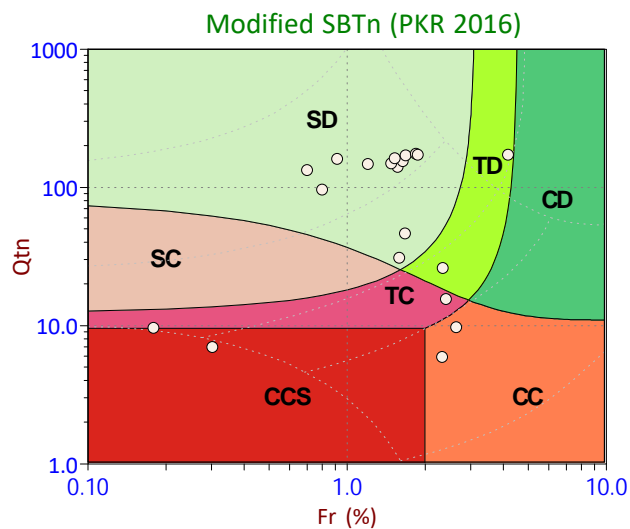


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

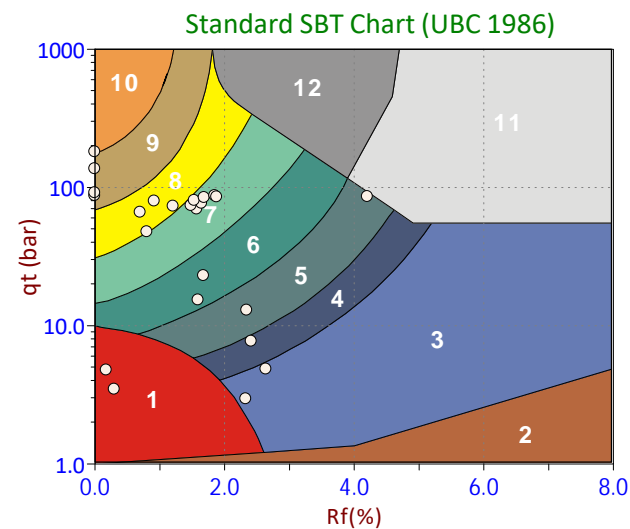
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



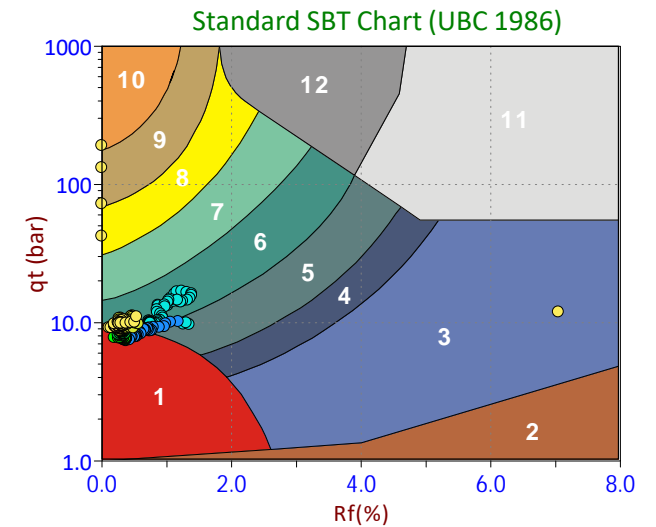
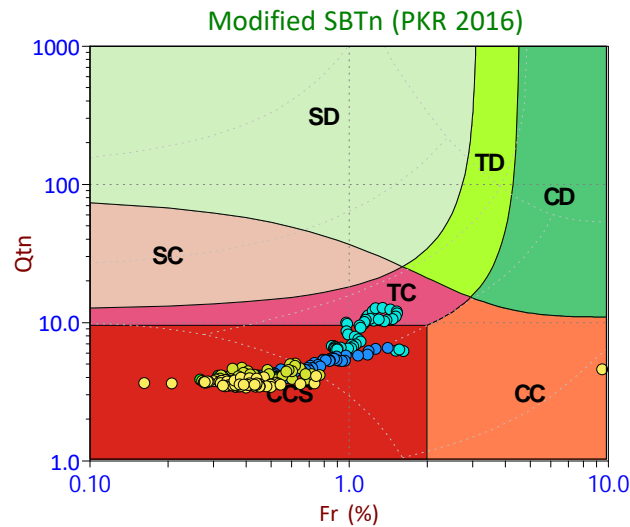
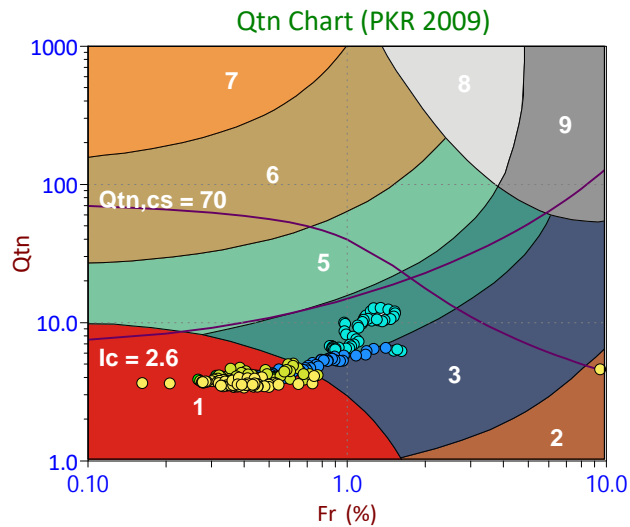
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand



Depth Ranges

- >0.0 to 5.0 ft
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- >35.0 to 40.0 ft
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- >45.0 to 50.0 ft
- >50.0 ft

Legend

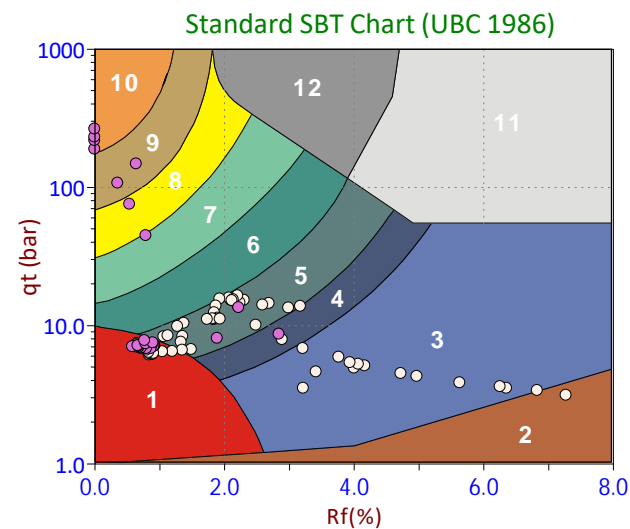
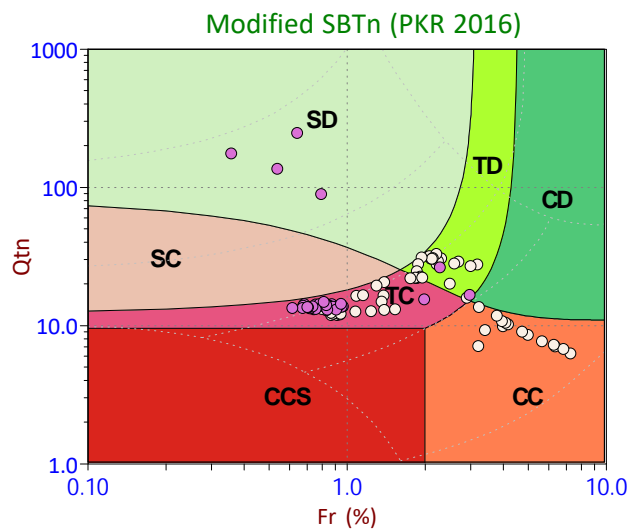
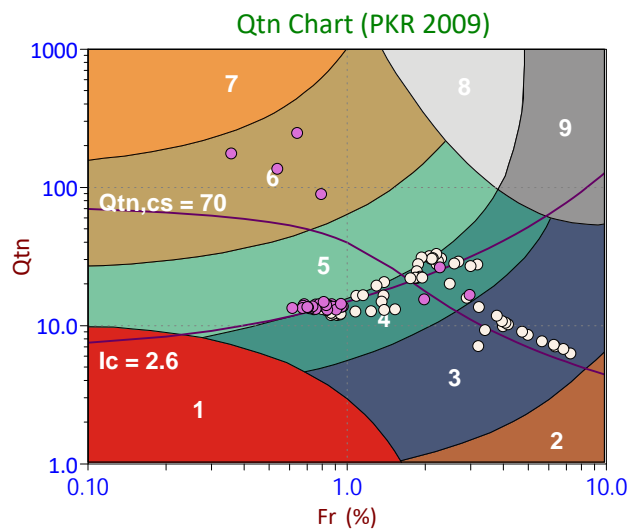
- Sensitive, Fine Grained
- Organic Soils
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- Gravelly Sand to Sand
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- >50.0 ft

Legend

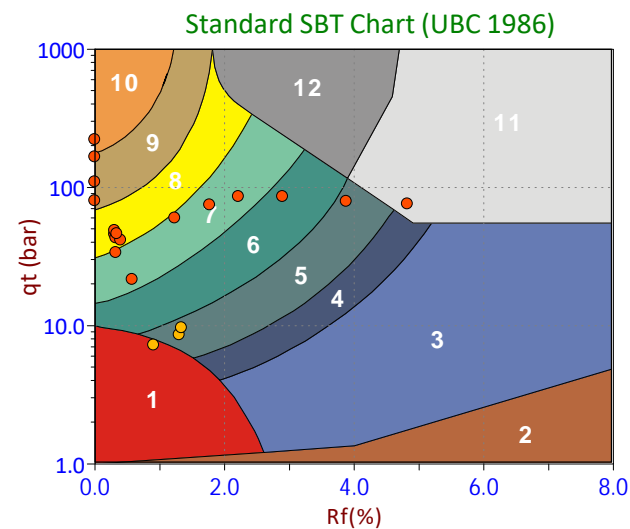
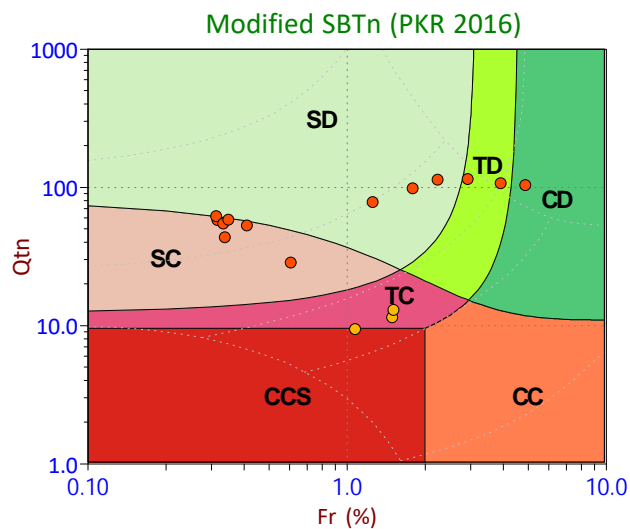
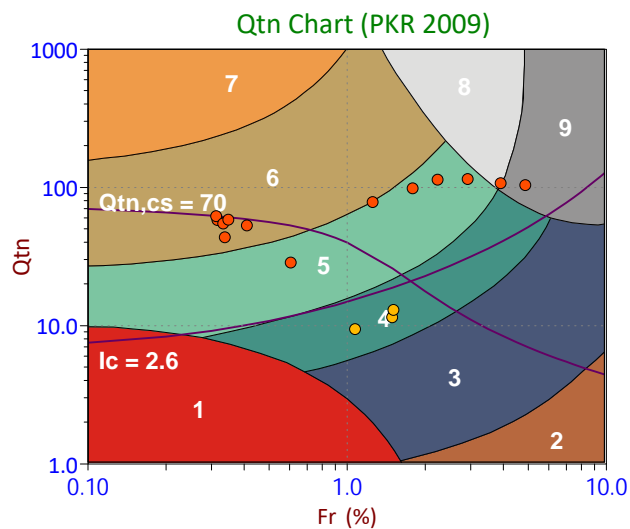
- Sensitive, Fine Grained
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- >45.0 to 50.0 ft
- >50.0 ft

Legend

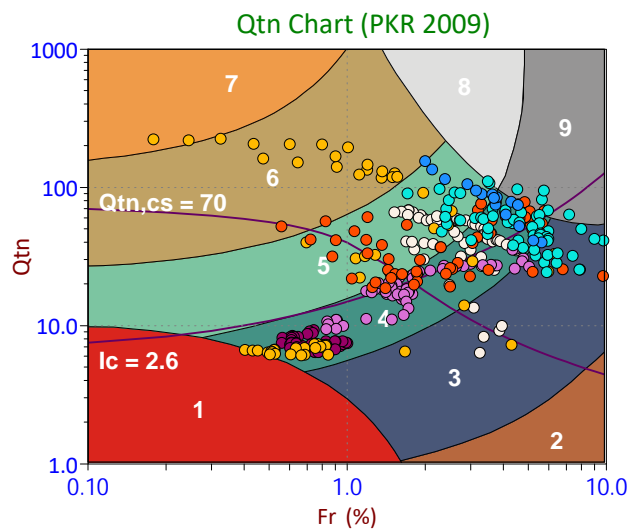
- Sensitive, Fine Grained
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- Stiff Fine Grained
- Cemented Sand

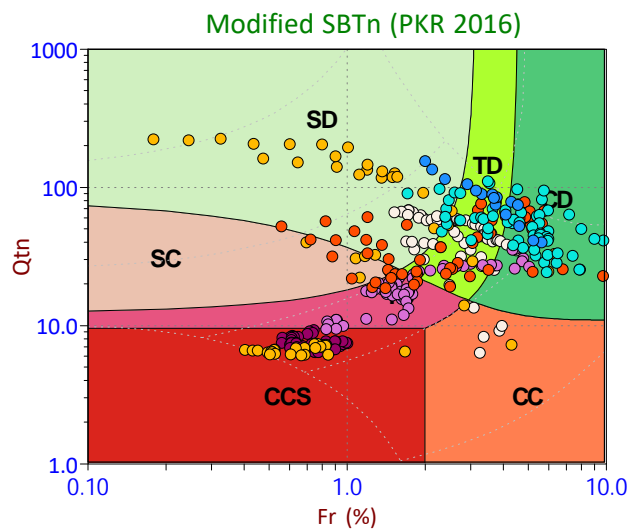


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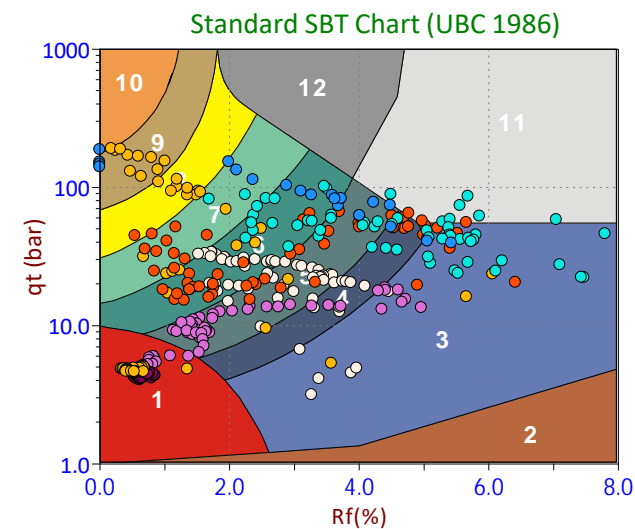
Legend

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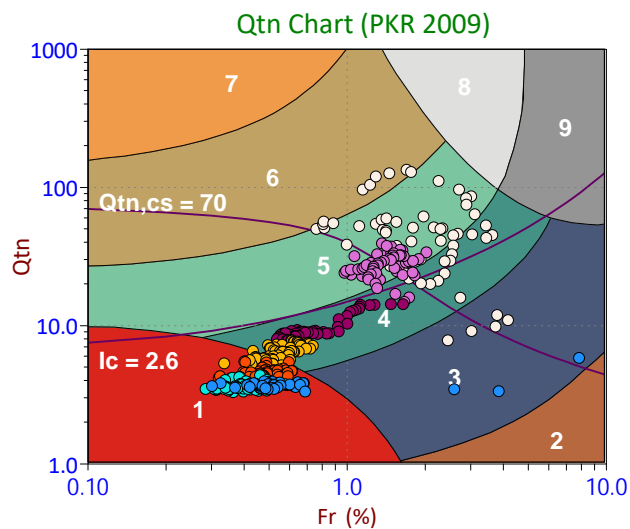
Legend

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Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
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- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

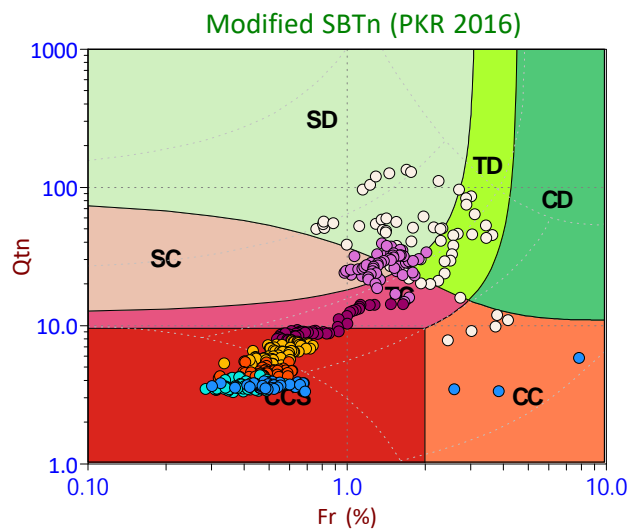


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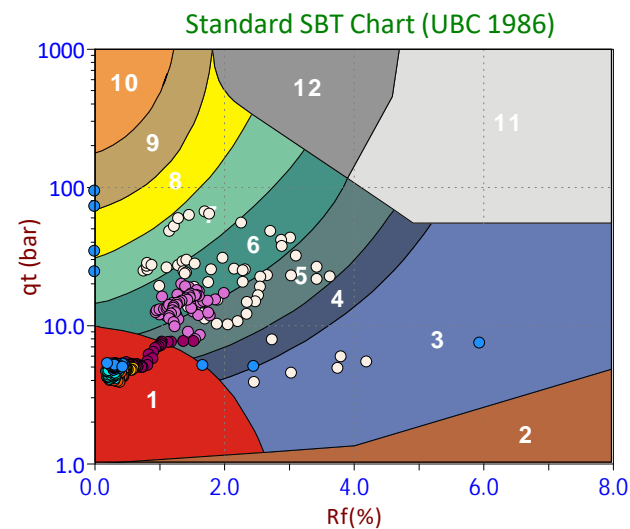
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
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- Gravelly Sand to Sand
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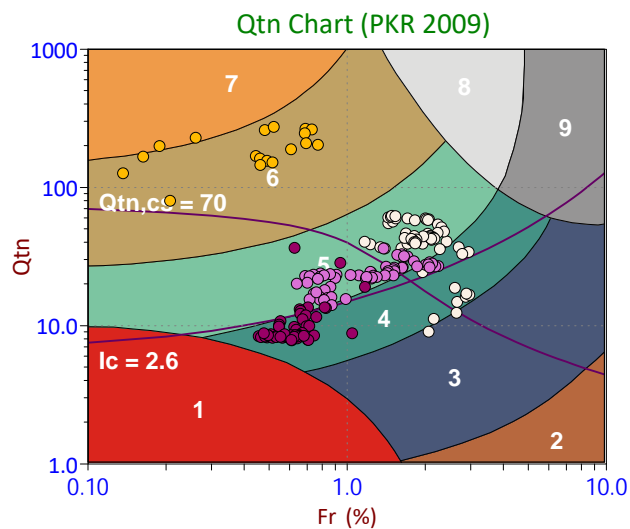
Legend

- CCS (Cont. sensitive clay like)
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- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
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Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

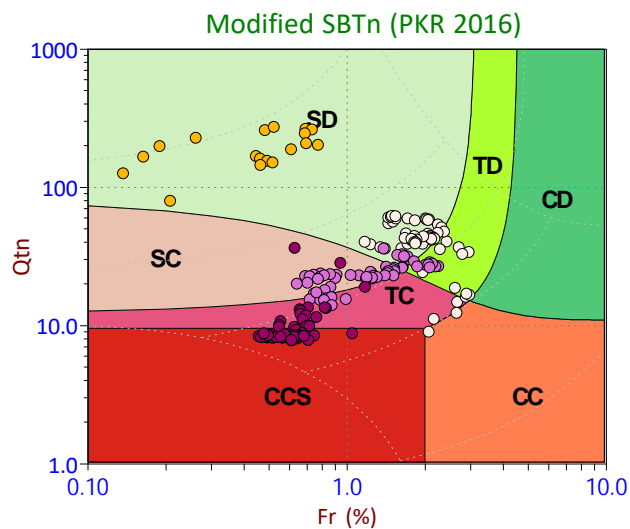


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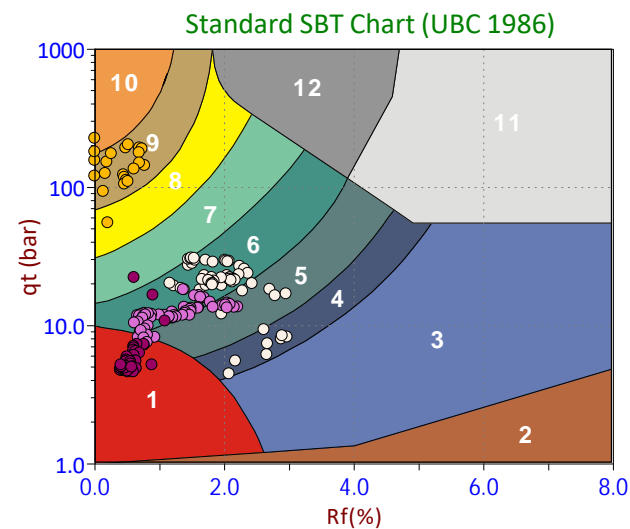
Legend

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Legend

- Sensitive Fines
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Haley & Aldrich

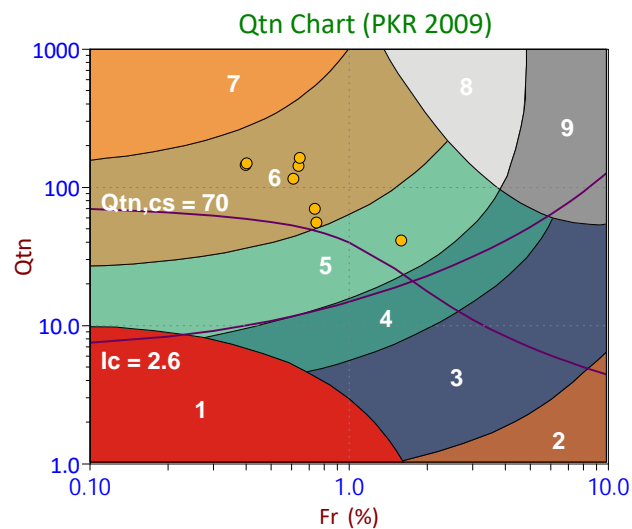
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Date: 2020-11-01 08:08

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-104

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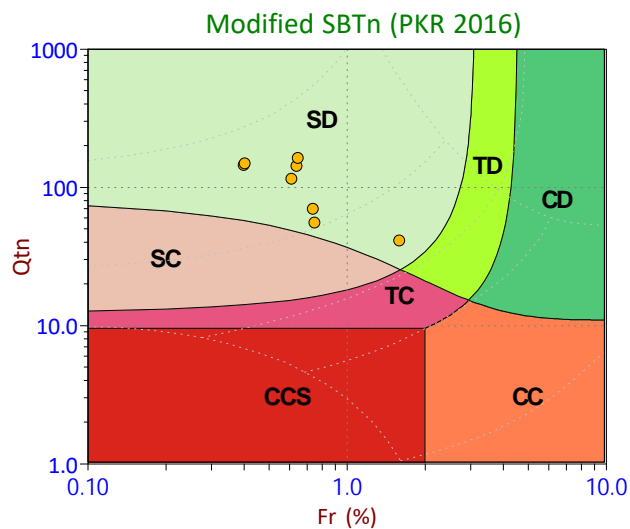


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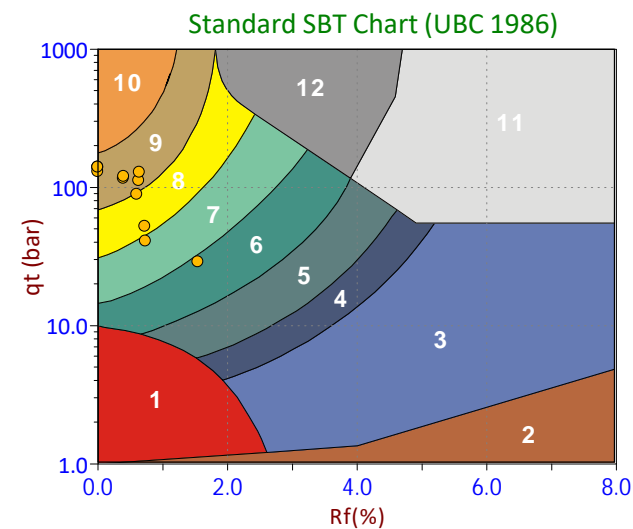
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
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- Gravelly Sand to Sand
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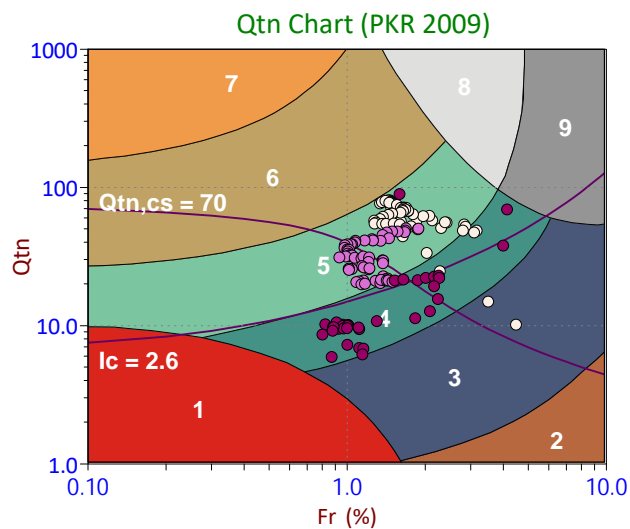
Legend

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Legend

- Sensitive Fines
- Organic Soil
- Clay
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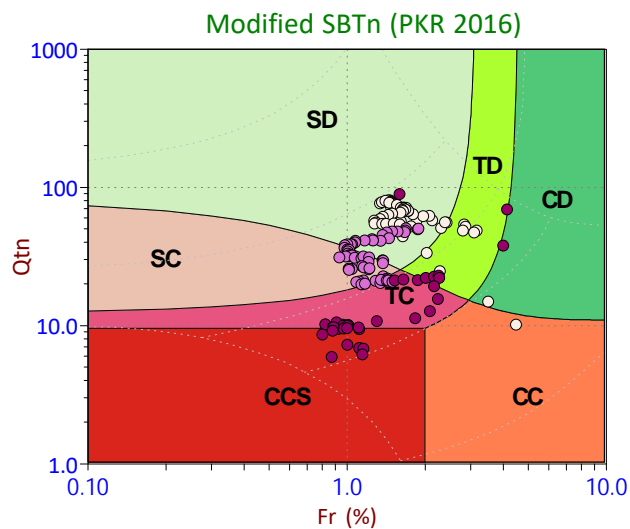


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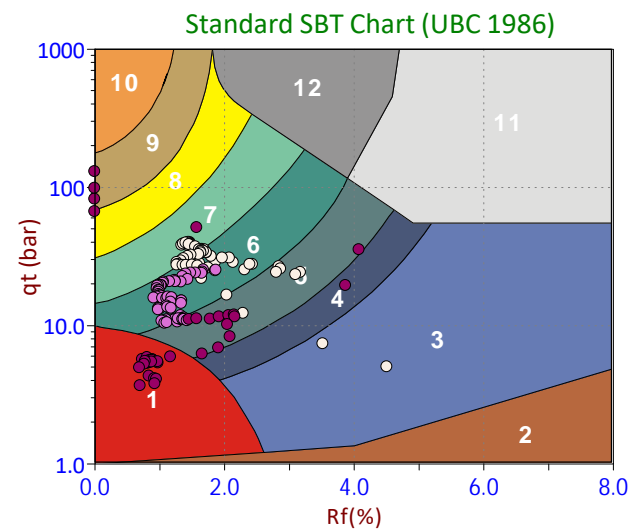
Legend

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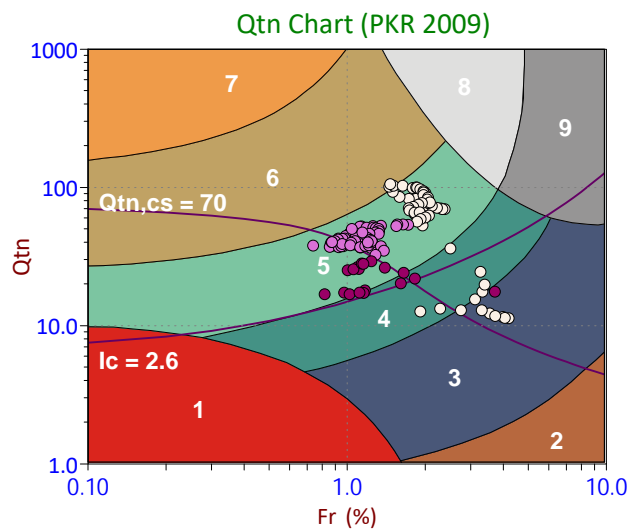
Legend

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Legend

- Sensitive Fines
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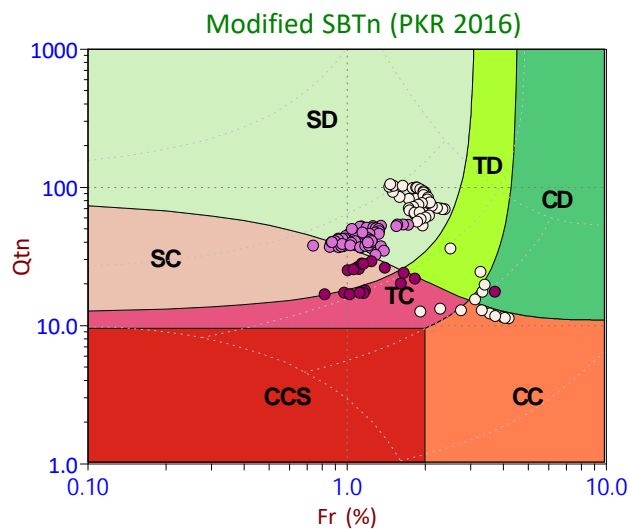


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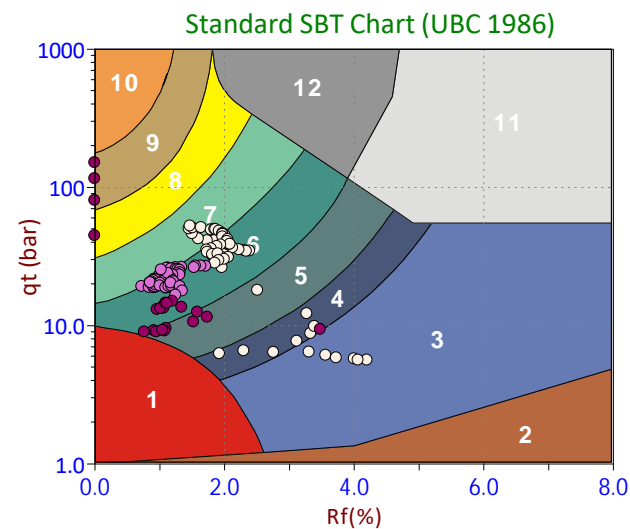
Legend

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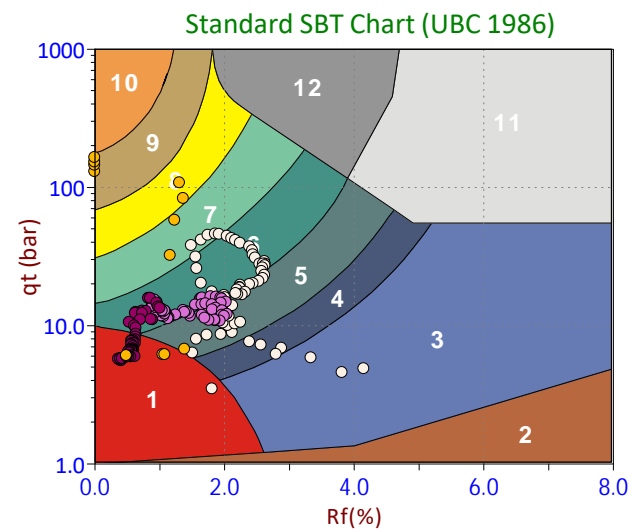
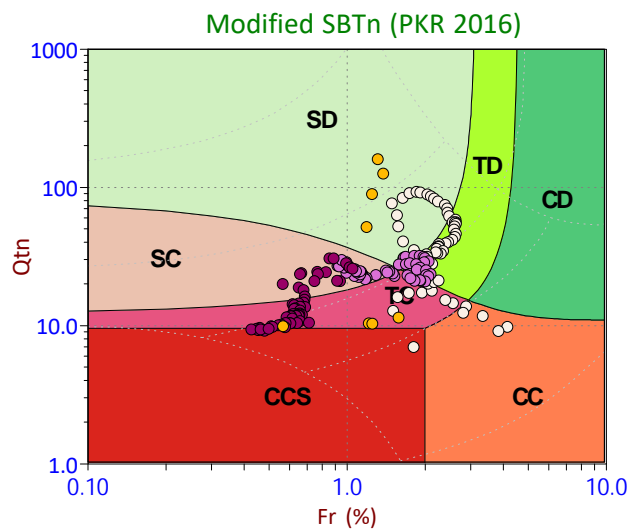
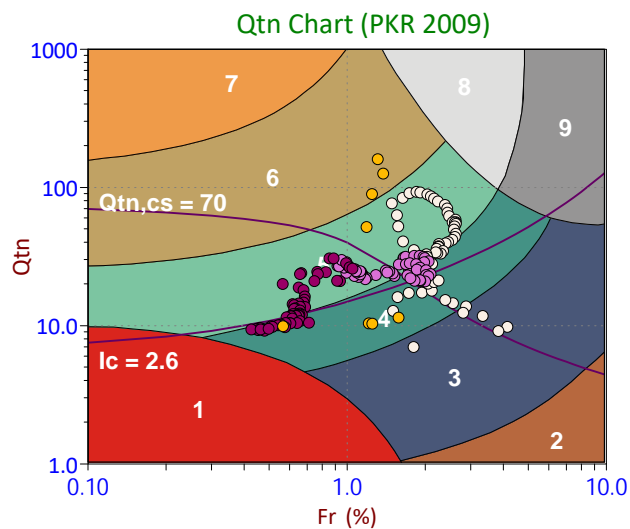
Legend

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Legend

- Sensitive Fines
- Organic Soil
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Legend

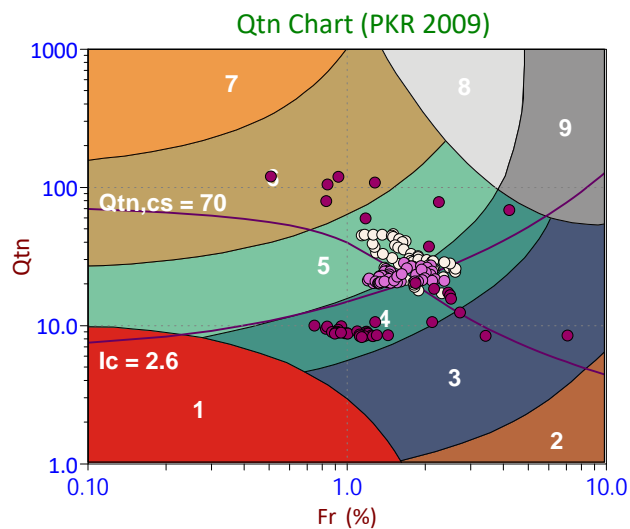
- Sensitive, Fine Grained
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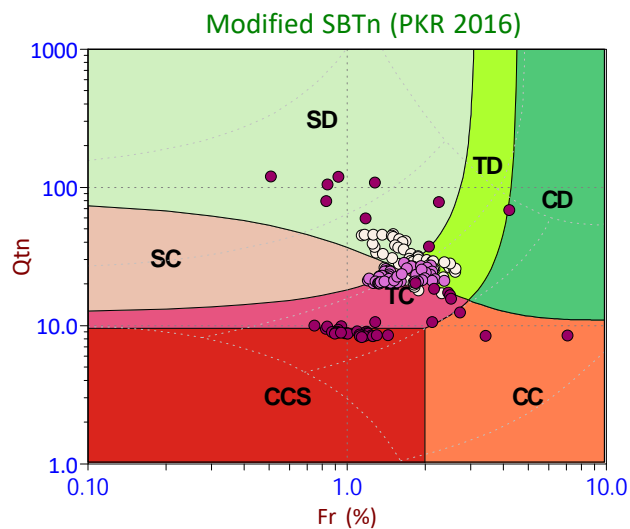


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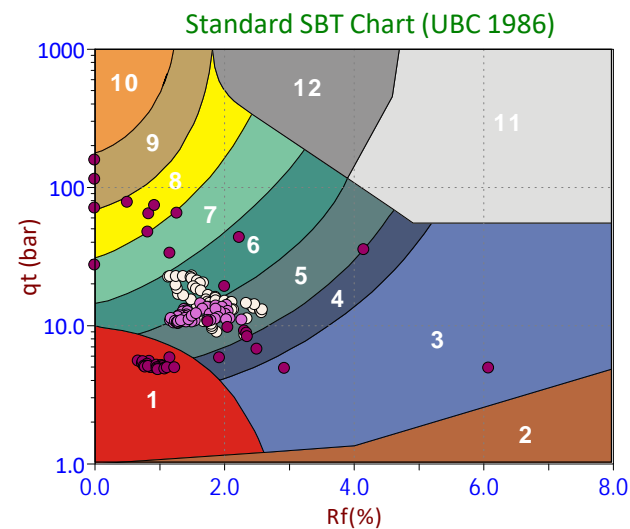
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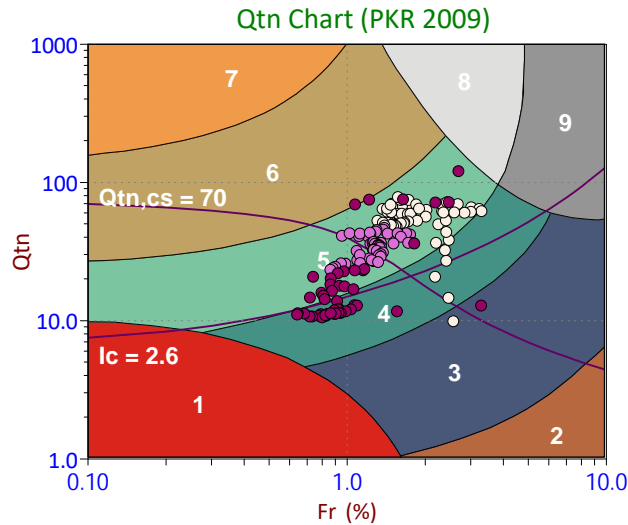
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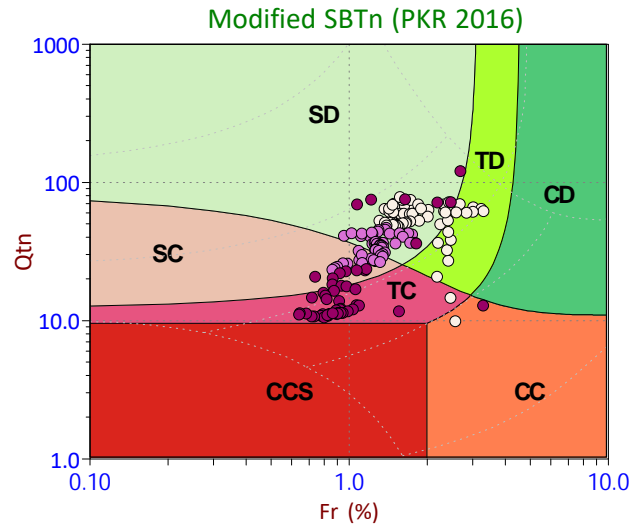


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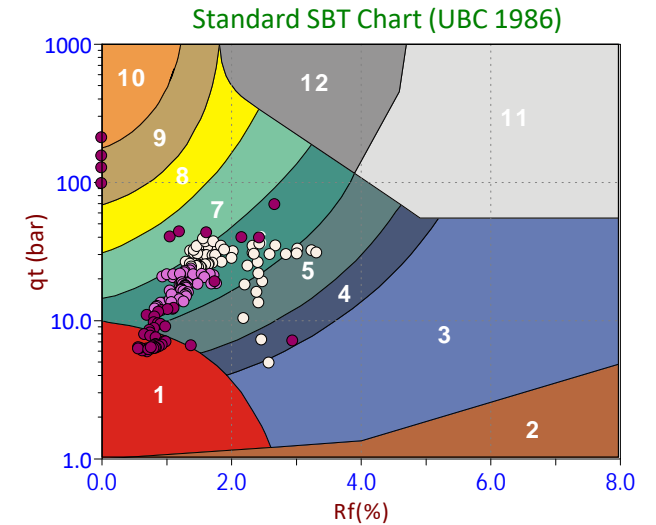
Legend

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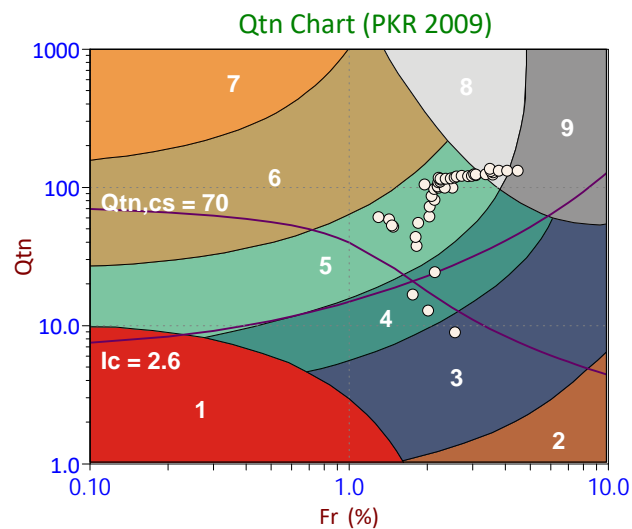
Legend

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Legend

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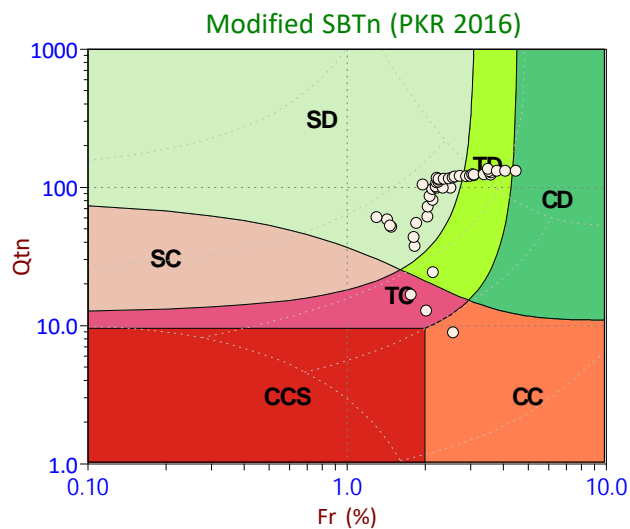


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- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

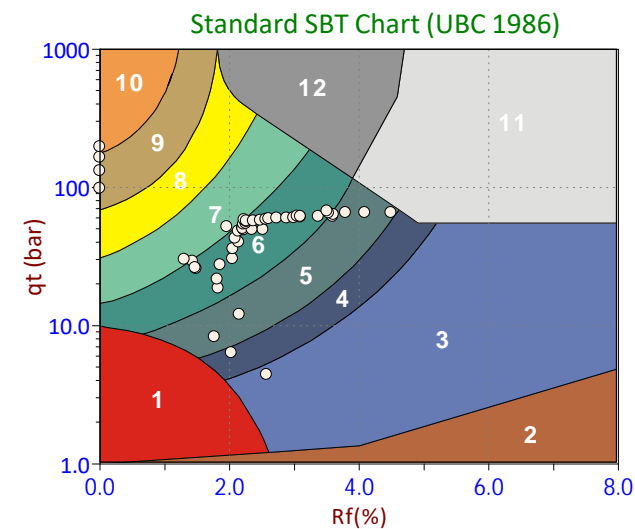
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



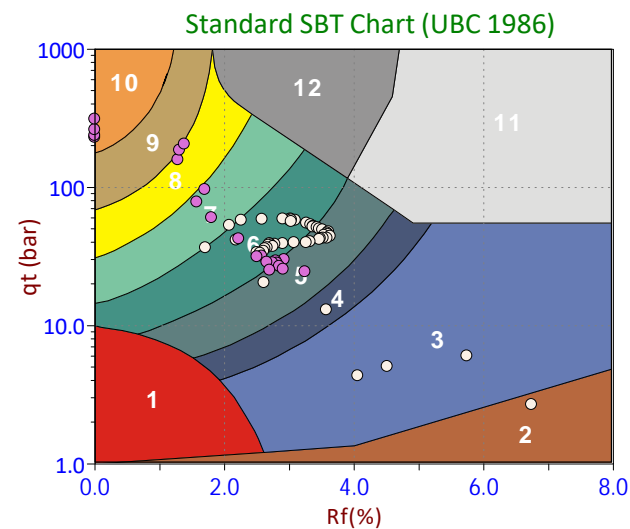
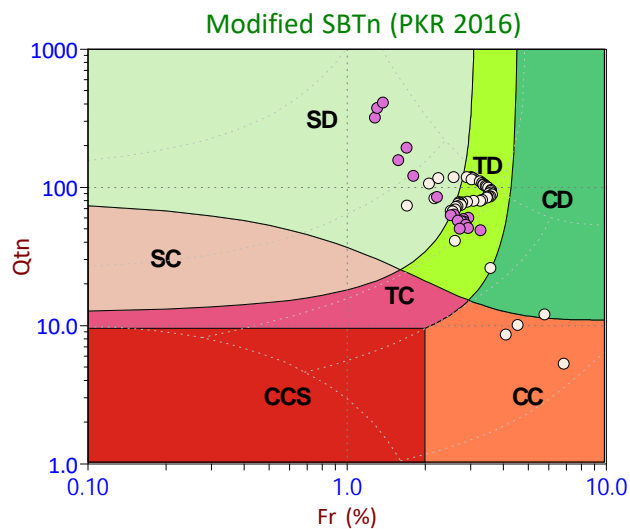
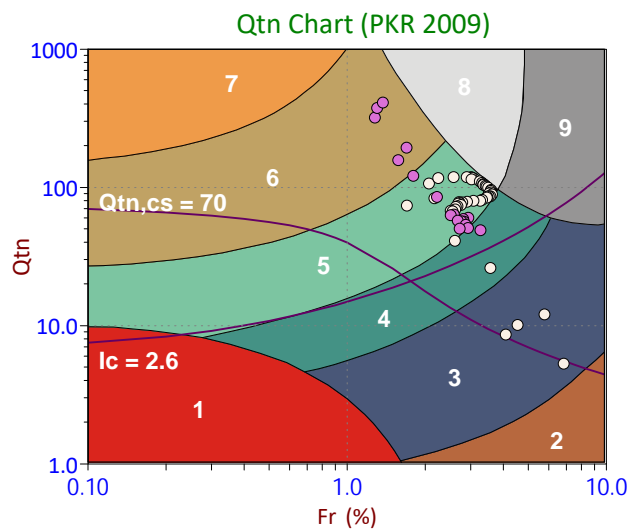
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend

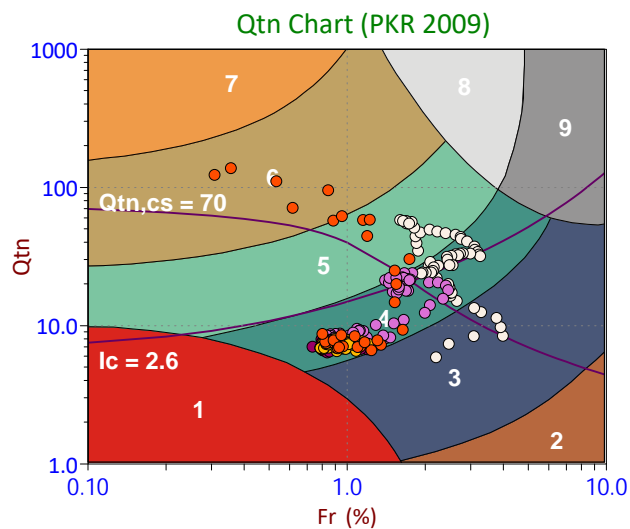
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

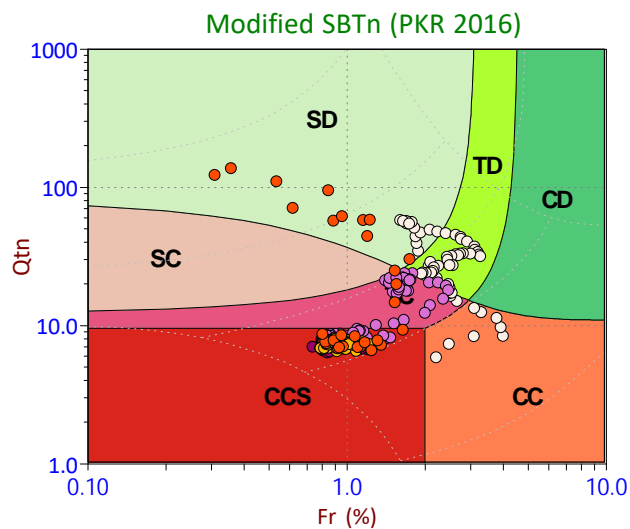


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

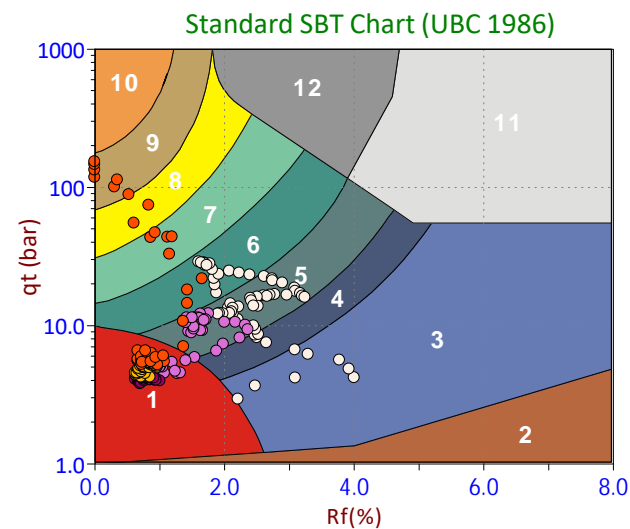
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



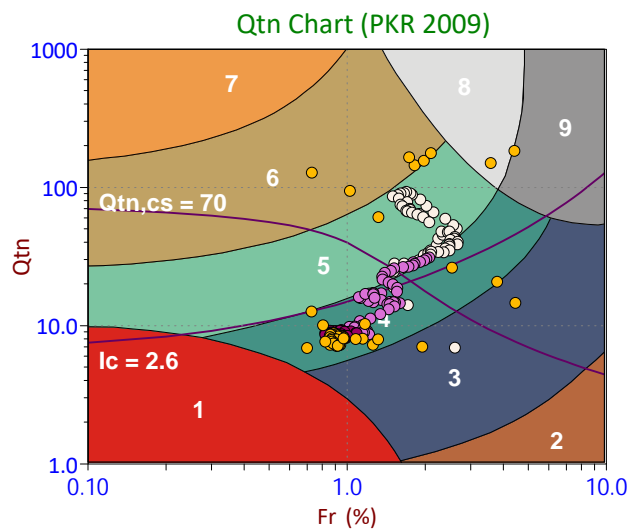
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

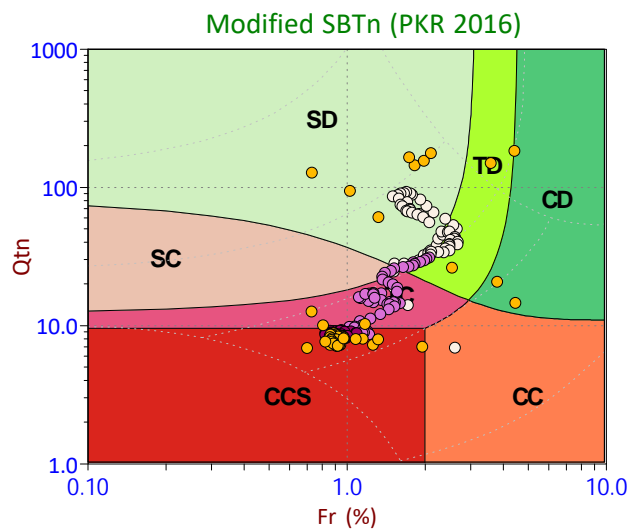


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

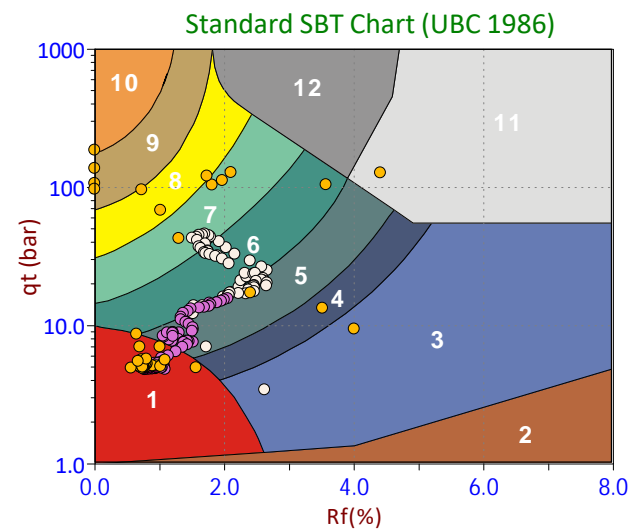
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



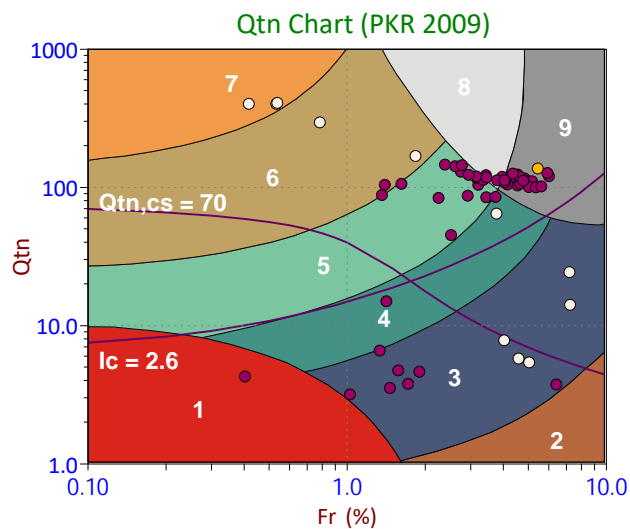
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

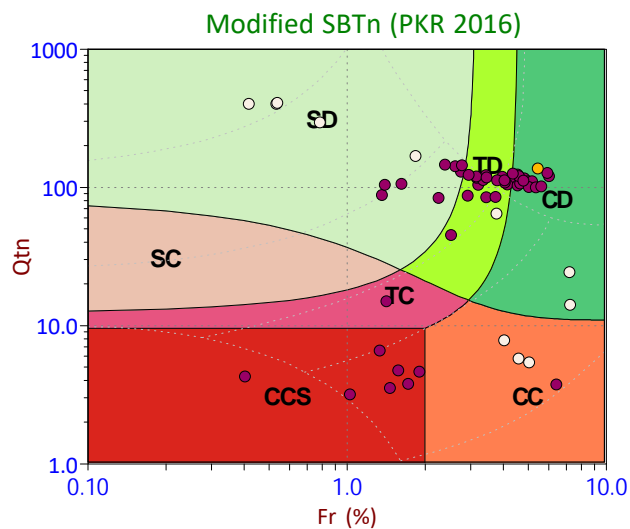


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

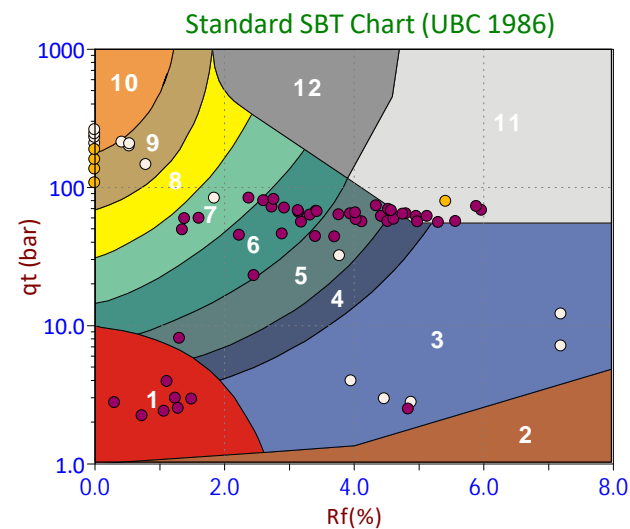
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



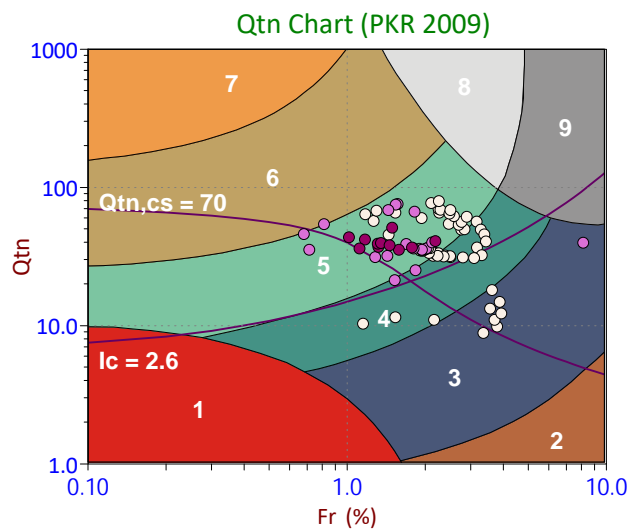
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

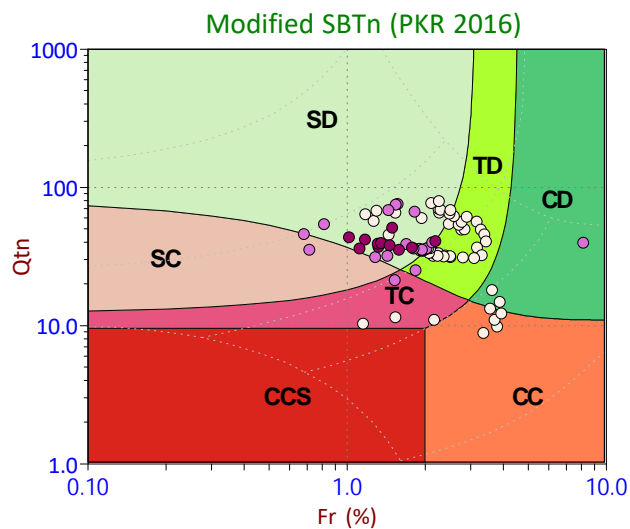


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
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- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

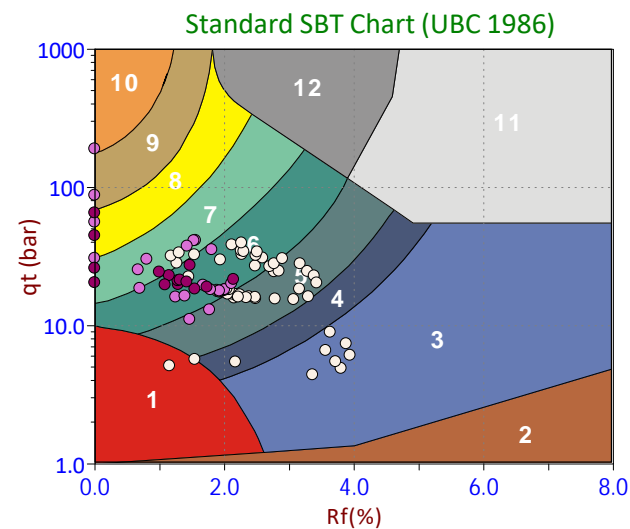
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



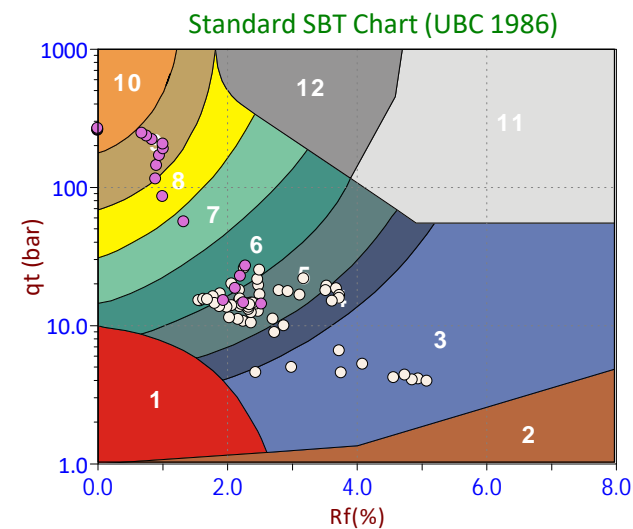
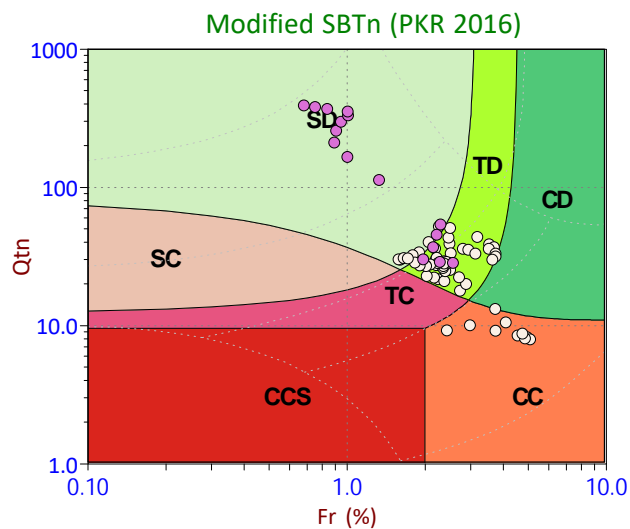
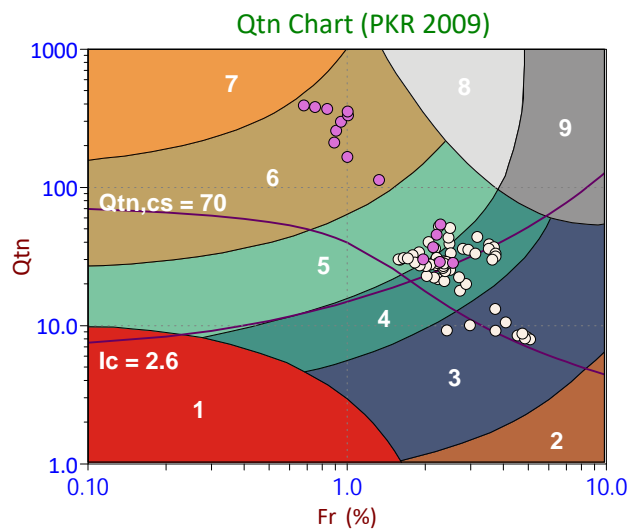
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend

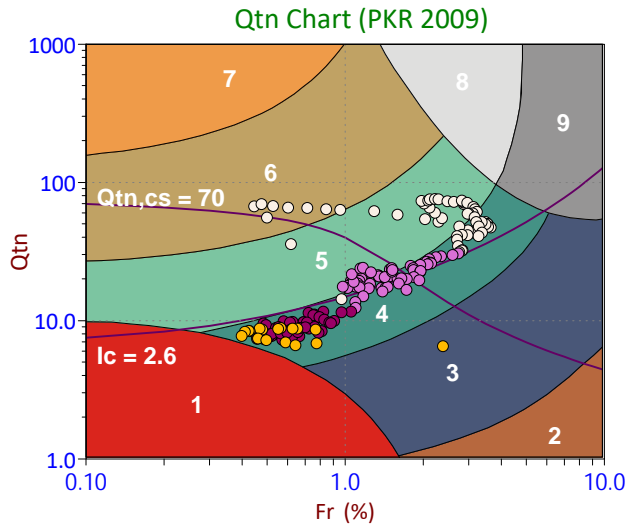
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

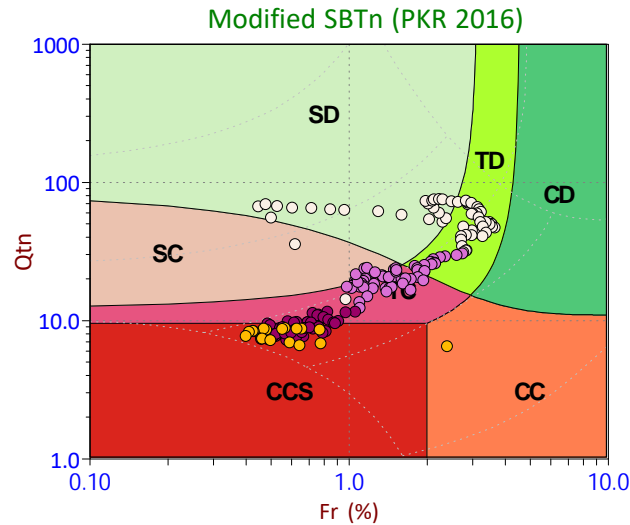


Depth Ranges

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- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
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- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

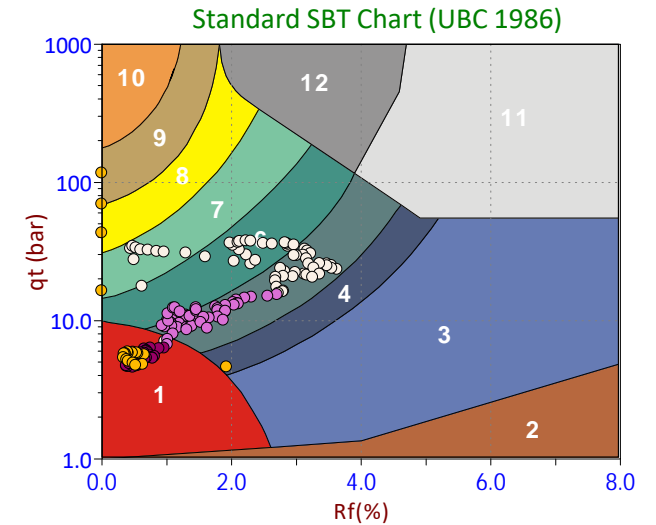
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



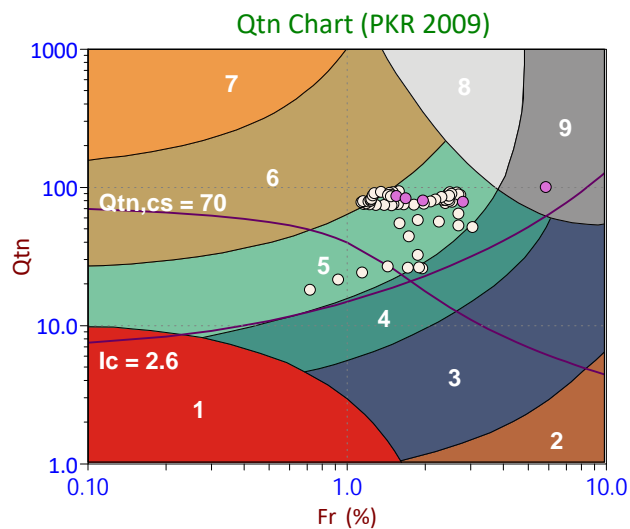
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

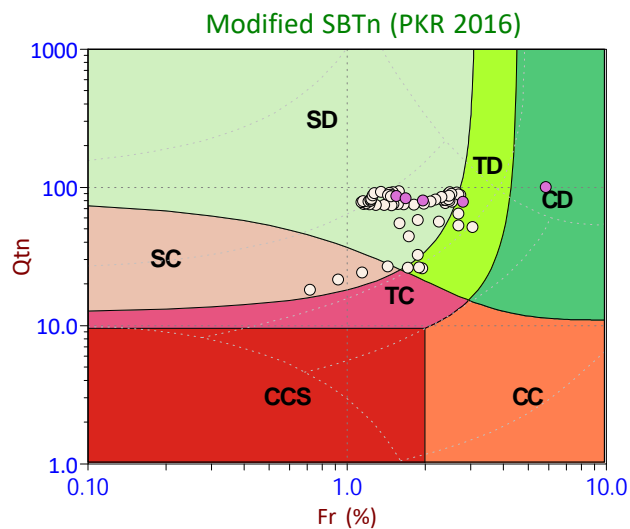


Depth Ranges

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- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
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- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

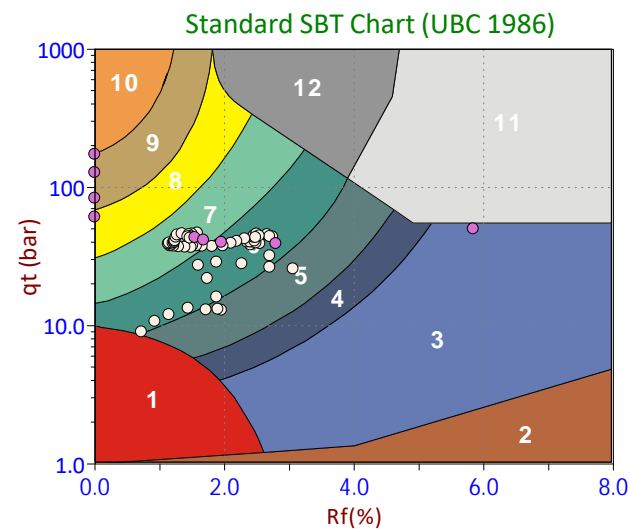
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand



Haley & Aldrich

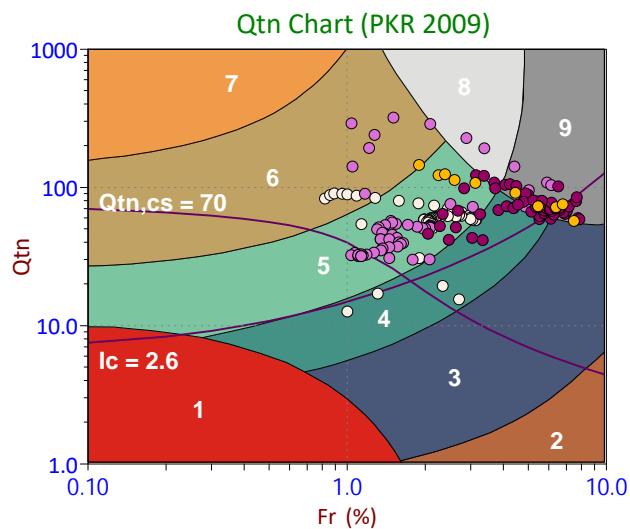
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Date: 2020-10-29 12:05

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

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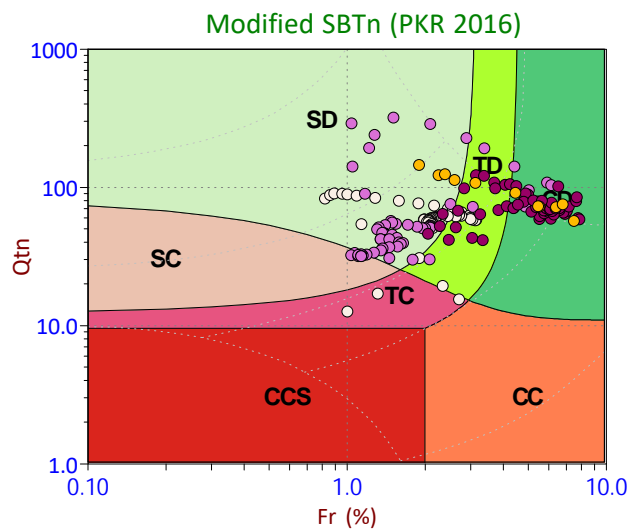


Depth Ranges

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- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
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- >45.0 to 50.0 ft
- >50.0 ft

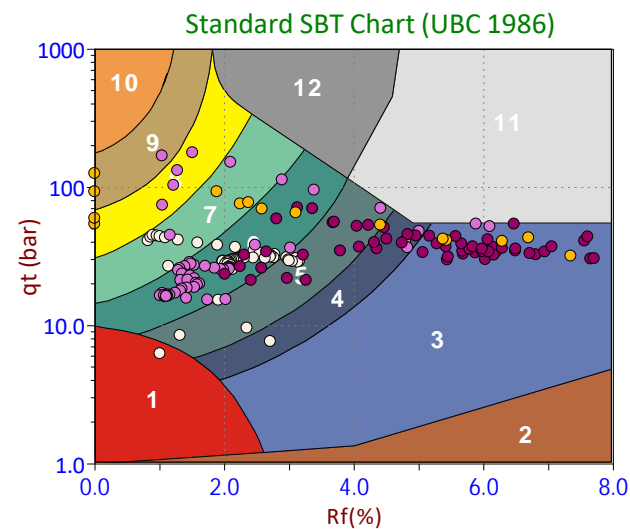
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



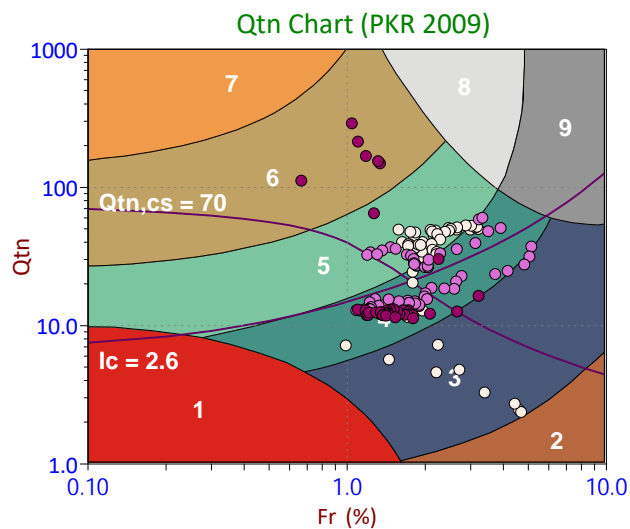
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

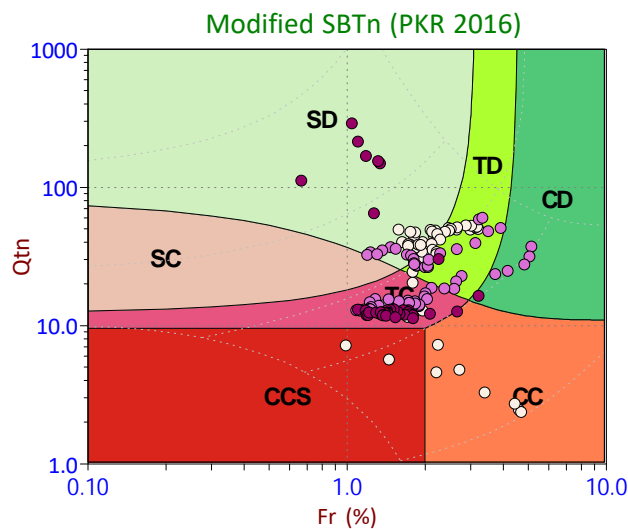


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
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- >20.0 to 25.0 ft
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- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

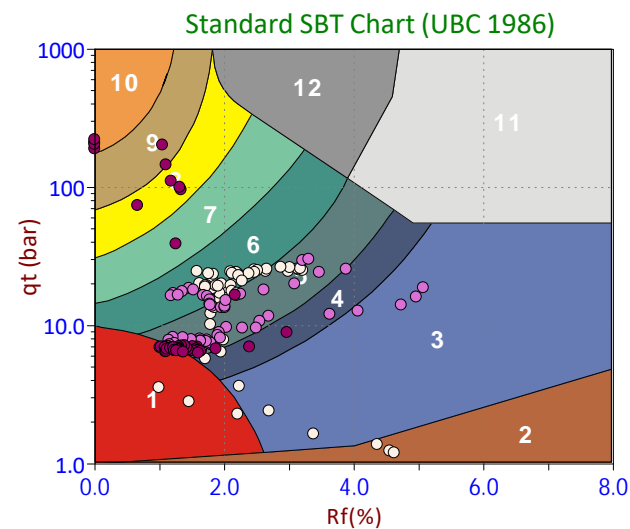
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



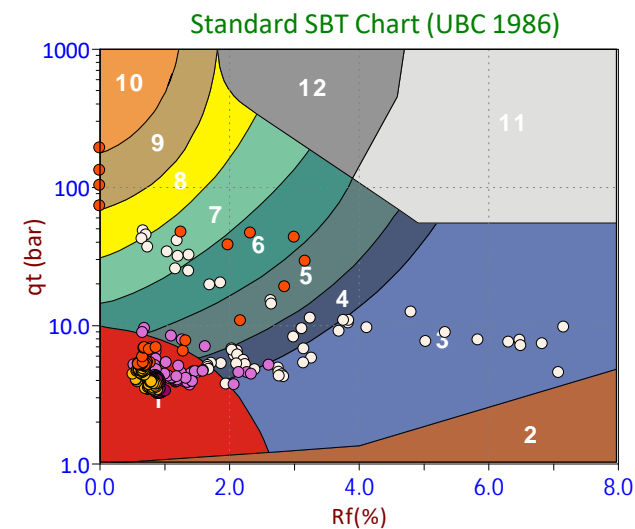
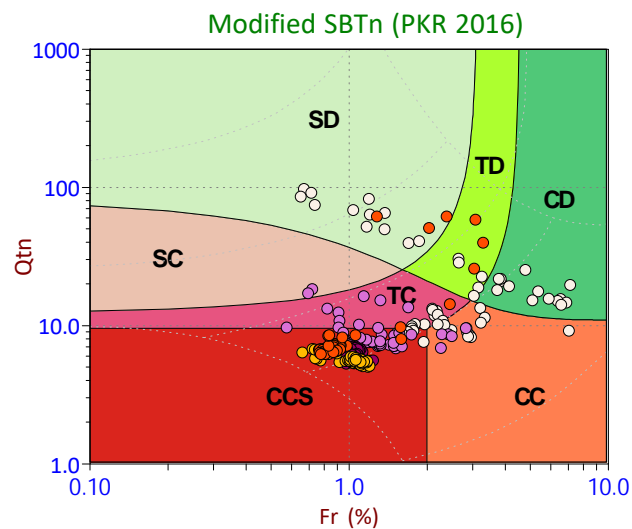
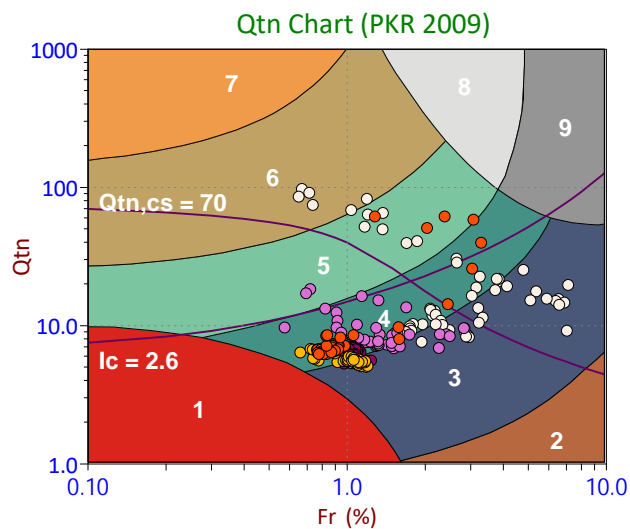
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend

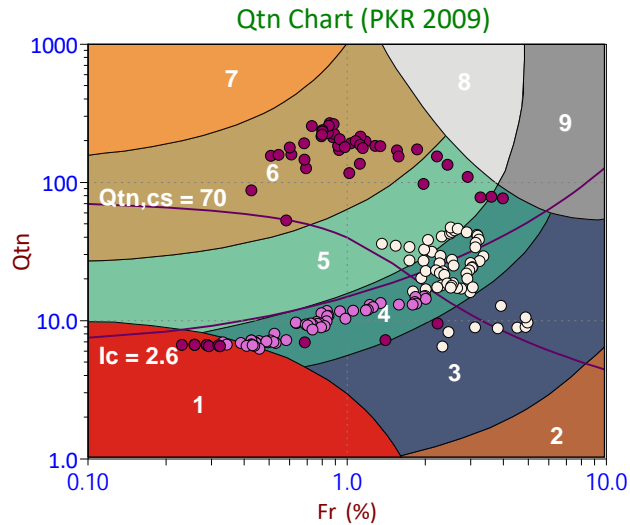
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

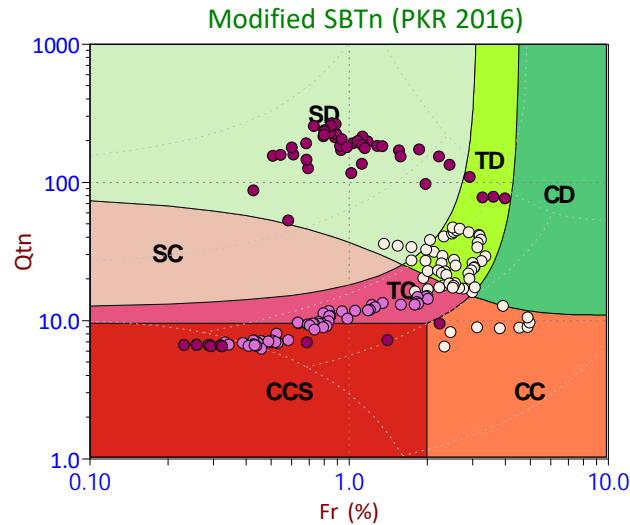


Depth Ranges

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- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
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- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

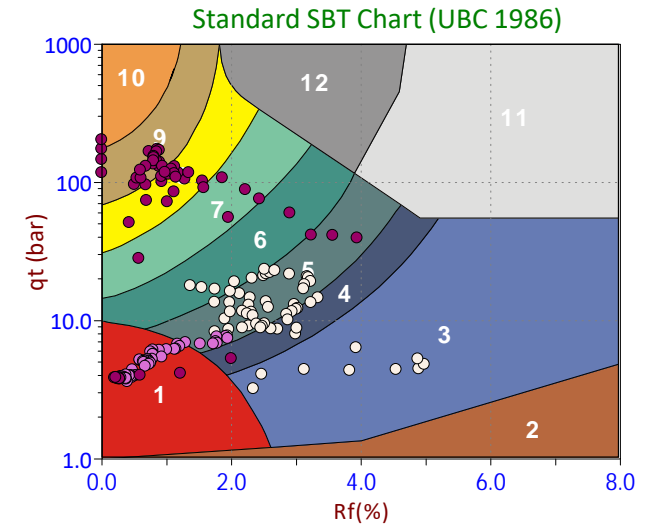
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



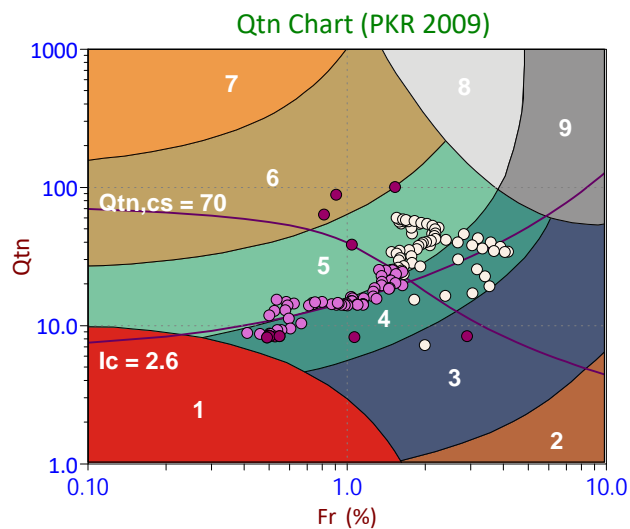
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

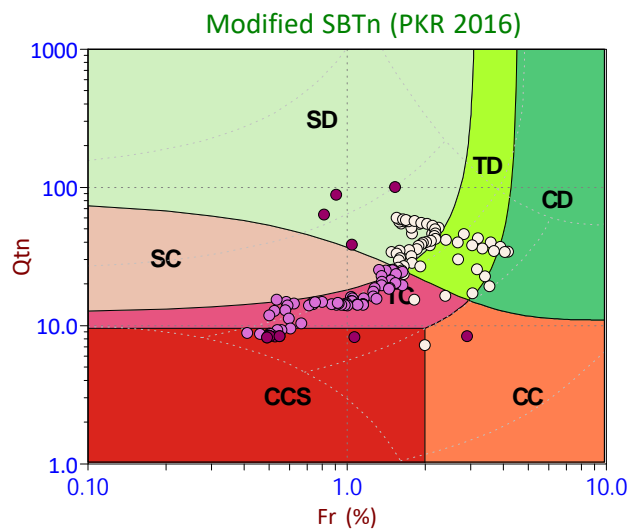


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

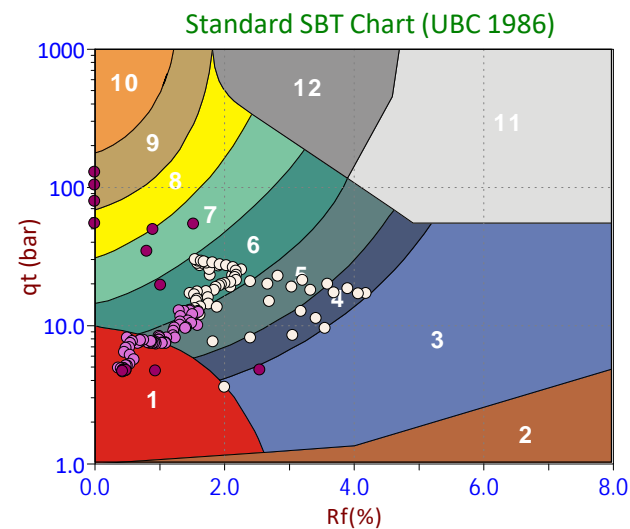
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



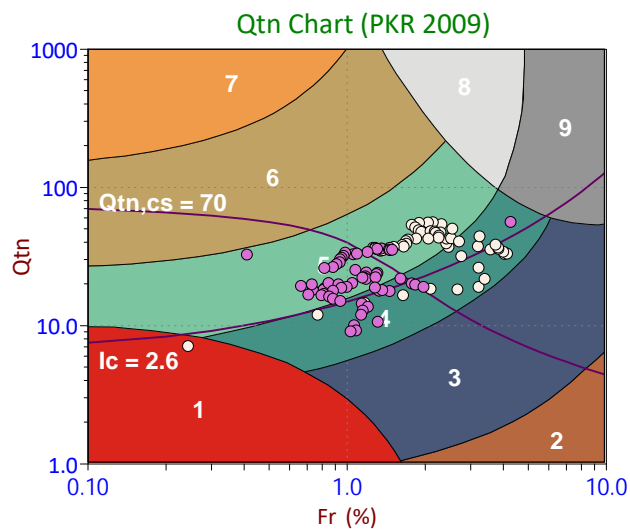
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

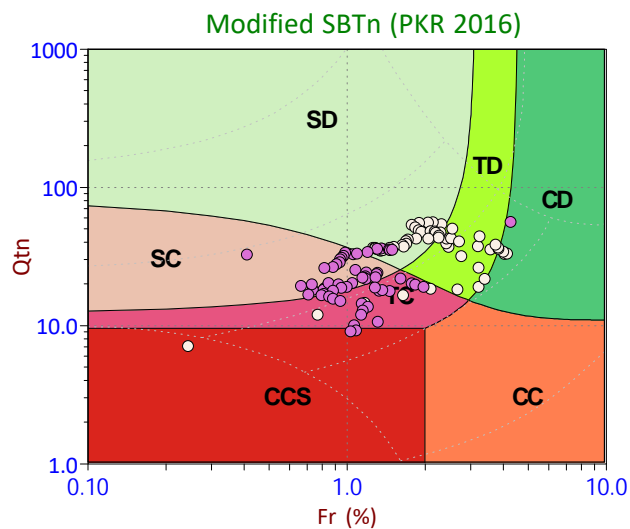


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

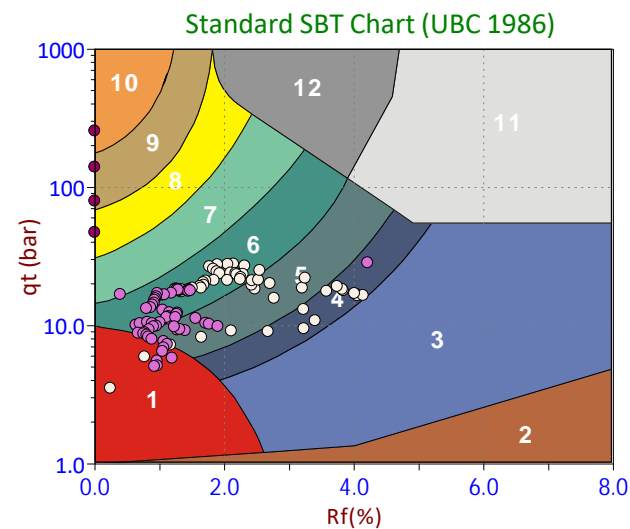
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



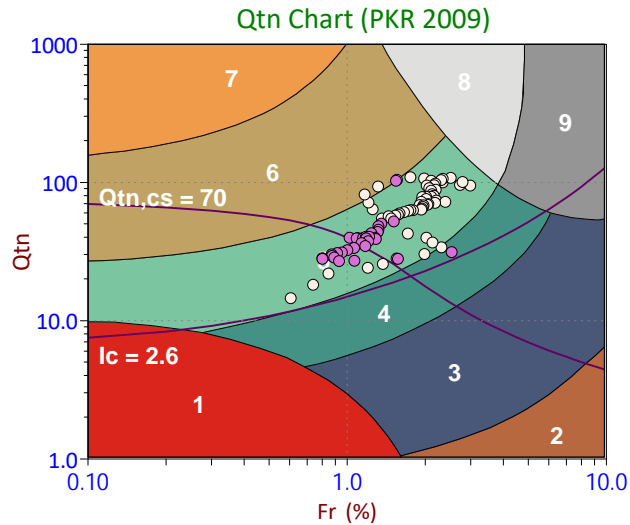
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

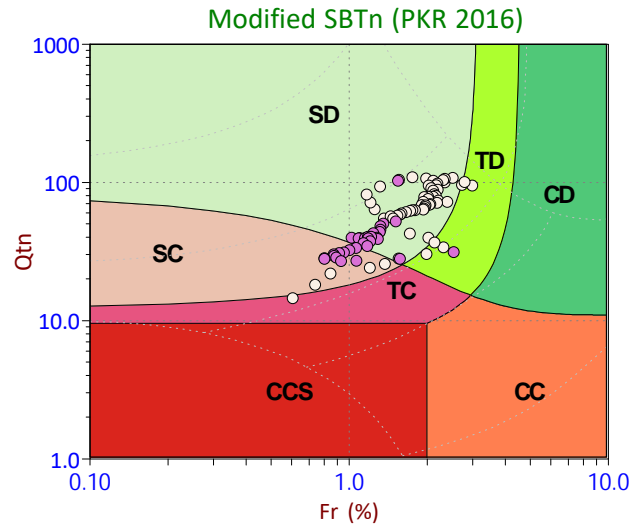


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

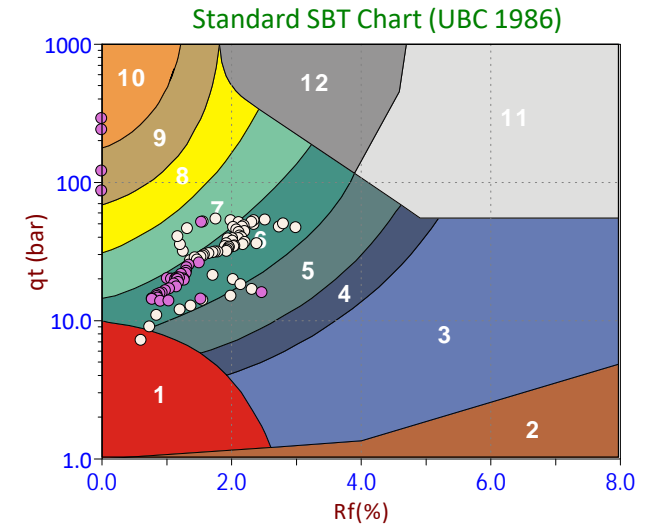
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



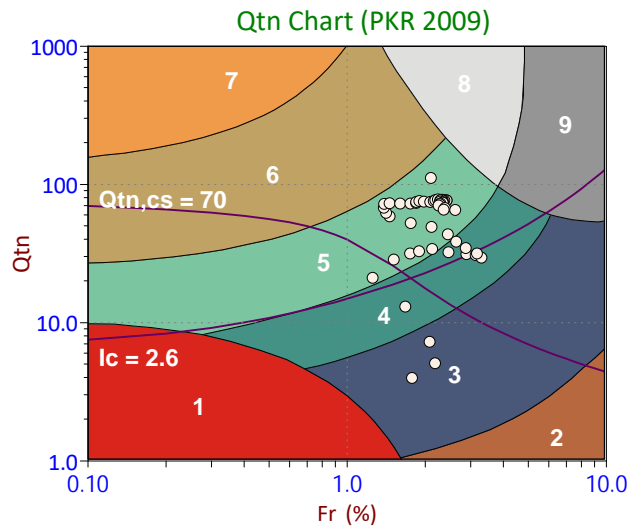
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
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- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

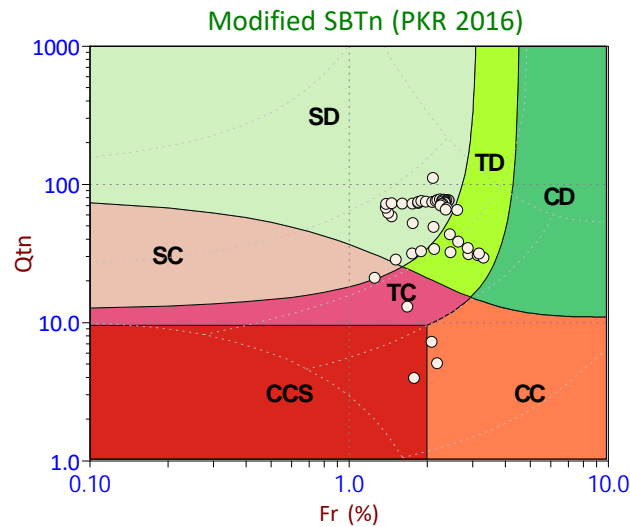


Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

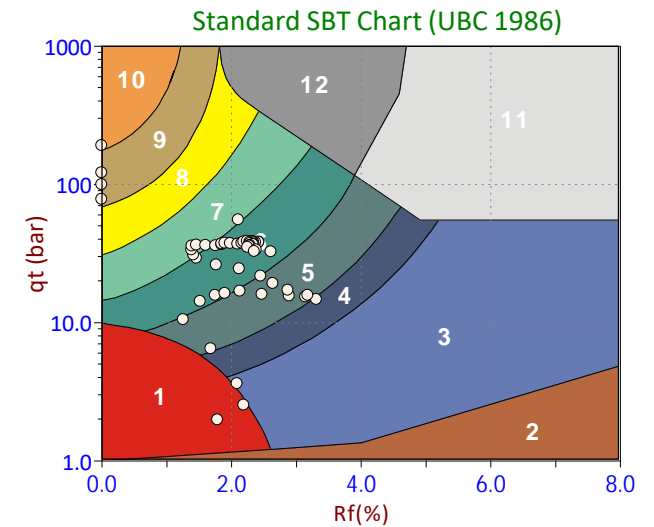
Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained



Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)



Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
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- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots



Job No: 20-53-21525
 Client: Haley & Aldrich
 Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
 Start Date: 26-Oct-2020
 End Date: 02-Nov-2020

CPT_u PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm ²)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U _{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t ₅₀ ^a (s)	Assumed Rigidity Index (I _r)	c _h ^b (cm ² /min)	Refer to Notation
CPT20-101B	20-53-21525_CP101B	15	4800	30.02	13.0		17.0	2662	100	0.3	
CPT20-101B	20-53-21525_CP101B	15	3595	48.15	31.1		17.0	1572	100	0.4	
SCPT20-101B	20-53-21525_SP101B	15	2700	8.12	4.6		3.5	2670	100	0.3	c
SCPT20-103	20-53-21525_SP103	15	4320	14.03	10.0		4.0	2612	100	0.3	
SCPT20-103	20-53-21525_SP103	15	4060	32.07	28.1		4.0	3354	100	0.2	
SCPT20-104	20-53-21525_SP104	15	1800	11.07	6.1		5.0	942	100	0.7	c
CPT20-105	20-53-21525_CP105	15	305	13.45	10.9	2.5					
CPT20-122	20-53-21525_CP122	15	3600	18.21	15.2		3.0	3160	100	0.2	
Totals	8 dissipations		419.7 min								

a. Time is relative to where umax occurred.

b. Houlsby and Teh, 1991.

c. The pore pressure dissipation test was completed in a split spoon sample hole and the soil is disturbed.



Haley & Aldrich

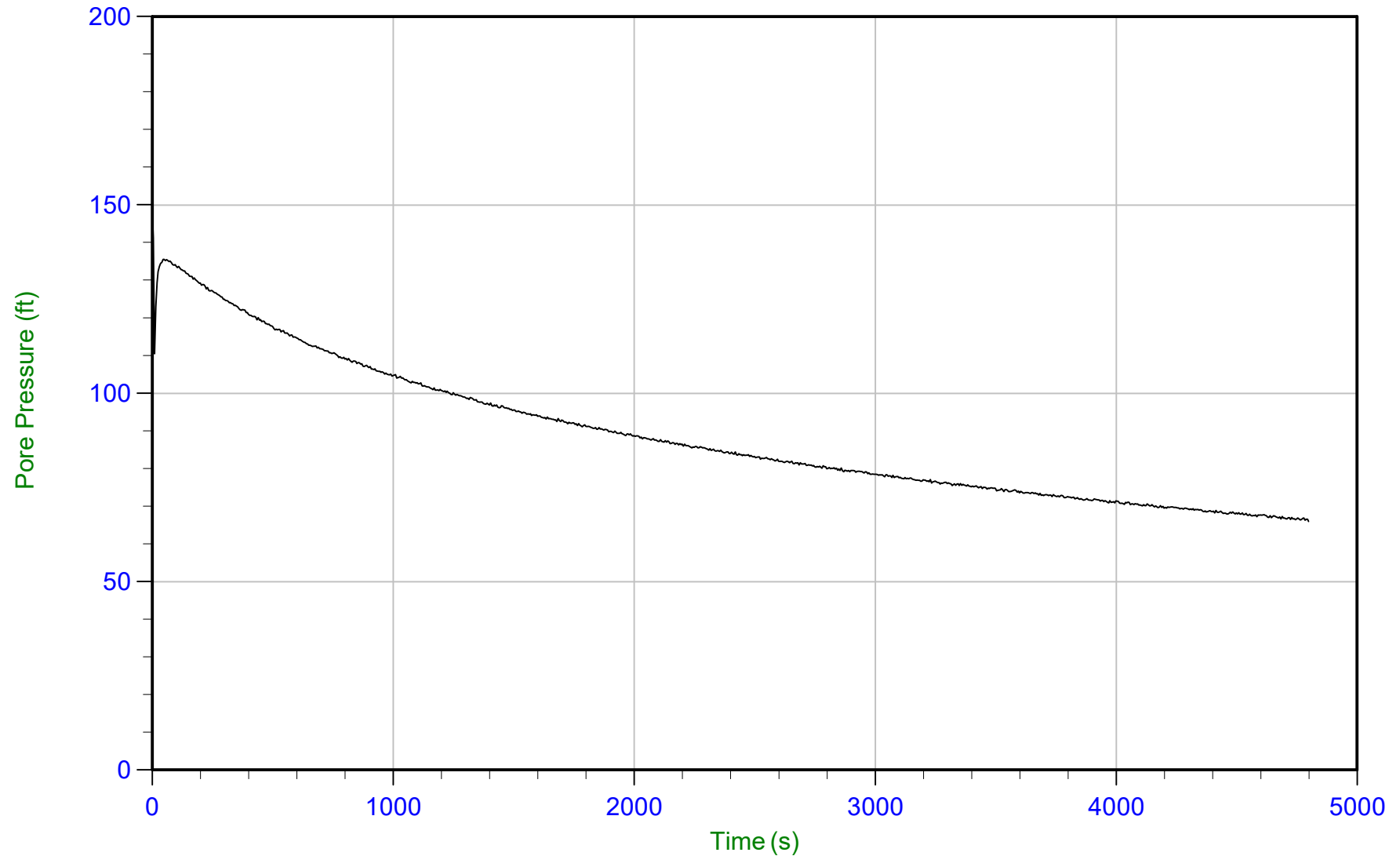
Job No: 20-53-21525

Date: 11/02/2020 10:10

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-101B

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_CP101B.PPD

Depth: 9.150 m / 30.019 ft

Duration: 4800.0 s

u Min: 66.0 ft

u Max: 149.7 ft

u Final: 66.0 ft

WT: 5.182 m / 17.000 ft

Ueq: 13.0 ft

U(50): 81.36 ft

T(50): 2661.8 s

Ir: 100

Ch: 0.3 cm²/min



Haley & Aldrich

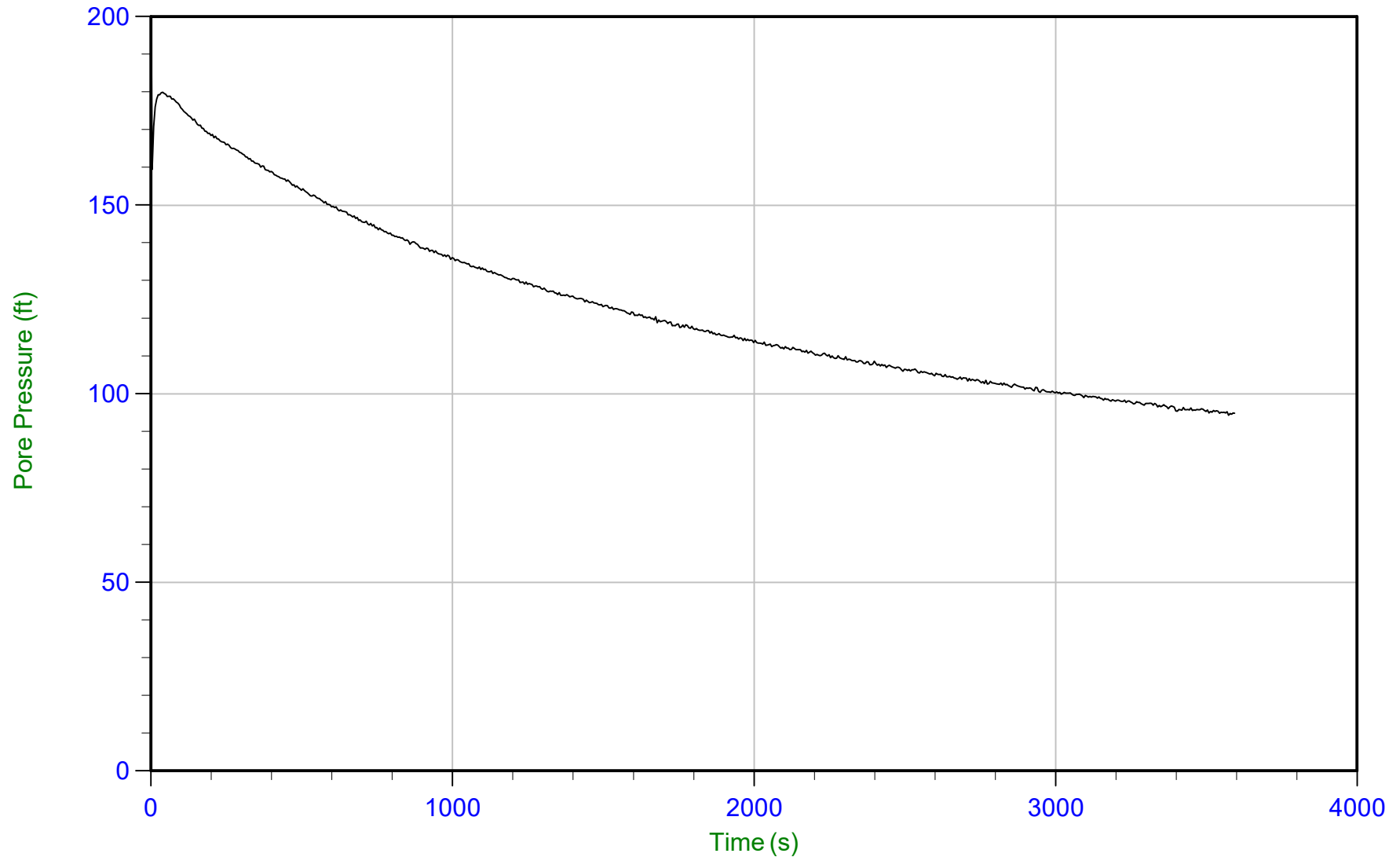
Job No: 20-53-21525

Date: 11/02/2020 10:10

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-101B

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_CP101B.PPD

Depth: 14.675 m / 48.146 ft

Duration: 3595.0 s

u Min: 94.3 ft

u Max: 212.7 ft

u Final: 94.8 ft

WT: 5.182 m / 17.000 ft

Ueq: 31.1 ft

U(50): 121.93 ft

T(50): 1572.3 s

Ir: 100

Ch: 0.4 cm²/min



Haley & Aldrich

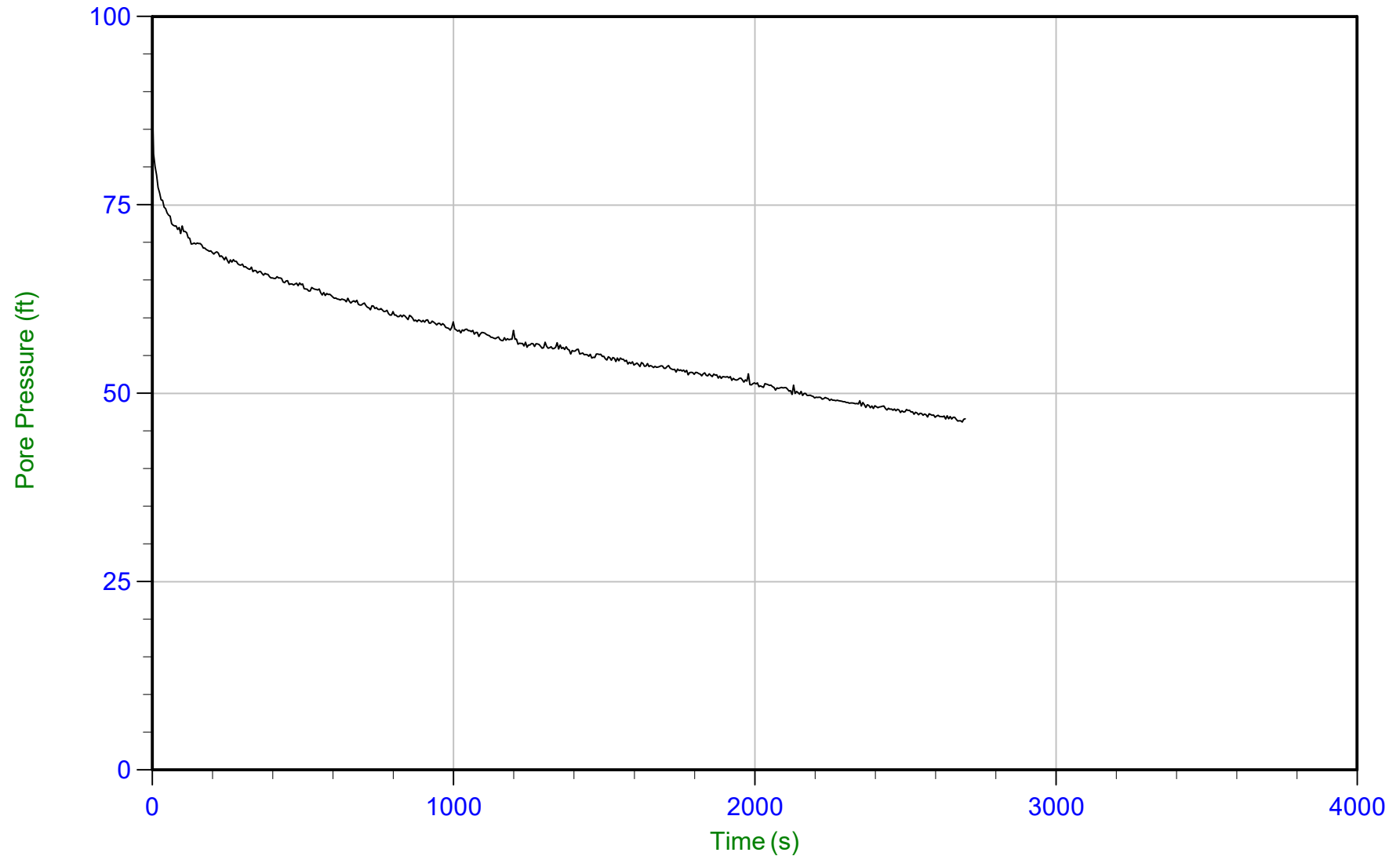
Job No: 20-53-21525

Date: 10/28/2020 08:27

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-101B

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_SP101B.PPD

Depth: 2.475 m / 8.120 ft

Duration: 2700.0 s

u Min: 46.2 ft

u Max: 88.4 ft

u Final: 46.6 ft

WT: 1.067 m / 3.500 ft

Ueq: 4.6 ft

U(50): 46.53 ft

T(50): 2670.1 s

Ir: 100

Ch: 0.3 cm²/min



Haley & Aldrich

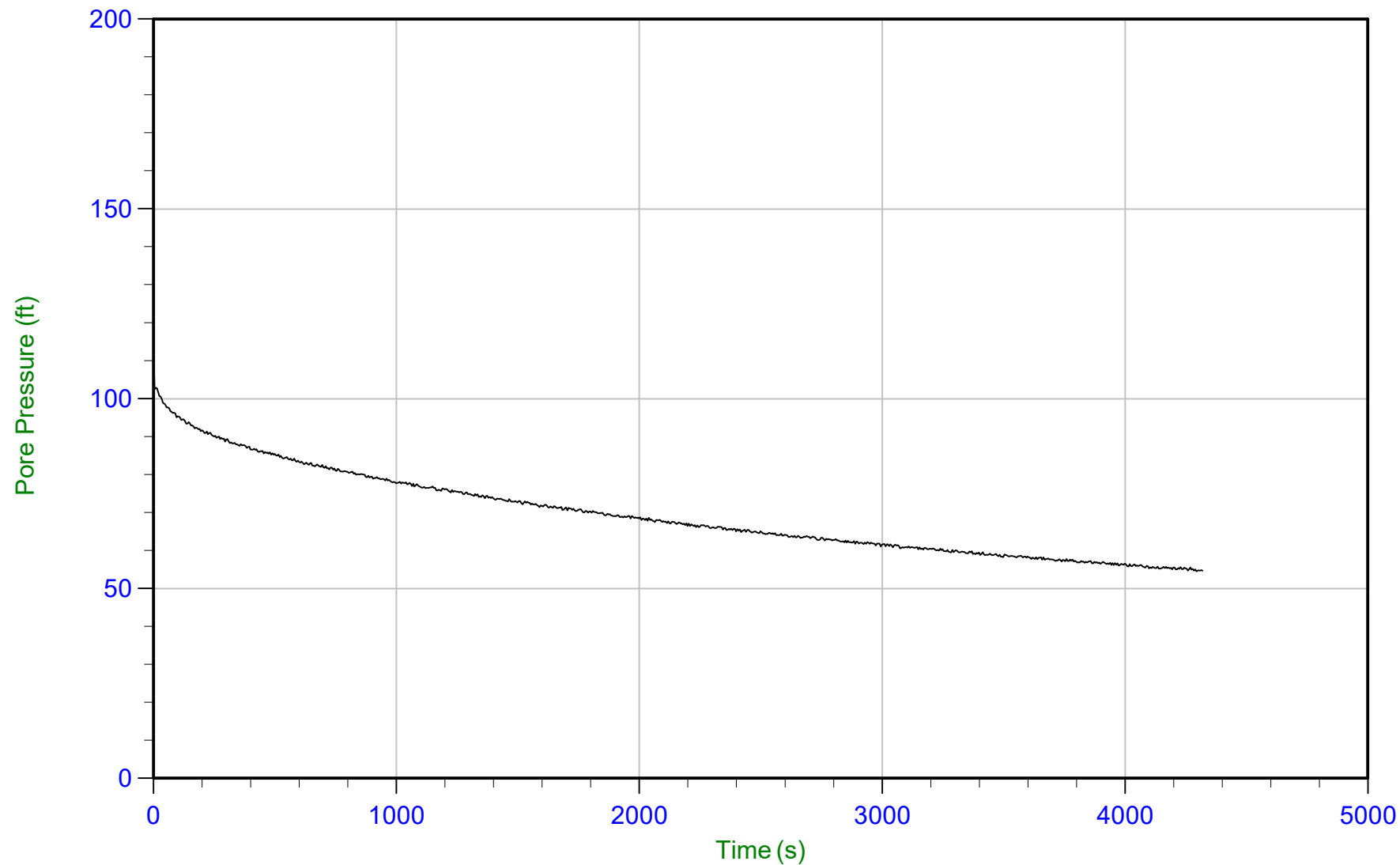
Job No: 20-53-21525

Date: 11/01/2020 12:46

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-103

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_SP103.PPD

Depth: 4.275 m / 14.025 ft

Duration: 4320.0 s

u Min: 54.5 ft

u Max: 117.7 ft

u Final: 54.7 ft

WT: 1.219 m / 4.000 ft

Ueq: 10.0 ft

U(50): 63.85 ft

T(50): 2611.9 s

Ir: 100

Ch: 0.3 cm²/min



Haley & Aldrich

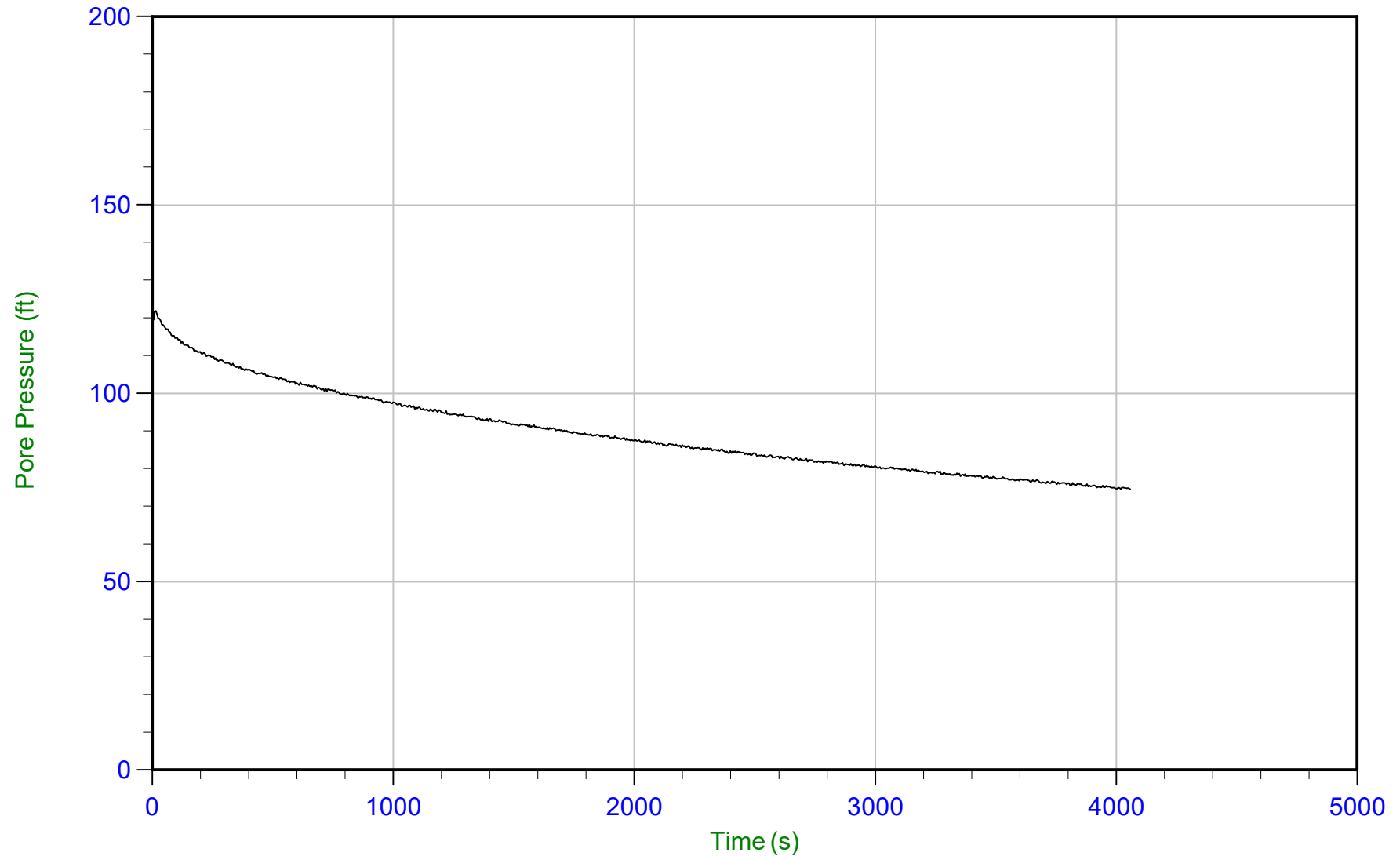
Job No: 20-53-21525

Date: 11/01/2020 12:46

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-103

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_SP103.PPD

Depth: 9.775 m / 32.070 ft

Duration: 4060.0 s

u Min: 74.5 ft

u Max: 128.2 ft

u Final: 74.5 ft

WT: 1.219 m / 4.000 ft

Ueq: 28.1 ft

U(50): 78.15 ft

T(50): 3353.7 s

Ir: 100

Ch: 0.2 cm²/min



Haley & Aldrich

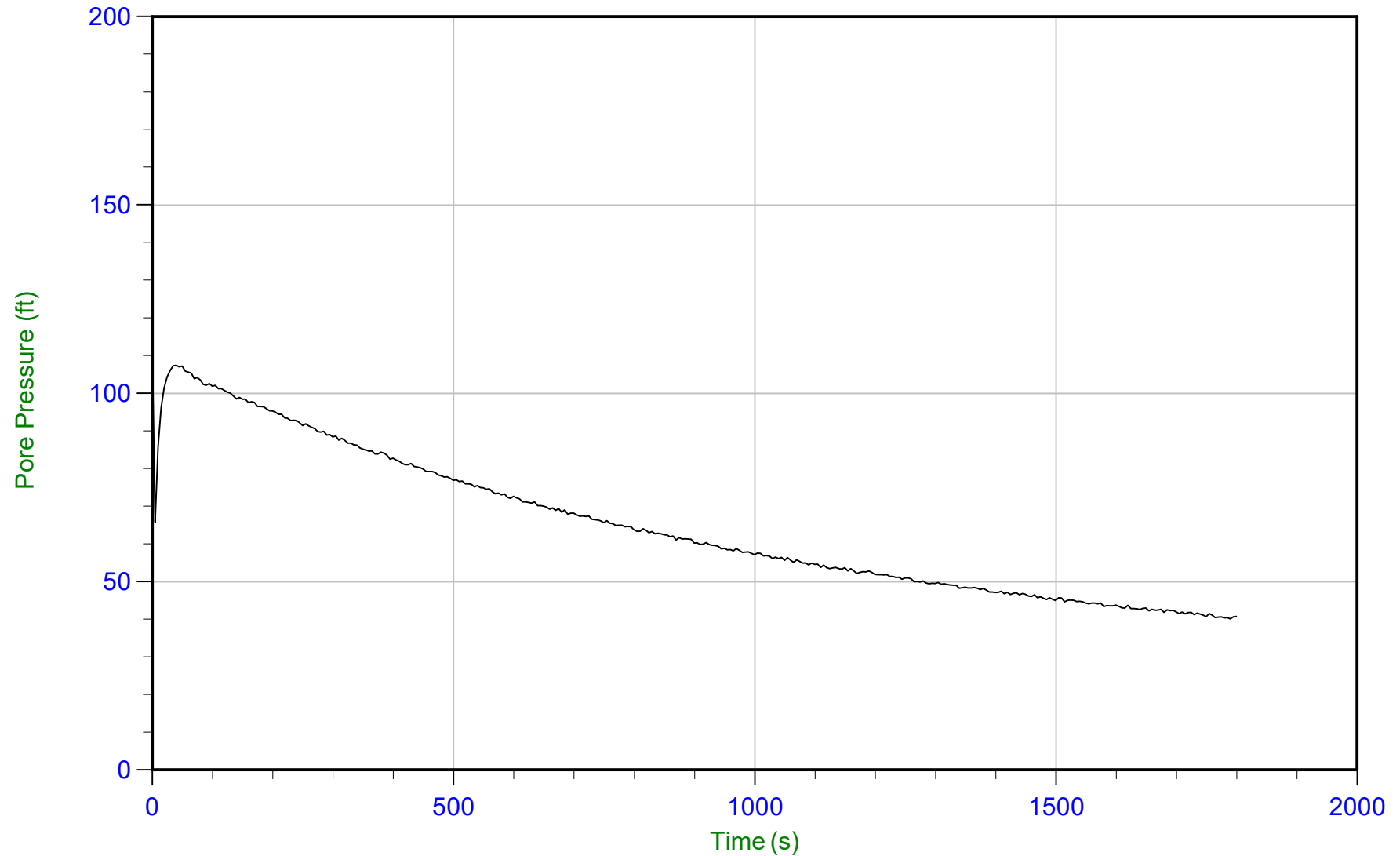
Job No: 20-53-21525

Date: 11/01/2020 08:08

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: SCPT20-104

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_SP104.PPD

Depth: 3.375 m / 11.073 ft

Duration: 1800.0 s

u Min: 40.1 ft

u Max: 112.1 ft

u Final: 40.7 ft

WT: 1.524 m / 5.000 ft

Ueq: 6.1 ft

U(50): 59.11 ft

T(50): 941.8 s

Ir: 100

Ch: 0.7 cm²/min



Haley & Aldrich

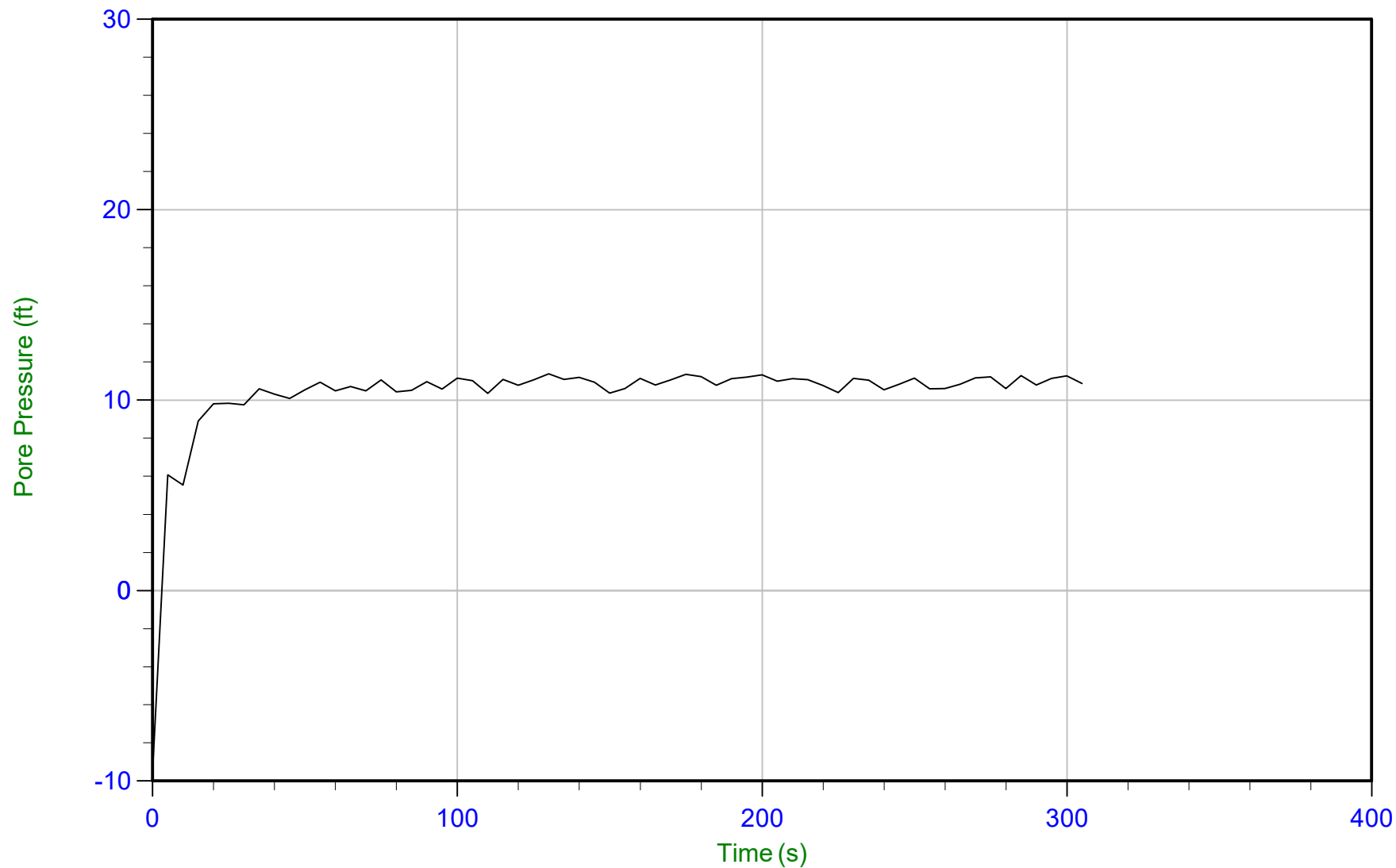
Job No: 20-53-21525

Date: 11/01/2020 10:13

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-105

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_CP105.PPD

Depth: 4.100 m / 13.451 ft

Duration: 305.0 s

u Min: -9.6 ft

u Max: 11.4 ft

u Final: 10.9 ft

WT: 0.763 m / 2.504 ft

Ueq: 10.9 ft



Haley & Aldrich

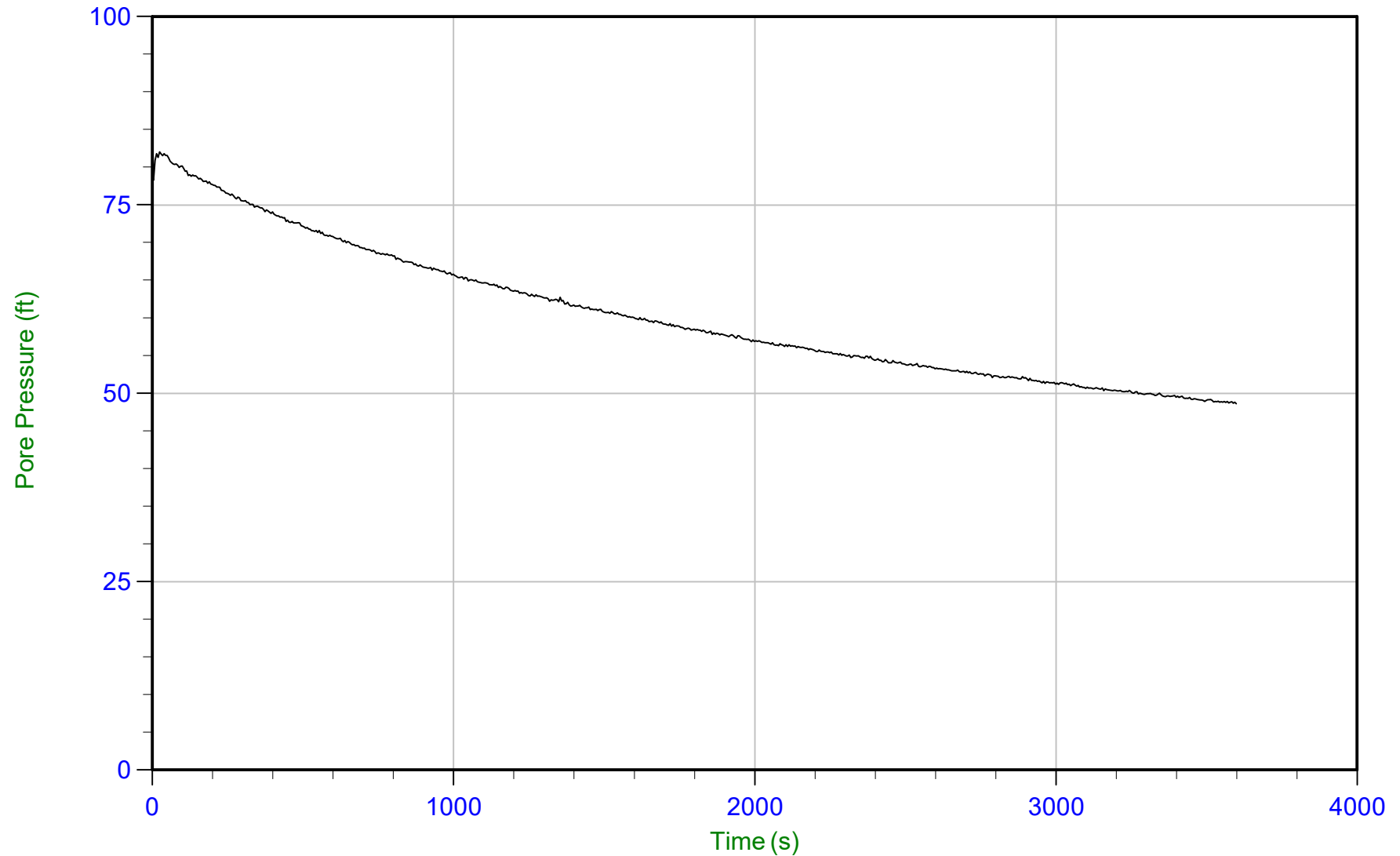
Job No: 20-53-21525

Date: 10/30/2020 12:58

Site: I-395 & Route 9 Connector, Brewer & Eddington, ME

Sounding: CPT20-122

Cone: 524:T375F10U500 Area=15 cm²



Trace Summary:

Filename: 20-53-21525_CP122.PPD

Depth: 5.550 m / 18.208 ft

Duration: 3600.0 s

u Min: 48.6 ft

u Max: 85.5 ft

u Final: 48.6 ft

WT: 0.914 m / 3.000 ft

Ueq: 15.2 ft

U(50): 50.37 ft

T(50): 3159.8 s

Ir: 100

Ch: 0.2 cm²/min

APPENDIX C

Observation Well Installation and Groundwater Monitoring Reports



BB-BEB-102

Page 1 of 1

DATE 12/19/2018

ELEVATION OF REFERENCE POINT (ft)	75.3	REFERENCE POINT:	Ground Surface	<input checked="" type="checkbox"/>	PVC	<input type="checkbox"/>	Other	<input type="checkbox"/>
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APPENDIX D

Laboratory Test Results



Client:	Haley & Aldrich, Inc.		
Project:	I-395/Rte 9 Connector (Area 2)		
Location:	Brewer-Eddington, ME	Project No:	GTX-313196
Boring ID:	---	Sample Type:	---
Sample ID:	---	Test Date:	03/22/21
Depth :	---	Test Id:	611809
		Tested By:	md
		Checked By:	emm

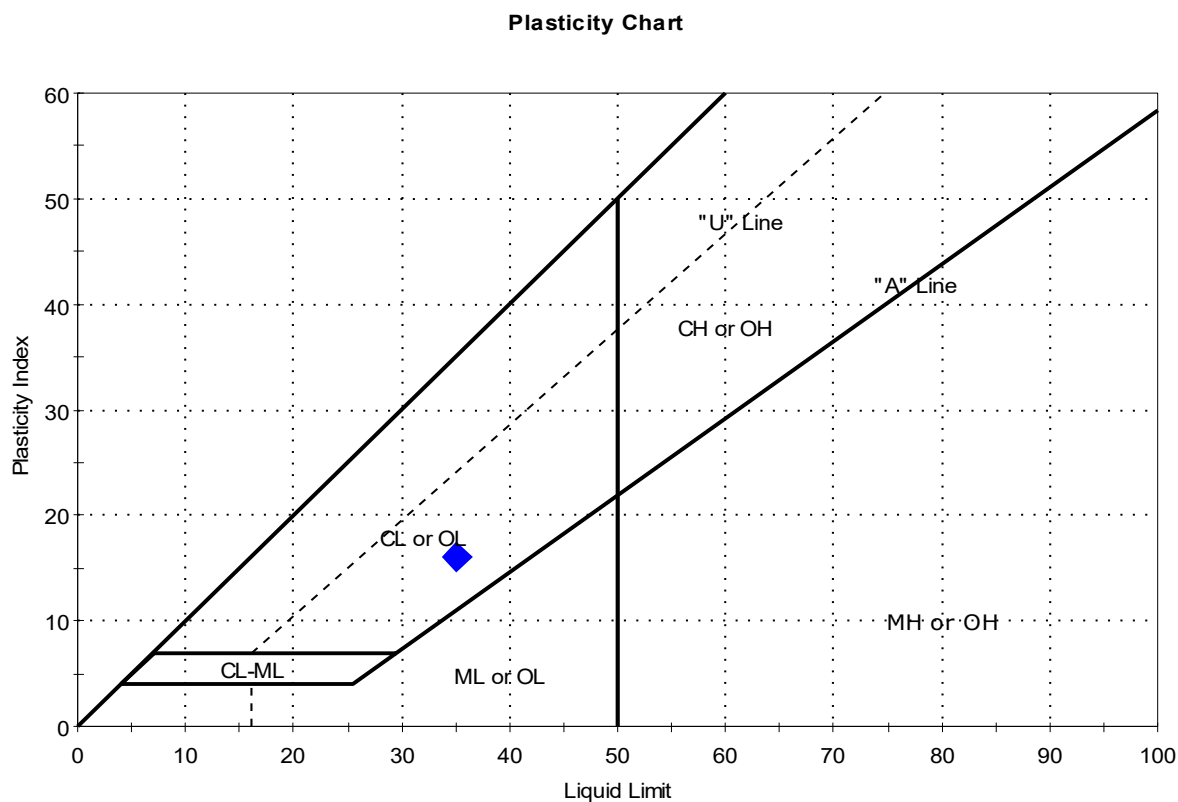
Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content, %
BB-BEB-202	U1	5-7 ft	Moist, gray clay	32.7
BB-BEB-202	U2	15-17 ft	Wet, gray clay	36.5
BB-BEB-204	U1	5-7 ft	Moist, light yellowish brown clay	29.3
BB-BEB-205	U1	10-12 ft	Moist, gray clay	36.8

Notes: Temperature of Drying : 110° Celsius

Client:	Haley & Aldrich, Inc.		
Project:	Rt 9/I-395 Connector		
Location:	Brewer and Eddington, ME	Project No:	GTX-308853
Boring ID:	BB-BEB-101	Sample Type:	tube
Sample ID:	1U	Test Date:	07/29/19
Depth :	5-7 ft	Test Id:	513660
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	1U	B-BEB-10	5-7 ft	31	35	19	16	0.8	

Sample Prepared using the WET method

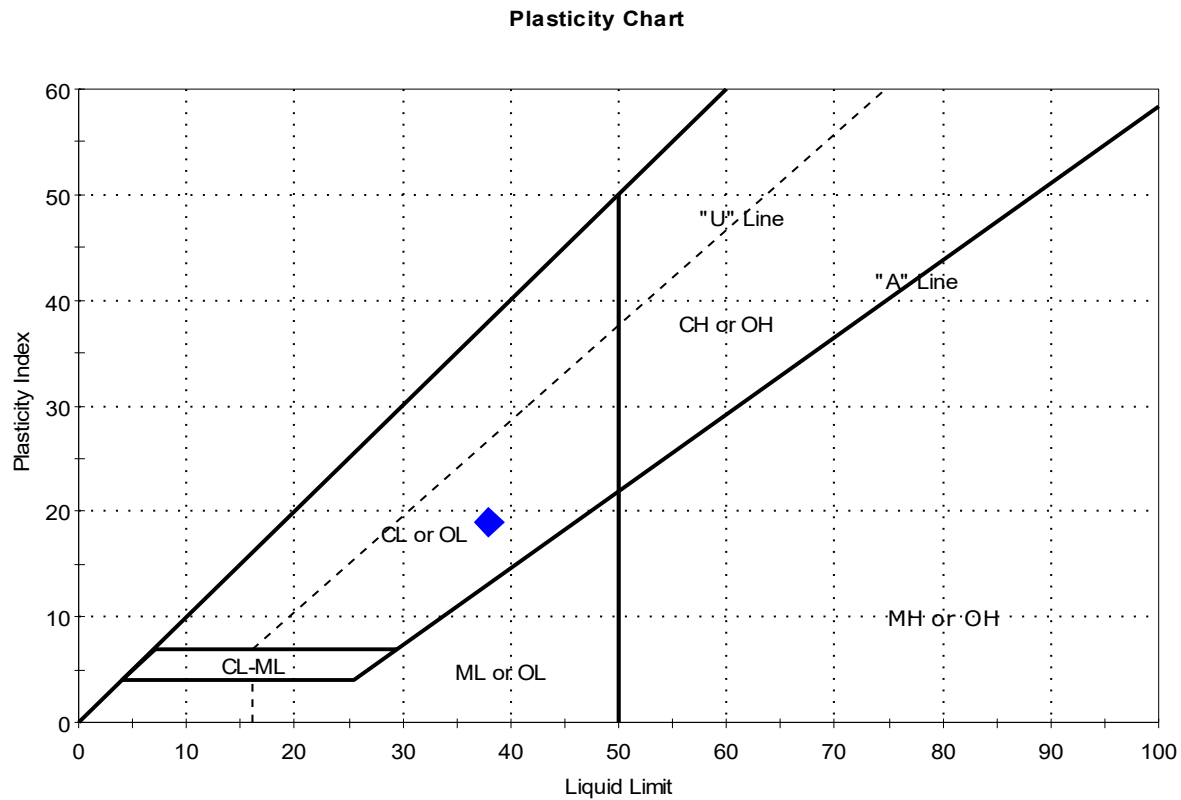
Dry Strength: VERY HIGH

Dilatancy: n/a

Toughness: n/a

Client:	Haley & Aldrich, Inc.	Project No:	GTX-308853
Project:	Rt 9/I-395 Connector		
Location:	Brewer and Eddington, ME		
Boring ID:	BB-BEB-103	Sample Type:	tube
Sample ID:	1U	Test Date:	07/30/19
Depth :	10-12 ft	Test Id:	513654
Test Comment:	---	Tested By:	cam
Visual Description:	Moist, dark gray clay	Checked By:	bfs
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	1U	B-BEB-10	10-12 ft	36	38	19	19	0.9	

Sample Prepared using the WET method

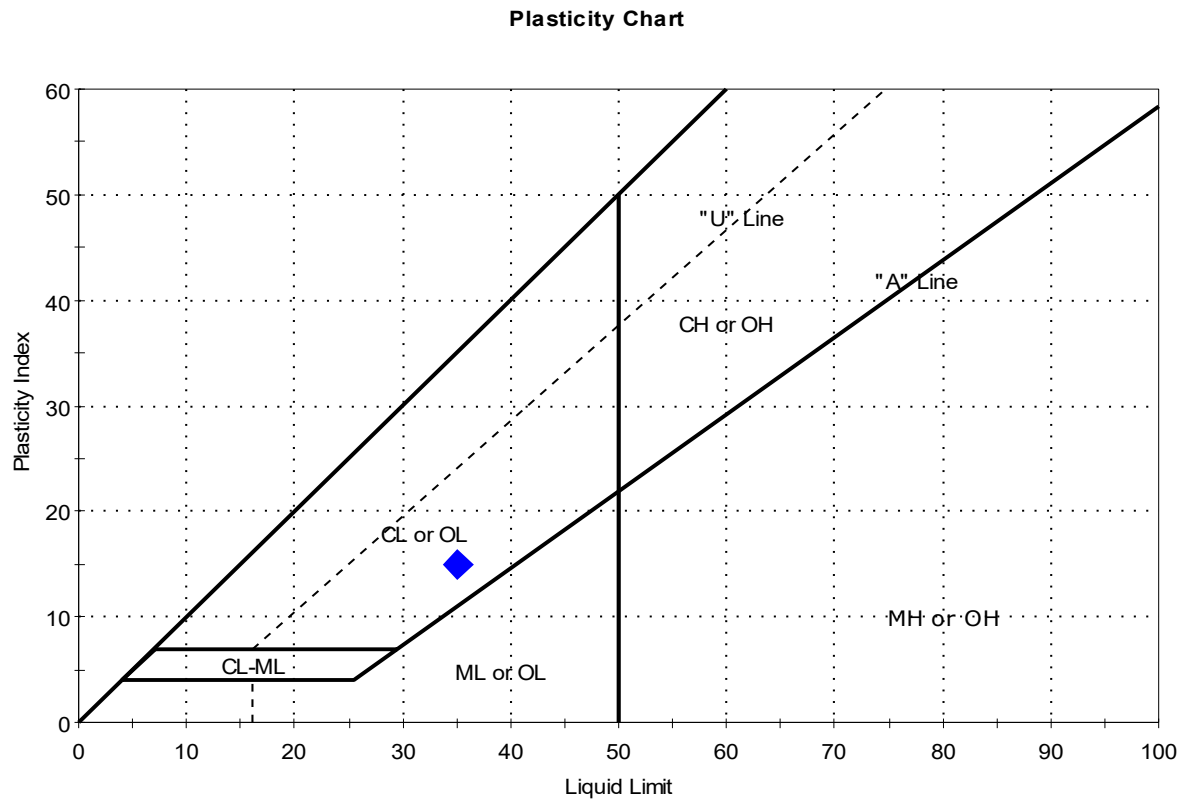
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Haley & Aldrich, Inc.				
Project:	Rt 9/I-395 Connector				
Location:	Brewer and Eddington, ME		Project No:	GTX-308853	
Boring ID:	BB-BEB-104	Sample Type:	tube	Tested By:	cam
Sample ID:	3U	Test Date:	07/26/19	Checked By:	bfs
Depth :	15-17 ft	Test Id:	513664		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	3U	B-BEB-10	15-17 ft	34	35	20	15	0.9	

Sample Prepared using the WET method

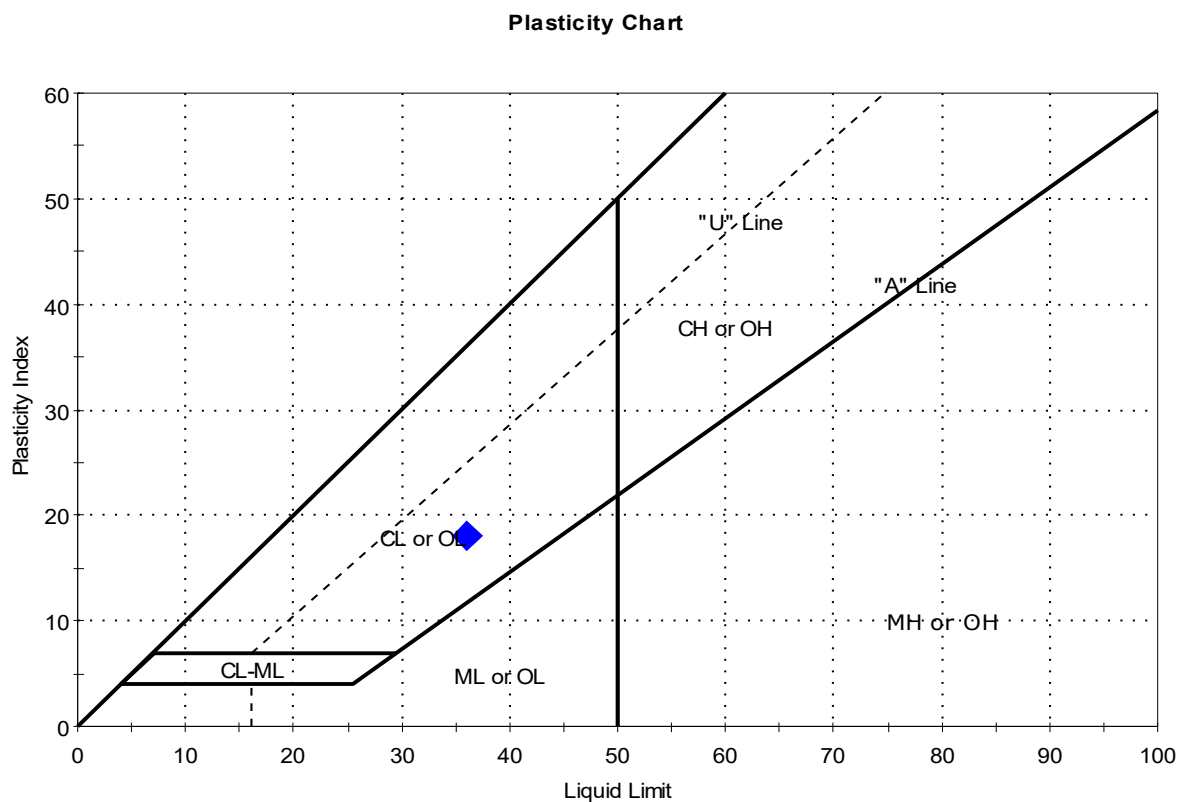
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Haley & Aldrich, Inc.		
Project:	I-395/Rte 9 Connector (Area 2)		
Location:	Brewer-Eddington, ME	Project No:	GTX-313196
Boring ID:	BB-BEB-202	Sample Type:	tube
Sample ID:	U1	Test Date:	03/22/21
Depth :	5-7 ft	Test Id:	611802
Test Comment:	---		
Visual Description:	Moist, gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U1	B-BEB-20	5-7 ft	33	36	18	18	0.8	

Sample Prepared using the WET method

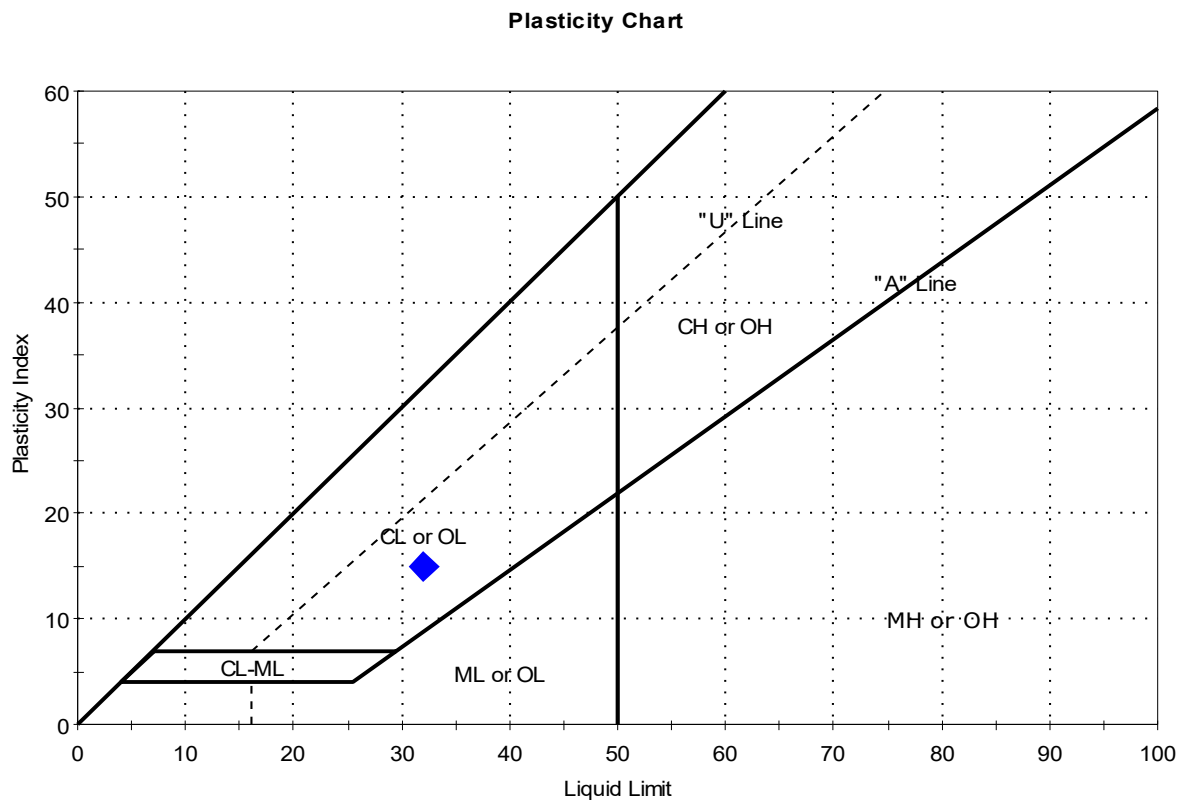
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Haley & Aldrich, Inc.		
Project:	I-395/Rte 9 Connector (Area 2)		
Location:	Brewer-Eddington, ME	Project No:	GTX-313196
Boring ID:	BB-BEB-202	Sample Type:	tube
Sample ID:	U2	Test Date:	03/22/21
Depth :	15-17 ft	Test Id:	611803
Test Comment:	---		
Visual Description:	Wet, gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U2	B-BEB-20	15-17 ft	36	32	17	15	1.3	

Sample Prepared using the WET method

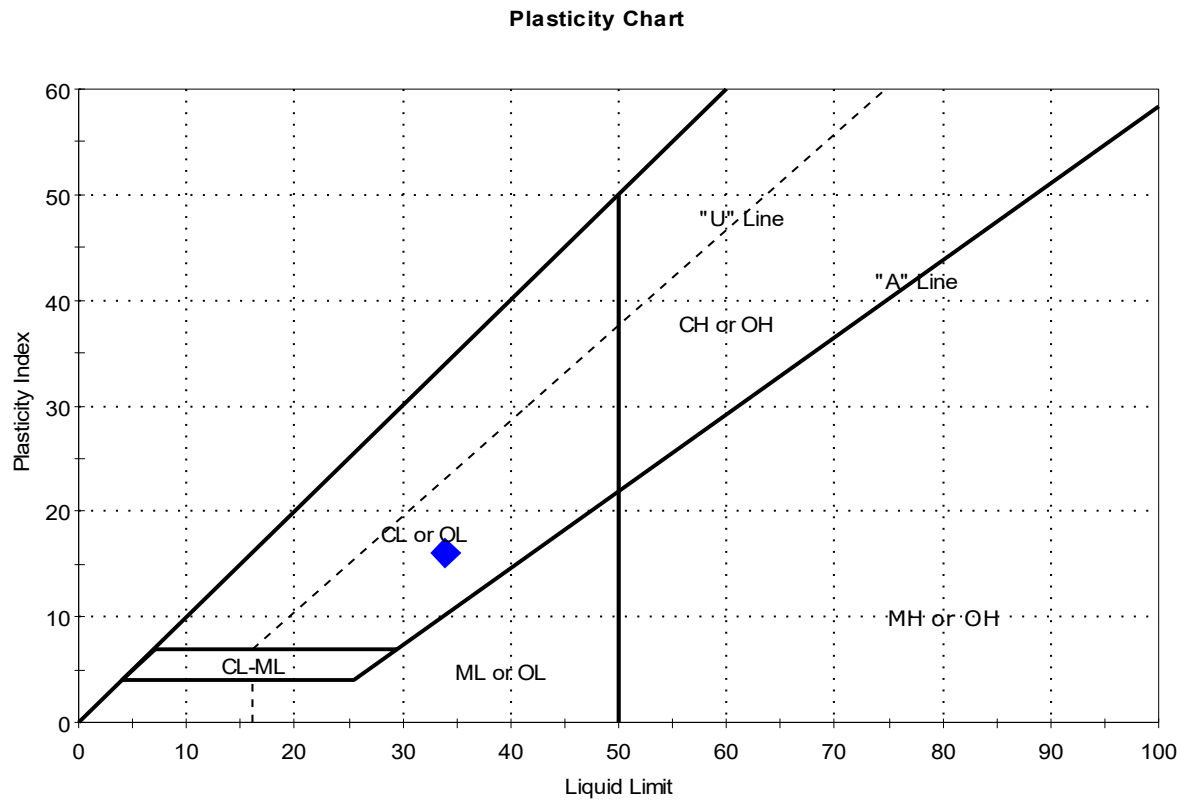
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Haley & Aldrich, Inc.		
Project:	I-395/Rte 9 Connector (Area 2)		
Location:	Brewer-Eddington, ME	Project No:	GTX-313196
Boring ID:	BB-BEB-204	Sample Type:	tube
Sample ID:	U1	Test Date:	03/22/21
Depth :	5-7 ft	Test Id:	611804
Test Comment:	---		
Visual Description:	Moist, light yellowish brown clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U1	B-BEB-20	5-7 ft	29	34	18	16	0.7	

Sample Prepared using the WET method

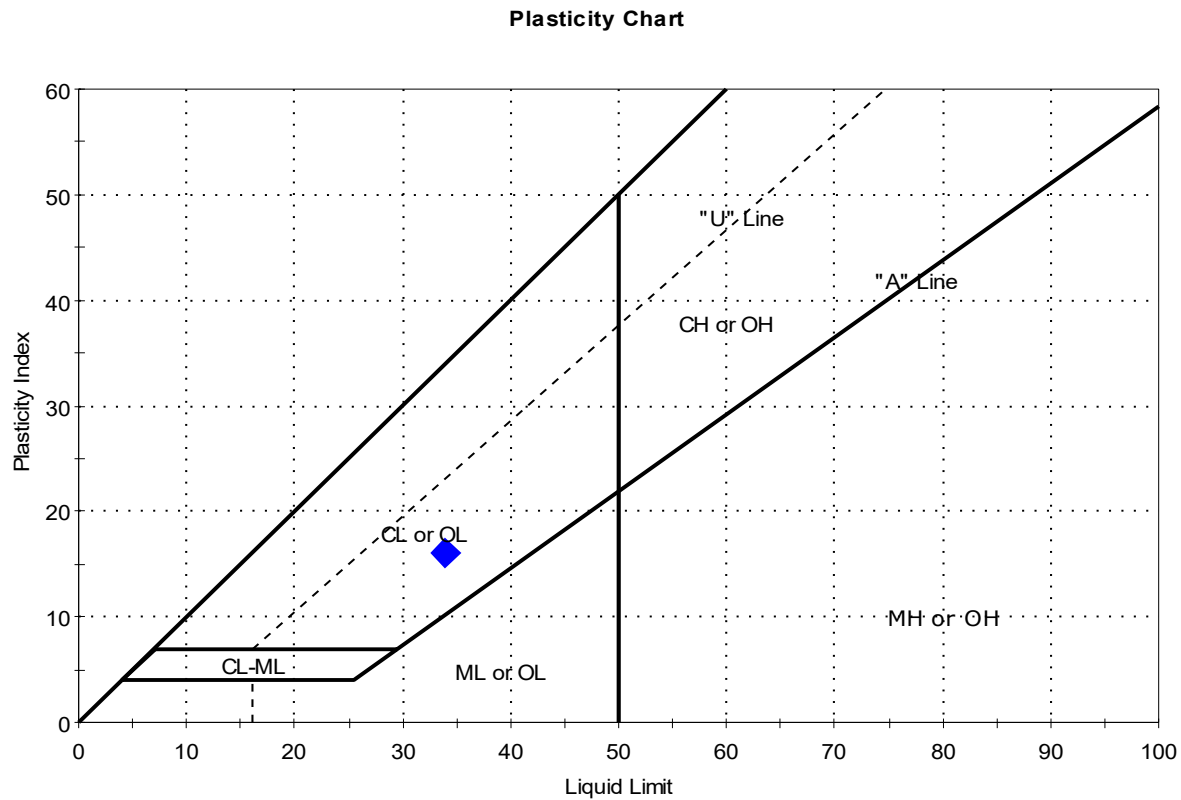
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Haley & Aldrich, Inc.		
Project:	I-395/Rte 9 Connector (Area 2)		
Location:	Brewer-Eddington, ME	Project No:	GTX-313196
Boring ID:	BB-BEB-205	Sample Type:	tube
Sample ID:	U1	Test Date:	03/23/21
Depth :	10-12 ft	Test Id:	611805
Test Comment:	---		
Visual Description:	Moist, gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U1	B-BEB-20	10-12 ft	37	34	18	16	1.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

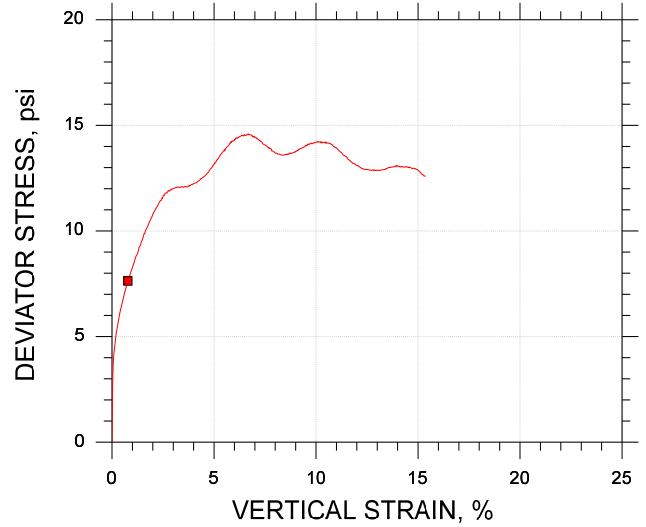
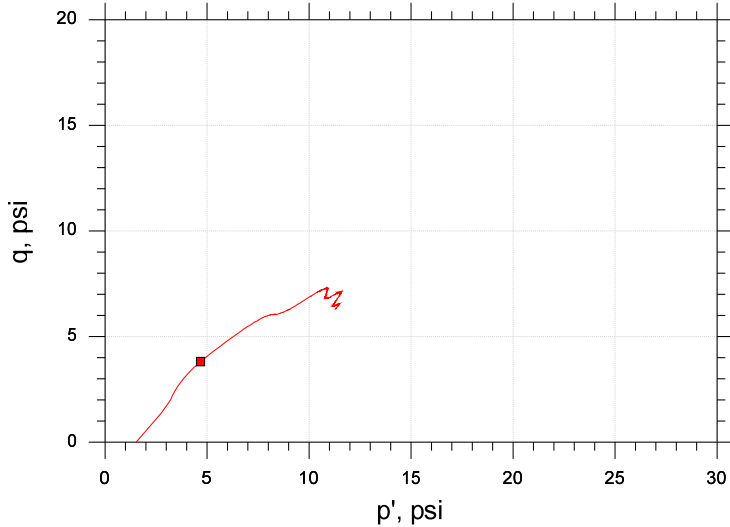
Dilatancy: SLOW

Toughness: LOW



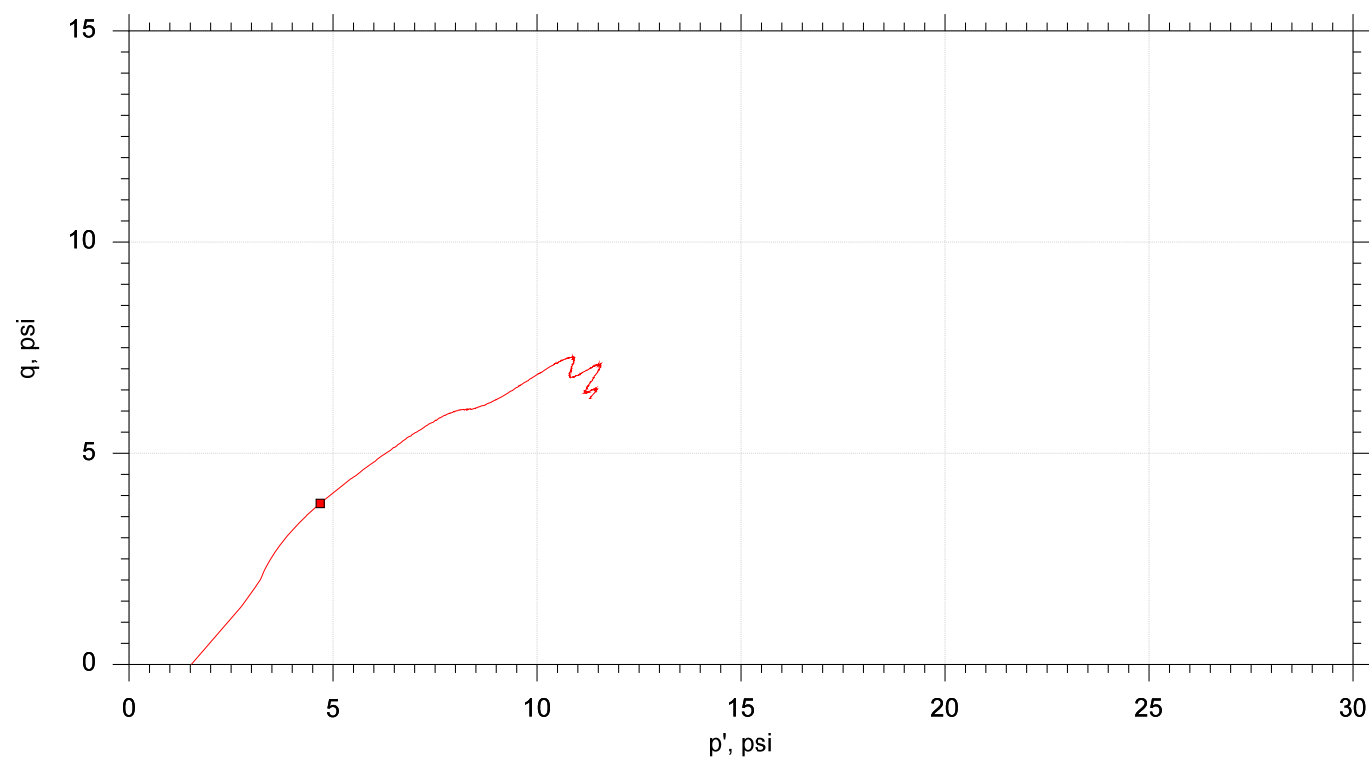
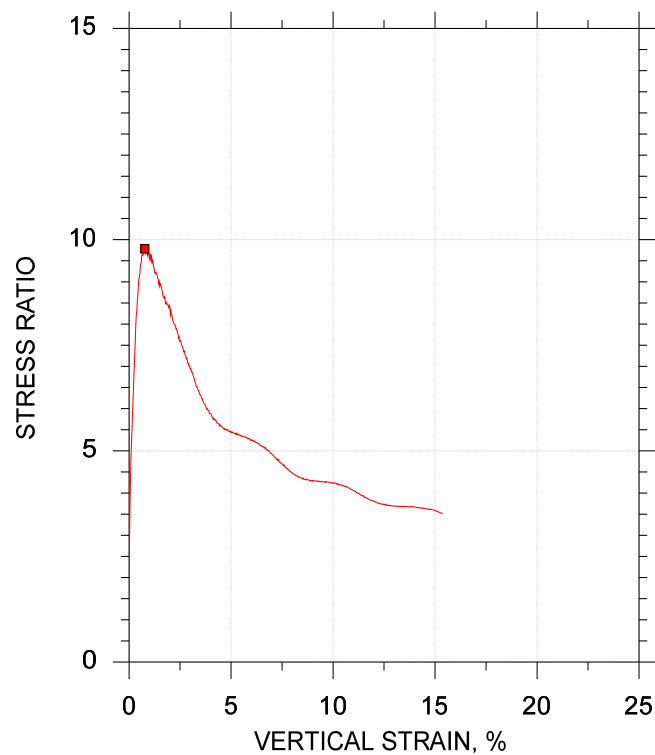
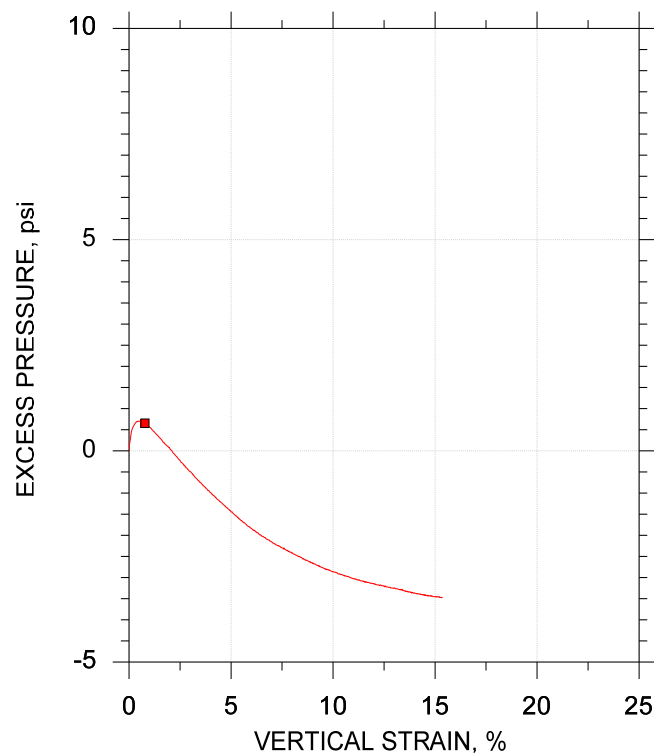
Client: Haley & Aldrich, Inc.	
Project Name: Rt 9/ I-395 Connector	
Project Location: Brewer and Eddington, ME	
Project Number: GTX-308853	
Tested By: trm	Checked By: mcm
Boring ID: BB-BEB-101	
Preparation: Intact	
Description: Moist, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 35	Plastic Limit: 19
Plasticity Index: 16	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




Symbol				
Sample ID		1U		
Depth, ft		5-7 ft		
Test Number		CU-12-1		
Initial	Height, in	4.910		
	Diameter, in	2.040		
	Moisture Content (from Cuttings), %	31.0		
	Dry Density, pcf	91.0		
	Saturation (Wet Method), %	98.3		
	Void Ratio	0.852		
Before Shear	Moisture Content, %	31.7		
	Dry Density, pcf	90.8		
	Cross-sectional Area (Method A), in ²	3.272		
	Saturation, %	100.0		
	Void Ratio	0.857		
	Back Pressure, psi	122.4		
Vertical Effective Consolidation Stress, psi		1.524		
Horizontal Effective Consolidation Stress, psi		1.523		
Vertical Strain after Consolidation, %		0.01118		
Volumetric Strain after Consolidation, %		0.2342		
Time to 50% Consolidation, min		56.25		
Shear Strength, psi		3.815		
Strain at Failure, %		0.775		
Strain Rate, %/min		0.01600		
Deviator Stress at Failure, psi		7.629		
Effective Minor Principal Stress at Failure, psi		0.8686		
Effective Major Principal Stress at Failure, psi		8.498		
B-Value		0.95		
Notes: - Before Shear Saturation set to 100% for phase calculation. - Moisture Content determined by ASTM D2216. - Atterberg Limits determined by ASTM D4318. - Deviator Stress includes membrane correction. - Values for c and ϕ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.				
Remarks:				
System S				

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



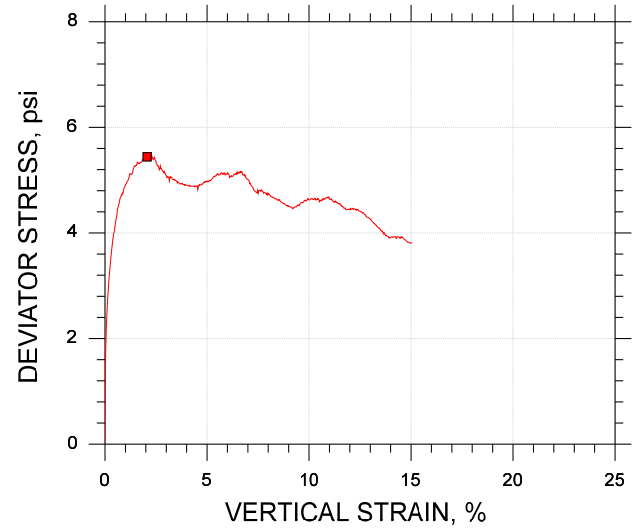
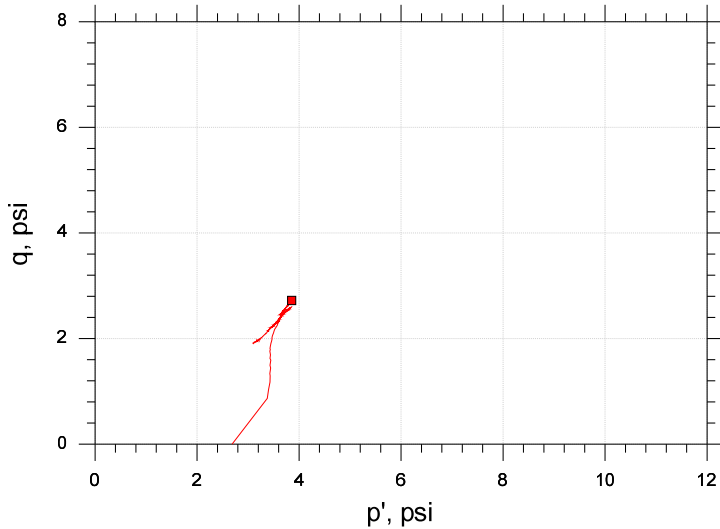
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■	1U	CU-12-1	5-7 ft	trm	7/23/19	mcm	8/2/19	308853-CU-12-1m.dat

			
	Project: Rt 9/ I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Sample Type: Intact	
	Description: Moist, dark gray clay		
	Remarks: System S		



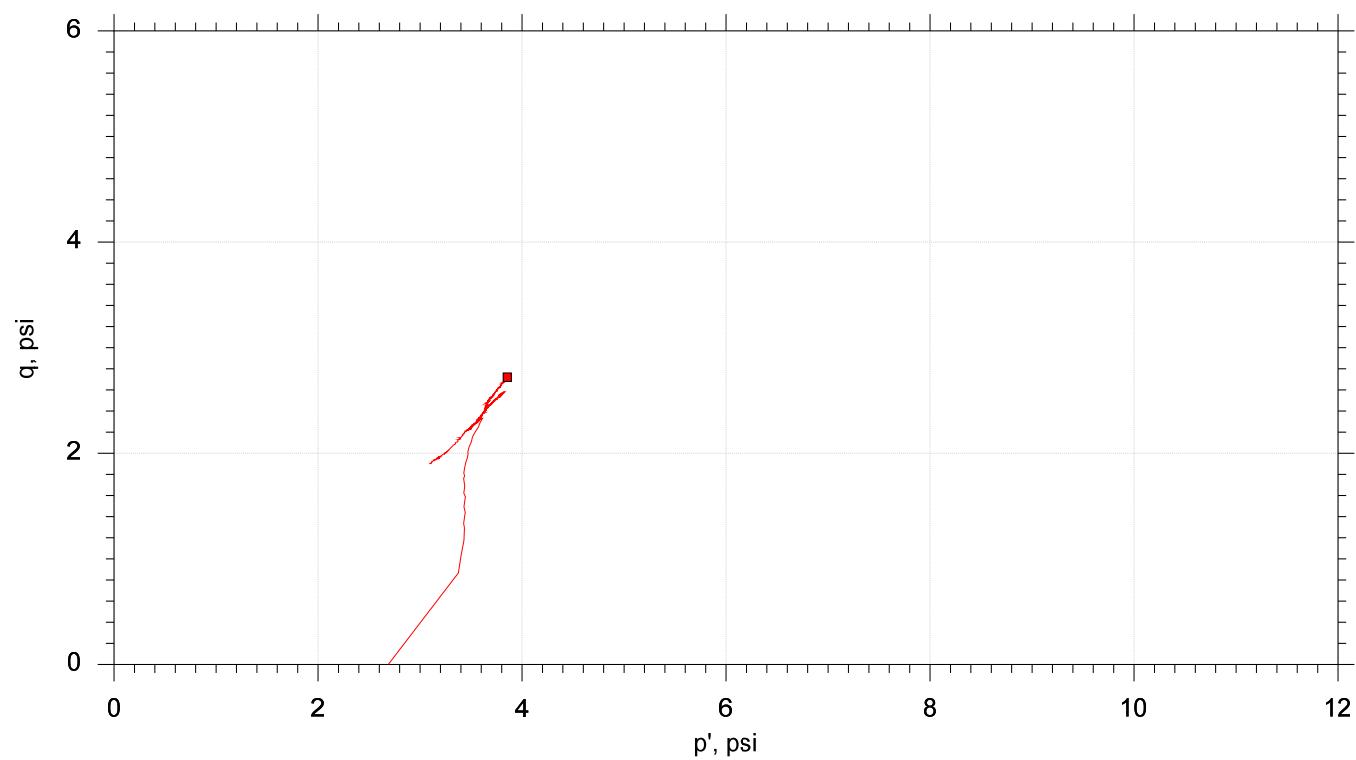
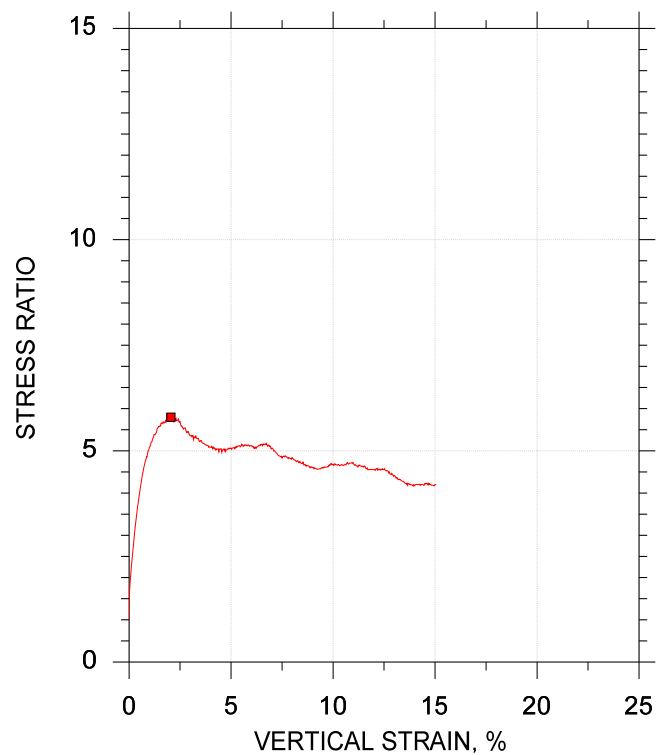
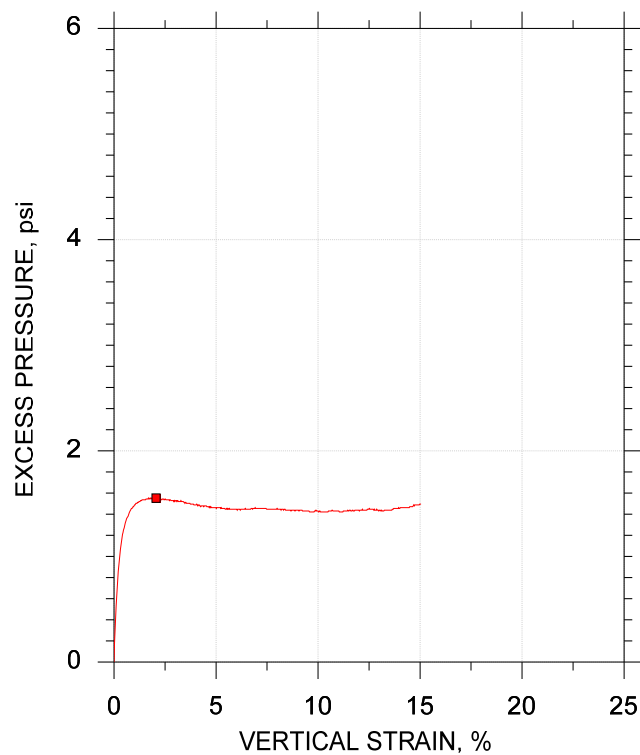
Client: Haley & Aldrich, Inc.	
Project Name: Rt 9/I-395 Connector	
Project Location: Brewer and Eddington, ME	
Project Number: GTX-308853	
Tested By: trm	Checked By: mcm
Boring ID: BB-BEB-103	
Preparation: Intact	
Description: Moist, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 38	Plastic Limit: 19
Plasticity Index: 19	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




Symbol		■		
Sample ID		1U		
Depth, ft		10-12 ft		
Test Number		CU-15-1		
Initial	Height, in	4.500		
	Diameter, in	1.950		
	Moisture Content (from Cuttings), %	37.9		
	Dry Density, pcf	81.2		
	Saturation (Wet Method), %	95.1		
	Void Ratio	1.08		
Before Shear	Moisture Content, %	35.0		
	Dry Density, pcf	86.7		
	Cross-sectional Area (Method A), in ²	2.842		
	Saturation, %	100.0		
	Void Ratio	0.945		
	Back Pressure, psi	48.99		
Vertical Effective Consolidation Stress, psi		2.689		
Horizontal Effective Consolidation Stress, psi		2.688		
Vertical Strain after Consolidation, %		0.006770		
Volumetric Strain after Consolidation, %		1.699		
Time to 50% Consolidation, min		110.3		
Shear Strength, psi		2.721		
Strain at Failure, %		2.05		
Strain Rate, %/min		0.01600		
Deviator Stress at Failure, psi		5.441		
Effective Minor Principal Stress at Failure, psi		1.134		
Effective Major Principal Stress at Failure, psi		6.576		
B-Value		0.96		
Notes: - Before Shear Saturation set to 100% for phase calculation. - Moisture Content determined by ASTM D2216. - Atterberg Limits determined by ASTM D4318. - Deviator Stress includes membrane correction. - Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.				
Remarks:				
System S				

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



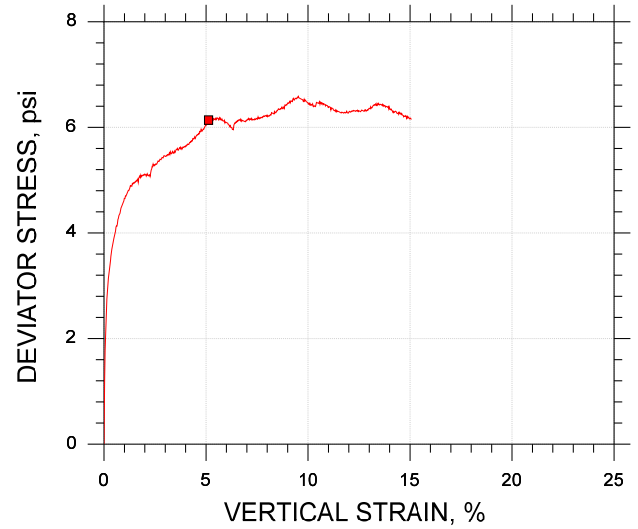
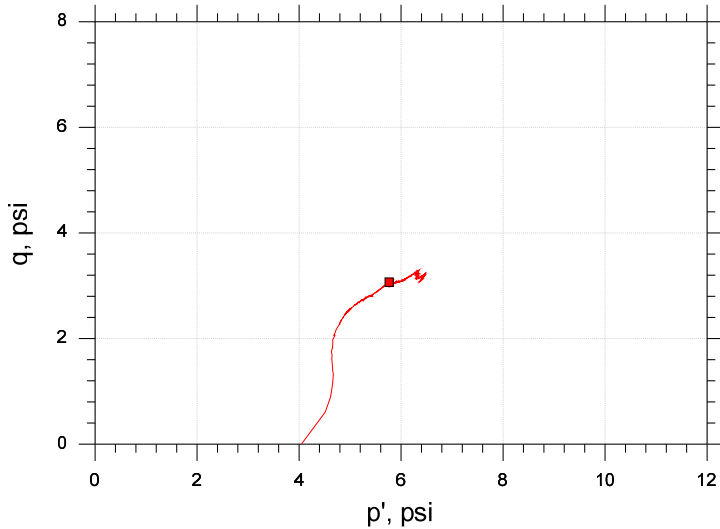
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■	1U	CU-15-1	10-12 ft	trm	7/25/19	mcm	8/2/19	308853-CU-15-1m.dat

			
	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Sample Type: Intact	
	Description: Moist, dark gray clay		
	Remarks: System S		



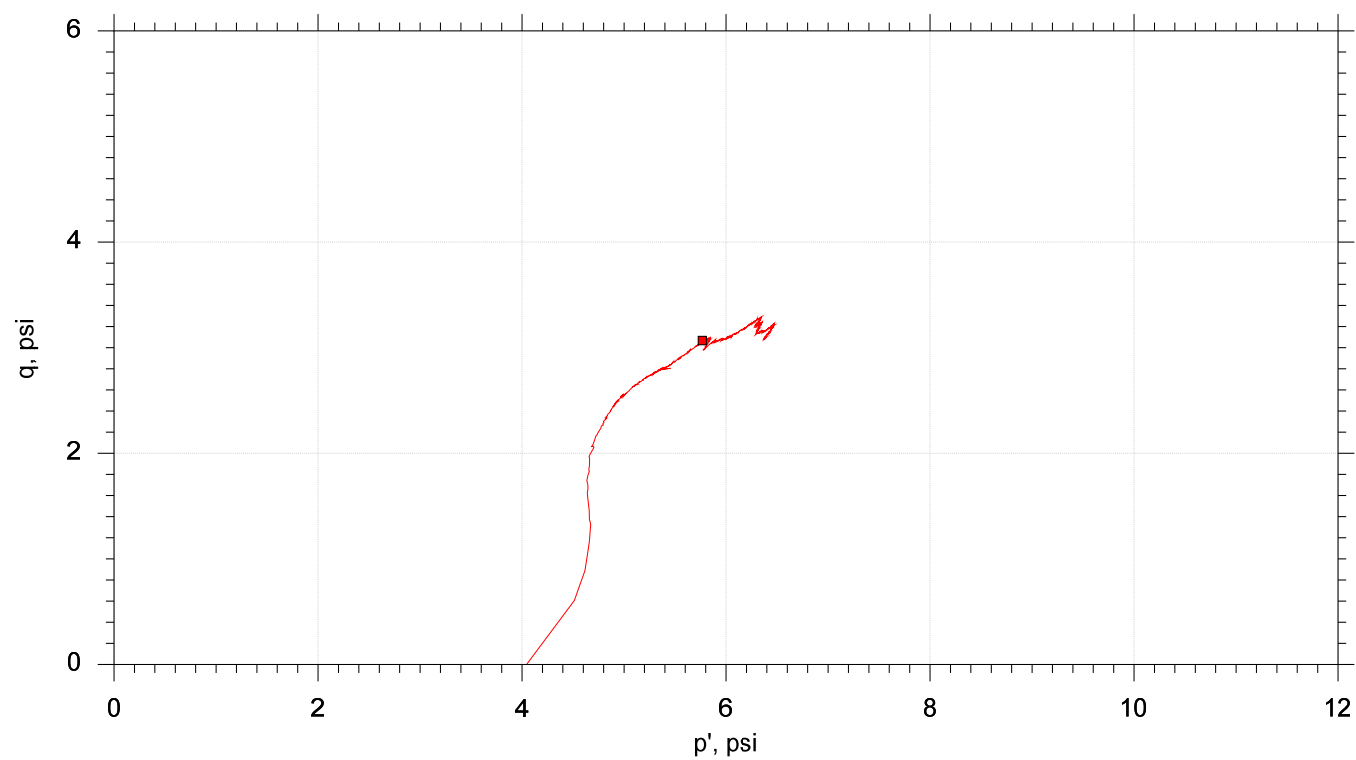
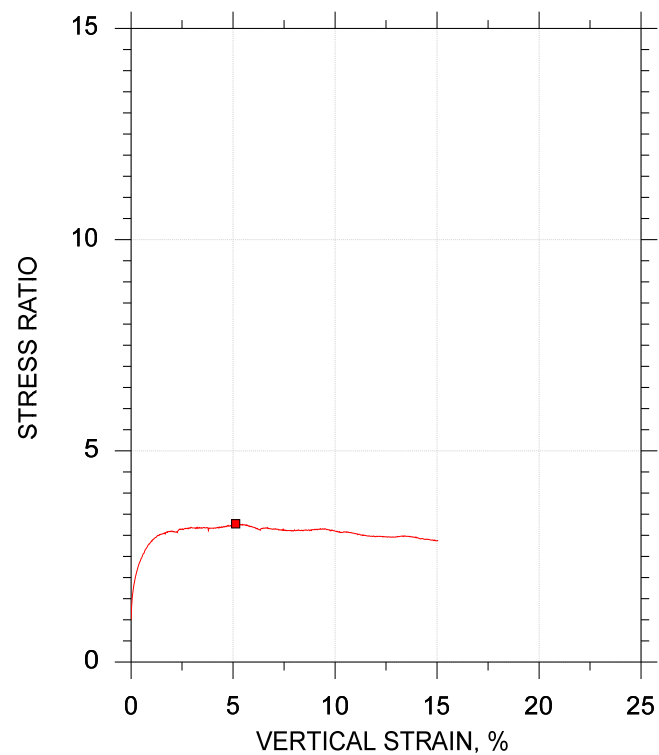
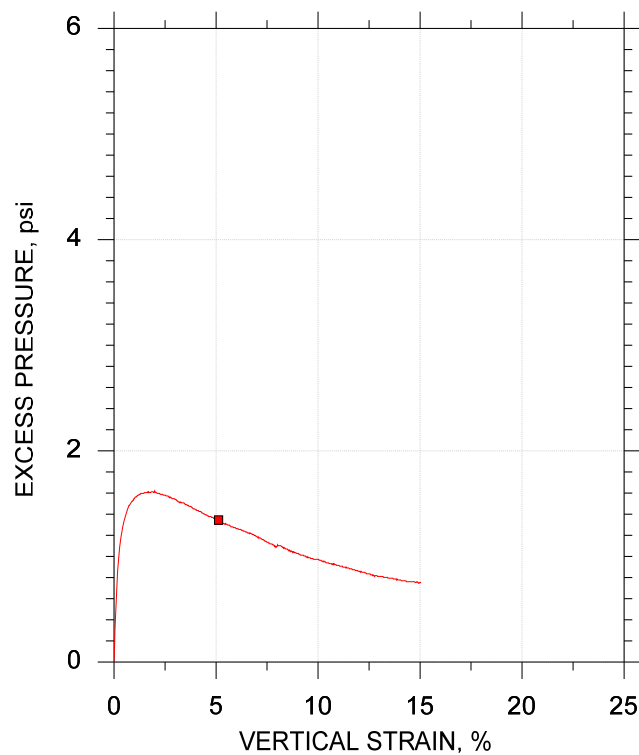
Client: Haley & Aldrich, Inc.	
Project Name: Rt 9/I-395 Connector	
Project Location: Brewer and Eddington, ME	
Project Number: GTX-308853	
Tested By: trm	Checked By: mcm
Boring ID: BB-BEB-104	
Preparation: Intact	
Description: Moist, dark gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 35	Plastic Limit: 20
Plasticity Index: 15	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




Symbol	■			
Sample ID	3U			
Depth, ft	15-17 ft			
Test Number	CU-13-1			
Initial	Height, in	4.840		
	Diameter, in	1.930		
	Moisture Content (from Cuttings), %	34.7		
	Dry Density, pcf	86.6		
	Saturation (Wet Method), %	99.0		
	Void Ratio	0.945		
Before Shear	Moisture Content, %	33.8		
	Dry Density, pcf	88.1		
	Cross-sectional Area (Method A), in ²	2.874		
	Saturation, %	100.0		
	Void Ratio	0.912		
	Back Pressure, psi	69.99		
Vertical Effective Consolidation Stress, psi		4.052		
Horizontal Effective Consolidation Stress, psi		4.044		
Vertical Strain after Consolidation, %		-0.01880		
Volumetric Strain after Consolidation, %		1.842		
Time to 50% Consolidation, min		72.25		
Shear Strength, psi		3.069		
Strain at Failure, %		5.12		
Strain Rate, %/min		0.01600		
Deviator Stress at Failure, psi		6.137		
Effective Minor Principal Stress at Failure, psi		2.698		
Effective Major Principal Stress at Failure, psi		8.835		
B-Value		0.95		
Notes: - Before Shear Saturation set to 100% for phase calculation. - Moisture Content determined by ASTM D2216. - Atterberg Limits determined by ASTM D4318. - Deviator Stress includes membrane correction. - Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.				
Remarks:				
System O				

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



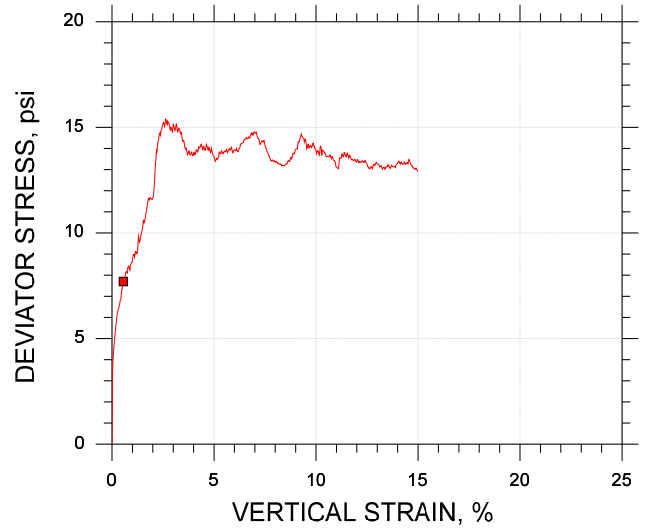
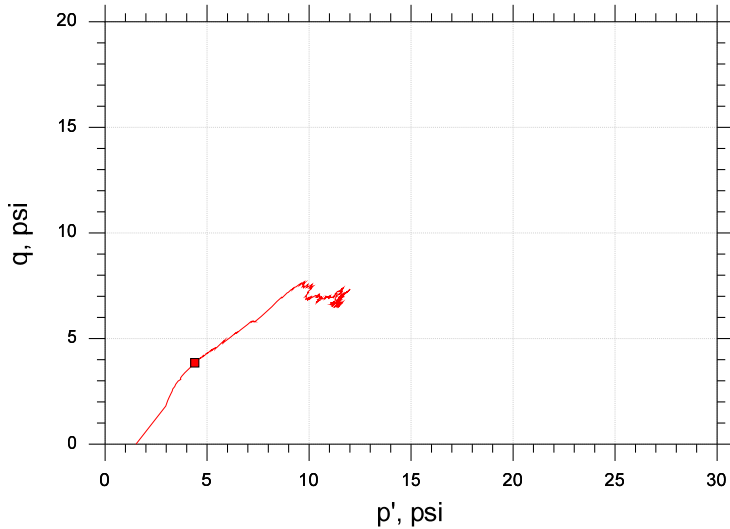
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■	3U	CU-13-1	15-17 ft	trm	7/24/19	mcm	8/2/19	308853-CU-13-1m.dat

			
	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Sample Type: Intact	
	Description: Moist, dark gray clay		
	Remarks: System O		



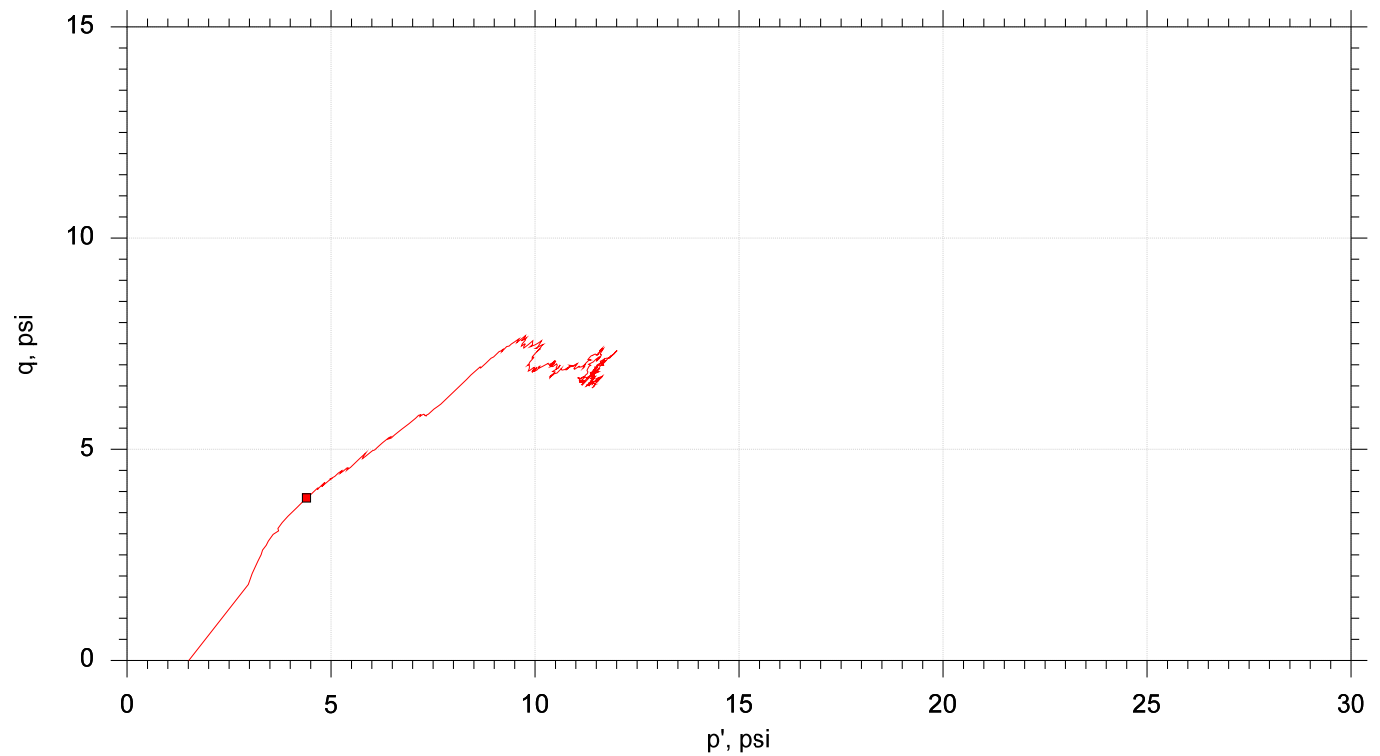
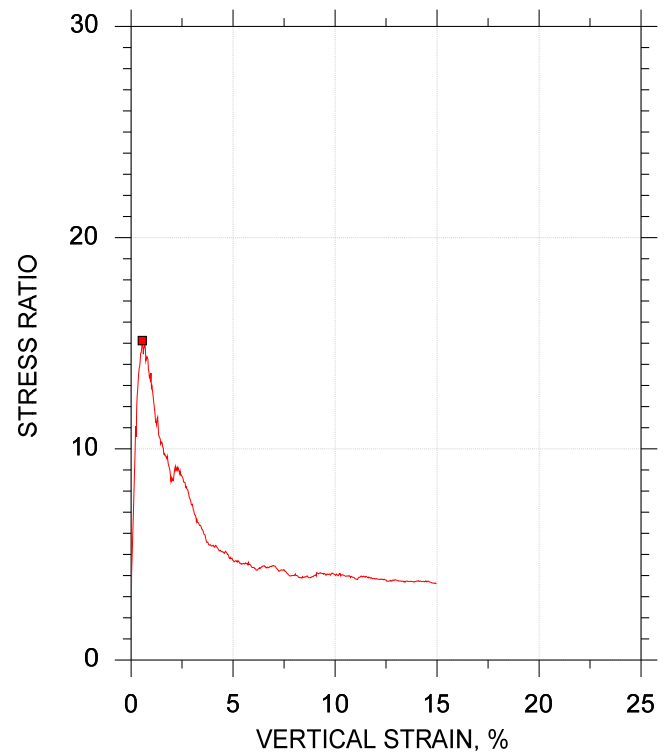
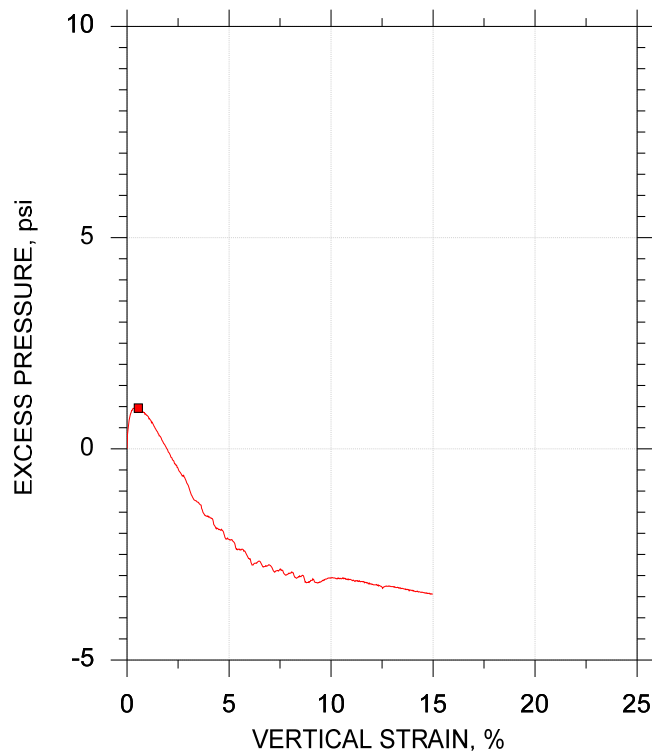
Client: Haley & Aldrich, Inc.	
Project Name: I-395/Rte 9 Connector (Area 2)	
Project Location: Brewer-Eddington, ME	
Project Number: GTX-313196	
Tested By: trm	Checked By: njh
Boring ID: BB-BEB-202	
Preparation: intact	
Description: Moist, gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 36	Plastic Limit: 18
Plasticity Index: 18	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




Symbol		■		
Sample ID		U1		
Depth, ft		5-7		
Test Number		CU-2		
Initial	Height, in	4.510		
	Diameter, in	2.040		
	Moisture Content (from Cuttings), %	31.8		
	Dry Density, pcf	90.4		
	Saturation (Wet Method), %	99.3		
	Void Ratio	0.865		
Before Shear	Moisture Content, %	31.5		
	Dry Density, pcf	91.1		
	Cross-sectional Area (Method A), in ²	3.253		
	Saturation, %	100.0		
	Void Ratio	0.851		
	Back Pressure, psi	153.0		
Vertical Effective Consolidation Stress, psi		1.514		
Horizontal Effective Consolidation Stress, psi		1.512		
Vertical Strain after Consolidation, %		0.02496		
Volumetric Strain after Consolidation, %		0.05722		
Time to 50% Consolidation, min		64.00		
Shear Strength, psi		3.850		
Strain at Failure, %		0.549		
Strain Rate, %/min		0.01600		
Deviator Stress at Failure, psi		7.701		
Effective Minor Principal Stress at Failure, psi		0.5450		
Effective Major Principal Stress at Failure, psi		8.246		
B-Value		0.94		
Notes: - Before Shear Saturation set to 100% for phase calculation. - Moisture Content determined by ASTM D2216. - Atterberg Limits determined by ASTM D4318. - Deviator Stress includes membrane correction. - Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.				
Remarks:				
System F				

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



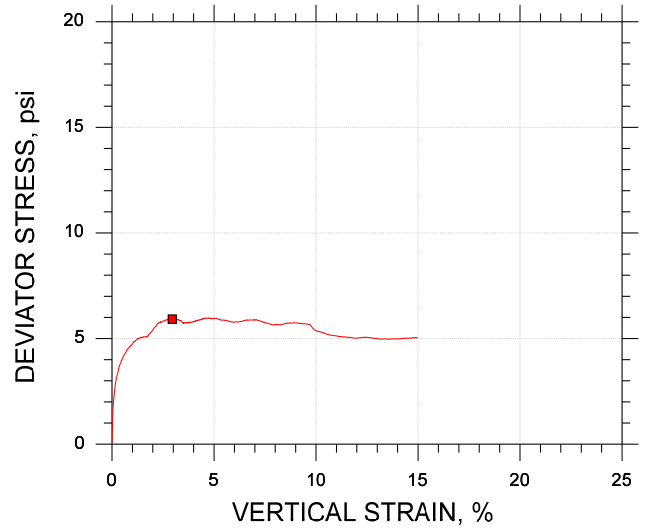
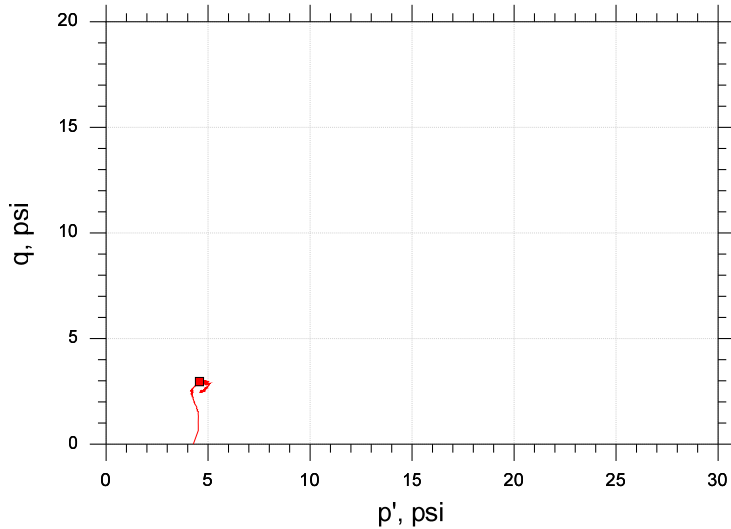
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■	U1	CU-2	5-7	trm	4/1/21	njh	4/9/21	313196-CU-2n.dat

			
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Sample Type: intact	
	Description: Moist, gray clay		
	Remarks: System F		



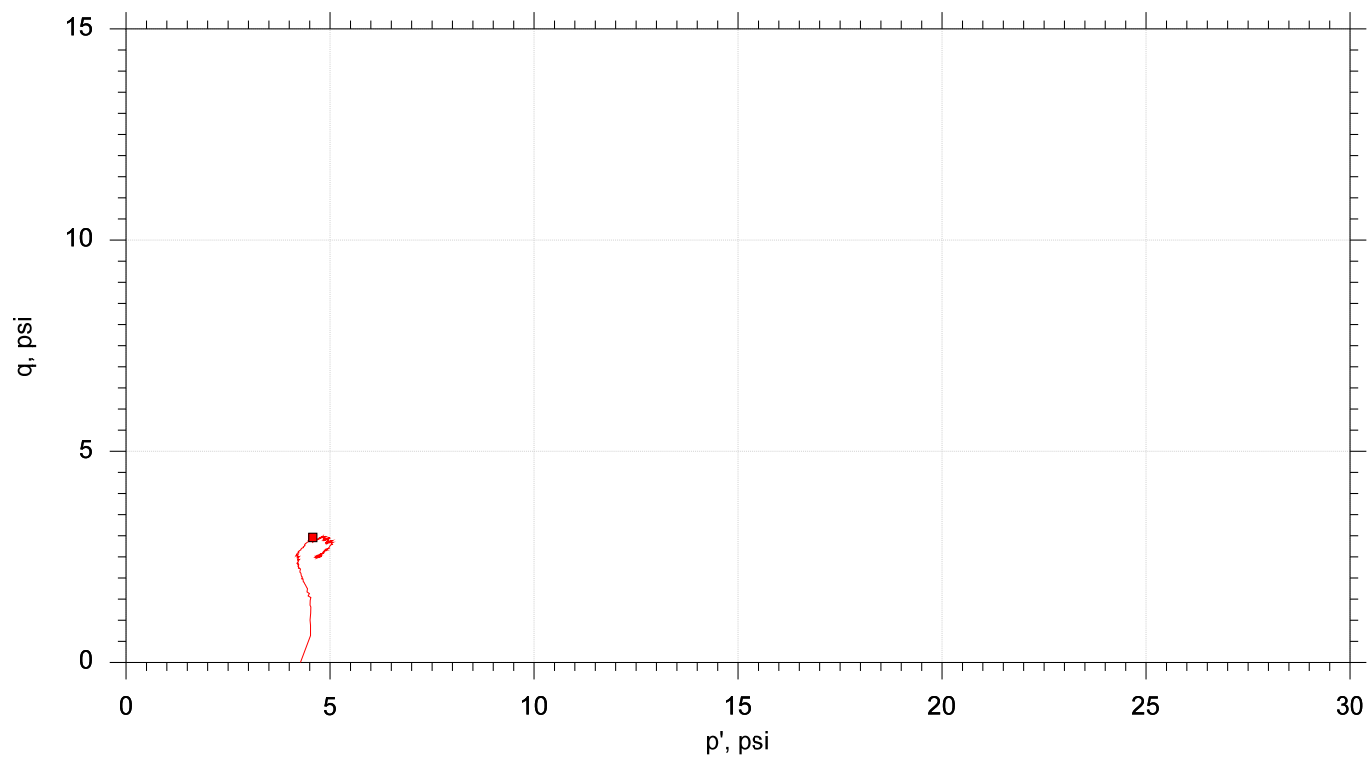
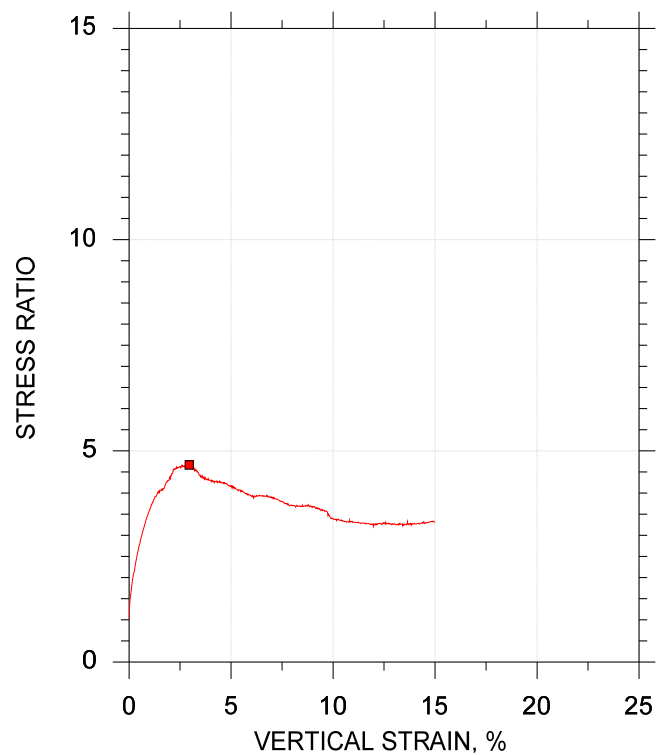
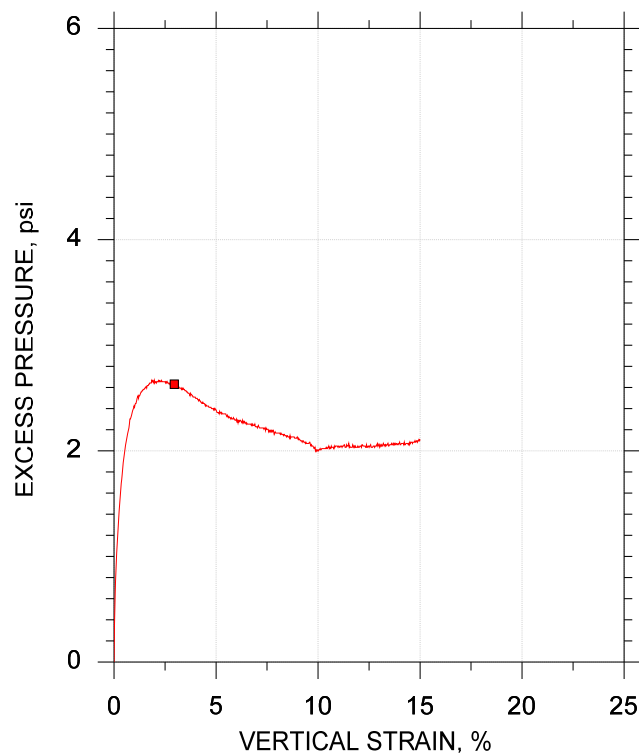
Client: Haley & Aldrich, Inc.	
Project Name: I-395/Rte 9 Connector (Area 2)	
Project Location: Brewer-Eddington, ME	
Project Number: GTX-313196	
Tested By: trm	Checked By: njh
Boring ID: BB-BEB-205	
Preparation: intact	
Description: Moist, gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 34	Plastic Limit: 18
Plasticity Index: 16	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




Symbol	■			
Sample ID	U1			
Depth, ft	10-12			
Test Number	CU-1			
Initial	Height, in	4.550		
	Diameter, in	2.040		
	Moisture Content (from Cuttings), %	37.0		
	Dry Density, pcf	80.2		
	Saturation (Wet Method), %	90.7		
	Void Ratio	1.10		
Before Shear	Moisture Content, %	40.6		
	Dry Density, pcf	80.4		
	Cross-sectional Area (Method A), in²	3.254		
	Saturation, %	100.0		
	Void Ratio	1.10		
	Back Pressure, psi	147.0		
Vertical Effective Consolidation Stress, psi		4.275		
Horizontal Effective Consolidation Stress, psi		4.271		
Vertical Strain after Consolidation, %		0.0000		
Volumetric Strain after Consolidation, %		0.7371		
Time to 50% Consolidation, min		51.84		
Shear Strength, psi		2.961		
Strain at Failure, %		2.95		
Strain Rate, %/min		0.01600		
Deviator Stress at Failure, psi		5.922		
Effective Minor Principal Stress at Failure, psi		1.616		
Effective Major Principal Stress at Failure, psi		7.538		
B-Value		0.95		
Notes: - Before Shear Saturation set to 100% for phase calculation. - Moisture Content determined by ASTM D2216. - Atterberg Limits determined by ASTM D4318. - Deviator Stress includes membrane correction. - Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.				
Remarks:				
System E				

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U1	CU-1	10-12	trm	3/16/21	njh	4/9/21	313196-CU-1n.dat

			
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Sample Type: intact	
	Description: Moist, gray clay		
	Remarks: System E		



Consolidated Undrained Direct Simple Shear Testing of Cohesive Soils by ASTM D6528

Client: Haley & Aldrich, Inc. GTX#: 313196
Project Name: I-395/Rte 9 Connector (Area 2) Test Date: 3/17/21
Project Location: Brewer-Eddington, ME

Boring ID: BB-BEB-202
Sample ID: U2
Depth, ft: 15-17

Visual Description: Wet, gray clay

Test Equipment: Top and bottom box (circular) = 2.50 in diameter. Load cells and LVDT's connected to data acquisition system for shear force, normal load, horizontal and vertical displacement; surface area = 4.91 in², soil height = 1 inch. Stacked rings used. Set up included porous stones with pins.

Test Condition: Inundated prior to consolidation

Sample Type and Preparation: Extruded from tube, cut, trimmed and placed into apparatus at as-received density and moisture.

Parameter	Point 1	Point 2	Point 3	Point 4	Point 5
Test No.	DSS-1				
Initial Moisture Content, %	36.5				
Initial Dry Density, pcf	79.6				
Nominal Rate of Shear Strain, %/hr	5.0				
Vertical Consolidation Stress, psi	5.13				
Final Moisture Content, %	35.9				
Measured Peak Shear Stress, psi	3.09				
Shear Strain at Peak Shear Stress, %	20.0				
Membrane Correction, psi	0.34				
Corrected Peak Shear Stress, psi	2.75				
S_u / σ'_{vc}	0.54				

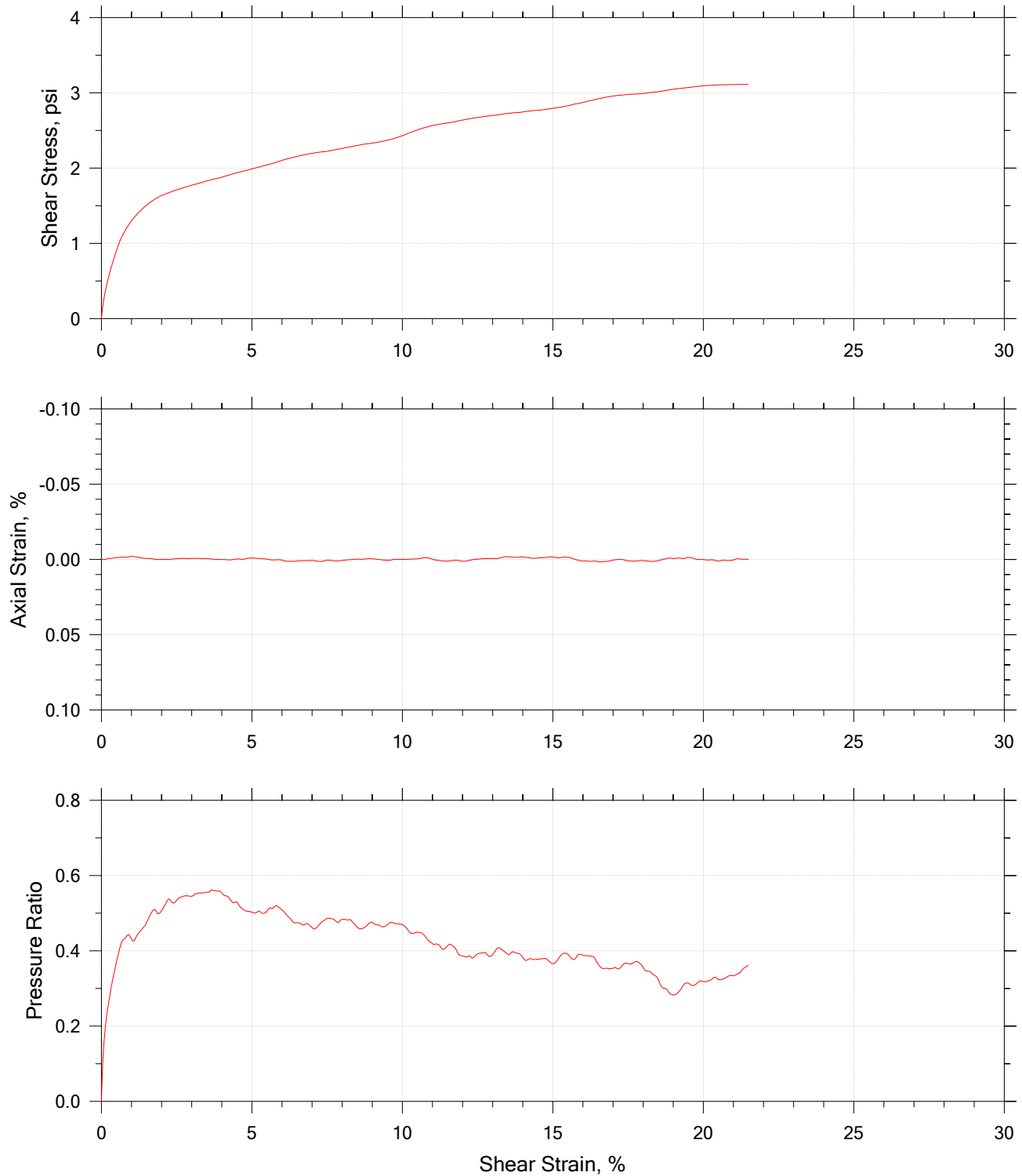
Comments: Failure taken at peak prior to or at 20% strain, per ASTM D6528.


Tested By: md
njh

Checked By:

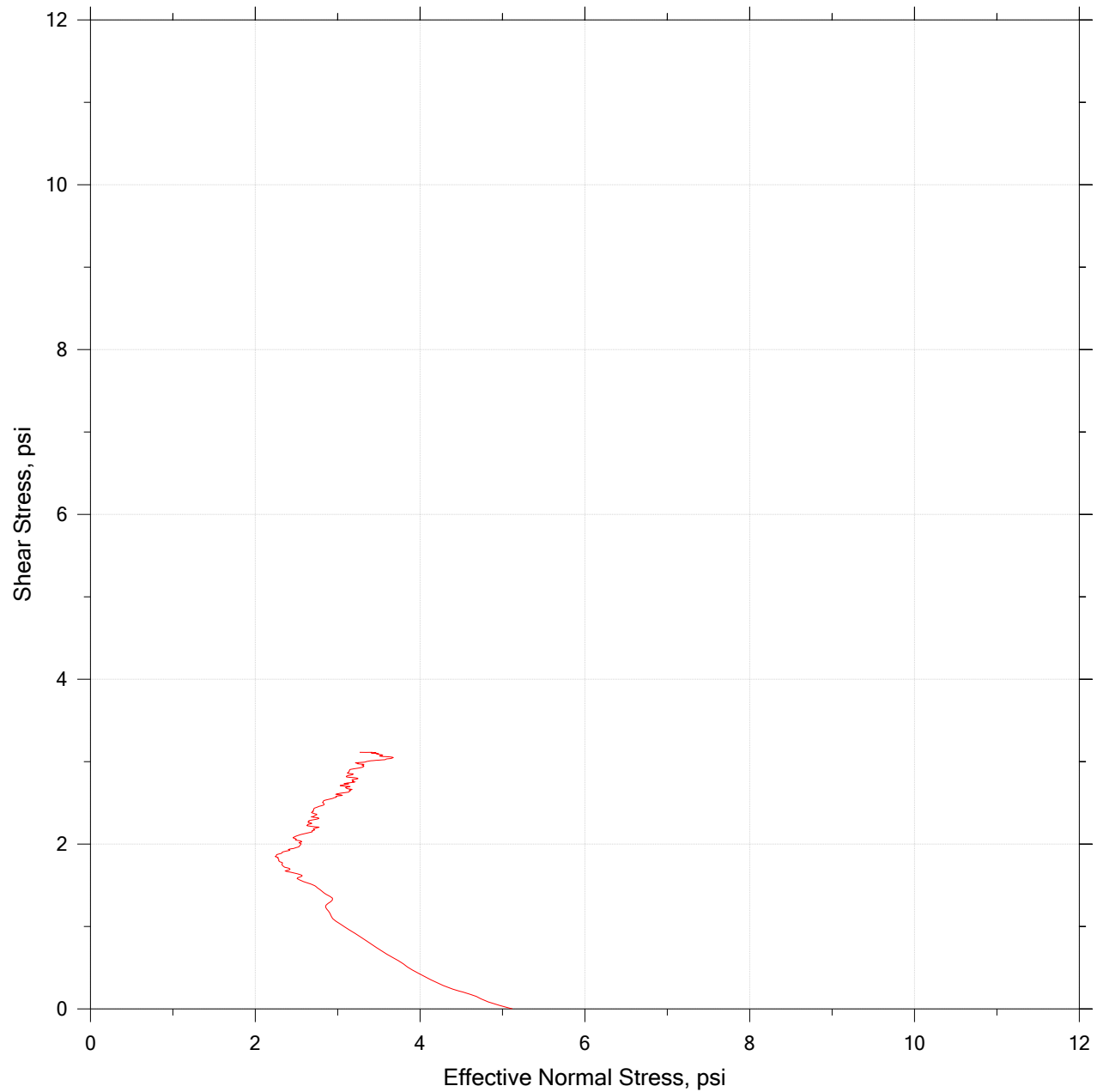
Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.


Direct Simple Shear Test



	Project Name: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project Number: GTX-313196
	Boring Number: BB-BEB-202	Tester: md	Checker: njh
	Sample Number: U2	Test Date: 03/17/21	Depth: 15-17 ft
	Test Number: DSS-1	Preparation: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks:		

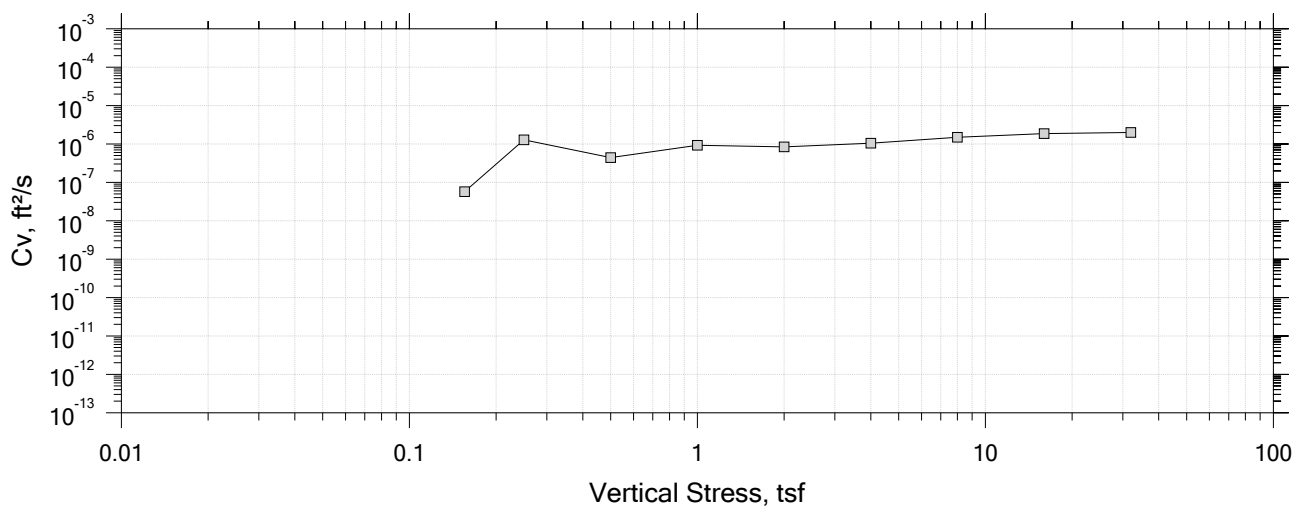
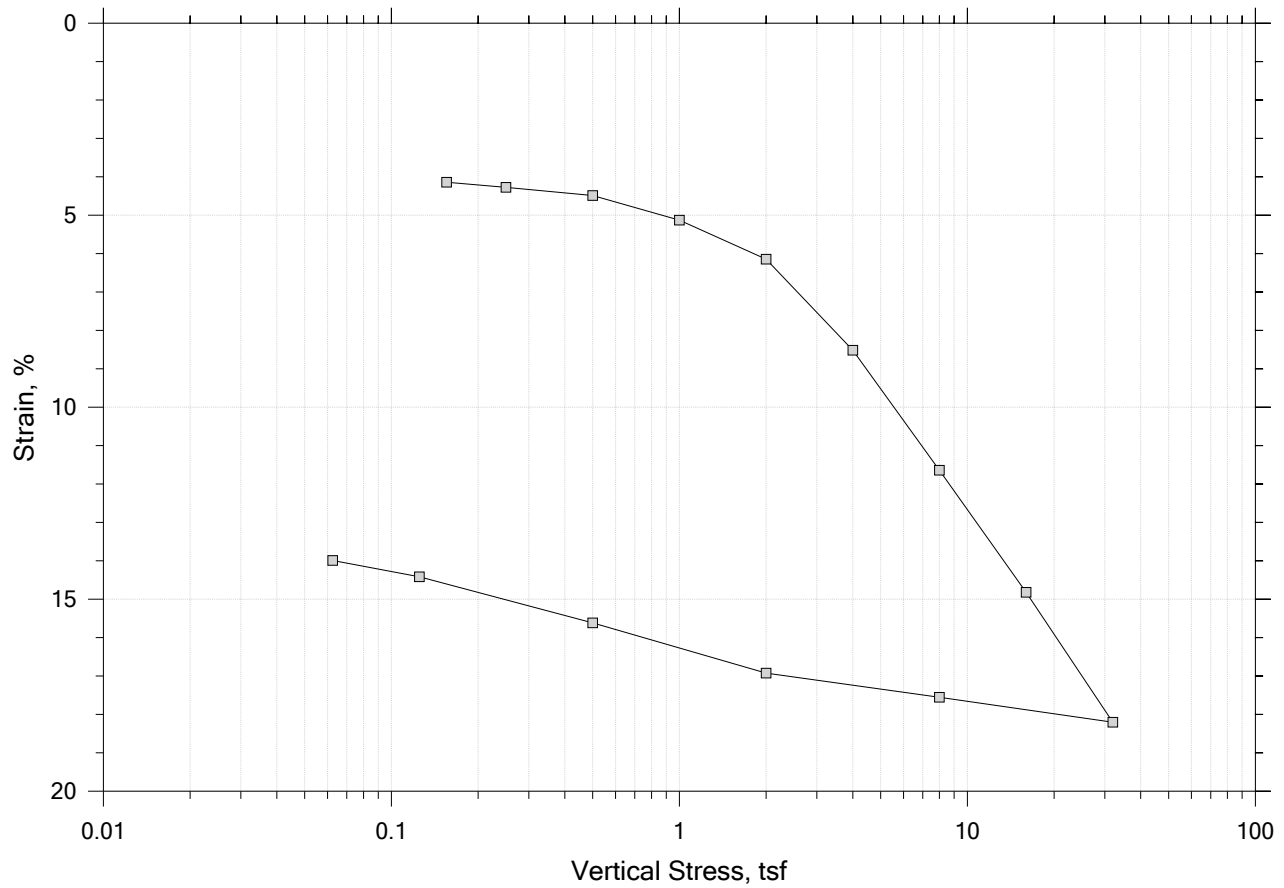
Direct Simple Shear Test




	Project Name: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project Number: GTX-313196
	Boring Number: BB-BEB-202	Tester: md	Checker: njh
	Sample Number: U2	Test Date: 03/17/21	Depth: 15-17 ft
	Test Number: DSS-1	Preparation: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks:		

One-Dimensional Consolidation by ASTM D2435 - Method B

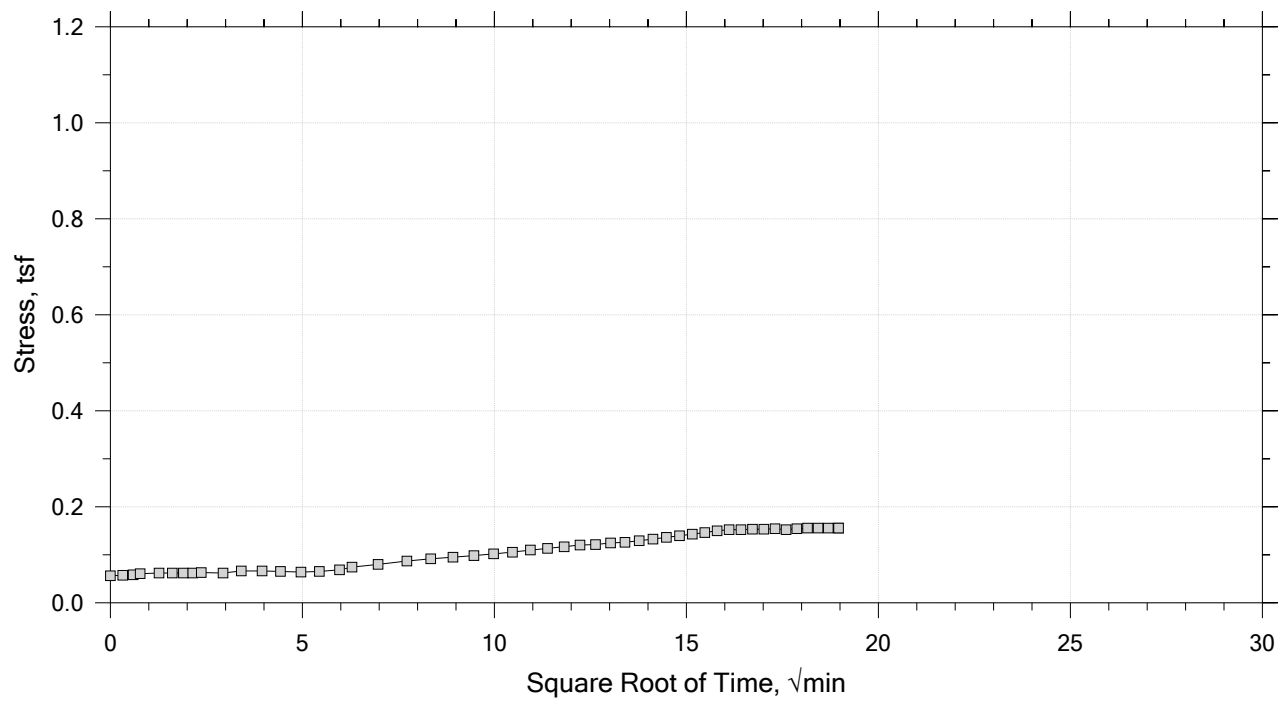
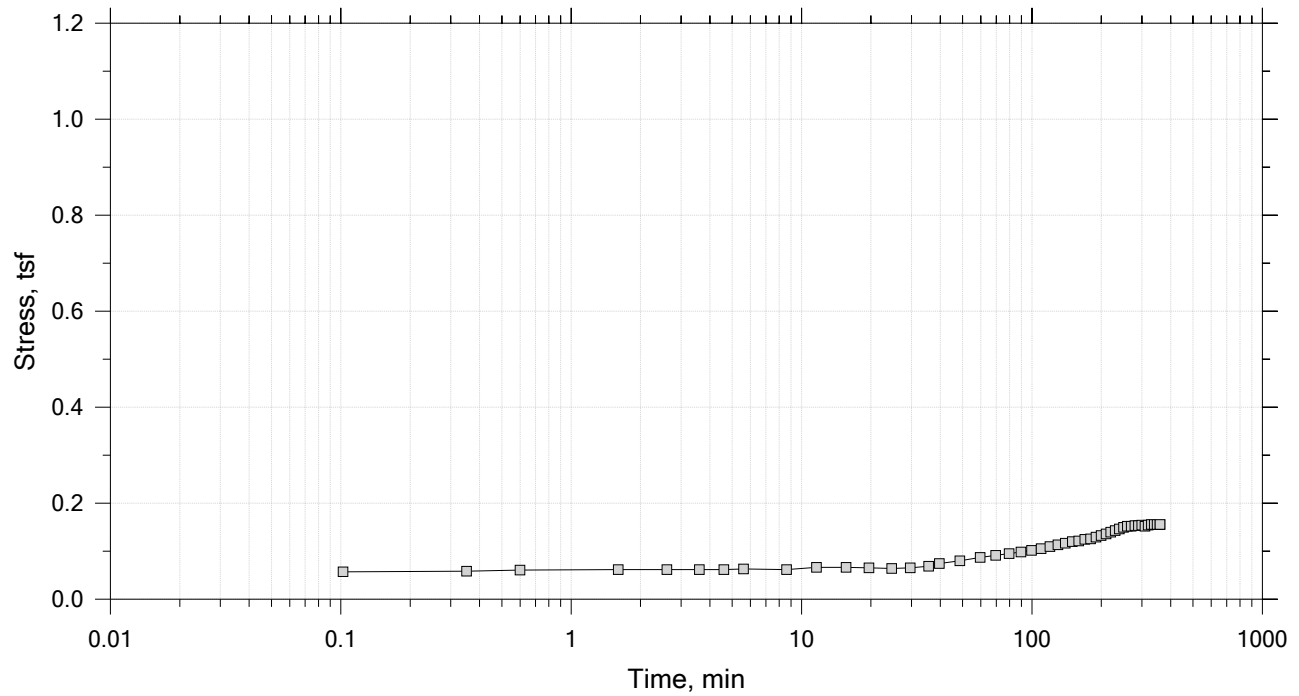
Summary Report




	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 14
Constant Volume Step
Stress: 0.156 tsf



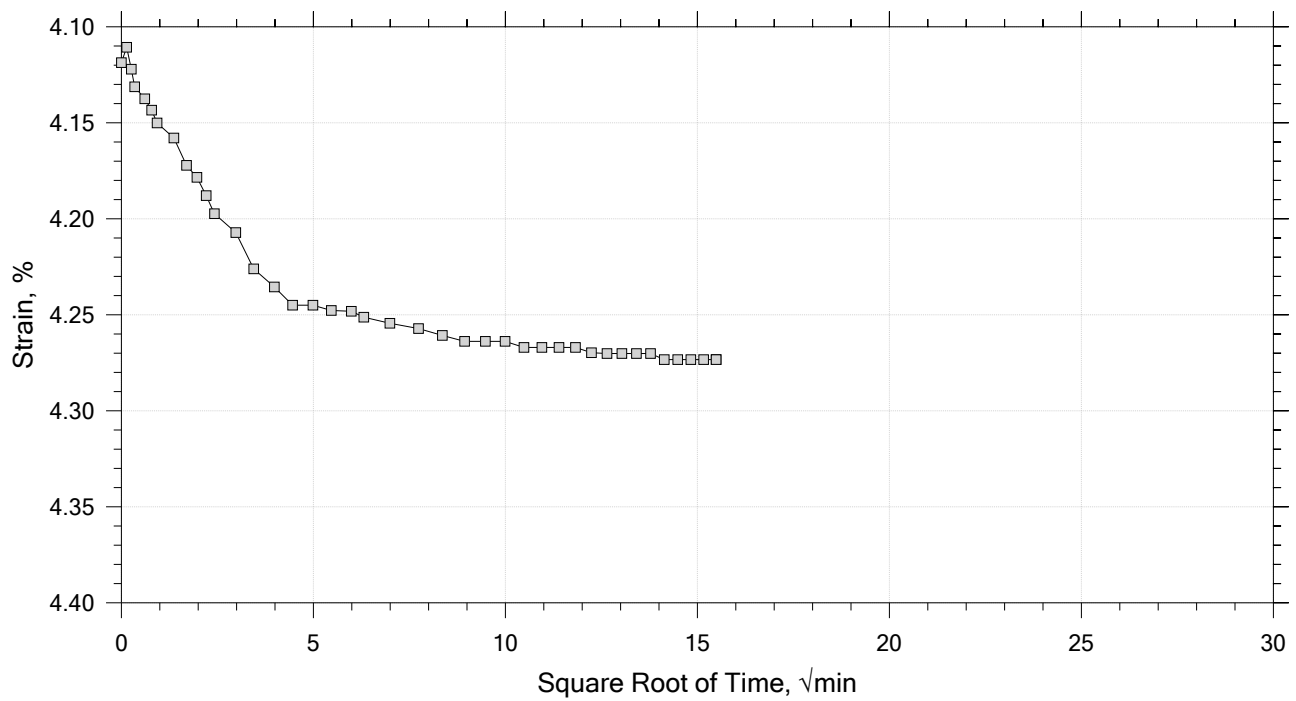
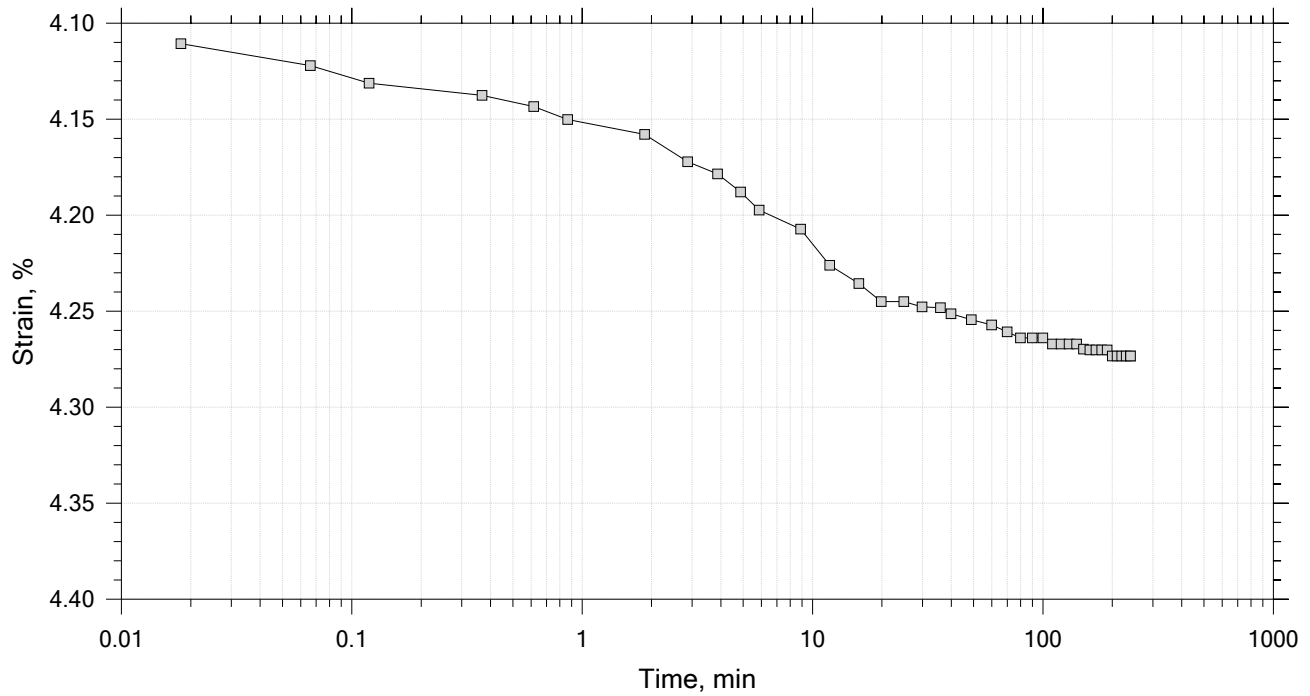
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 14

Constant Load Step

Stress: 0.25 tsf



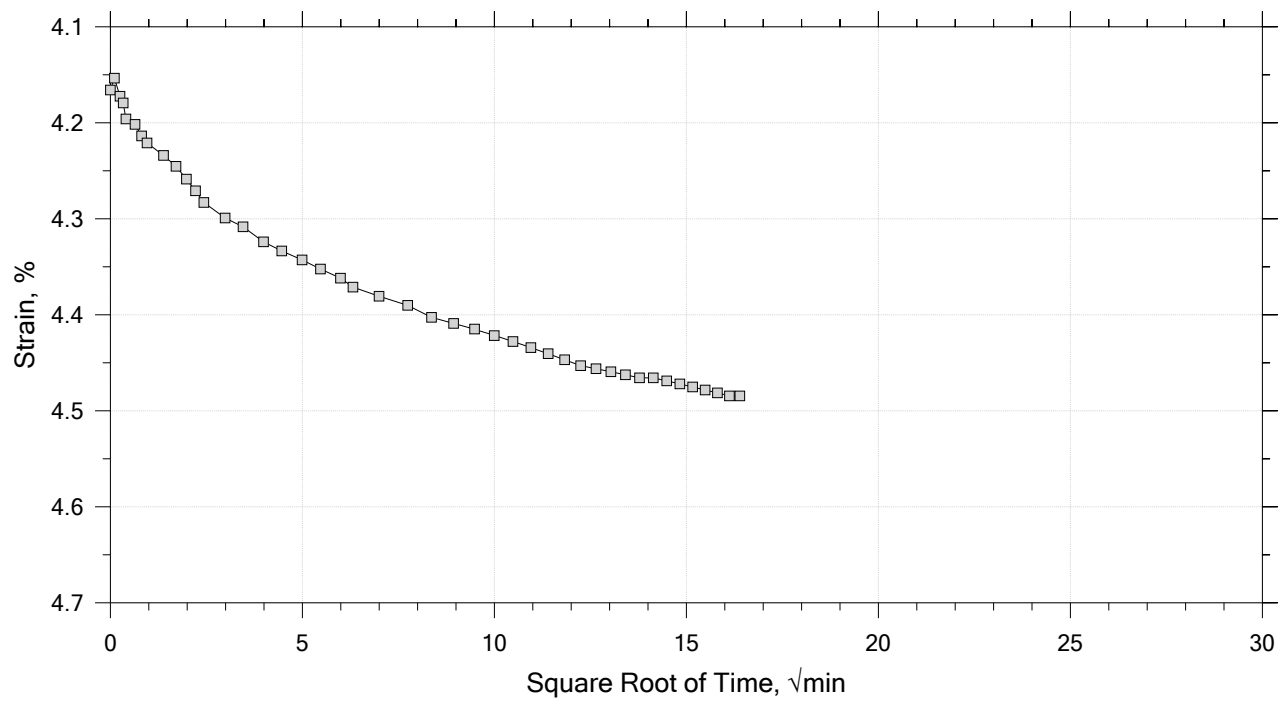
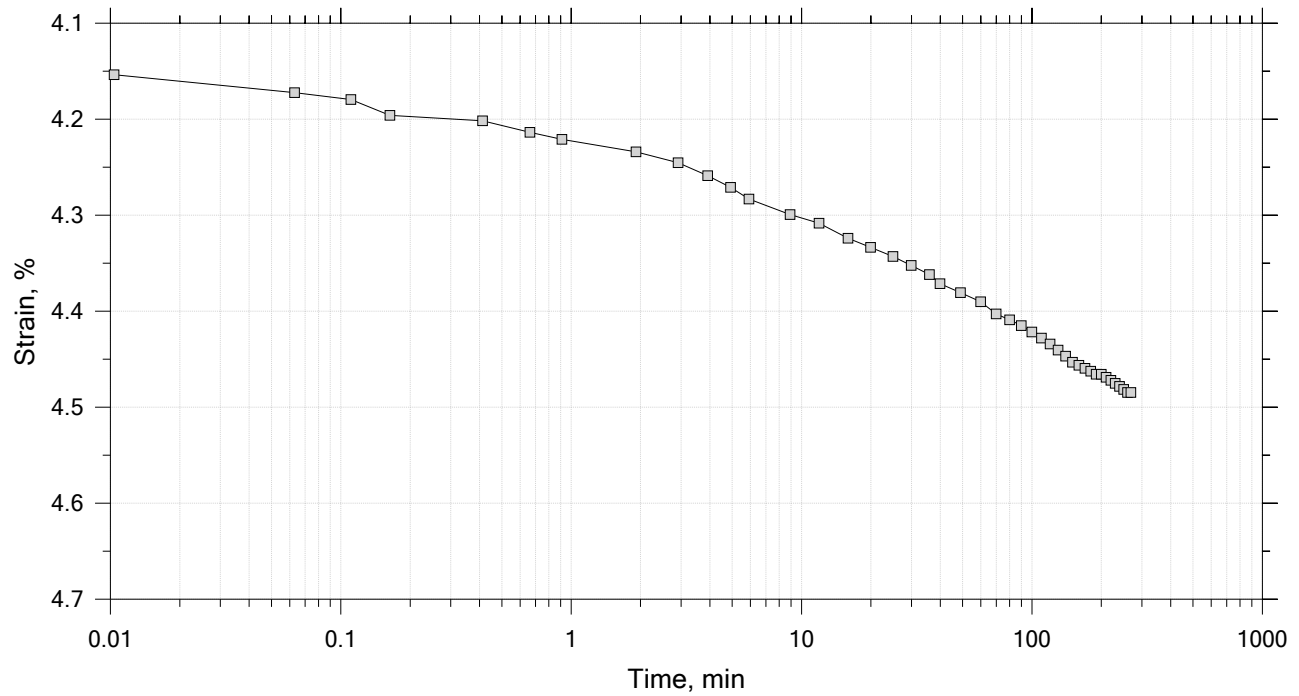
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 14

Constant Load Step

Stress: 0.5 tsf



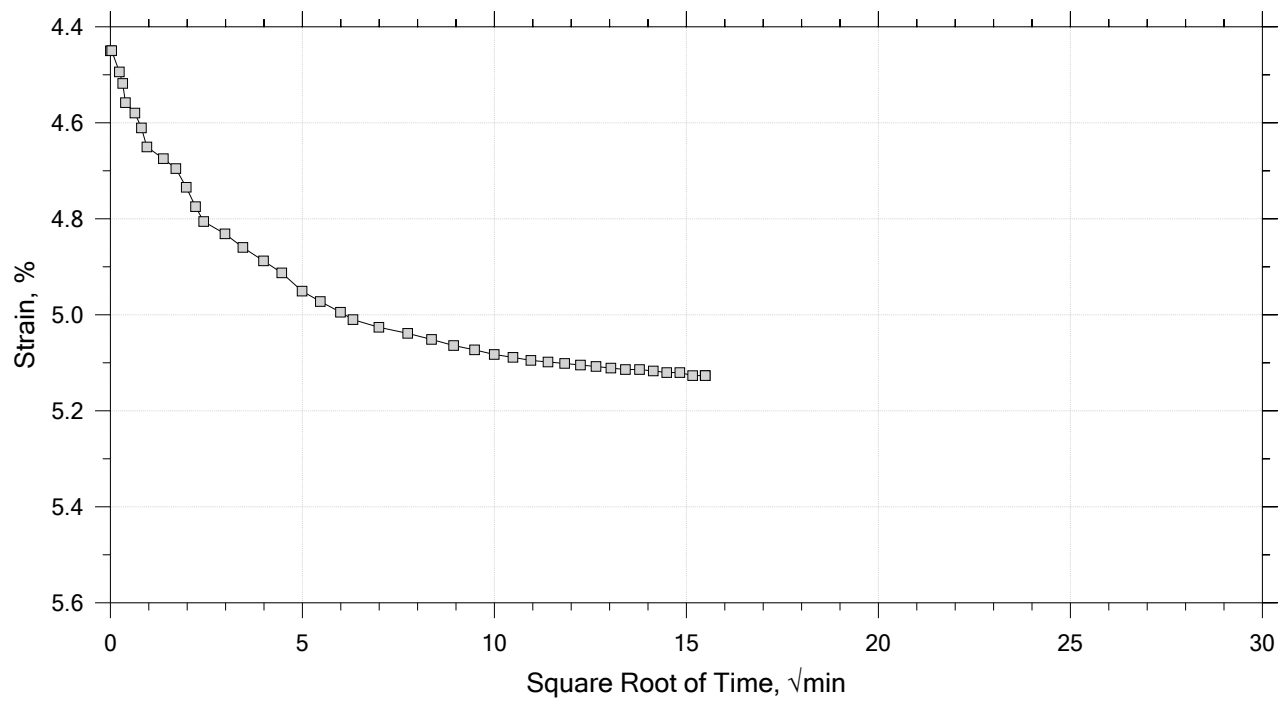
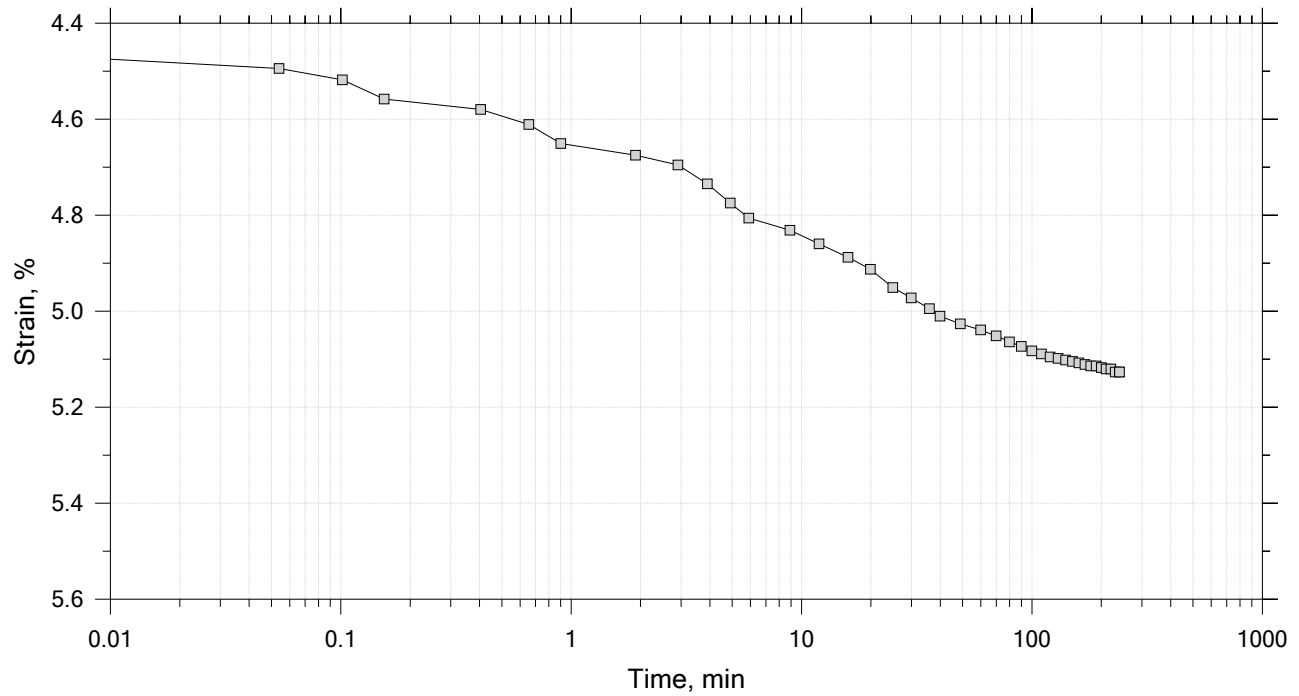
	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 14

Constant Load Step

Stress: 1 tsf



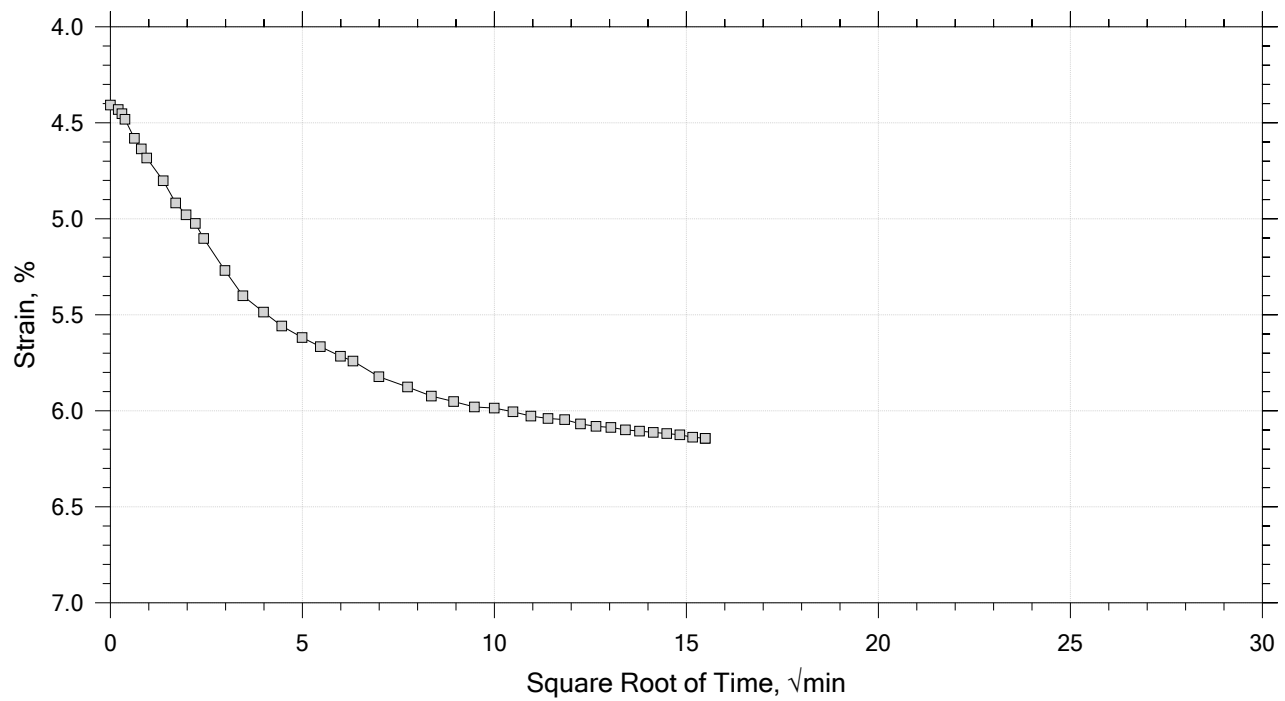
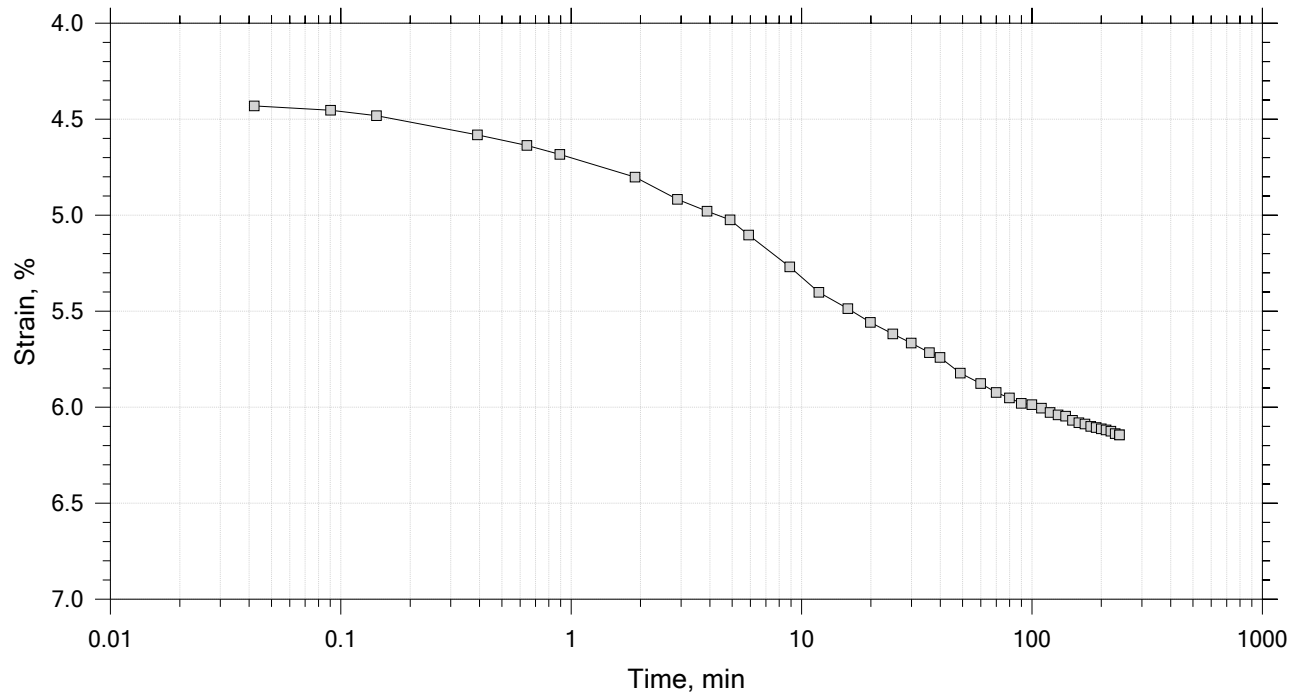
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 14

Constant Load Step

Stress: 2 tsf



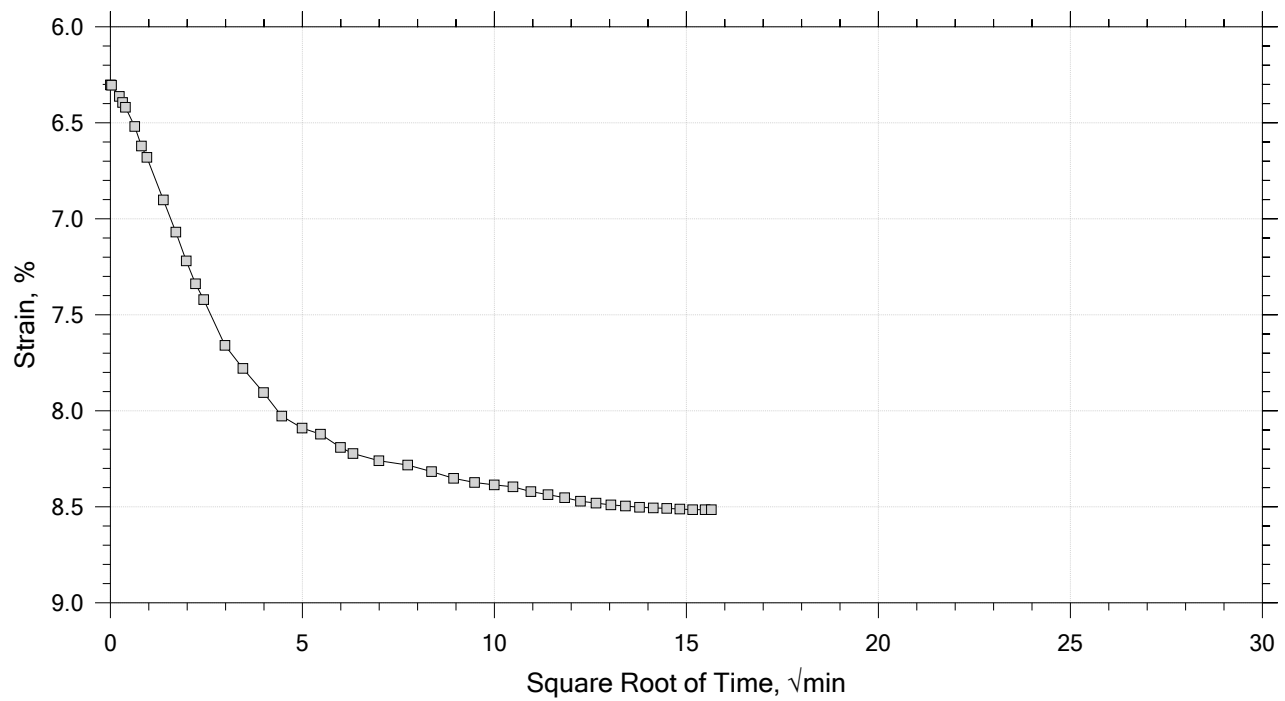
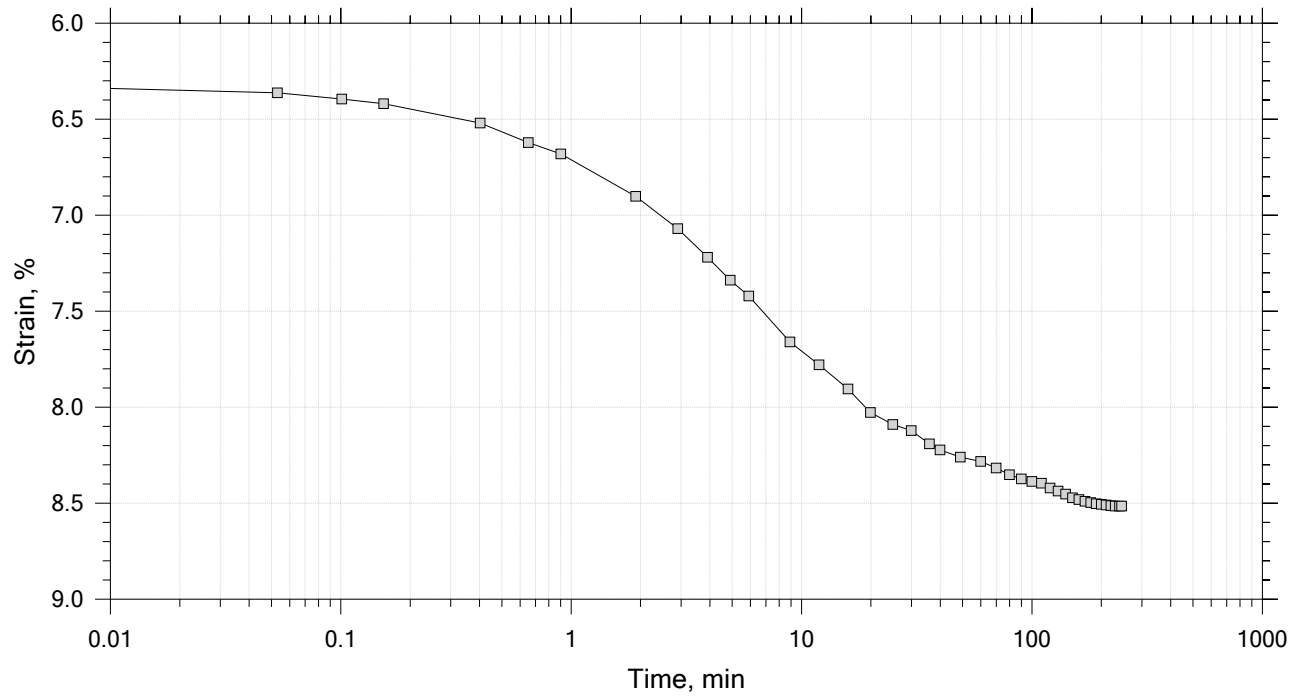
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 14

Constant Load Step

Stress: 4 tsf



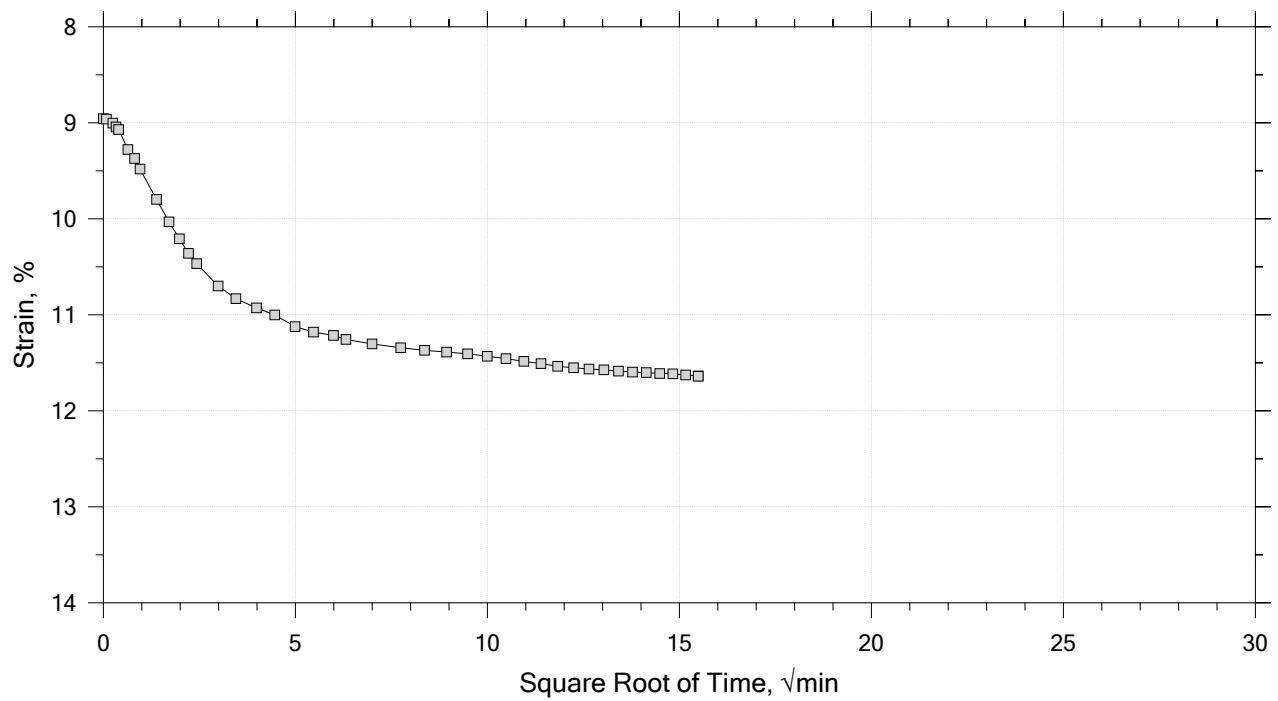
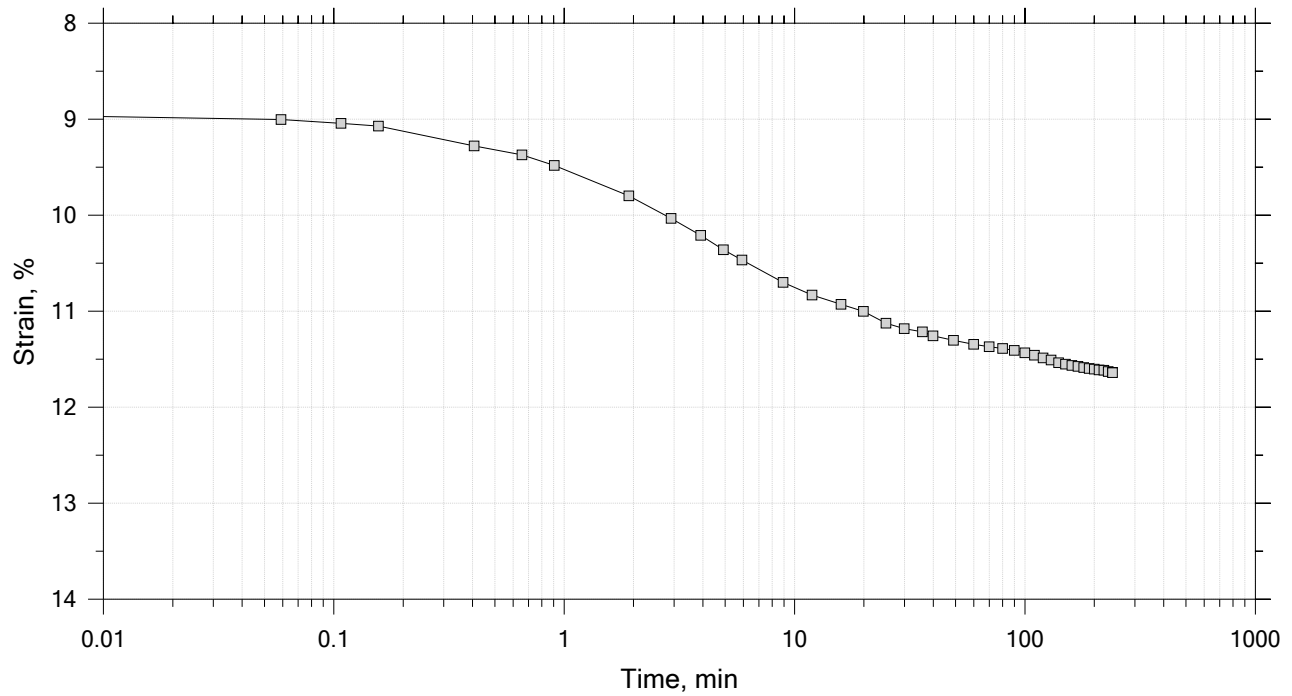
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 14

Constant Load Step

Stress: 8 tsf



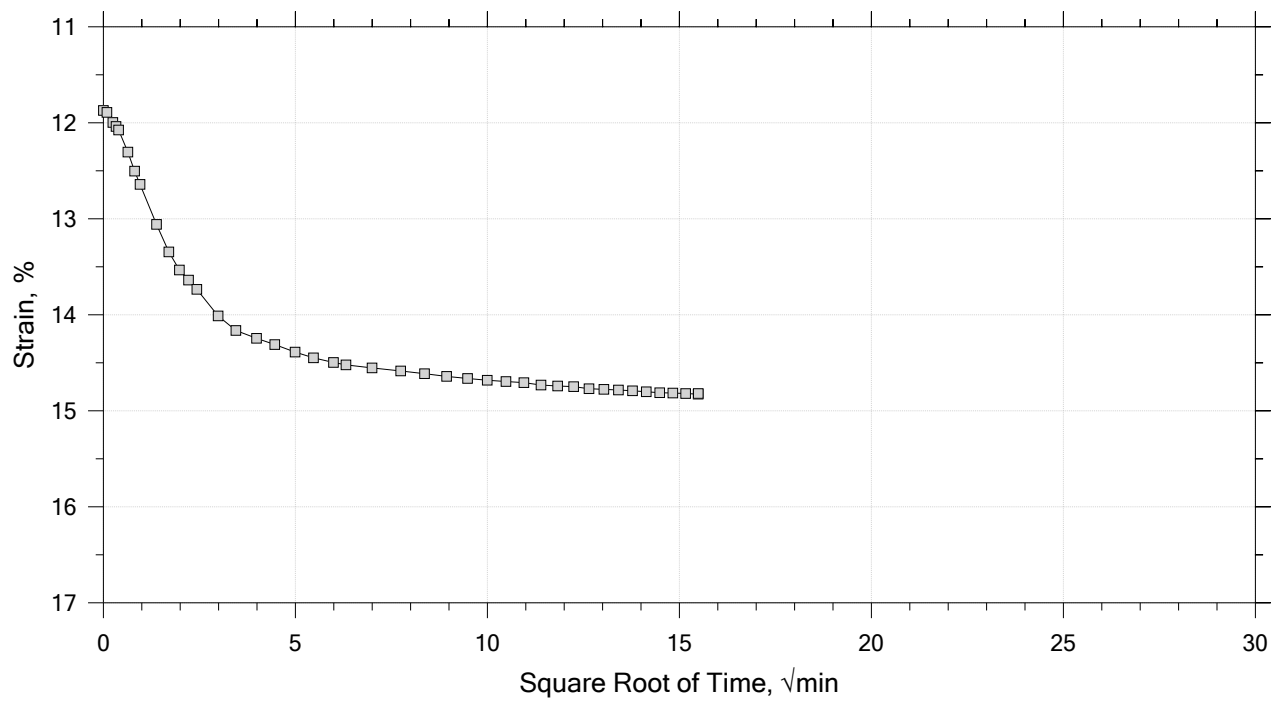
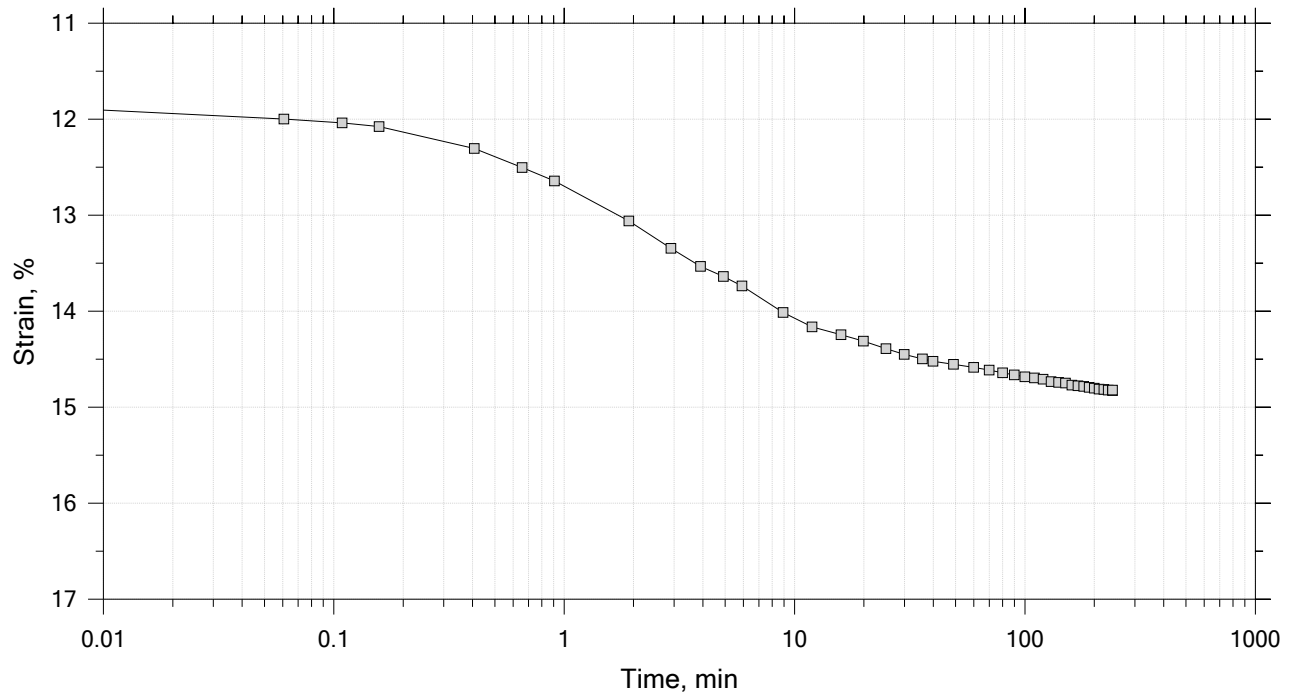
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 14

Constant Load Step

Stress: 16 tsf



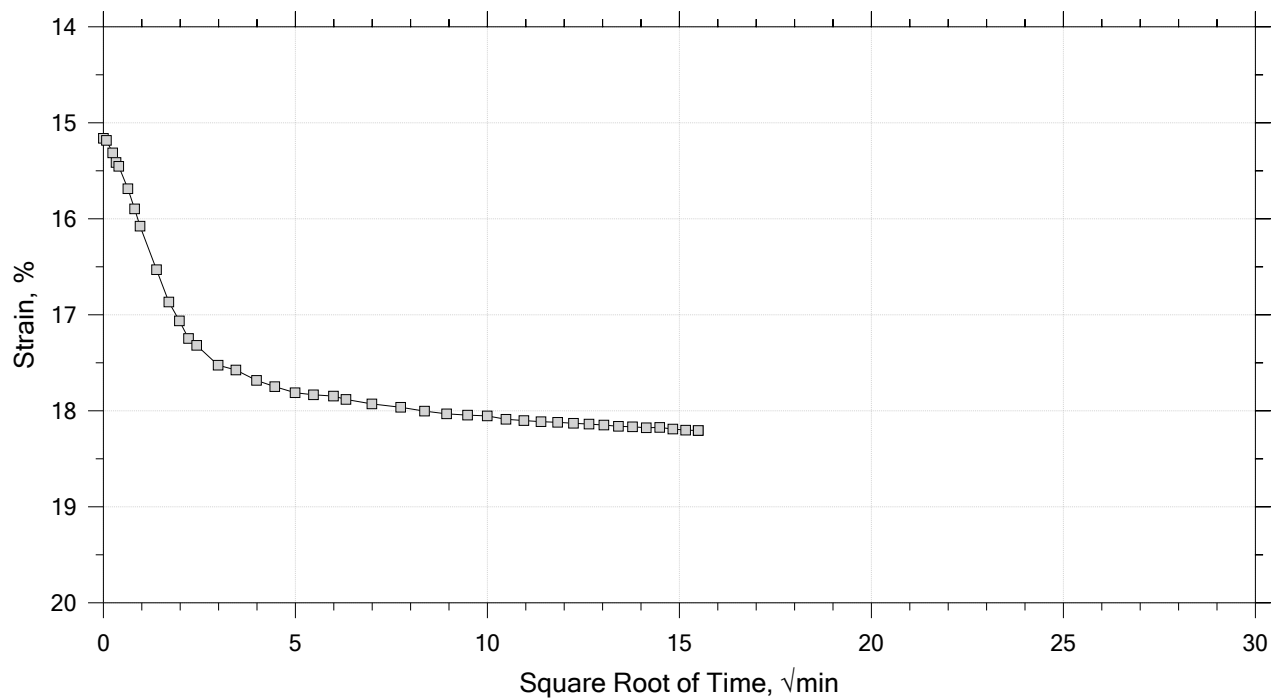
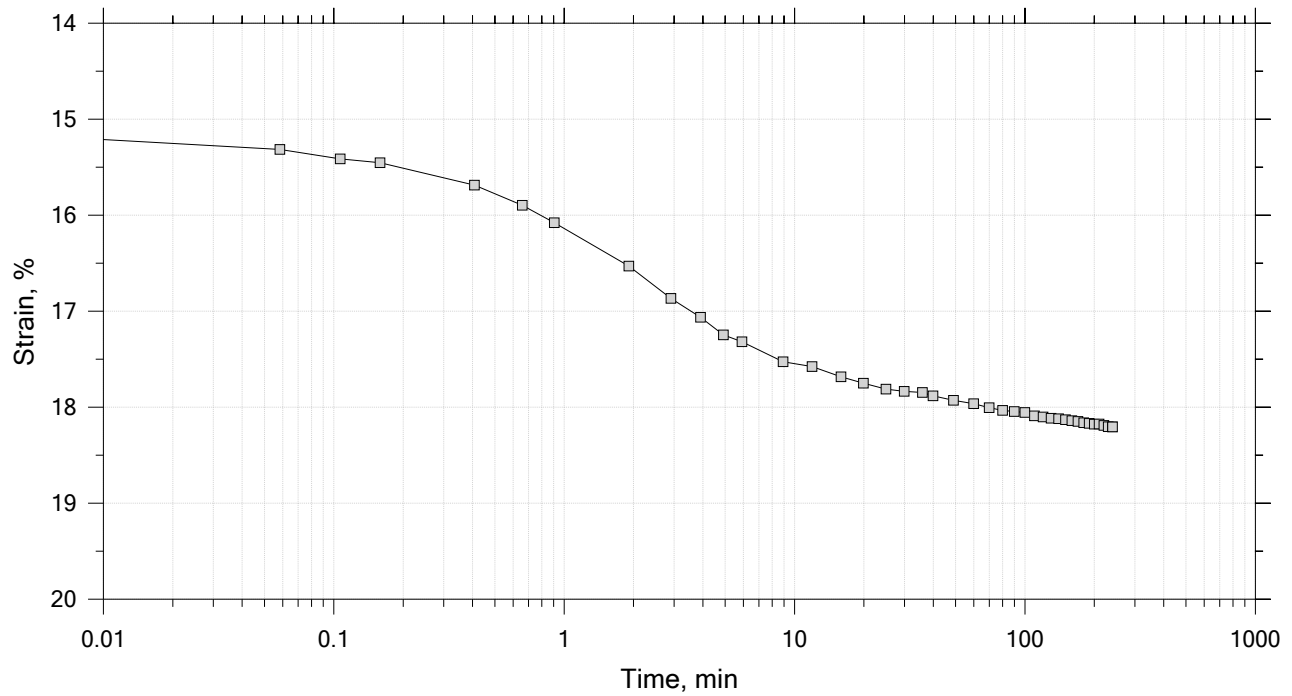
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 14

Constant Load Step

Stress: 32 tsf



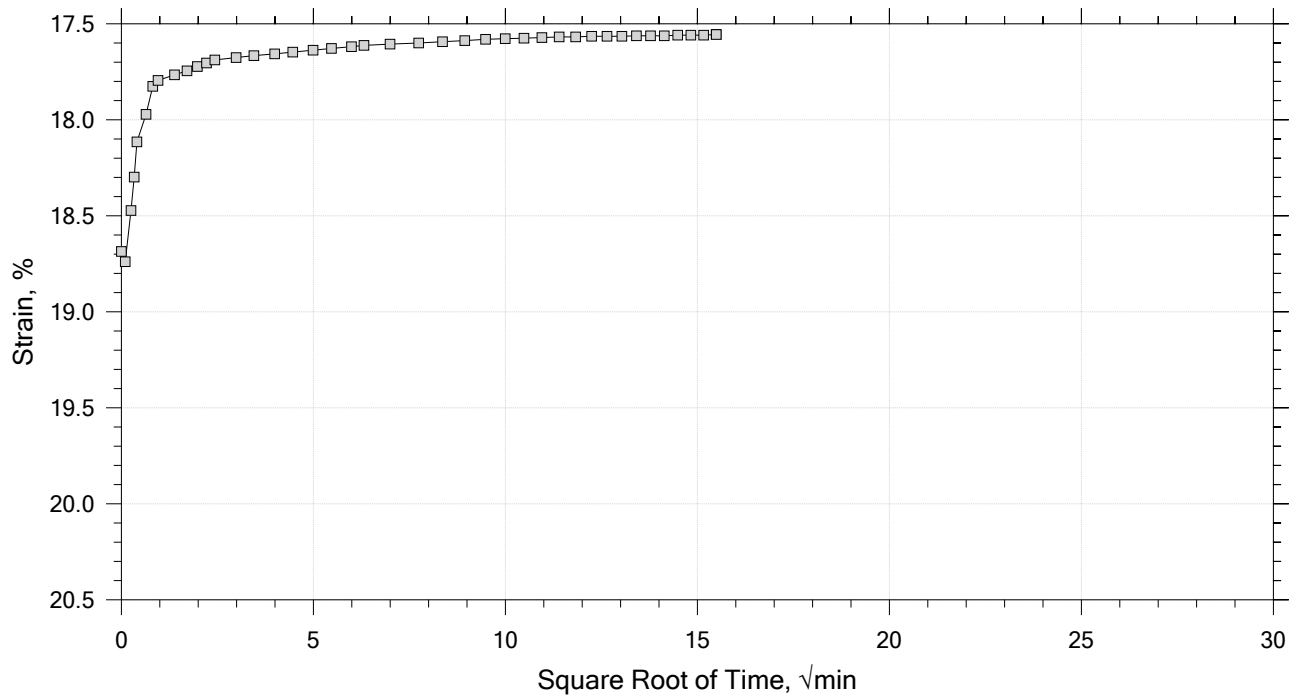
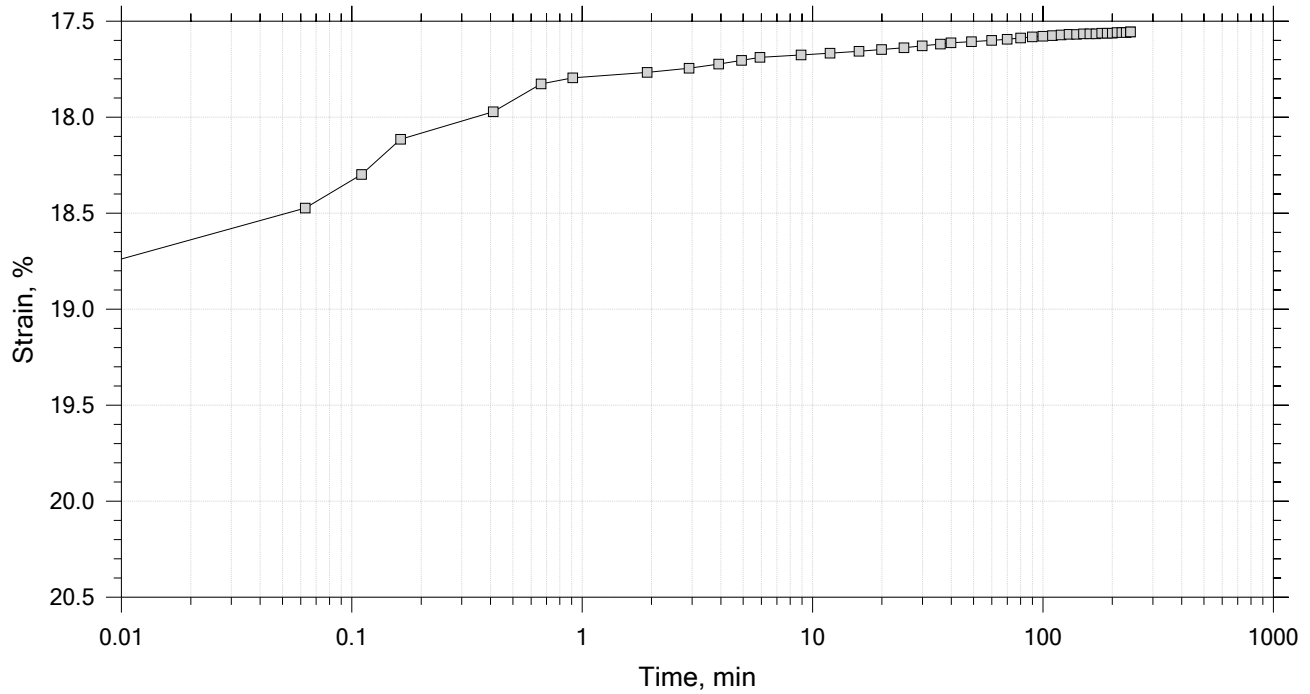
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 14

Constant Load Step

Stress: 8 tsf



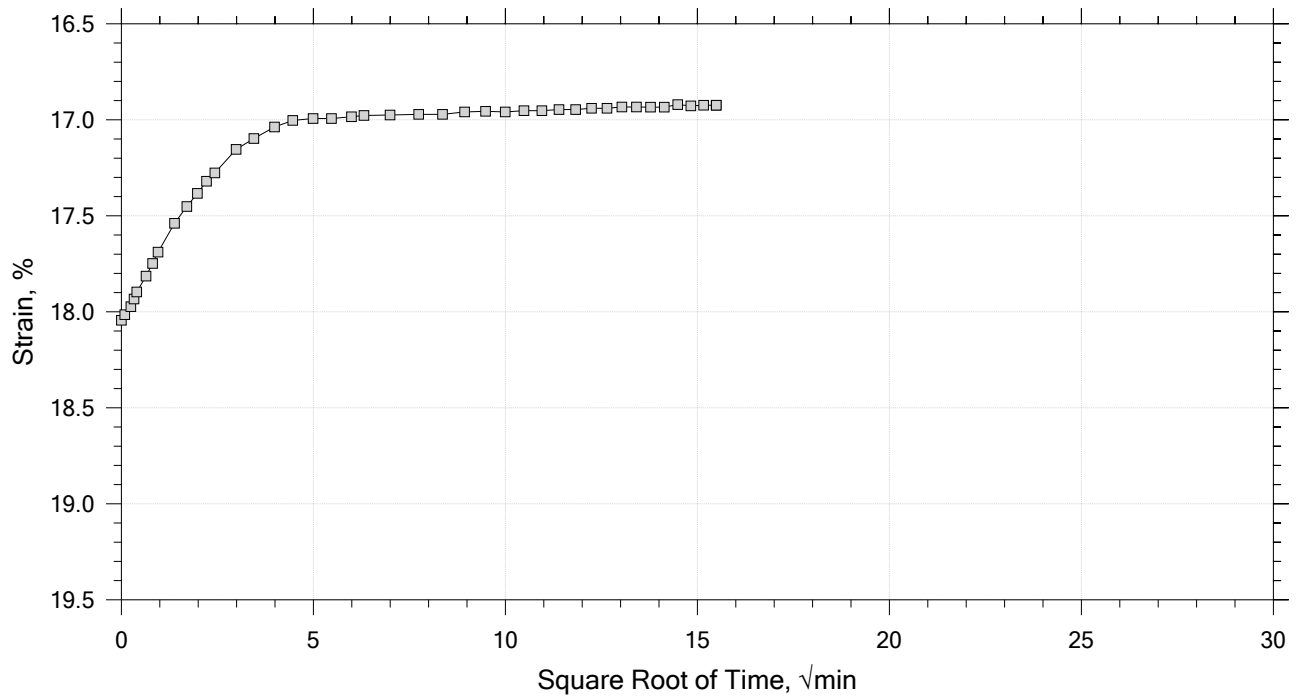
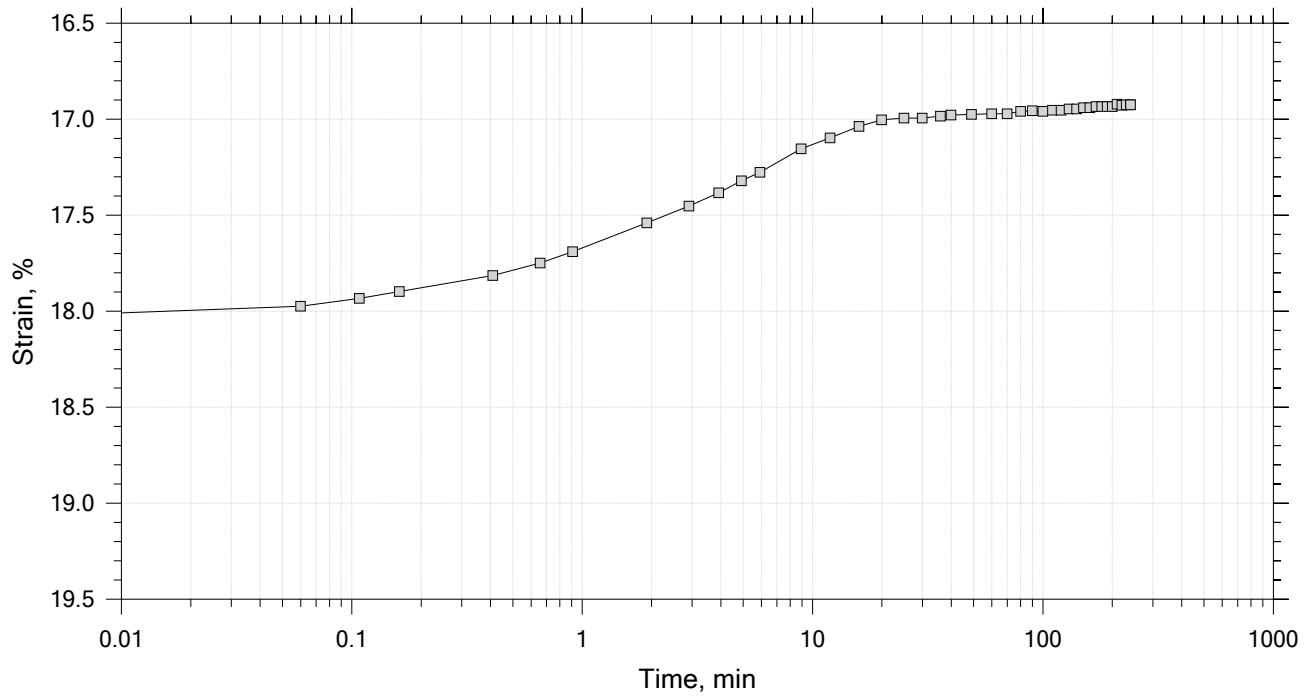
	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 14

Constant Load Step

Stress: 2 tsf



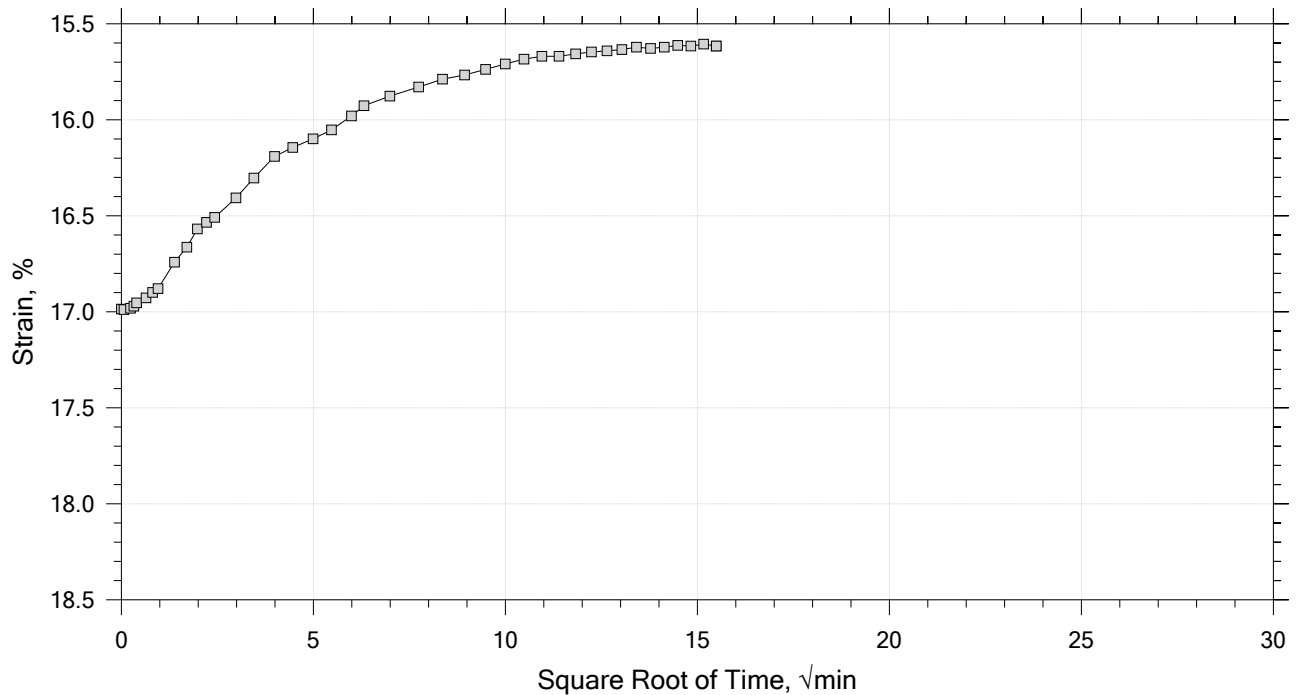
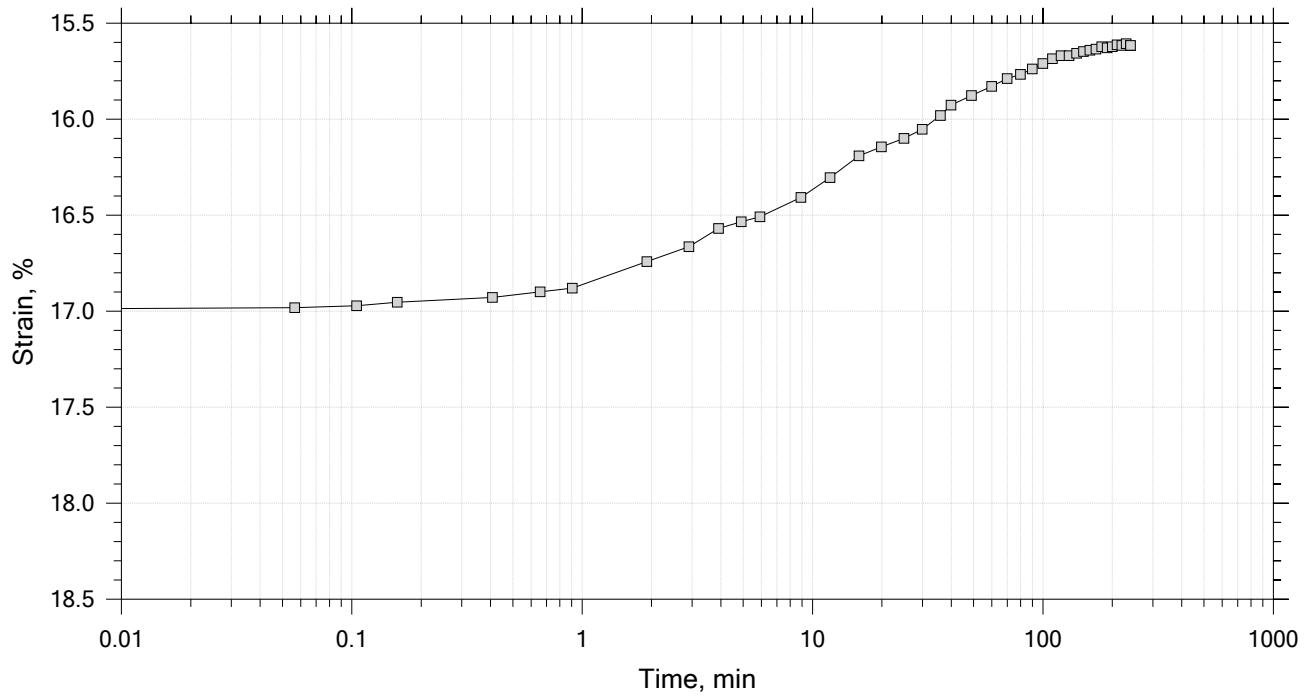
	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 14

Constant Load Step

Stress: 0.5 tsf



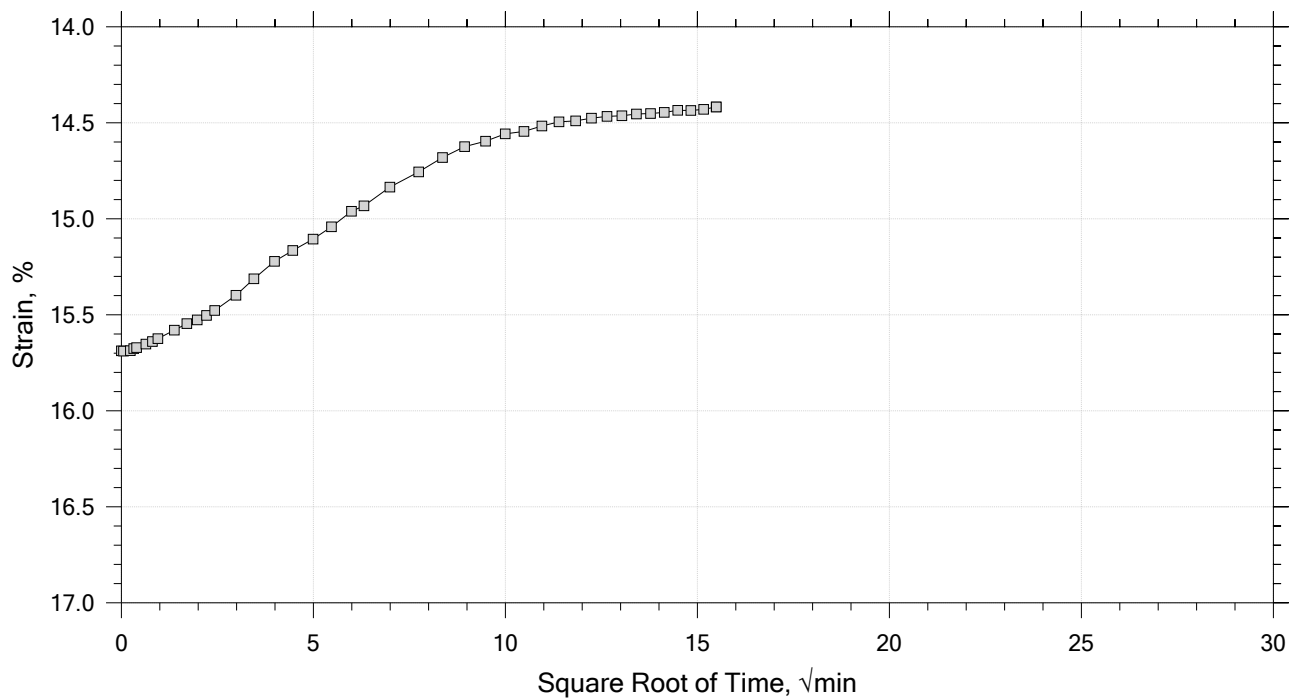
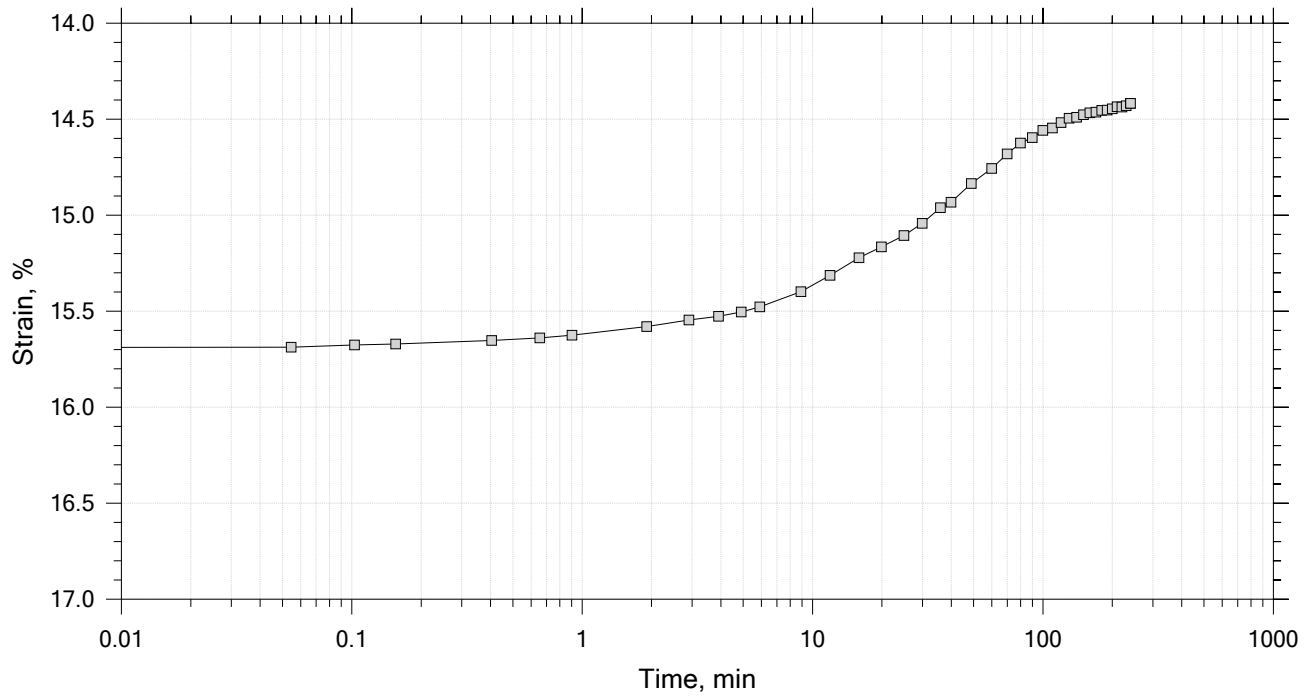
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	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 14

Constant Load Step

Stress: 0.125 tsf



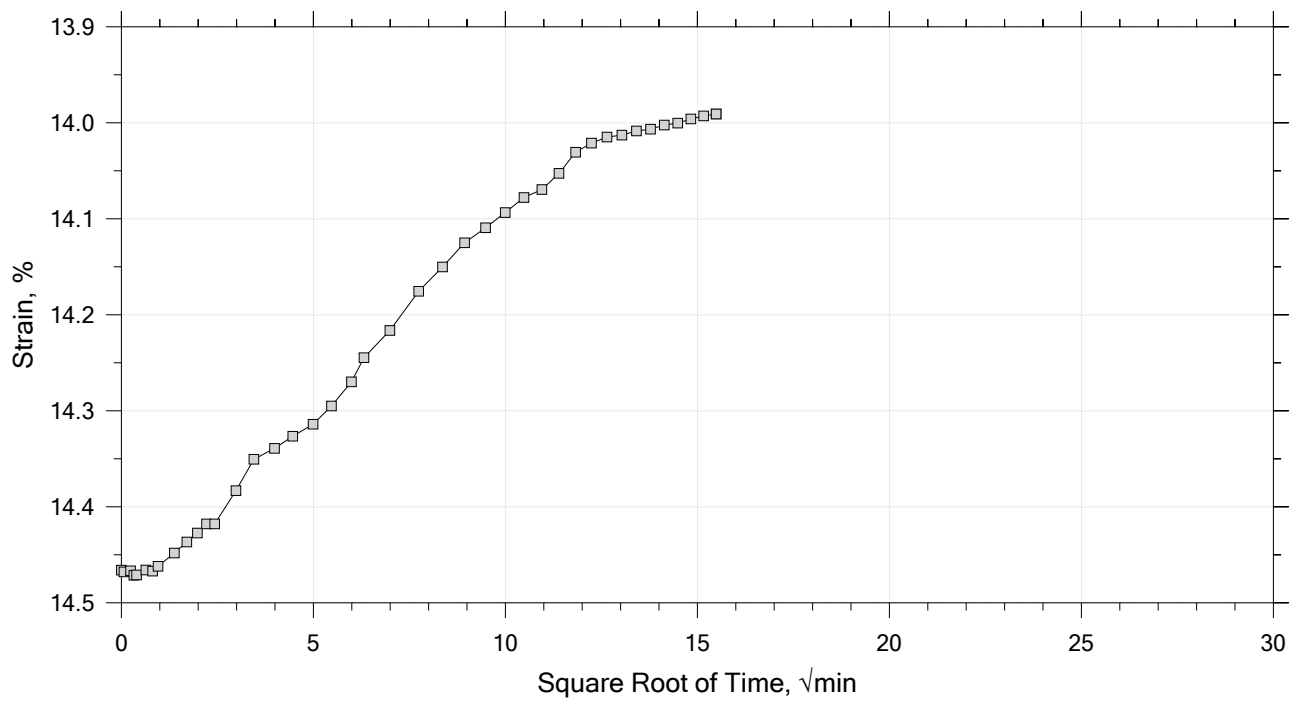
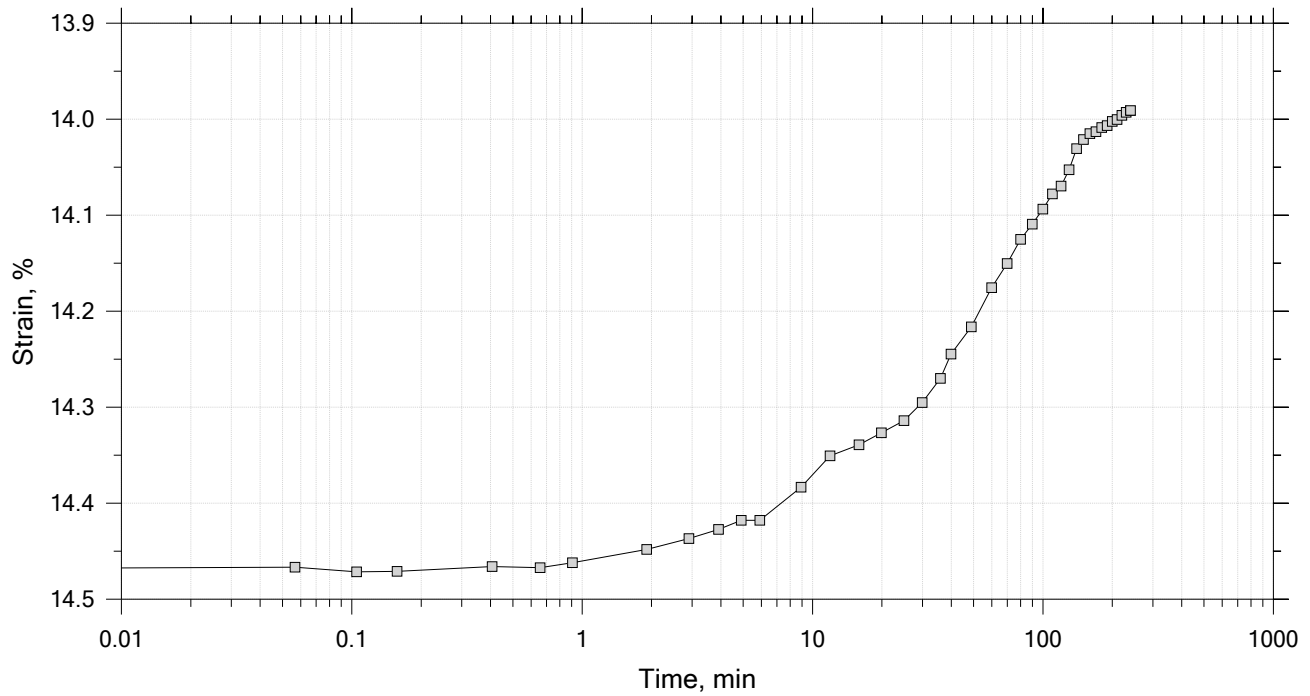
	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 14

Constant Load Step

Stress: 0.0625 tsf




	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.78	Liquid Limit: 35
Initial Height: 1.00 in	Initial Void Ratio: 0.836	Plastic Limit: 19
Final Height: 0.86 in	Final Void Ratio: 0.579	Plasticity Index: 16

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D-972	RING		D-2296
Mass Container, gm	8.26	107.93	107.93	8.4
Mass Container + Wet Soil, gm	161.89	264.41	255.27	155.08
Mass Container + Dry Soil, gm	125.33	229.9	229.9	129.82
Mass Dry Soil, gm	117.07	121.97	121.97	121.42
Water Content, %	31.23	28.30	20.80	20.80
Void Ratio	---	0.84	0.58	---
Degree of Saturation, %	---	94.23	100.00	---
Dry Unit Weight, pcf	---	94.656	110.05	---


Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients


[illegible]

	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		
Displacement at End of Increment			

One-Dimensional Consolidation by ASTM D2435 - Method B

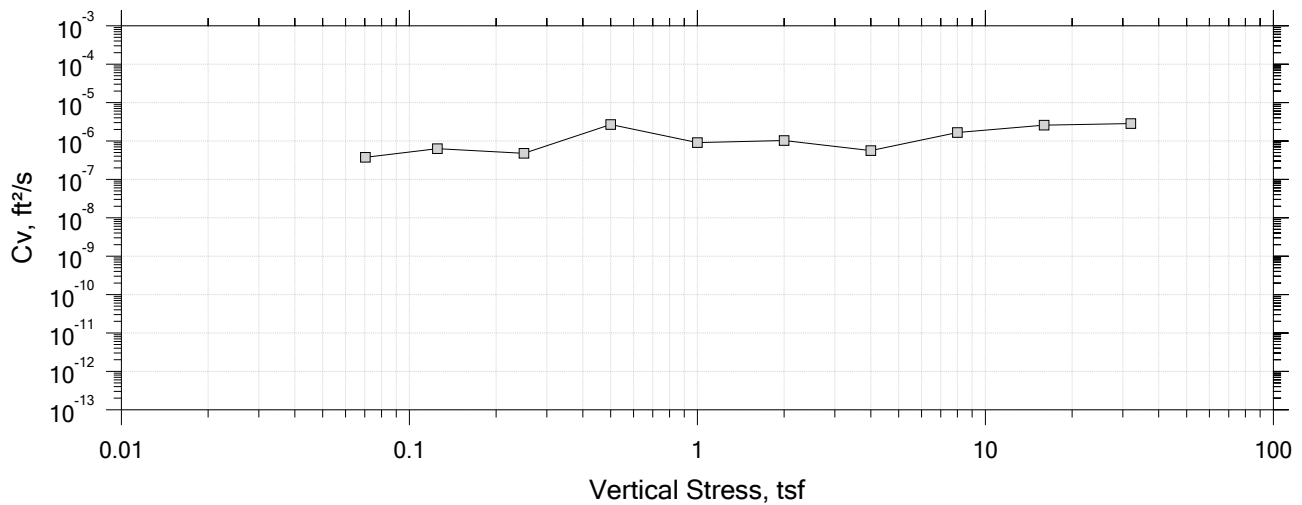
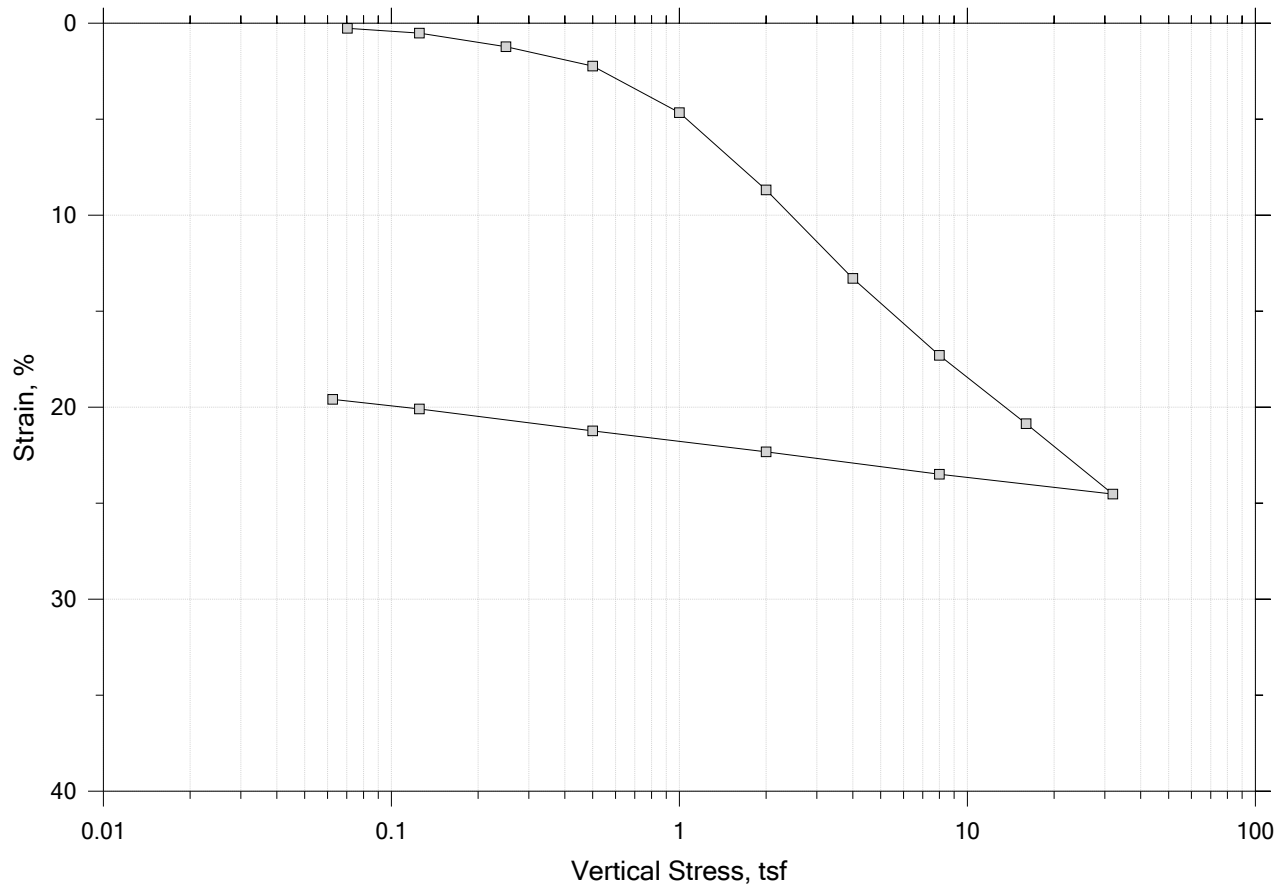
Square Root of Time Coefficients


[illegible]

	Project: Rt 9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-101	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 5-7 ft
	Test No.: IP-17	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.156 tsf		
Displacement at End of Increment			

One-Dimensional Consolidation by ASTM D2435 - Method B

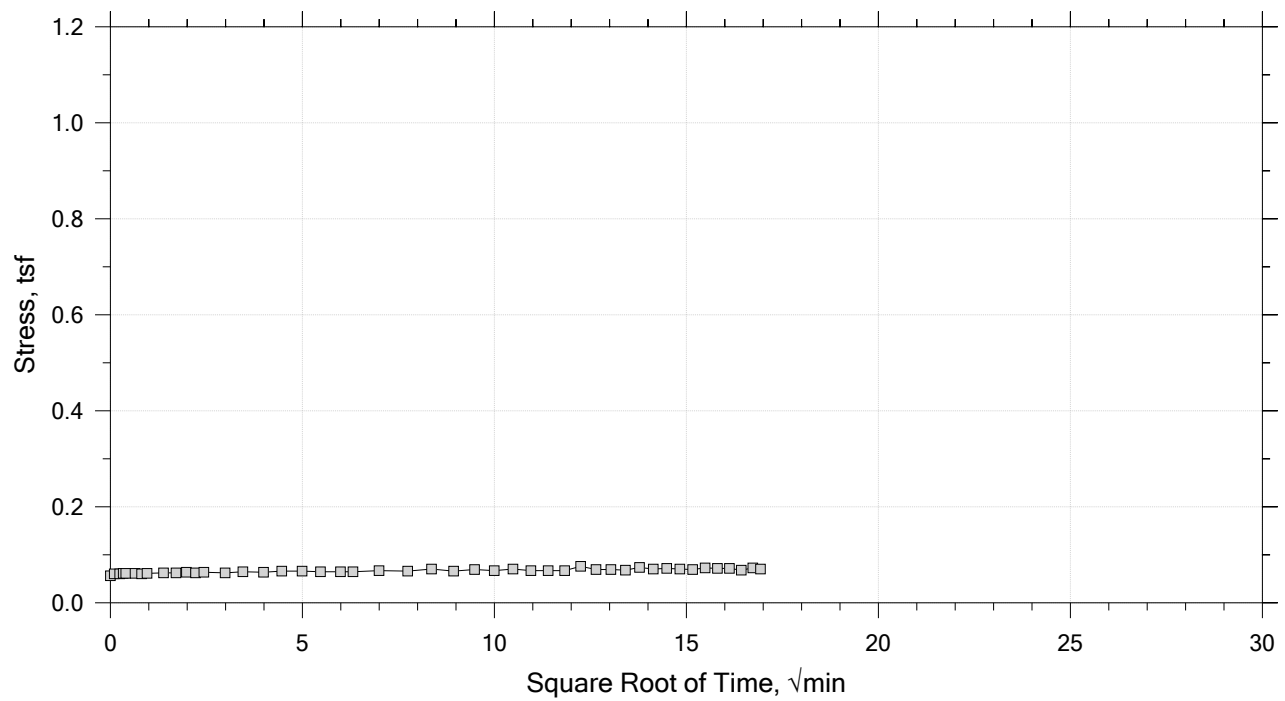
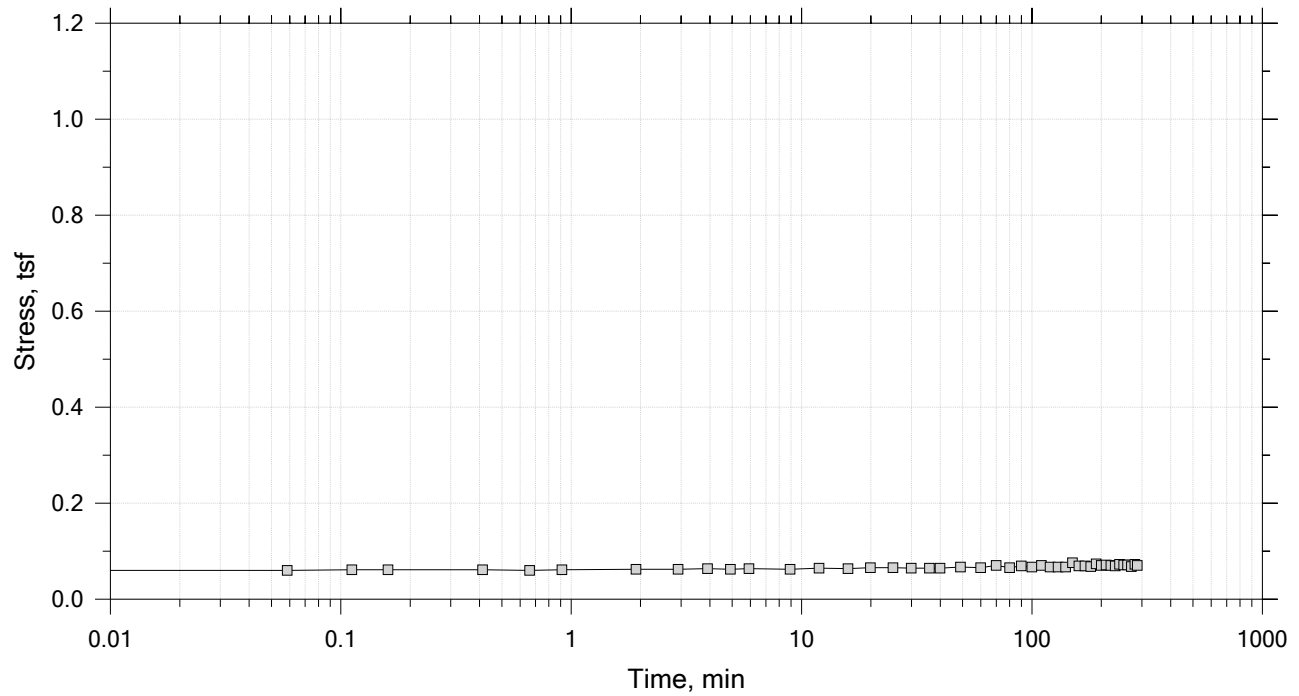
Summary Report




	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0703 tsf



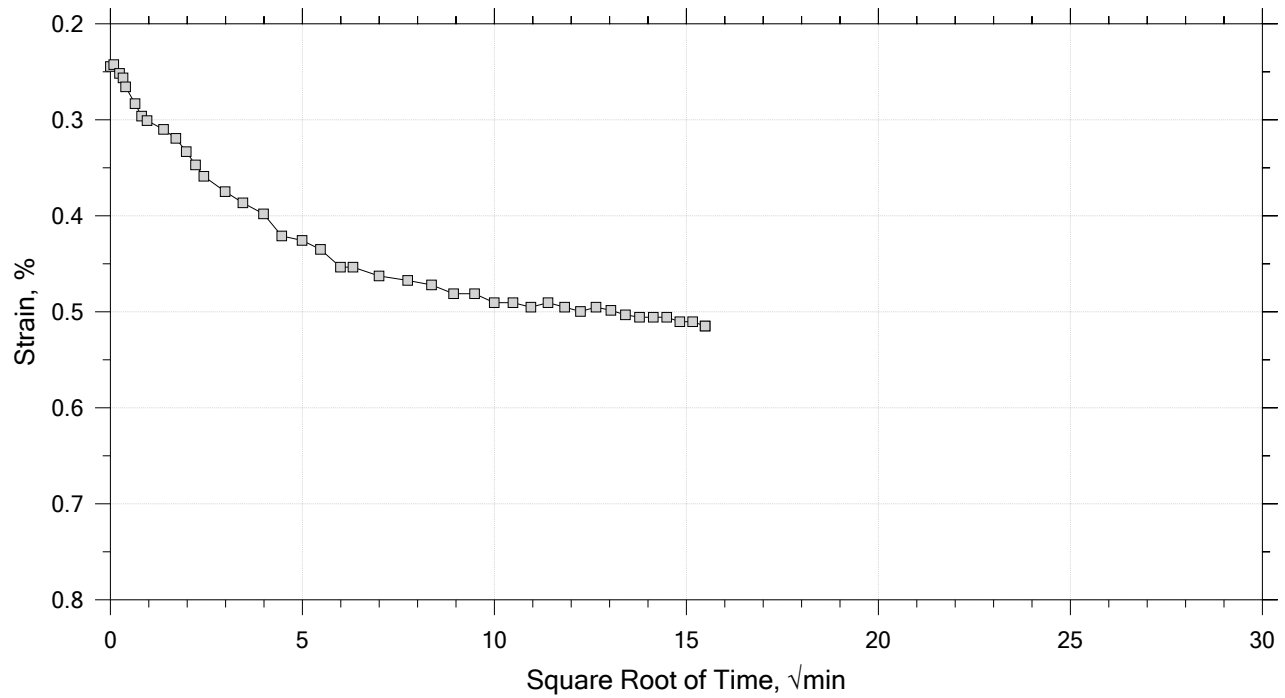
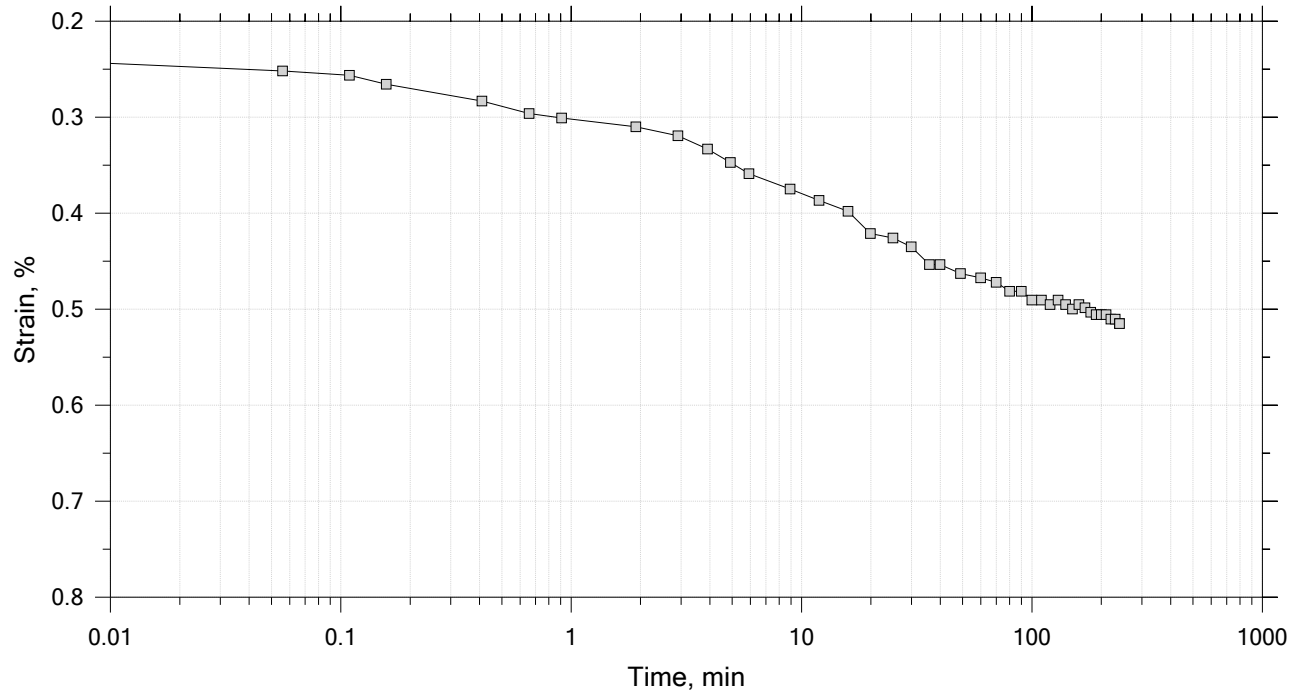
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	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf



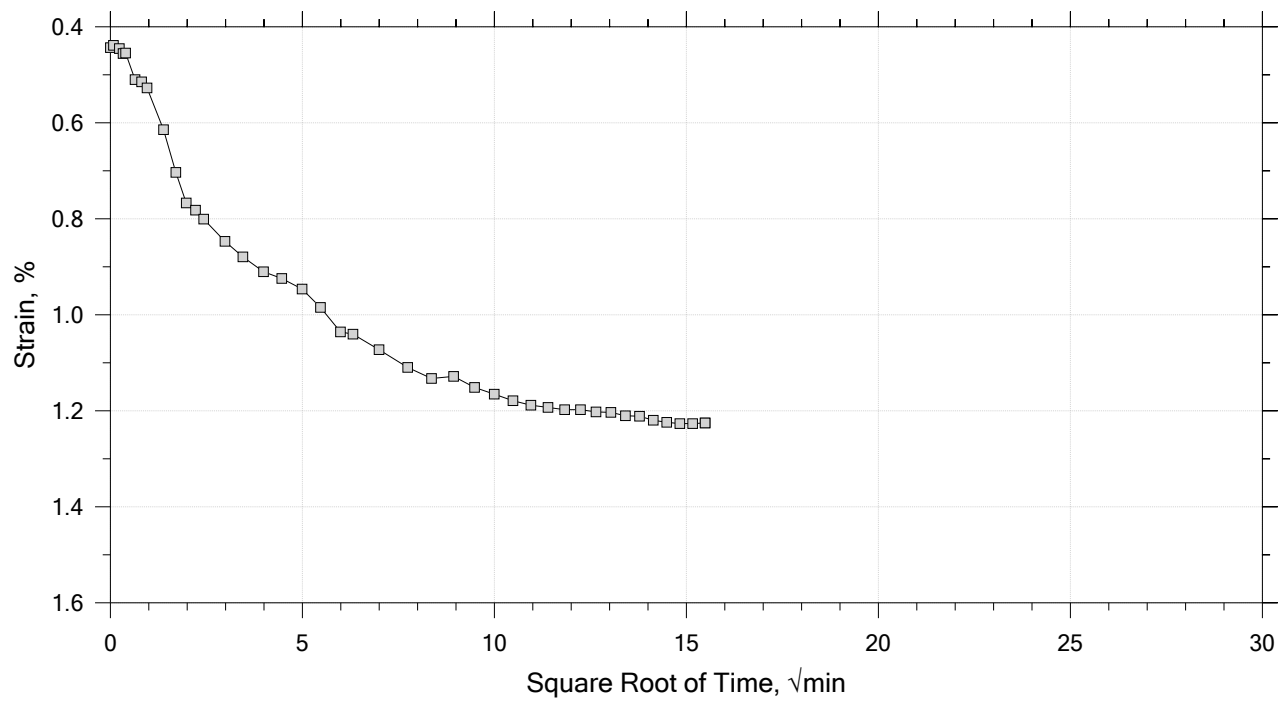
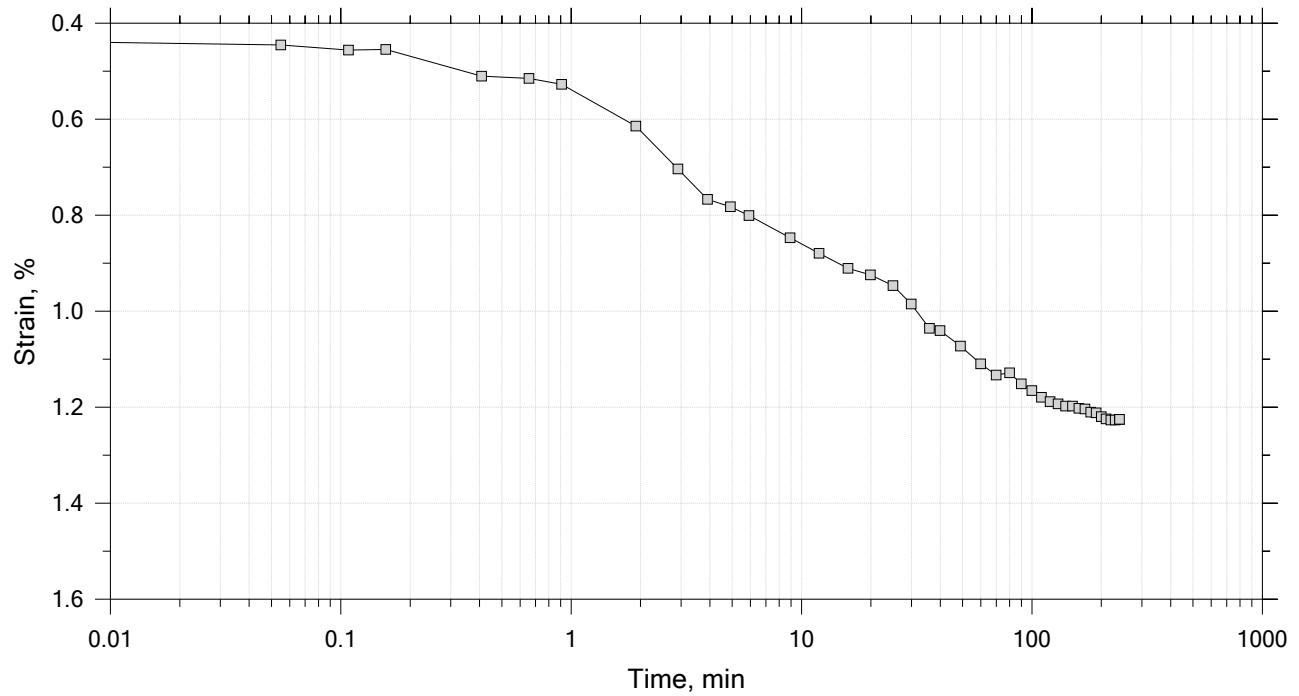
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	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf



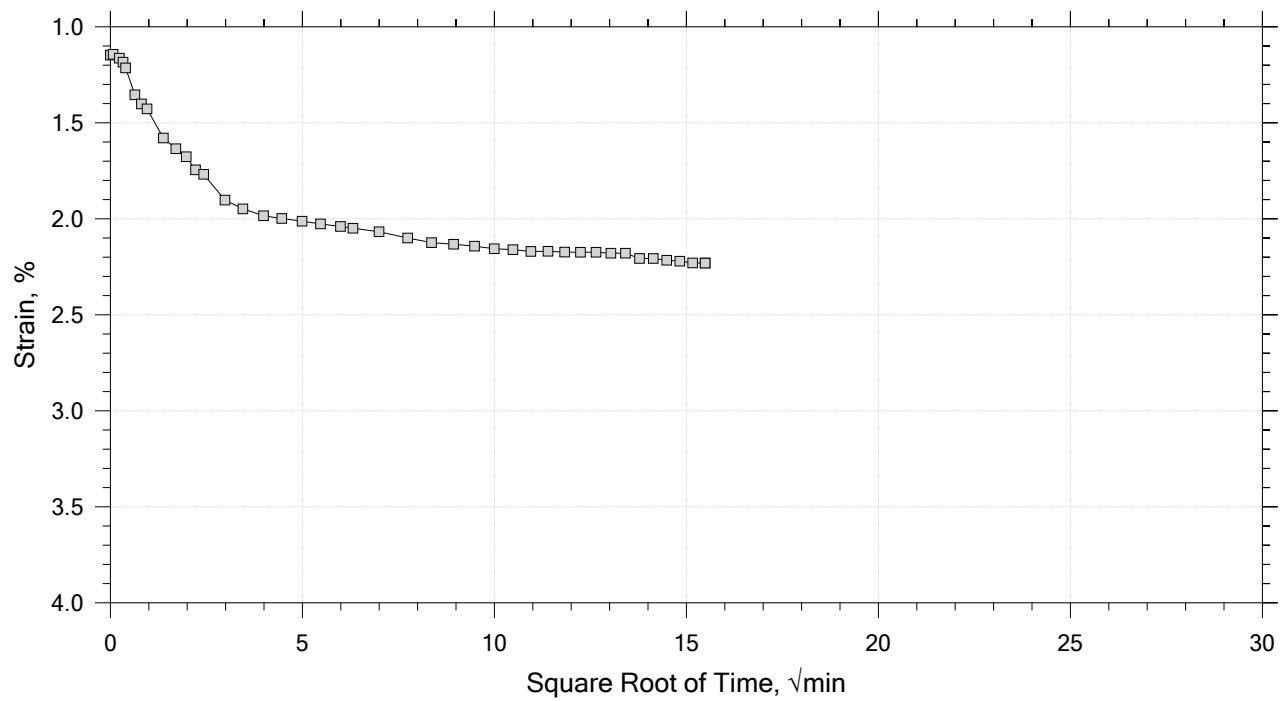
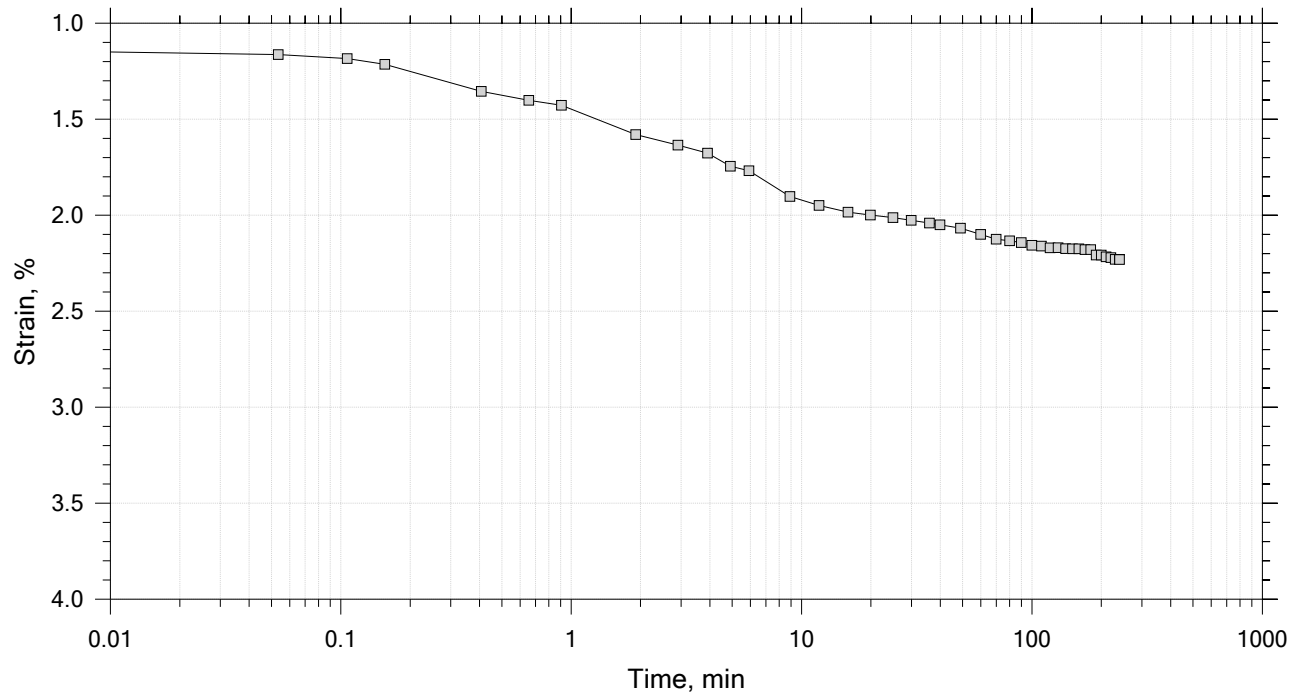
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf



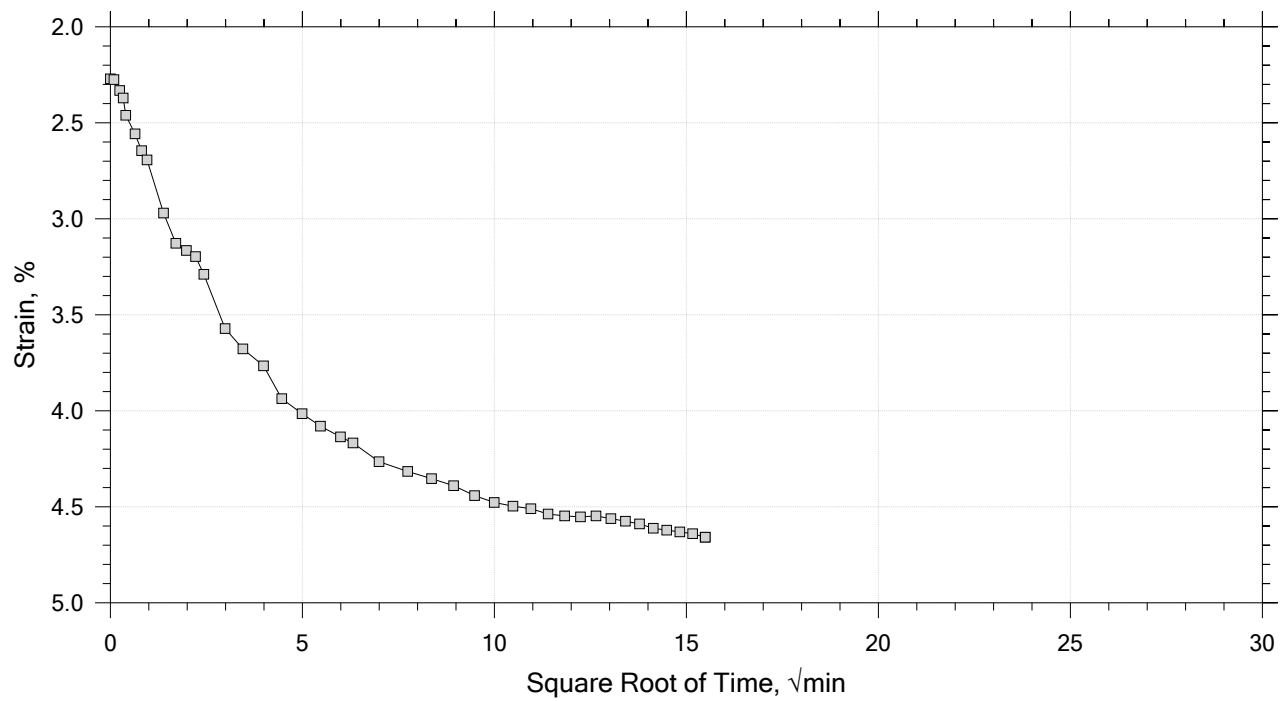
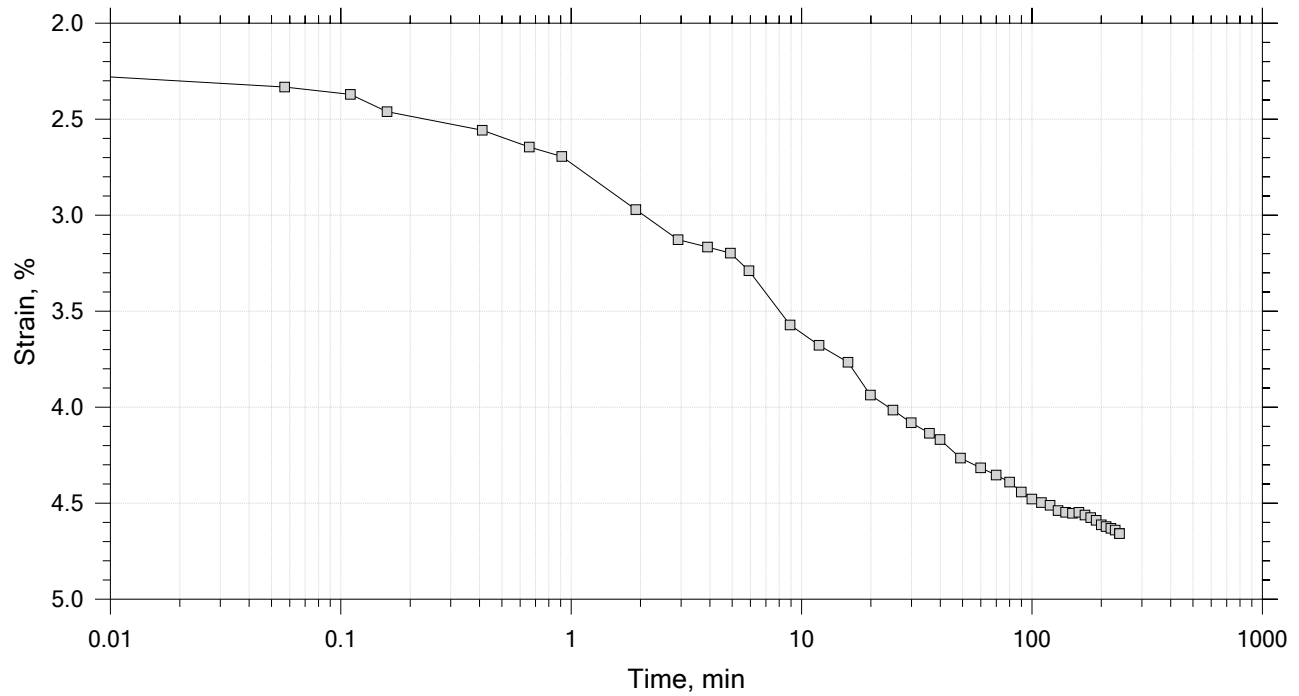
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf



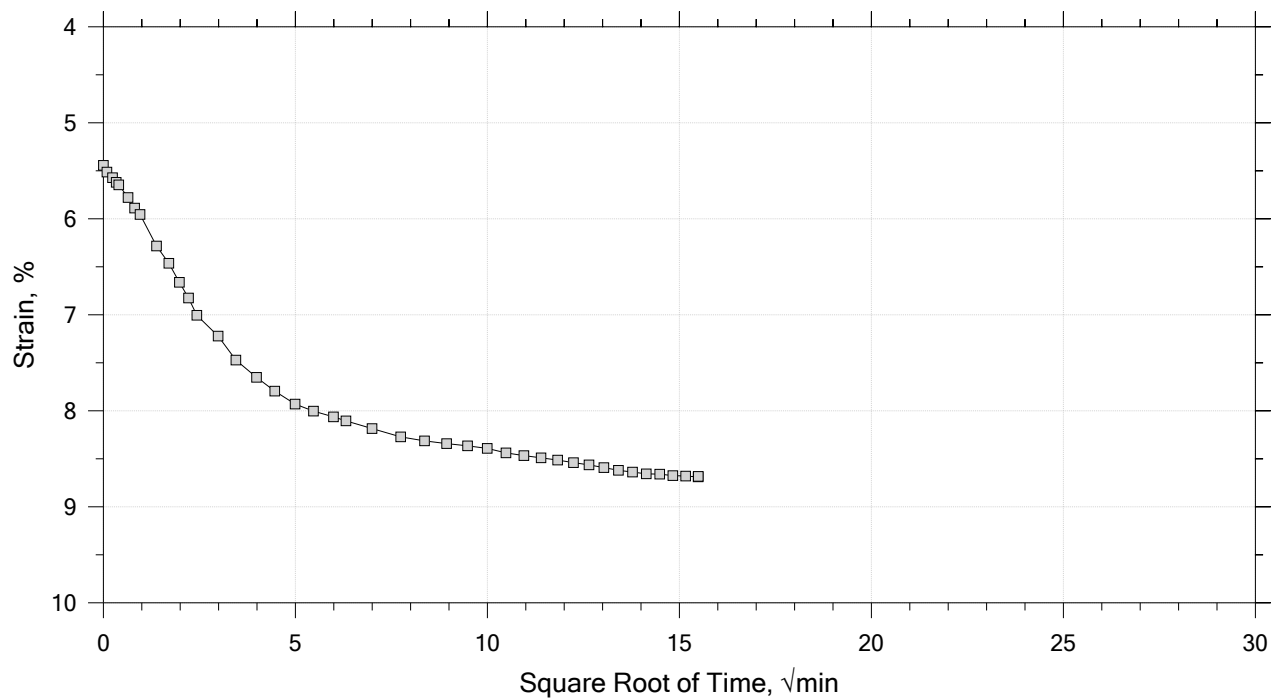
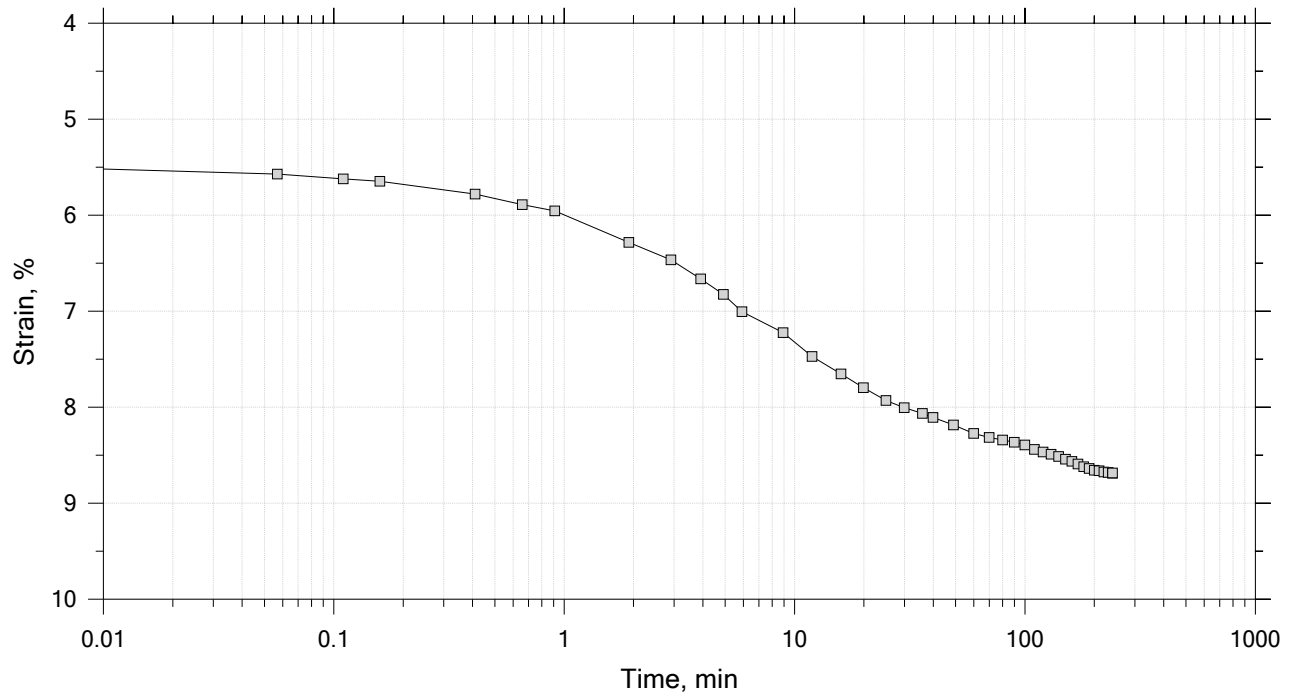
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	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf



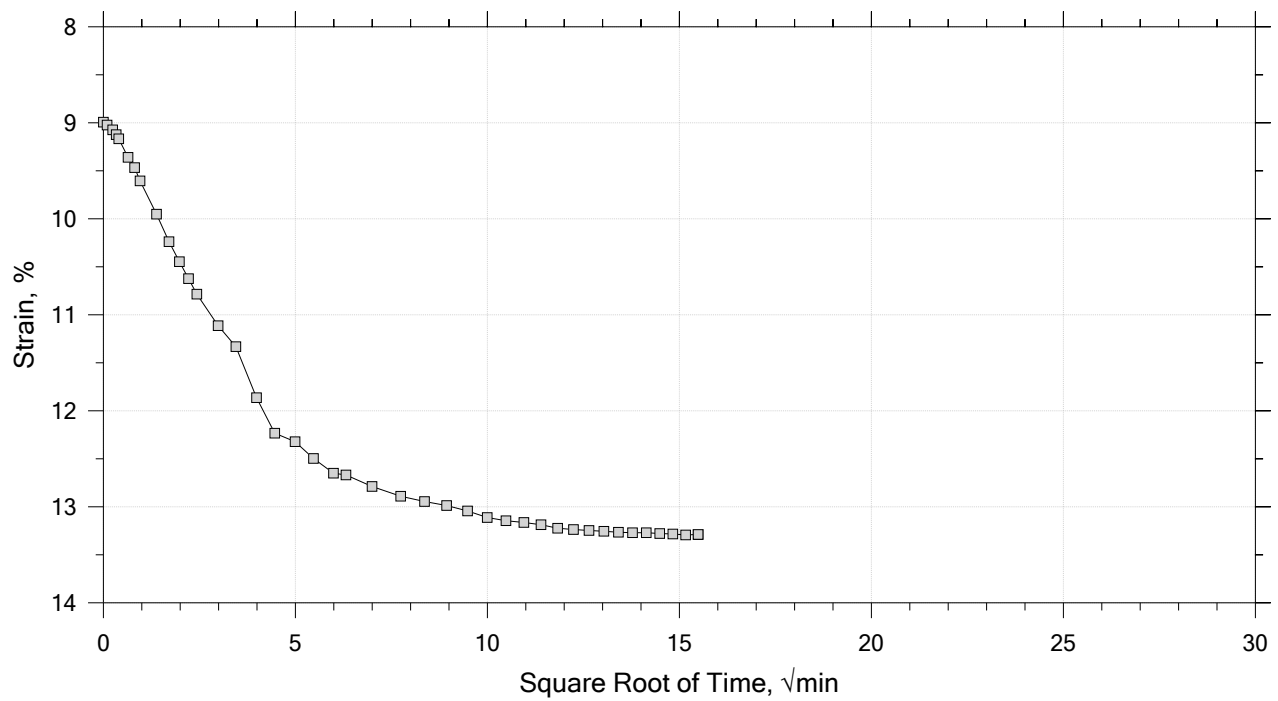
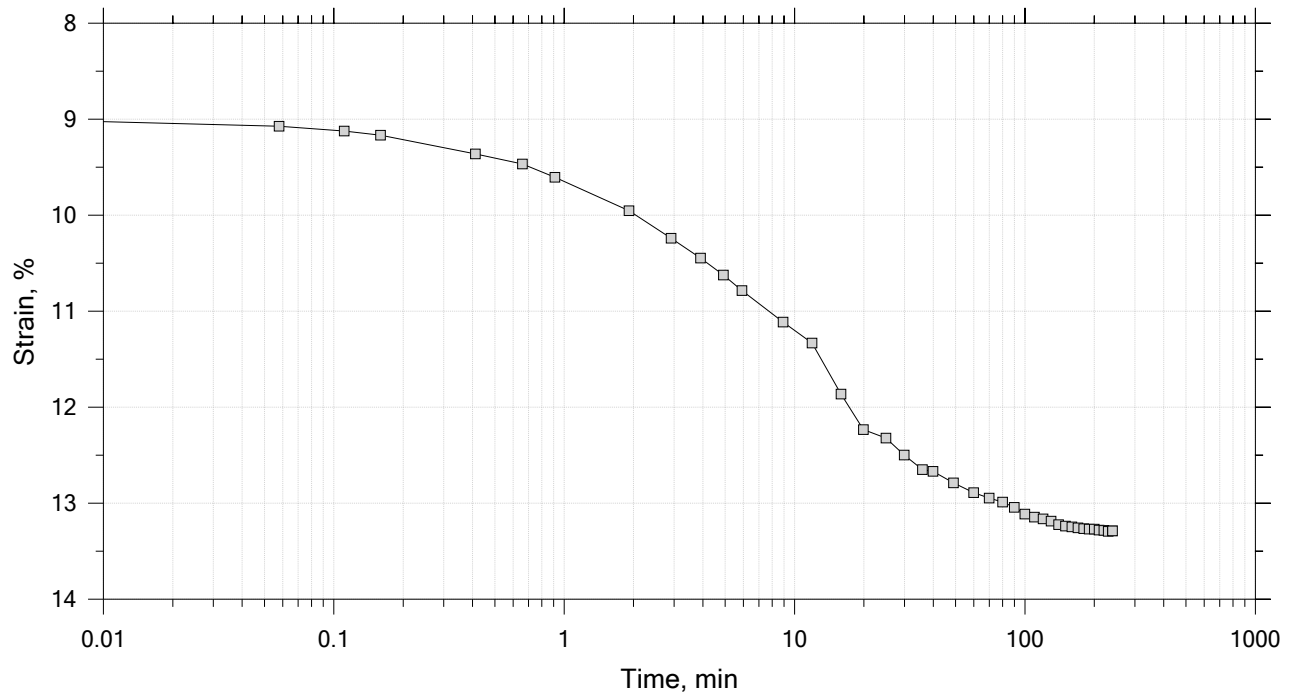
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf



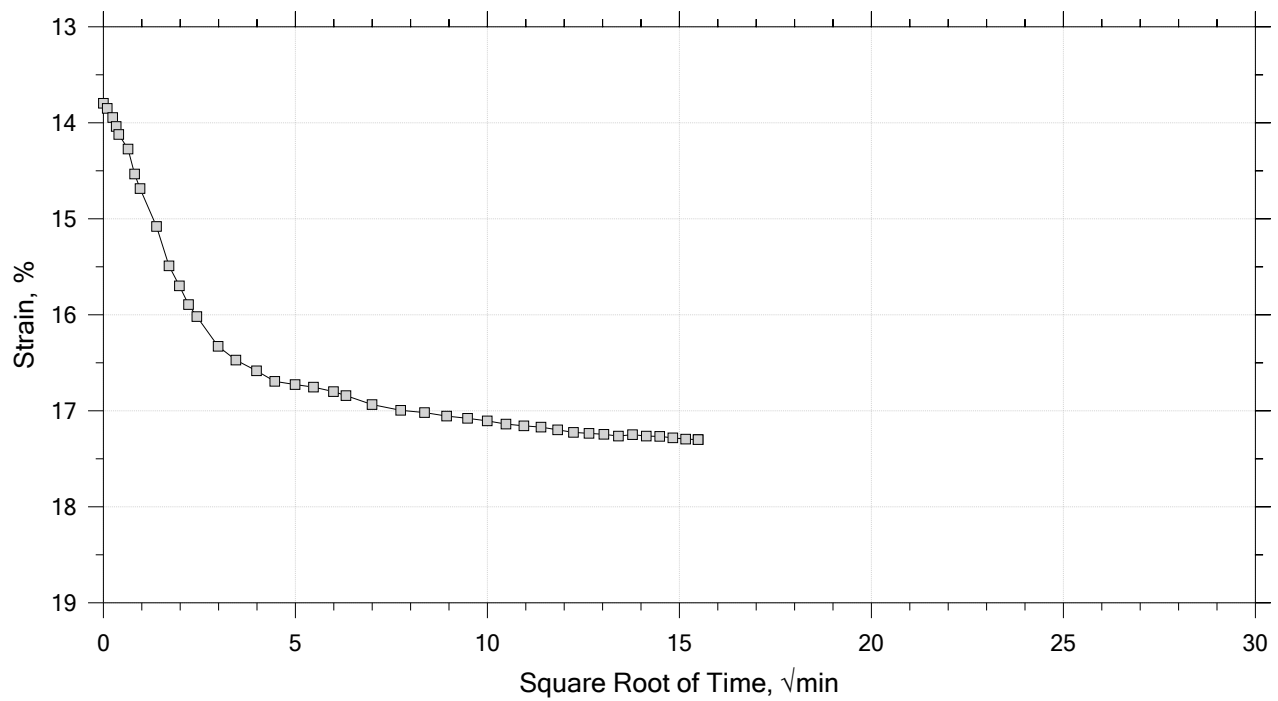
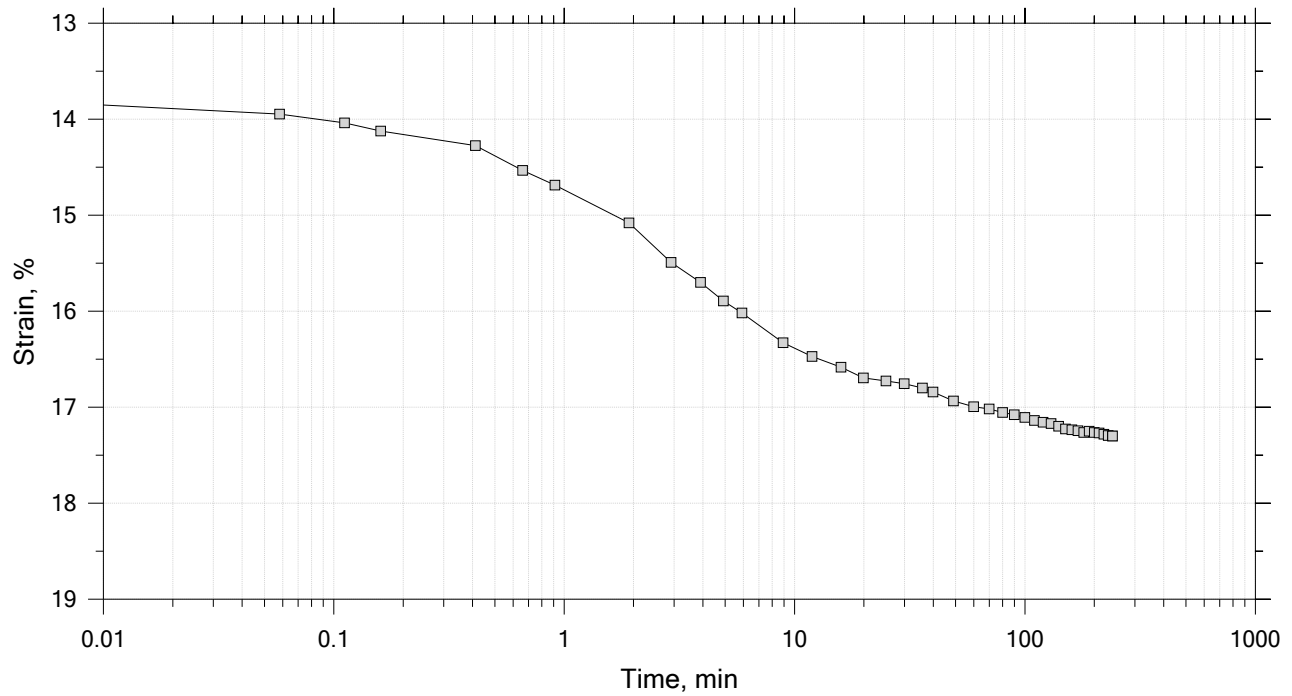
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf



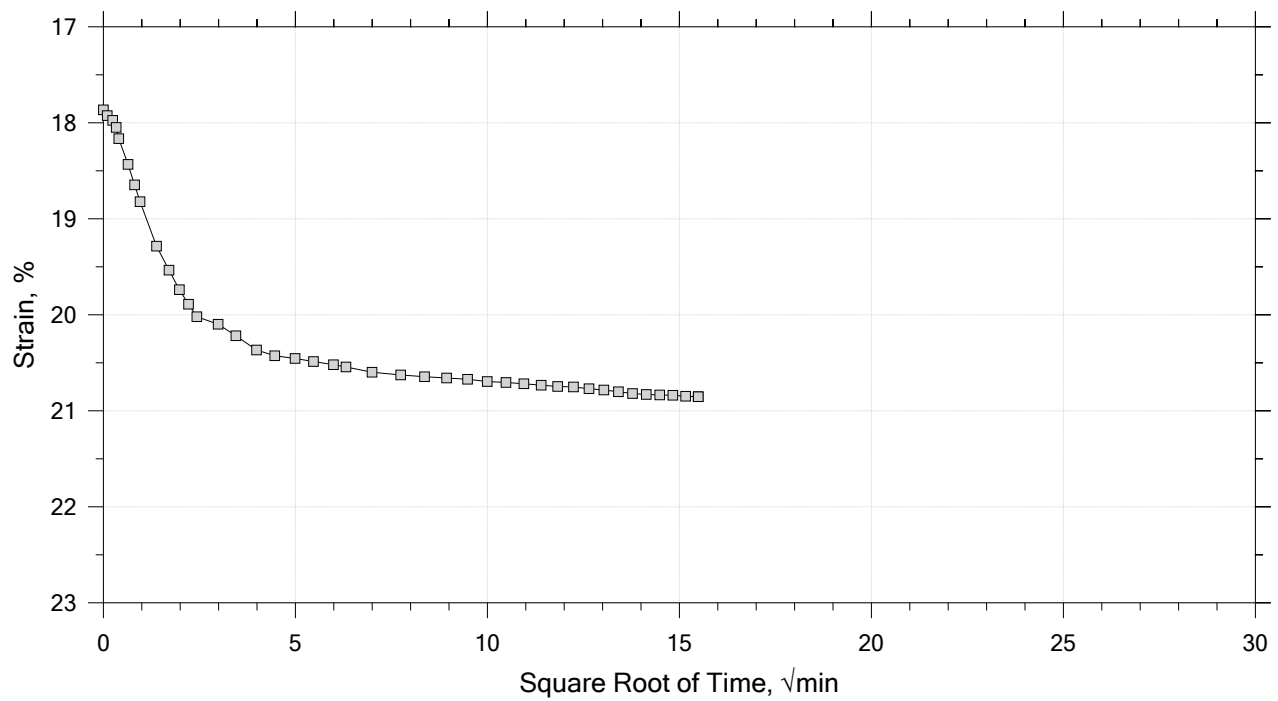
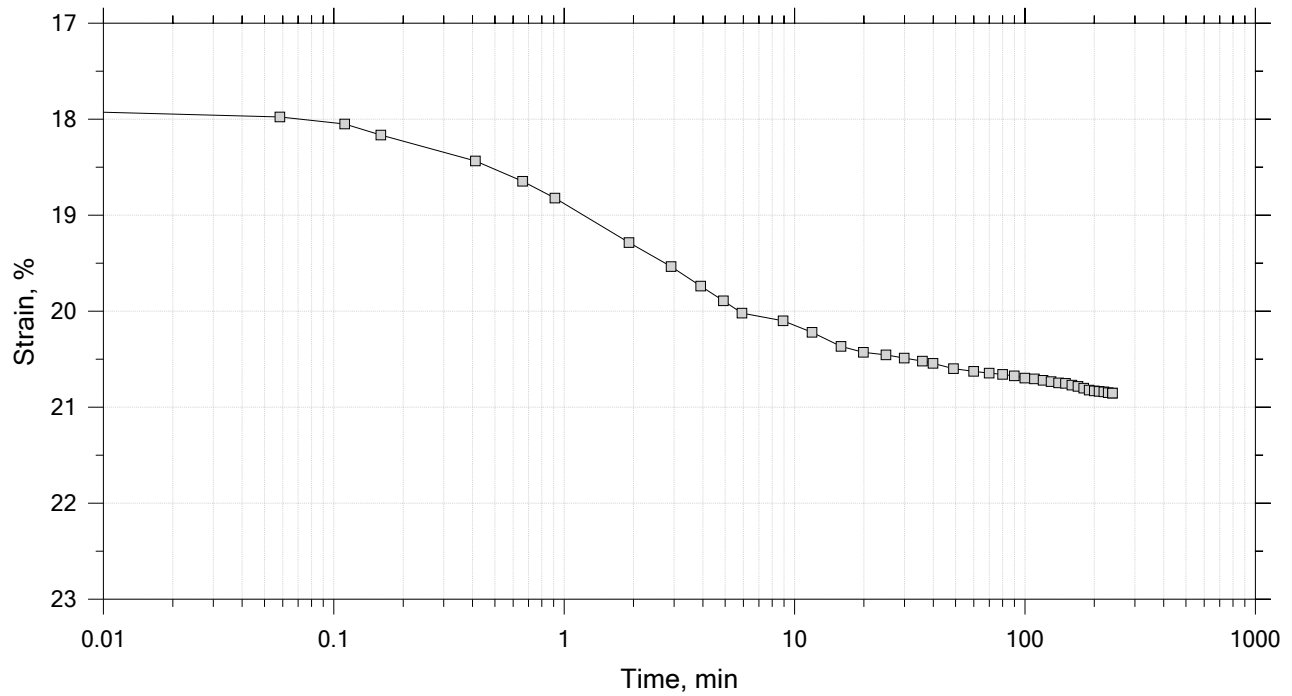
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf



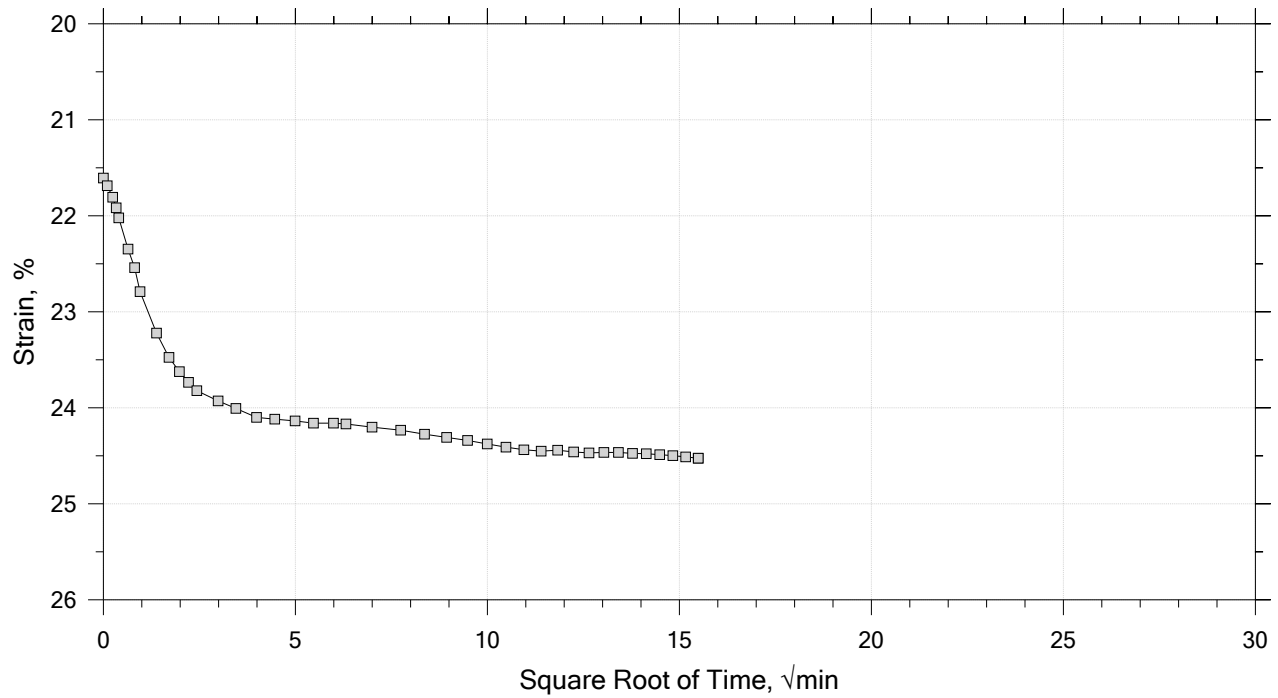
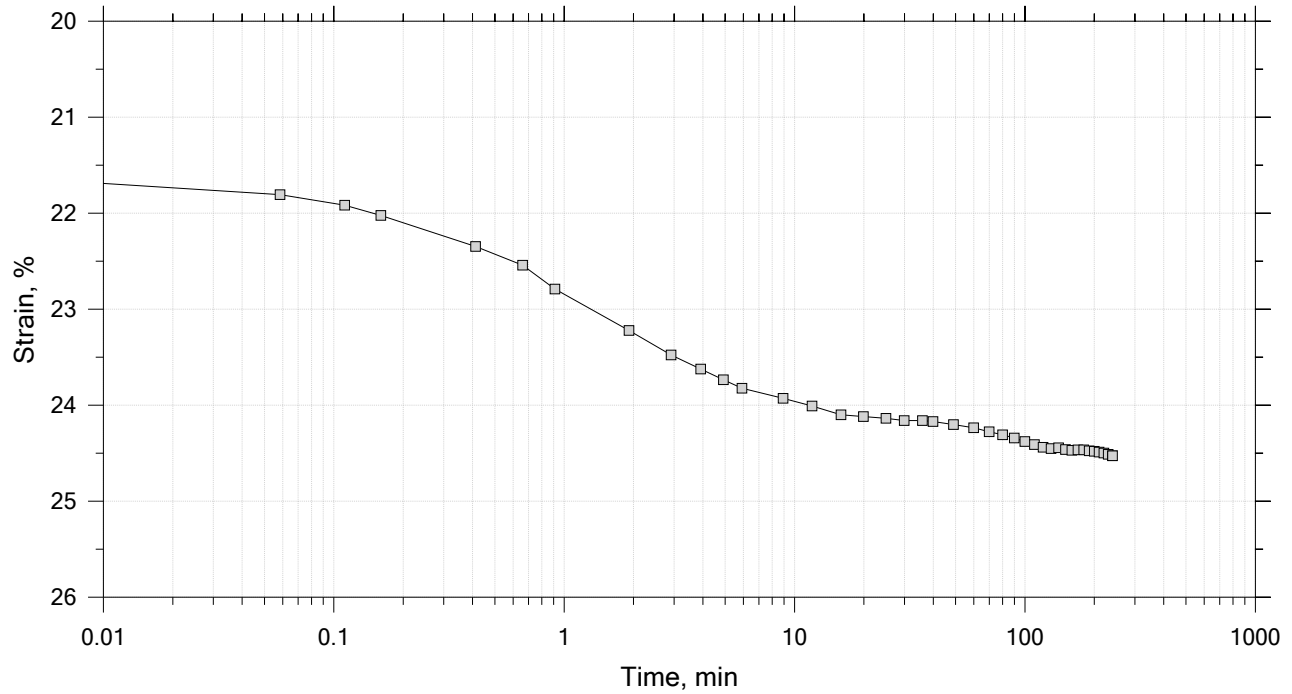
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf



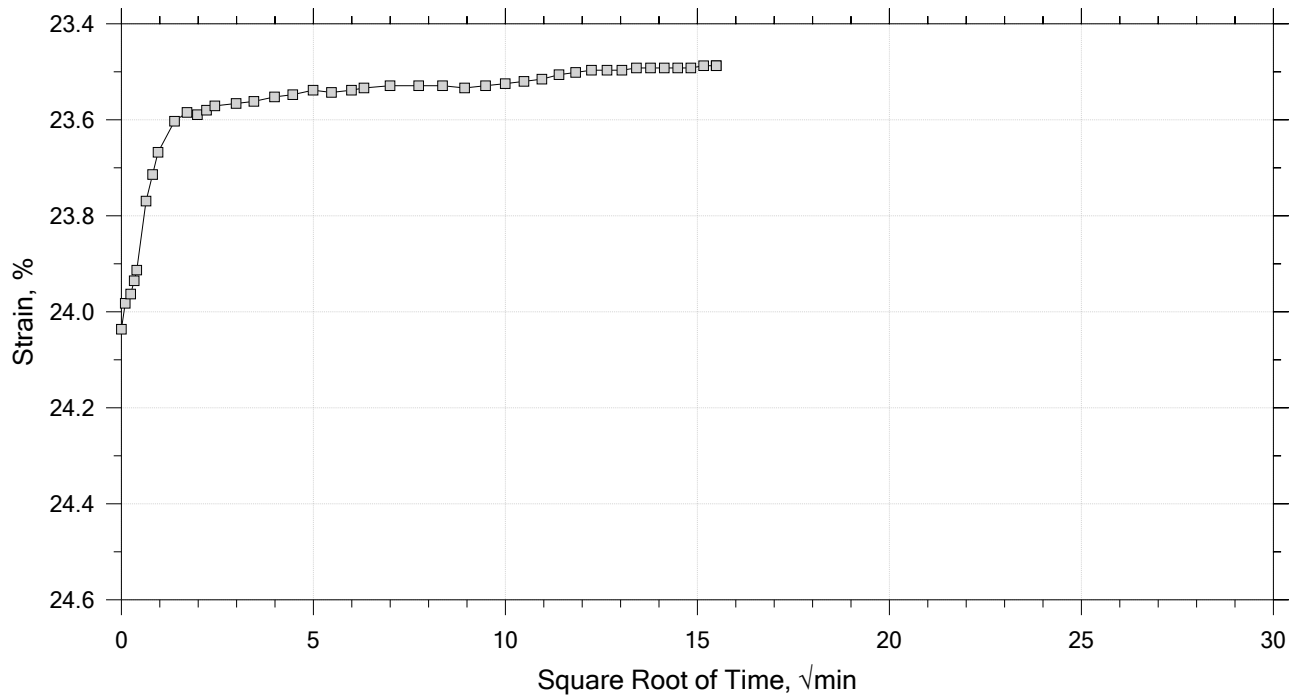
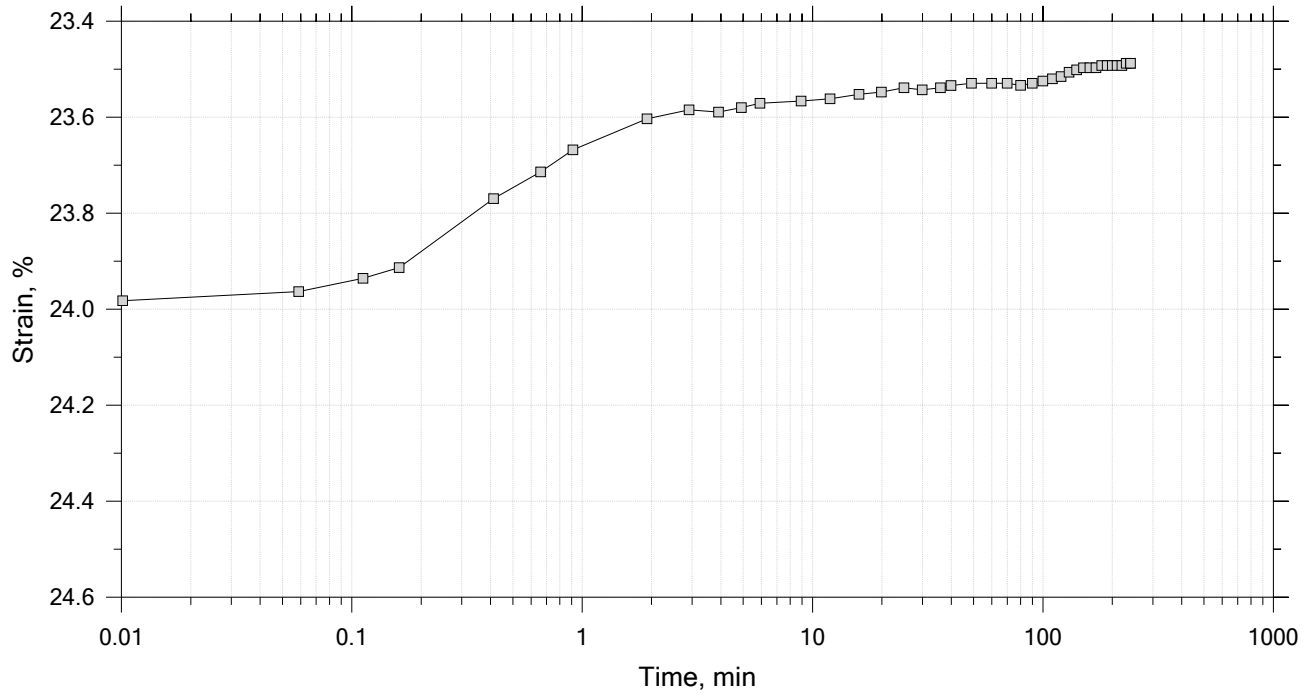
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf



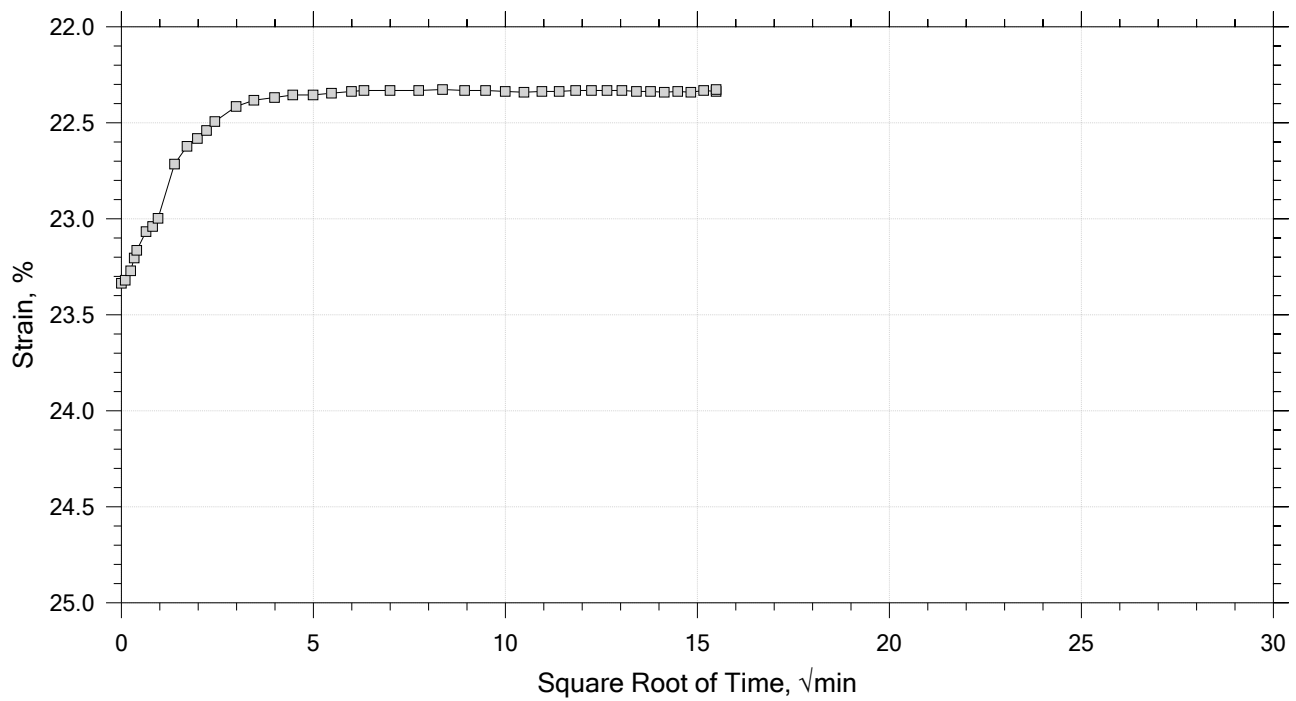
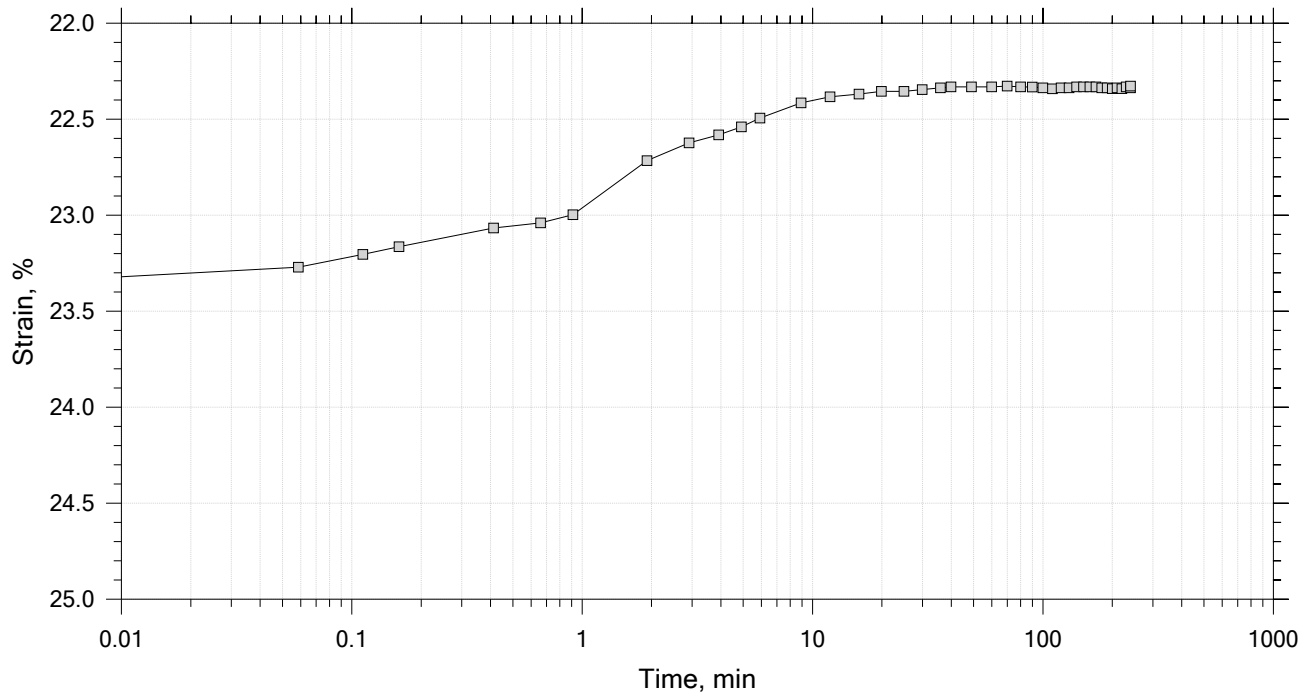
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	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf



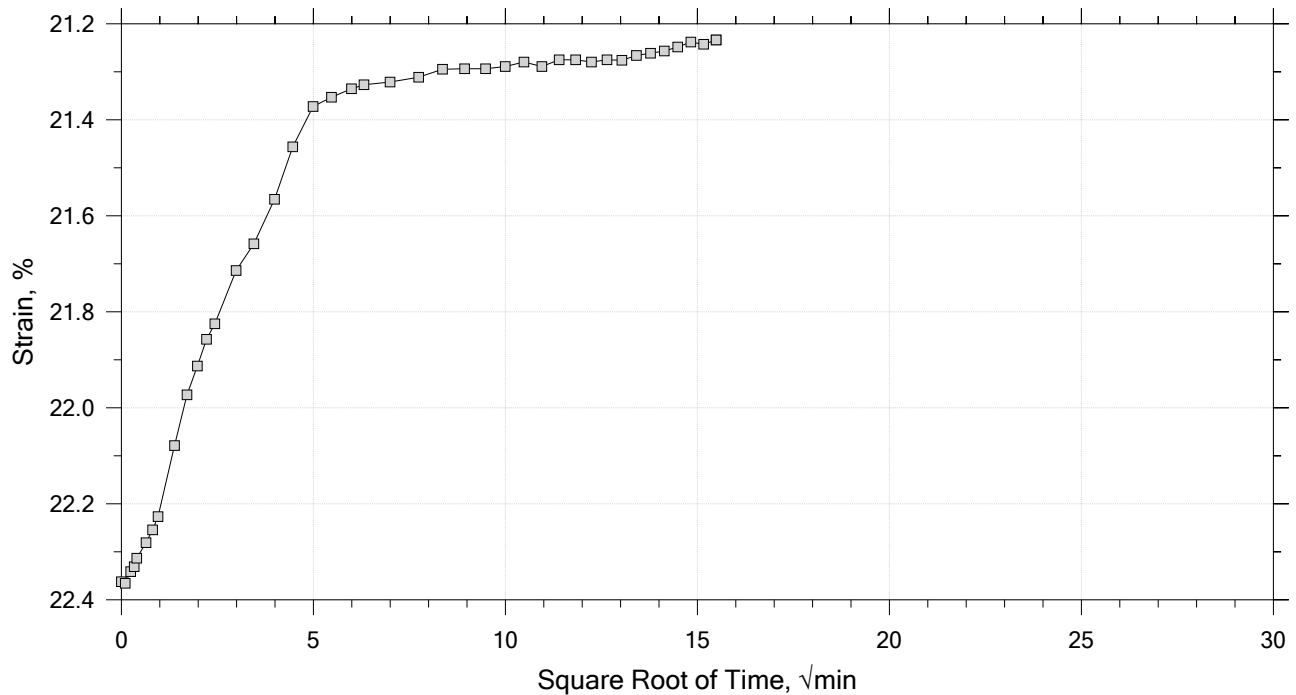
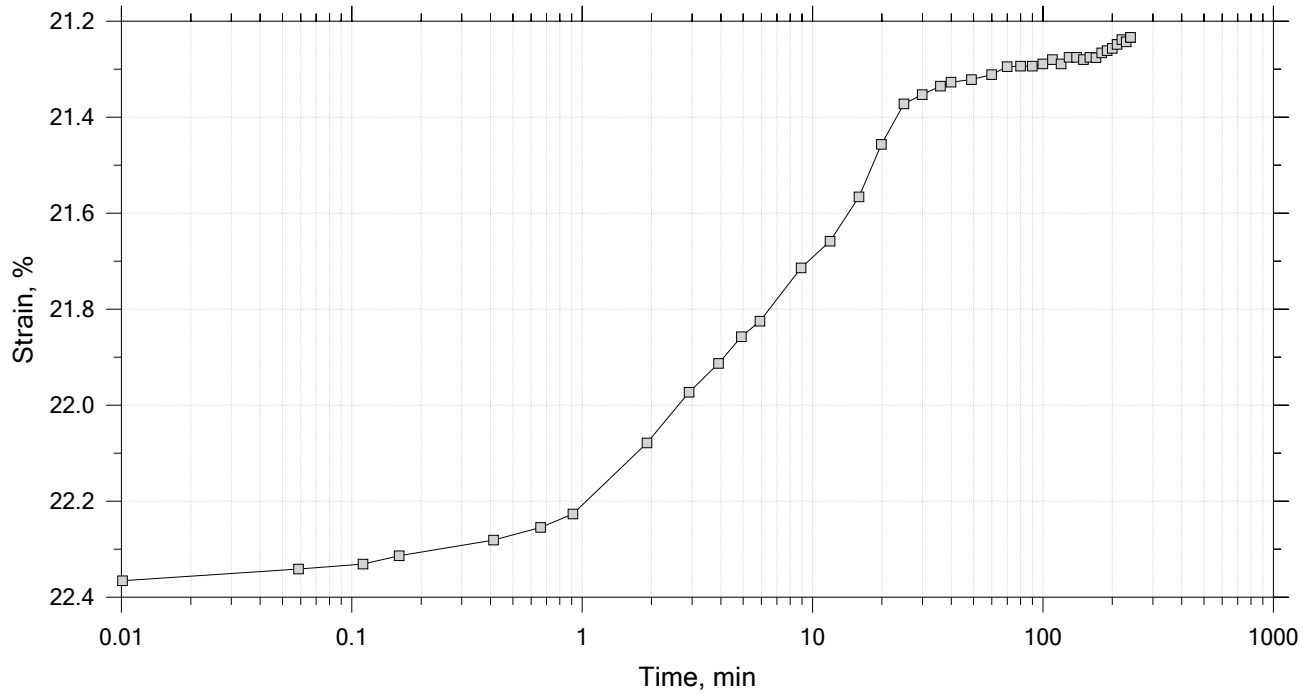
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	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf



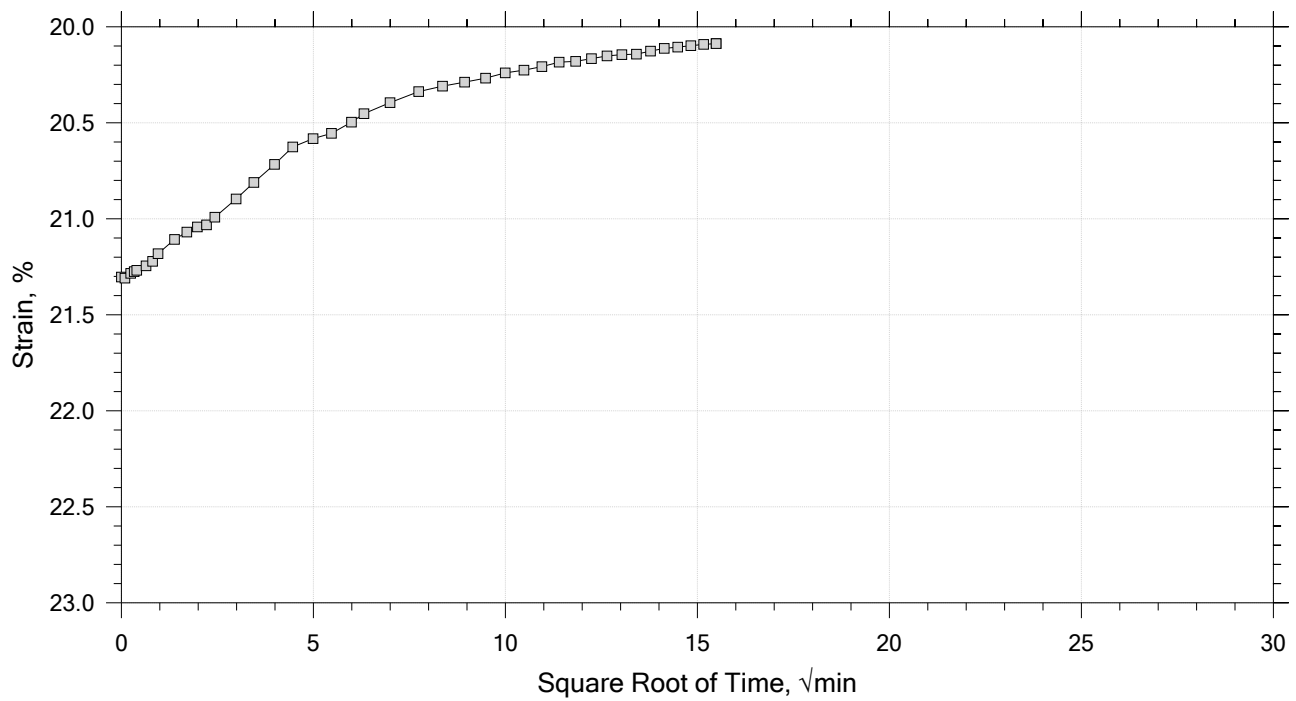
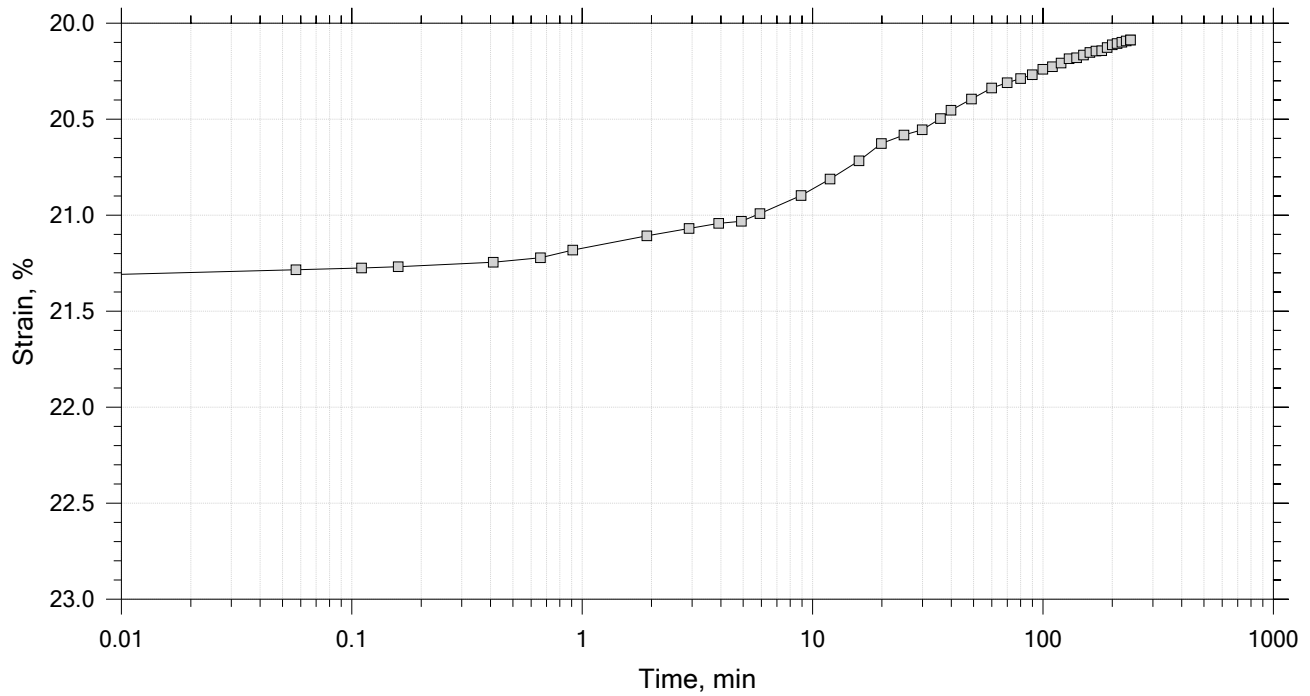
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	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf



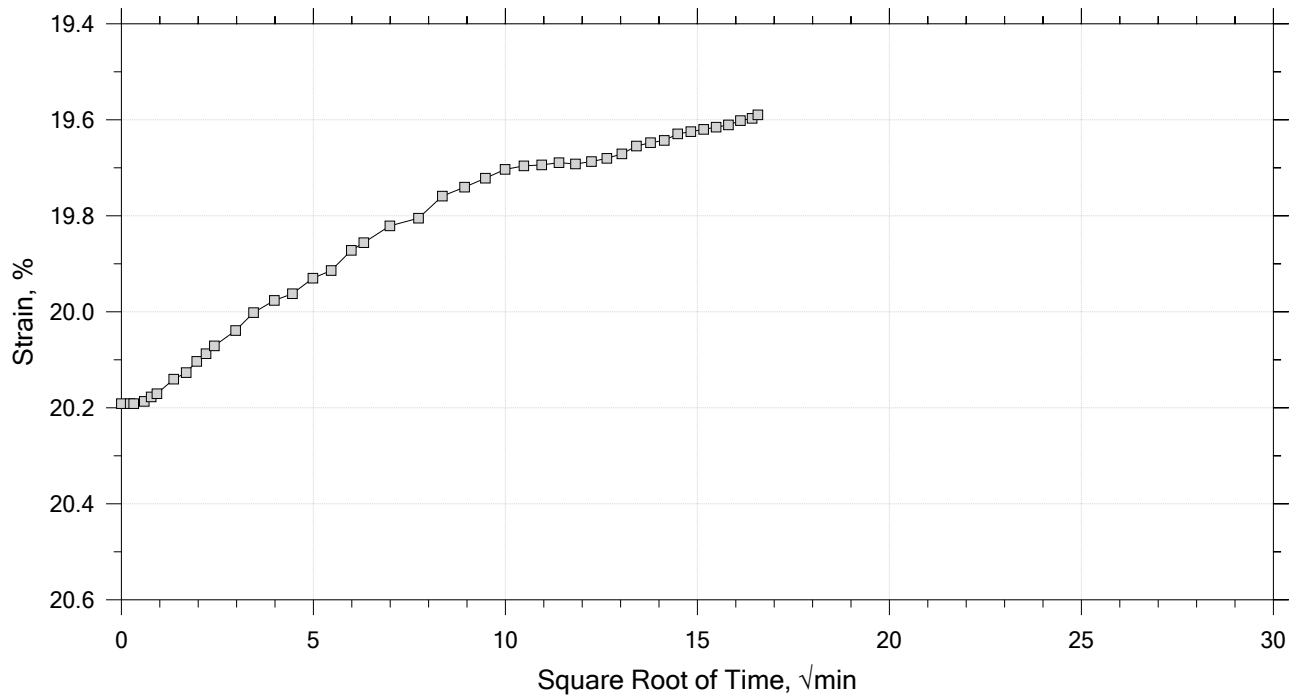
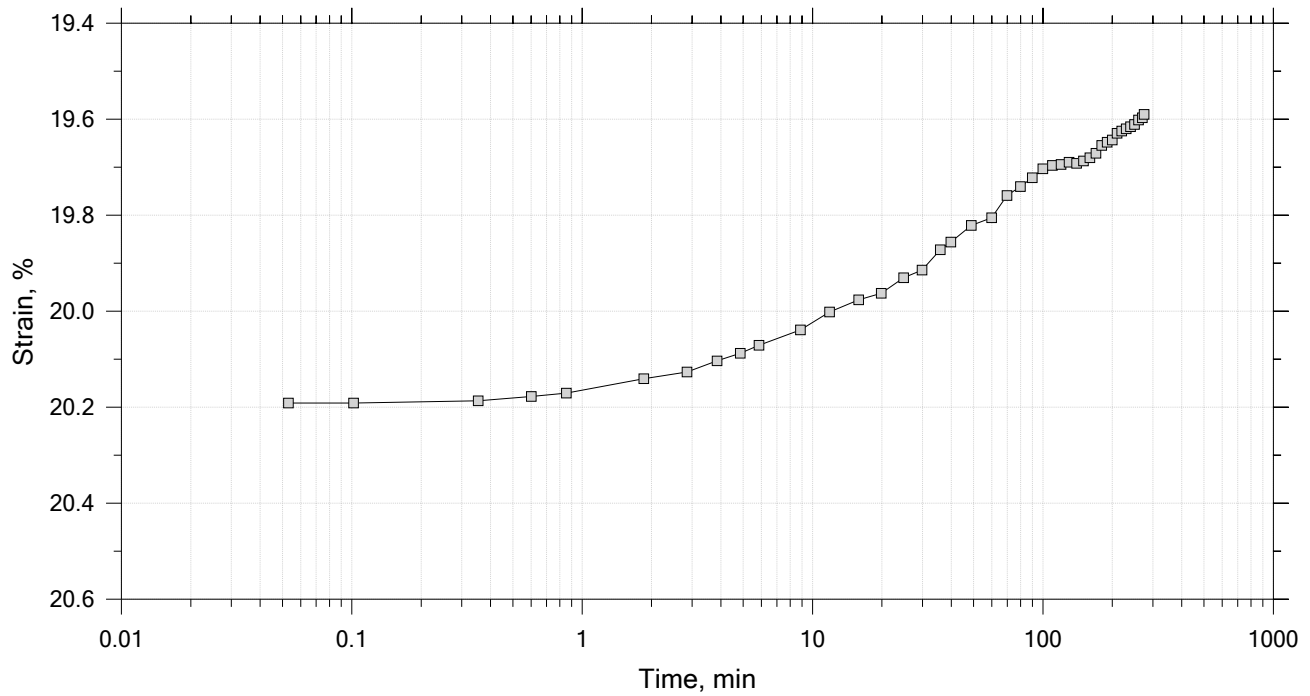
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	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf




	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.76	Liquid Limit: 38
Initial Height: 1.00 in	Initial Void Ratio: 0.952	Plastic Limit: 19
Final Height: 0.80 in	Final Void Ratio: 0.57	Plasticity Index: 19

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	A-1250	RING		A-3059
Mass Container, gm	8.43	107.87	107.87	8.31
Mass Container + Wet Soil, gm	141.72	259.4	245.06	145.65
Mass Container + Dry Soil, gm	106.38	221.59	221.59	122.15
Mass Dry Soil, gm	97.95	113.72	113.72	113.84
Water Content, %	36.08	33.25	20.64	20.64
Void Ratio	---	0.95	0.57	---
Degree of Saturation, %	---	96.39	100.00	---
Dry Unit Weight, pcf	---	88.253	109.75	---


Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients


[illegible]

	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

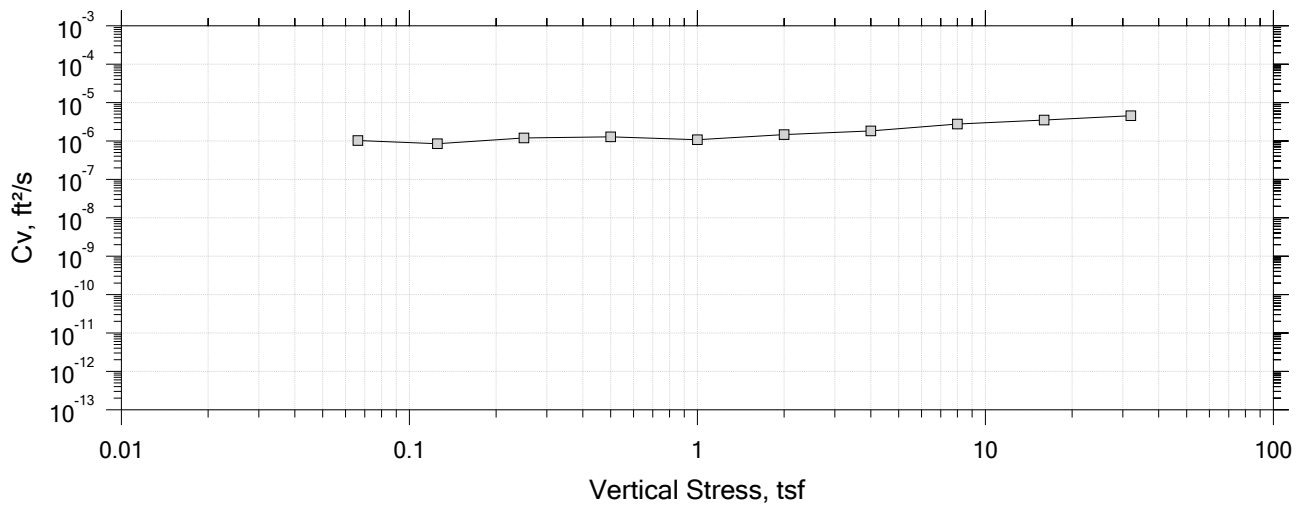
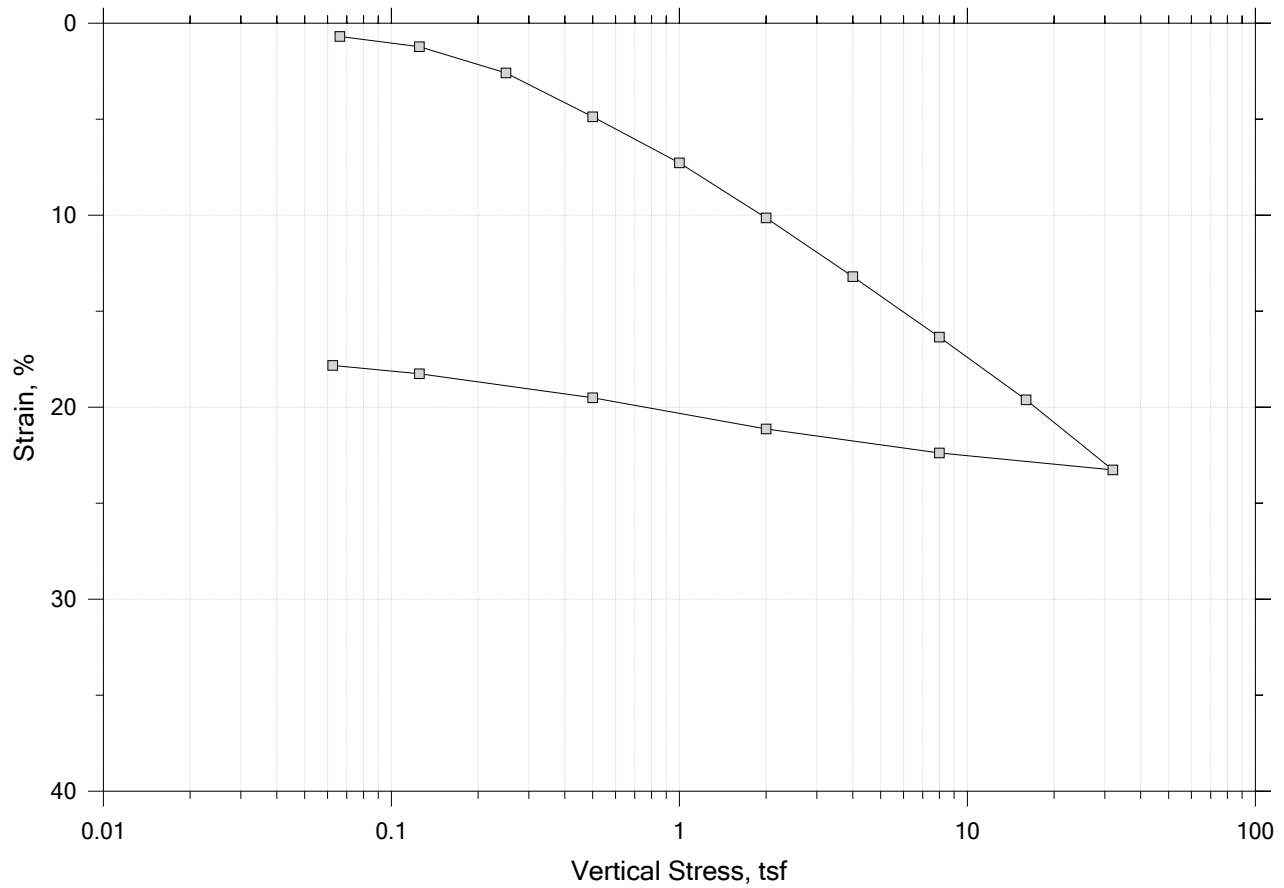
Square Root of Time Coefficients


[illegible]

	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-103	Tested By: md	Checked By: mcm
	Sample No.: 1U	Test Date: 07/17/19	Depth: 10-12 ft
	Test No.: IP-14	Sample Type: Intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System V, Swell Pressure = 0.0703 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

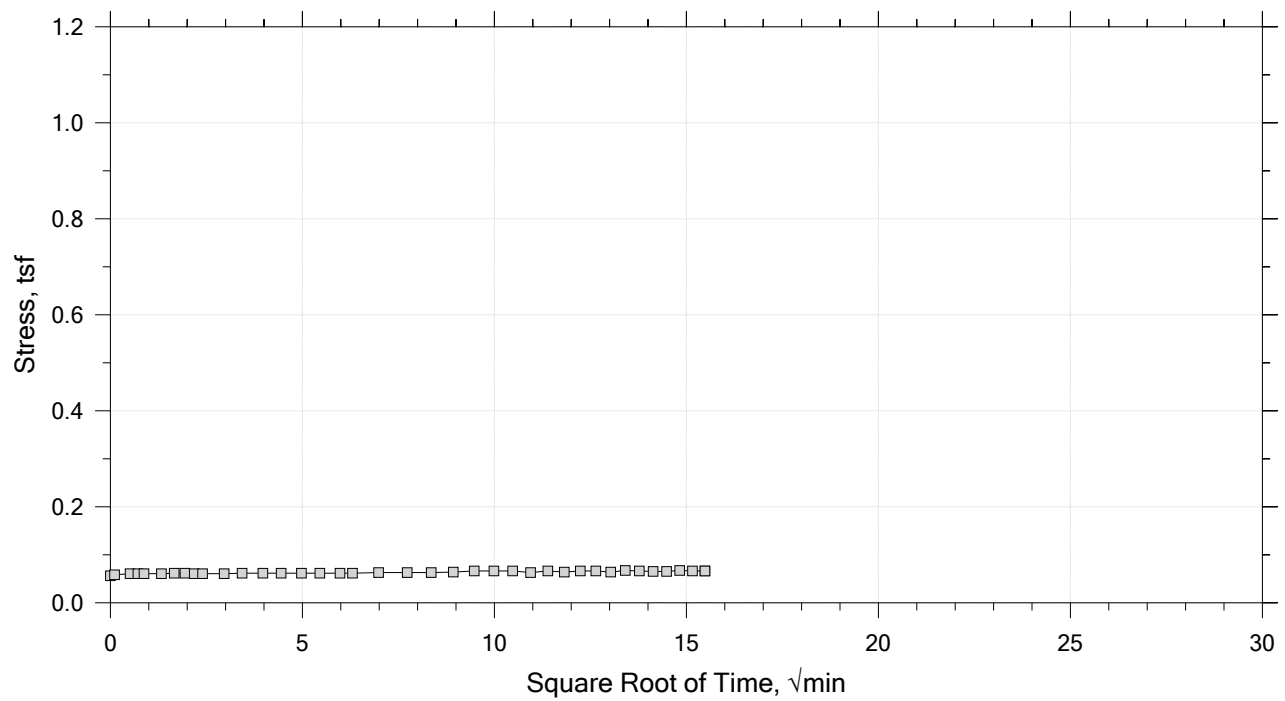
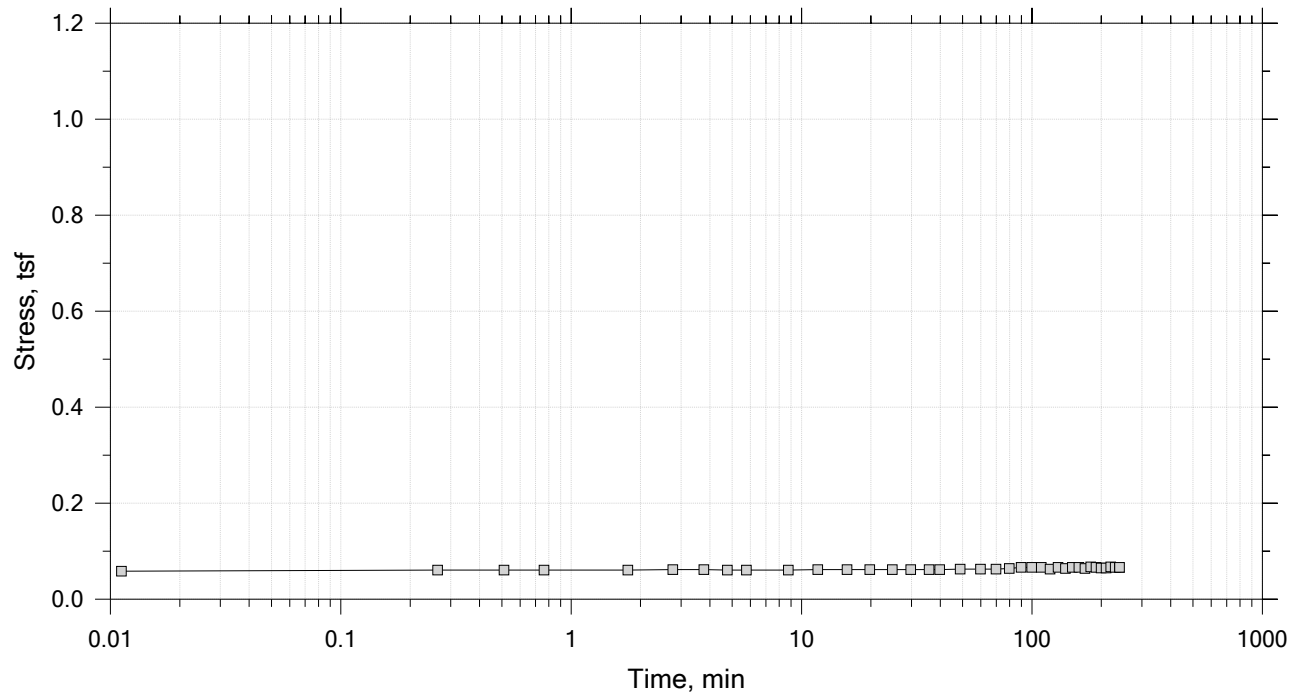
Summary Report




	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0662 tsf



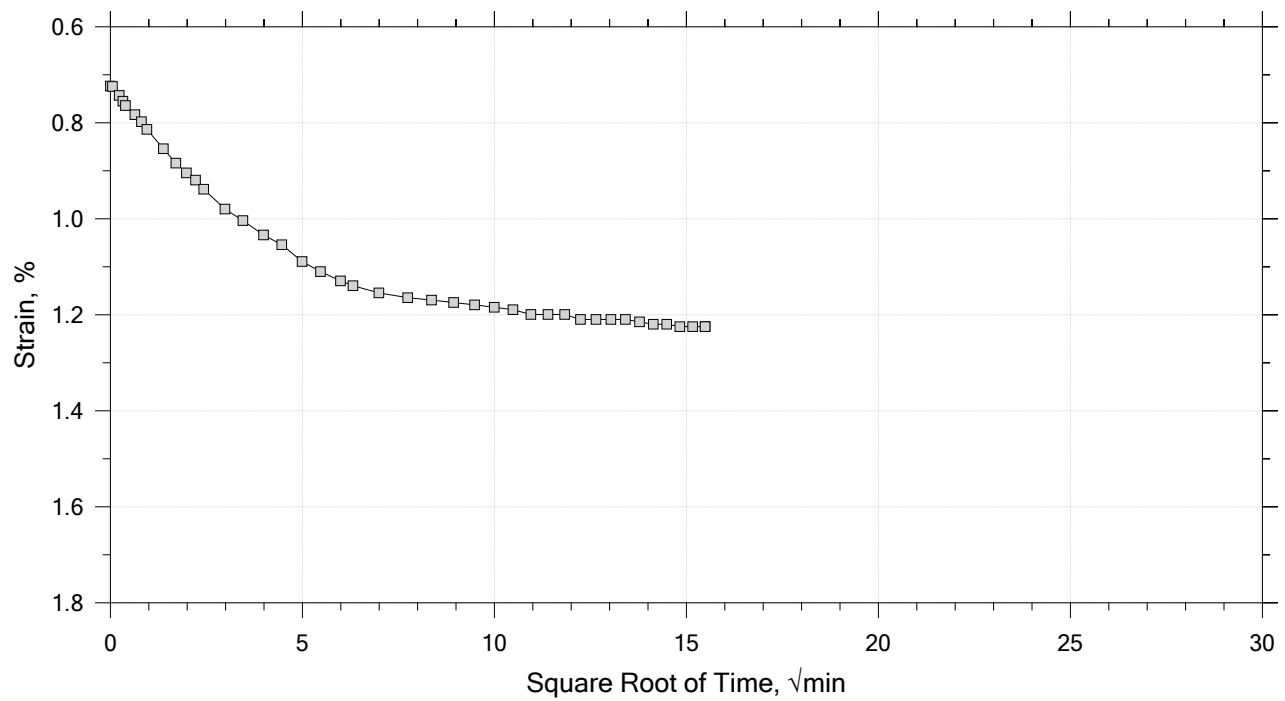
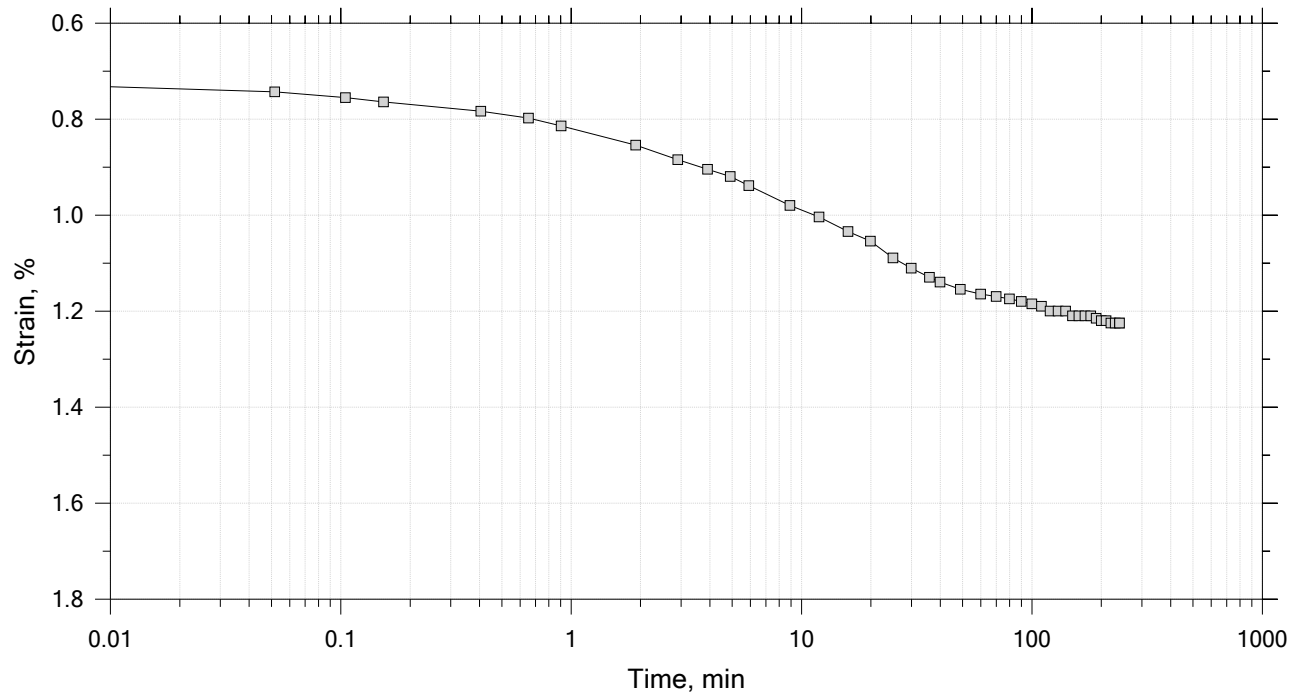
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf



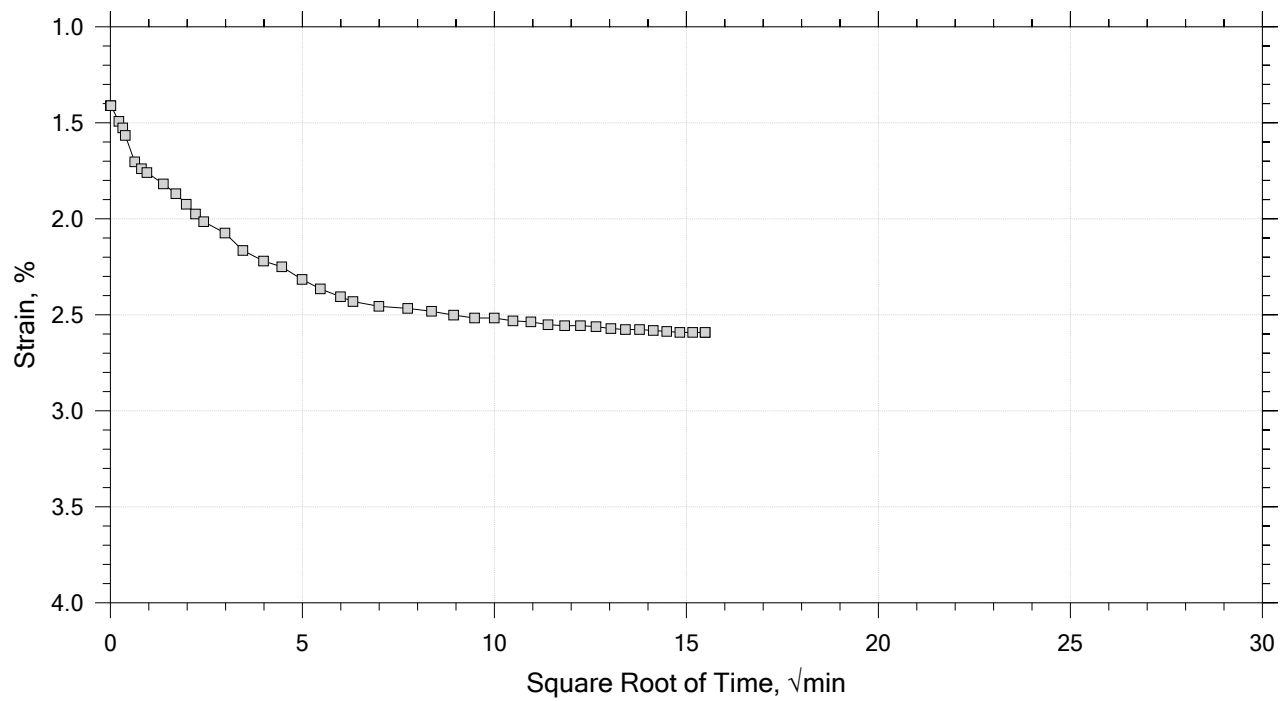
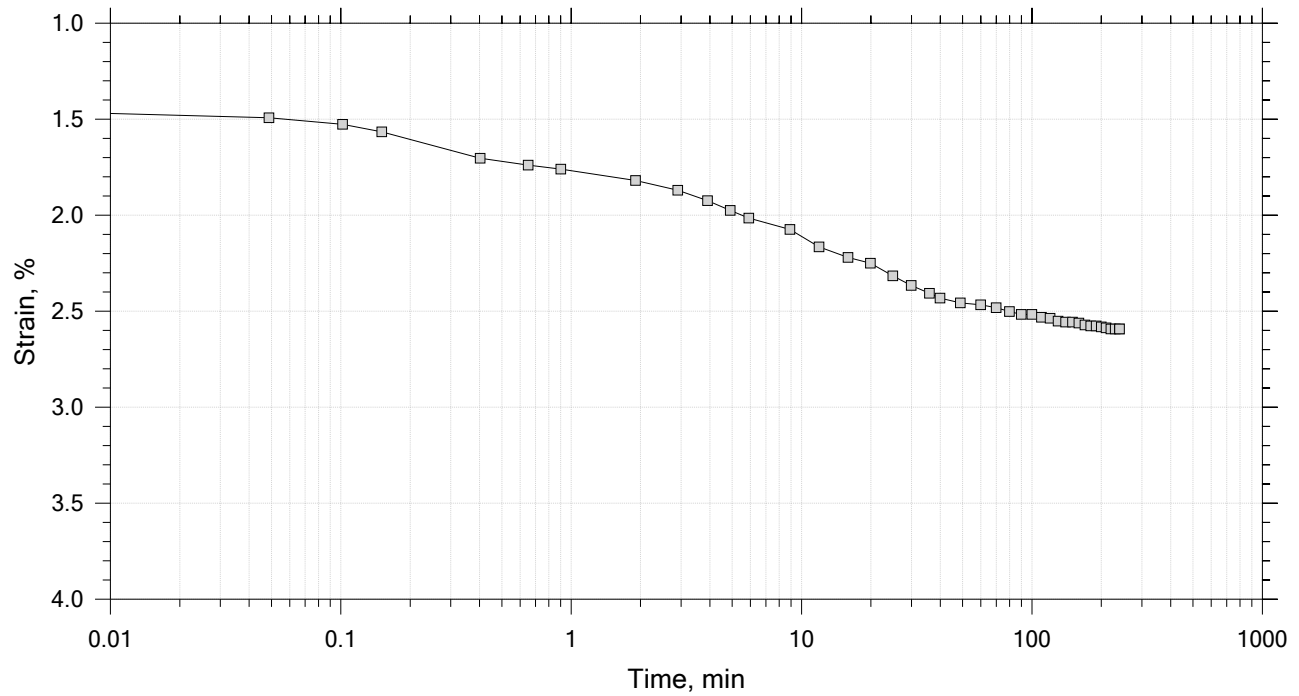
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf



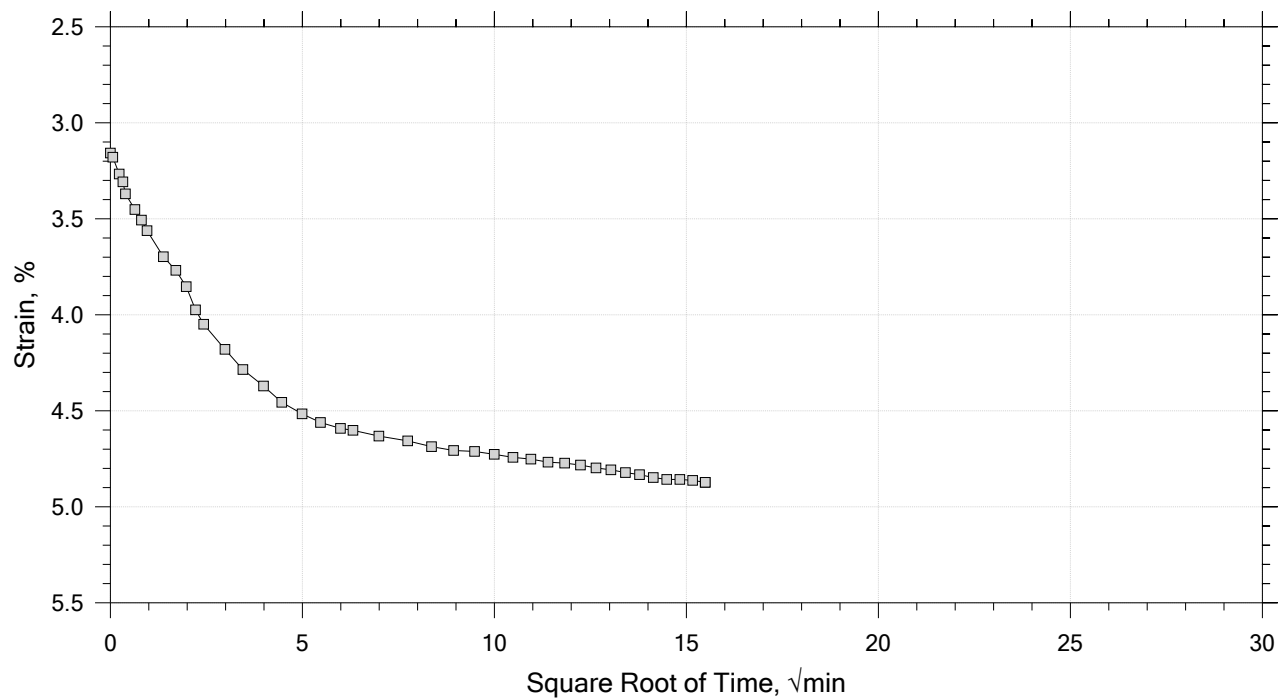
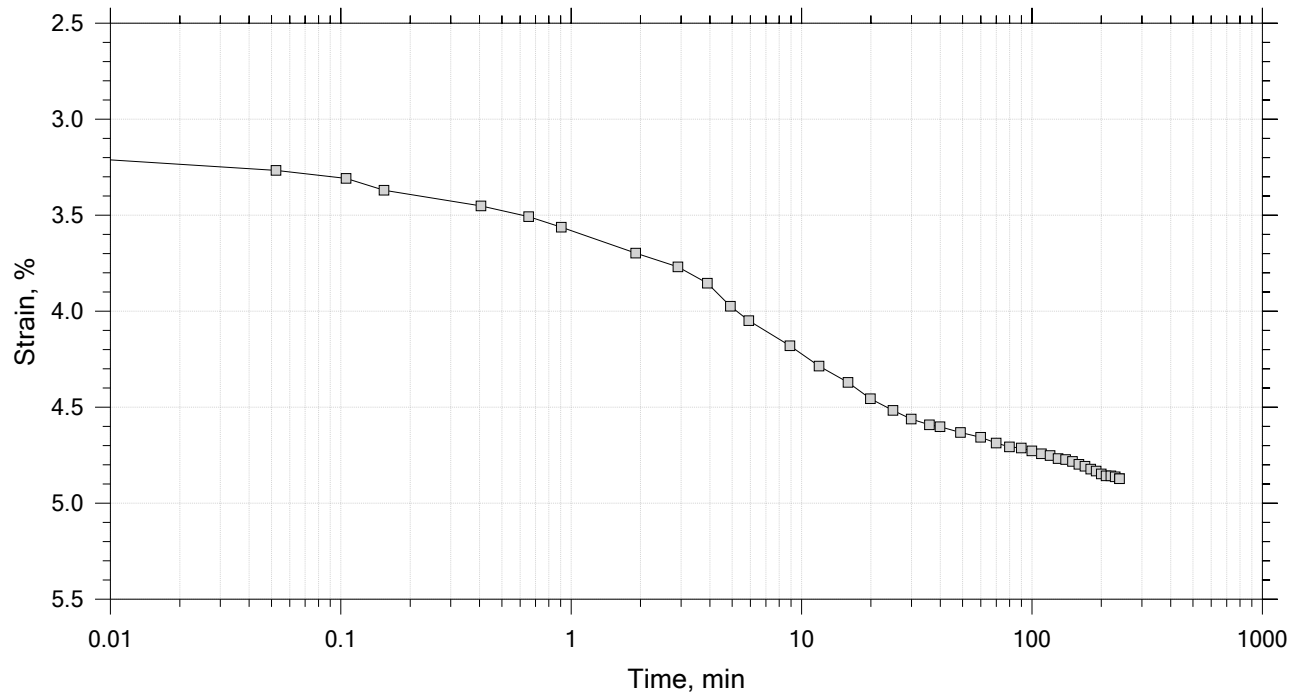
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf



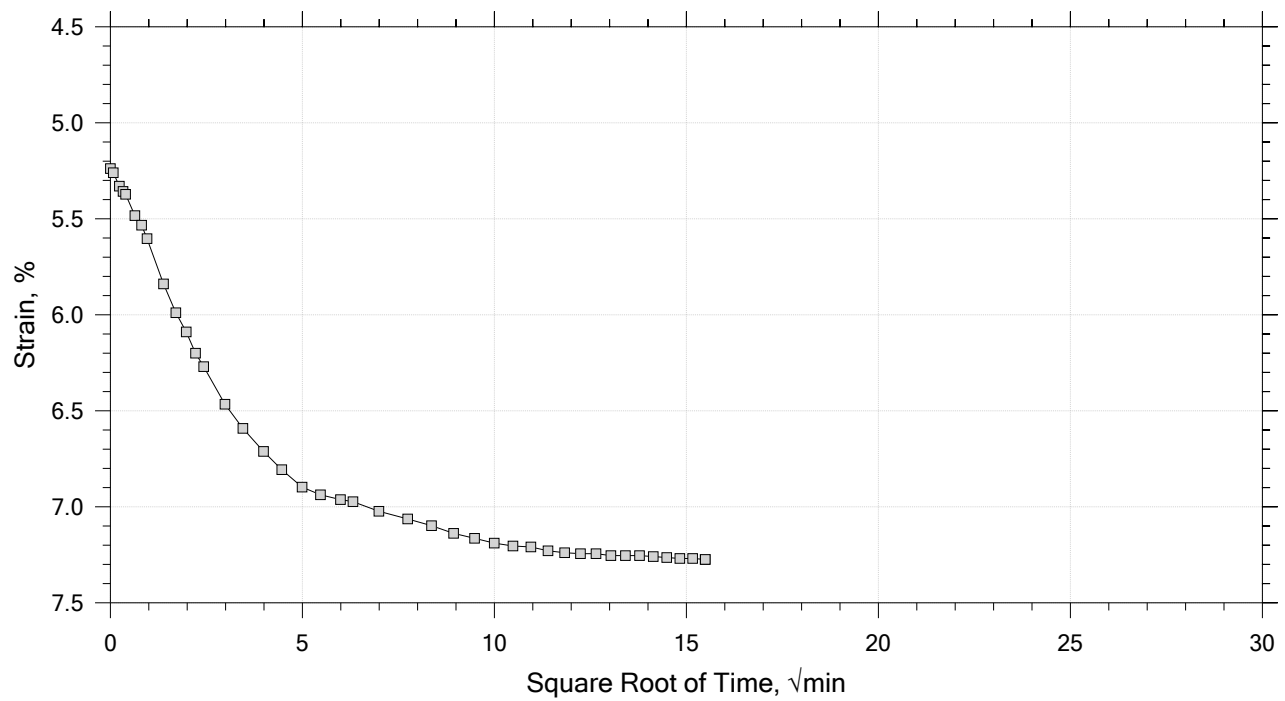
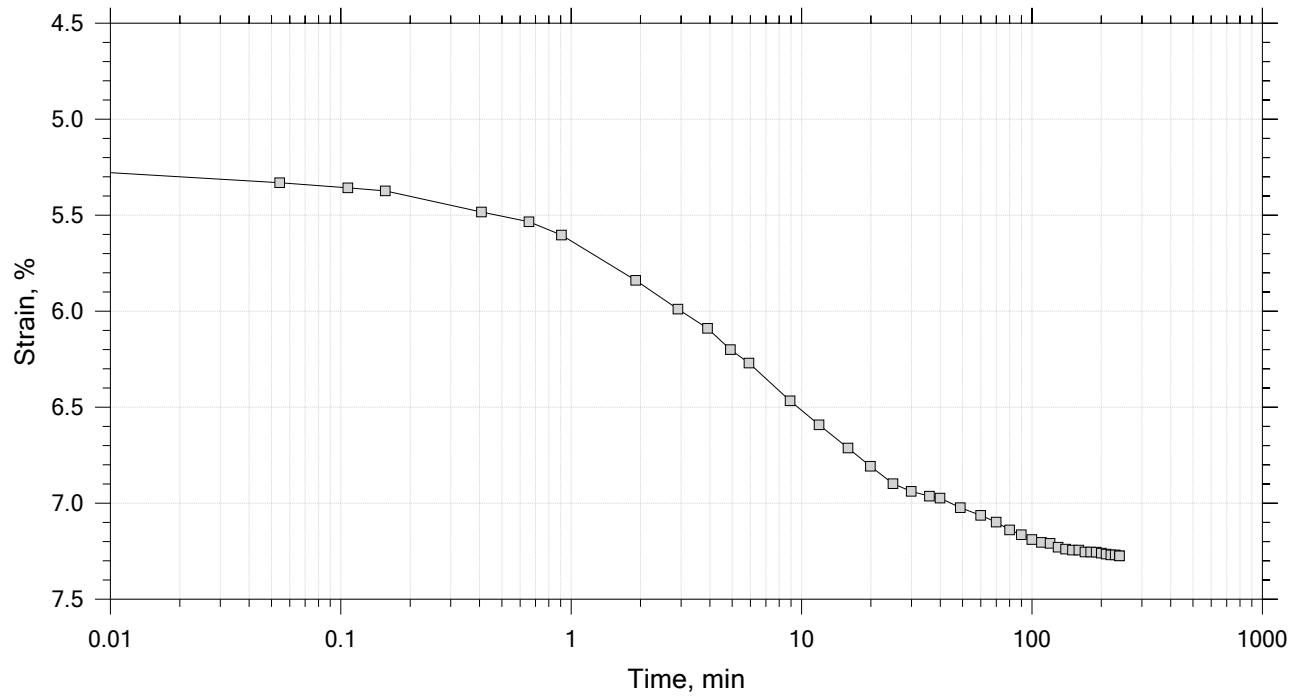
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf



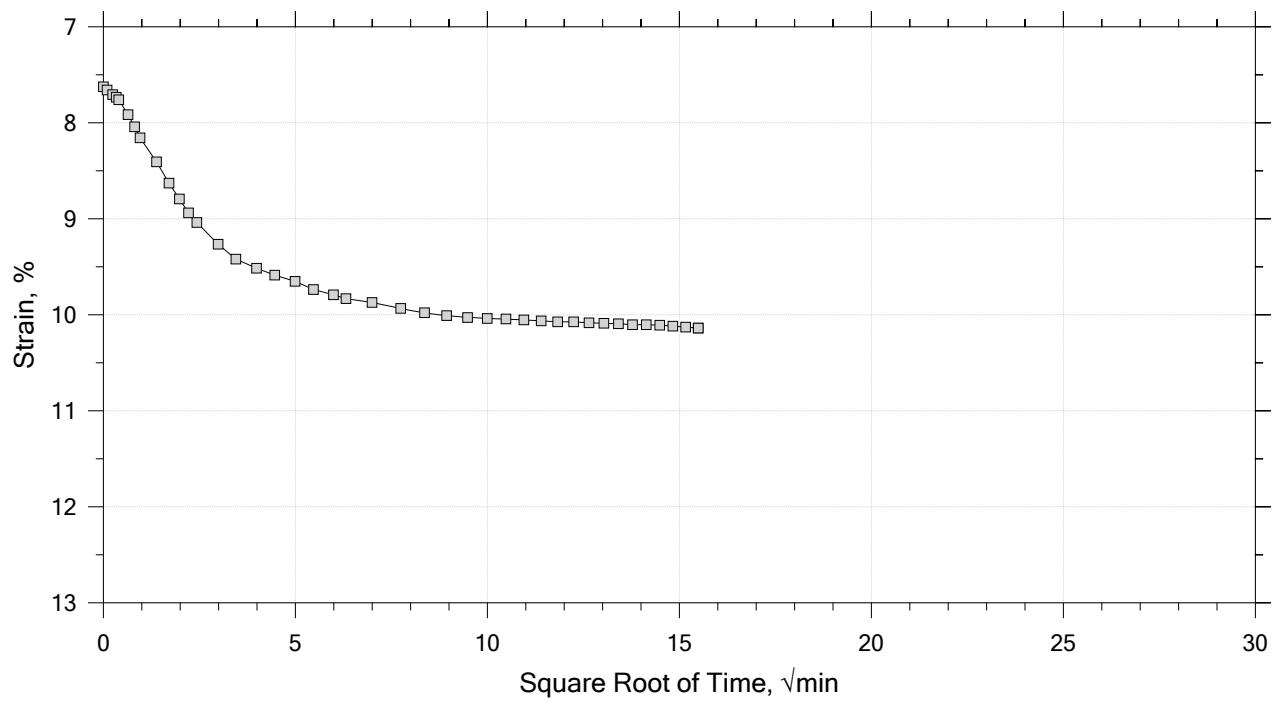
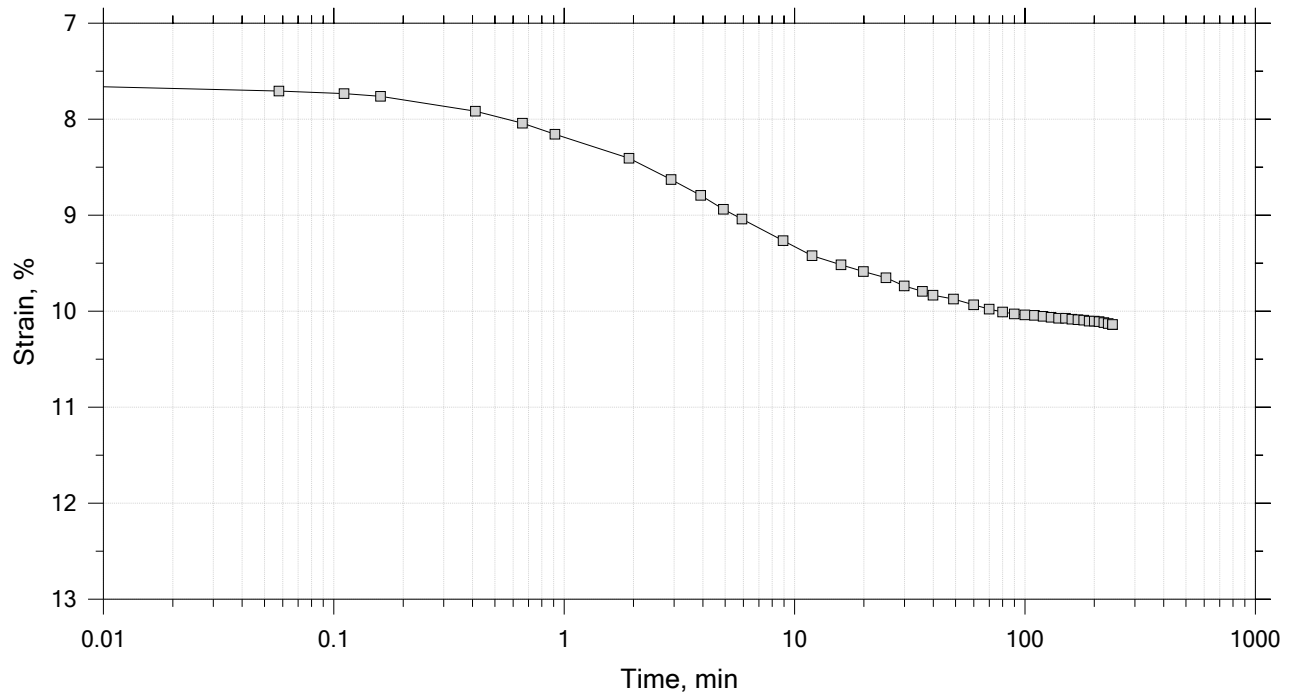
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf



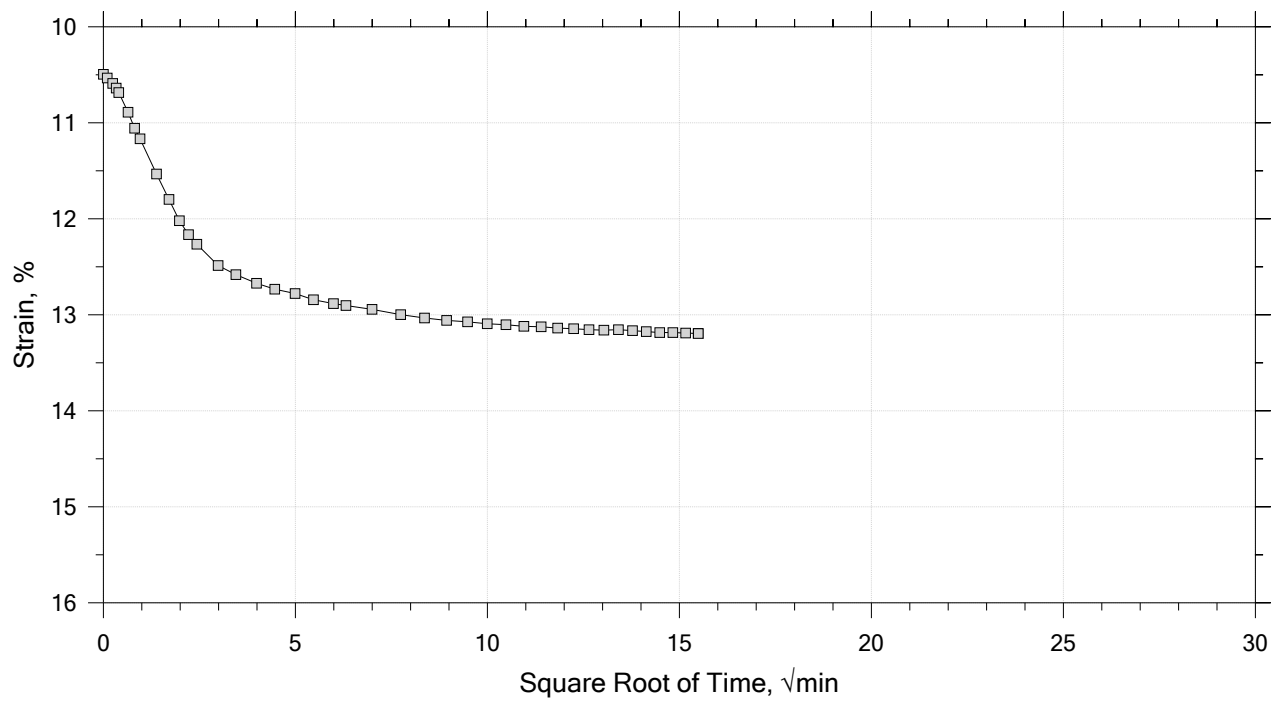
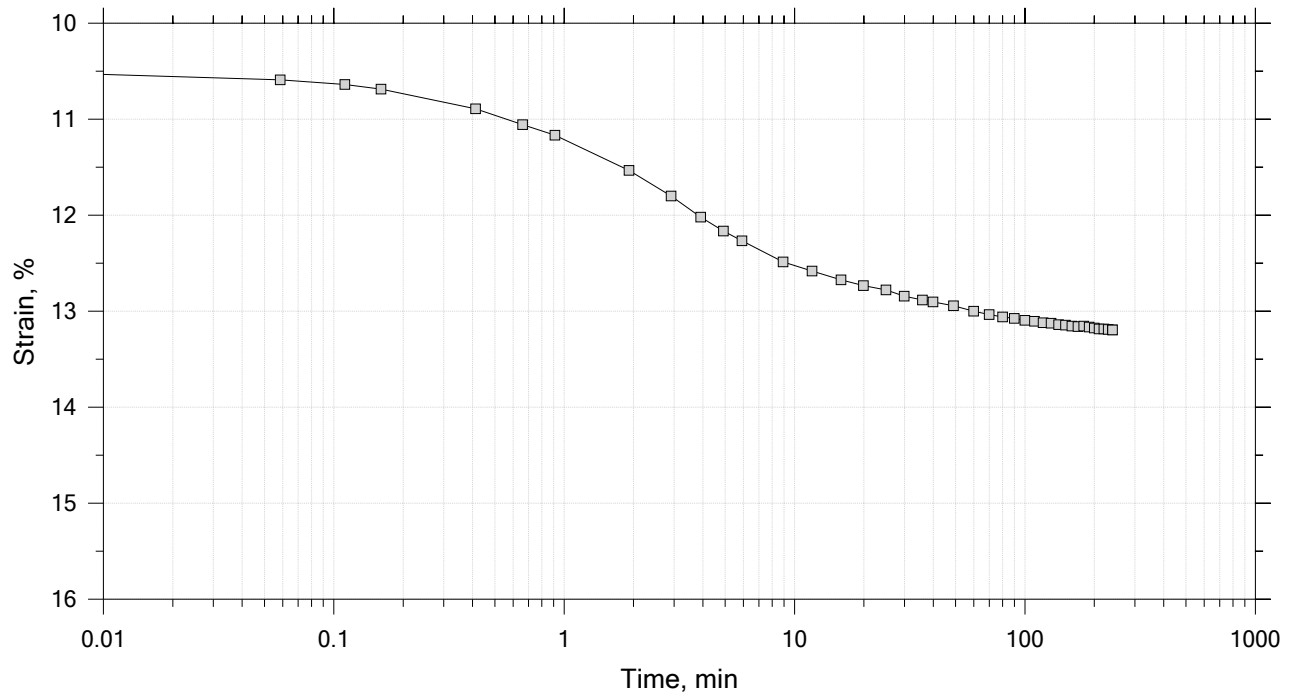
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf



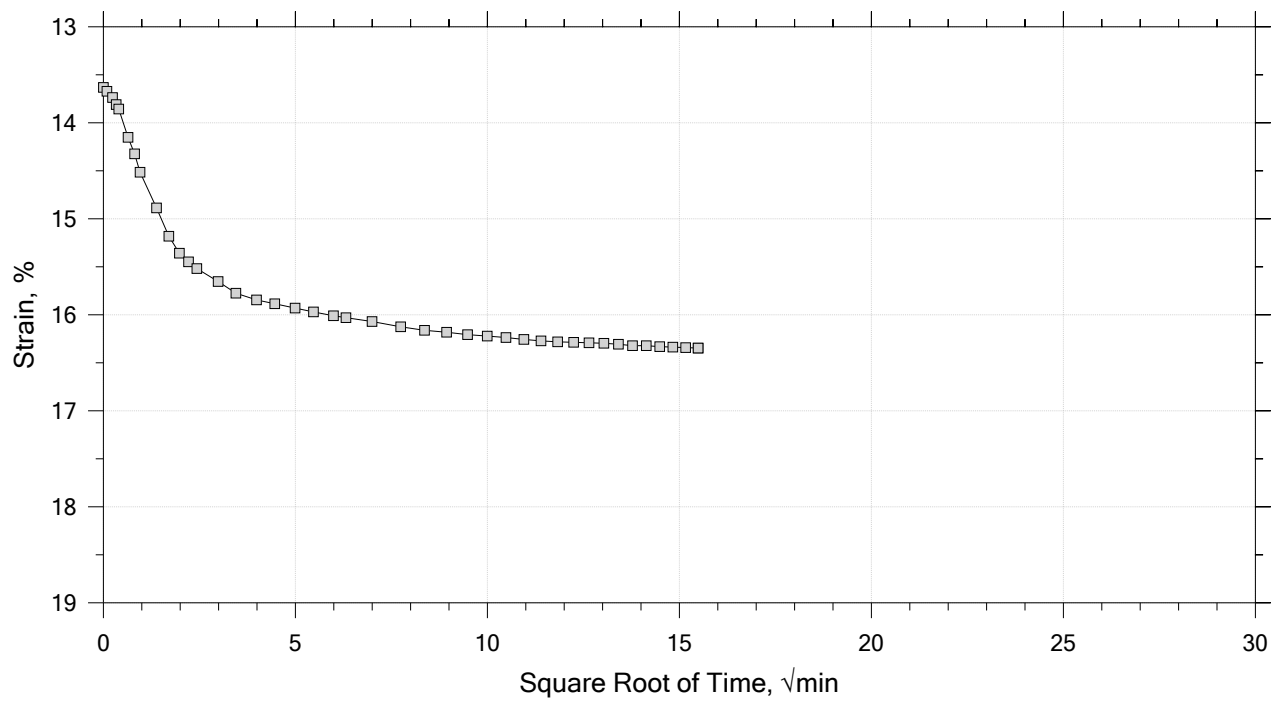
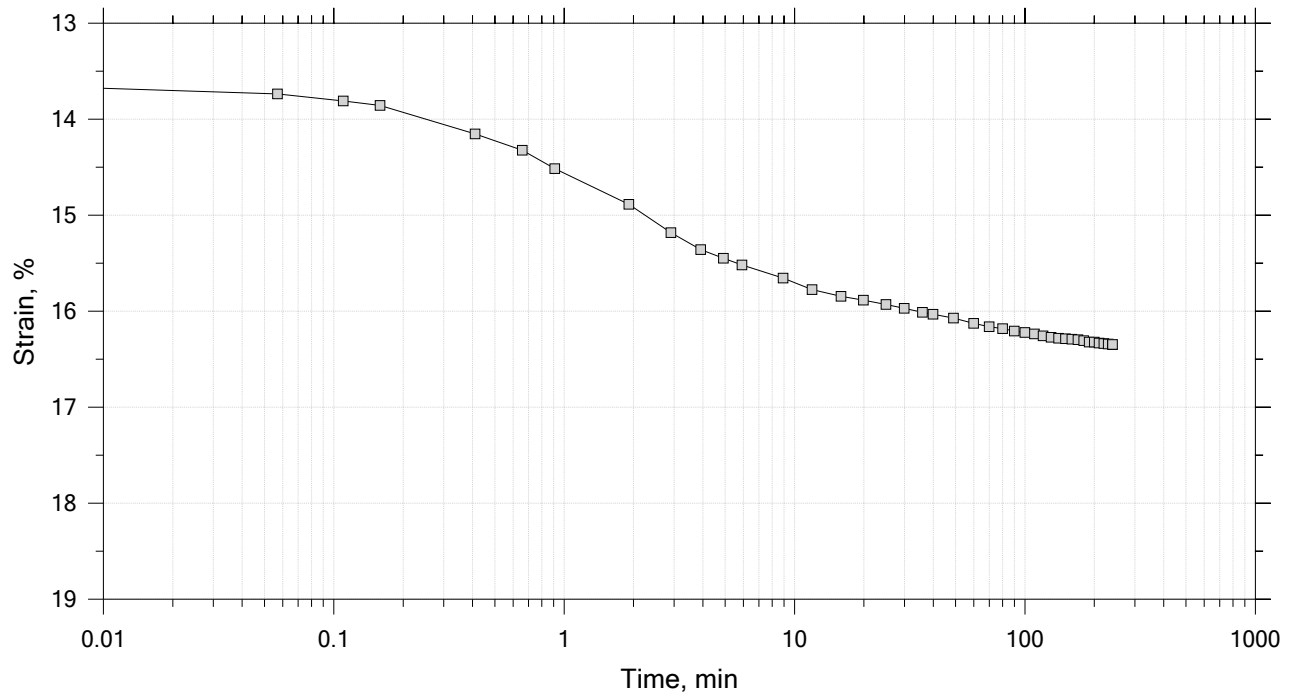
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf



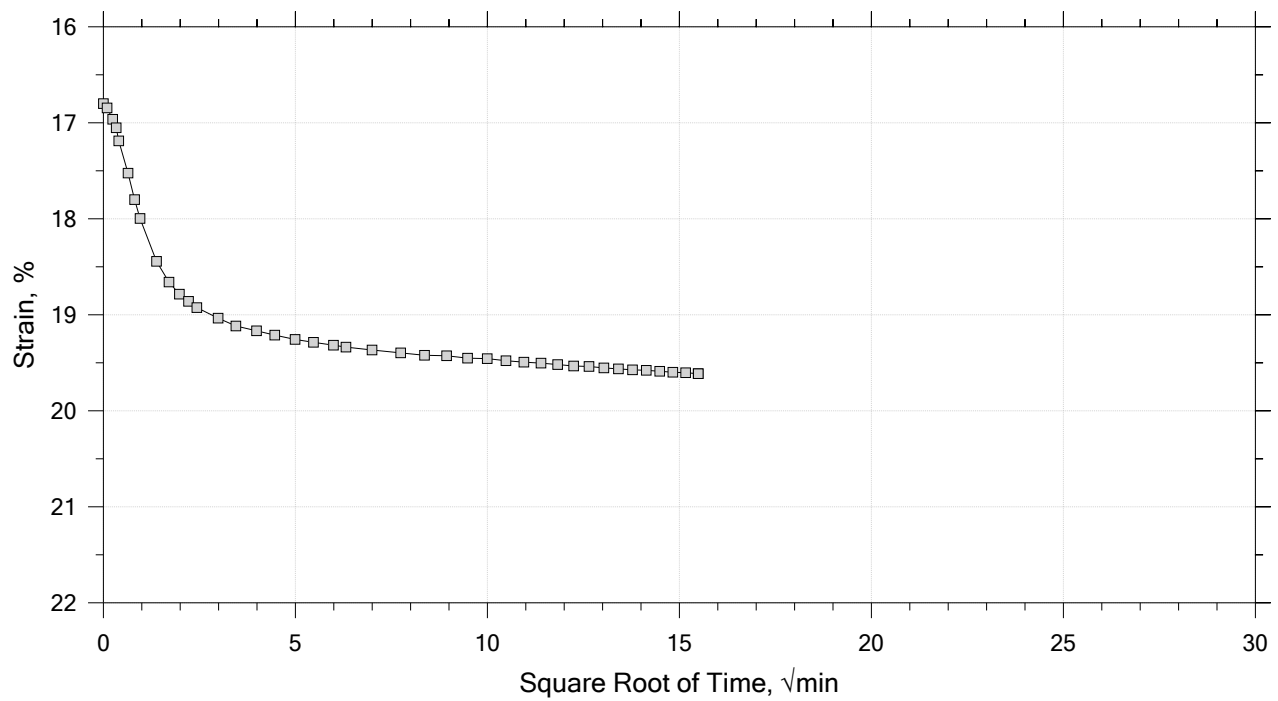
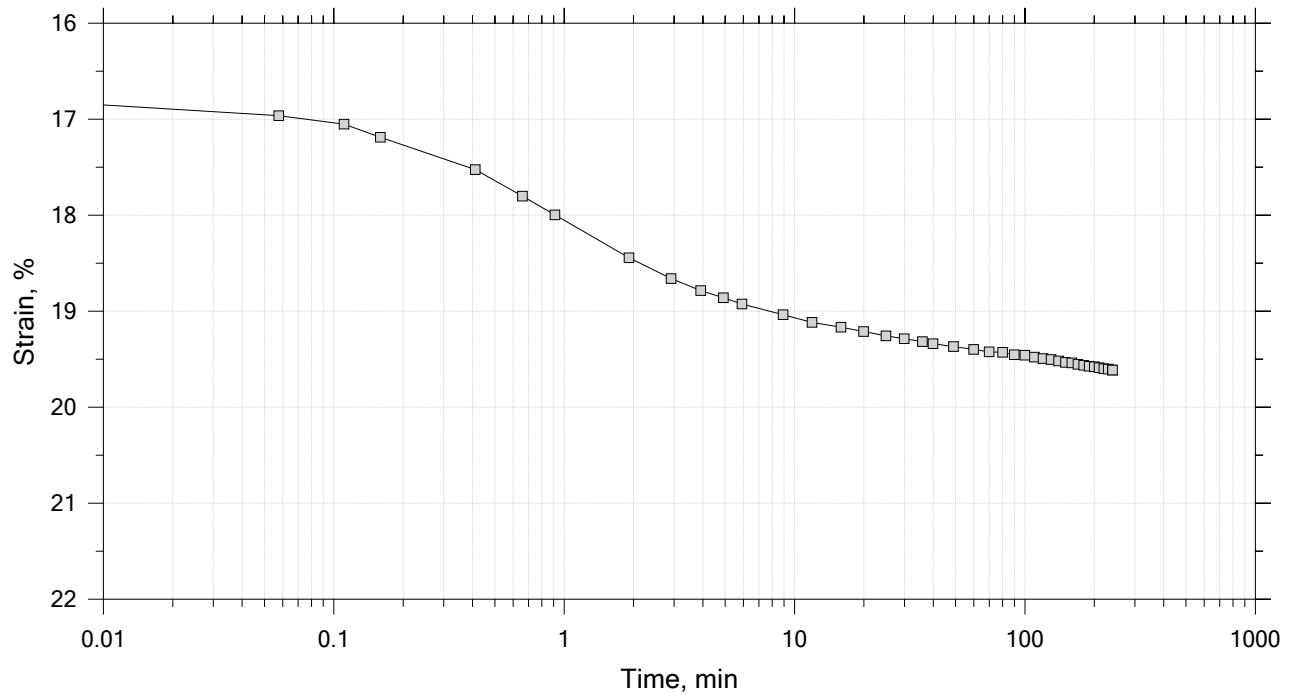
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf



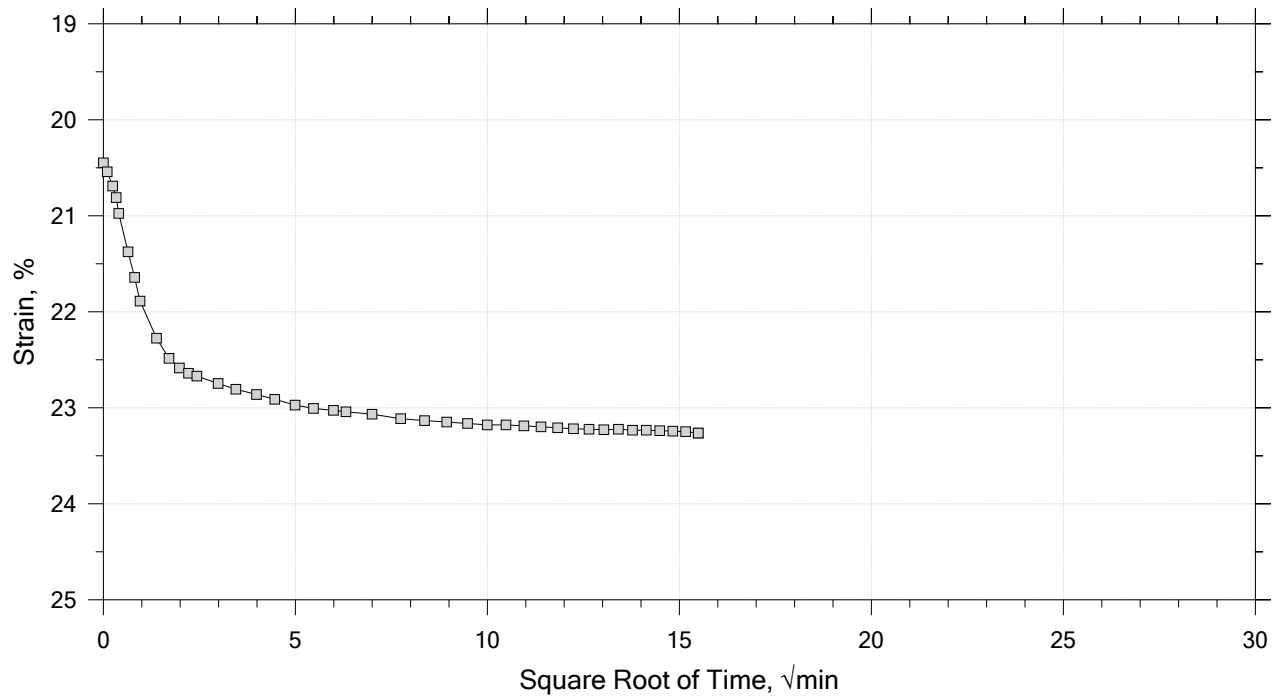
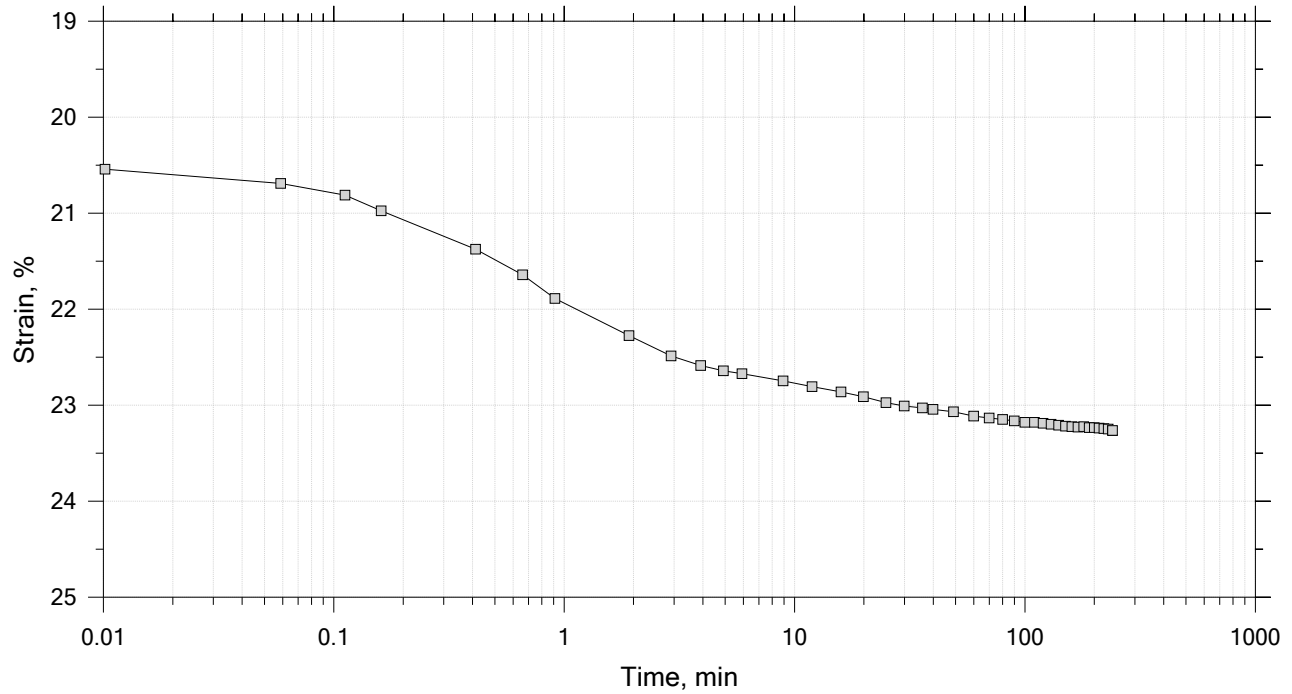
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf



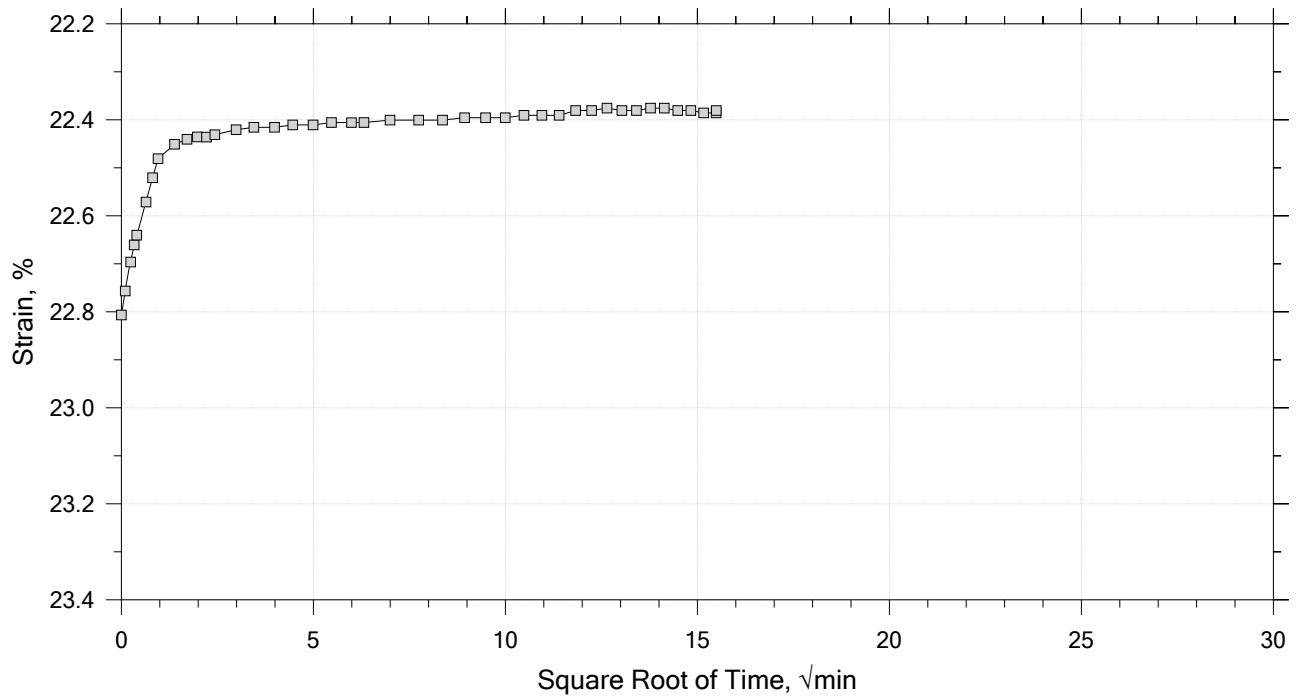
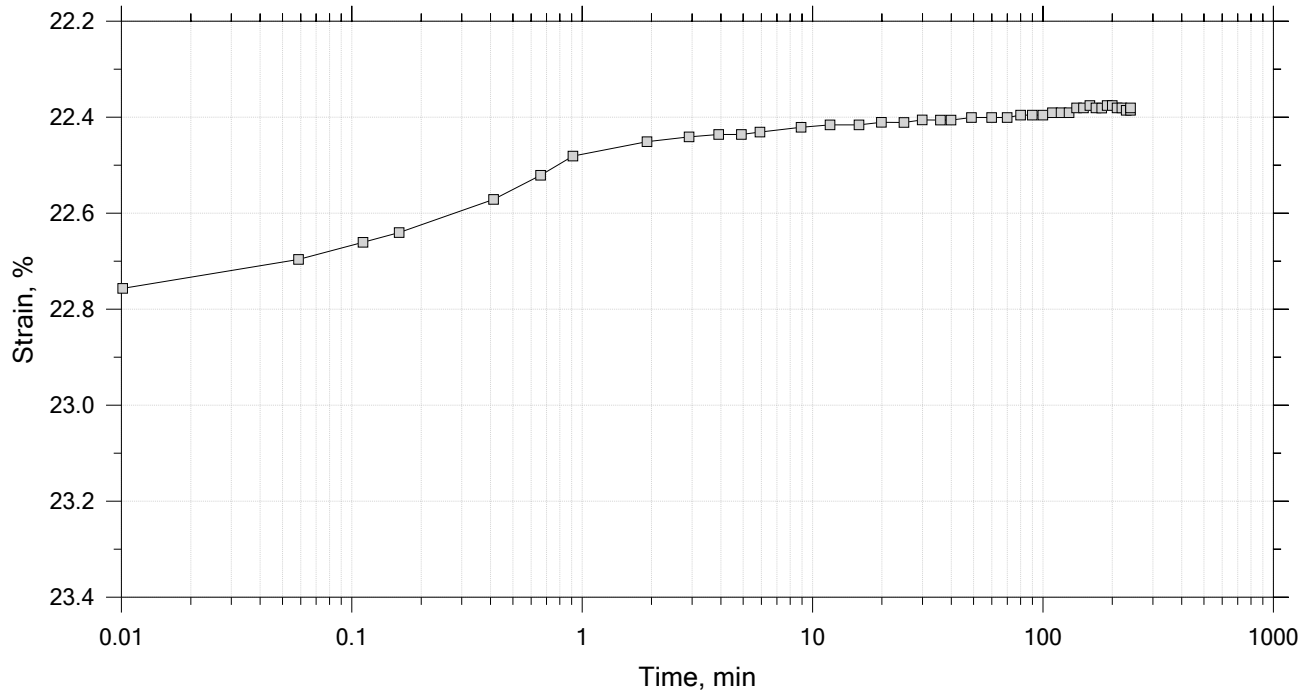
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf



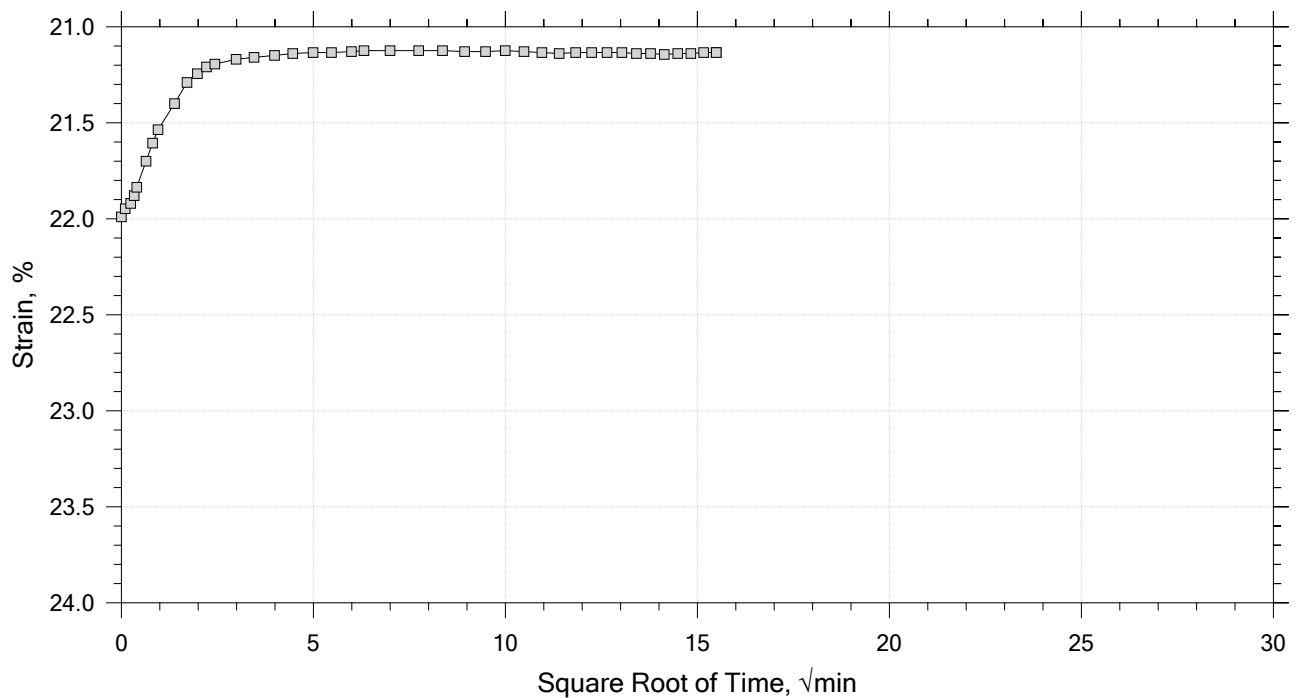
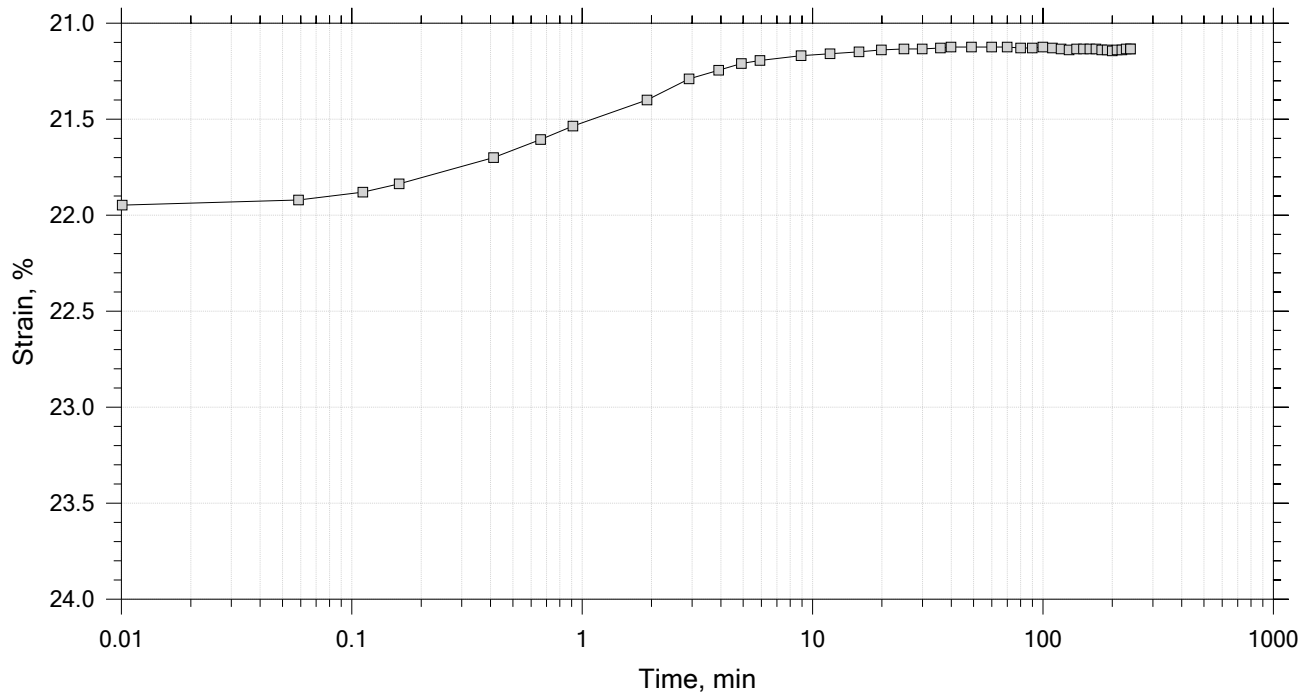
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf



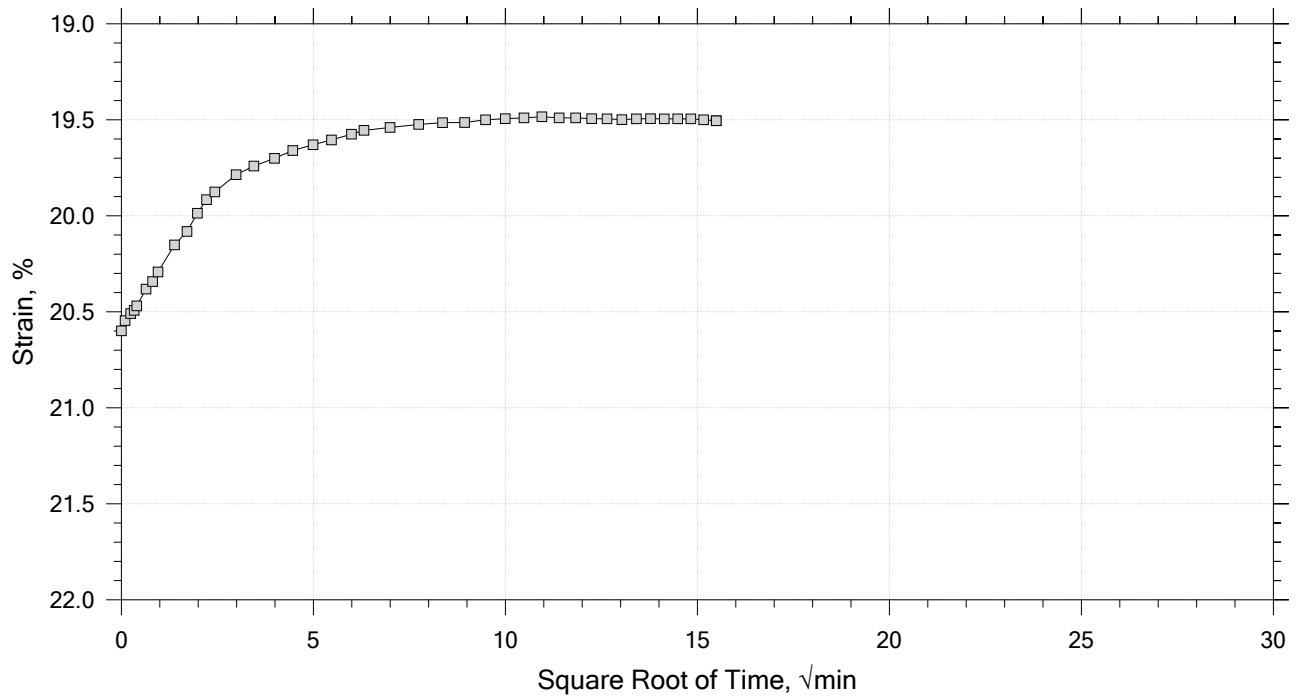
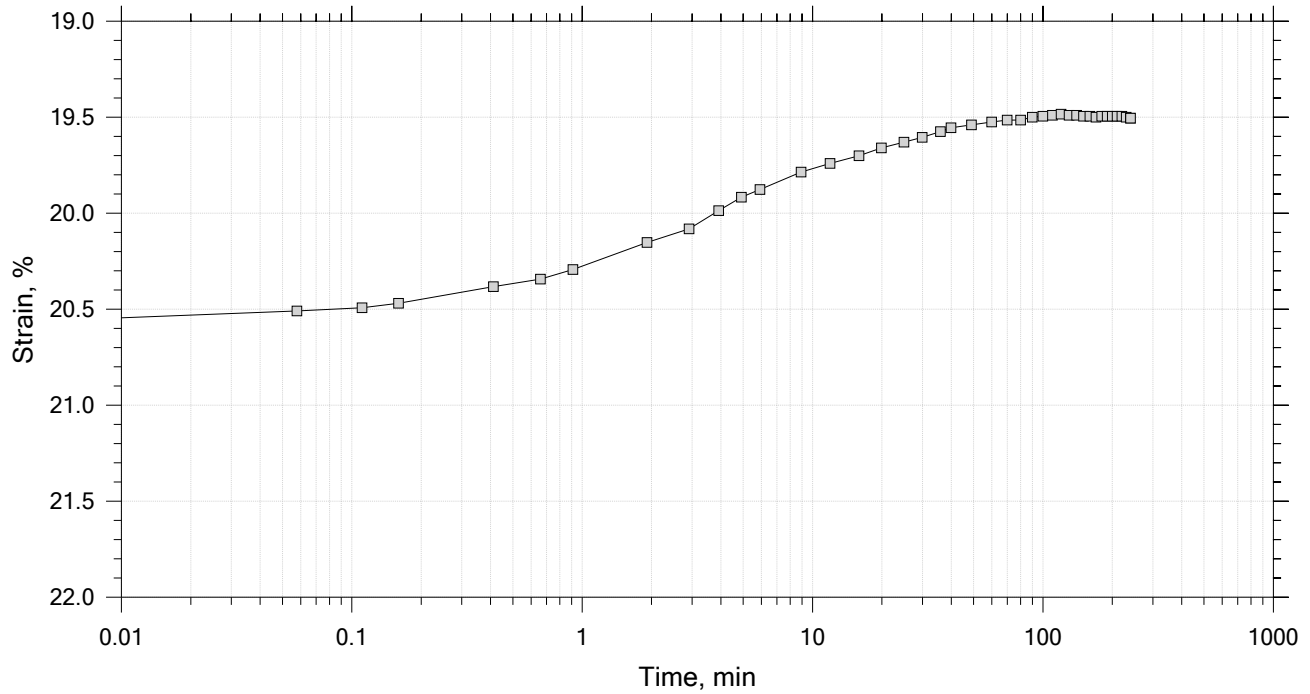
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	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf



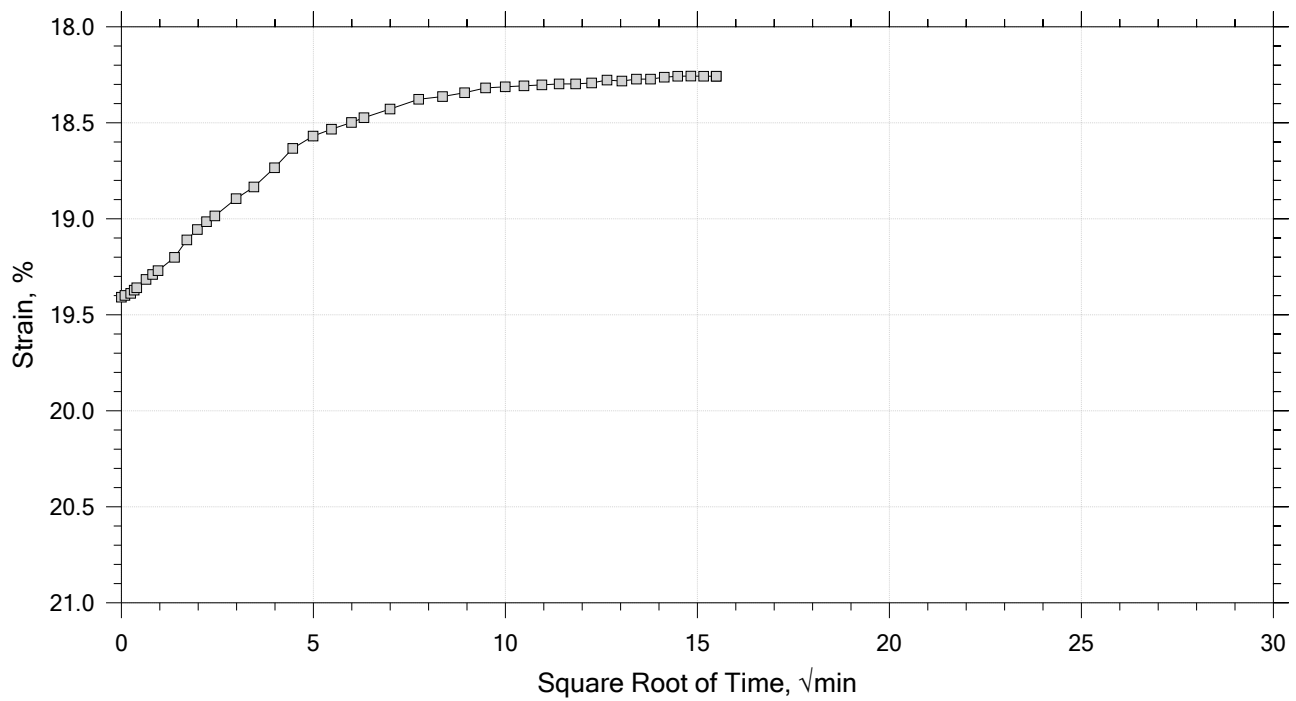
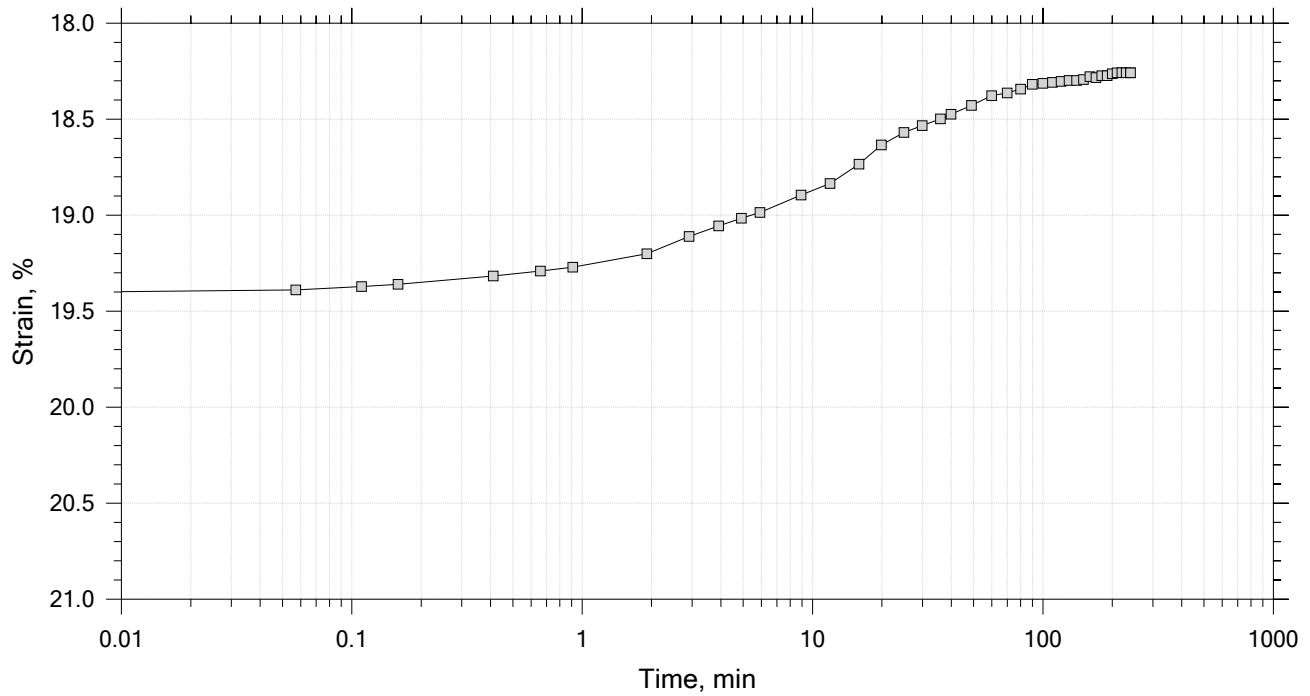
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf



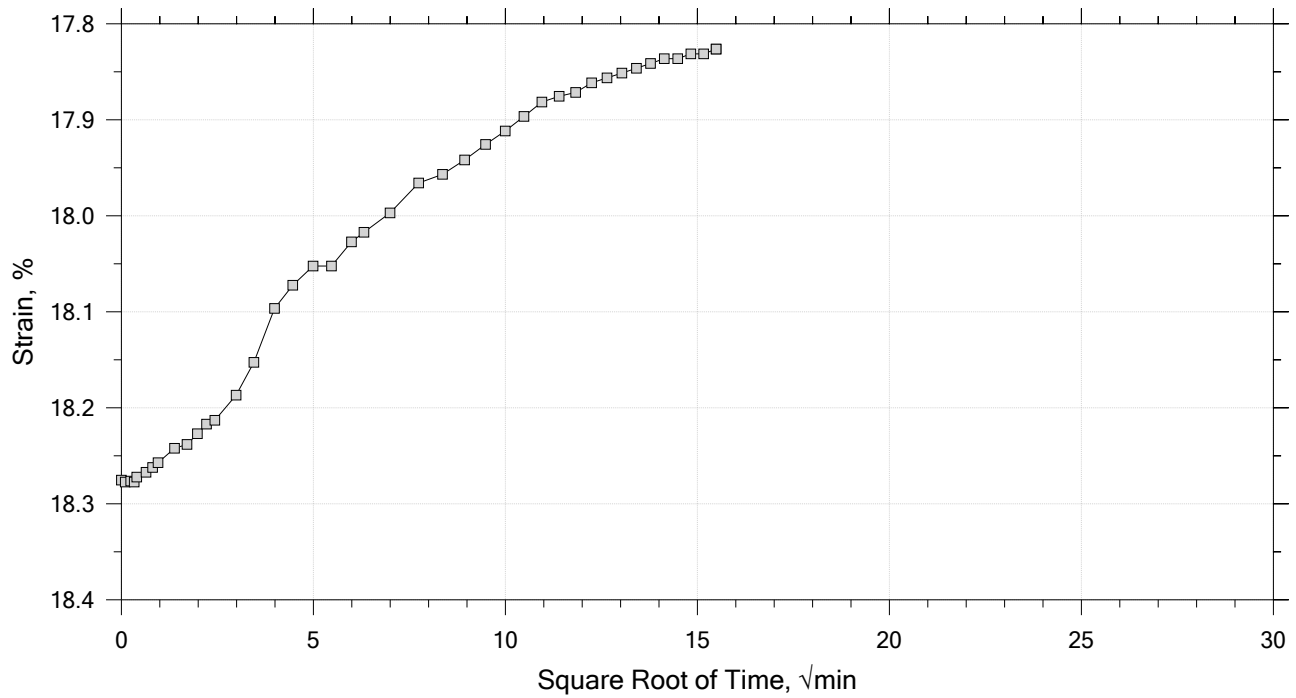
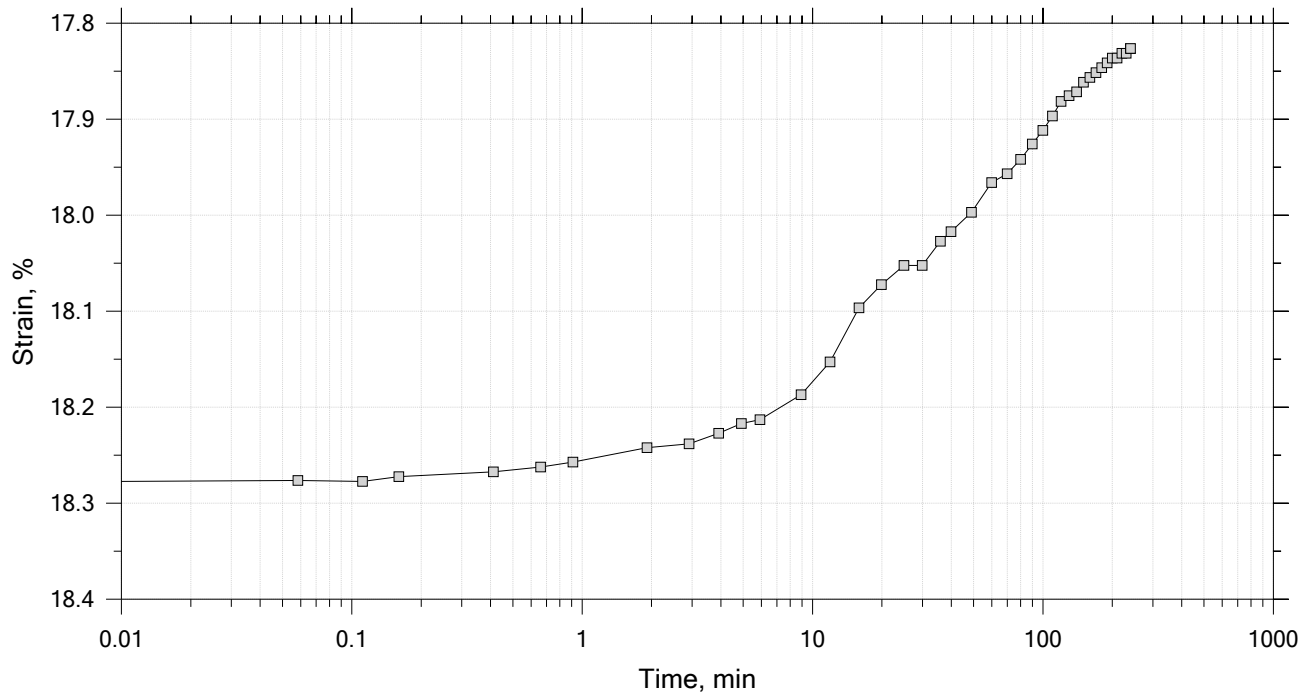
	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf




	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.78	Liquid Limit: 35
Initial Height: 1.00 in	Initial Void Ratio: 0.909	Plastic Limit: 20
Final Height: 0.82 in	Final Void Ratio: 0.569	Plasticity Index: 15

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	A-2387	RING		D-693
Mass Container, gm	8.2	109.53	109.53	8.23
Mass Container + Wet Soil, gm	139.33	263.67	250.81	149.22
Mass Container + Dry Soil, gm	106.05	226.85	226.85	125.31
Mass Dry Soil, gm	97.85	117.32	117.32	117.08
Water Content, %	34.01	31.38	20.42	20.42
Void Ratio	---	0.91	0.57	---
Degree of Saturation, %	---	96.14	100.00	---
Dry Unit Weight, pcf	---	91.051	110.8	---


Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients


[illegible]

	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

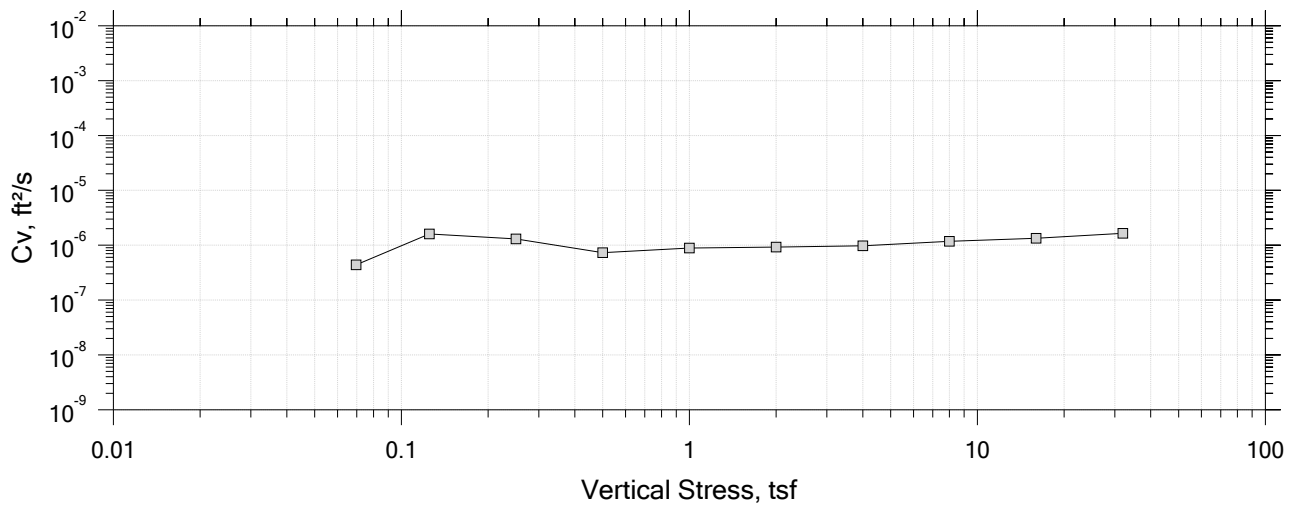
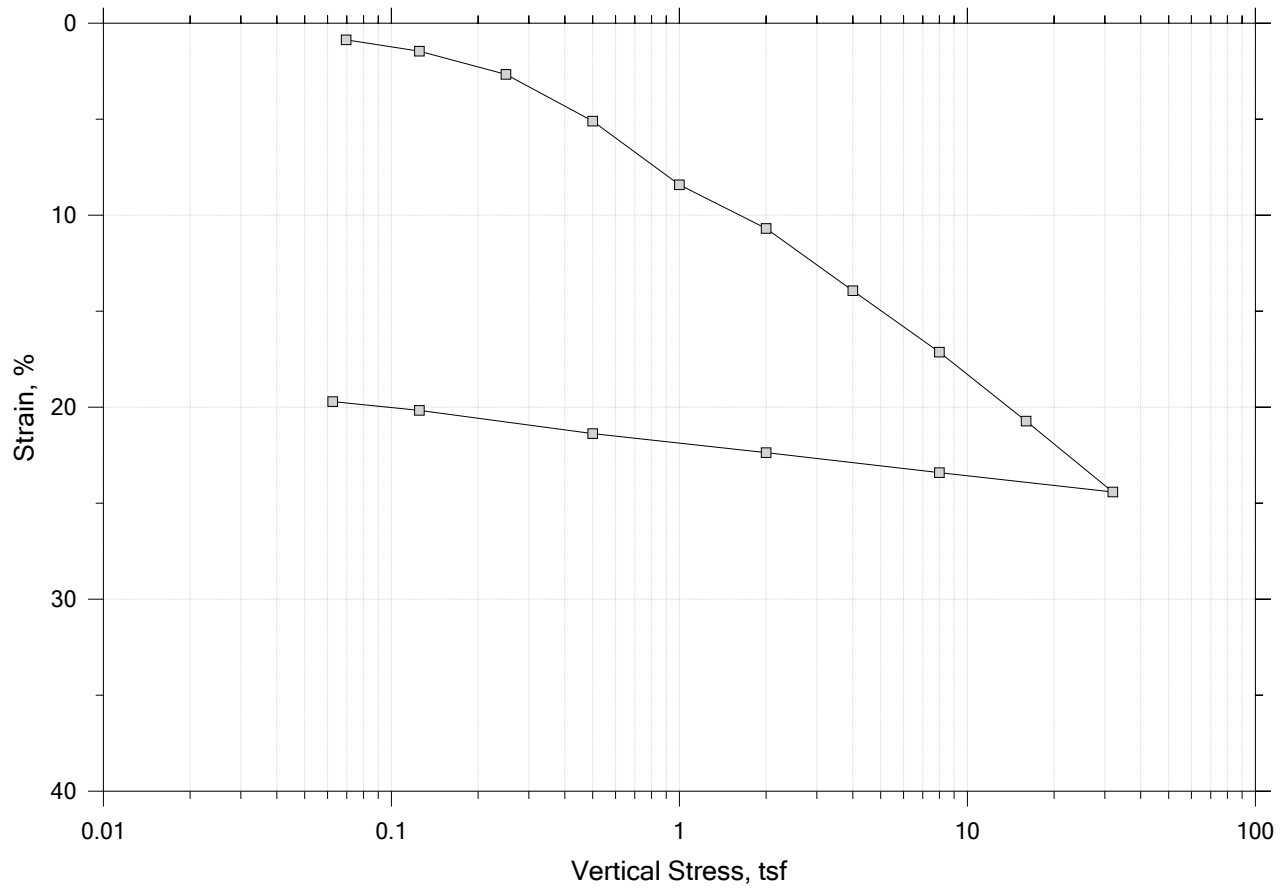
Square Root of Time Coefficients


[illegible]

	Project: Rt-9/I-395 Connector	Location: Brewer and Eddington, ME	Project No.: GTX-308853
	Boring No.: BB-BEB-104	Tested By: md	Checked By: mcm
	Sample No.: 3U	Test Date: 07/17/19	Depth: 15-17 ft
	Test No.: IP-15	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System Q, Swell Pressure = 0.0662 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

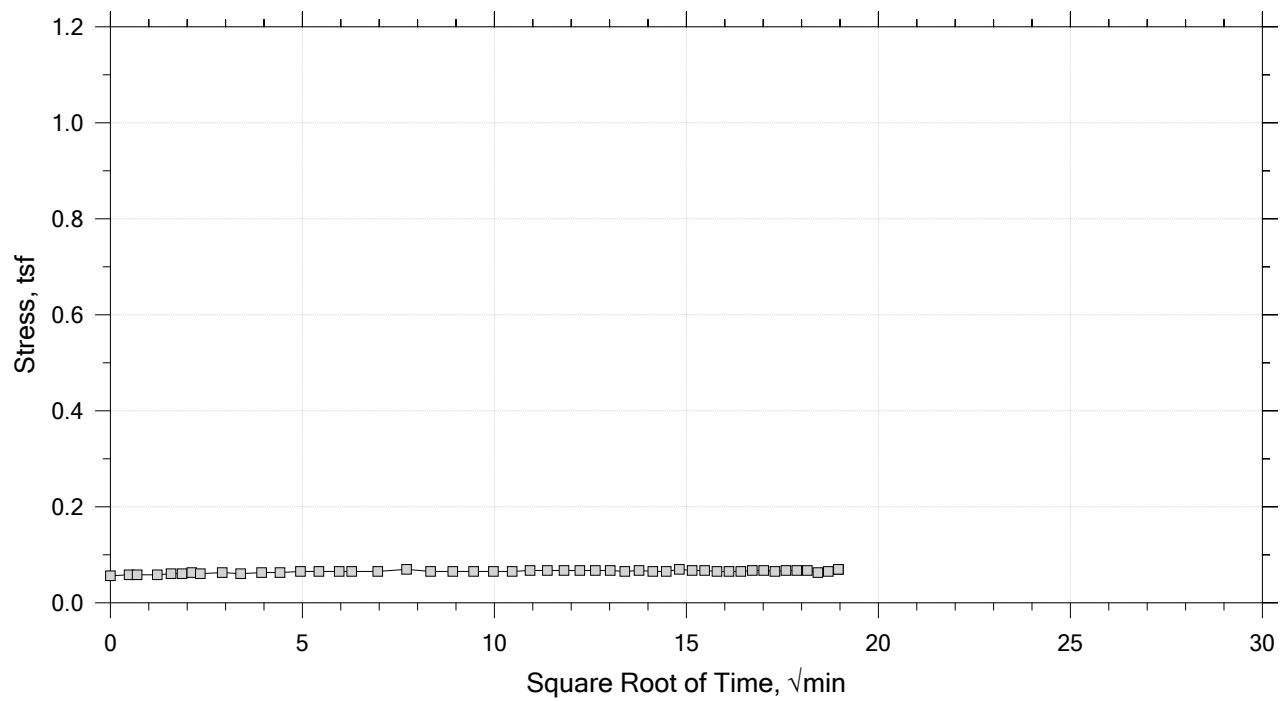
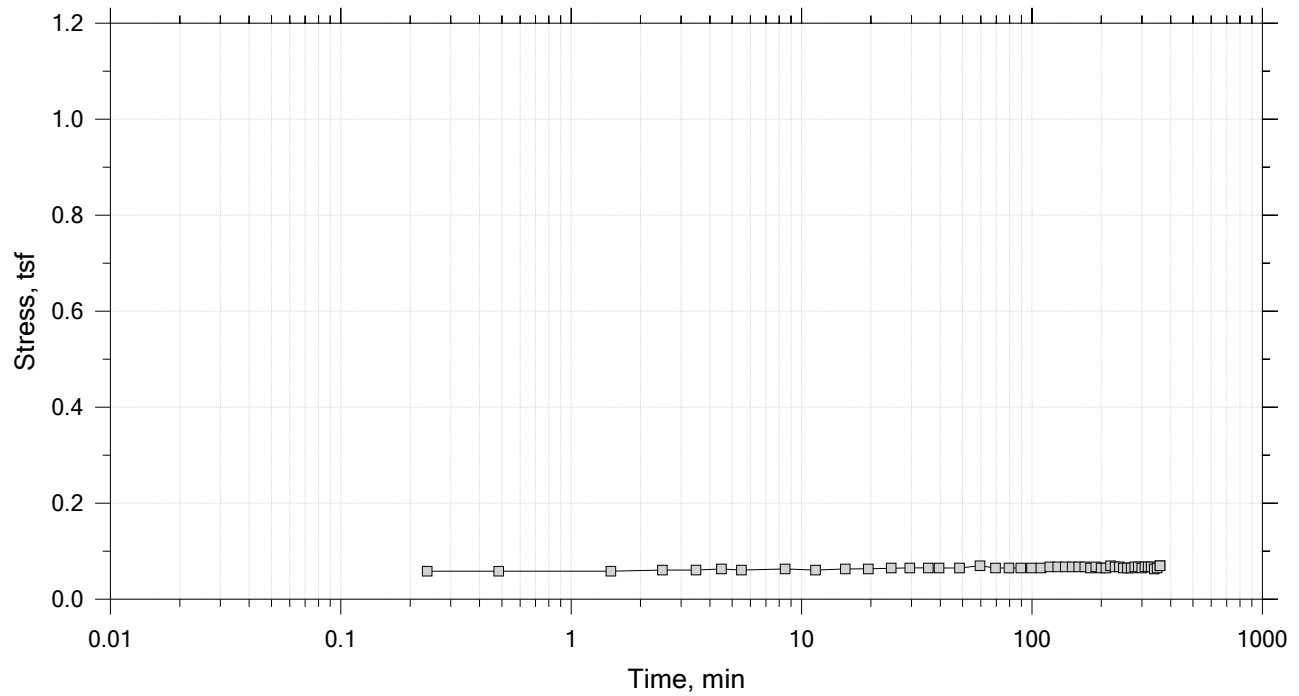
Summary Report




	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0696 tsf



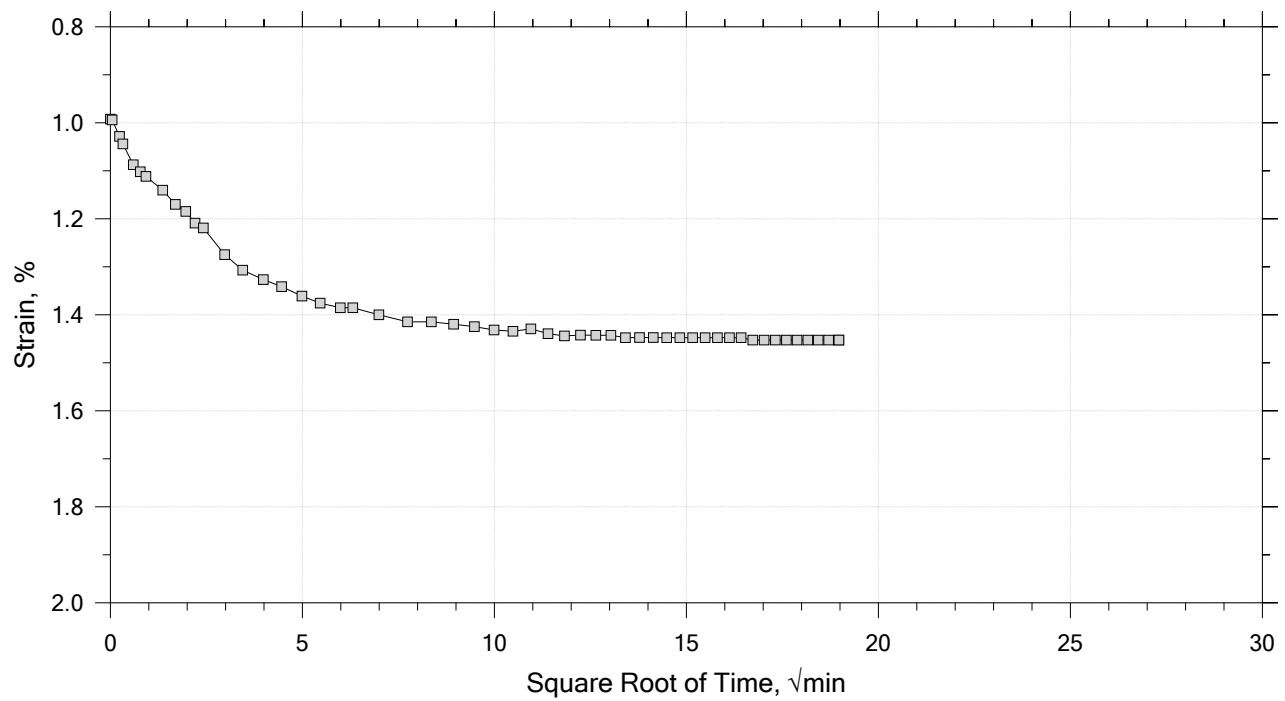
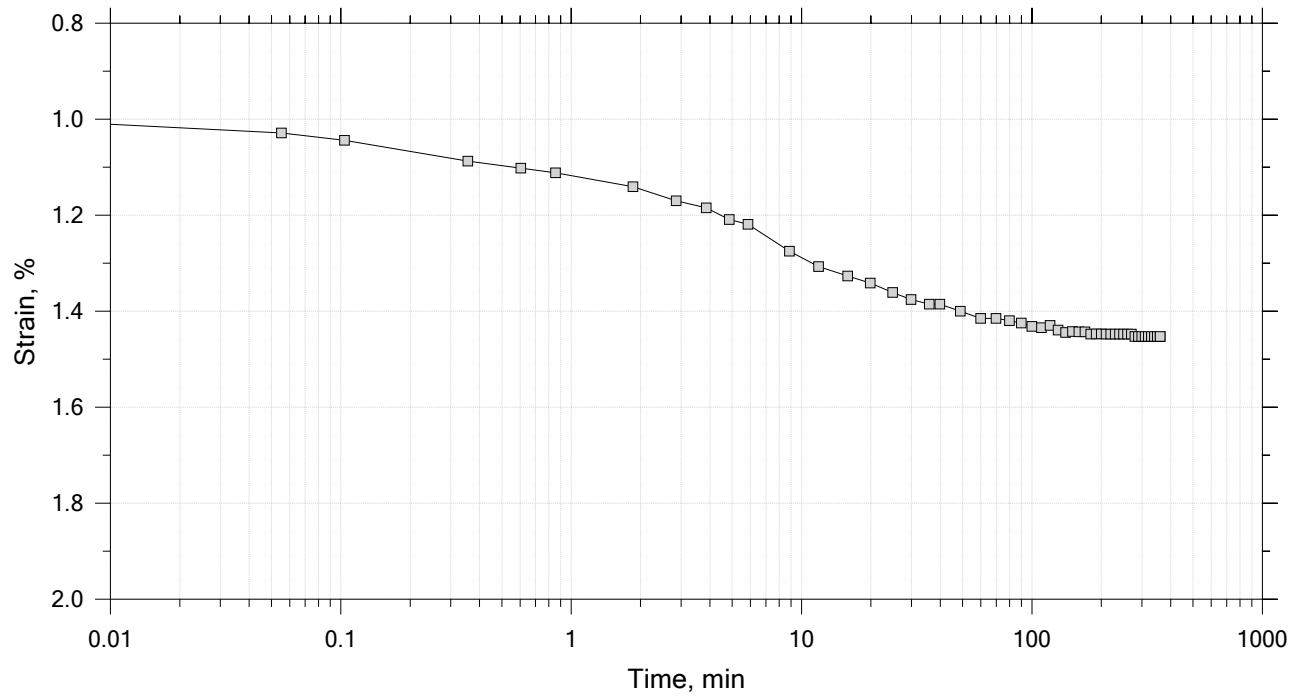
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf



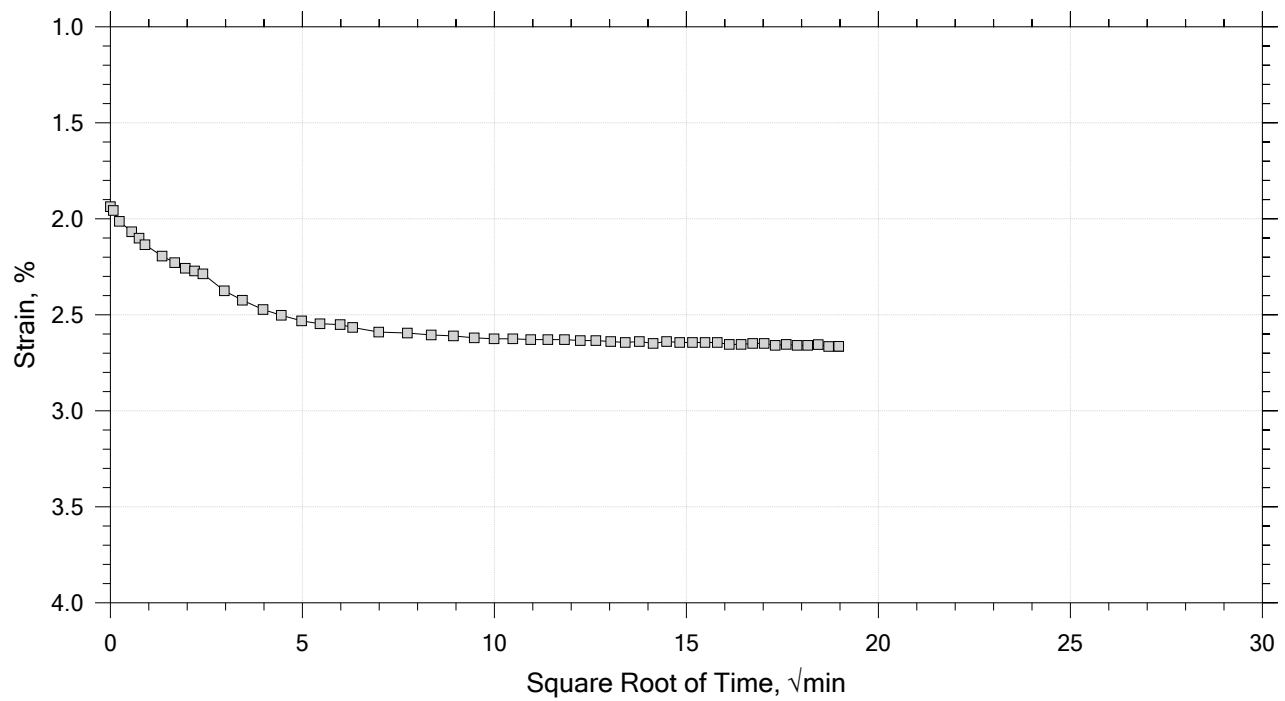
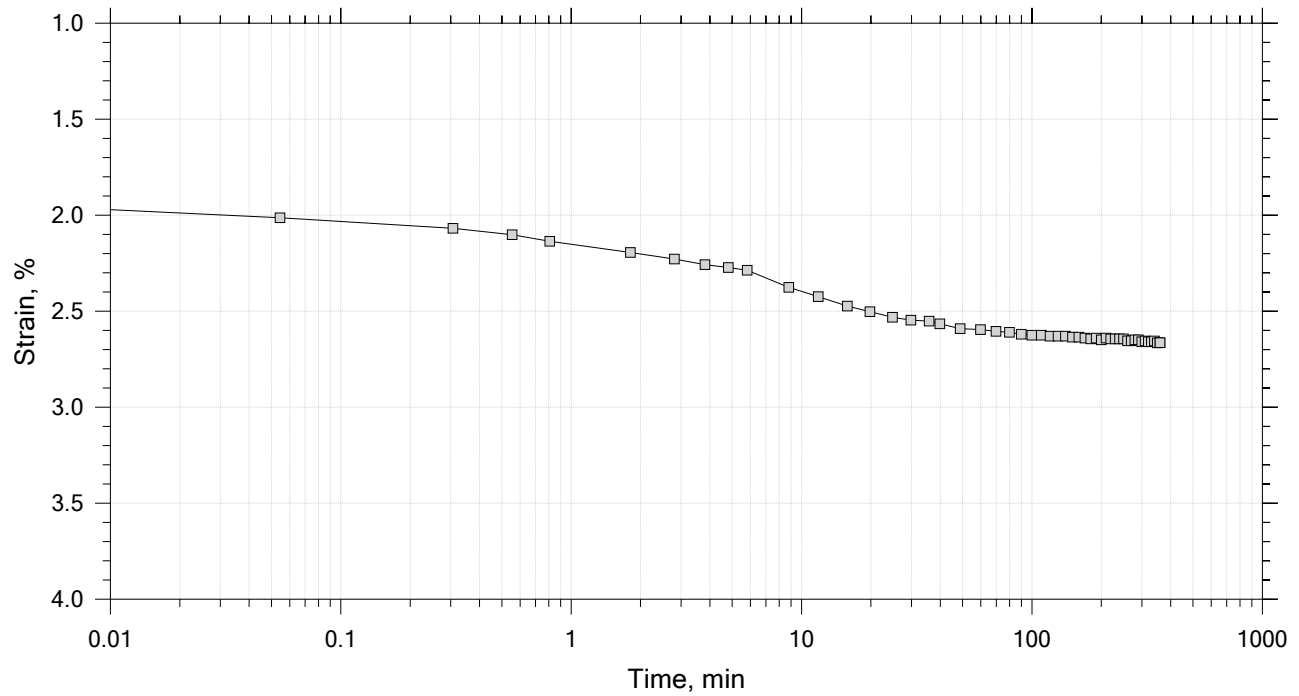
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf



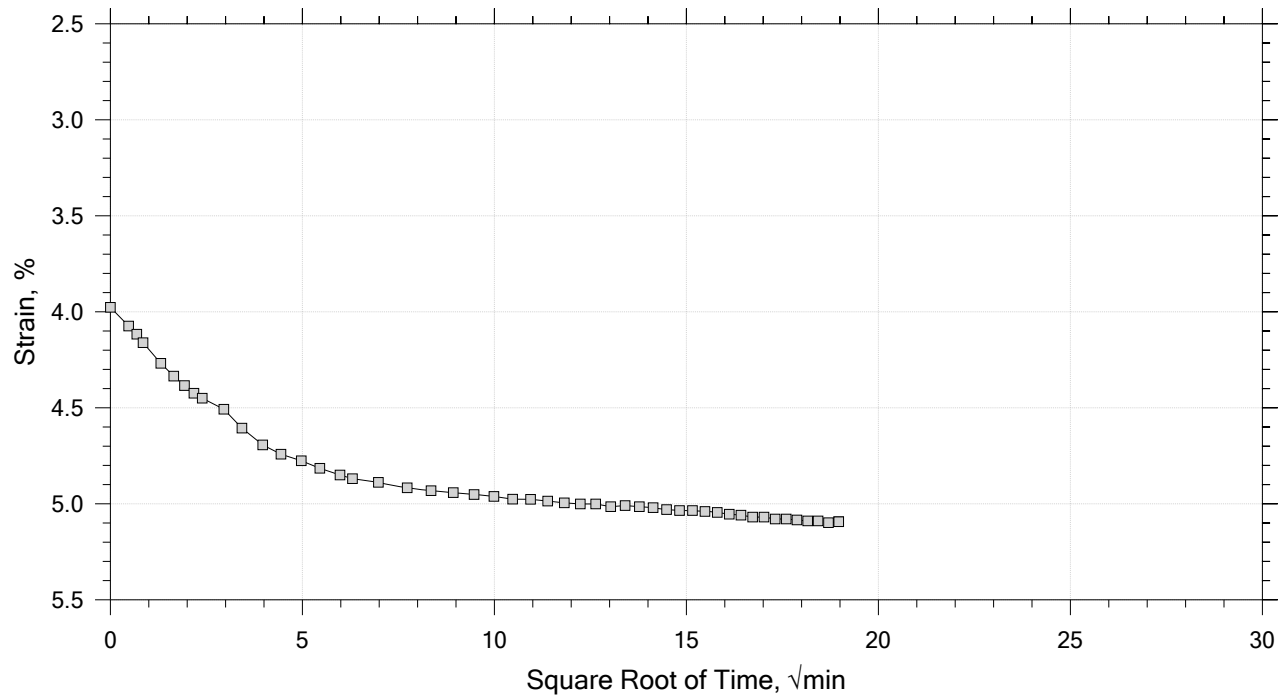
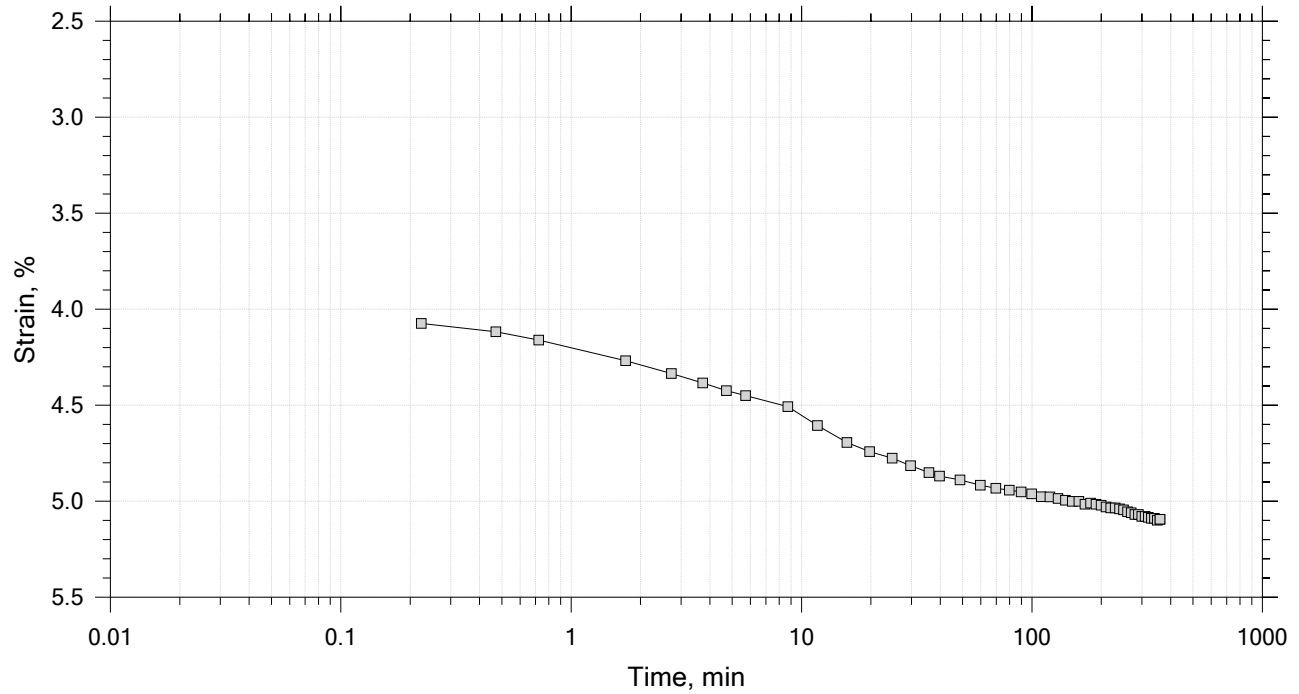
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf



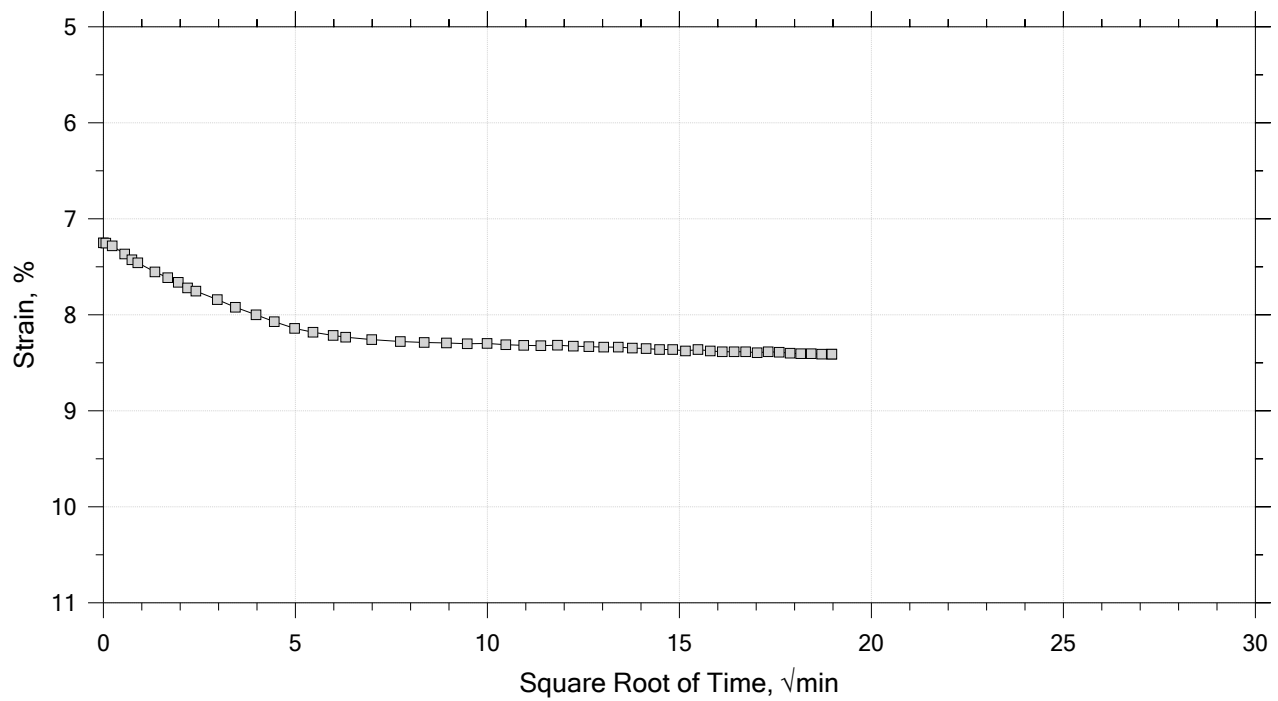
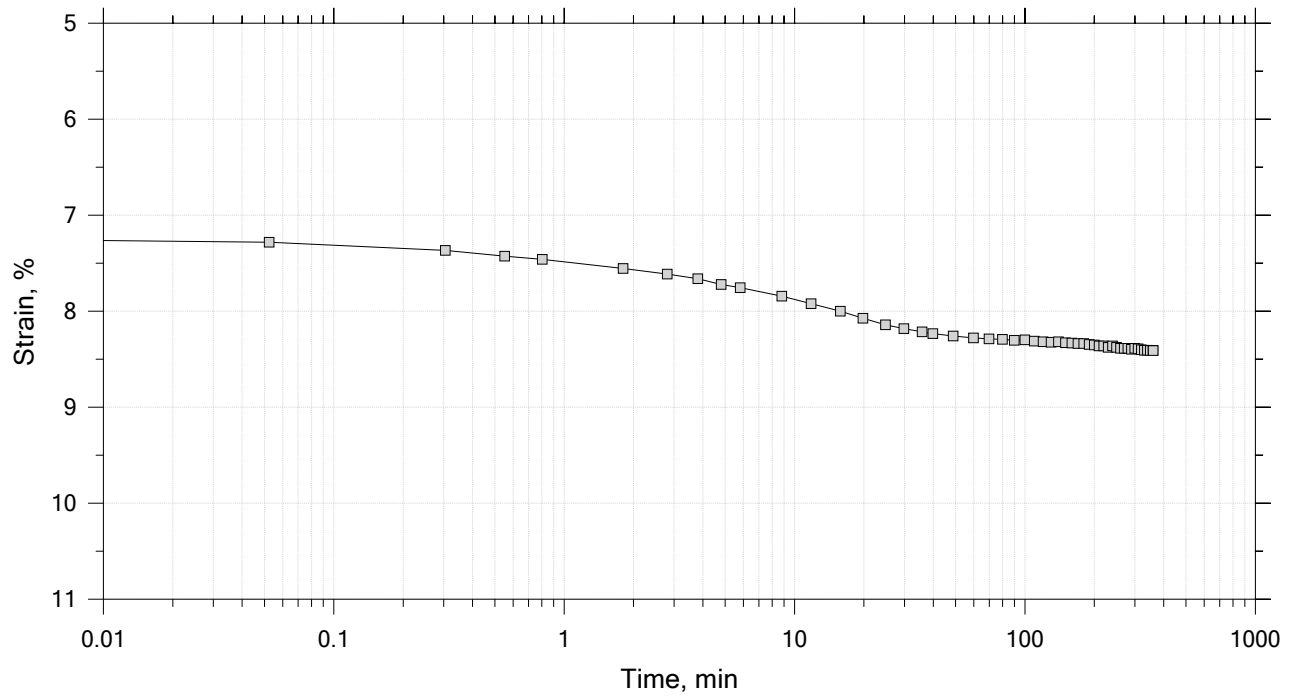
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf



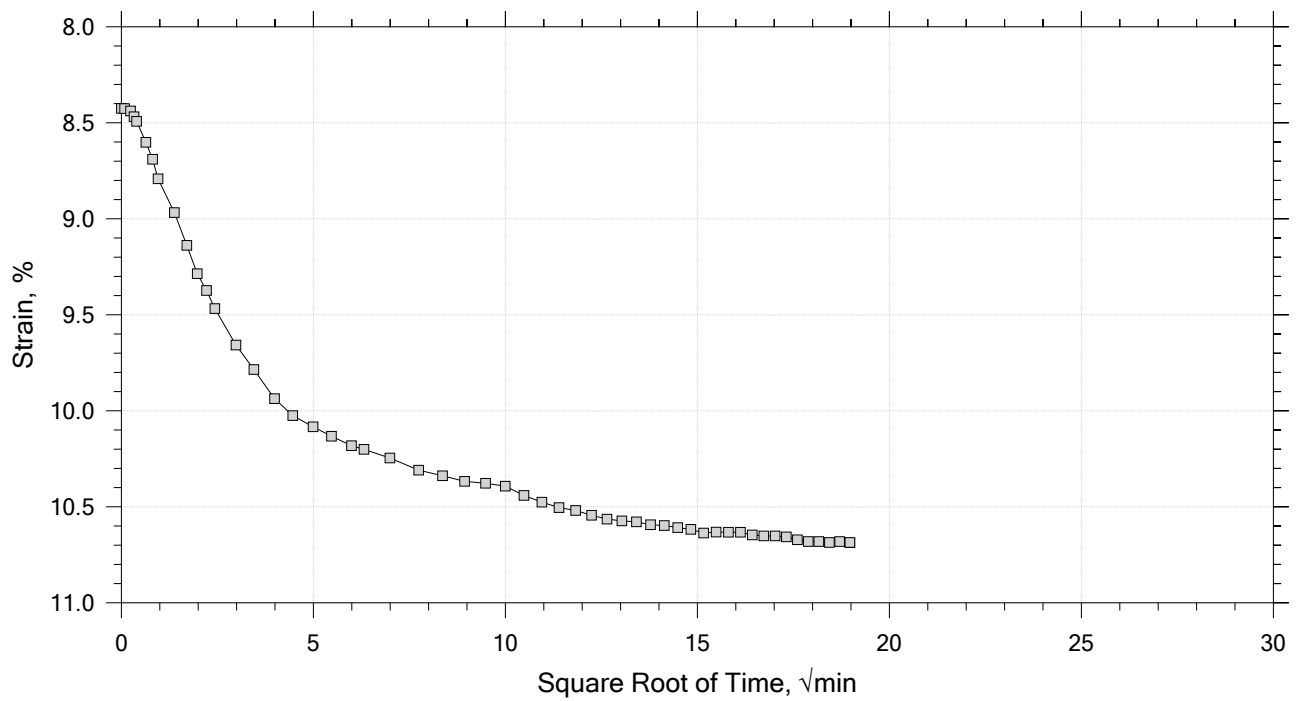
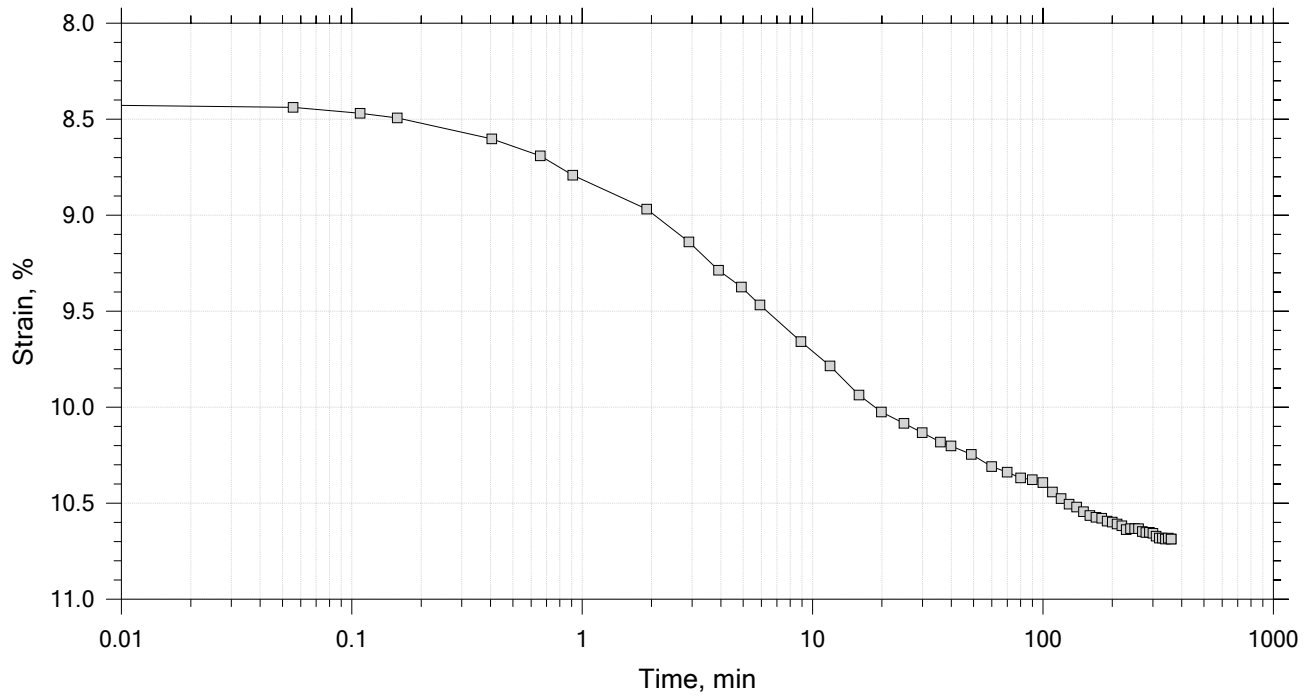
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf



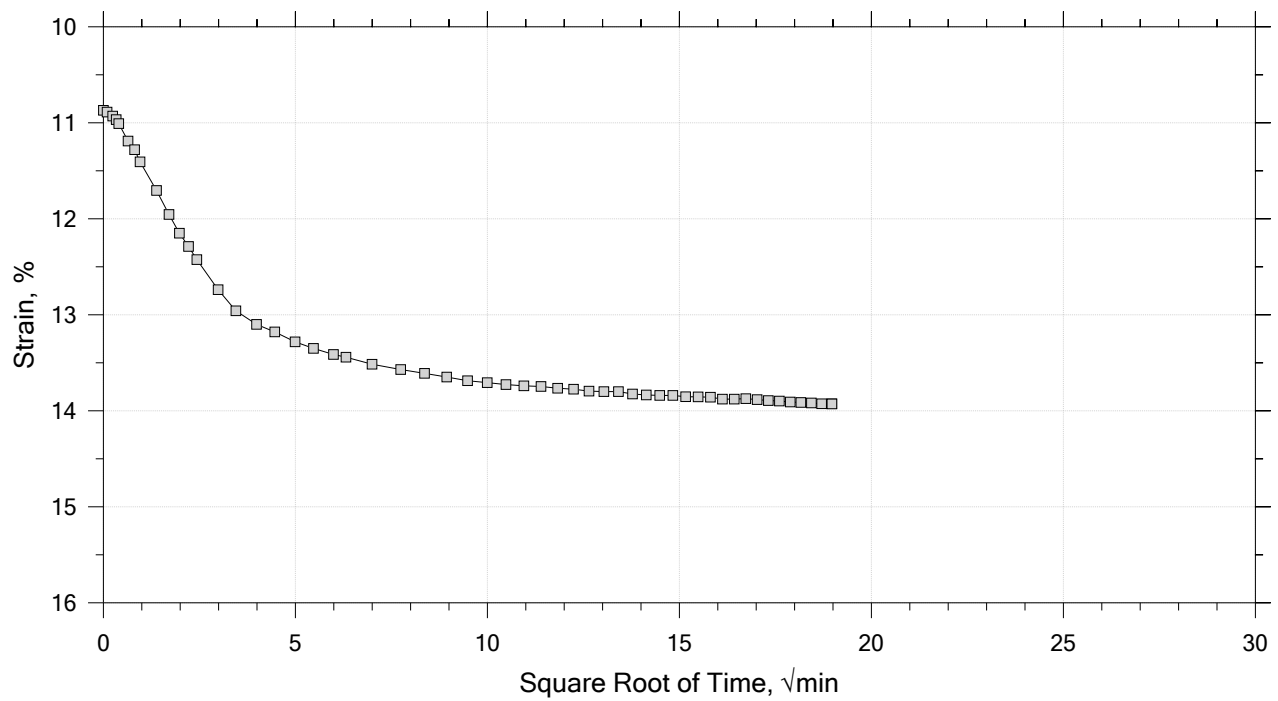
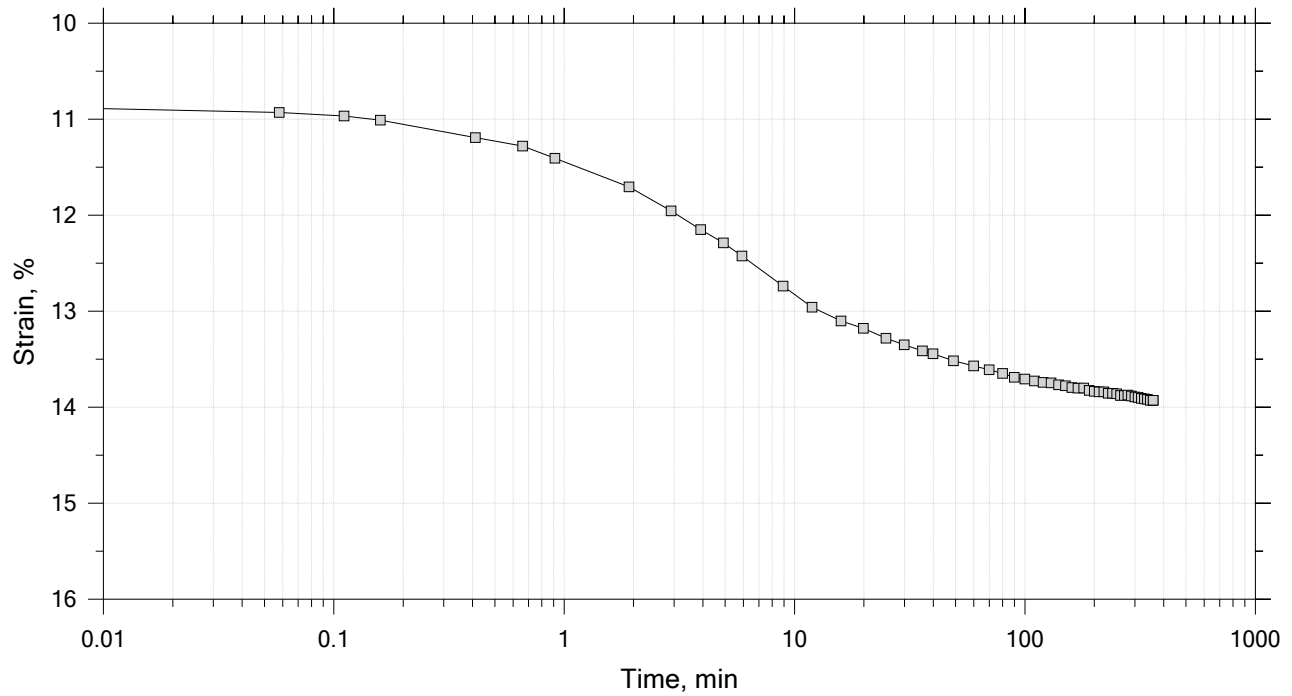
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf



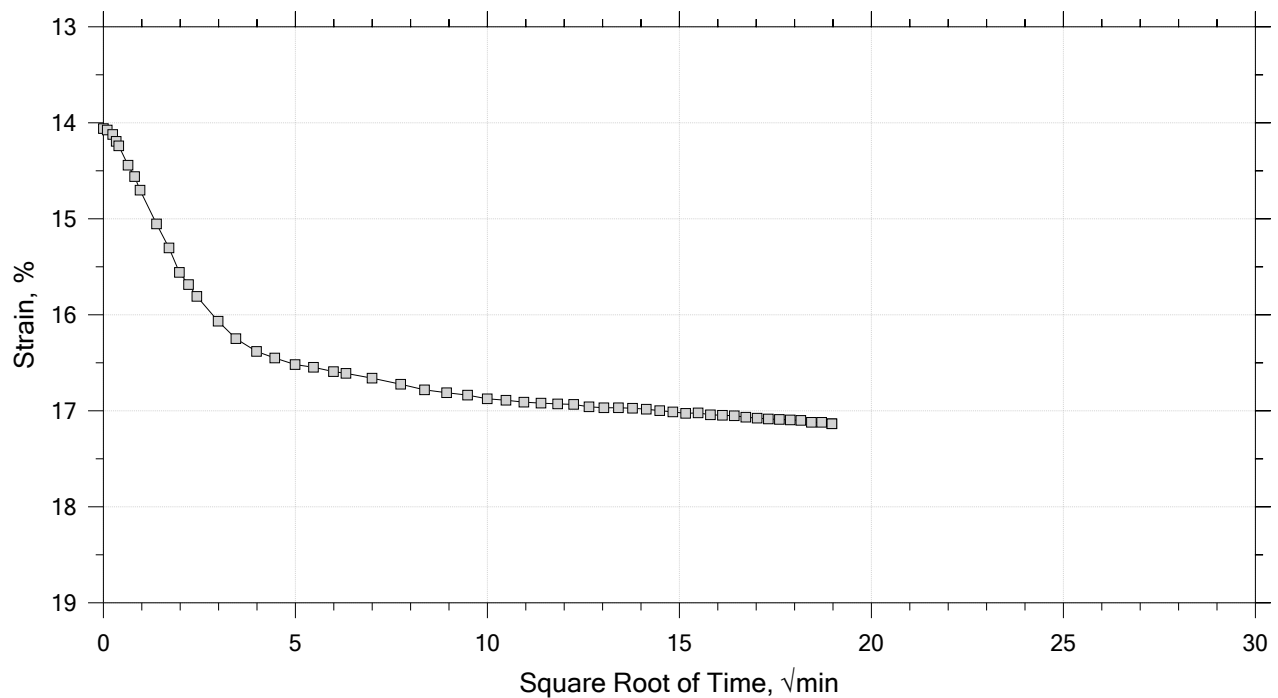
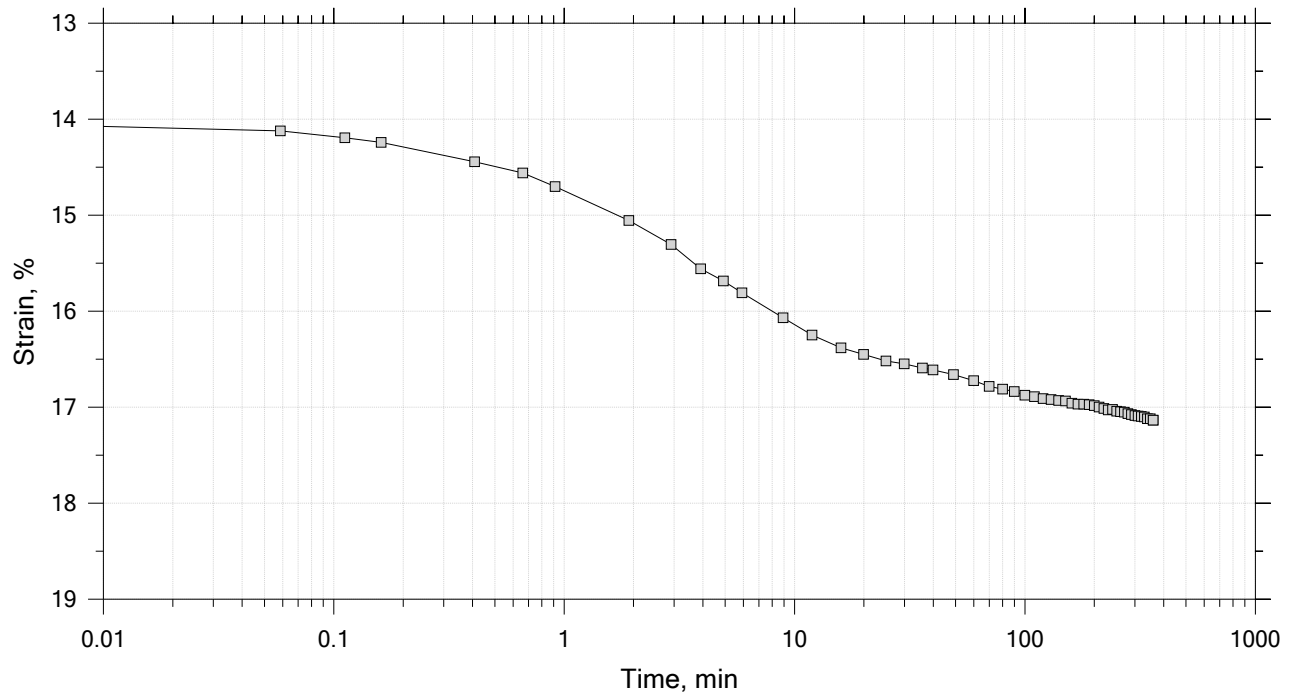
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf



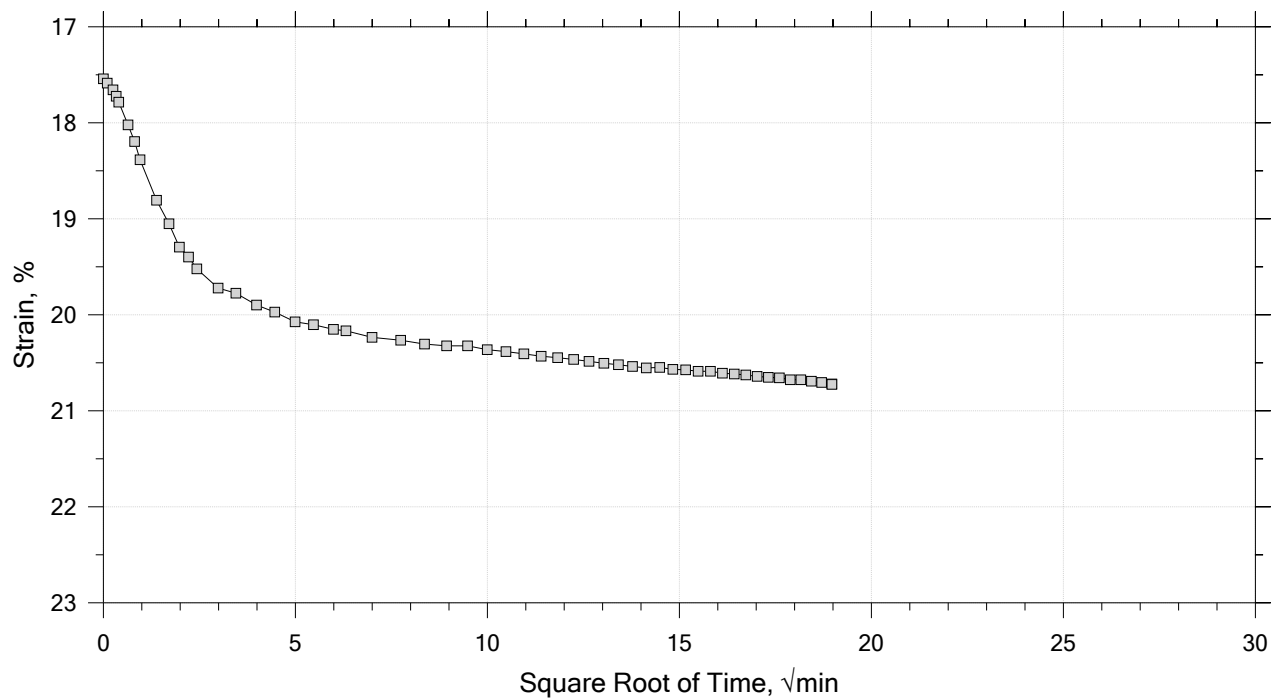
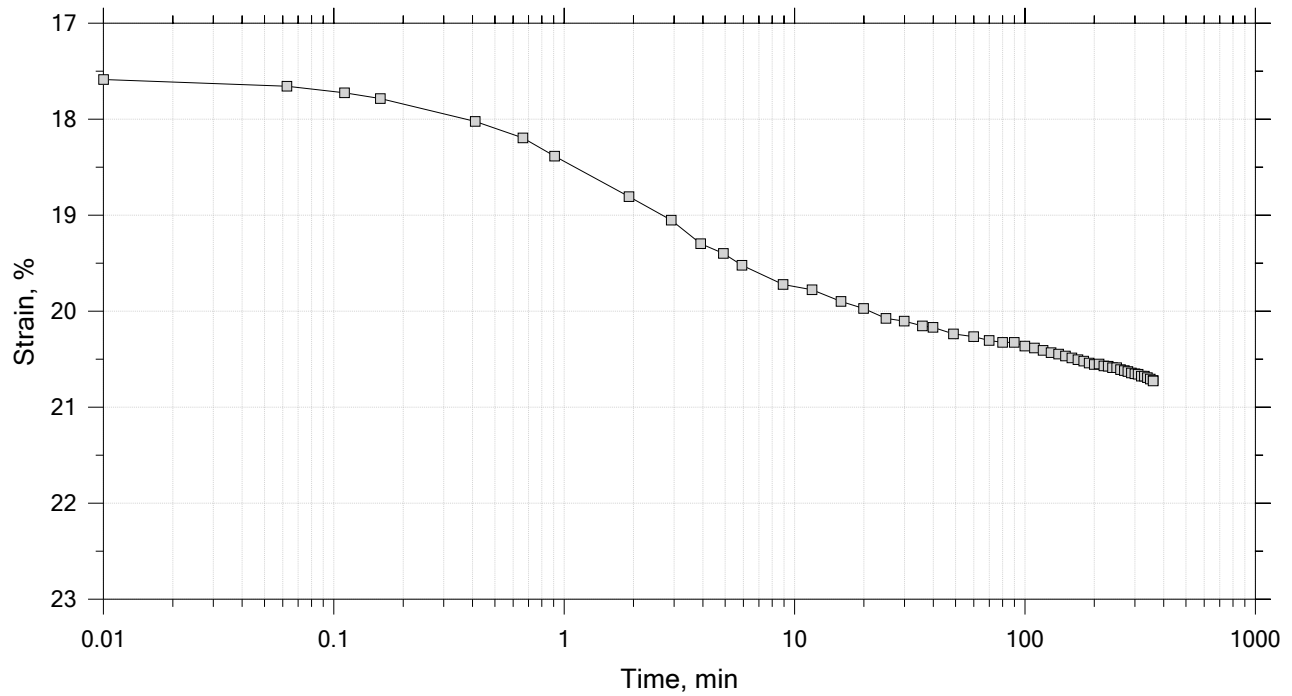
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf



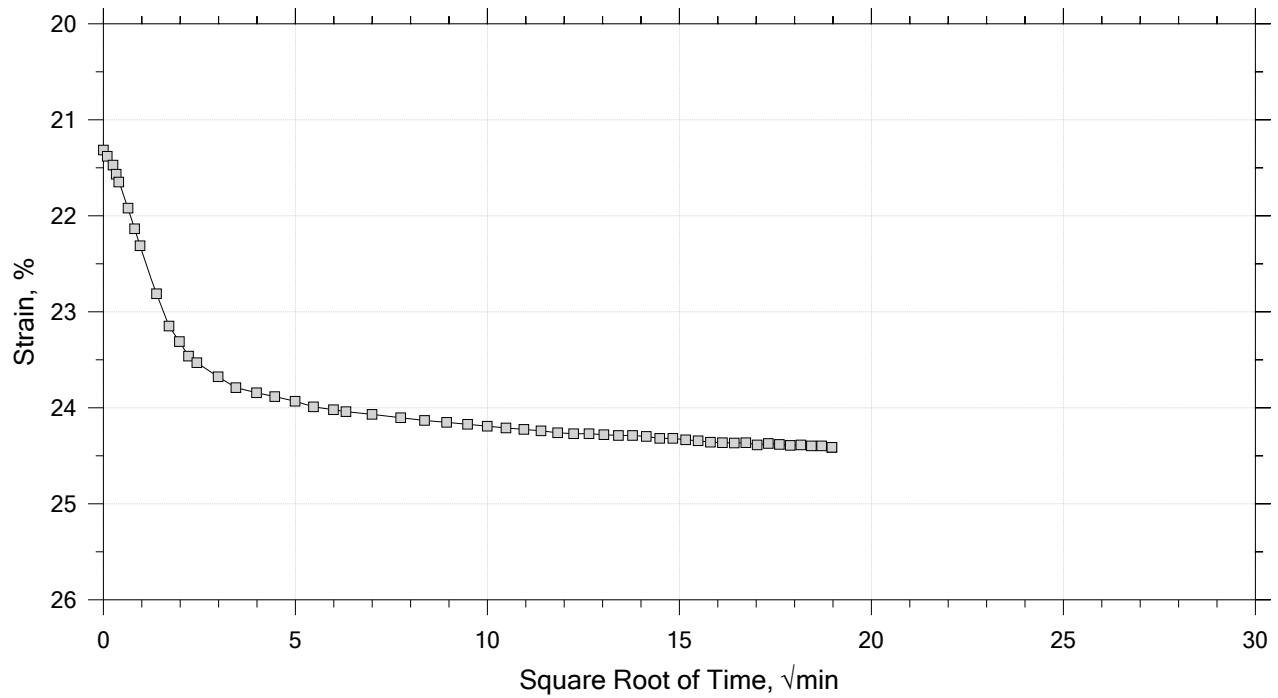
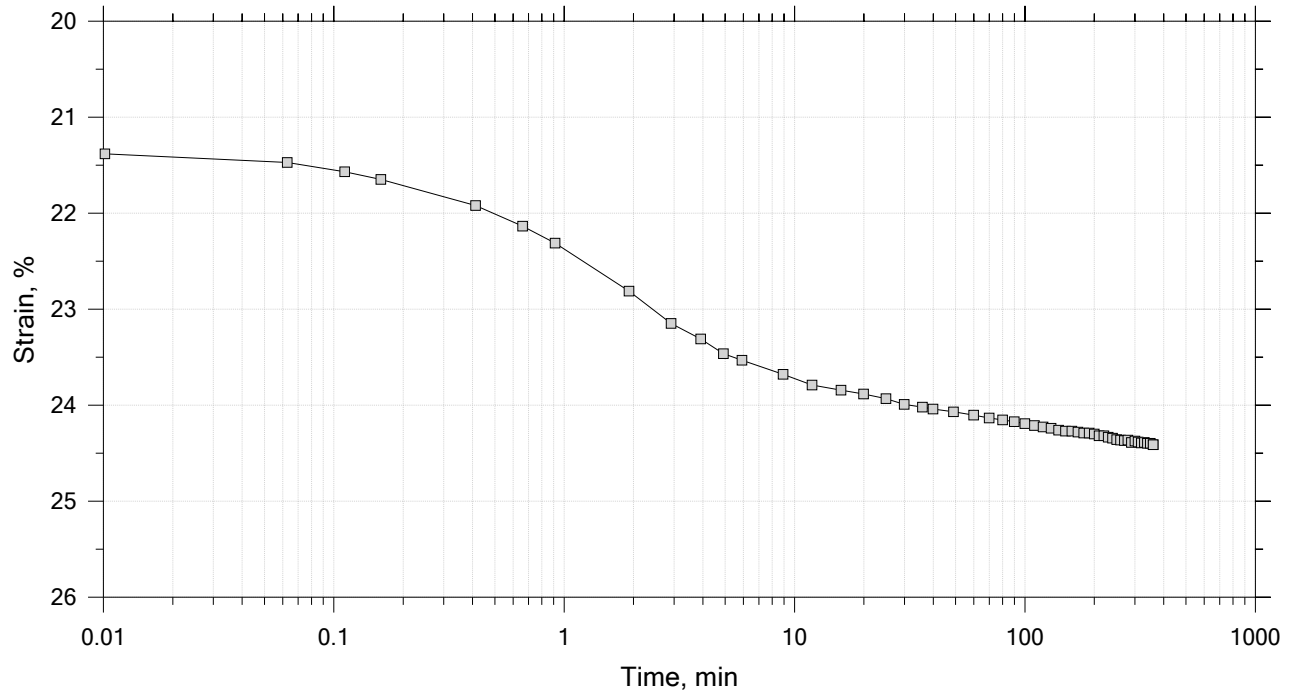
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf



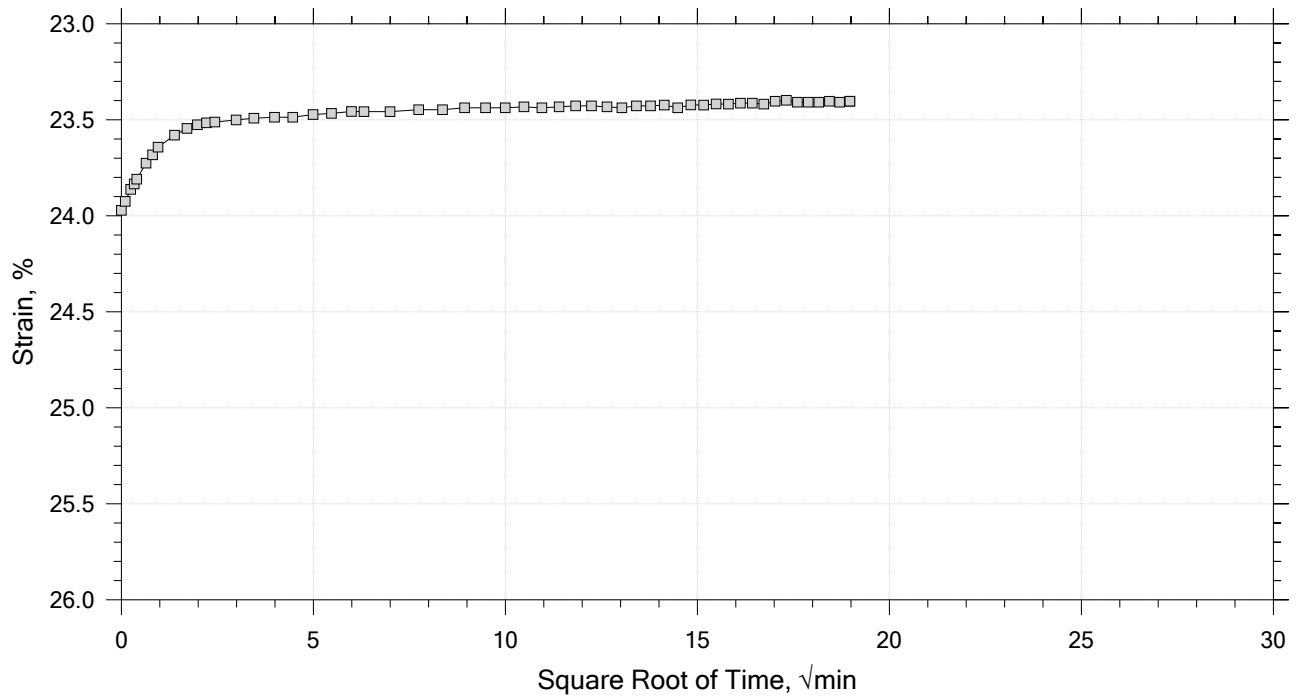
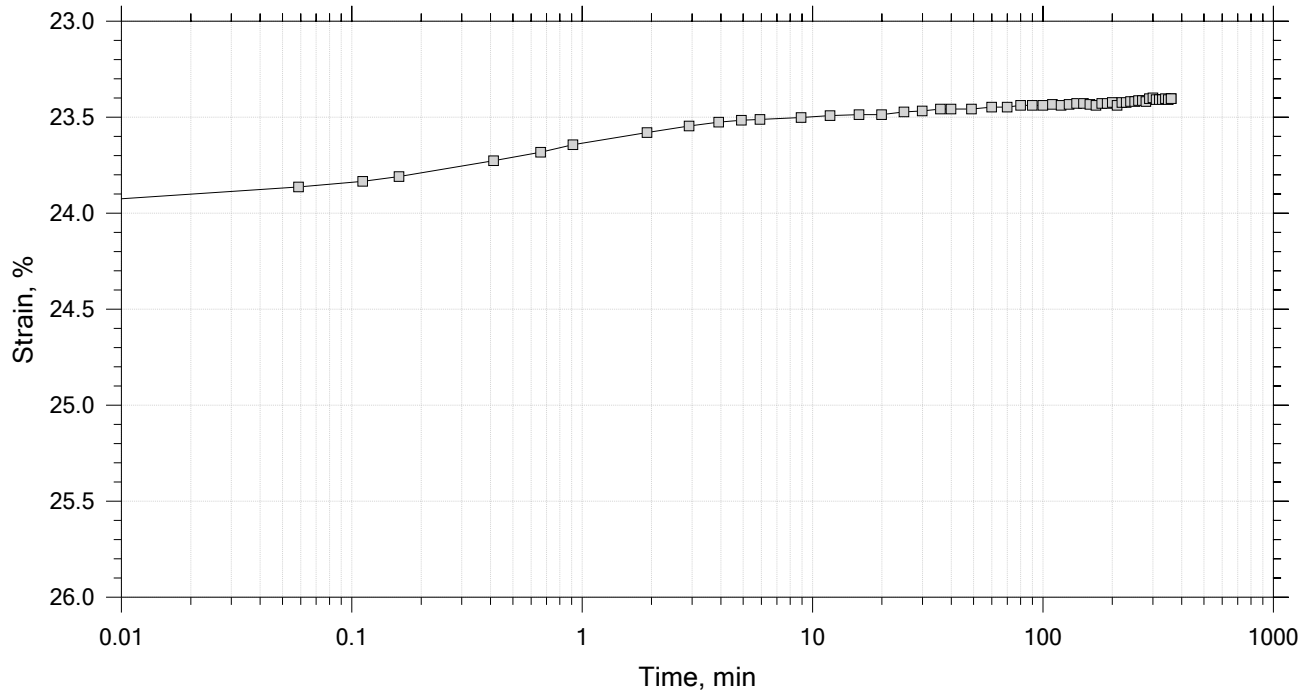
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf



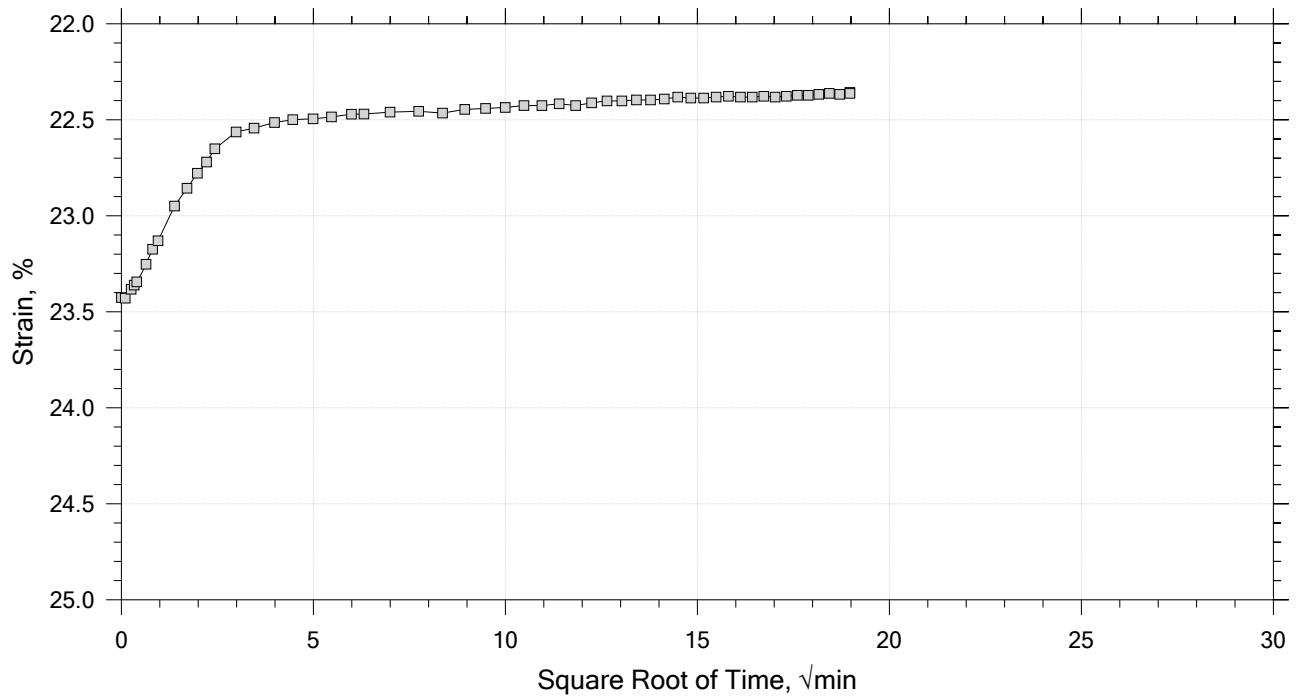
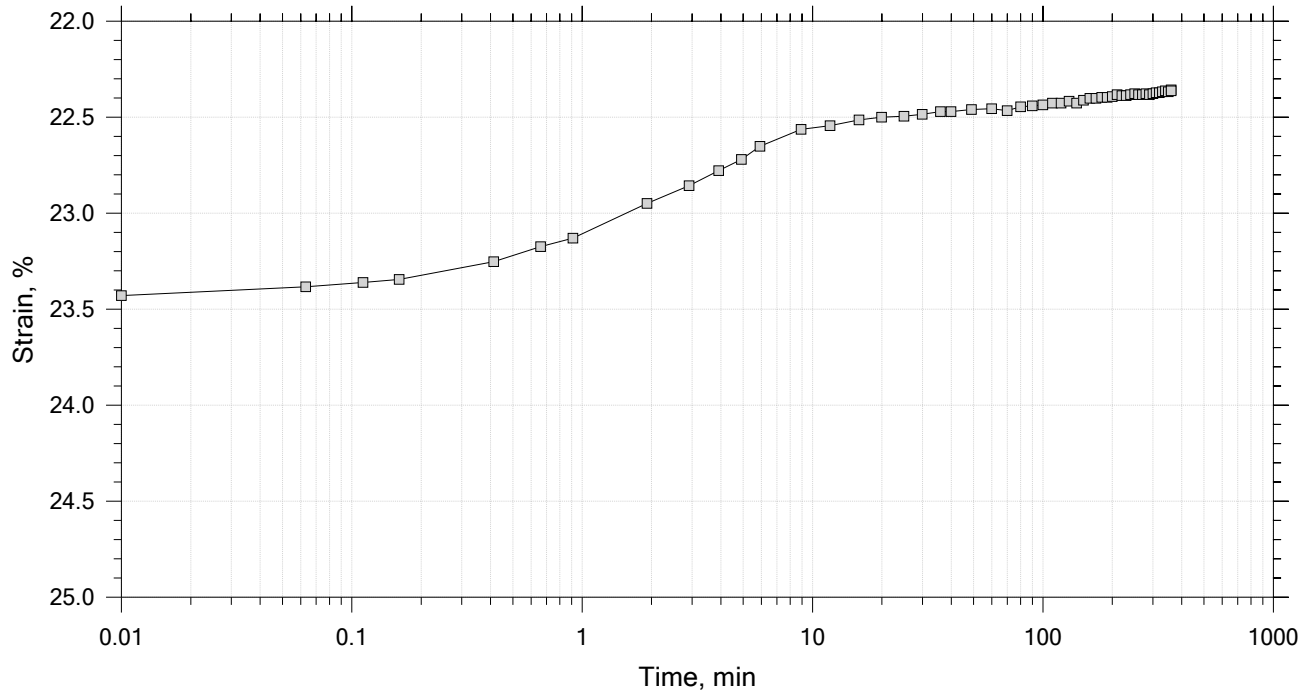
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf



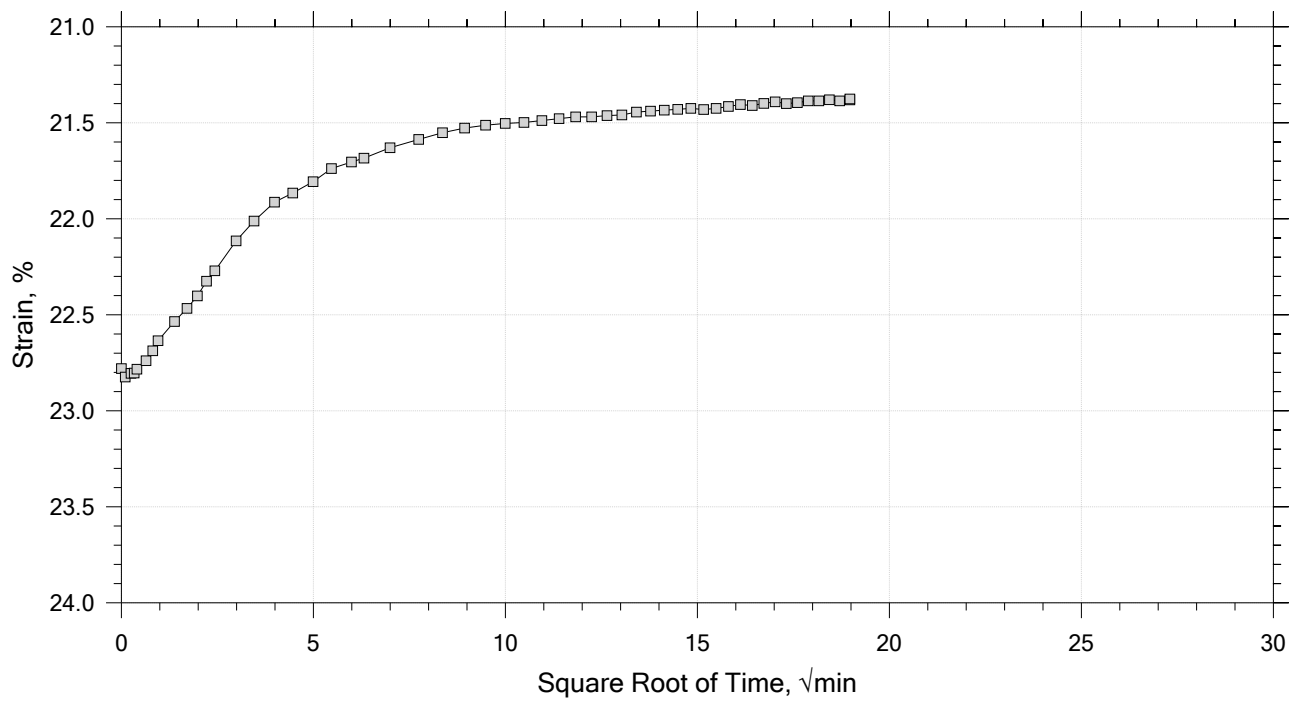
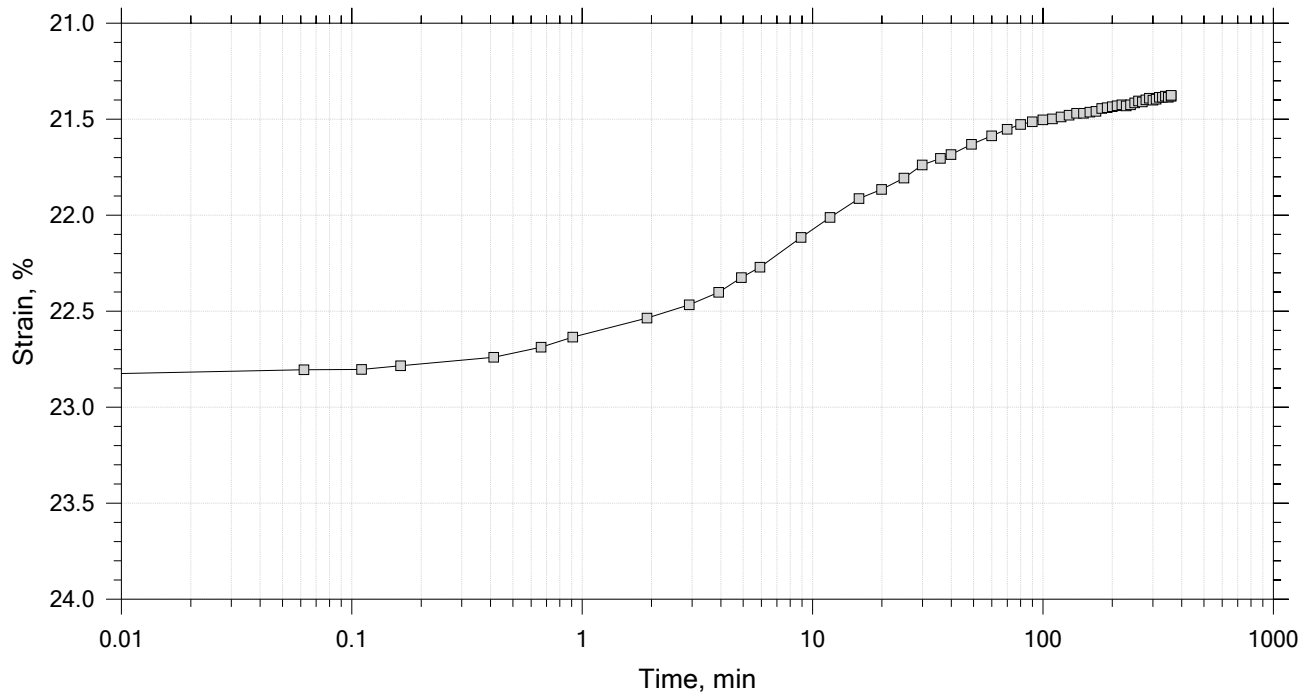
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf



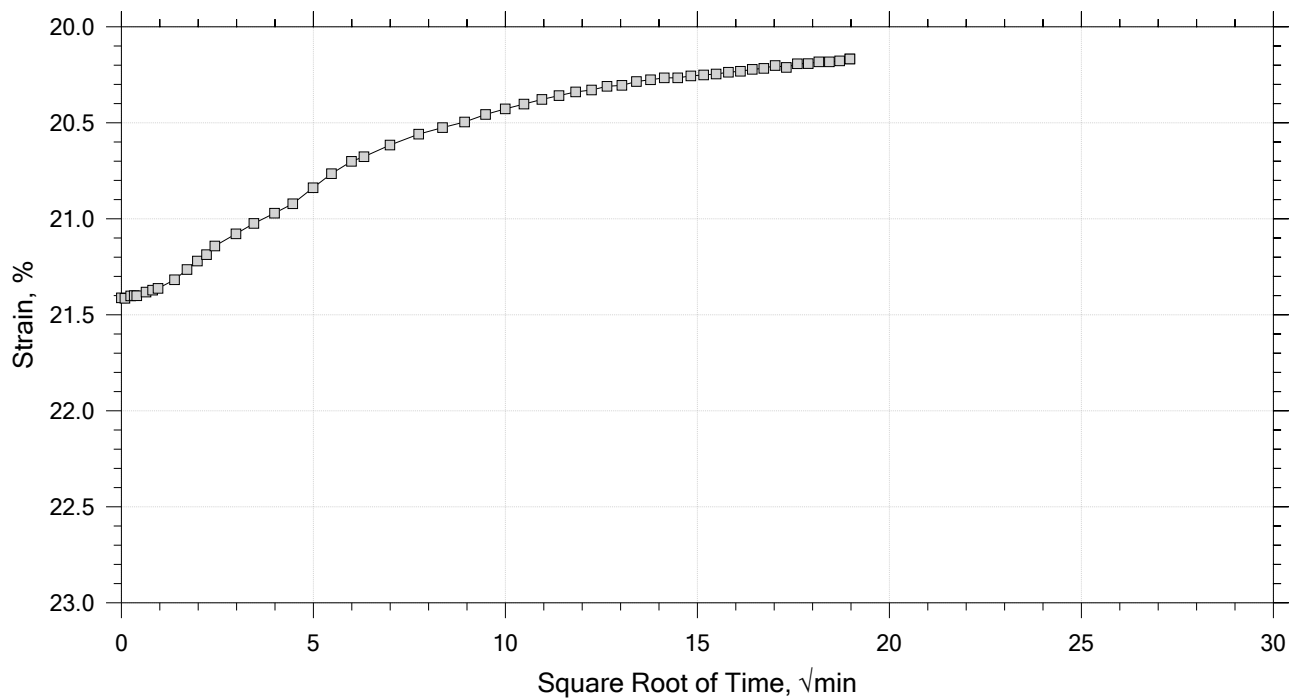
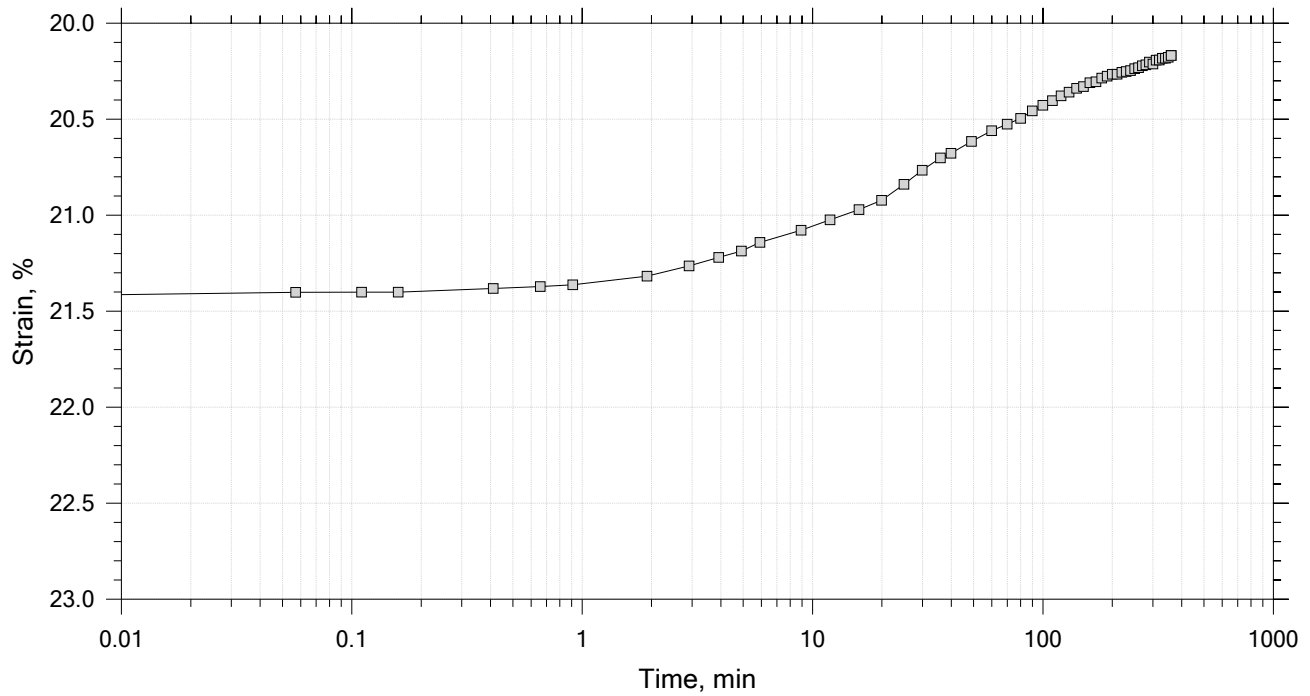
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf



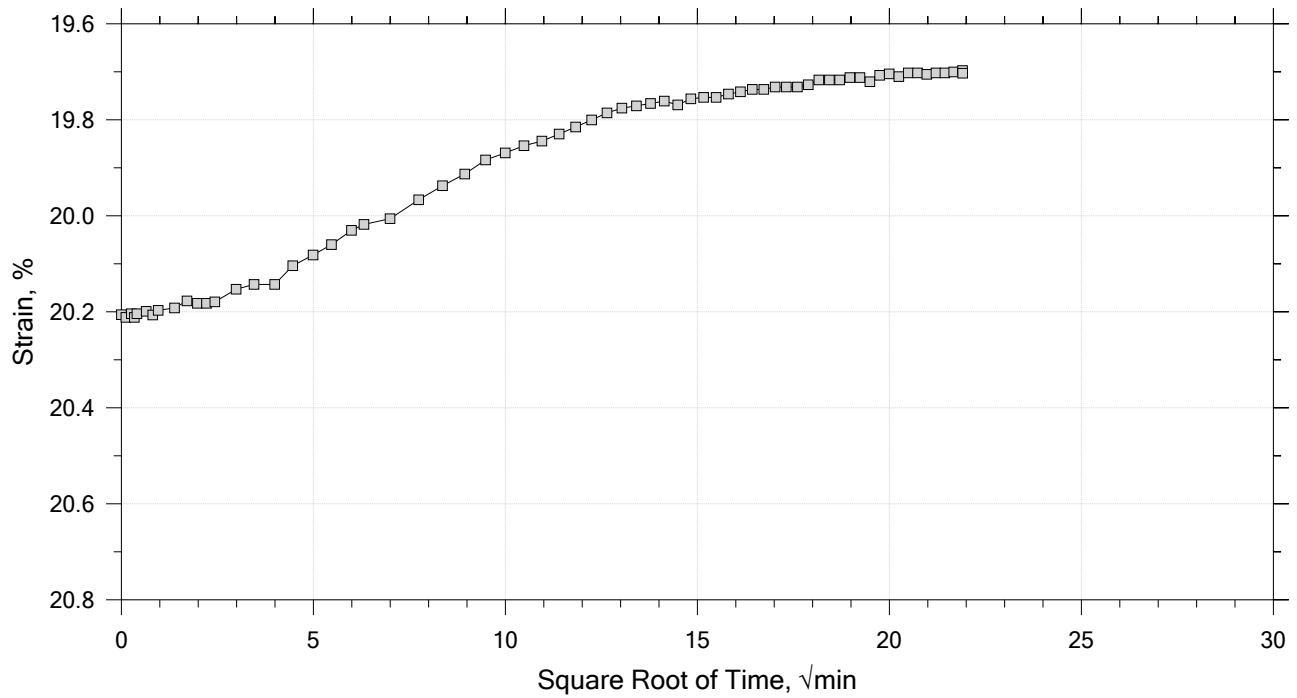
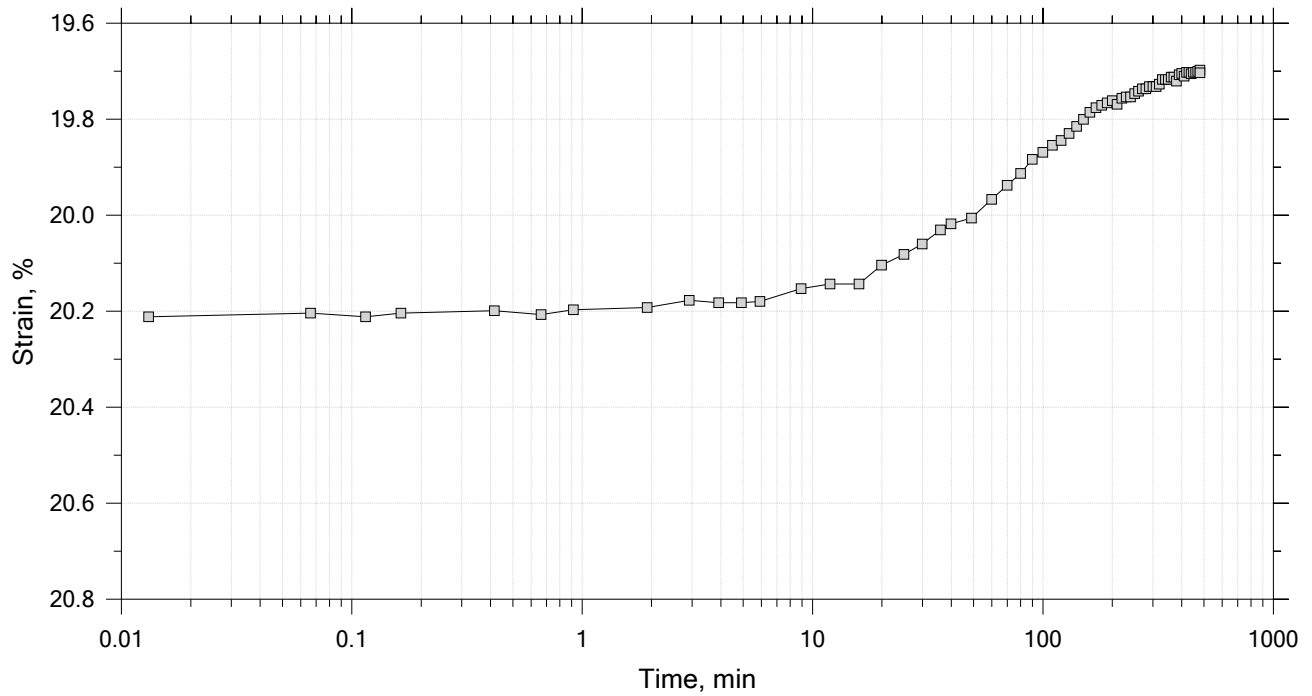
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	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf




	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 36
Initial Height: 1.00 in	Initial Void Ratio: 0.828	Plastic Limit: 18
Final Height: 0.85 in	Final Void Ratio: 0.554	Plasticity Index: 18

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E-2599	RING		A1902
Mass Container, gm	8.22	109.73	109.73	8.29
Mass Container + Wet Soil, gm	167.94	265.46	255	153.18
Mass Container + Dry Soil, gm	128.62	230.63	230.63	128.87
Mass Dry Soil, gm	120.4	120.9	120.9	120.58
Water Content, %	32.66	28.81	20.16	20.16
Void Ratio	---	0.83	0.55	---
Degree of Saturation, %	---	95.59	100.00	---
Dry Unit Weight, pcf	---	93.825	110.38	---


Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

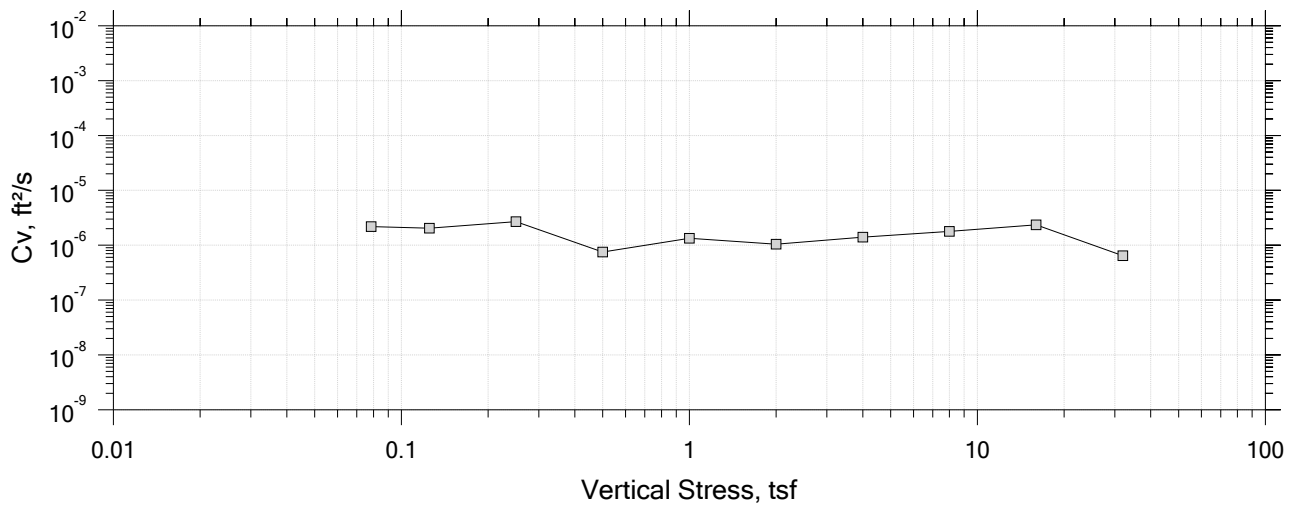
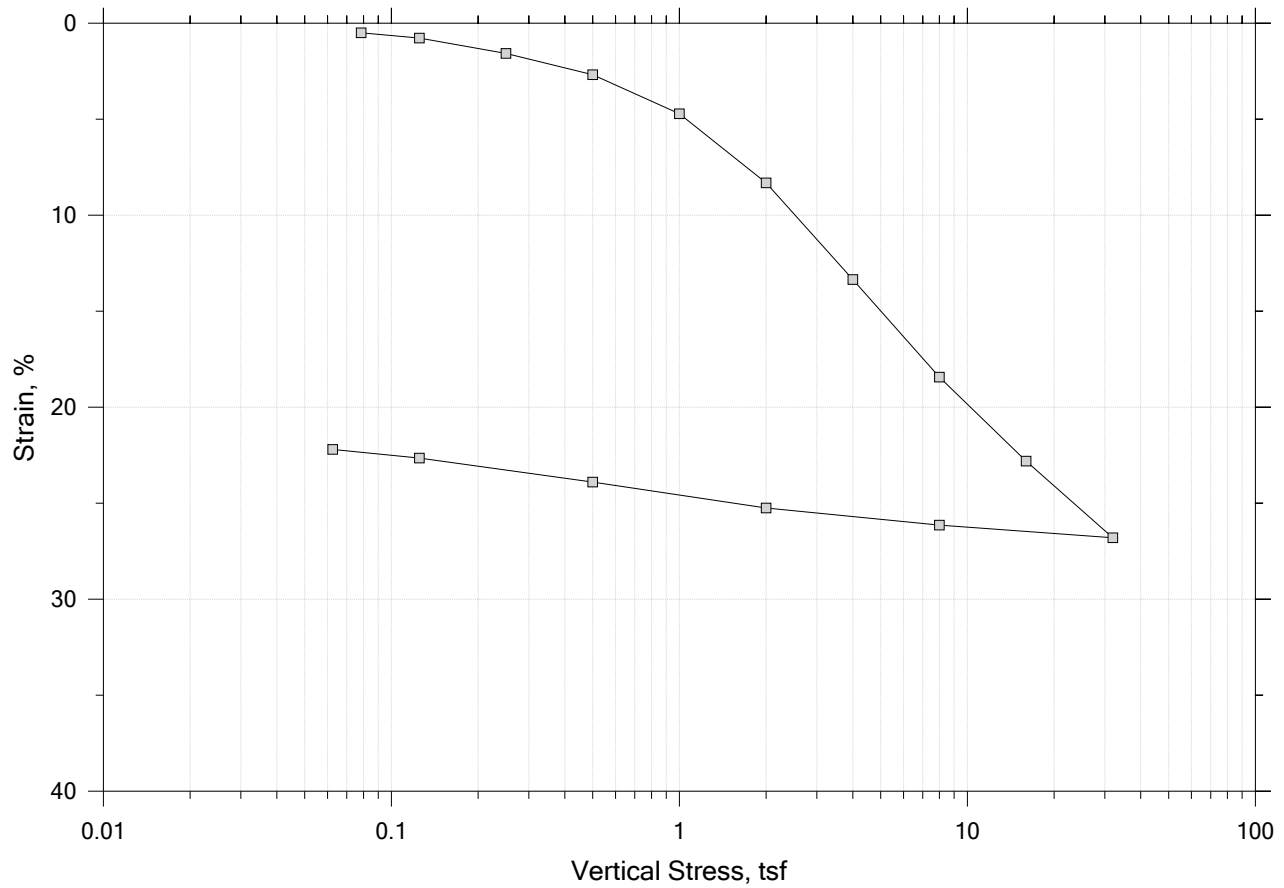
Square Root of Time Coefficients


[illegible]

	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 5-7 ft
	Test No.: IP-2	Sample Type: intact	Elevation:
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0696 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

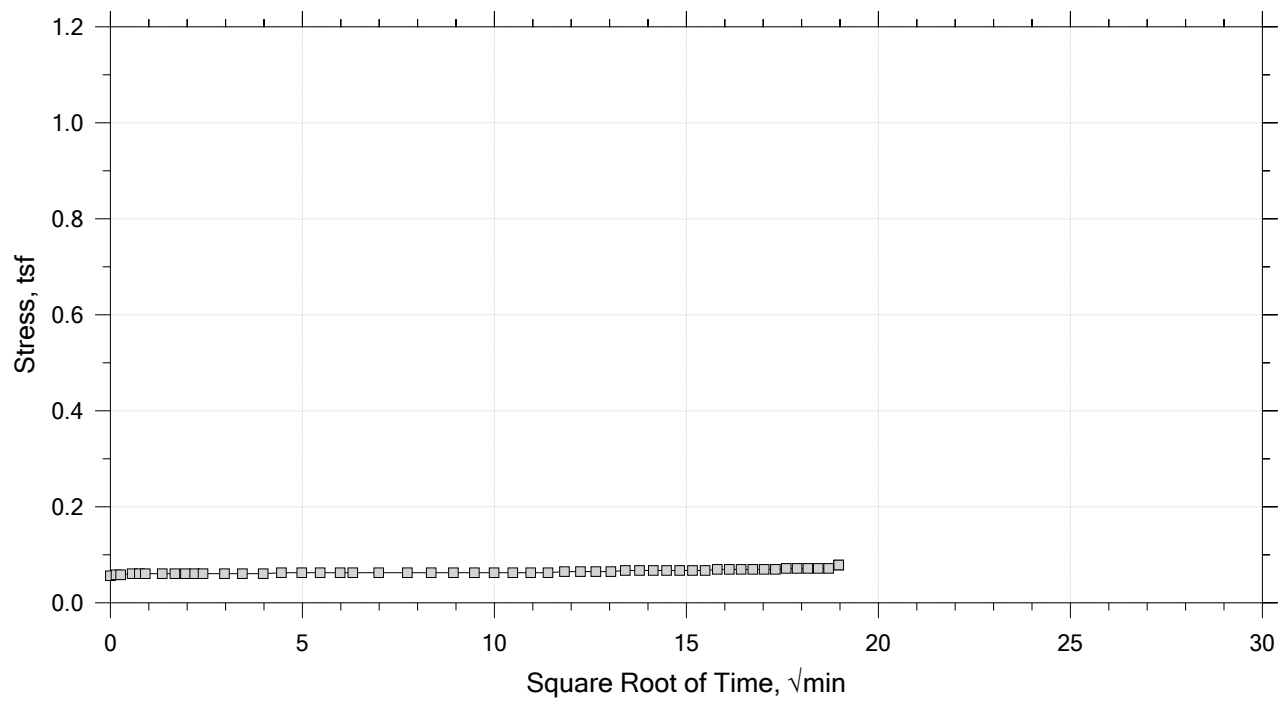
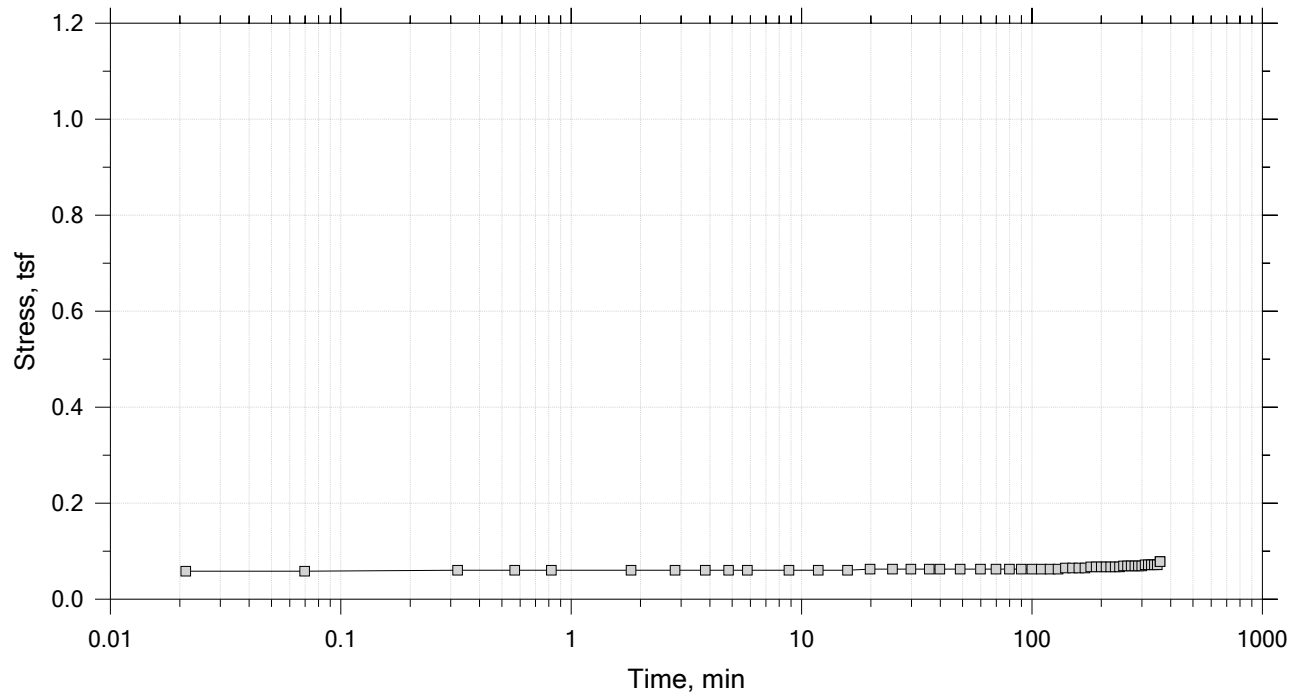
Summary Report




	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0785 tsf



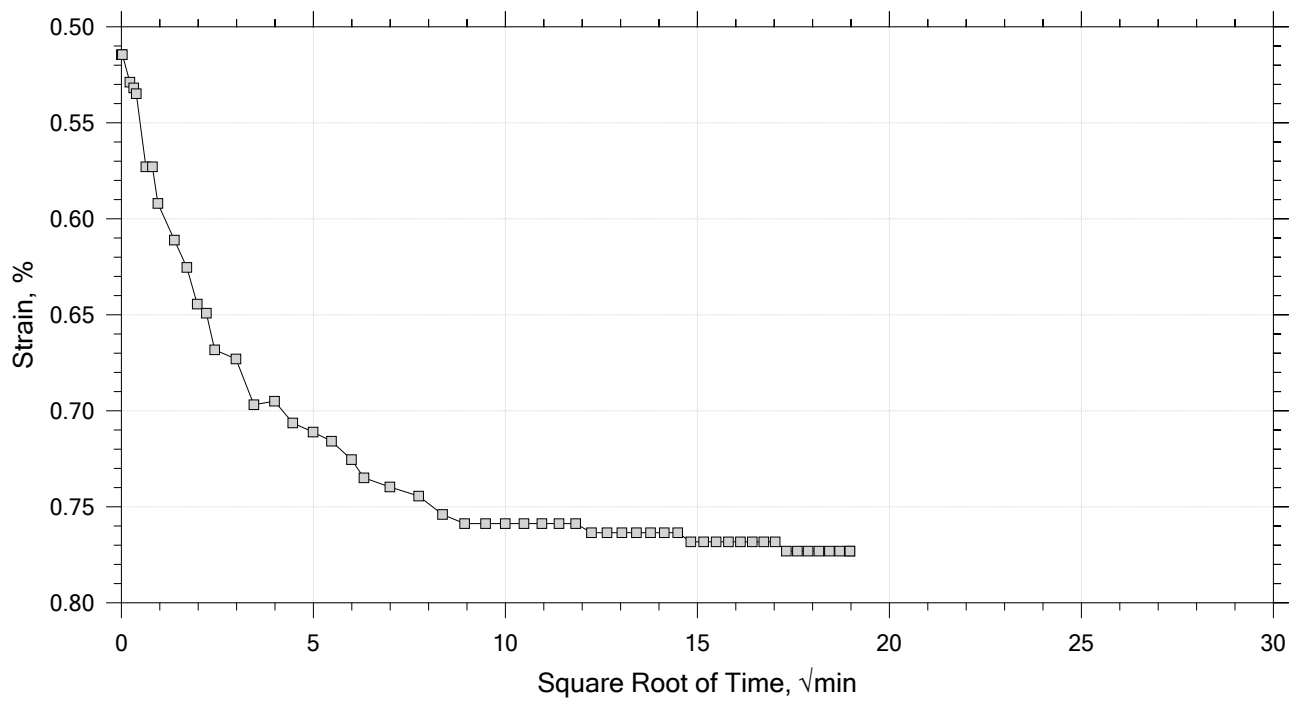
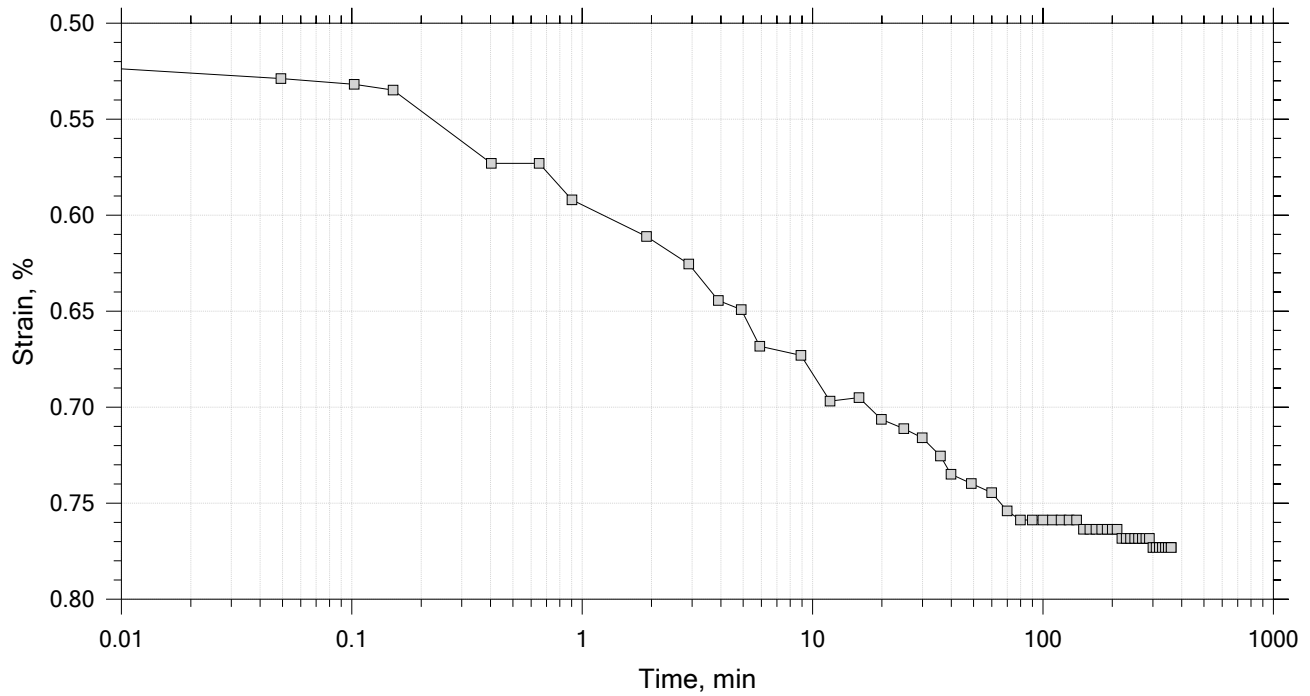
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	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf



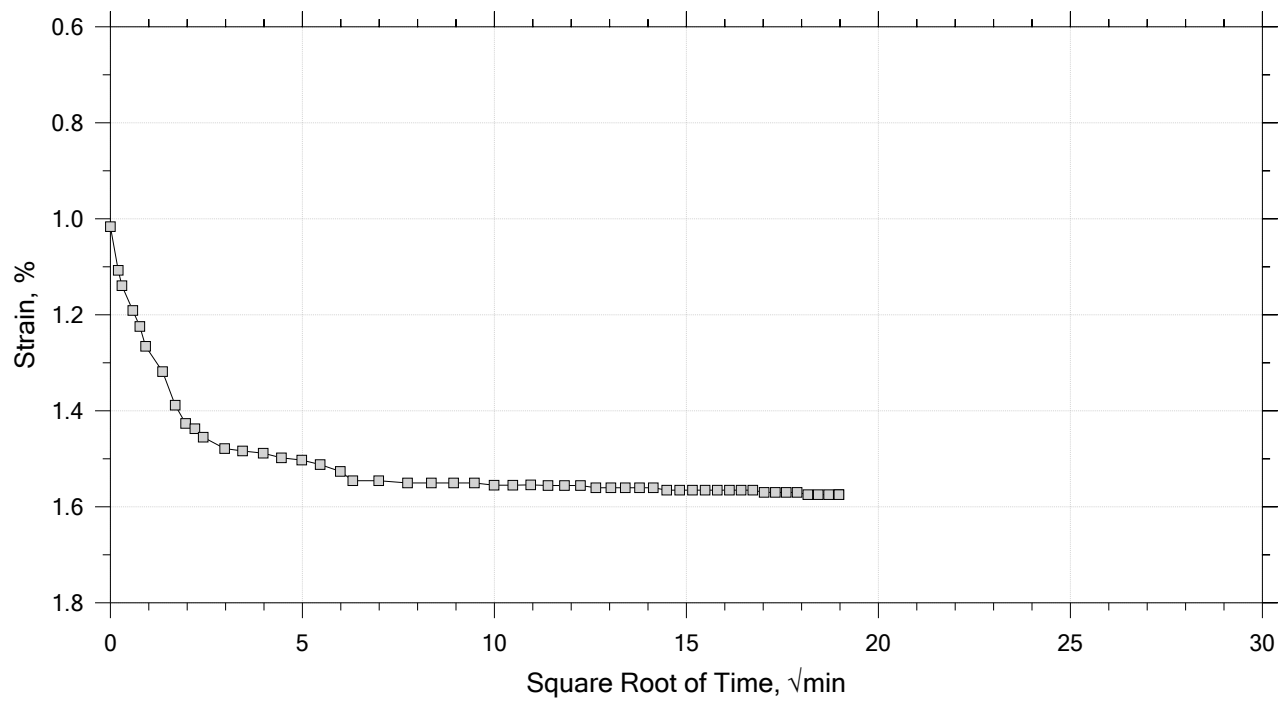
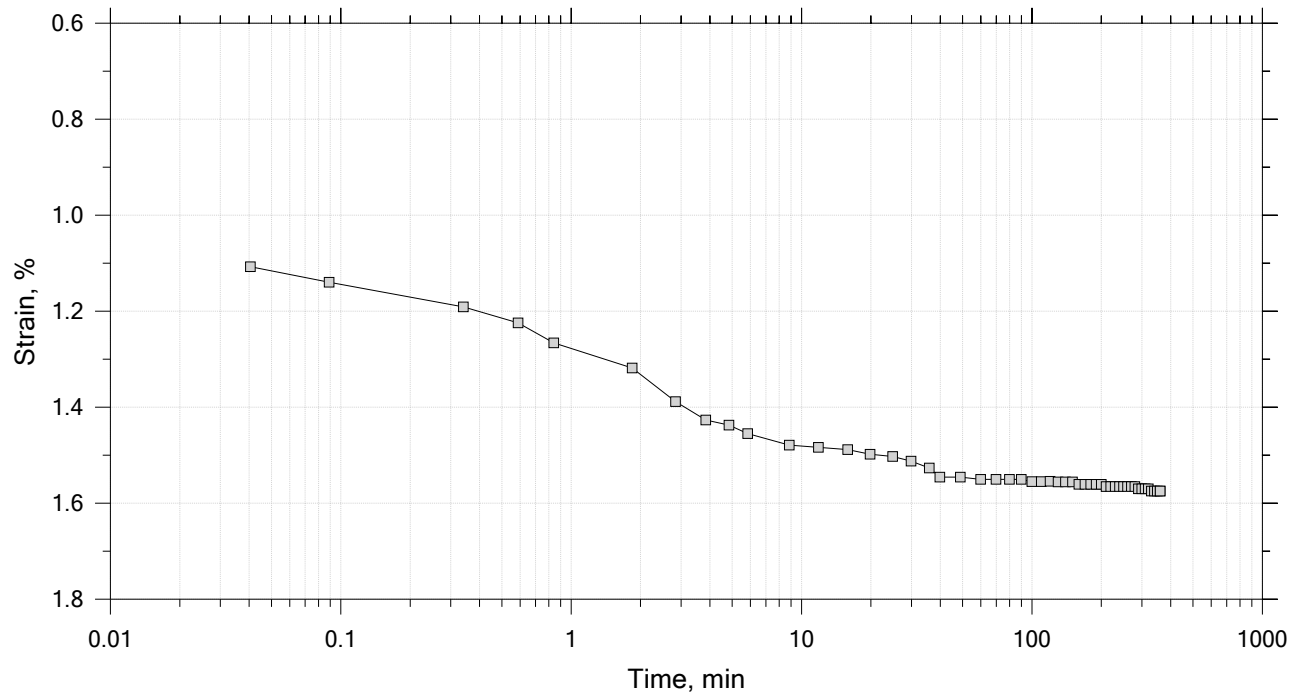
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	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf



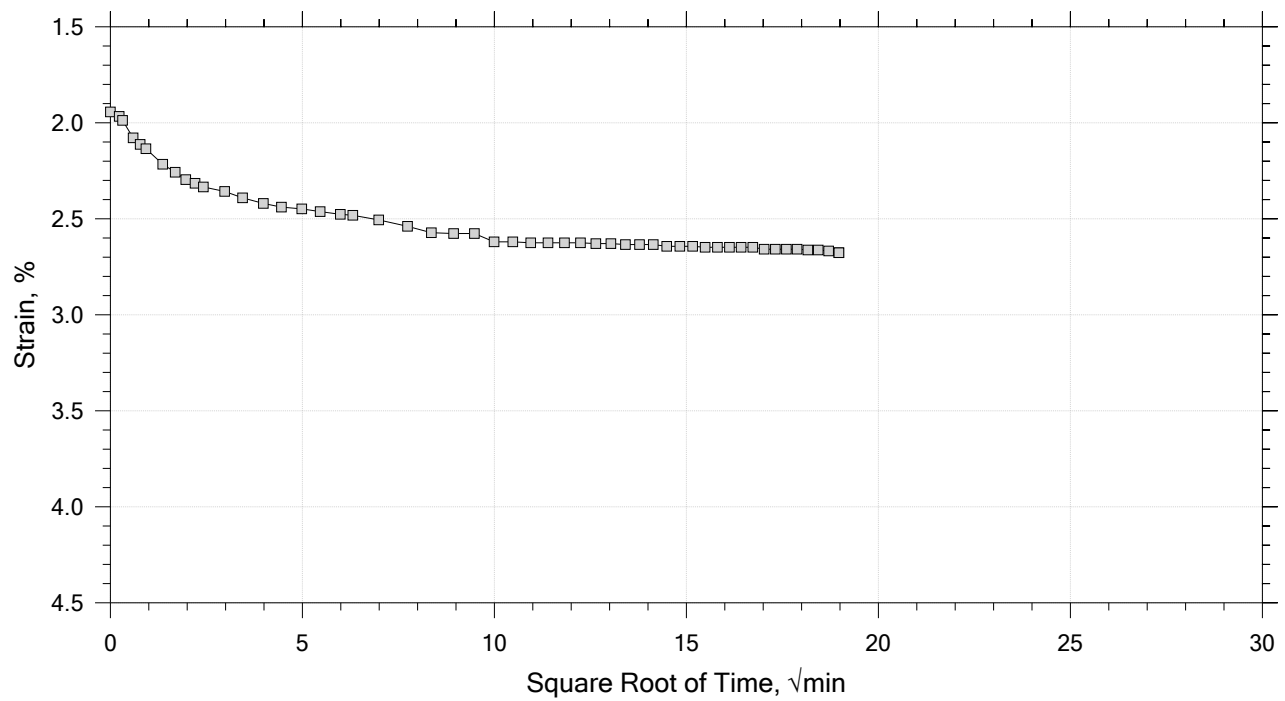
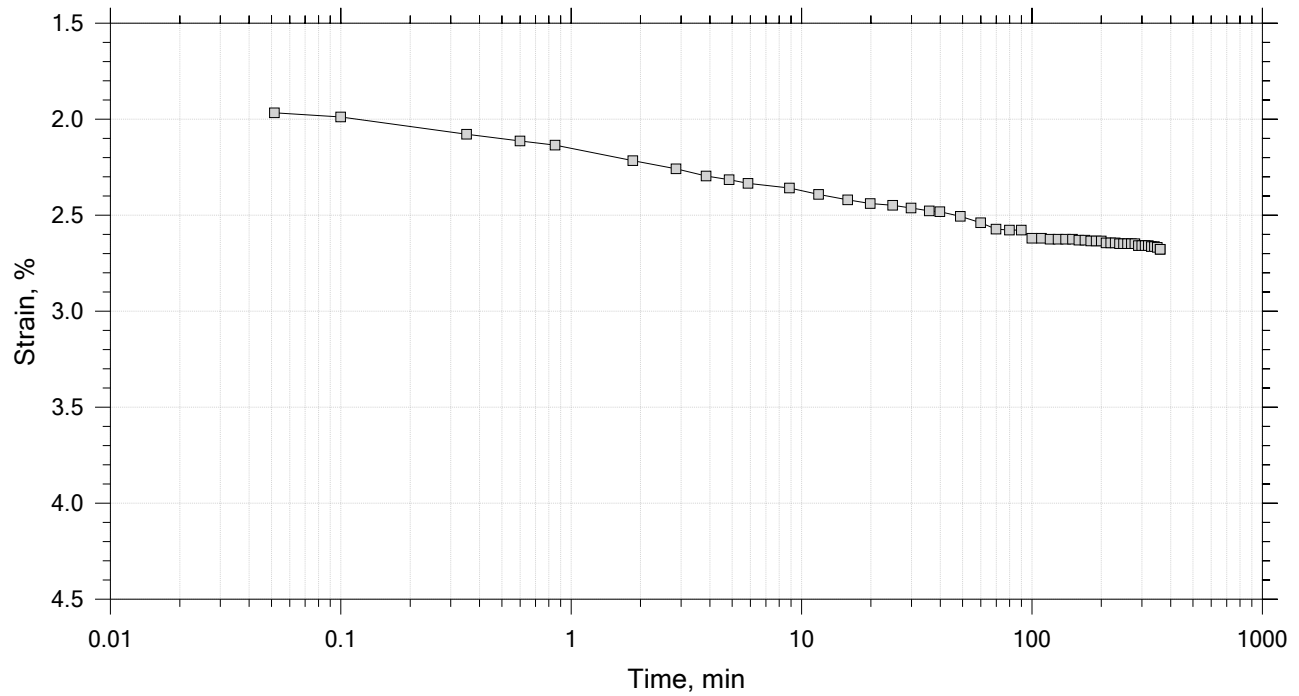
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf



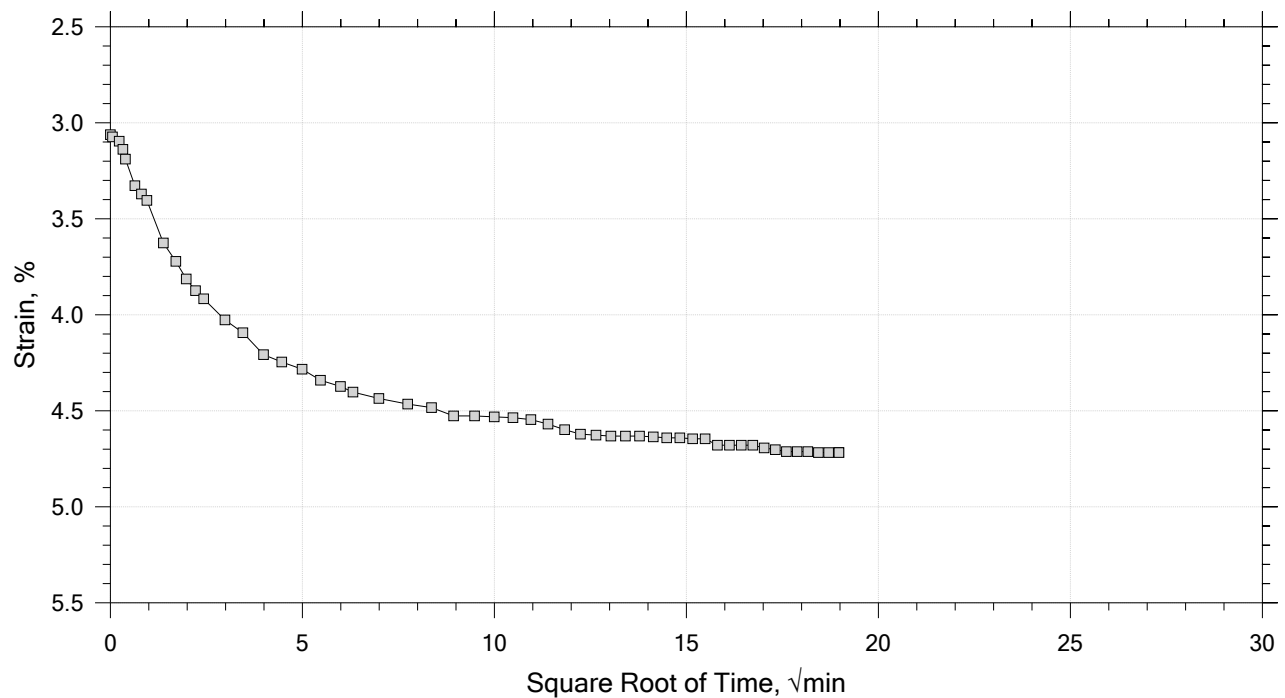
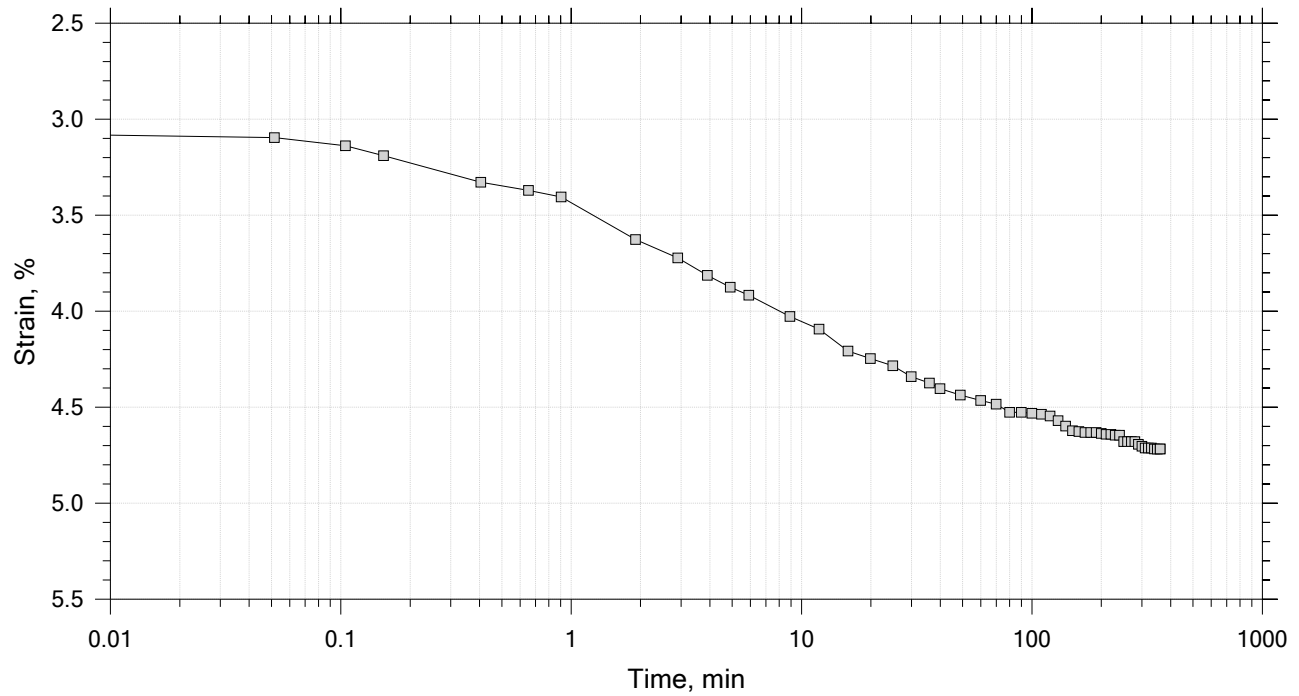
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf



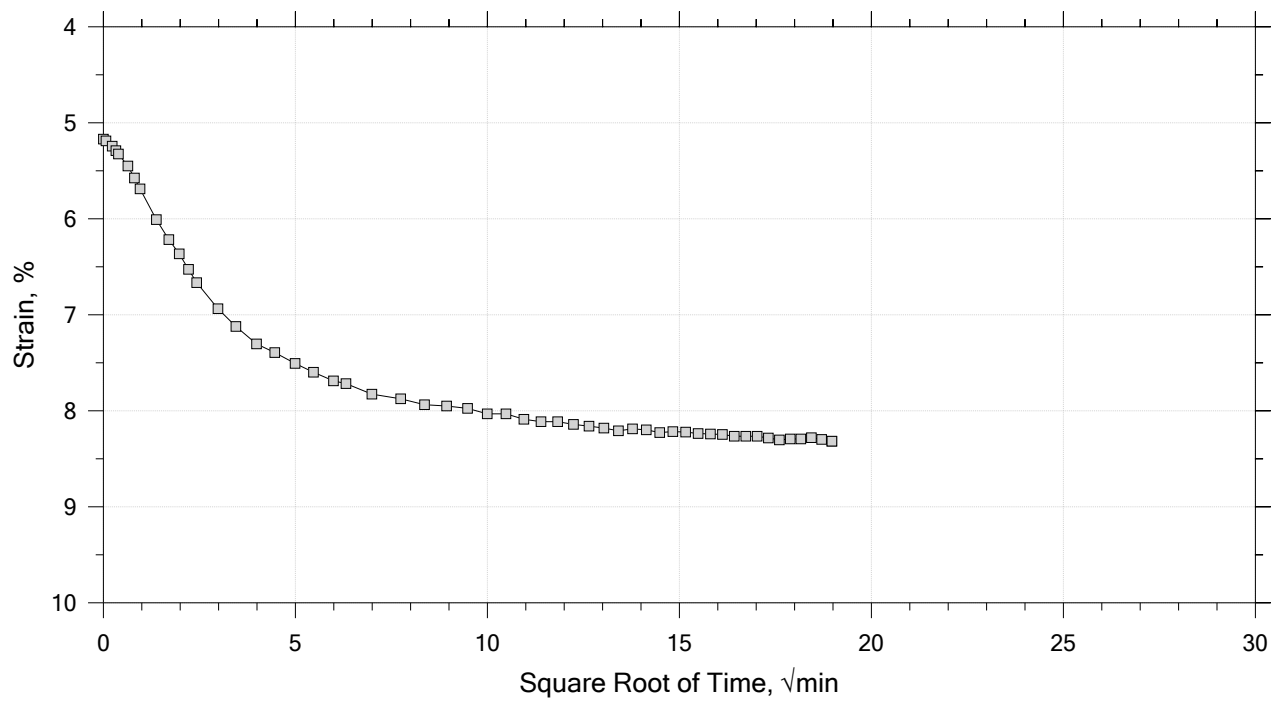
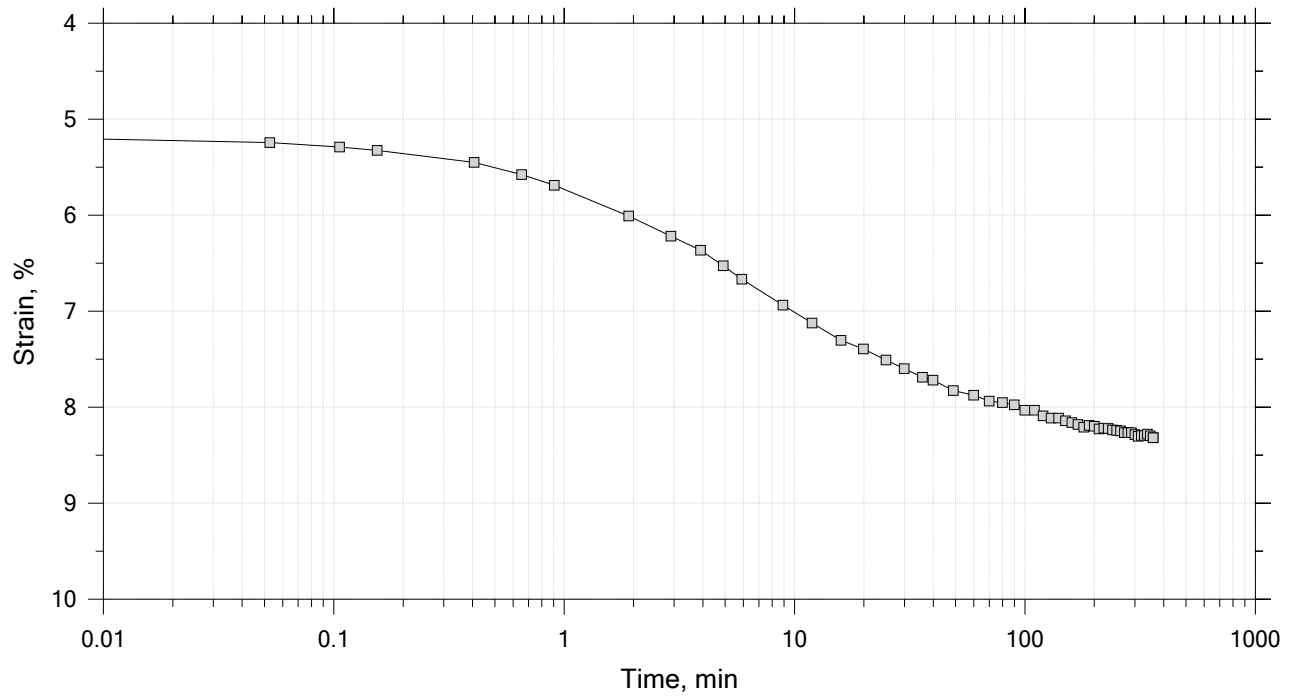
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf



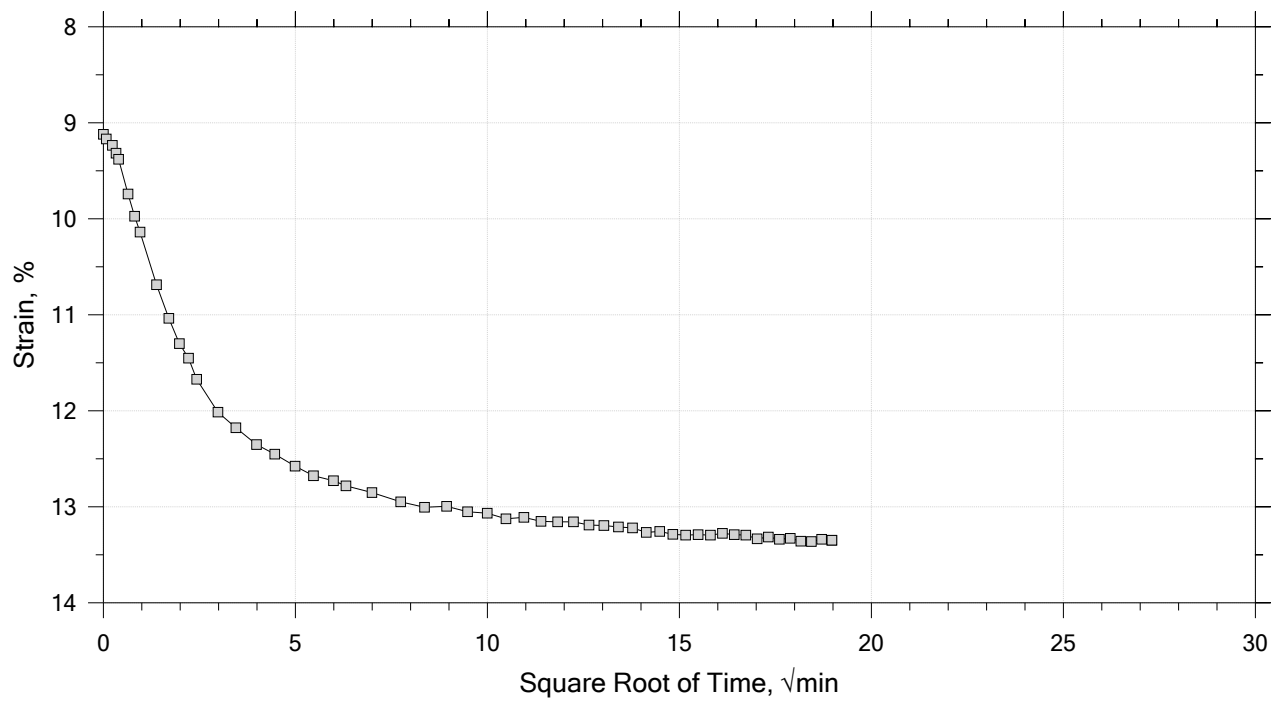
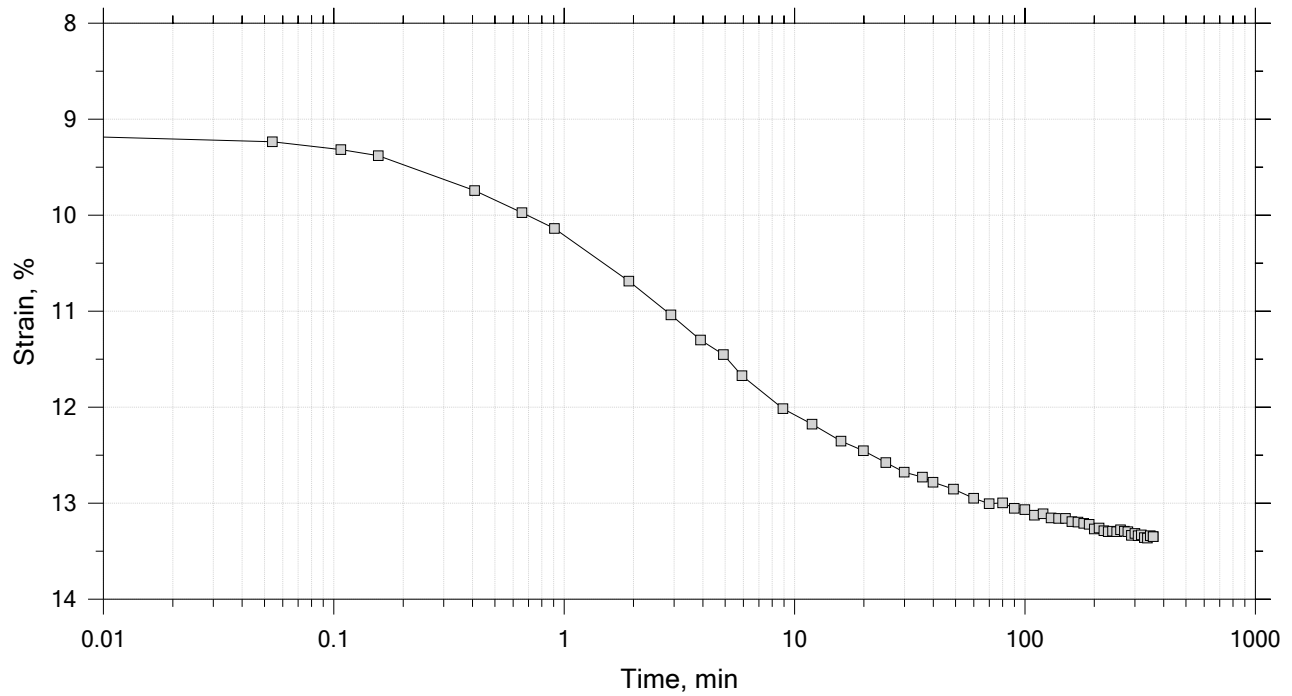
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf



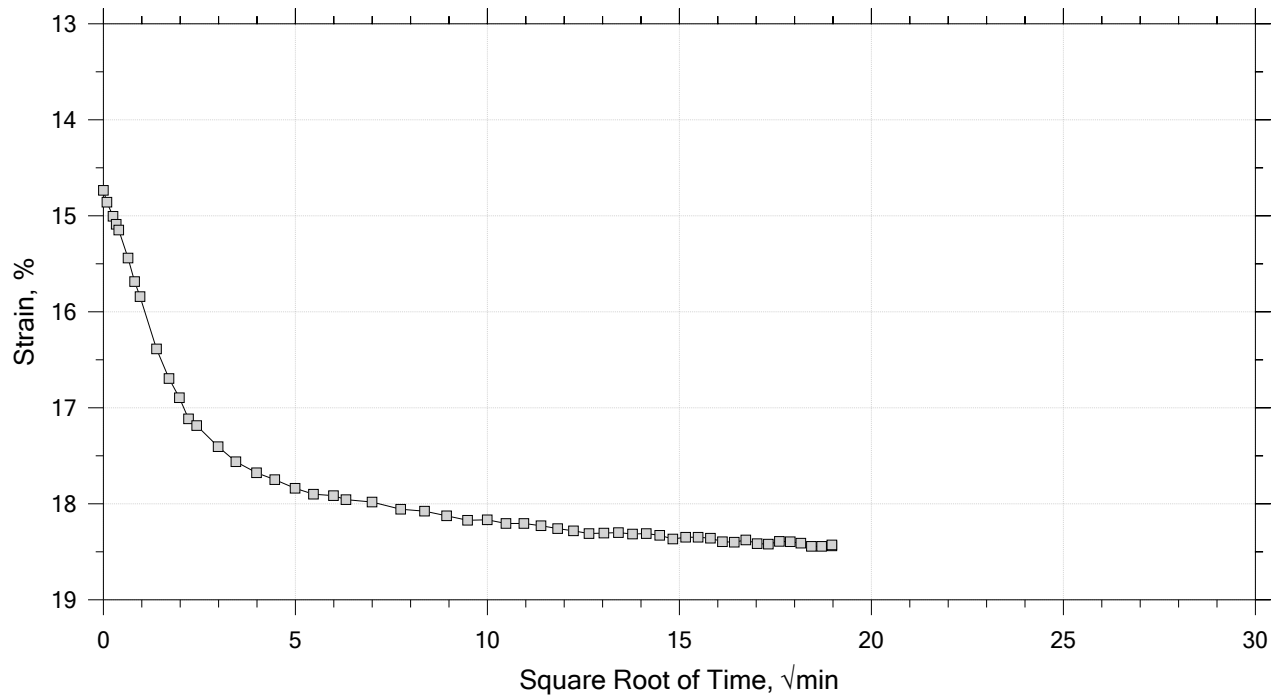
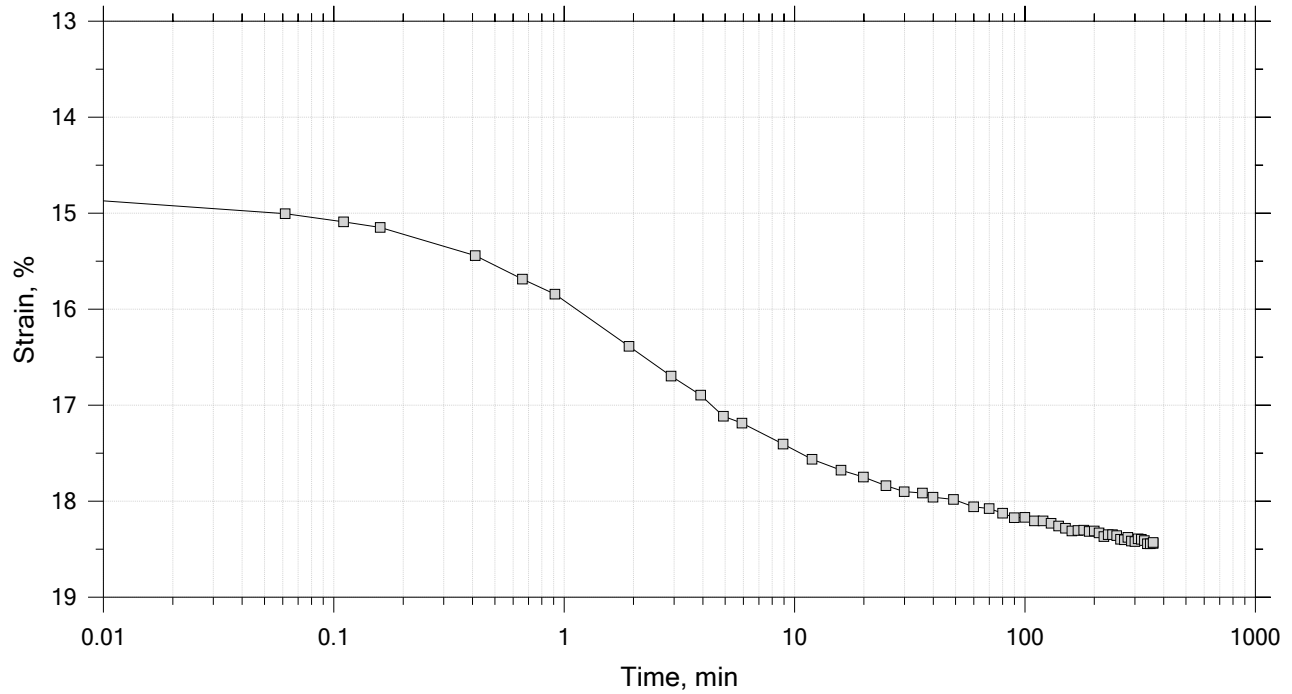
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf



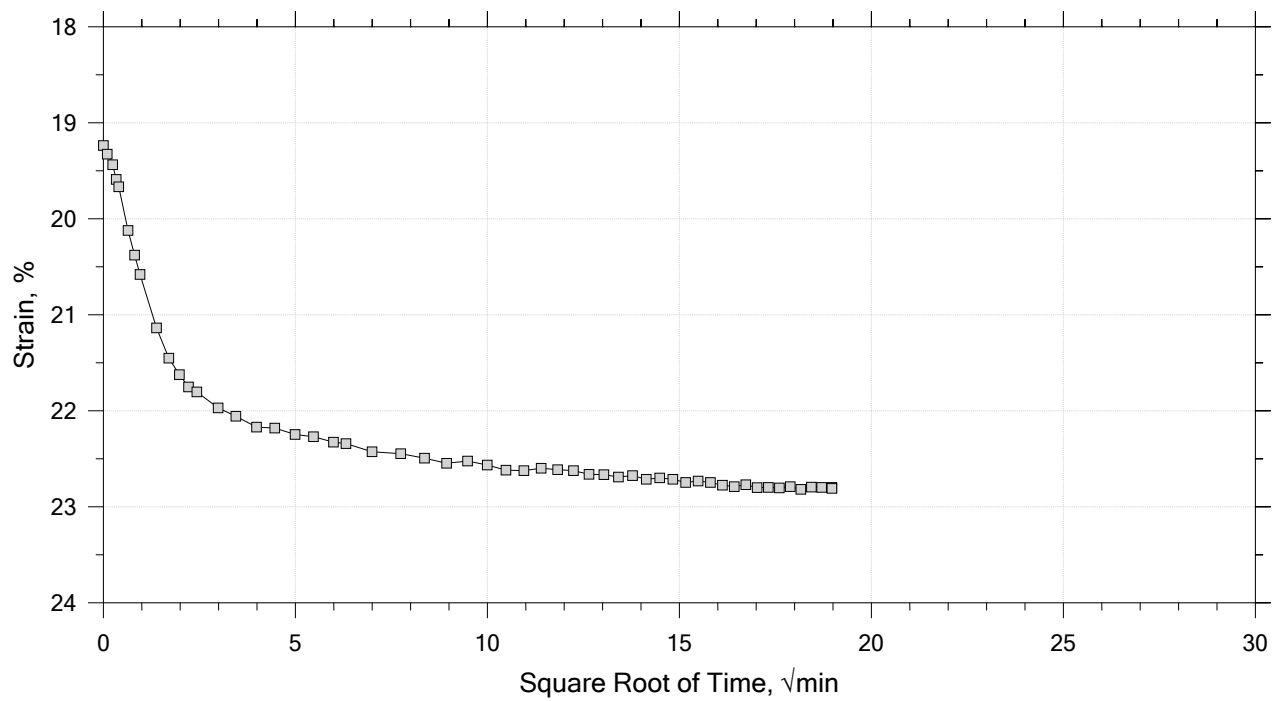
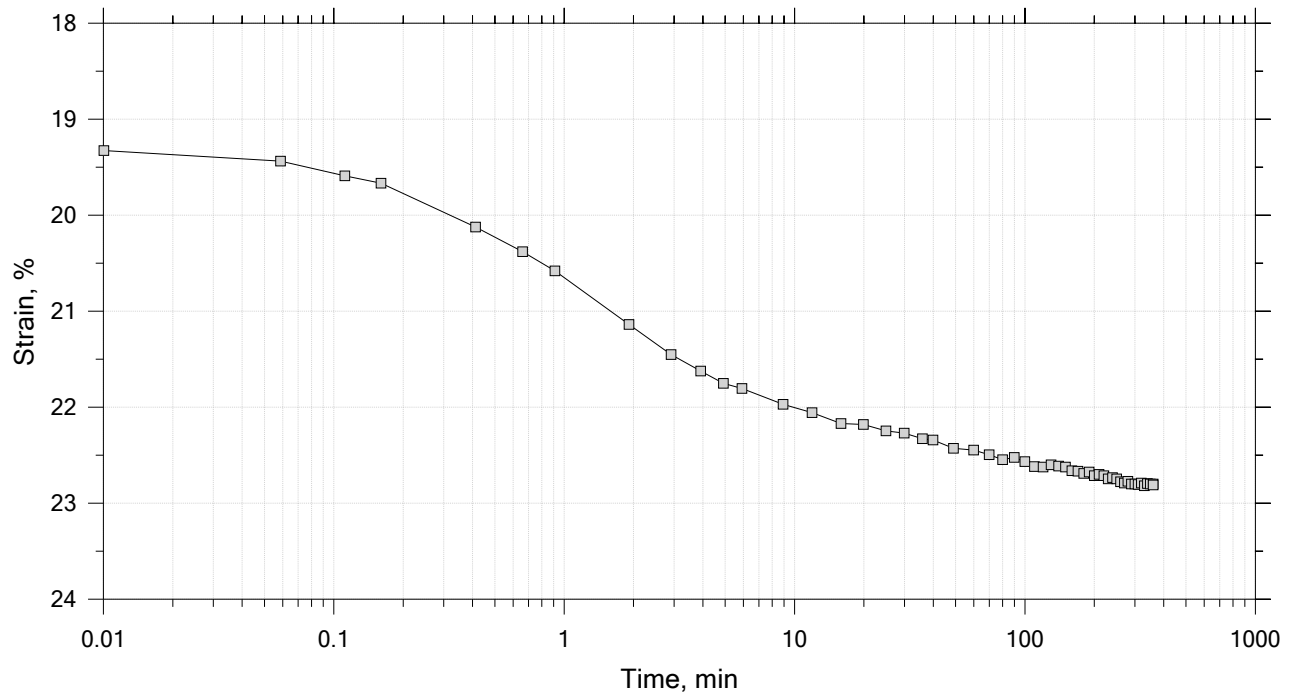
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf



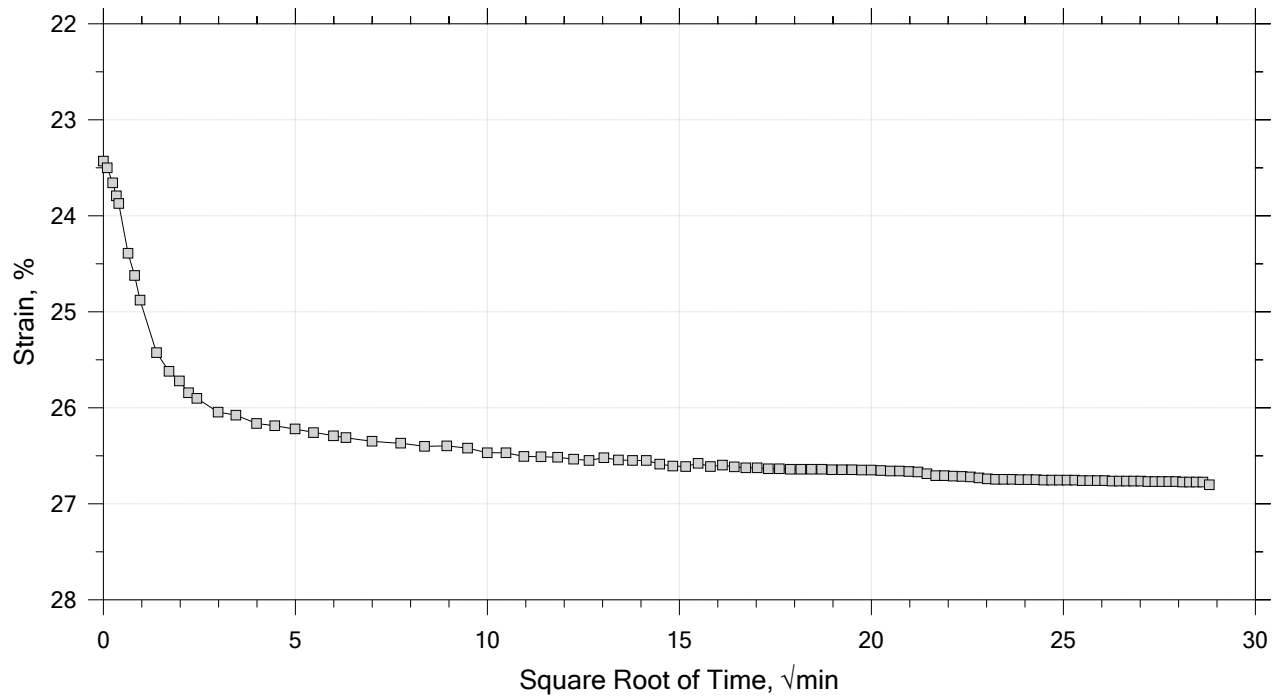
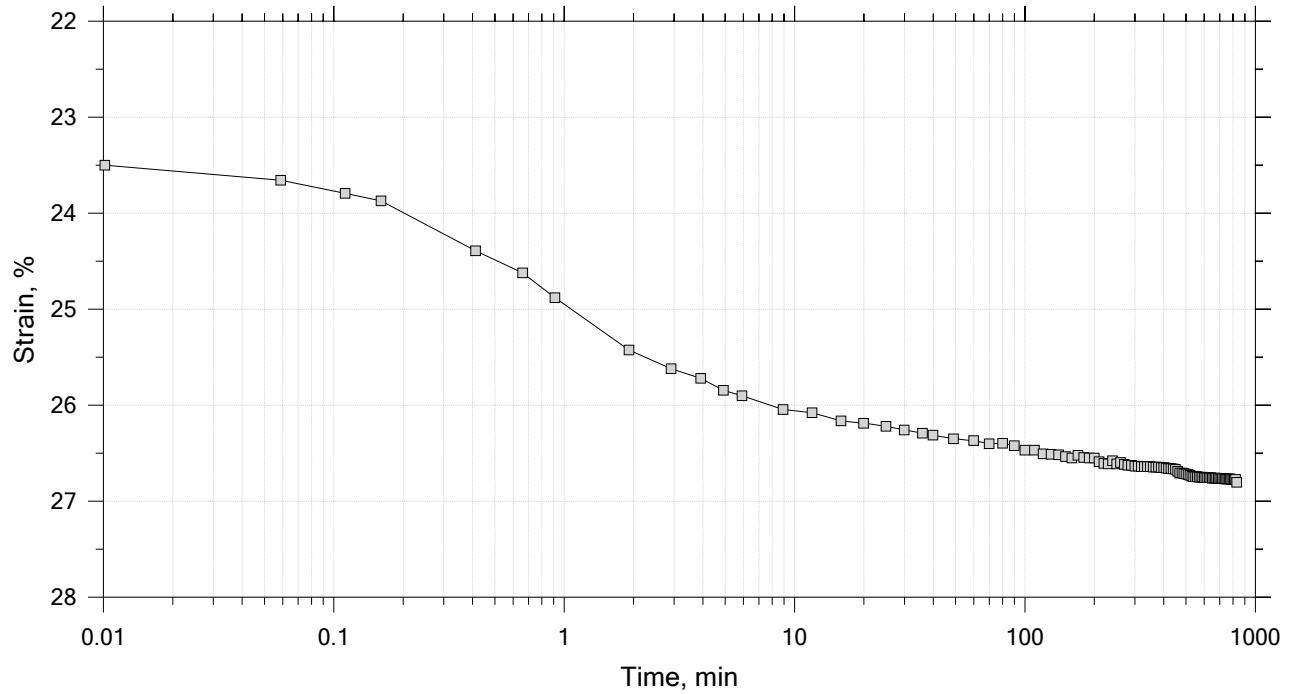
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf



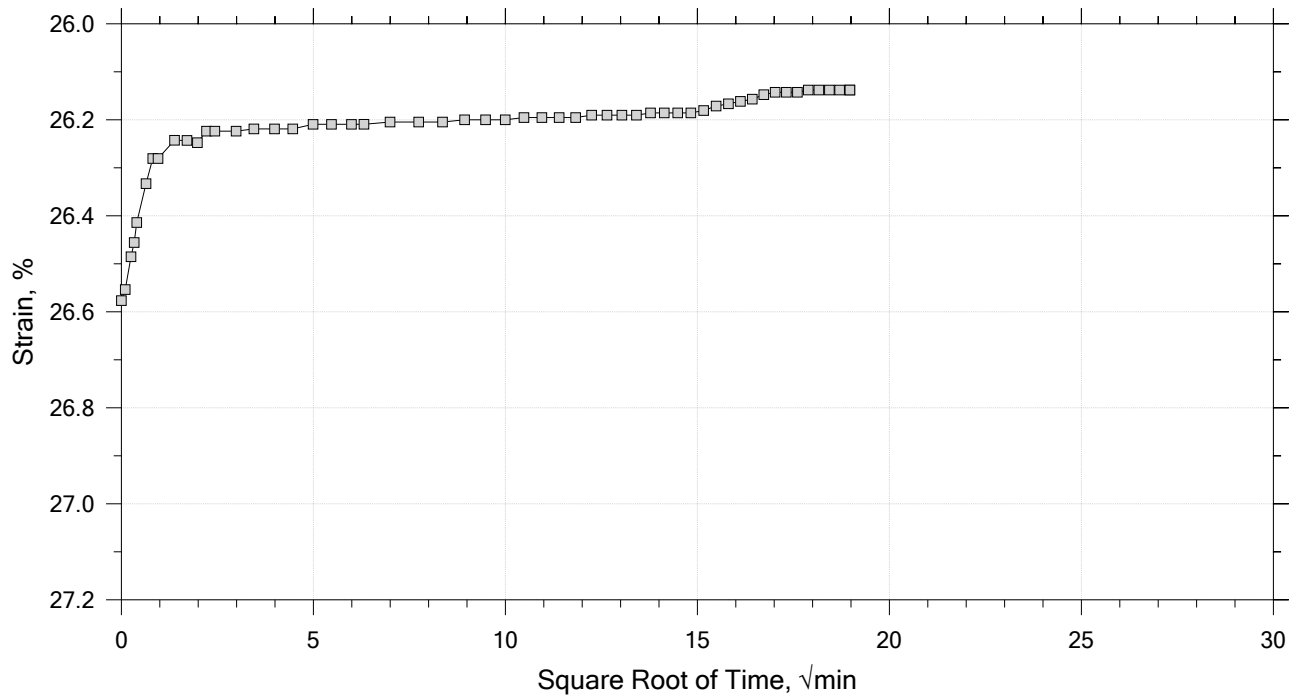
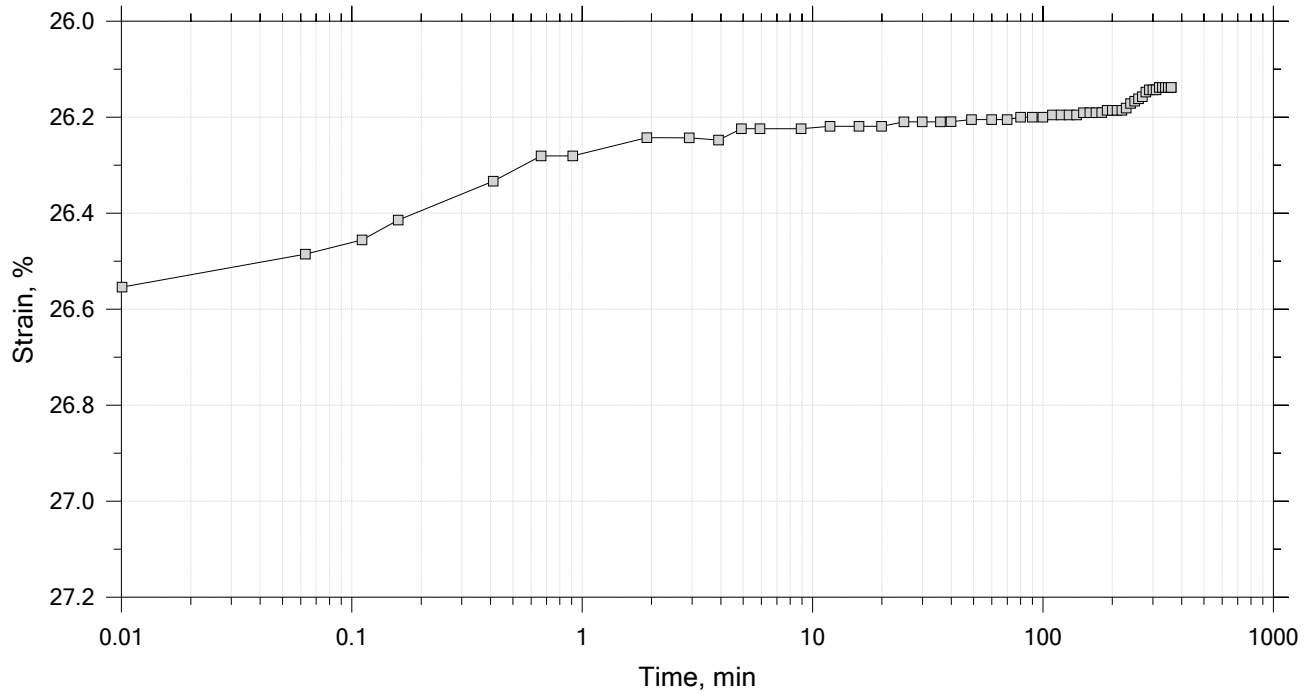
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf



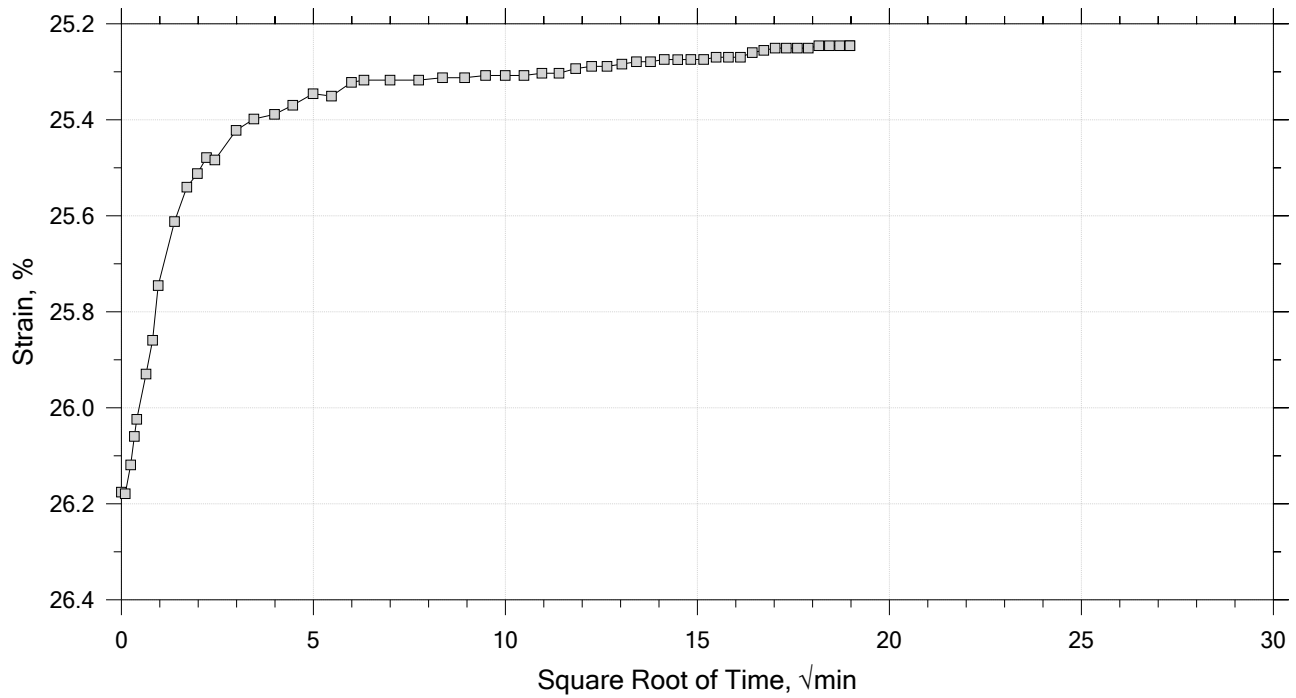
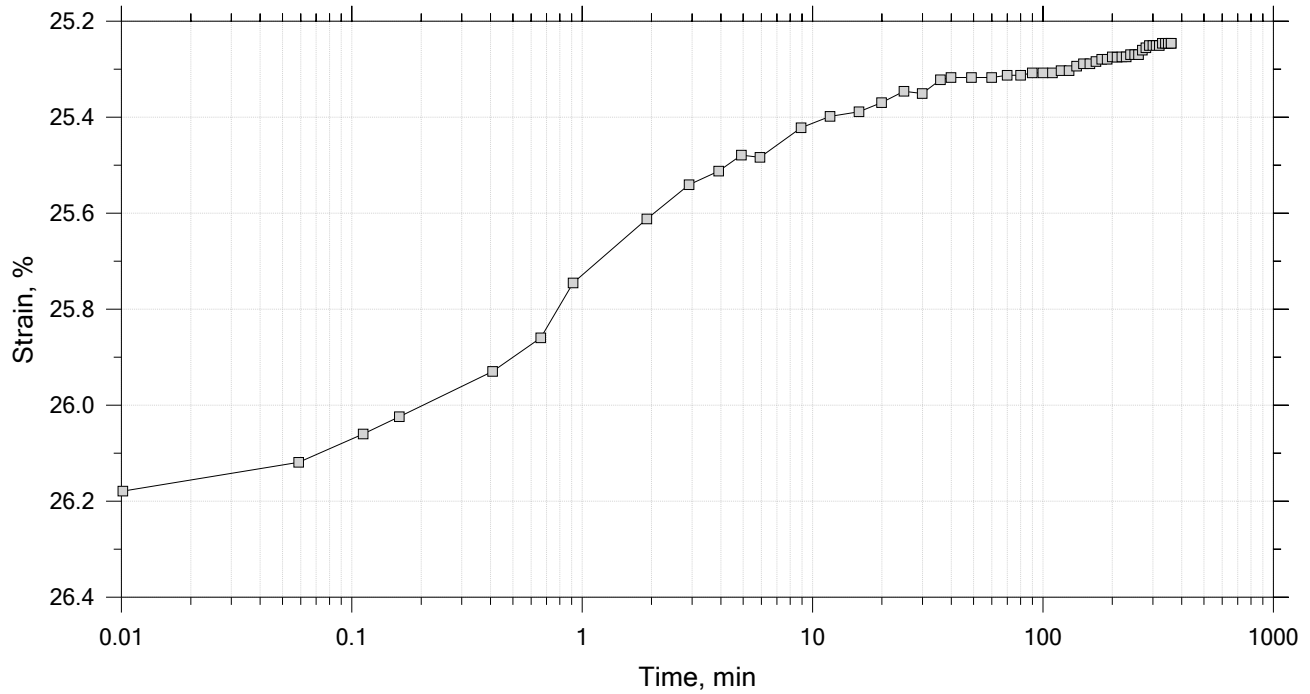
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf



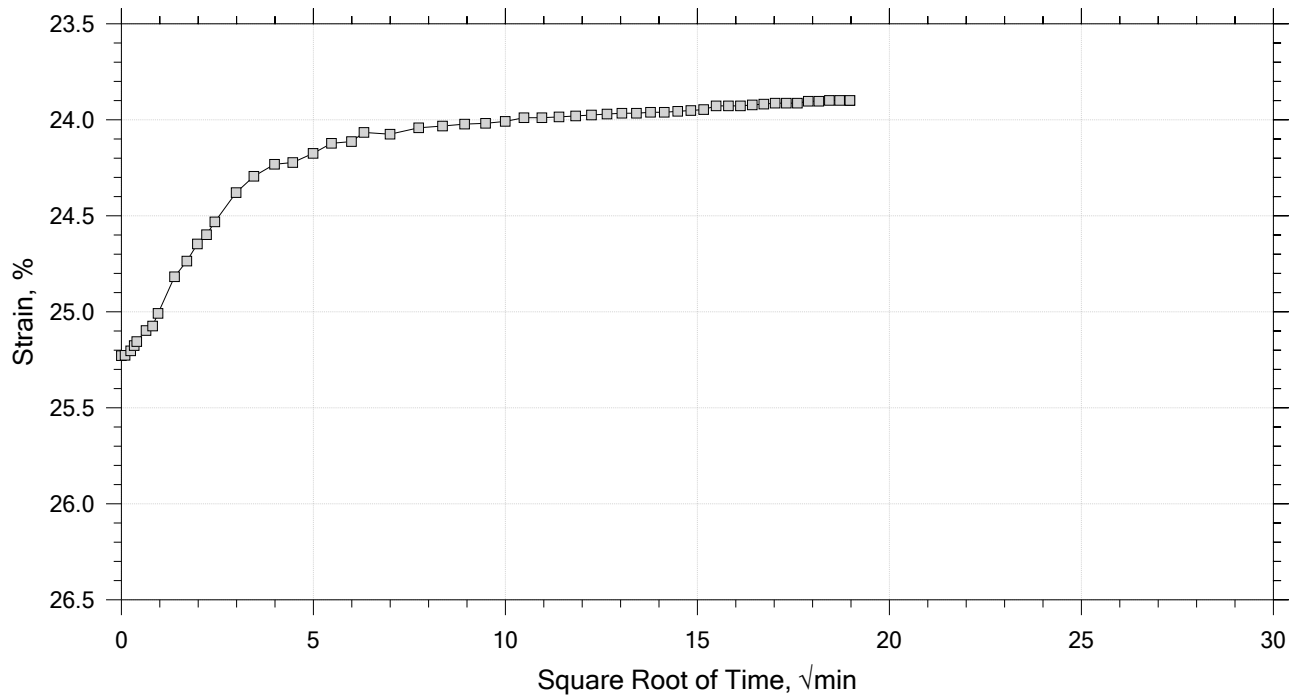
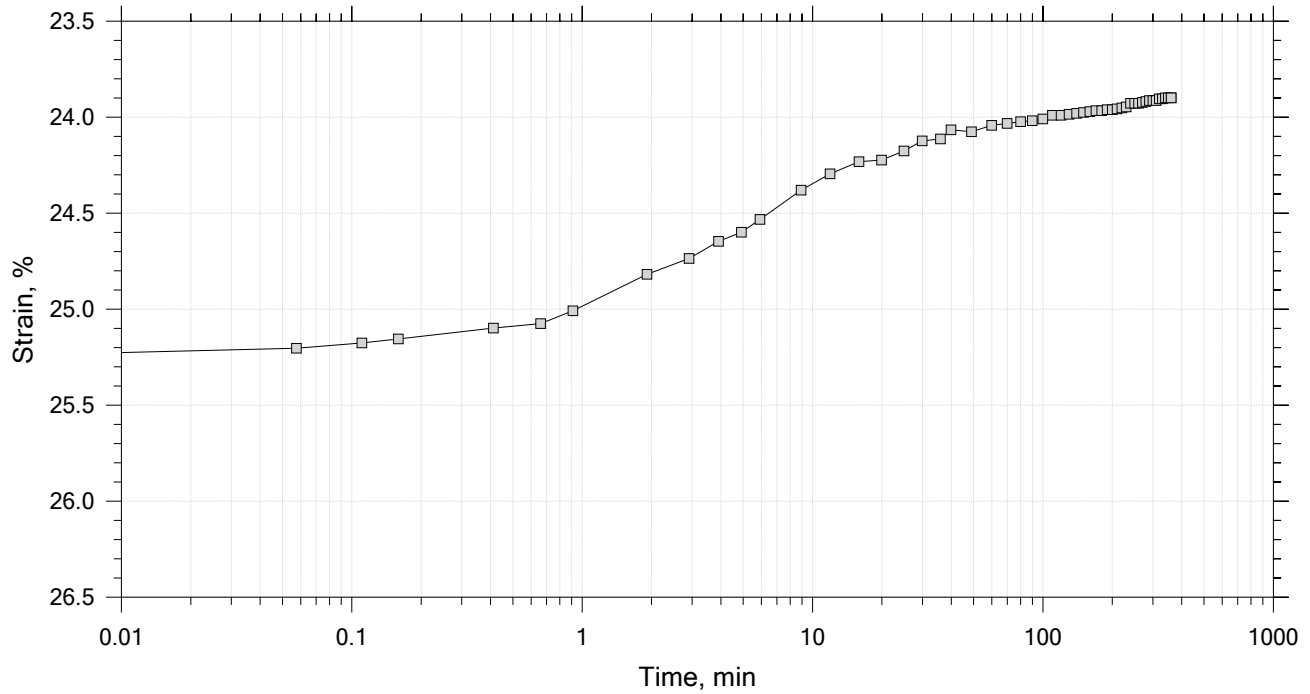
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf



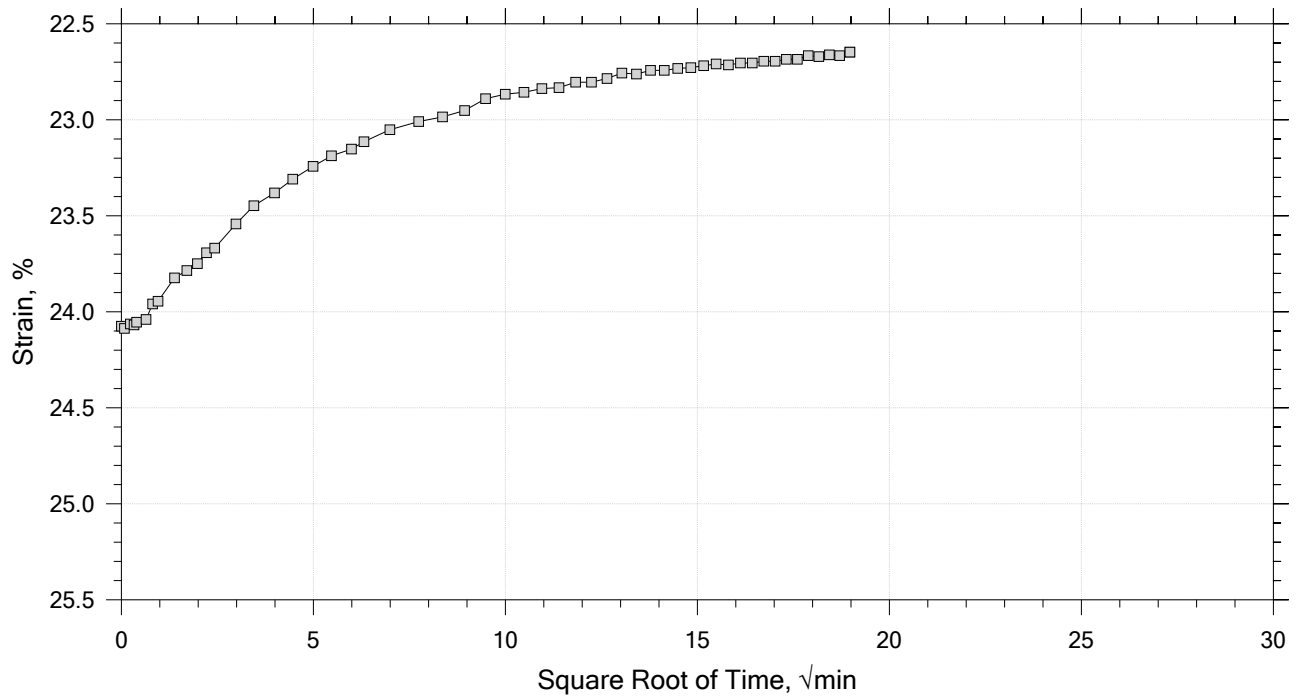
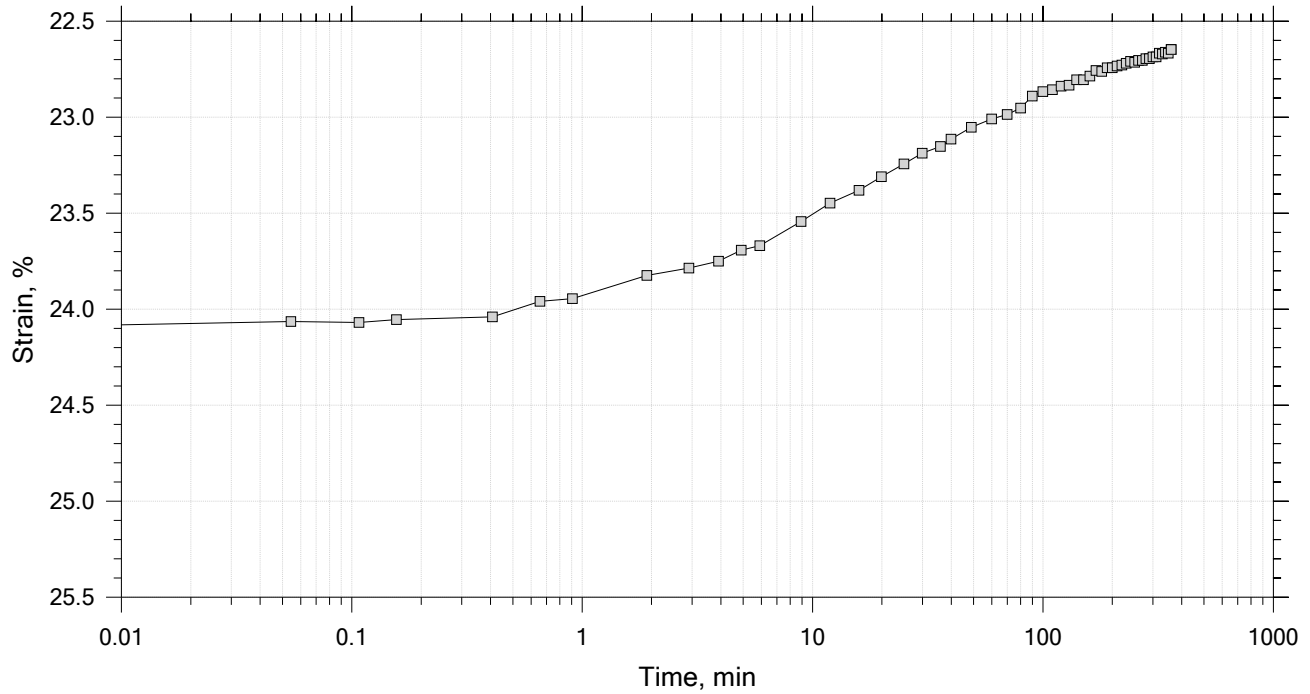
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf



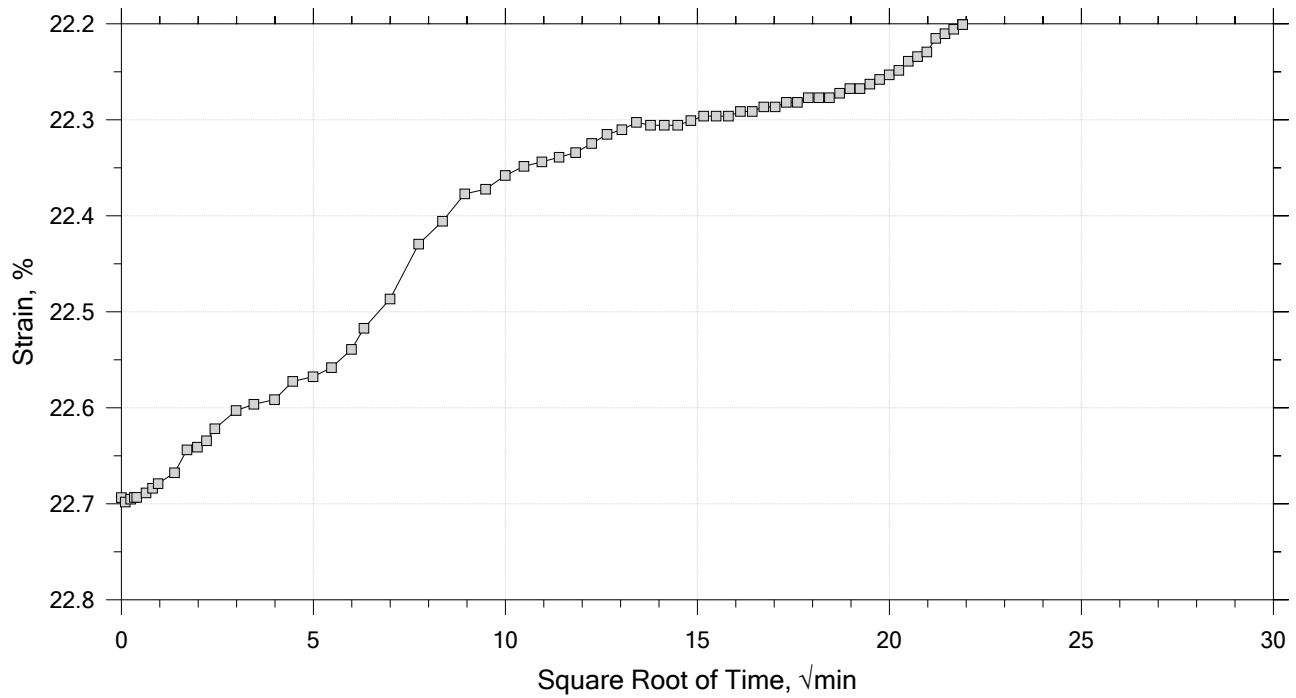
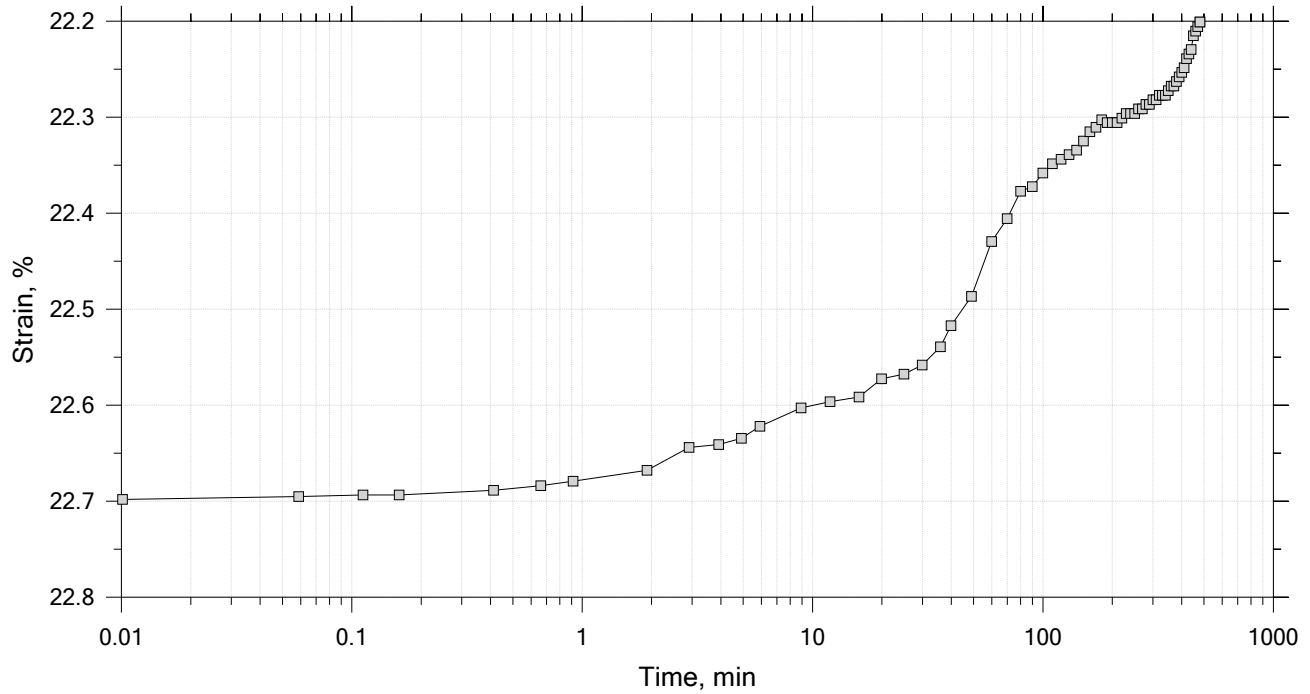
	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf




	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 34
Initial Height: 1.00 in	Initial Void Ratio: 0.981	Plastic Limit: 18
Final Height: 0.83 in	Final Void Ratio: 0.644	Plasticity Index: 16

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E-2530	RING		D2840
Mass Container, gm	8.15	109.06	109.06	8.2
Mass Container + Wet Soil, gm	281.18	260.61	247	145.5
Mass Container + Dry Soil, gm	207.73	220.85	220.85	119.47
Mass Dry Soil, gm	199.58	111.79	111.79	111.27
Water Content, %	36.80	35.57	23.39	23.39
Void Ratio	---	0.98	0.64	---
Degree of Saturation, %	---	99.84	100.00	---
Dry Unit Weight, pcf	---	86.757	104.53	---


Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

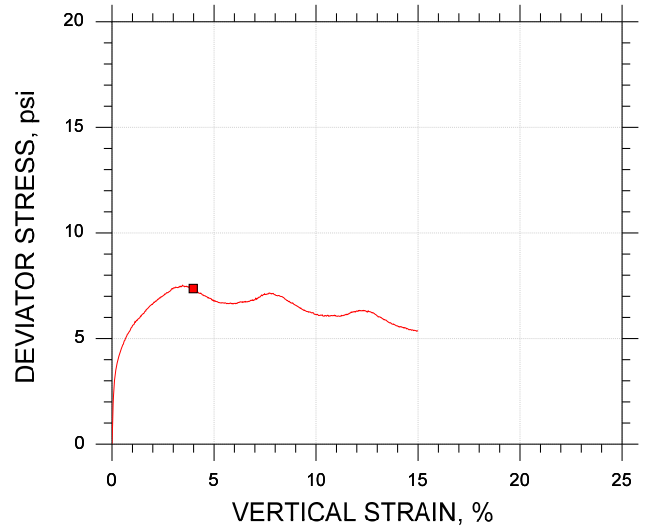
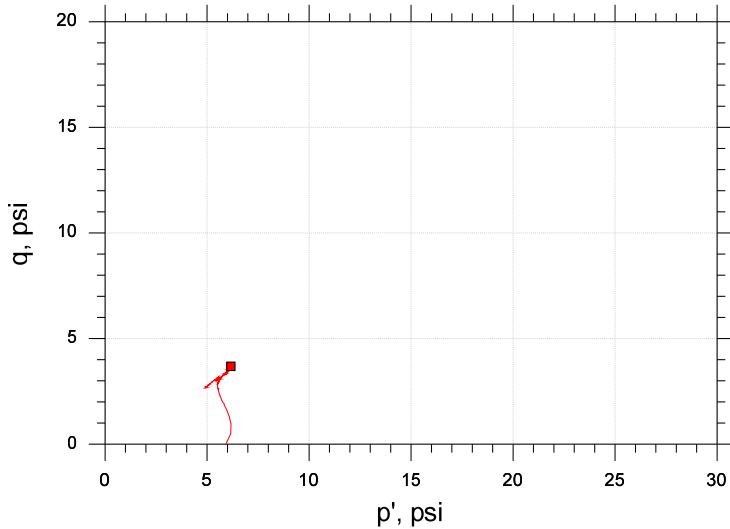
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	Project: I-395/Rte 9 Connector	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-205	Tested By: md	Checked By: anm
	Sample No.: U1	Test Date: 03/16/21	Depth: 10-12 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System X, Swell Pressure = 0.0785 tsf		
	Displacement at End of Increment		



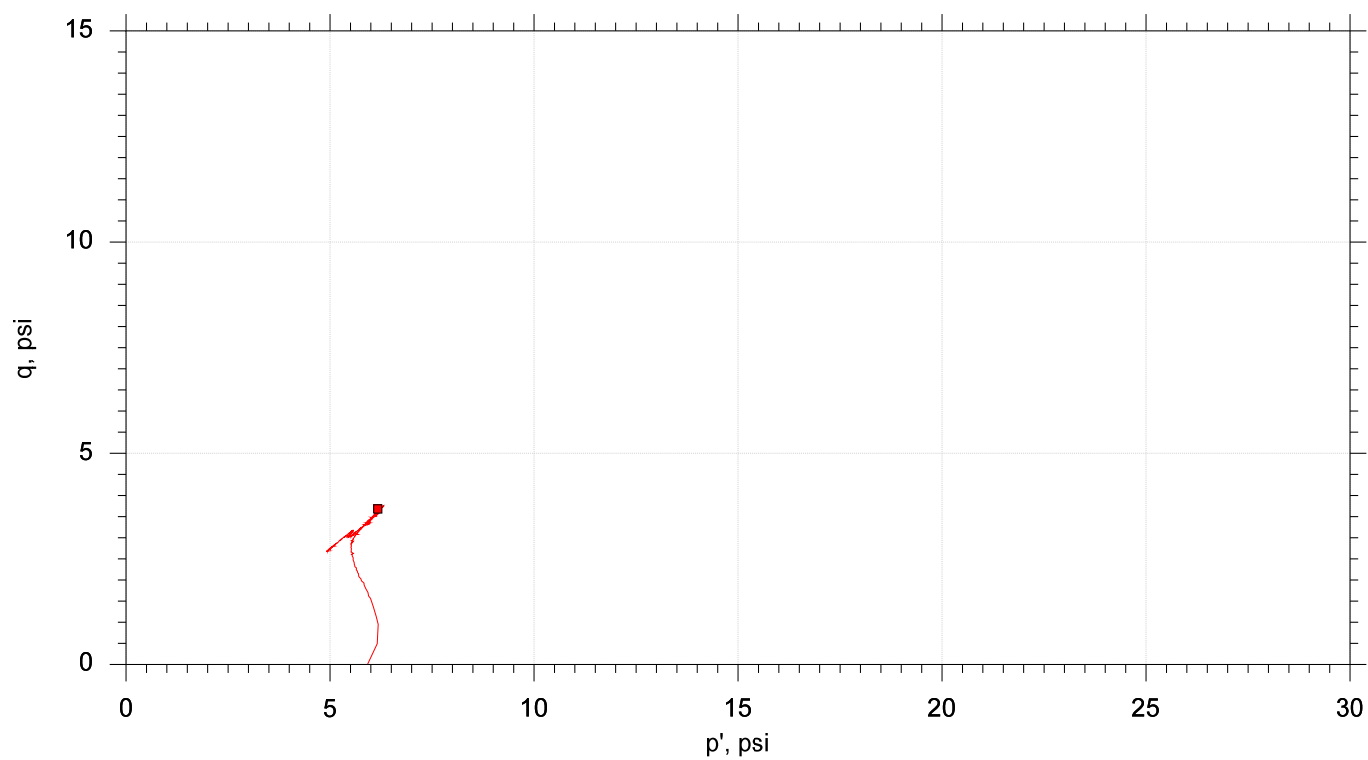
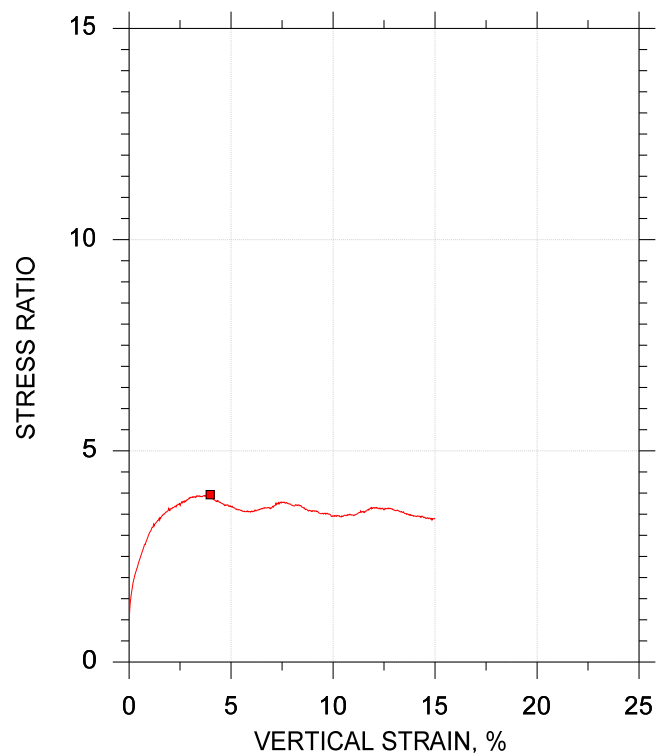
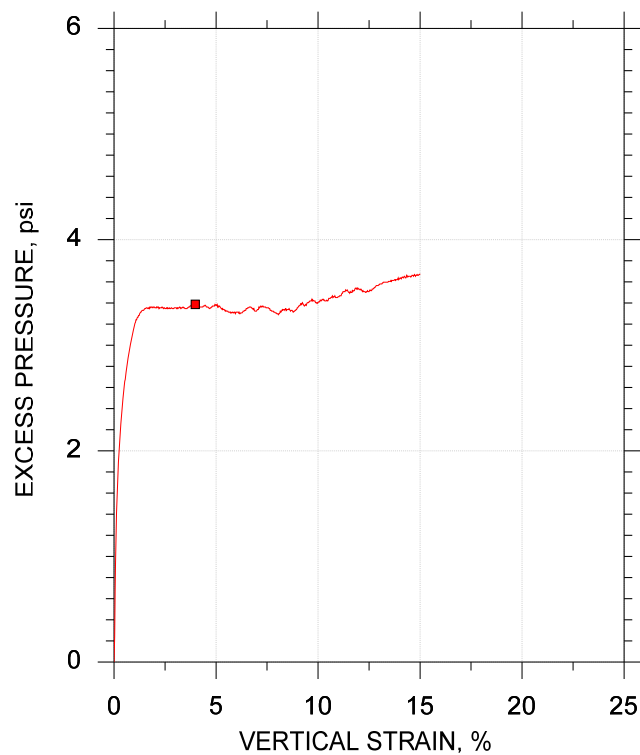
Client: Haley & Aldrich, Inc.	
Project Name: I-395/Rte 9 Connector (Area 2)	
Project Location: Brewer-Eddington, ME	
Project Number: GTX-313196	
Tested By: trm	Checked By: njh
Boring ID: BB-BEB-202	
Preparation: intact	
Description: Wet, gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 32	Plastic Limit: 17
Plasticity Index: 15	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




Symbol		■		
Sample ID		U2		
Depth, ft		15-17		
Test Number		CU-3-1		
Initial	Height, in	4.510		
	Diameter, in	2.030		
	Moisture Content (from Cuttings), %	38.2		
	Dry Density, pcf	79.7		
	Saturation (Wet Method), %	92.5		
	Void Ratio	1.11		
Before Shear	Moisture Content, %	40.3		
	Dry Density, pcf	80.8		
	Cross-sectional Area (Method A), in ²	3.208		
	Saturation, %	100.0		
	Void Ratio	1.09		
	Back Pressure, psi	150.9		
Vertical Effective Consolidation Stress, psi		5.902		
Horizontal Effective Consolidation Stress, psi		5.914		
Vertical Strain after Consolidation, %		0.3311		
Volumetric Strain after Consolidation, %		1.042		
Time to 50% Consolidation, min		64.00		
Shear Strength, psi		3.684		
Strain at Failure, %		3.98		
Strain Rate, %/min		0.01600		
Deviator Stress at Failure, psi		7.367		
Effective Minor Principal Stress at Failure, psi		2.486		
Effective Major Principal Stress at Failure, psi		9.853		
B-Value		0.96		
Notes: - Before Shear Saturation set to 100% for phase calculation. - Moisture Content determined by ASTM D2216. - Atterberg Limits determined by ASTM D4318. - Deviator Stress includes membrane correction. - Values for c and ϕ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.				
Remarks:				

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

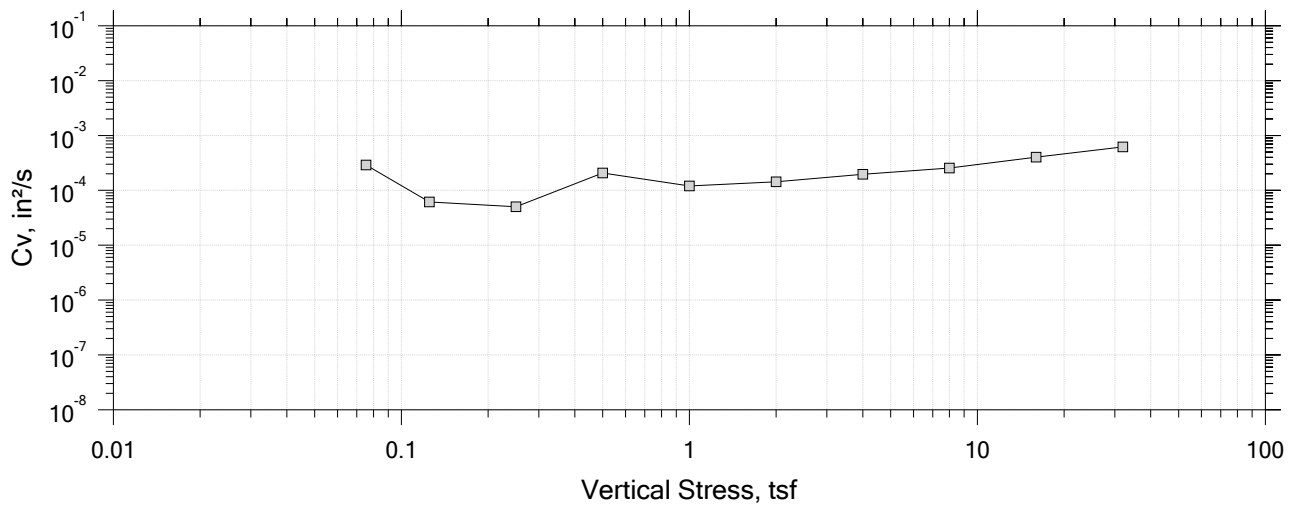
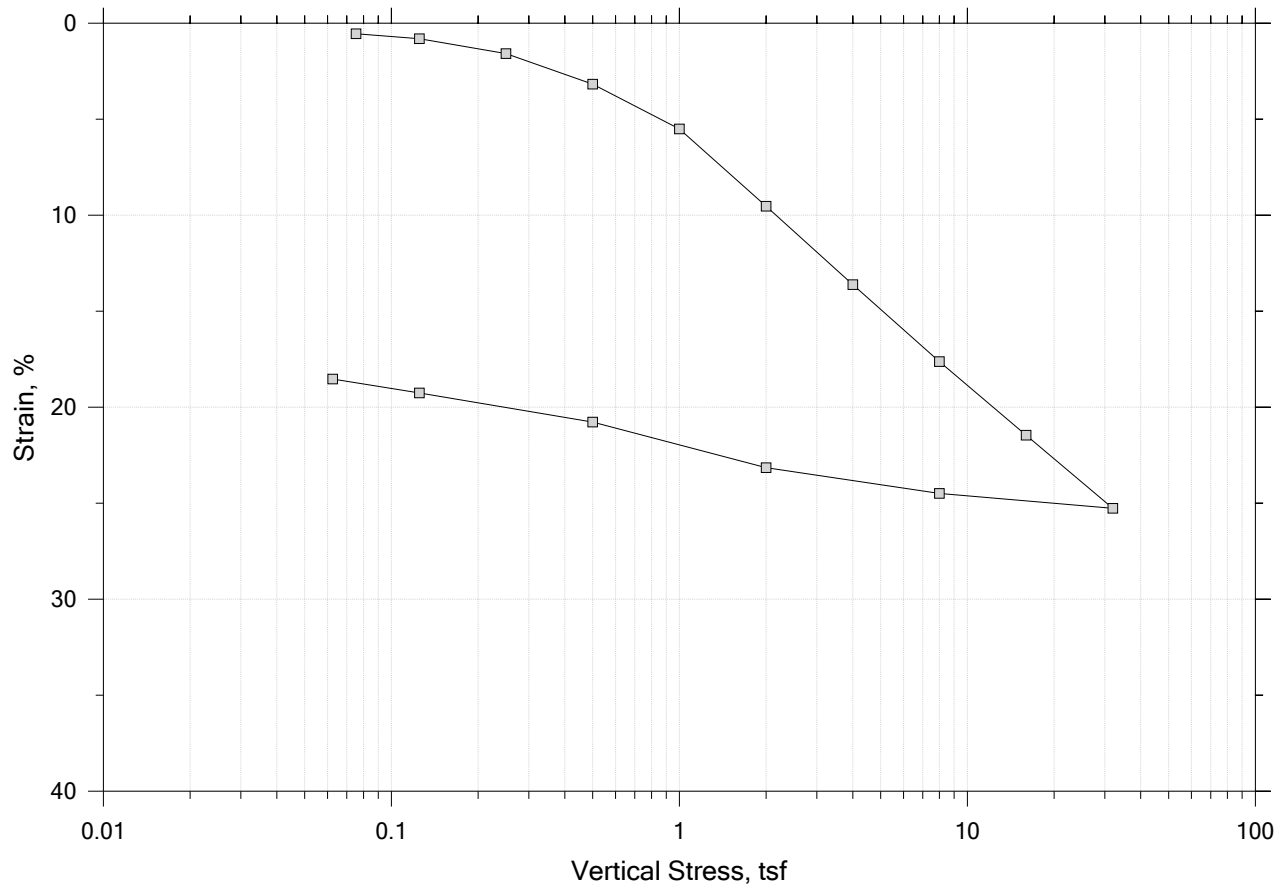



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U2	CU-3-1	15-17	trm	4/26/21	njh	5/5/21	313196-CU-3n.dat

			
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Sample Type: intact	
	Description: Wet, gray clay		
	Remarks: System JJ		

One-Dimensional Consolidation by ASTM D2435 - Method B

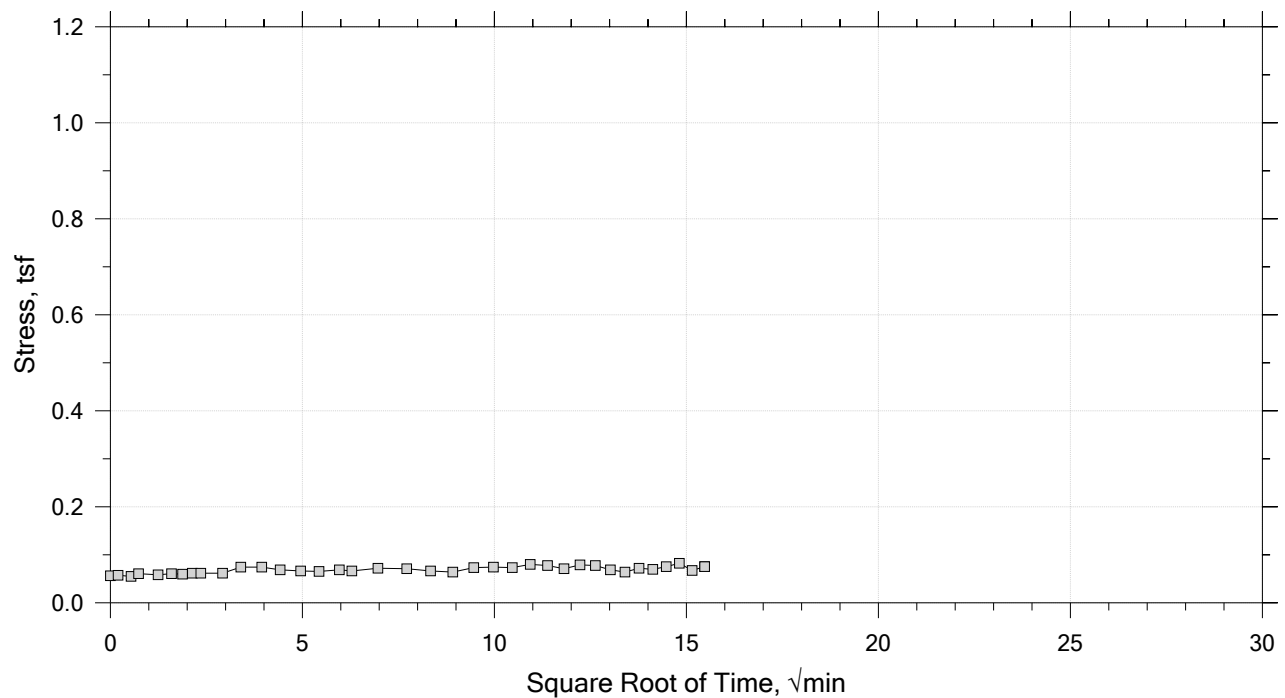
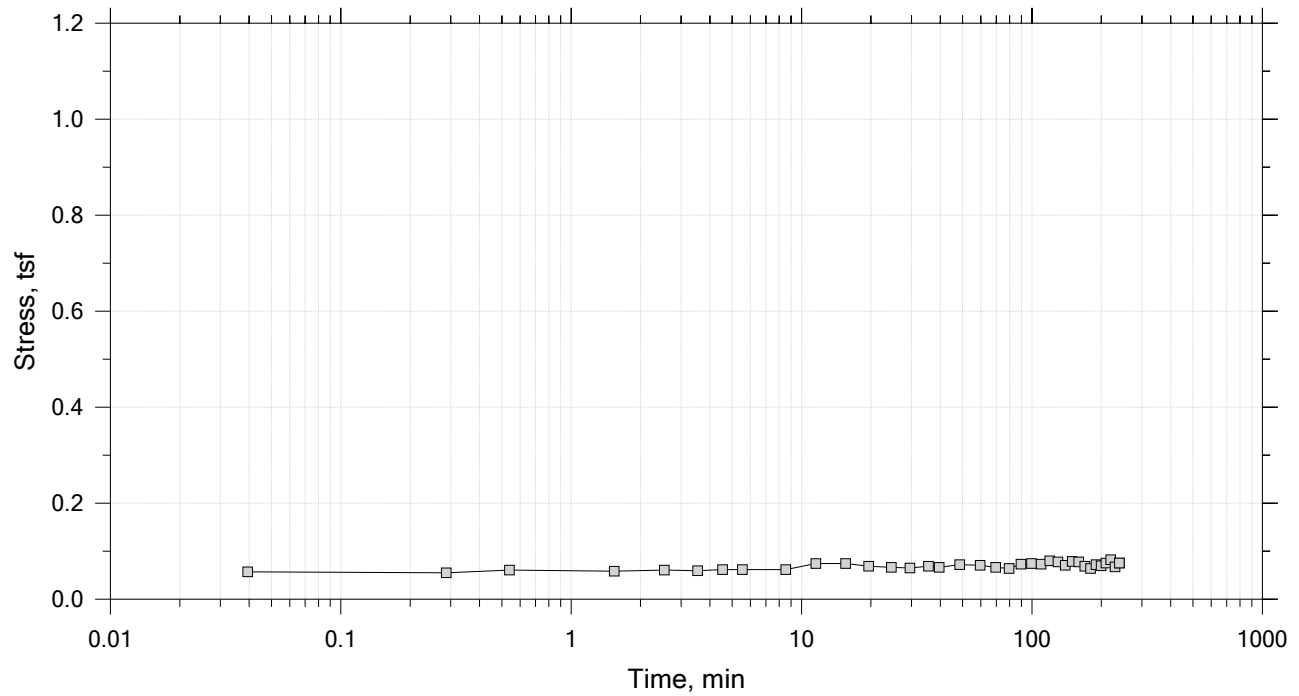
Summary Report




	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0754 tsf



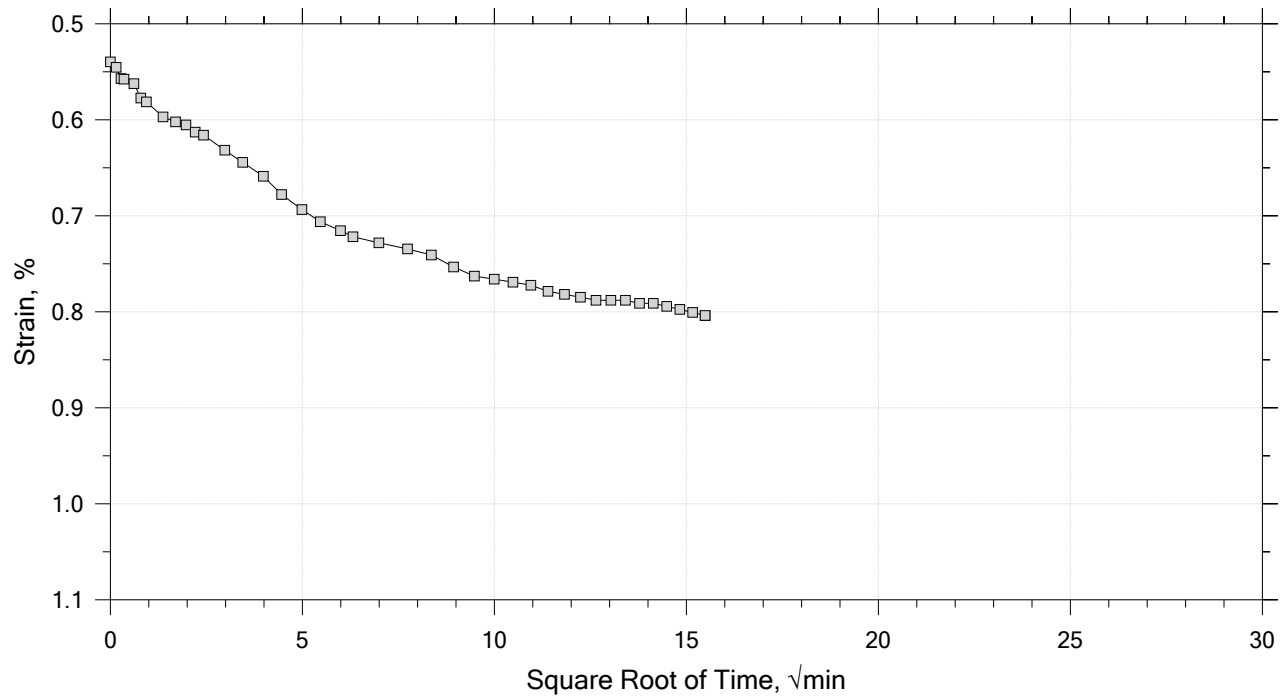
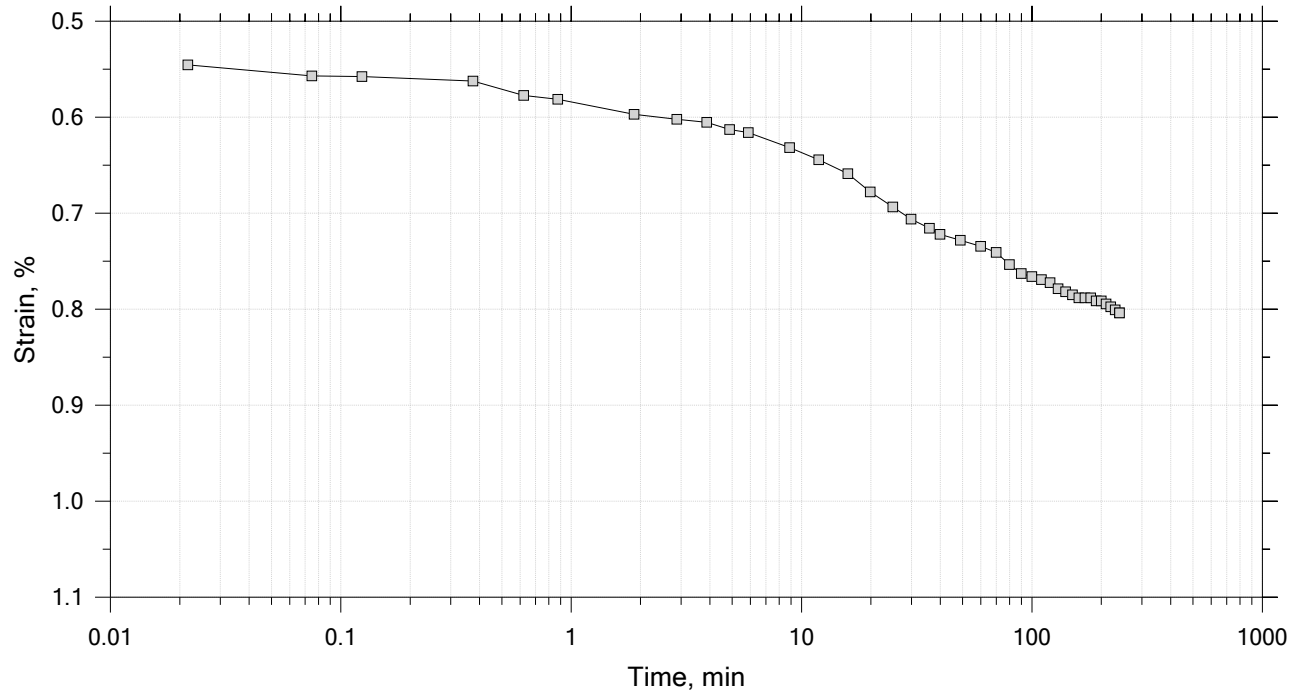
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf



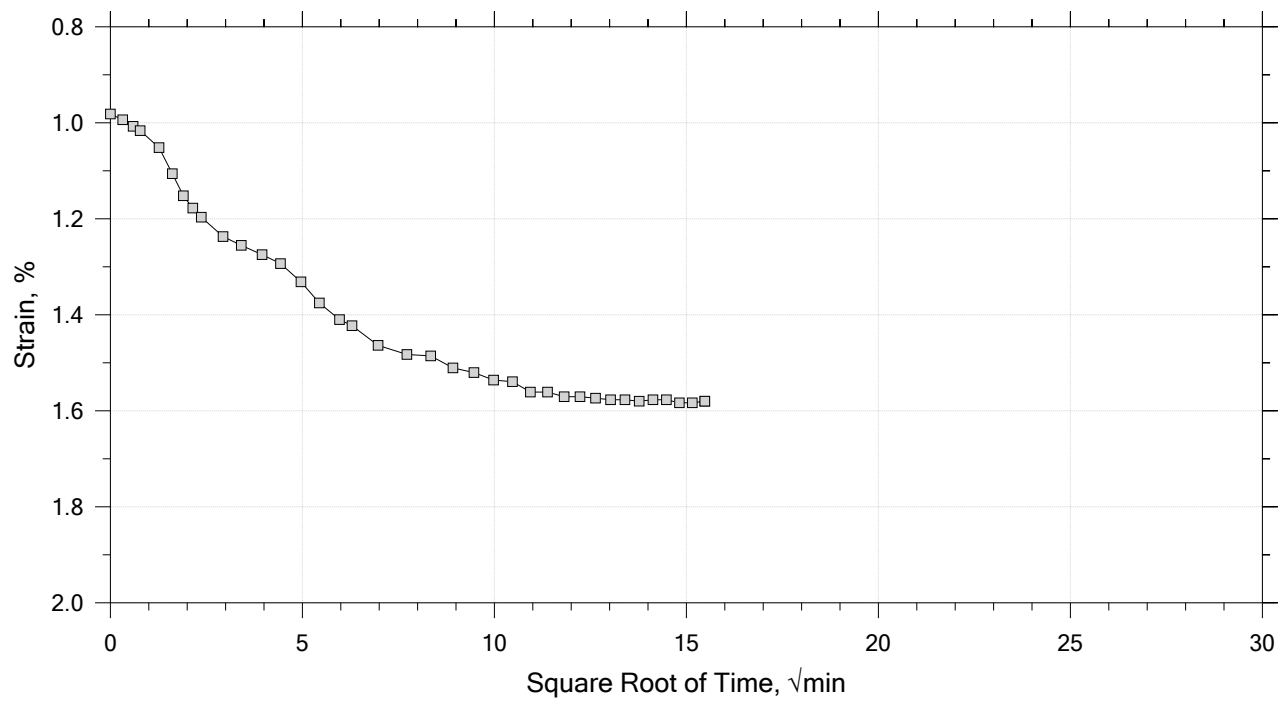
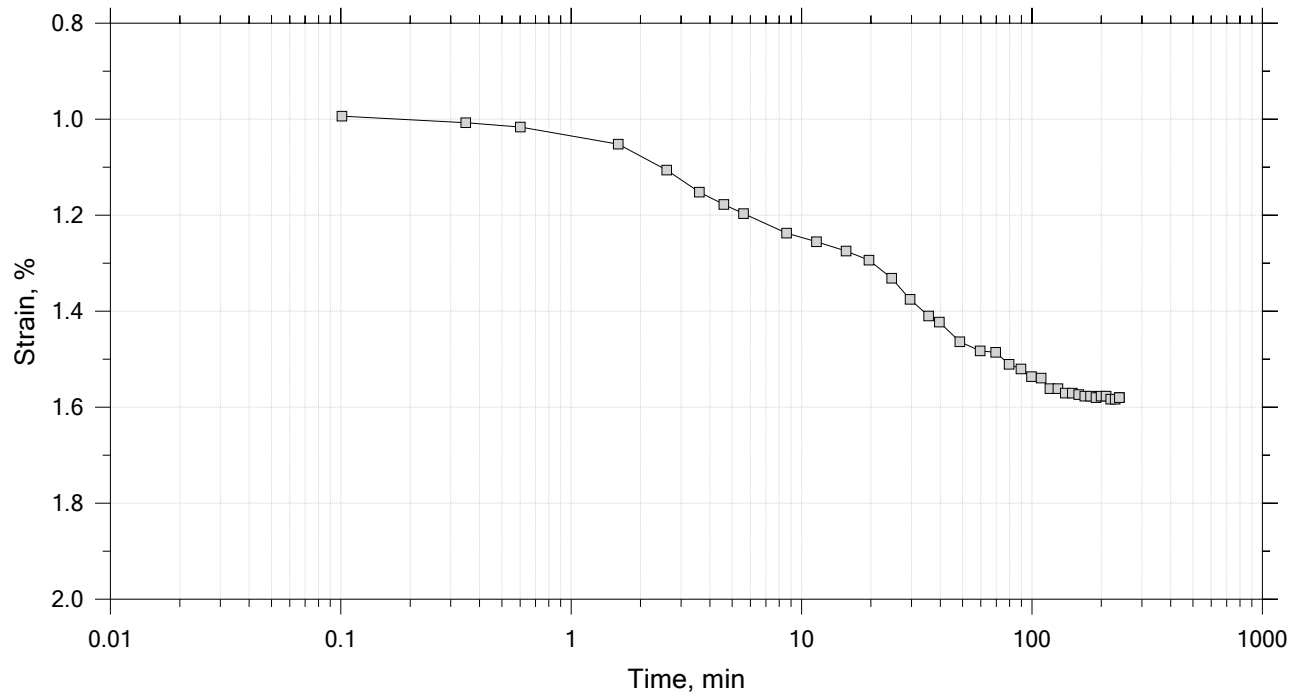
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf



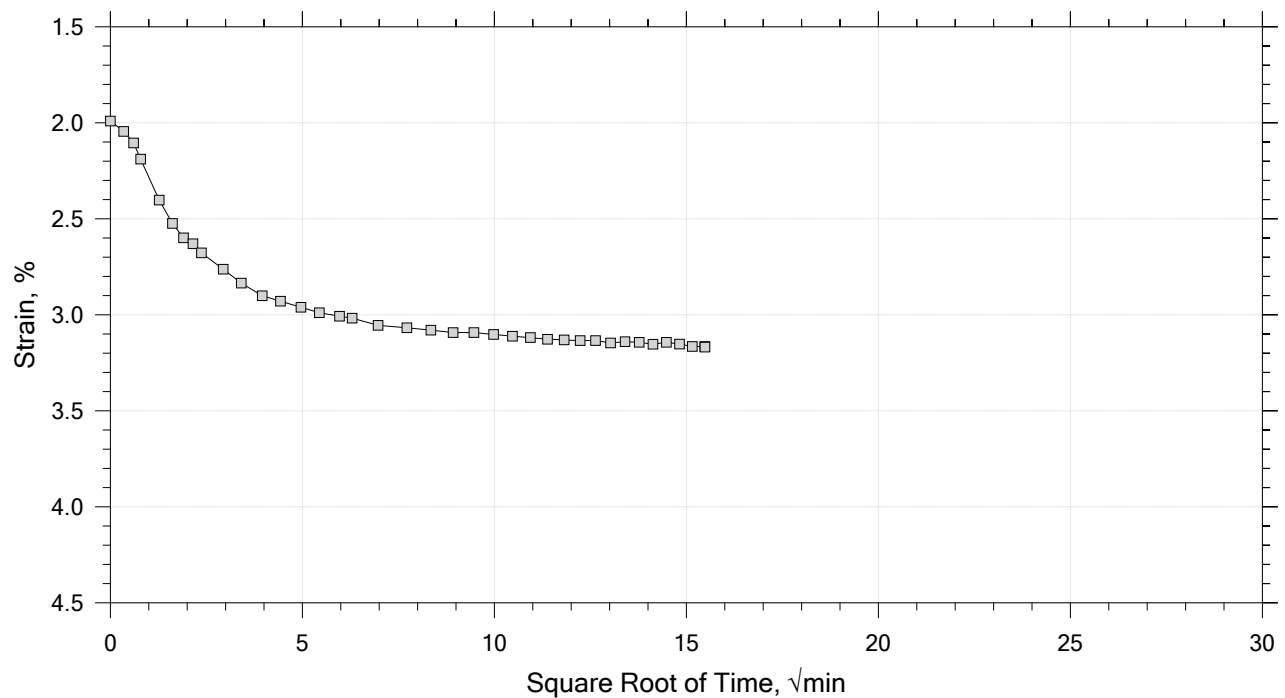
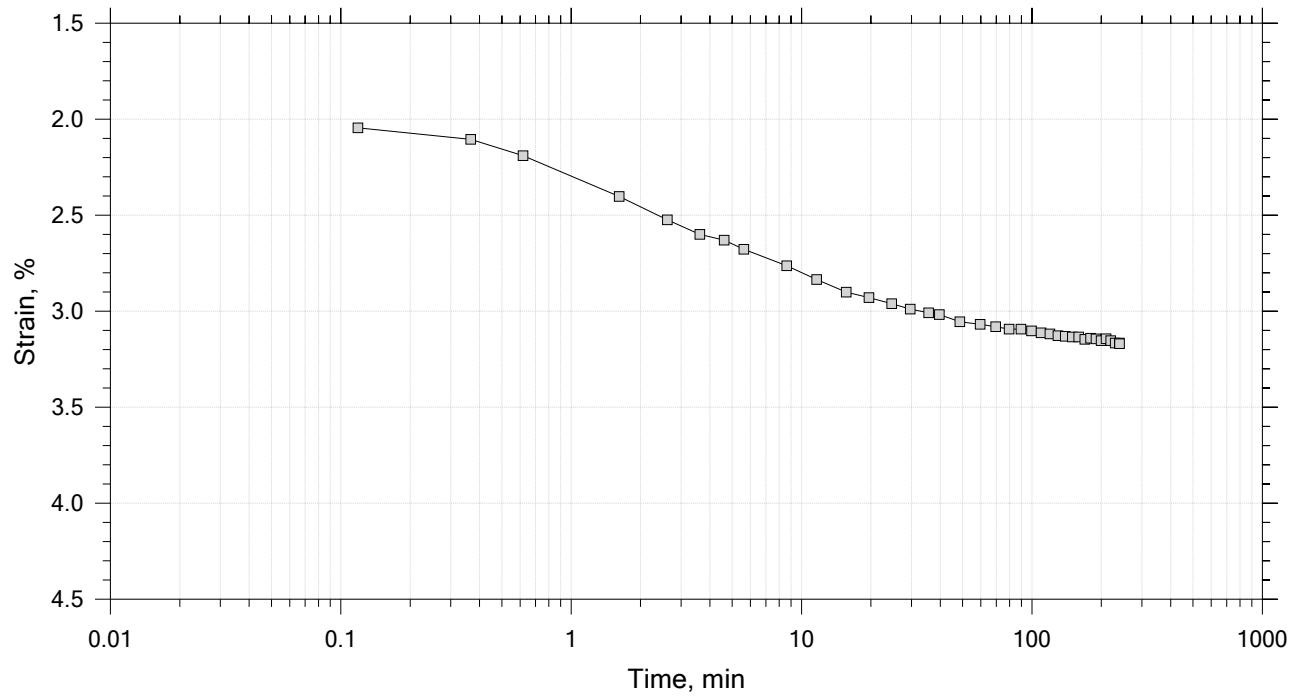
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf



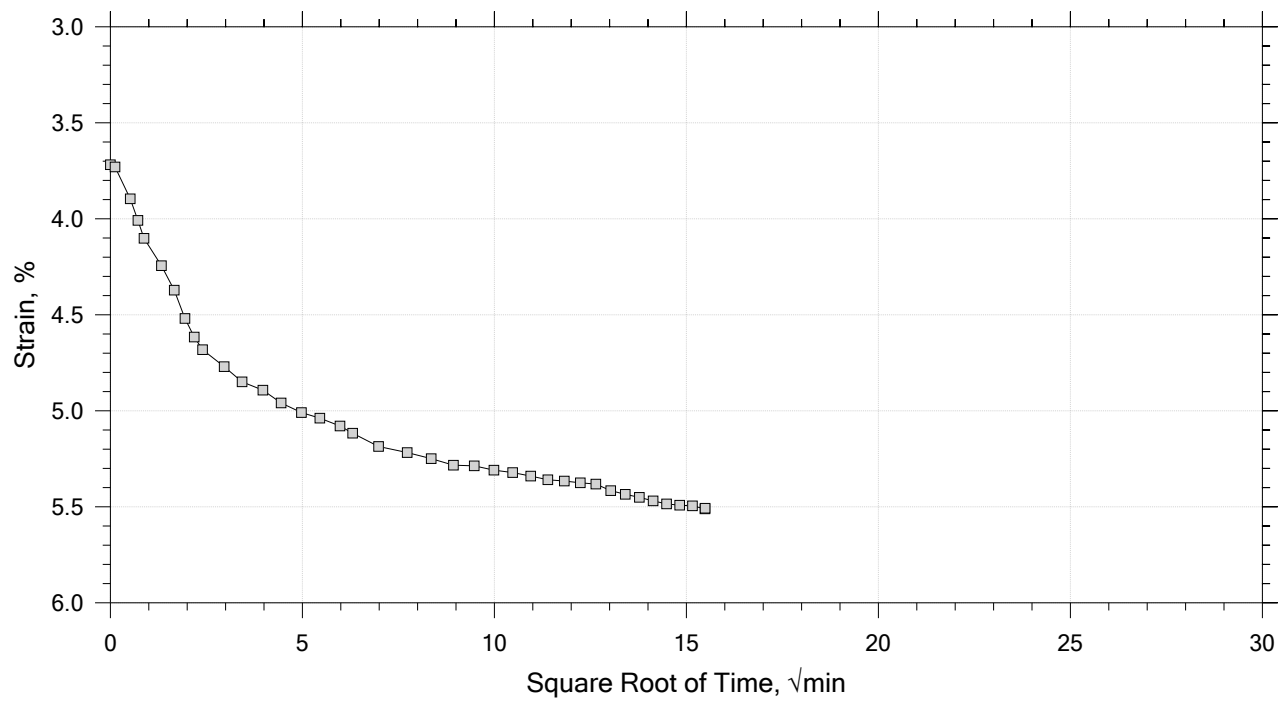
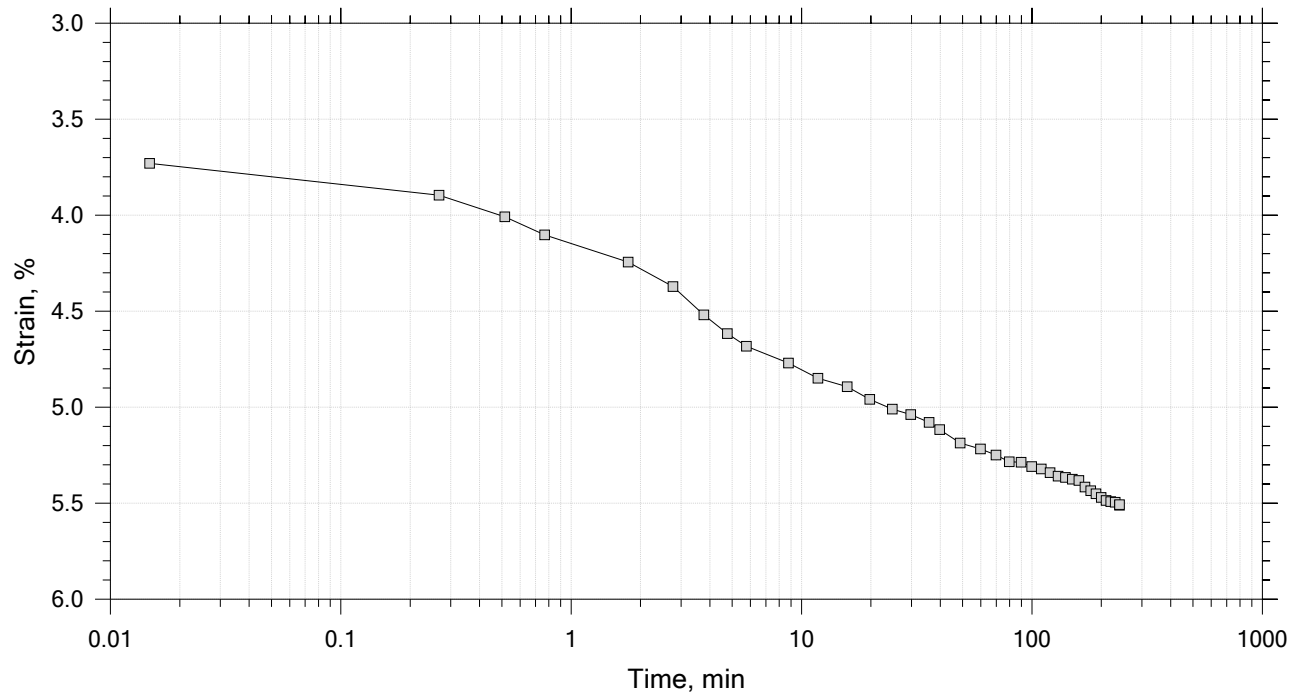
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf



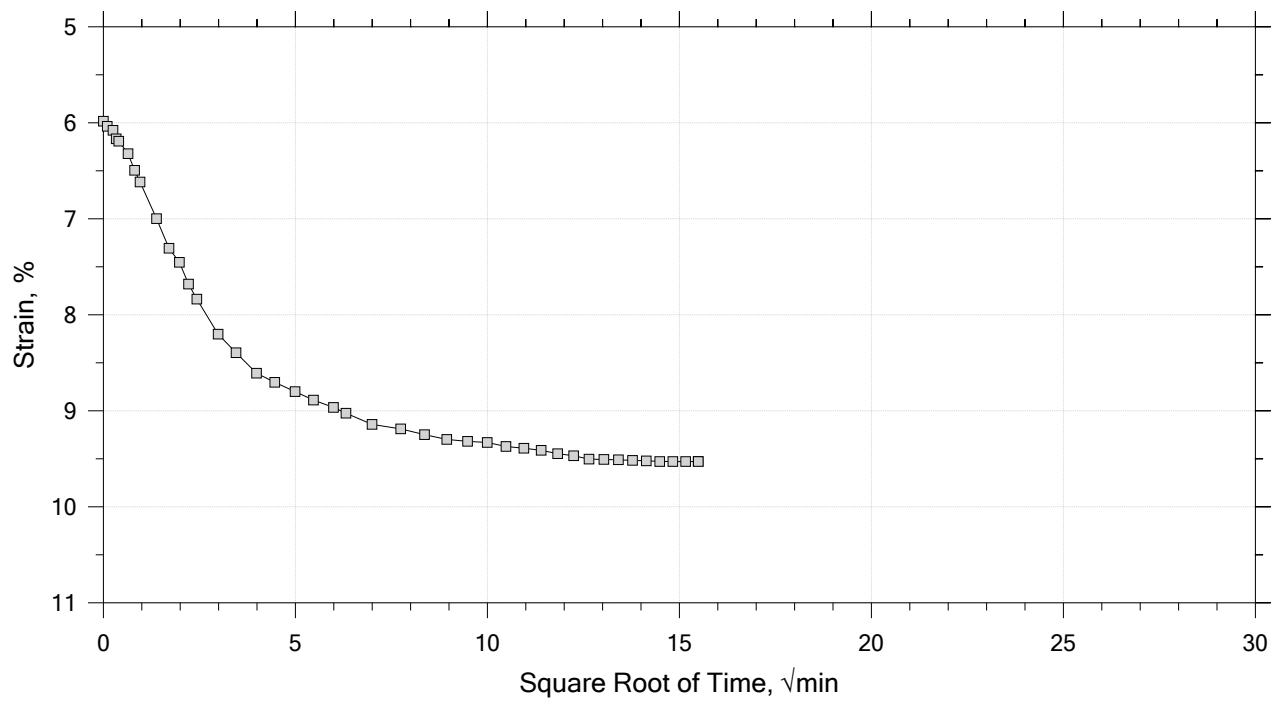
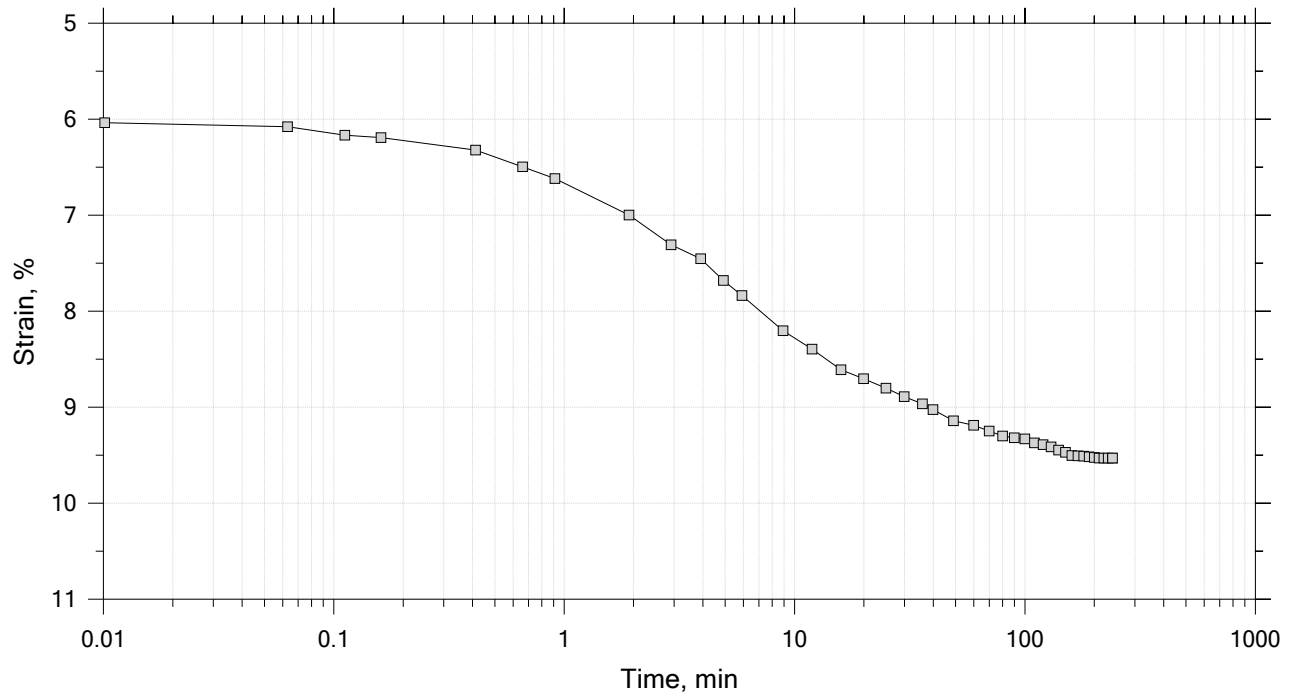
	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf



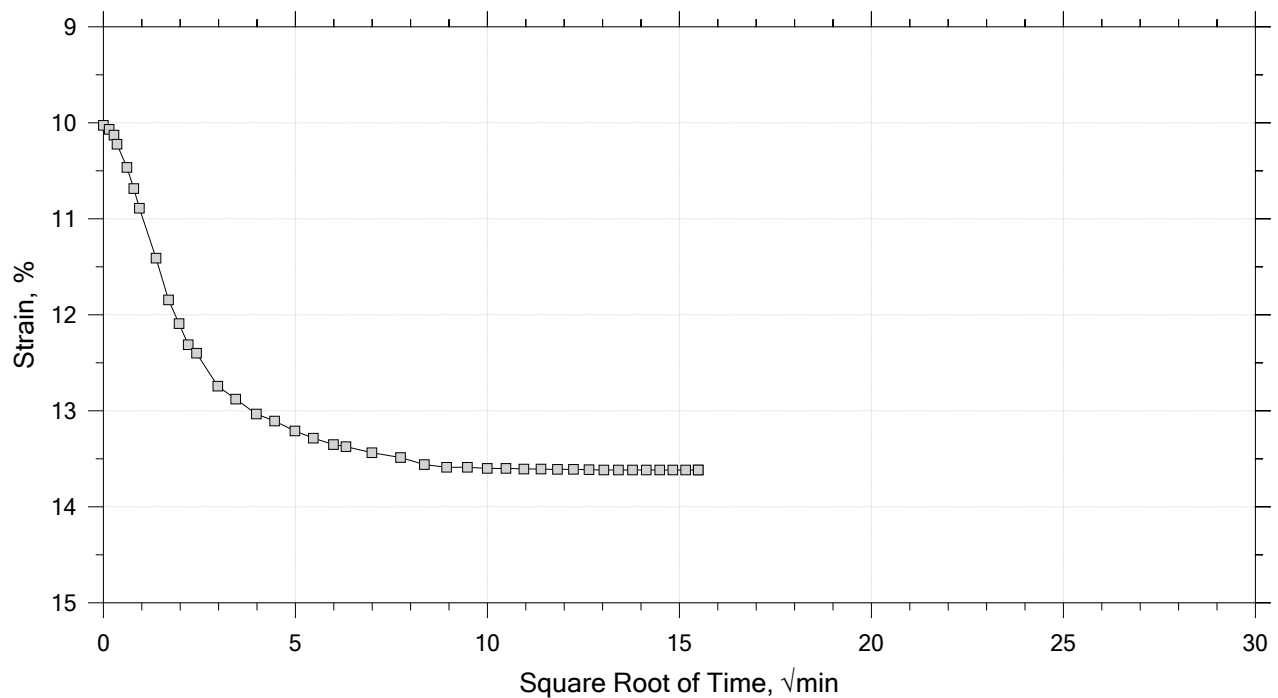
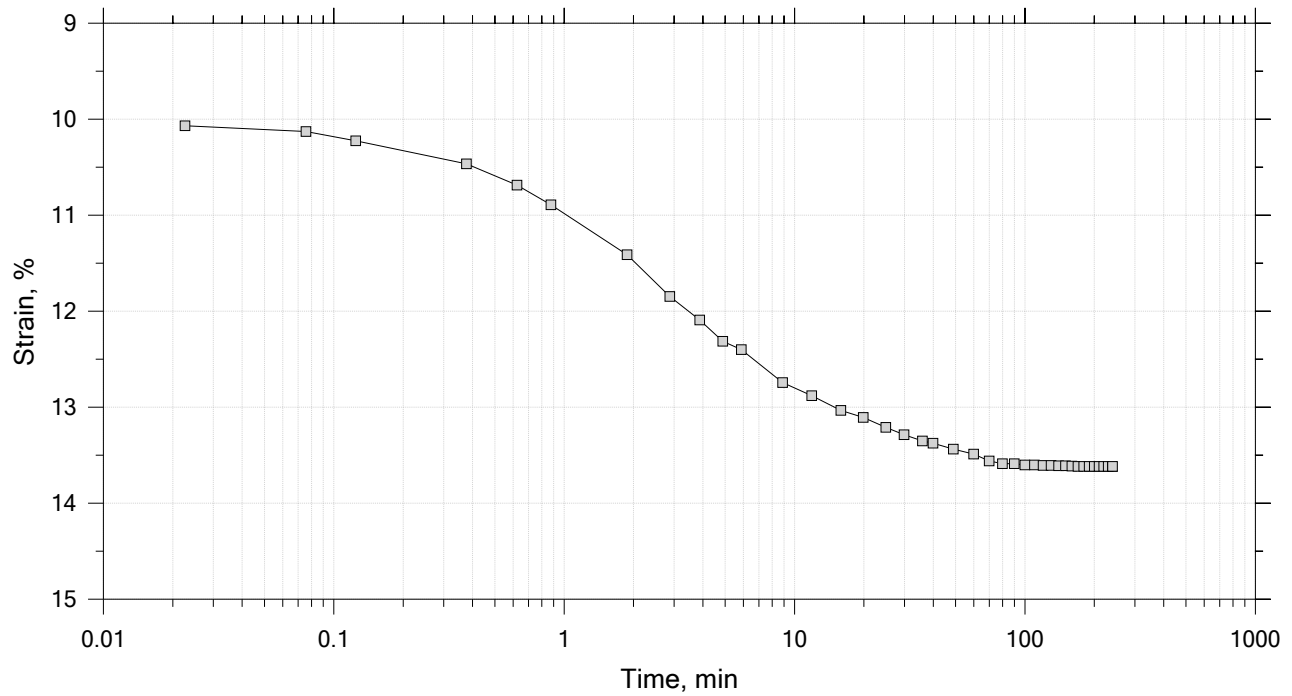
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf



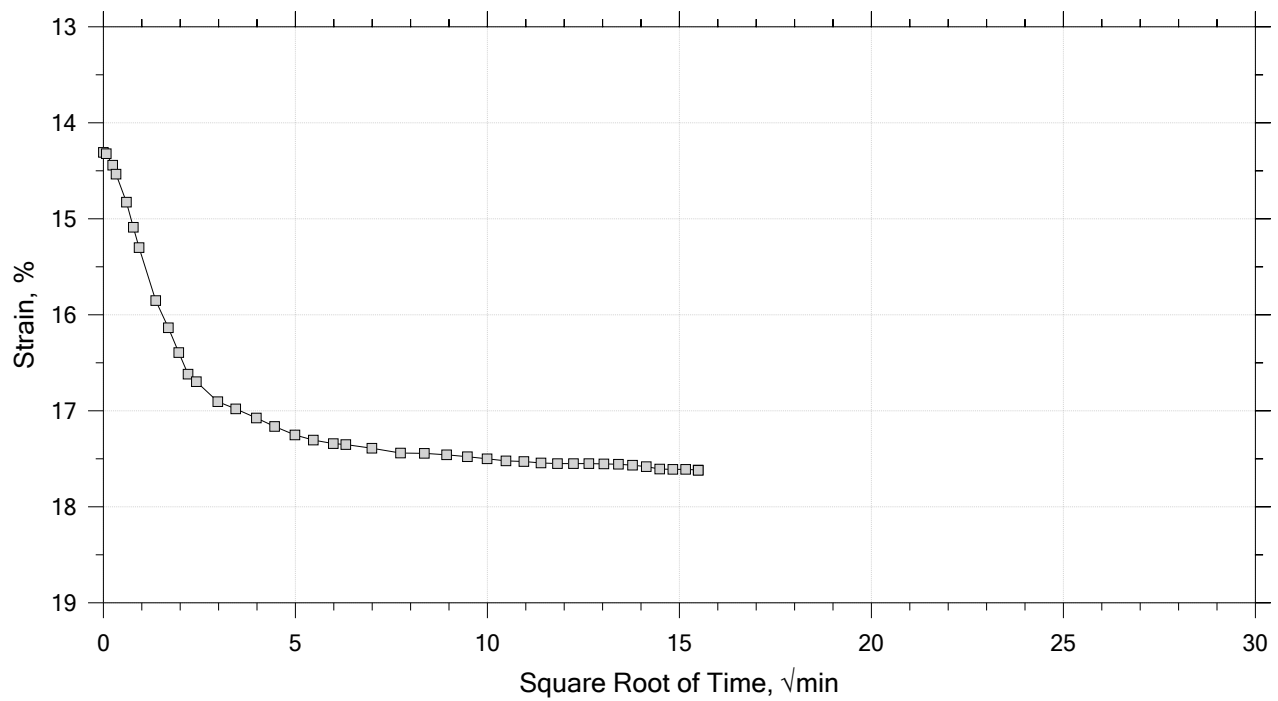
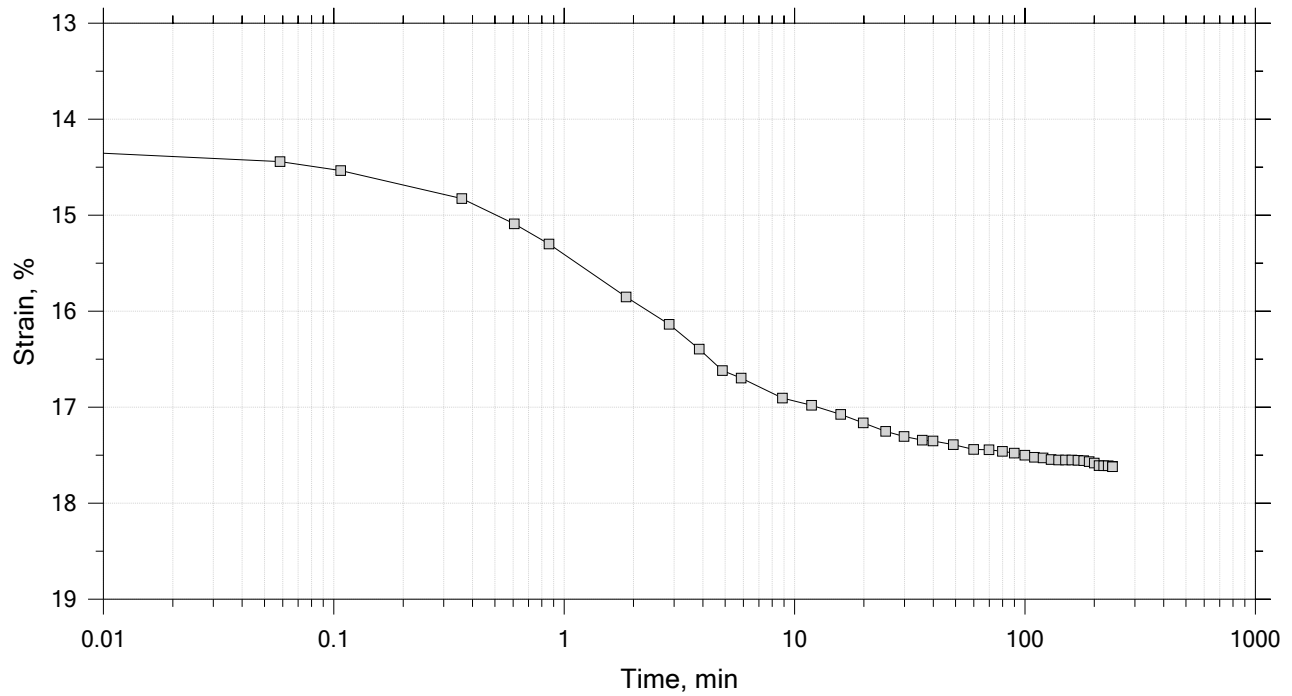
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf



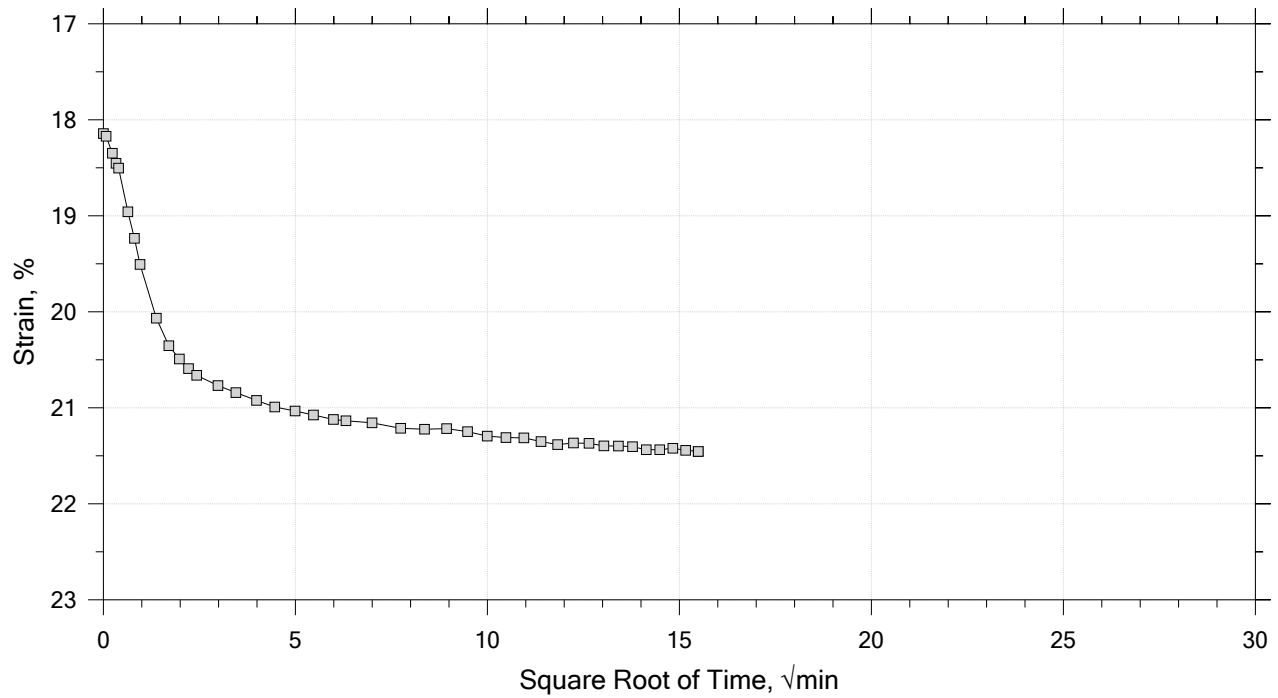
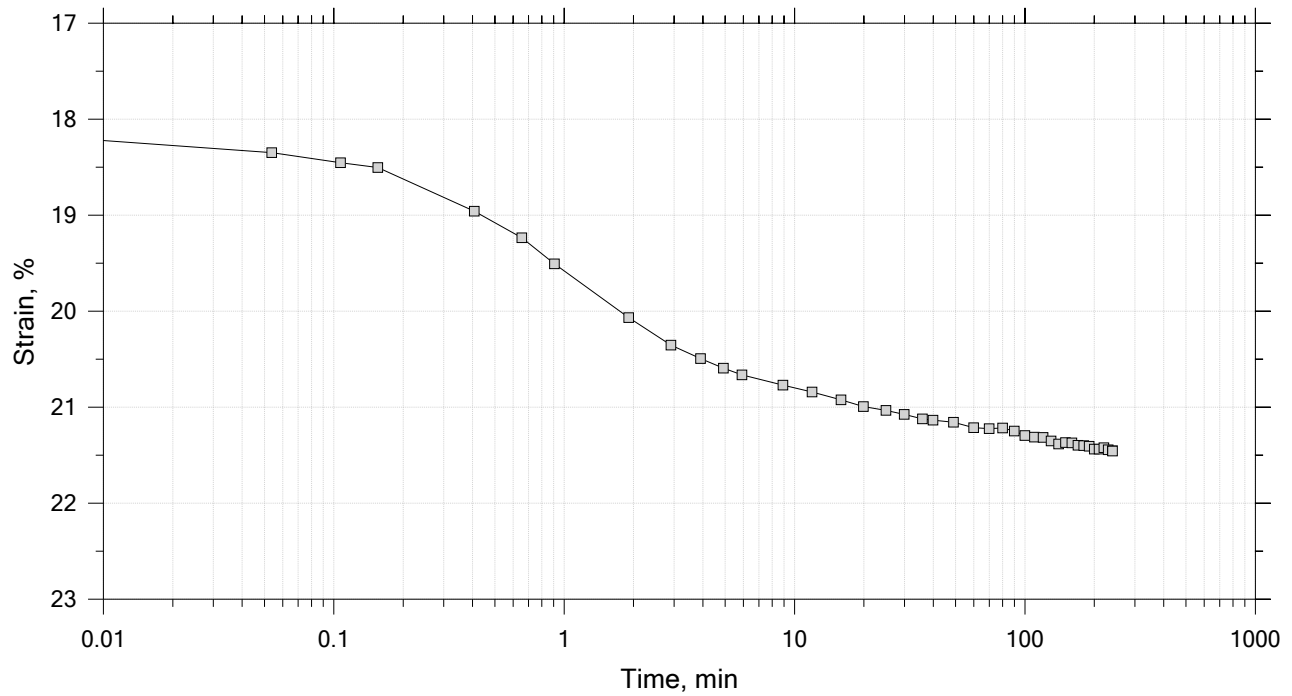
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf



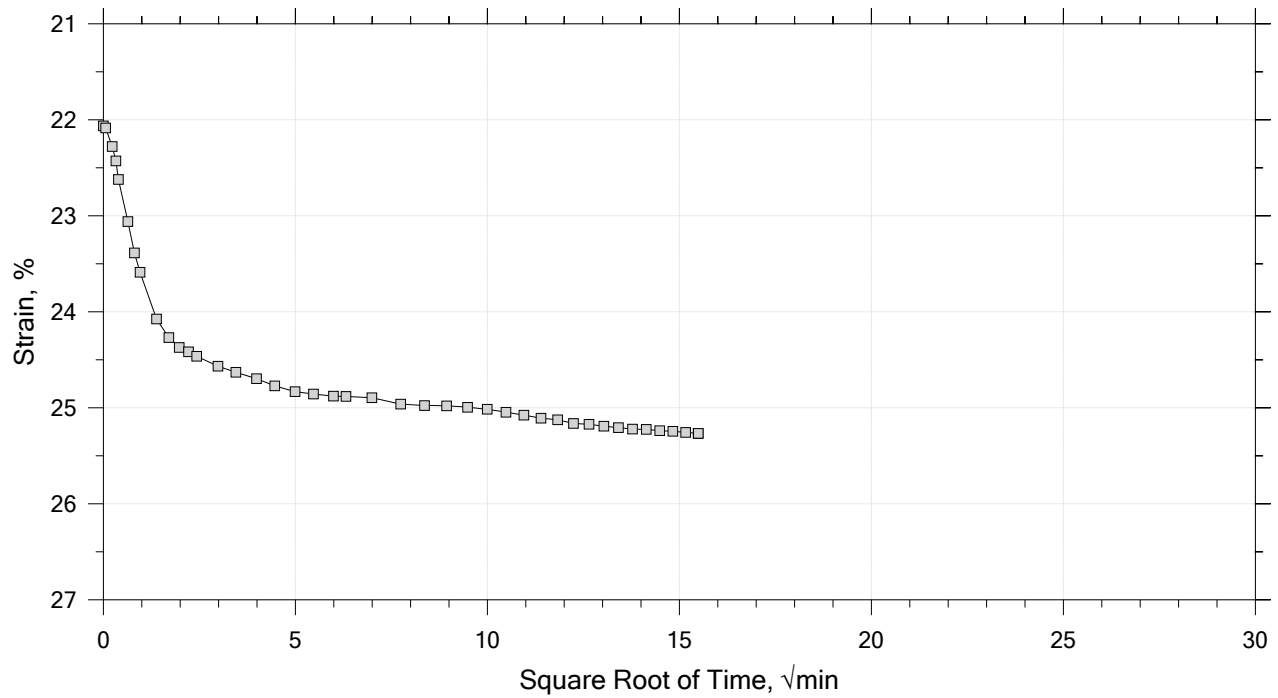
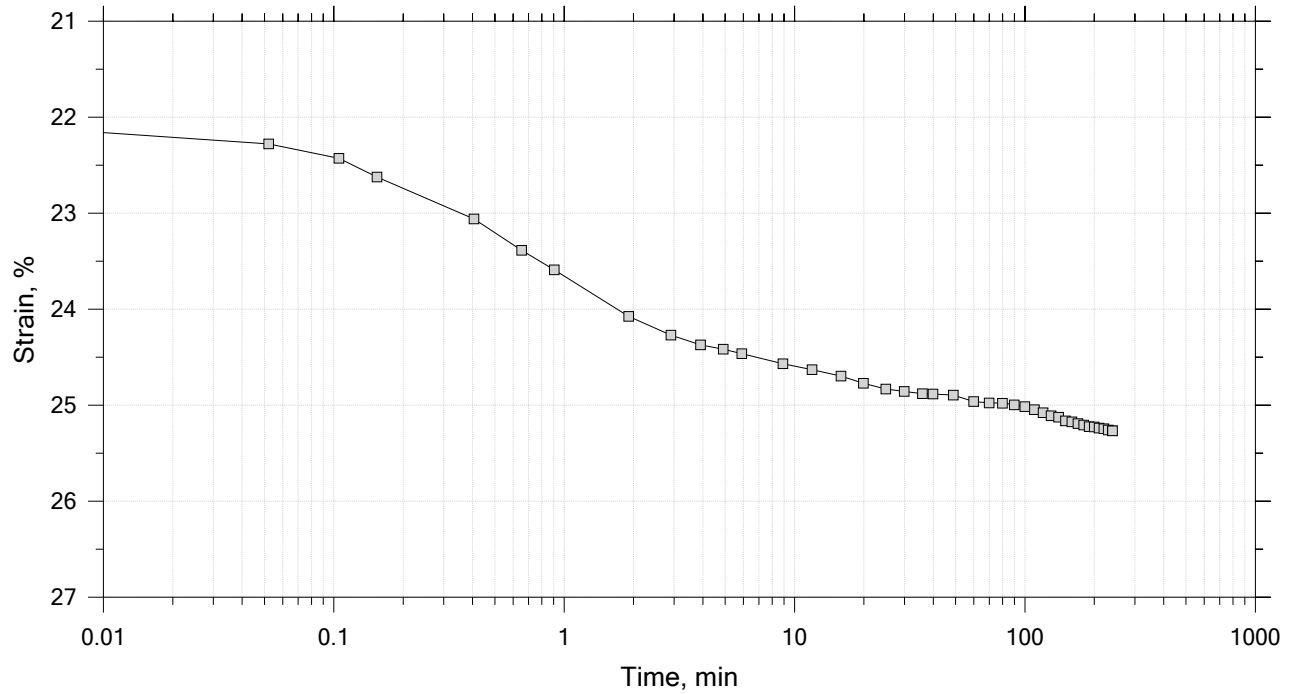
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf



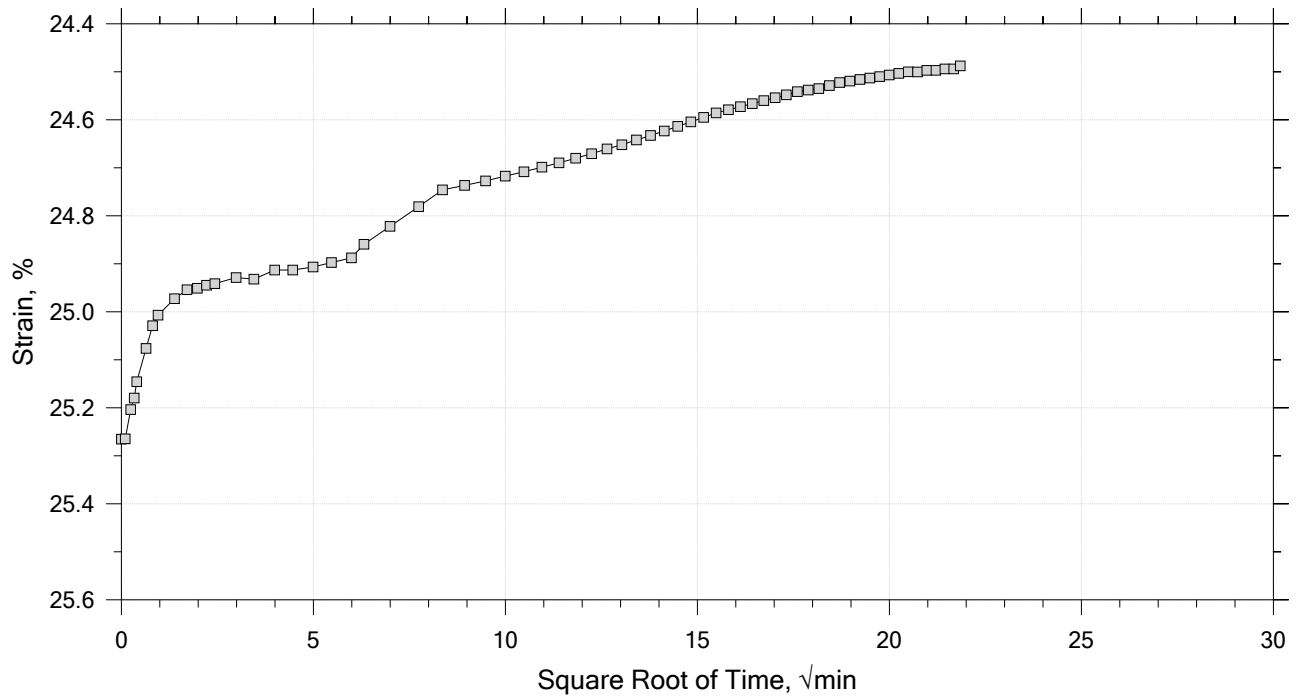
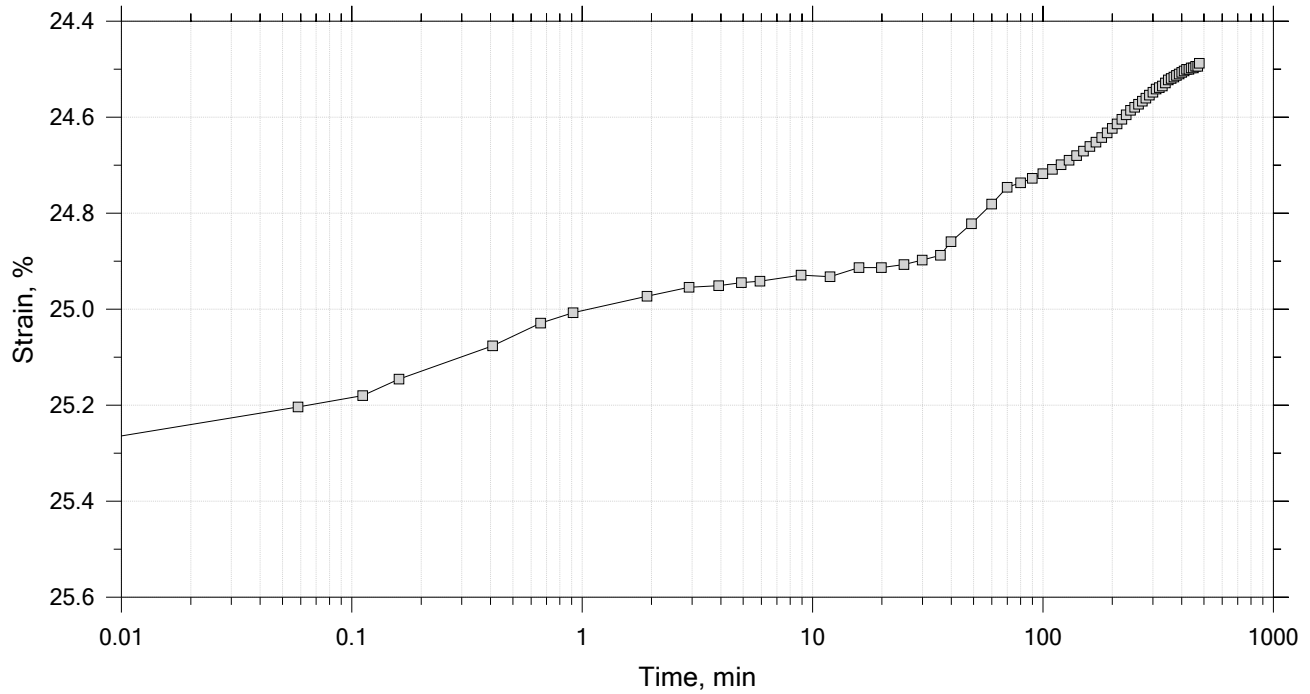
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf



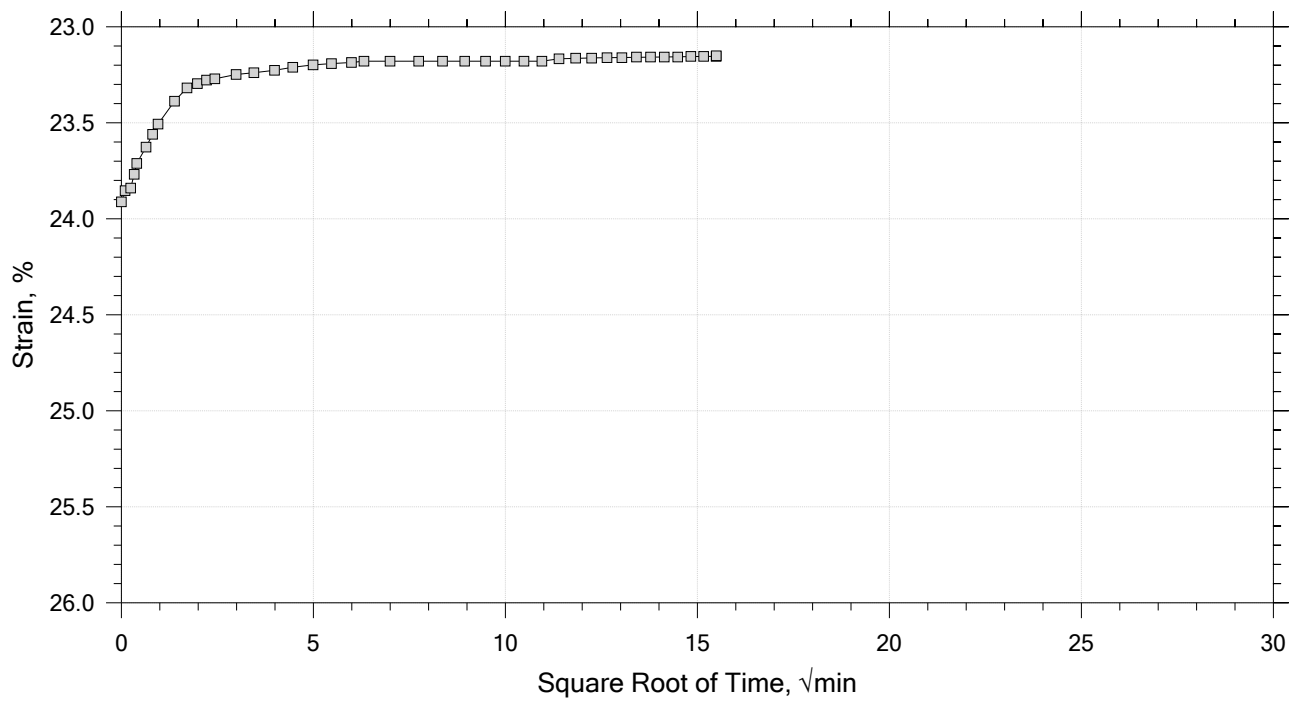
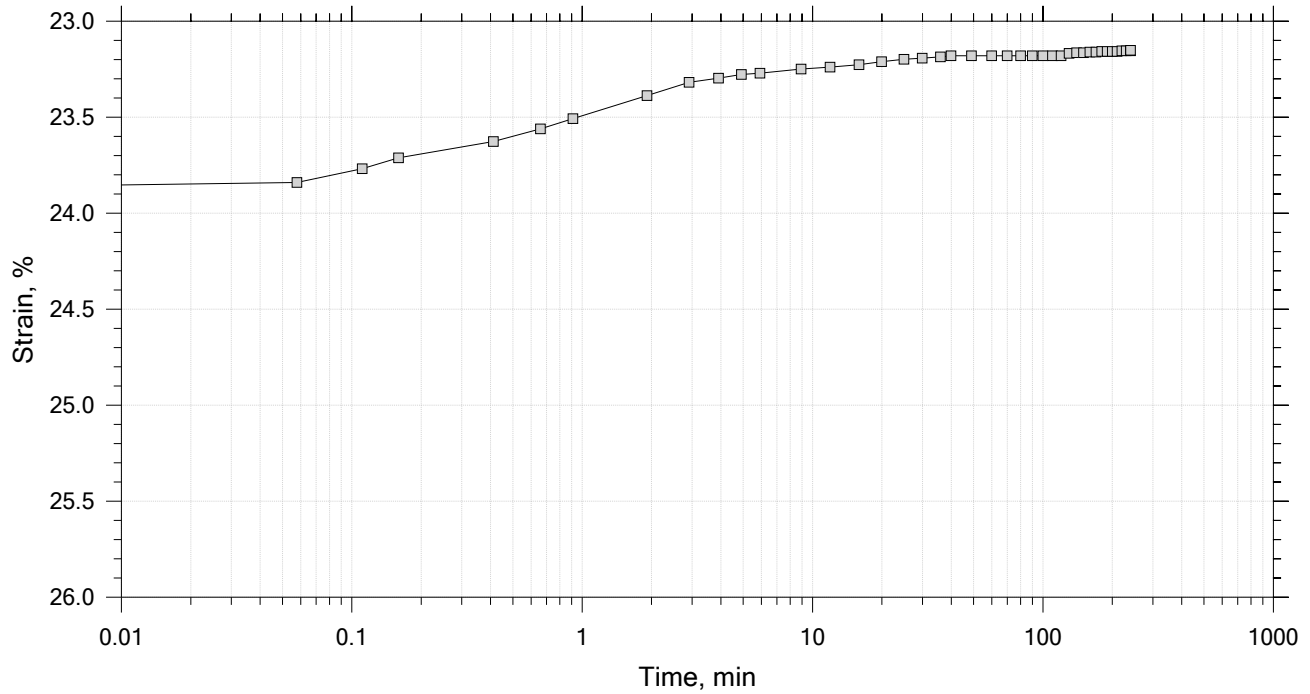
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf



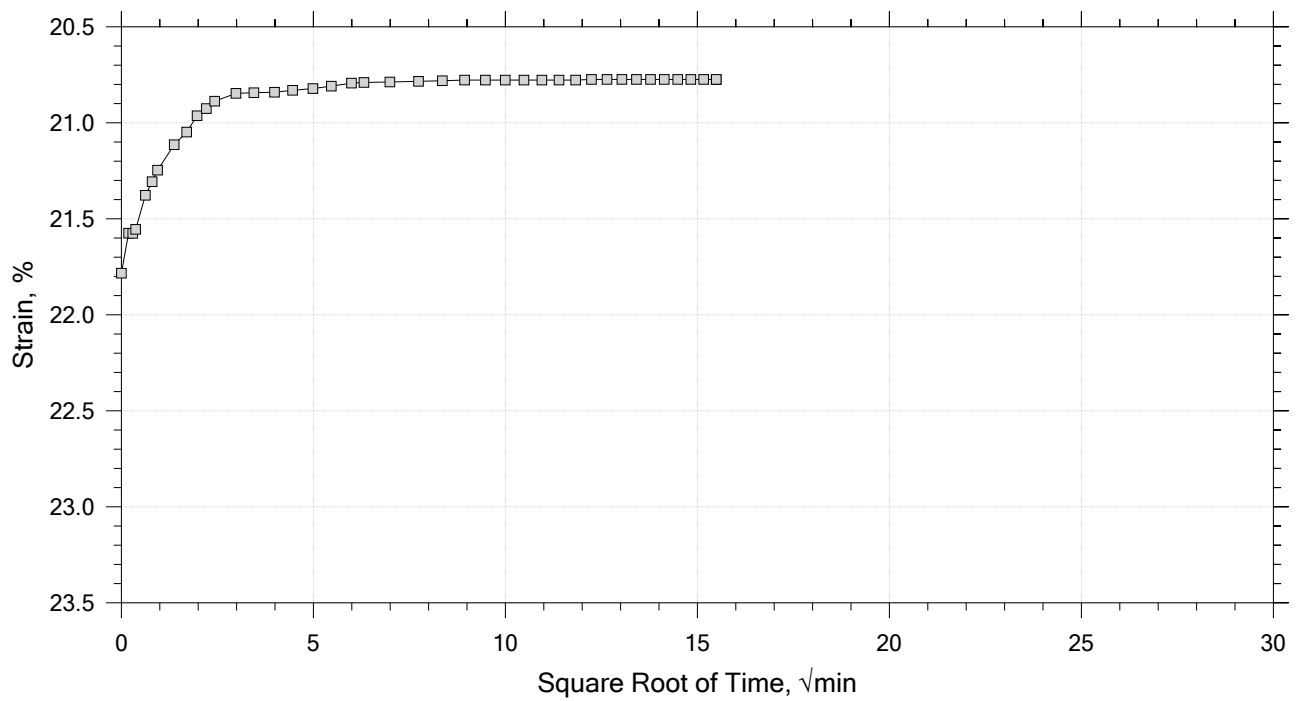
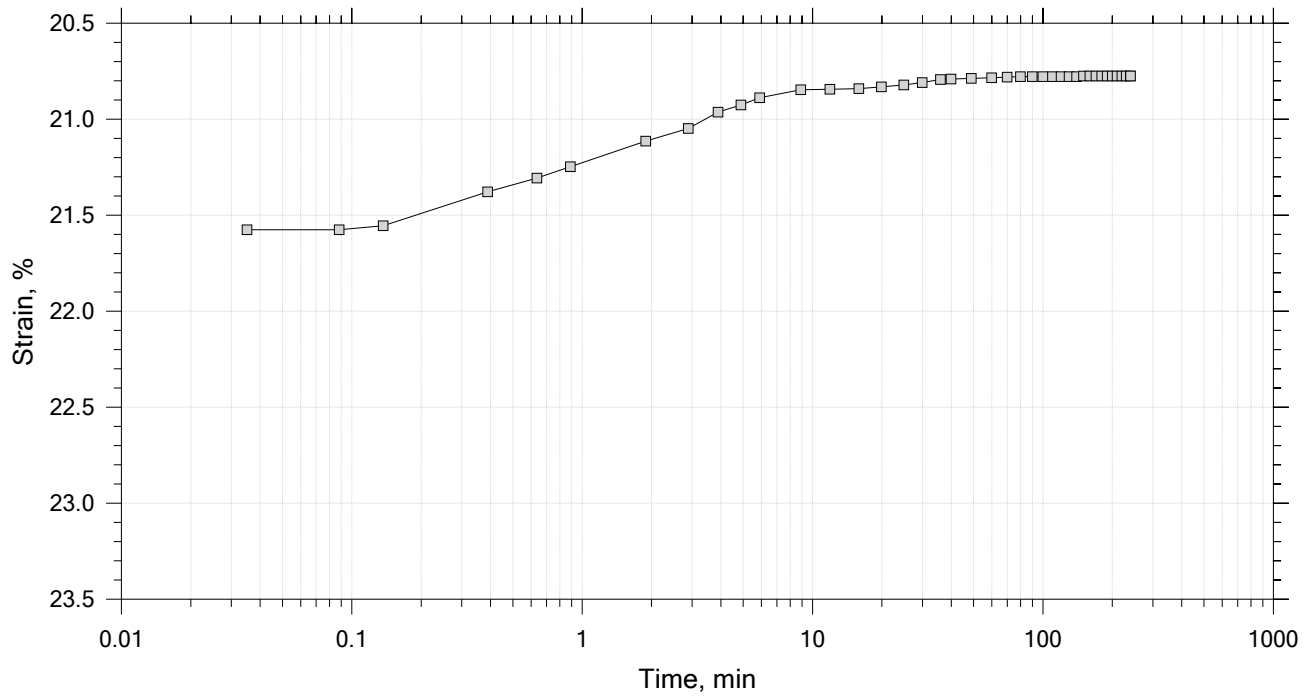
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf



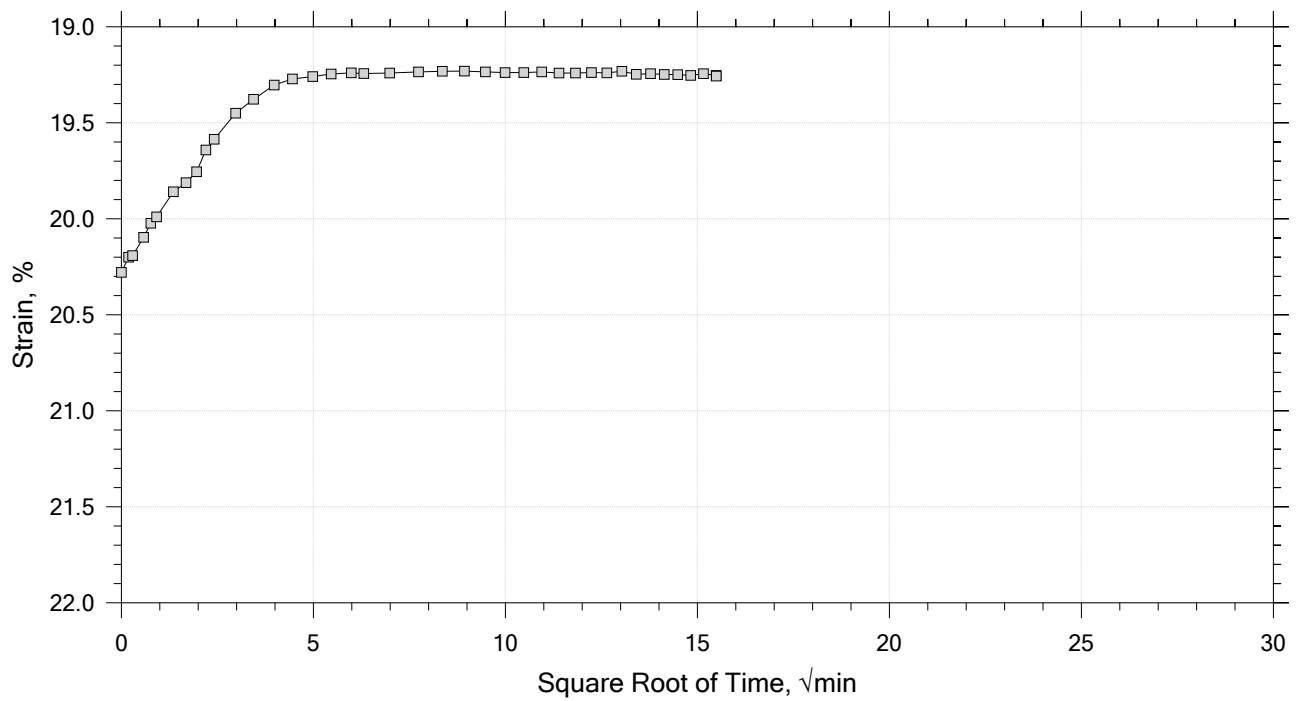
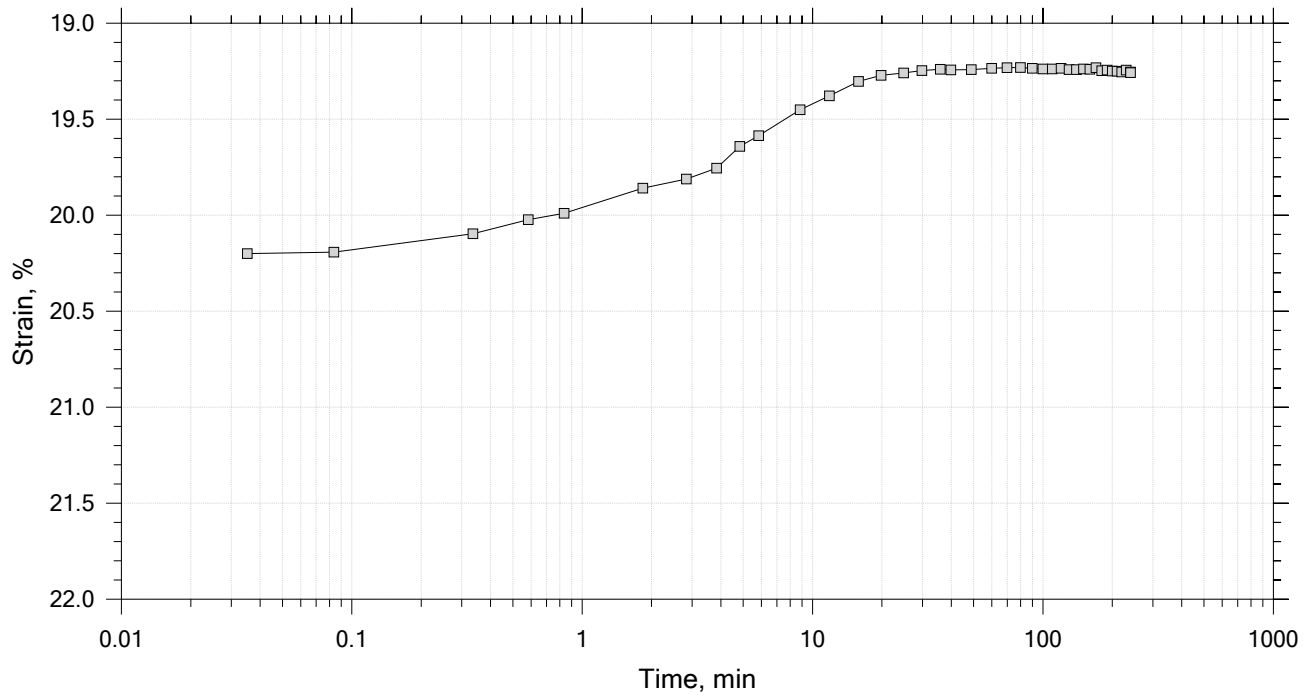
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf



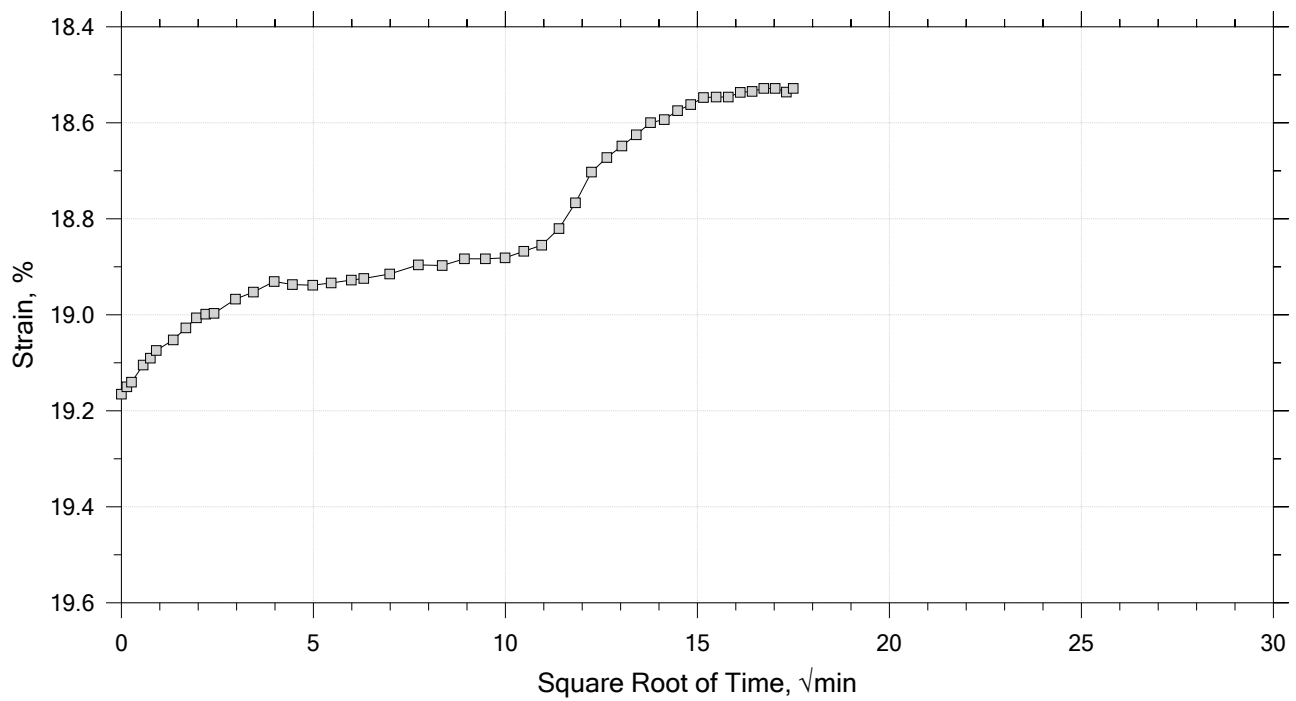
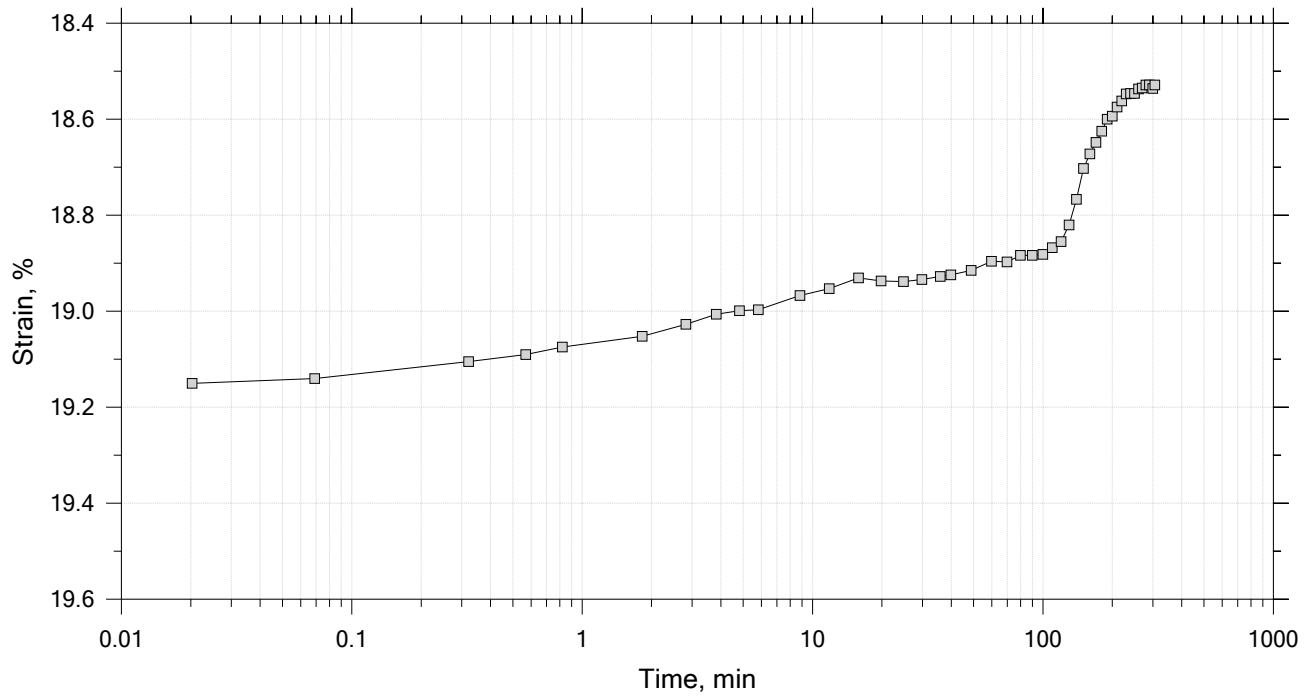
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	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		


One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf




	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 32
Initial Height: 1.00 in	Initial Void Ratio: 0.994	Plastic Limit: 17
Final Height: 0.81 in	Final Void Ratio: 0.615	Plasticity Index: 15

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E 2058	RING		E-0613
Mass Container, gm	8.24	110.31	110.31	8.54
Mass Container + Wet Soil, gm	198.02	261.38	246.18	145.1
Mass Container + Dry Soil, gm	150.26	221.37	221.37	120.16
Mass Dry Soil, gm	142.02	111.06	111.06	111.62
Water Content, %	33.63	36.03	22.34	22.34
Void Ratio	---	0.99	0.62	---
Degree of Saturation, %	---	99.79	100.00	---
Dry Unit Weight, pcf	---	86.189	106.41	---


Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

[illegible]

	Project: I-395/Rte 9 Connector (Area 2)	Location: Brewer-Eddington, ME	Project No.: GTX-313196
	Boring No.: BB-BEB-202	Tested By: mp	Checked By: njh
	Sample No.: U2	Test Date: 4/26/21	Depth: 15-17
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Wet, gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0754 tsf		
	Displacement at End of Increment		

APPENDIX E

Geotechnical Design Calculations

Global Stability

Global Embankment Stability

Area 2 - Longitudinal

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Transverse

Checked by: EMS

PROBLEM STATEMENT AND OBJECTIVE

Calculate the global stability minimum factor of safety at critical sections along the proposed highway alignment.

REFERENCES

1. AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014.
2. Slide version 7.0 by RocScience.
3. Maine DOT Bridge Design Guide, 2003, with 2014 updates.

AVAILABLE INFORMATION

1. Plan set titled, "Brewer-Eddington I-395/Route 9 Connector, Cross Sections," by MaineDOT dated 25 February 2020.
2. Plan set titled, "I-395/Route 9 Connector, Interpretive Subsurface Profile," by MaineDOT dated 2 October 2019.

ASSUMPTIONS

Soil profiles will be modeled to match settlement calculation models, as summarized below.

SOIL PROPERTIES

Material	Unit Weight (pcf)	Friction Angle (degrees)	Undrained Shear Strength (psf)
New Fill	125	32	0
Marine Deposit	115	varies ¹	
Glacial Till	130	36	0
Bedrock	infinite strength		

Notes:

1. Soil properties for Existing Fill and Marine Deposit vary based on location. See individual soil profiles for details.

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

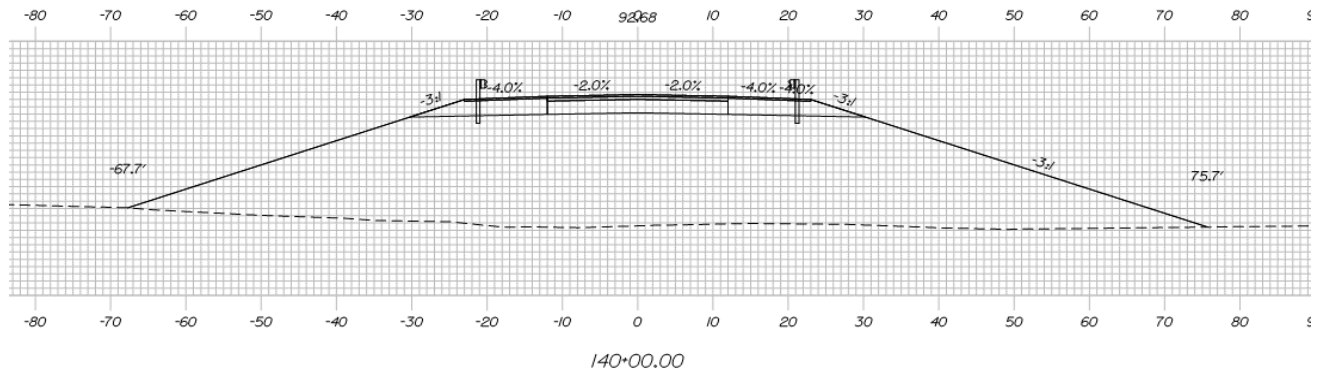
Subject: Global Stability - Area 2 Transverse

Checked by: EMS

STA 140+00 GEOMETRY

Fill height = 18 ft

Ground surface at center = El. 74.5


STA 140+00 SOIL PROFILE AND PROPERTIES (not to scale)

Based on boring BB-BEB-102, BB-BEB-101, BB-BEB-202, BB-BEB-103

Groundwater depth = ground surface (based on boring BB-BEB-102, BB-BEB-101, BB-BEB-202 and BB-BEB-103)

Boring BB-BEB-102 (distance from the center= 101.9 LT)

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	74.5
7.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
9.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 500 \text{ psf}$	65
15	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	59.5
27	Glacial Till SILT/SAND $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	47.5

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Transverse

Checked by: EMS

STA 140+00 Continued

Boring BB-BEB-101 (distance from the center= 0.6 RT)

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	74.5
7.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
9.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	65
18	Glacial Till SILT/SAND $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	56.5
37	BEDROCK infinite strength	37.5
52		22.5

Boring BB-BEB-202 (distance from the center= 19.5 RT)

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	74.5
7.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
9.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	57.5
18	Glacial Till SILT/SAND $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	56.5
50	BEDROCK infinite strength	24.5
69		5.5

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Transverse

Checked by: EMS

STA 140+00 Continued

Boring BB-BEB-103 (distance from the center= 97.9 RT)

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	74.5
7.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
9.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 500 \text{ psf}$	65
23	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	51.5
50	Glacial Till SILT/SAND $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	24.5

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

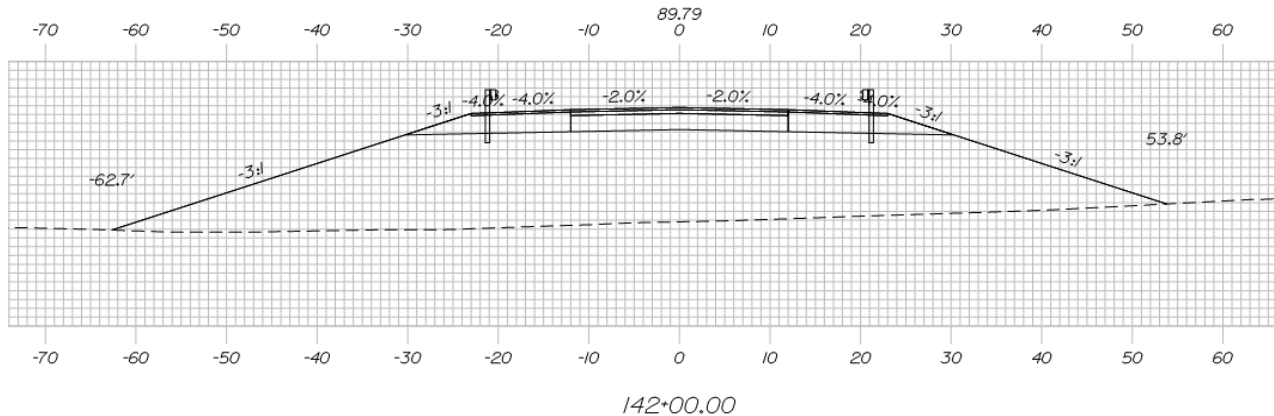
Subject: Global Stability - Area 2 Transverse

Checked by: 0

STA 142+00 GEOMETRY

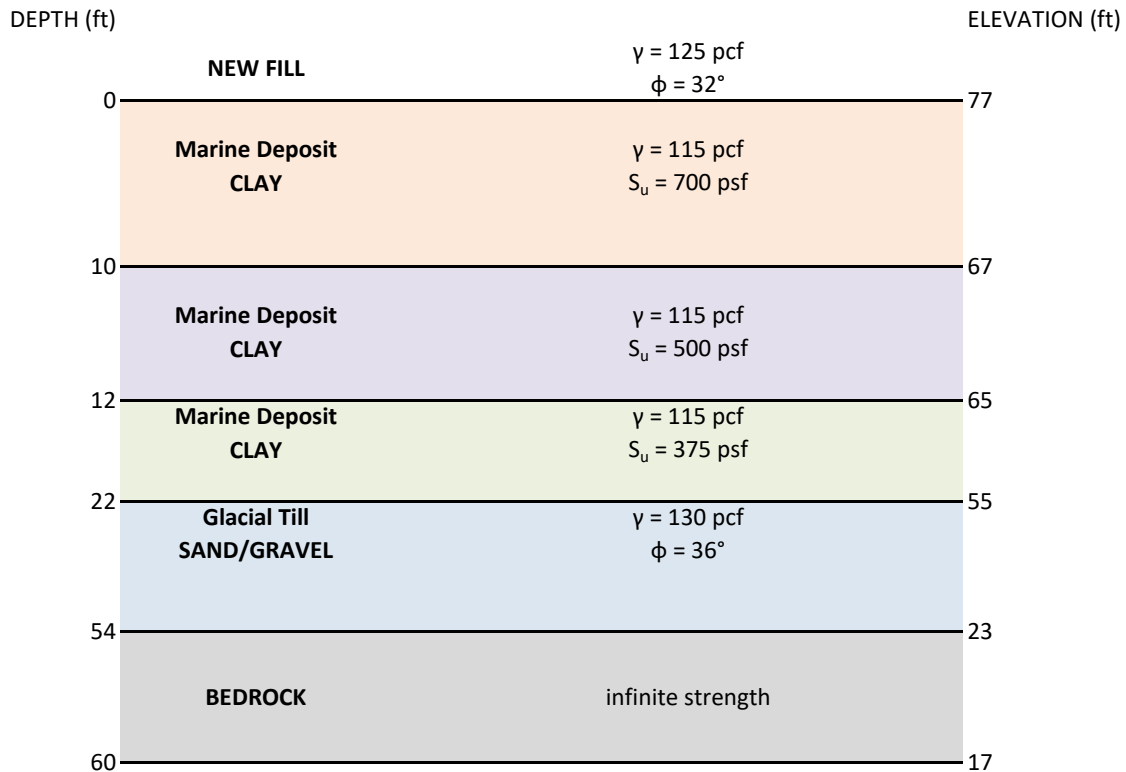
Fill height = 14 ft

Ground surface at center = El. 77.0


STA 142+00 SOIL PROFILE AND PROPERTIES (not to scale)

Based on boring BB-BEB-203, BB-BEB-104, BB-BEB-204/204A and BB-BEB-205

Groundwater depth = at ground surface (based on boring BB-BEB-203, BB-BEB-104, BB-BEB-204/204A and BB-BEB-205)

Boring BB-BEB-203


Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Transverse

Checked by: EMS

STA 142+00 Continued

Boring BB-BEB-104

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	77
5	Marine Deposit SILT $\gamma = 115 \text{ pcf}$ $\phi = 28^\circ$	72
10	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
12	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 500 \text{ psf}$	65
19	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	58
60	Glacial Till SAND/GRAVEL $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	17
71	BEDROCK infinite strength	6

Boring BB-BEB-204/204A

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	77
10	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
12	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 500 \text{ psf}$	65
17	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	60
70	Glacial Till SAND/GRAVEL $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	7
90	BEDROCK infinite strength	-13

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Transverse

Checked by: EMS

STA 142+00 Continued

Boring BB-BEB-205

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	77
10	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
12	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 500 \text{ psf}$	65
15	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	62
71	Glacial Till SAND/GRAVEL $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	6
75	BEDROCK infinite strength	2

Temporary Condition

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Transverse

Checked by: EMS

RESULTS AND CONCLUSIONS - TEMPORARY CONDITION

Left to Right (F.S=1.15)

Station	Height of Embankment	Maximum Temporary First Stage Fill Height	Factor of Safety (Spencer Method)	Factor of Safety (Bishop Simplified Method)	Factor of Safety (GLE/Morgenstern-Price Method)
Sta. 140+00	18	18	1.28	1.29	1.29
Sta. 142+00	14	14	1.98	2.00	1.99

Right to Left (F.S=1.15)

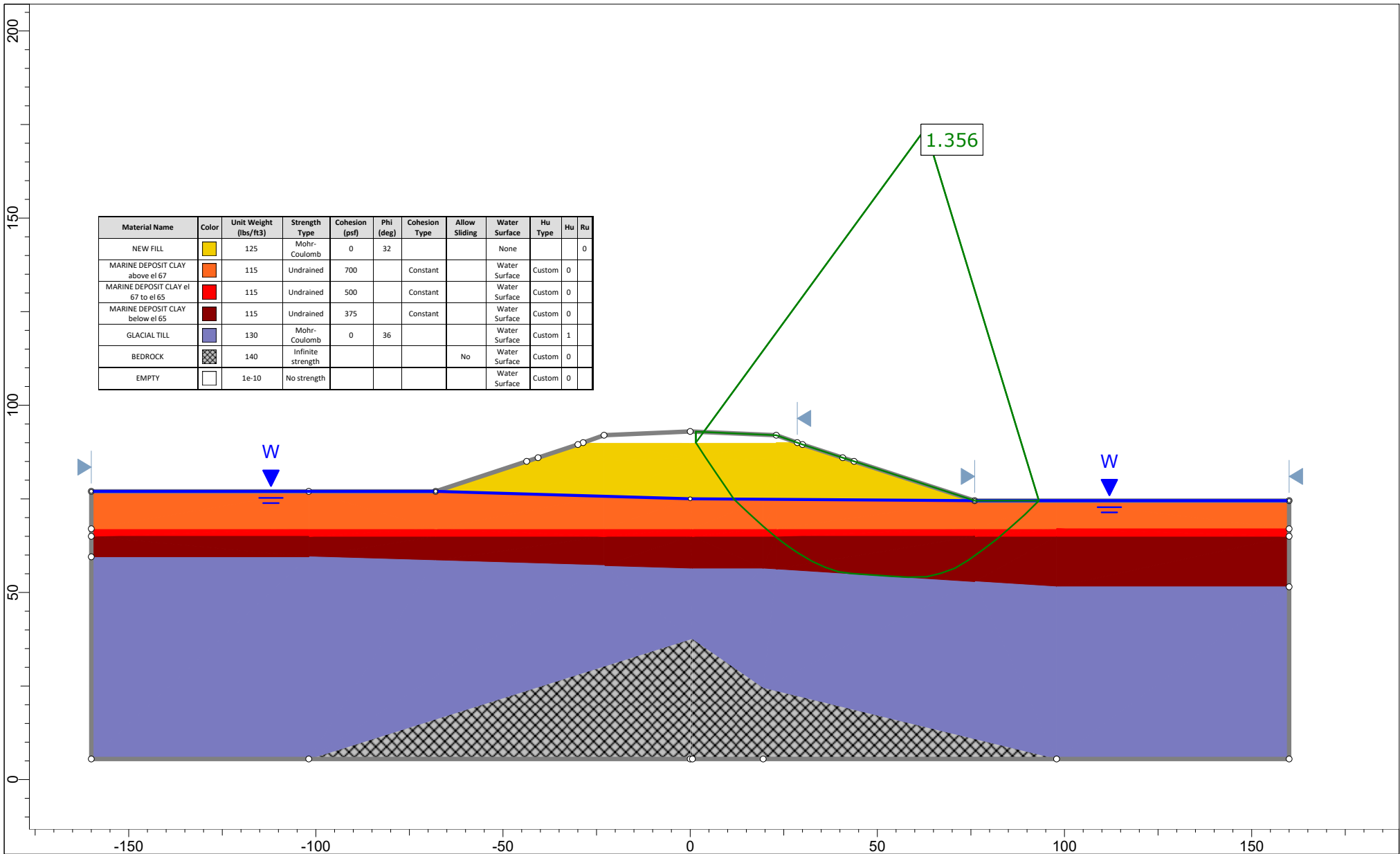
Station	Height of Embankment	Maximum Temporary First Stage Fill Height	Factor of Safety (Spencer Method)	Factor of Safety (Bishop Simplified Method)	Factor of Safety (GLE/Morgenstern-Price Method)
Sta. 140+00	18	18	1.44	1.45	1.45
Sta. 142+00	14	14	1.47	1.48	1.48




Non-circular (F.S=1.15)

Station	Height of Embankment	Maximum Temporary First Stage Fill Height	Factor of Safety (Spencer Method)	Factor of Safety (GLE/Morgenstern-Price Method)
Sta. 140+00	18	15*	1.36	1.36
Sta. 142+00	14	14	1.44	1.45

Note: * Longitudinal case governs. As a result fill height was limited to 15 ft

Sta. 140+00



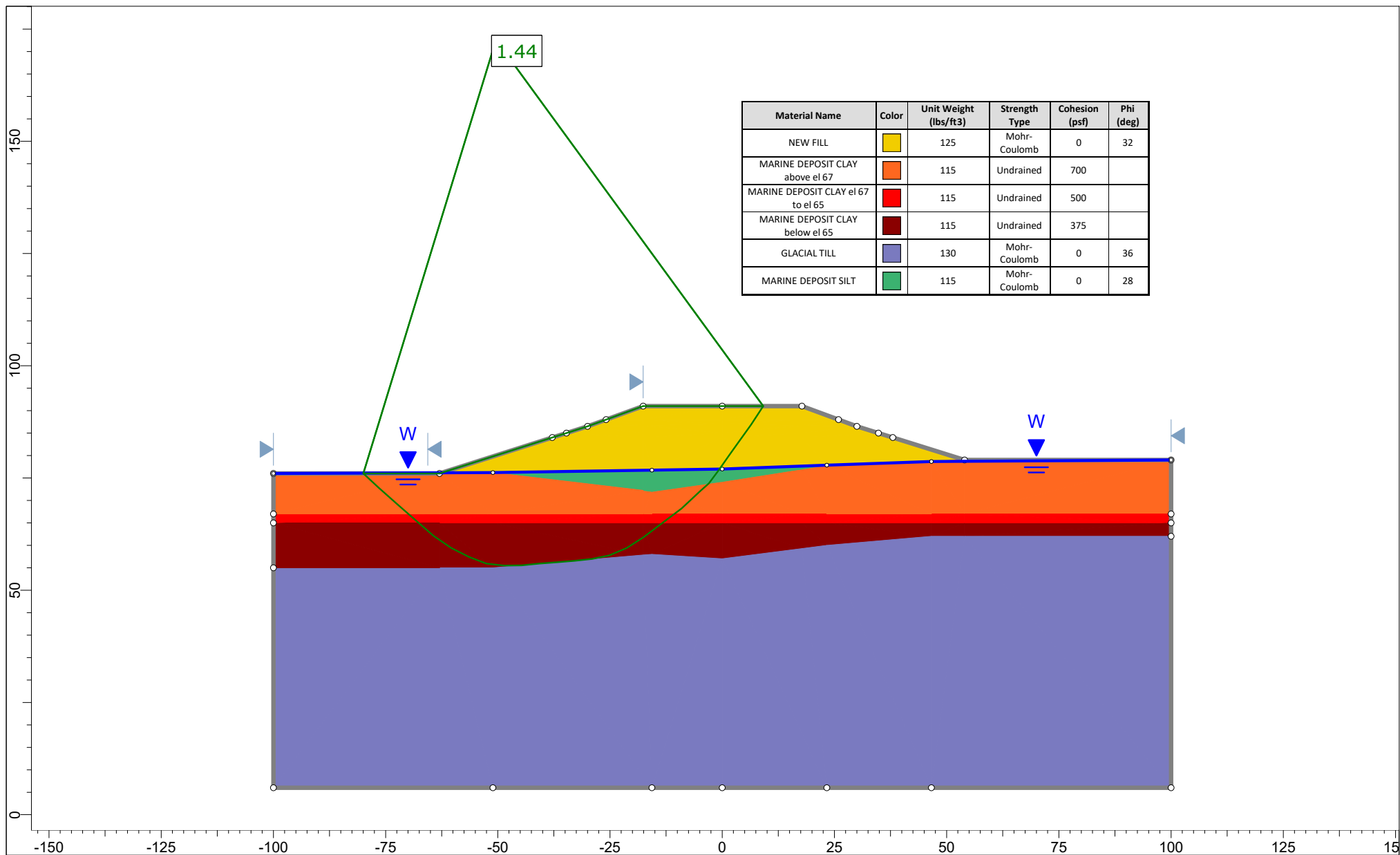
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Allow Sliding	Water Surface	Hu Type	Hu	Ru
NEW FILL		125	Mohr-Coulomb	0	32			None			0
MARINE DEPOSIT CLAY above el 67		115	Undrained	700		Constant		Water Surface	Custom	0	
MARINE DEPOSIT CLAY el 67 to el 65		115	Undrained	500		Constant		Water Surface	Custom	0	
MARINE DEPOSIT CLAY below el 65		115	Undrained	375		Constant		Water Surface	Custom	0	
GLACIAL TILL		130	Mohr-Coulomb	0	36			Water Surface	Custom	1	
BEDROCK		140	Infinite strength				No	Water Surface	Custom	0	
EMPTY		1e-10	No strength					Water Surface	Custom	0	



SLIDEINTERPRET 9.004

Project	SLIDE - An Interactive Slope Stability Program	
Group	Temporary Case	Scenario Master Scenario
Drawn By		Company
Date	5/20/2021, 10:16:23 AM	File Name 2021-0527- Sta 140+00- Left to Right-non circular-F.S1.15-D1.slmd

Sta. 142+00



SLIDEINTERPRET 9.008

Project	SLIDE - An Interactive Slope Stability Program	
Group	Temporary Case	Scenario Master Scenario
Drawn By		Company
Date	5/20/2021, 10:16:23 AM	File Name 2021-0615- Sta 142+00- Right to Left-non circular-F.S1.15-D3.slmd

Permanent Condition

Client: Maine Department of Transportation

Date: 27-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Transverse

Checked by: EMS

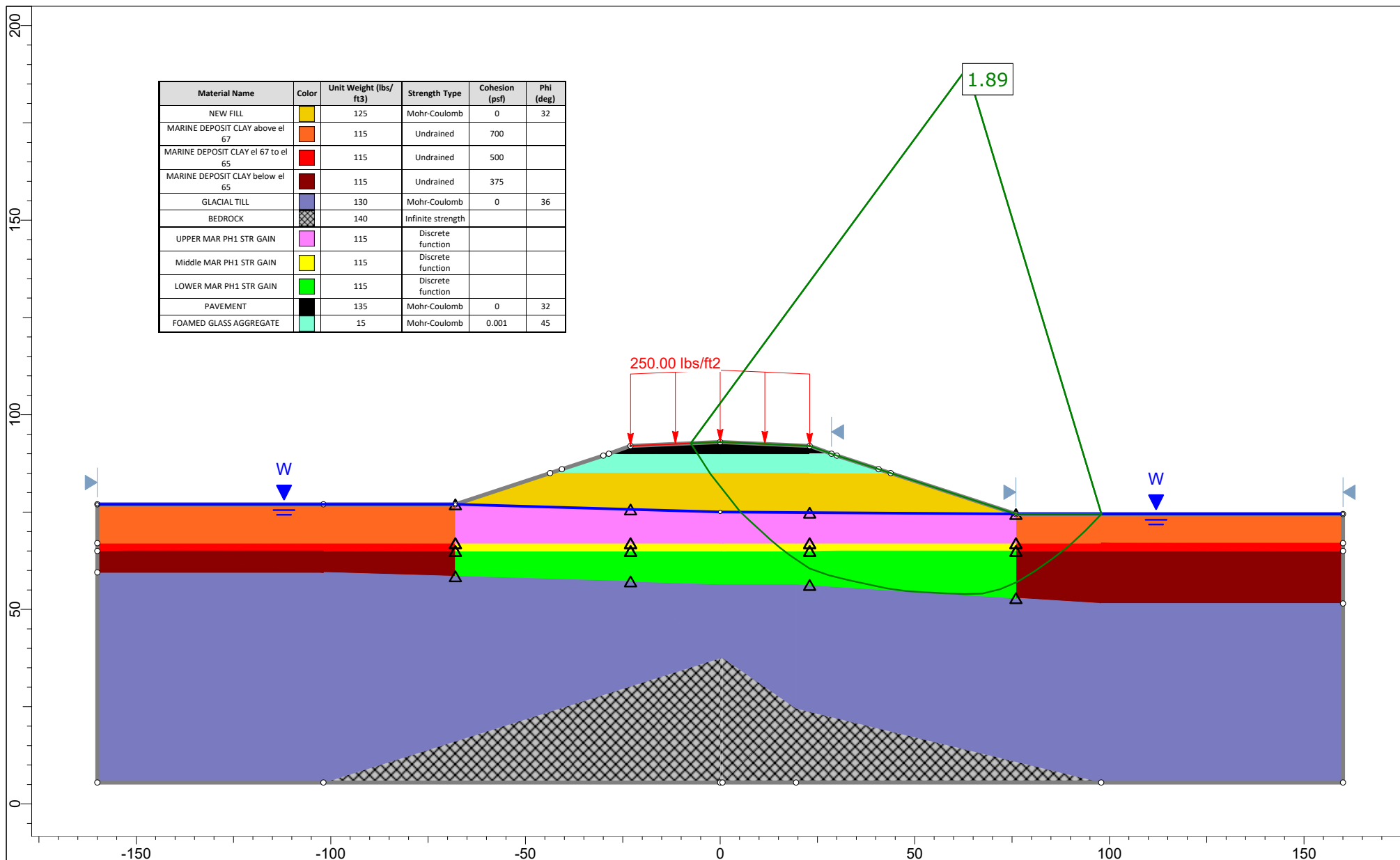
RESULTS AND CONCLUSIONS - PERMANENT CONDITION

Non-circular (F.S=1.3) - Transverse

Station	Height of Embankment	New Weight Fill Thickness (ft)	Lightweight Fill Thickness (ft)	Pavement Thickness (ft)	Stages	Factor of Safety (Spencer Method)	Factor of Safety (GLE/Morgenstern-Price Method)
Sta. 140+00	18	10	5	3.0	Final Condition + Loading	1.89	1.89
					Site Class D Pseudo-Static, 0.05g	1.53	1.53
Sta. 142+00	14	7	4	3.0	Final Condition + Loading	2.10	2.11
					Site Class D Pseudo-Static, 0.05g	1.68	1.69

Sta. 140+00

Material Name	Color	Unit Weight (lbs/ft ³)	Strength Type	Cohesion (psf)	Phi (deg)
NEW FILL		125	Mohr-Coulomb	0	32
MARINE DEPOSIT CLAY above el 67		115	Undrained	700	
MARINE DEPOSIT CLAY el 67 to el 65		115	Undrained	500	
MARINE DEPOSIT CLAY below el 65		115	Undrained	375	
GLACIAL TILL		130	Mohr-Coulomb	0	36
BEDROCK		140	Infinite strength		
UPPER MAR PH1 STR GAIN		115	Discrete function		
Middle MAR PH1 STR GAIN		115	Discrete function		
LOWER MAR PH1 STR GAIN		115	Discrete function		
PAVEMENT		135	Mohr-Coulomb	0	32
FOAMED GLASS AGGREGATE		15	Mohr-Coulomb	0.001	45



Project

SLIDE - An Interactive Slope Stability Program

Group

Permanent Case

Scenario

Overexc and NWF to Final+250psf Surch

Drawn By

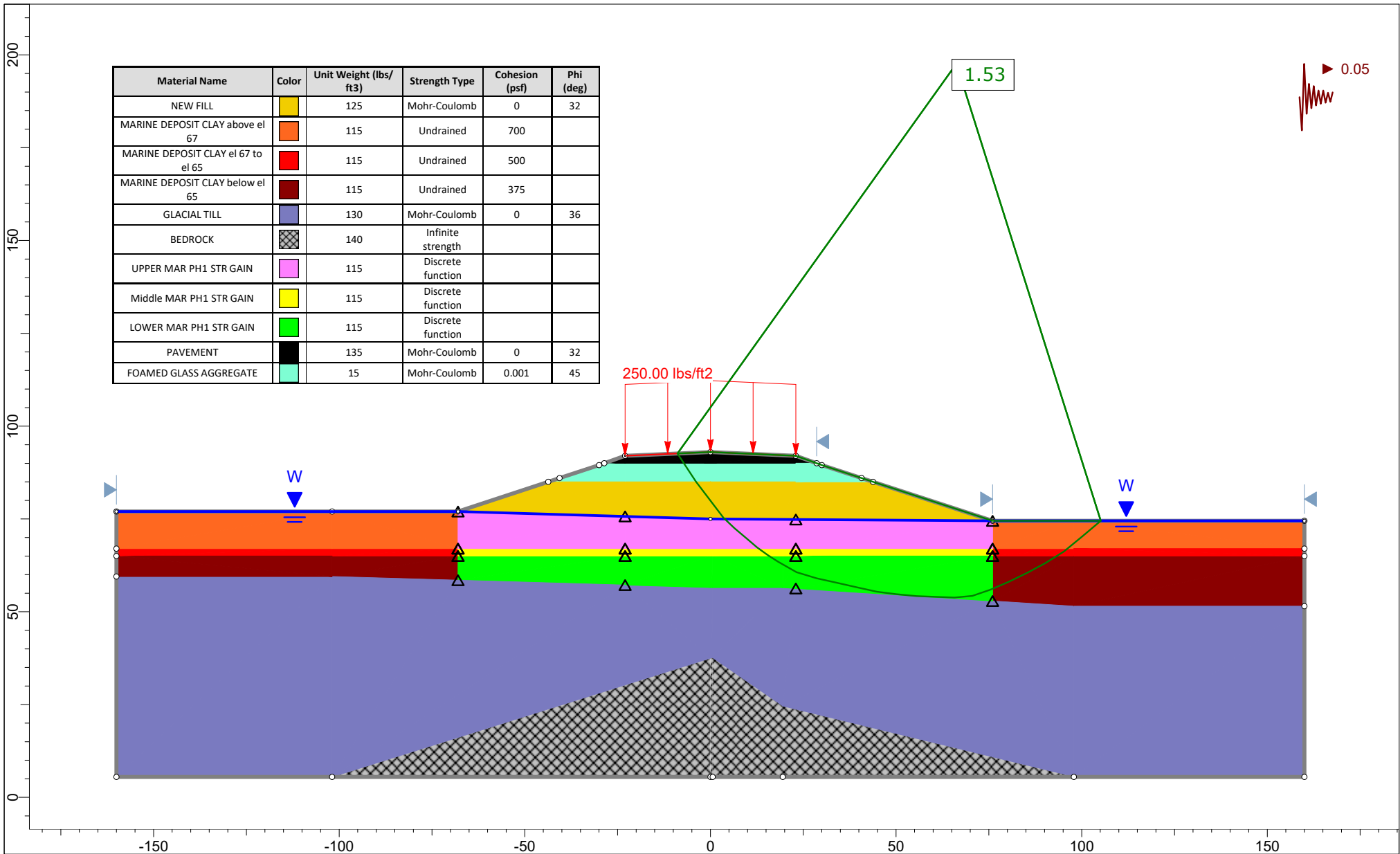
Company

Date

5/20/2021, 10:16:23 AM

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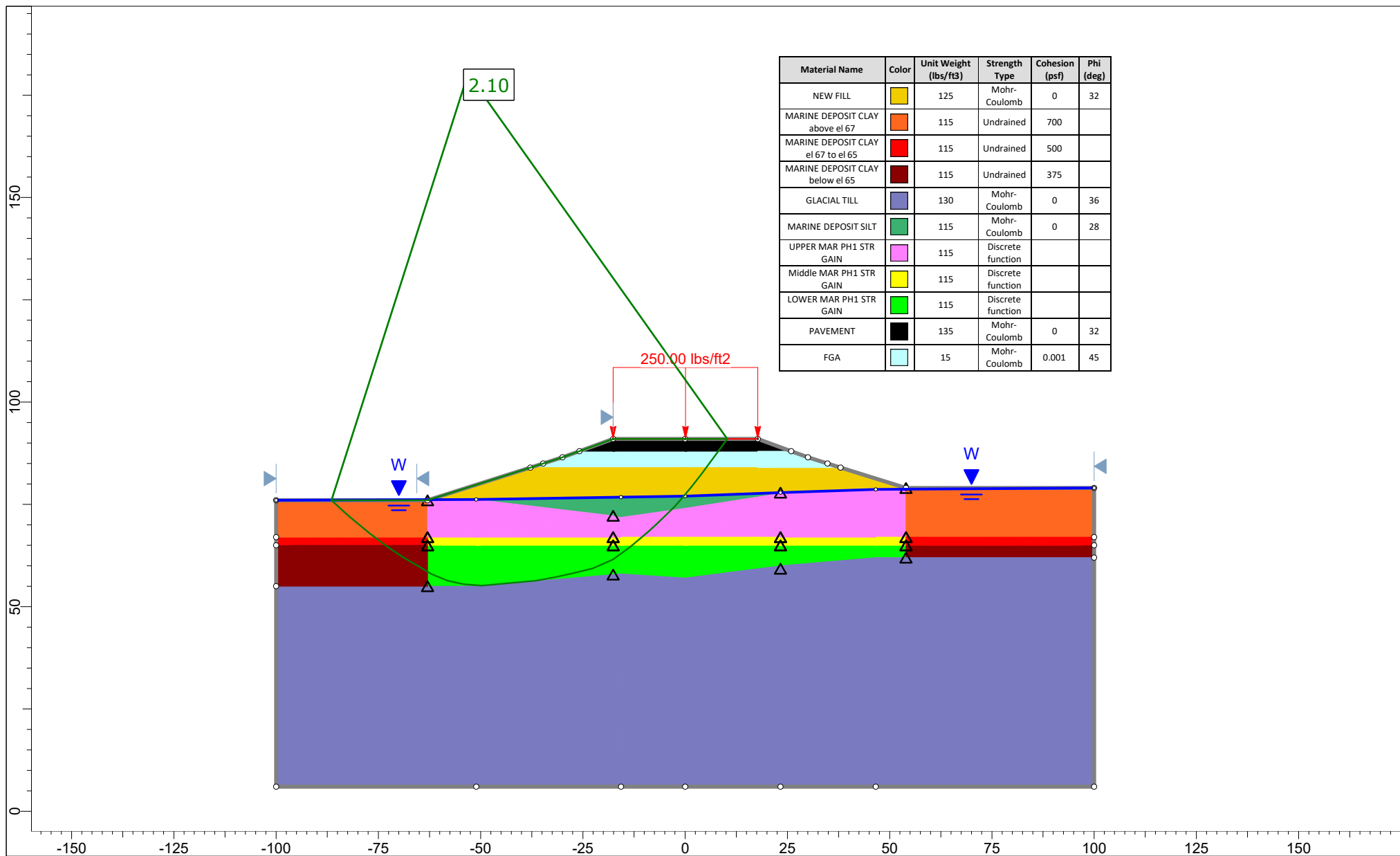
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SLIDEINTERPRET 9.008

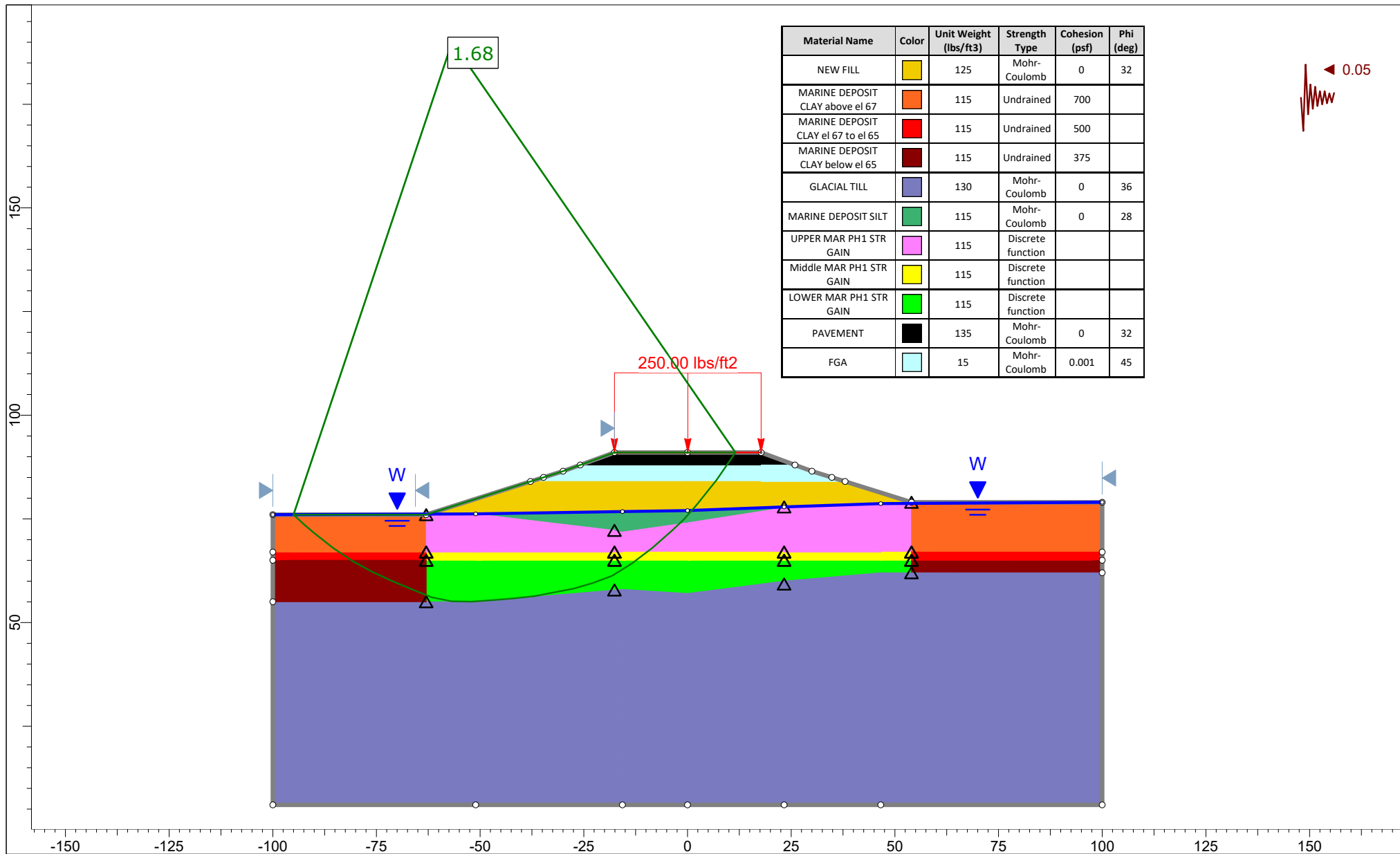
Project			
SLIDE - An Interactive Slope Stability Program			
Group	Permanent Case		Scenario
			Site Class D Pseudo-Static, 0.05g
Drawn By			Company
Date	5/20/2021, 10:16:23 AM		File Name
			2021-0527- Sta 140+00- Left to Right-non circular-F.S1.15-D1.slmd

Sta. 142+00



SLIDEINTERPRET 9.008

Project	SLIDE - An Interactive Slope Stability Program		
Group	Permanent Case	Scenario	Overexc and NWF to Final+250psf Surch
Drawn By		Company	
Date	5/20/2021, 10:16:23 AM	File Name	2021-0615- Sta 142+00- Right to Left-non circular-F.S1.15-D3.slmd



SLIDEINTERPRET 9.008

Project			
SLIDE - An Interactive Slope Stability Program			
Group	Permanent Case		Scenario Site Class D Pseudo-Static, 0.05g
Drawn By			Company
Date	5/20/2021, 10:16:23 AM		File Name 2021-0615- Sta 142+00- Right to Left-non circular-F.S1.15-D3.slmd

Area 2 - Longitudinal

Client: Maine Department of Transportation

Date: 20-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Longitudinal

Checked by: EMS

PROBLEM STATEMENT AND OBJECTIVE

Calculate the global stability minimum factor of safety at critical sections along the proposed highway alignment.

REFERENCES

1. AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014.
2. Slide version 7.0 by RocScience.
3. Maine DOT Bridge Design Guide, 2003, with 2014 updates.

AVAILABLE INFORMATION

1. Plan set titled, "Brewer-Eddington I-395/Route 9 Connector, Cross Sections," by MaineDOT dated 25 February 2020.
2. Plan set titled, "I-395/Route 9 Connector, Interpretive Subsurface Profile," by MaineDOT dated 2 October 2019.

ASSUMPTIONS

1. Soil profiles will be modeled to match settlement calculation models, as summarized below.
2. Used seismic site class D: $A_s/2 = 0.107/2 = 0.05$ g
3. A 250 psf traffic surcharge will be modeled.

SOIL PROPERTIES

Material	Unit Weight (pcf)	Friction Angle (degrees)	Undrained Shear Strength (psf)
New Fill	125	32	0
Marine Deposit	115	varies1	
Glacial Till	130	36	0
Bedrock	infinite strength		

Notes:

1. Soil properties for Existing Fill and Marine Deposit vary based on location. See individual soil profiles for details.

Client: Maine Department of Transportation

Date: 20-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

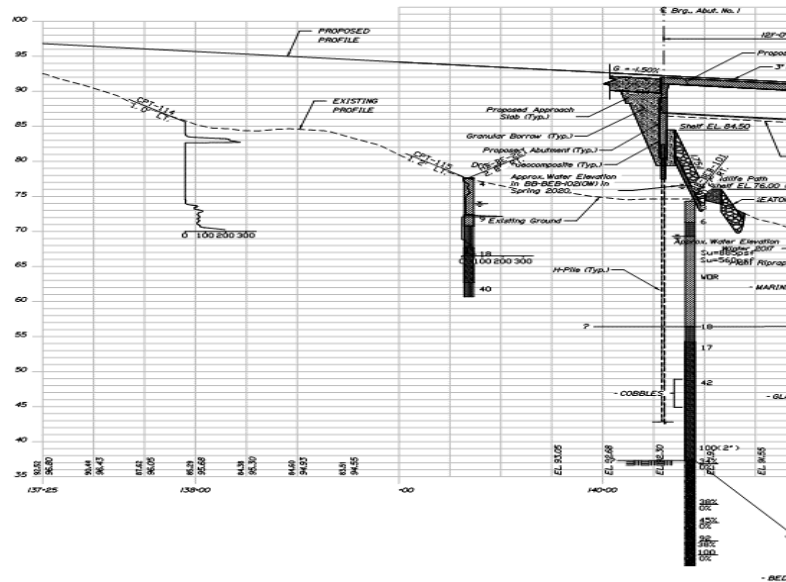
Computed by: SSM

Subject: Global Stability - Area 2 Longitudinal

Checked by: EMS

Abutment No. 1 (South) Geometry

Fill height = 18 ft


SOIL PROFILE AND PROPERTIES (not to scale)

Based on boring BB-BEB-101 and HB-BE-221

Groundwater Elev. = 74.5 ft

Boring BB-BEB-101

DEPTH (ft)			ELEVATION (ft)
0	NEW FILL	$\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	74.3
7.3	Marine Deposit CLAY	$\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
9.3	Marine Deposit CLAY	$\gamma = 115 \text{ pcf}$ $S_u = 500 \text{ psf}$	65
18	Marine Deposit CLAY	$\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	56.3
37	Glacial Till GRAVEL	$\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	37.3
52	BEDROCK	infinite strength	22.3

Client: Maine Department of Transportation

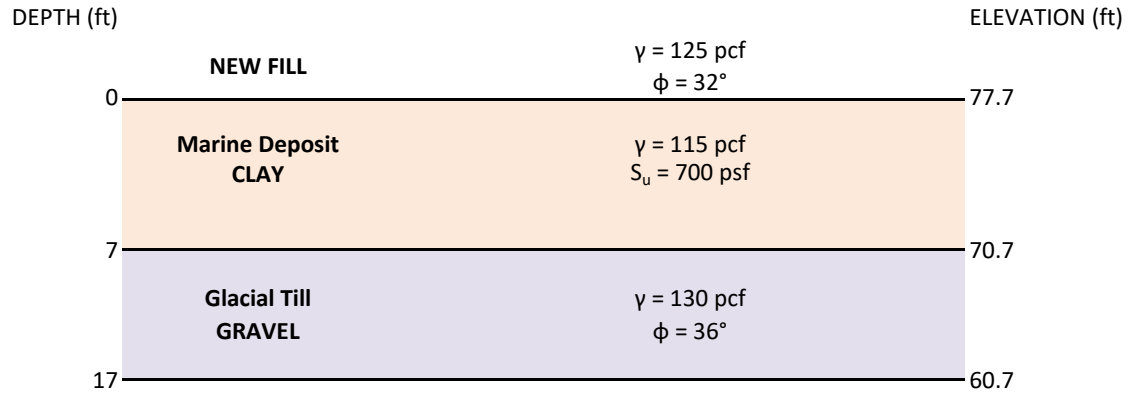
Date: 20-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Longitudinal

Checked by: EMS

Abutment No. 1 Geometry - continued
Boring HB-BE-221


Client: Maine Department of Transportation

Date: 20-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

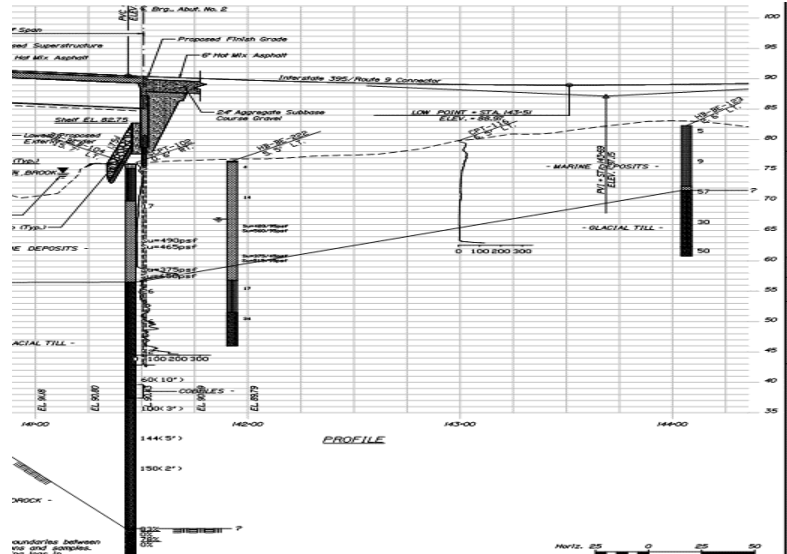
Computed by: SSM

Subject: Global Stability - Area 2 Longitudinal

Checked by: EMS

Abutment No. 2 (North) Geometry

Fill height = 14.0 ft

**SOIL PROFILE AND PROPERTIES (not to scale)**

Based on boring BB-BEB-104, HB-BE-222, HB-BE-123

Groundwater Elev. = 74.5 ft

Boring BB-BEB-104

DEPTH (ft)

ELEVATION (ft)

DEPTH (ft)		ELEVATION (ft)
0	NEW FILL $\gamma = 125 \text{ pcf}$ $\phi = 32^\circ$	76
5	Marine Deposit SILT $\gamma = 115 \text{ pcf}$ $\phi = 28^\circ$	71
9	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 700 \text{ psf}$	67
11	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 500 \text{ psf}$	65
19.5	Marine Deposit CLAY $\gamma = 115 \text{ pcf}$ $S_u = 375 \text{ psf}$	56.5
60	Glacial Till SILT/GRAVEL $\gamma = 130 \text{ pcf}$ $\phi = 36^\circ$	16
71	BEDROCK infinite strength	5

Client: Maine Department of Transportation

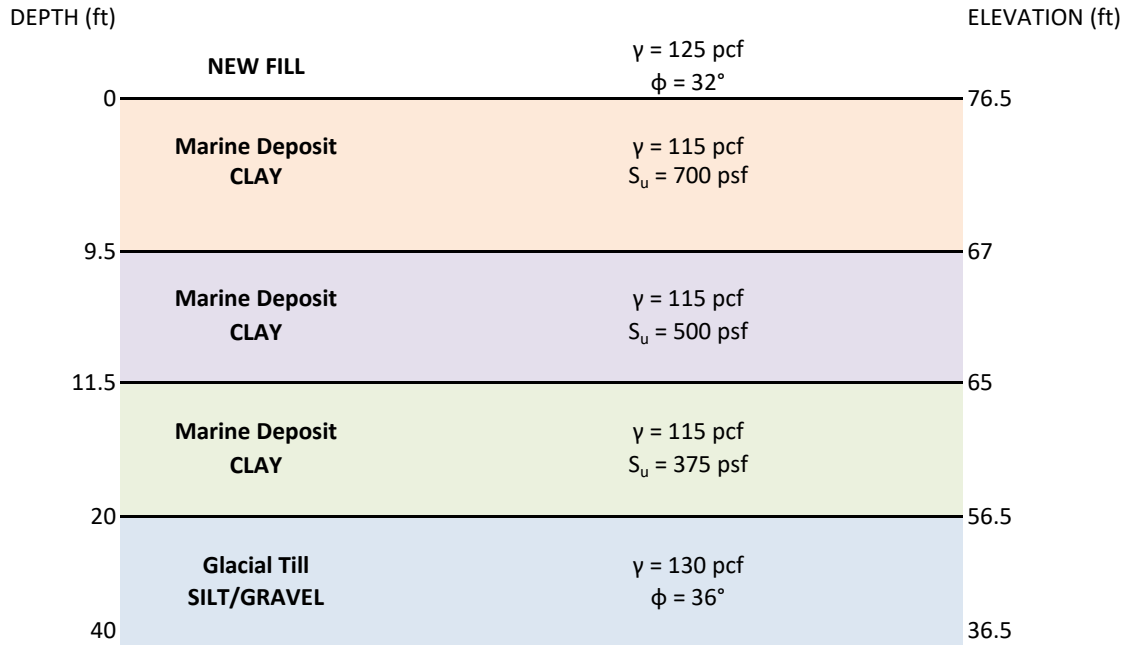
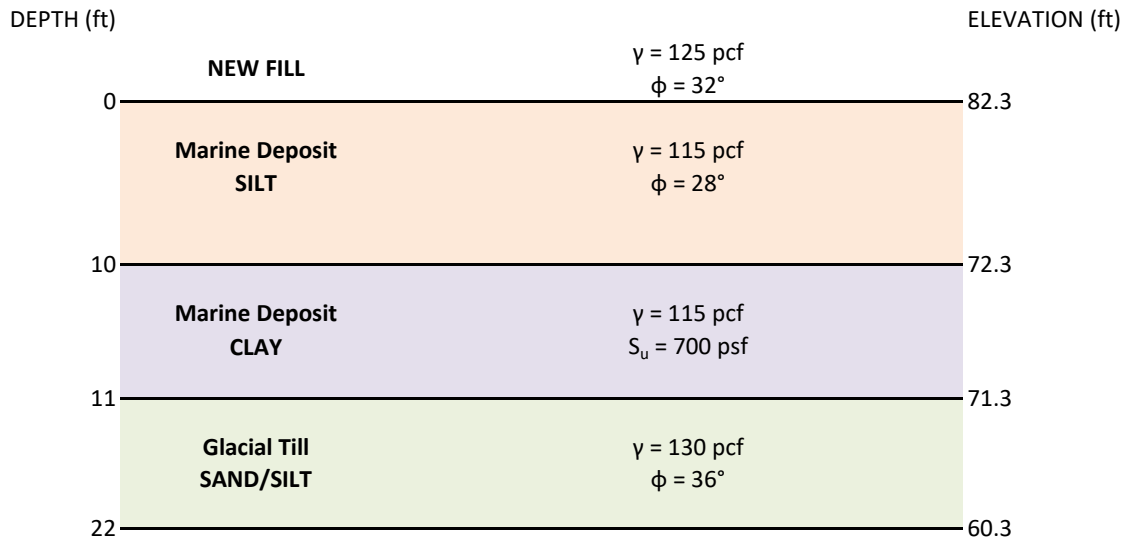
Date: 20-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Longitudinal

Checked by: EMS

Abutment No. 2 Geometry - continued
Boring HB-BE-222

Boring HB-BE-123


Temporary Condition

Client: Maine Department of Transportation

Date: 20-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Longitudinal

Checked by: EMS

RESULTS AND CONCLUSIONS - TEMPORARY CONDITION







Circular (F.S=1.15)

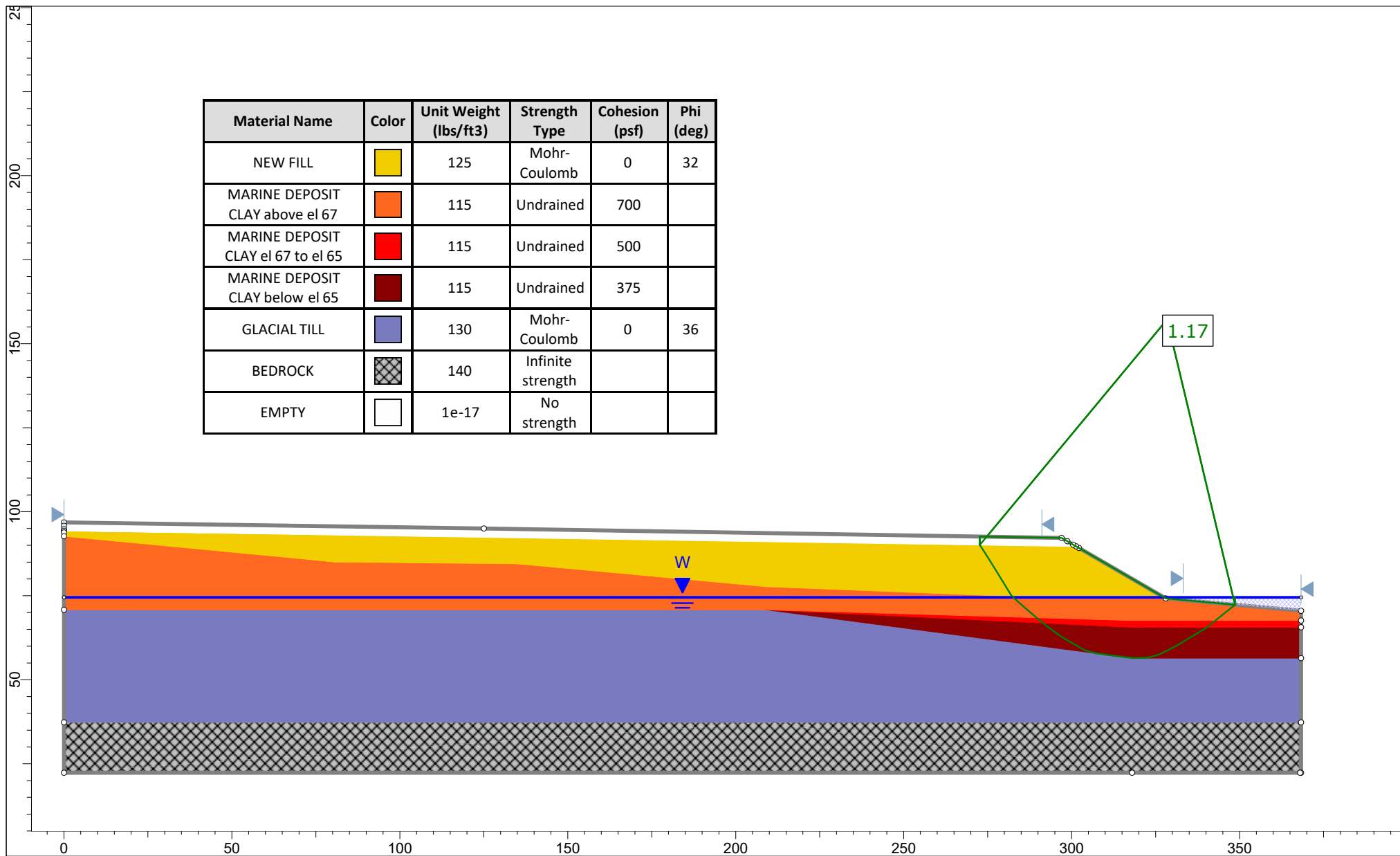
Station	Height of Embankment	Maximum Temporary First Stage Fill Height	Factor of Safety (Spencer Method)	Factor of Safety (Bishop Simplified Method)	Factor of Safety (GLE/Morgenstern-Price Method)
Abutment No. 1 (S)	18	15.5	1.16	1.17	1.16
Abutment No. 2 (N)	14	14	1.18	1.19	1.18

Non-Circular (F.S=1.15)

Station	Height of Embankment	Maximum Temporary First Stage Fill Height	Factor of Safety (Spencer Method)	Factor of Safety (GLE/Morgenstern-Price Method)
Abutment No. 1 (S)	18	15	1.17	1.18
Abutment No. 2 (N)	14	14	1.16	1.17

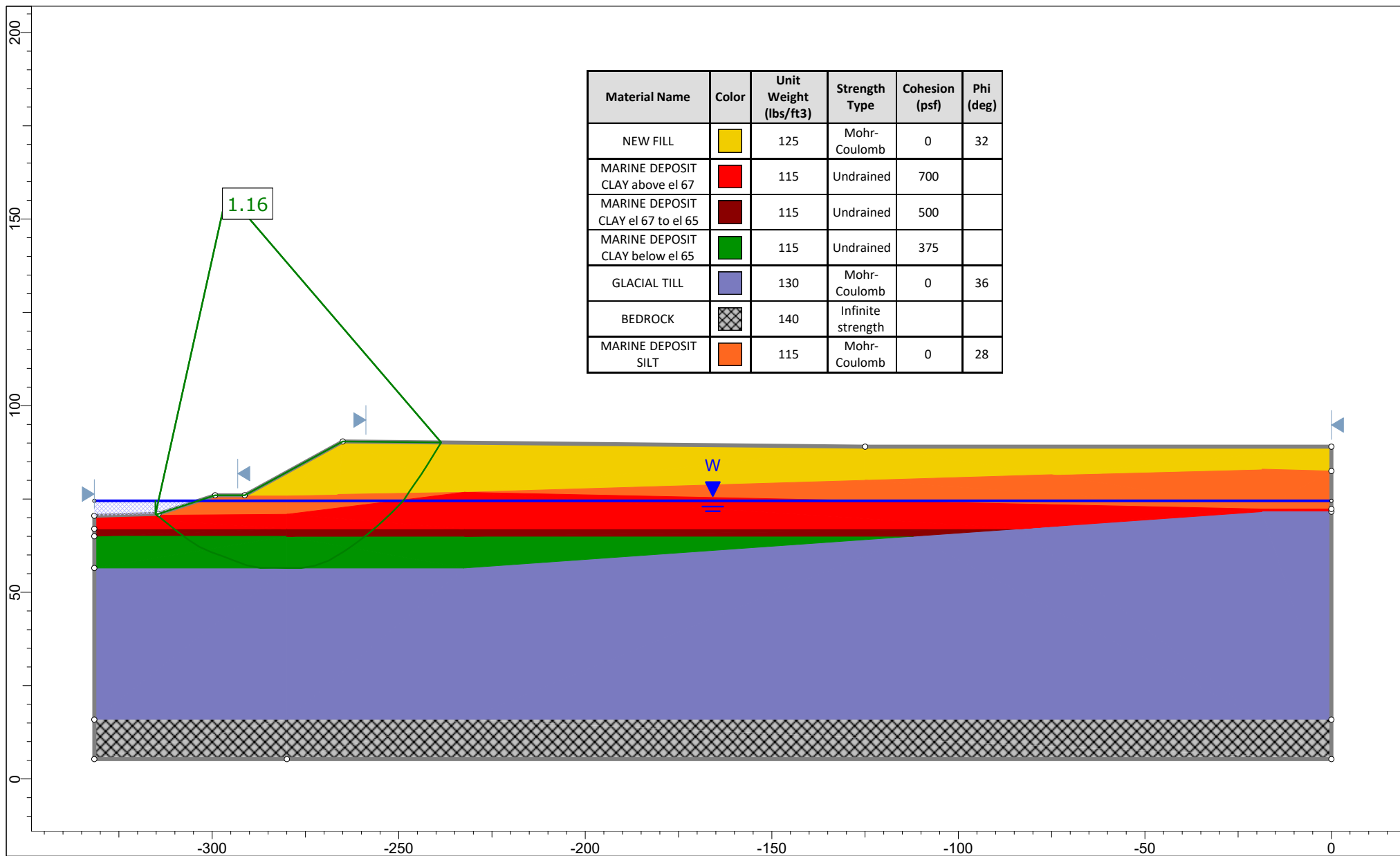
Abutment No. 1 (South)

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
NEW FILL		125	Mohr-Coulomb	0	32
MARINE DEPOSIT CLAY above el 67		115	Undrained	700	
MARINE DEPOSIT CLAY el 67 to el 65		115	Undrained	500	
MARINE DEPOSIT CLAY below el 65		115	Undrained	375	
GLACIAL TILL		130	Mohr-Coulomb	0	36
BEDROCK		140	Infinite strength		
EMPTY		1e-17	No strength		



Project		SLIDE - An Interactive Slope Stability Program	
Group	Temporary Case	Scenario	Master Scenario
Drawn By		Company	
Date	5/20/2021, 10:16:23 AM	File Name	2021-0520- Brg., Abut. No.1 (South)- Left to Right-non-circular-F S1 15-D1 slmd

Abutment No. 2 (North)



SLIDEINTERPRET 9.008

Project			
SLIDE - An Interactive Slope Stability Program			
Group		Scenario	
Temporary Case		Master Scenario	
Drawn By		Company	
Date		File Name	
5/20/2021, 10:16:23 AM		2021-0611- Brg., Abut. No.2 (North)-Right to Left-non circular- E S1 15-D1 slmd	

Permanent Condition

Client: Maine Department of Transportation

Date: 20-May-2021

Project: I-395/Route 9 Connector - WIN 18915.00

Computed by: SSM

Subject: Global Stability - Area 2 Longitudinal

Checked by: EMS

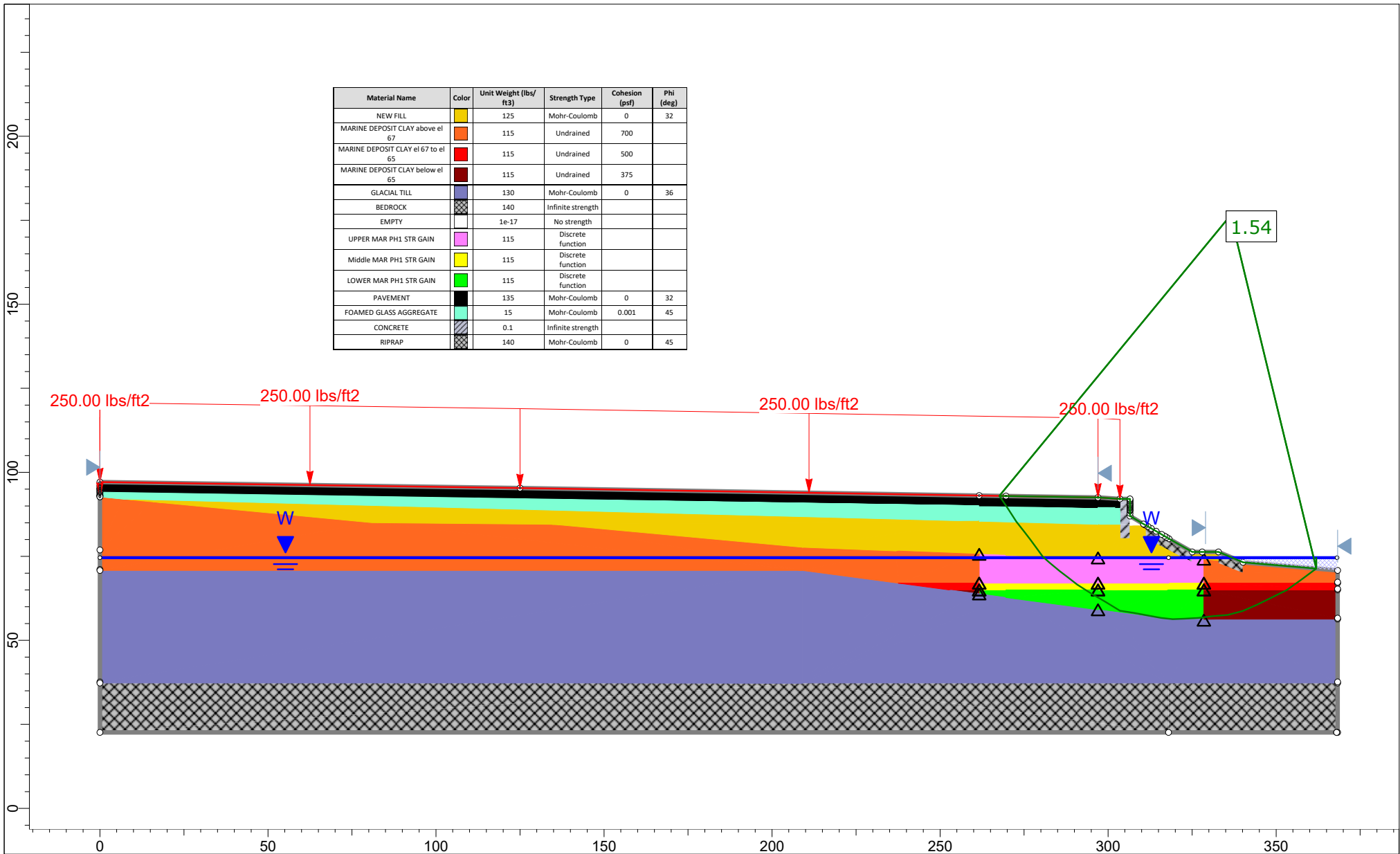
RESULTS AND CONCLUSIONS - PERMANENT CONDITION

Non-Circular (F.S=1.5) - Longitudinal

Station	Height of Embankment	New Weight Fill Thickness (ft)	Lightweight Fill Thickness (ft)	Pavement Thickness (ft)	Stages	Factor of Safety (Spencer Method)	Factor of Safety (GLE/Morgenstern-Price Method)
Abutment No. 1 (South)	18	10	5	3	Final Condition + Loading	1.54	1.55
					Site Class D Pseudo-Static, 0.05g	1.27	1.26
Abutment No. 2 (North)	14	7	4	3	Final Condition + Loading	1.60	1.60
					Site Class D Pseudo-Static, 0.05g	1.37	1.38

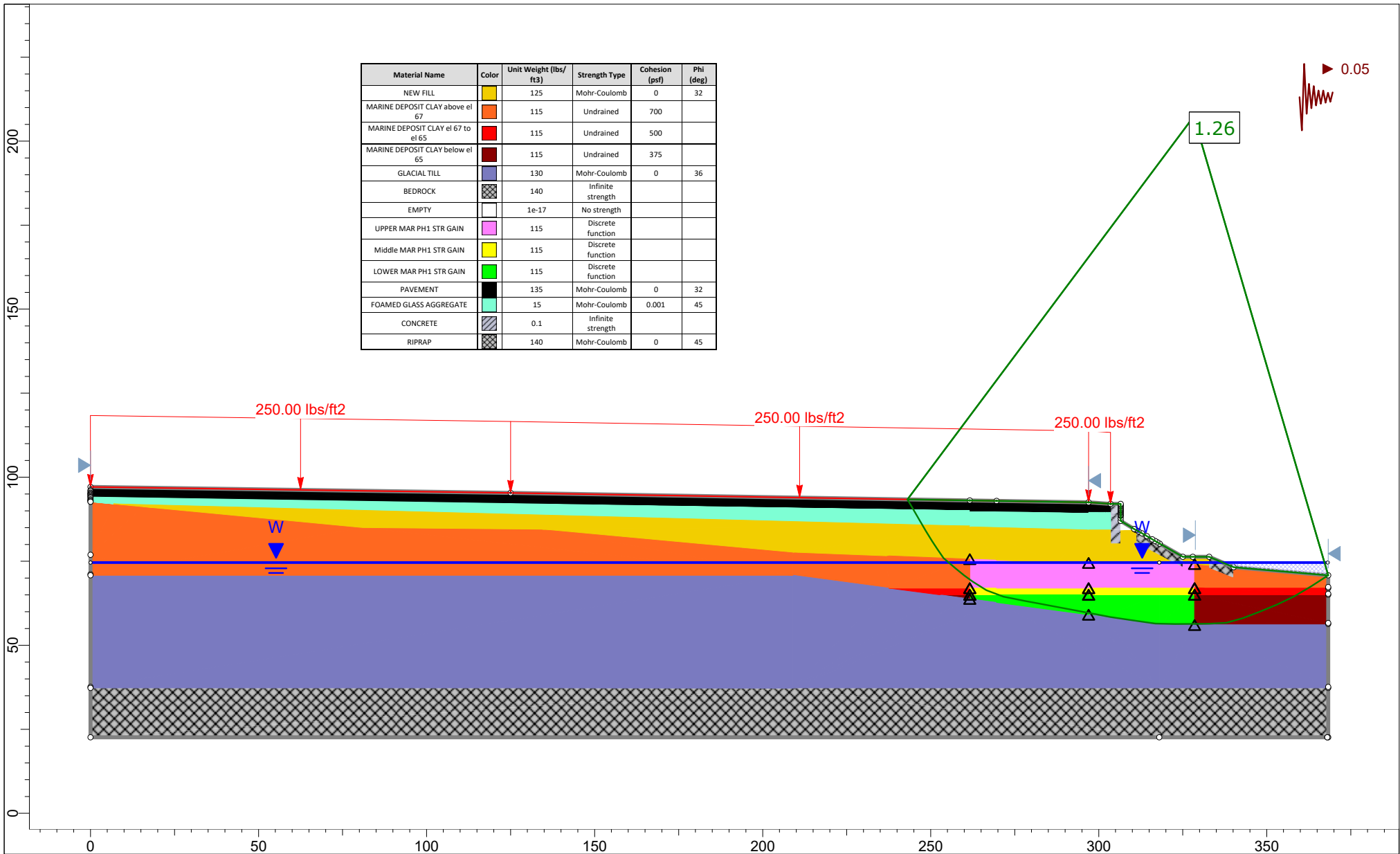
Abutment No. 1 (South)


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
NEW FILL		125	Mohr-Coulomb	0	32
MARINE DEPOSIT CLAY above el 67		115	Undrained	700	
MARINE DEPOSIT CLAY el 67 to el 65		115	Undrained	500	
MARINE DEPOSIT CLAY below el 65		115	Undrained	375	
GLACIAL TILL		130	Mohr-Coulomb	0	36
BEDROCK		140	Infinite strength		
EMPTY		1e-17	No strength		
UPPER MAR PH1 STR GAIN		115	Discrete function		
Middle MAR PH1 STR GAIN		115	Discrete function		
LOWER MAR PH1 STR GAIN		115	Discrete function		
PAVEMENT		135	Mohr-Coulomb	0	32
FOAMED GLASS AGGREGATE		15	Mohr-Coulomb	0.001	45
CONCRETE		0.1	Infinite strength		
RIPRAP		140	Mohr-Coulomb	0	45



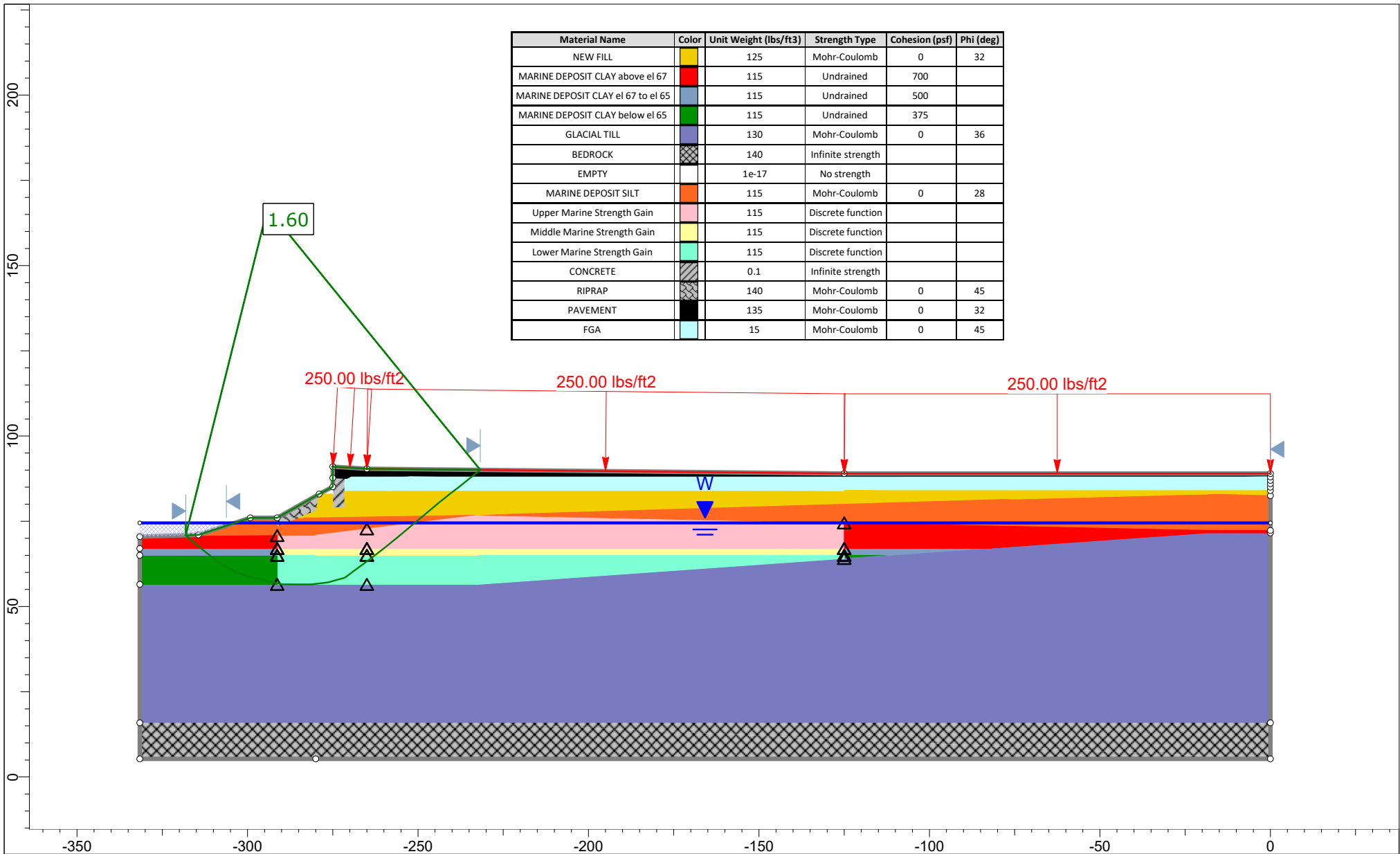
Project	SLIDE - An Interactive Slope Stability Program		
Group	Permanent Case	Scenario	Overexc and NWF to Final+250psf Surch
Drawn By		Company	
Date	5/20/2021, 10:16:23 AM	File Name	2021-0520-Abut. No.1- Left to Right-non-circular-F.S1.15-D1.slmd


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
NEW FILL		125	Mohr-Coulomb	0	32
MARINE DEPOSIT CLAY above el 67		115	Undrained	700	
MARINE DEPOSIT CLAY el 67 to el 65		115	Undrained	500	
MARINE DEPOSIT CLAY below el 65		115	Undrained	375	
GLACIAL TILL		130	Mohr-Coulomb	0	36
BEDROCK		140	Infinite strength		
EMPTY		1e-17	No strength		
UPPER MAR PH1 STR GAIN		115	Discrete function		
Middle MAR PH1 STR GAIN		115	Discrete function		
LOWER MAR PH1 STR GAIN		115	Discrete function		
PAVEMENT		135	Mohr-Coulomb	0	32
FOAMED GLASS AGGREGATE		15	Mohr-Coulomb	0.001	45
CONCRETE		0.1	Infinite strength		
RIPRAP		140	Mohr-Coulomb	0	45

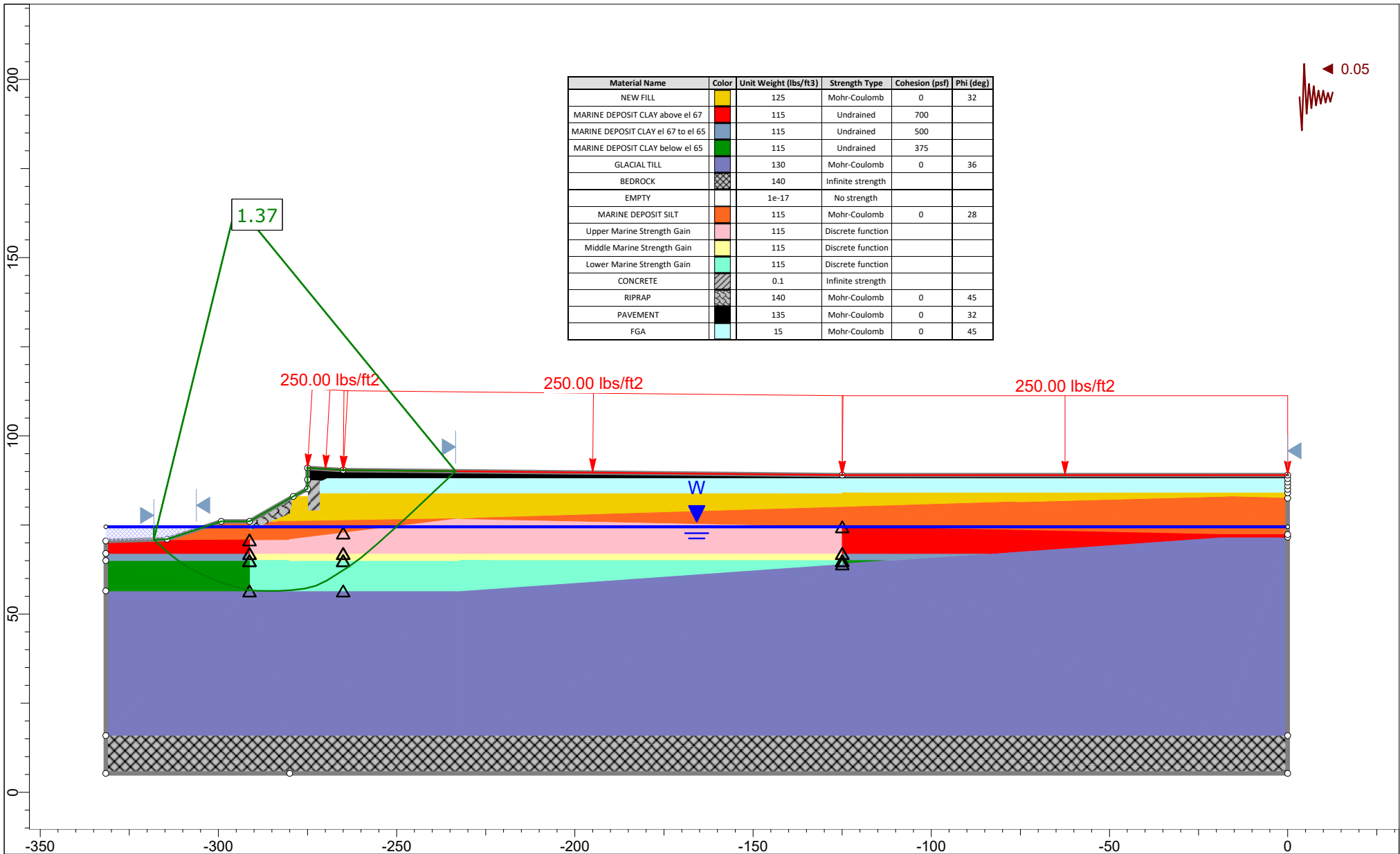



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	Group	Permanent Case	Scenario	Site Class D Pseudo-Static, 0.05g
	Drawn By		Company	
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Abutment No. 2 (North)

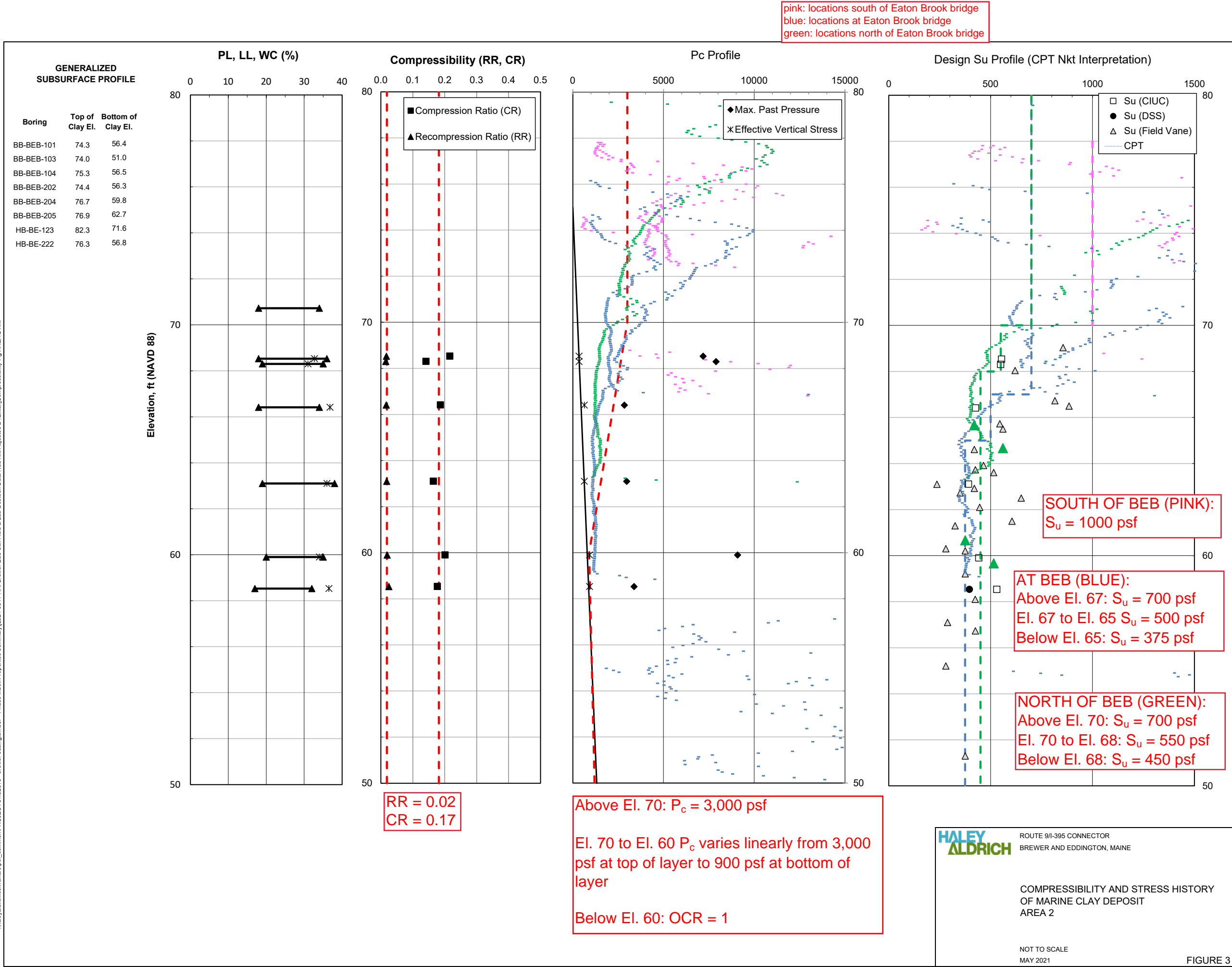



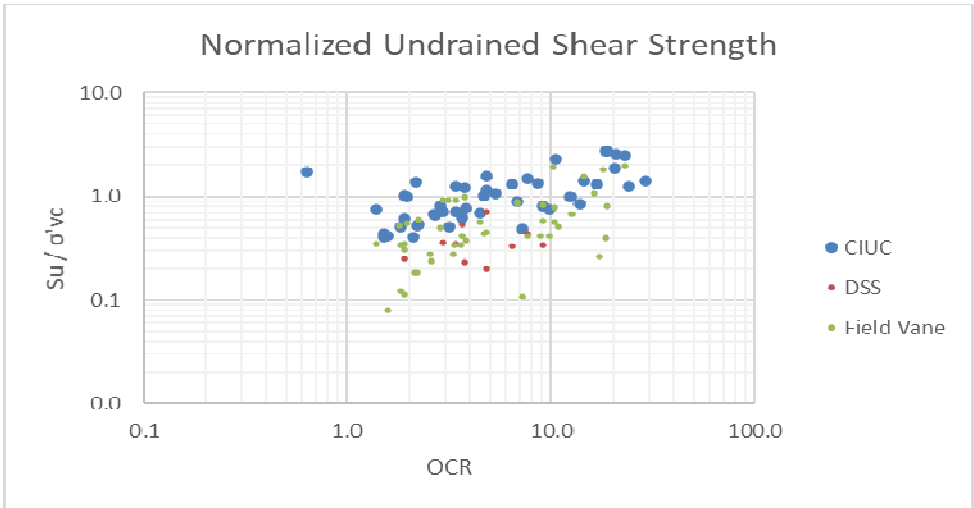
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				4021-0616- Brg., Abut. No.2 (North)-Right to Left-non circular- E S1 15-D5 slmd	



	Project		SLIDE - An Interactive Slope Stability Program	
	Group	Permanent Case	Scenario	Seismic Site Class D 0.05g
	Drawn By		Company	
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\\haleyaldrich.com\share\por_common\PROJECTS\132076 - Brewer Eddington\007 - Phase 1\Soil Properties Summary\2021-0511-HA-Brewer-Edd-Soil Field & Lab Geotech Data-Ndu Nkt Adjusted-D12.xlsx\Compressibility Fig AREA 2 Nkt



		File No.:	132076-007
CALCULATIONS		Sheet:	1 of 3
Client:	Maine Department of Transportation	Date:	22JUN2021
Project:	I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME	Computed by:	JLL
Subject:	Clay Deposit Undrained Shear Strength Gain	Checked by:	EMS
<p>PROBLEM STATEMENT & OBJECTIVE</p> <p>Estimate the undrained shear strength gain ratio for the marine clay deposits (to be applied to slope stability evaluations).</p> <p>EXECUTIVE SUMMARY</p> <p>The estimated marine clay undrained strength gain is equal to 21% of the increase in vertical effective stress. The strength gain should be reduced based on the expected average degree of consolidation (e.g., 0.9 for U=90%).</p> <p>REFERENCES</p> <ol style="list-style-type: none"> 1. Ladd, C.C., and Foott, R., New Design Procedure for Stability of Soft Clays, Journal of the Geotechnical Engineering Division, Proceedings of the ASCE, Vol. 100, No. GT7, July, 1974. 2. Ladd, C.C., 1.361-1.366 MIT Course Notes, 1999. 3. Holtz, R.D. & Kovacs, W.D., An Introduction to Geotechnical Engineering. 5. 9th Edition, AASHTO LRFD Bridge Design Specifications, 2020. <p>AVAILABLE INFORMATION</p> <ol style="list-style-type: none"> 1. Subsurface Data: preliminary and final design phase borings. 2. Laboratory consolidation and undrained shear strength testing (CIUC, DSS) results for the marine clay. 3. Field vane (FV) undrained shear strength testing in the preliminary and final design phase borings. 4. (CPT soundings were not used to evaluate strength gain. They were used to calibrate strength correlation parameters such as Nkt and Ndu). <p>PROCEDURE</p> <ol style="list-style-type: none"> 1. For each strength test location (depth or elevation), estimate the following: <ul style="list-style-type: none"> - Vertical effective stress (estimated soil unit weight, groundwater depth or elevation) - Preconsolidation pressure (from lab consolidation testing) - Calculate the OCR (i.e., ratio between preconsolidation pressure and vertical effective stress) - Calculate the ratio between the undrained shear strength and the test effective confining stress (normalized undrained shear strength, S_u/s'_{vc}) 2. Plot the S_u/s'_{vc} versus OCR (log-log plot) and calculate the SHANSEP relationship ($S_u/s'_{vc}=S(OCR)^m$) for each "type" of undrained shear strength (e.g., CIUC, DSS, and field vane). (CIUC-isotropically consolidated undrained triaxial compression; DSS-direct simple shear; FV-field vane) <p>CALCULATIONS</p> <ol style="list-style-type: none"> 1. The normalized S_u versus OCR plot for CIUC, DSS, and FV tests are shown below: 			
 <p>The plot shows that the normalized CIUC is generally higher than the DSS and FV.</p>			

Client: Maine Department of Transportation

Date: 22JUN2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

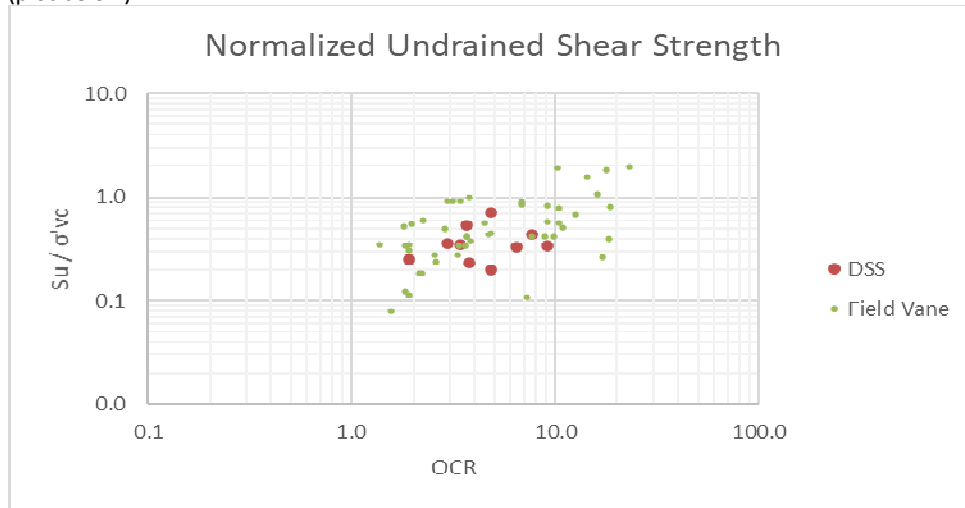
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Subject: Clay Deposit Undrained Shear Strength Gain

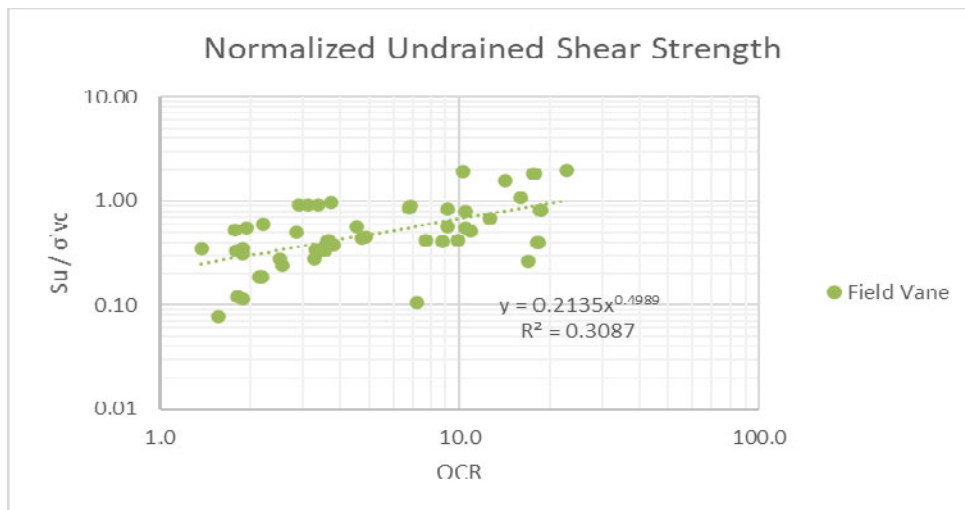
Checked by: EMS

CALCULATIONS (continued...)

2. For stability evaluations using isotropic S_u profiles, one can run DSS tests or run triaxial compression and extension and take the average of the two. In our case, we have DSS test data. In addition, the FV data and DSS data appear similar (plot below).



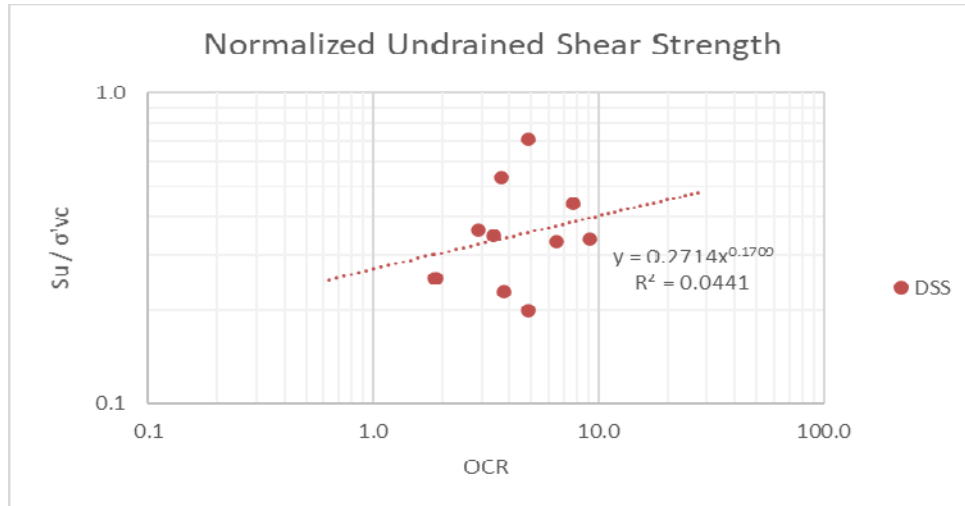
3. Using power functions to fit a line through the FV (to get a SHANSEP type $S_u/s'vc = S(OCR)^m$ equation), we get the plot below. For normally consolidated conditions, the plot suggests $S_u/s'vc = S$ of about 0.21.



Client:	Maine Department of Transportation
Project:	I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME
Subject:	Clay Deposit Undrained Shear Strength Gain


CALCULATIONS (continued...)

4. For the DSS, the plot is shown below. For normally consolidated conditions, the plot suggests $S_u/s'_{vc} = S$ of about 0.27.



5. According to Ladd, the strength increase during staged construction differs for NC and OC clay. For NC clay, use the S value (e.g., 0.21 or 0.27 in our case). For clay that remains OC, use $S(OCR)^m$ which will result in values greater than S depending on the OCR.

For simplicity of application to global stability evaluations, assume strength gain for NC clay. Use an S value of 0.21 and 90% average degree of consolidation under the stress increase due to staged embankment construction. For example, if the construction stage involves 15 ft of normal weight fill, the undrained shear strength gain within the clay will be equal to $15 \text{ ft} \times 125 \text{ pcf} \times 0.21 \times 90\% = 354 \text{ psf}$.

		CALCULATIONS		File No.: 132076-007
				Sheet: 1 of 2
Client:	Maine Department of Transportation			Date: 22JUN2021
Project:	I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME			Computed by: JLL
Subject:	Estimate Site-Specific CPT Parameters Nkt and Ndu for Undrained Shear Strength			Checked by: EMS

PROBLEM STATEMENT & OBJECTIVE
 Estimate CPT correlation factors using data from CPT soundings compared with lab and field testing results from nearby borings.

EXECUTIVE SUMMARY
 The Su FV based Nkt and Ndu values range from 18.6 to 23.1 and 12.5 to 15.4, respectively depending on the likely soil type (e.g., silt & clay, silt, or clay)

REFERENCES

1. Engineering Design Using the Cone Penetration Test (Geotech. Applications Guide) by Conetec, 2017.
2. Correlation of Undrained Shear Strength and CPT Resistance, Remai, Z., 2012, Periodica Polytechnica.

AVAILABLE INFORMATION

1. Subsurface Data: preliminary and final design phase borings.
2. Laboratory consolidation and undrained shear strength (Su) testing (CIUC, DSS) results for the marine clay.
3. Field vane (FV) undrained shear strength testing in the preliminary and final design phase borings.
4. Data from CPT soundings performed at the site (e.g., net qt, du=excess pore pressure measurement, etc.).

PROCEDURE

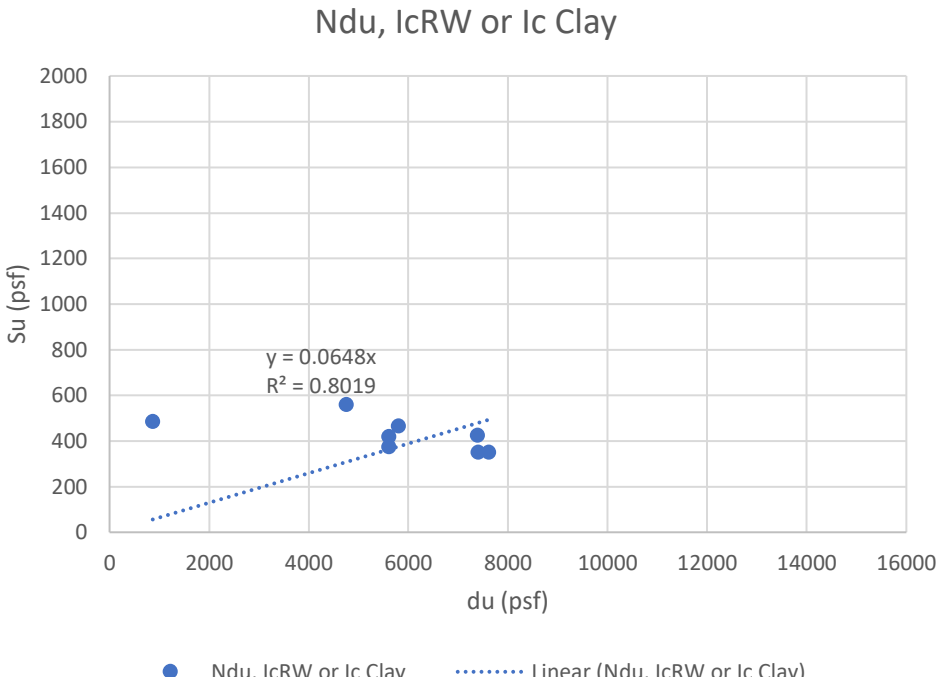
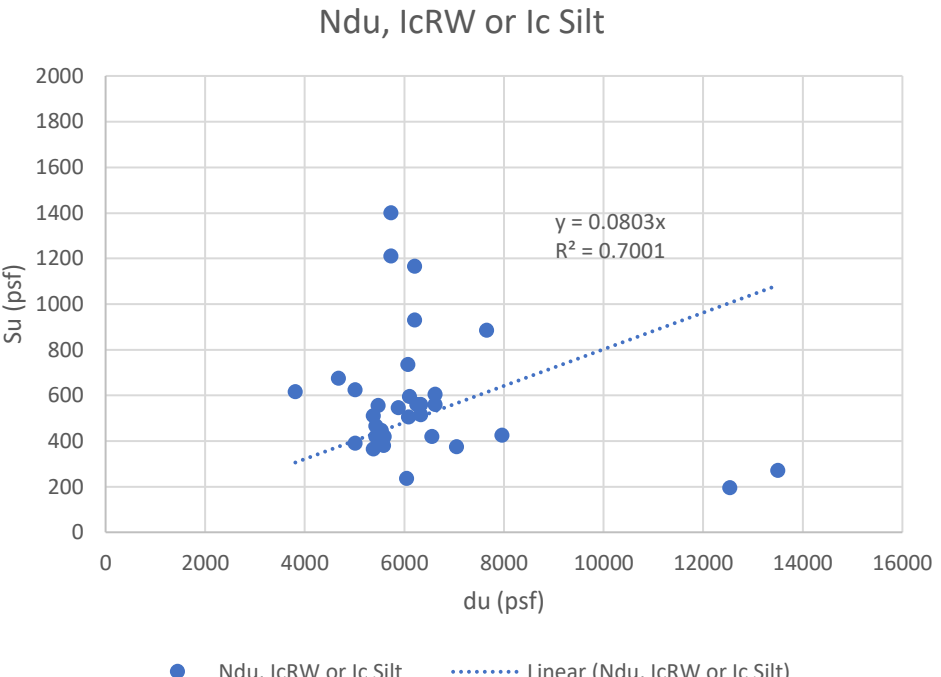
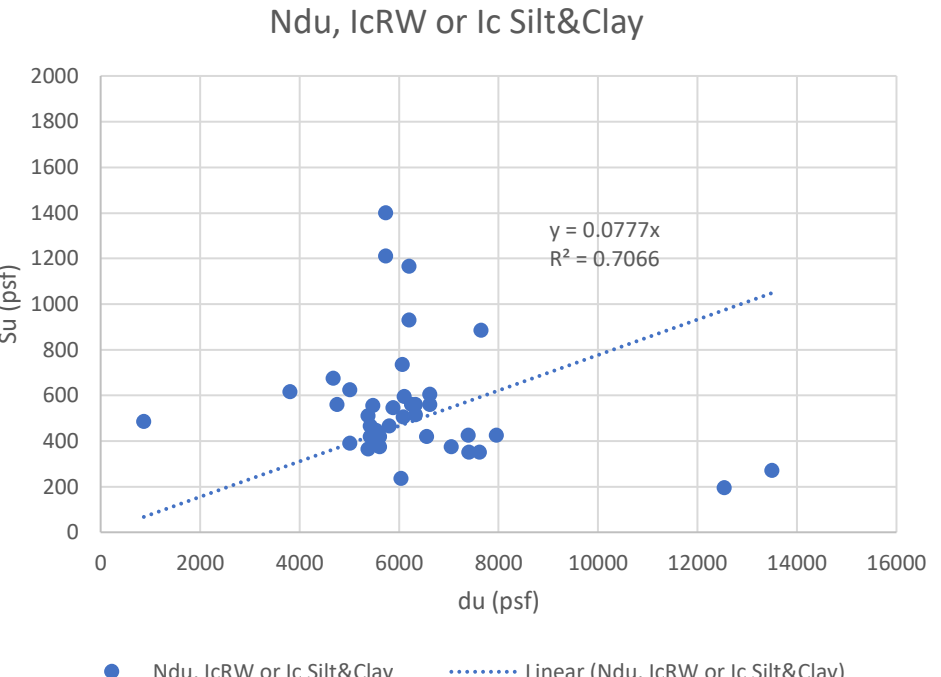
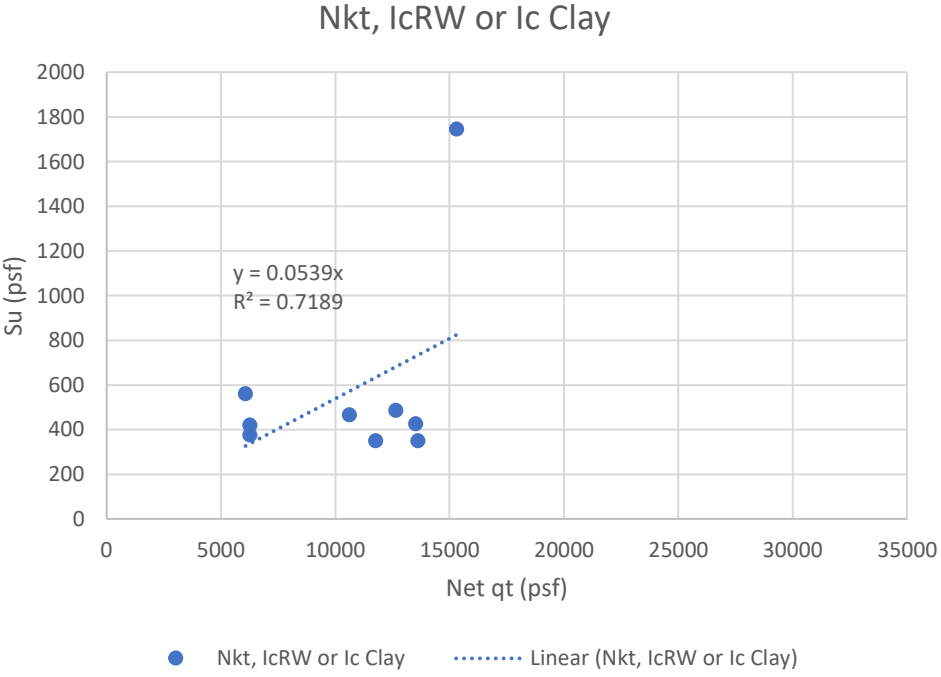
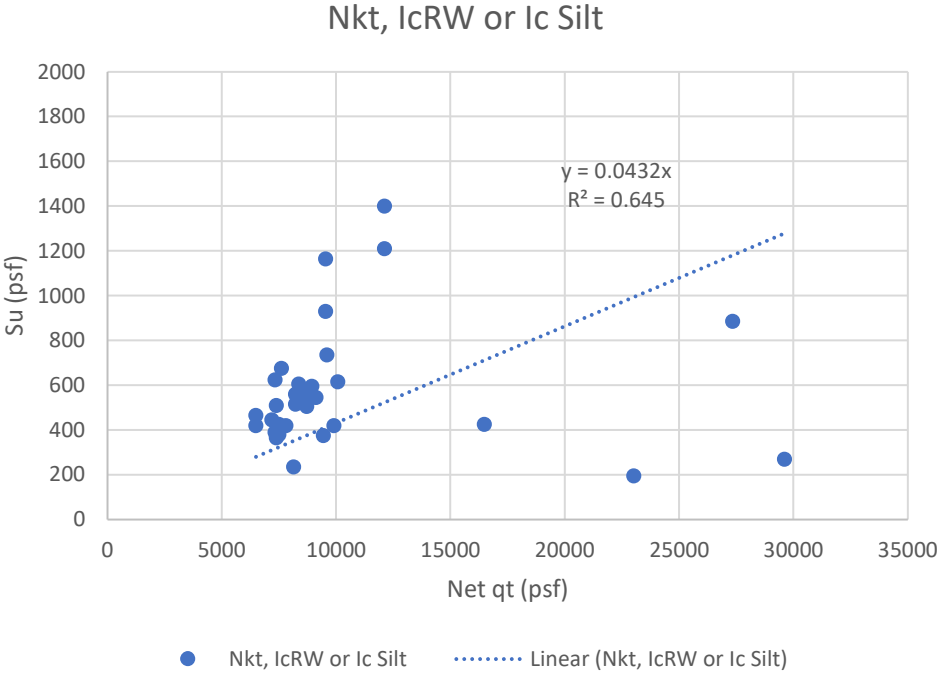
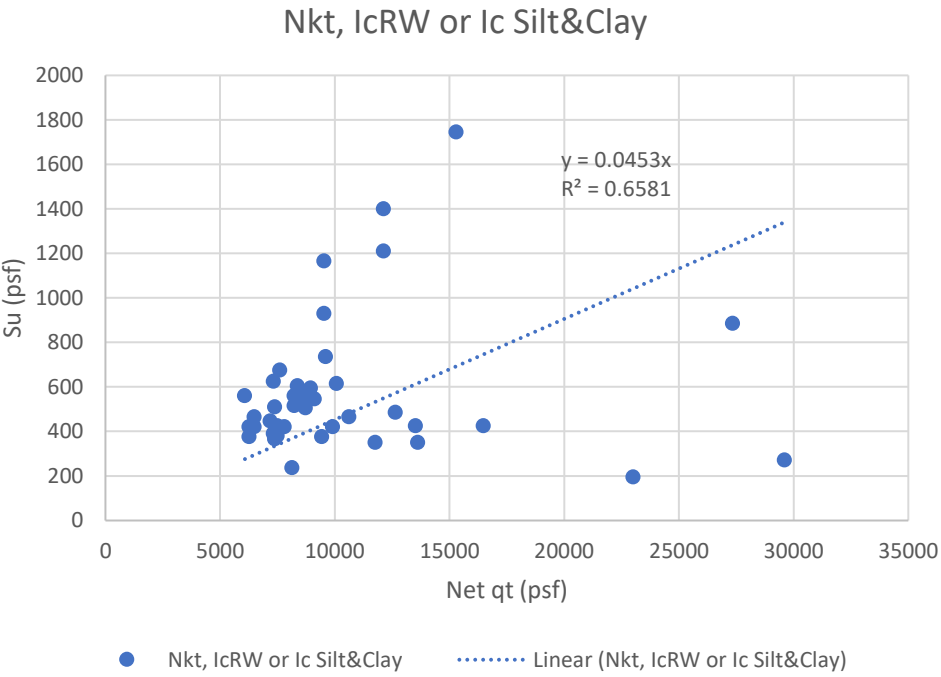
1. For each CPT location, determine the nearest boring where FV, CIUC, or DSS Su strength testing was performed.
2. For each Su test within each nearby boring, match the Su test depth with the CPT net qt and excess pore pressure measurement (du) from the nearest CPT sounding.
3. Once completed, we get data pairs of Su and net qt or du from the CPT and boring combinations.
4. The Nkt and Ndu parameters are calculated from the best fit line through the plots of the data pairs.
5. We focused on the Su from FV tests because the design Su for global stability was based on FV. Therefore, the Nkt and Ndu values reported here are for Su FV.
6. CPT readings were also filtered in several ways such as Friction Ratio, Ic and IcRW to eliminate non-silt and clay readings from the evaluations.
7. There were limited DSS data so the Nkt and Ndu were not calculated for Su DSS. The Su CIUC data were (expectedly) higher than the FV and DSS data, Nkt and Ndu values were not calculated for CIUC.

RESULTS

1. The calculated Nkt and Ndu values for **Su FV** are summarized below:


Descr.	Nkt	R^2 Nkt	Ndu	R^2 Ndu
Ic Silt & Clay	22.1	0.658	12.9	0.707
Ic Silt	23.1	0.645	12.5	0.700
Ic Clay	18.6	0.719	15.4	0.802

Notes:
 For comparison, the default ConeTec values are Nkt=12.5 and Ndu=6.0.
 The best-fit line intercept was set to zero.
 R^2 is the coefficient of determination for the best-fit line.
 (see next page for data plots and best-fit lines).



Notes:
In the plots, the trendline are for $y = \text{Field Vane Su}$ and $x = \text{Net qt OR du}$.
The slopes shown are either $1/\text{Nkt}$ or $1/\text{Ndu}$.

Settlement

 CALCULATIONS		File No.:	132076-007																																			
		Sheet:	1 of 8																																			
Client:	Maine Department of Transportation	Date:	06JUL2021																																			
Project:	I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME	Computed by:	JLL																																			
Subject:	Embankment Construction Settlement Evaluations	Checked by:	EMS																																			
<p>PROBLEM STATEMENT & OBJECTIVE Evaluate primary consolidation and secondary settlements in staged construction of embankments to meet post-construction settlement criteria.</p> <p>EXECUTIVE SUMMARY Construction staging, pre-excavation depths, lightweight fill thickness required were calculated based on the settlement criteria. Results are presented in the pages that follow.</p> <p>REFERENCES 1. 9th Edition, AASHTO LRFD Bridge Design Specifications, 2020. 2. Holtz, R.D. & Kovacs, W.D., An Introduction to Geotechnical Engineering.</p> <p>AVAILABLE INFORMATION 1. Subsurface Data: preliminary and final design phase borings. 2. Laboratory consolidation test results for the marine clay (compressibility and stress history/preconsolidation pressure). 3. (CPT soundings were not used to evaluate stress history and compressibility. They were used to calibrate CPT parameters against lab data). 4. Settlement criteria for highway (embankment), bridge, and culvert structures. 5. Maximum stable stage heights also based on global stability evaluations performed by Haley & Aldrich.</p> <p>ASSUMPTIONS 1. Elevations are in feet, NAVD88 Datum. 2. The project was divided into 4 areas with the following compressibility parameters and stress history:</p> <table border="1"> <thead> <tr> <th>Area</th> <th colspan="2">Approx. Stations</th> <th>CR</th> <th>RR</th> <th>C$\alpha$$\epsilon$</th> <th>Preconsolidation Pressure, p'_c Profile/Stress History (psf)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>50+50</td> <td>83+00</td> <td>0.17</td> <td>0.02</td> <td>0.004</td> <td>6000-2000 above El. 65, NC below El. 65</td> </tr> <tr> <td>2</td> <td>137+00</td> <td>143+00</td> <td>0.17</td> <td>0.02</td> <td>0.004</td> <td>3000-900 above El. 60, NC below El. 60</td> </tr> <tr> <td>3</td> <td>159+00</td> <td>170+00</td> <td>0.19</td> <td>0.02</td> <td>0.004</td> <td>9000-2500 above El. 100, 2500-NC below El. 65</td> </tr> <tr> <td>4</td> <td>179+00</td> <td>186+00</td> <td>0.18</td> <td>0.02</td> <td>0.004</td> <td>5000-1000 above El. 84, NC below El. 84</td> </tr> </tbody> </table> <p>Notes: CR = strain-based compressibility for virgin compression, $CR=C_c/(1+e_0)$ from lab consolidation test data. RR = strain-based compressibility for recompression, $RR=C_r/(1+e_0)$ from lab consolidation test data. C$\alpha$$\epsilon$ = strain-based coefficient of secondary compression, from lab consolidation test data. p'_c = preconsolidation pressure or maximum past pressure, NC - normally-consolidated, OCR=1. Settlement calculated at select stations along alignment using nearest boring soil conditions. Water depth/elevation taken from water level readings at nearest boring, if not available, completely submerged conditions were assumed.</p> <p>3. For areas where prefabricated vertical drains (PVD or wick drains) will be used, separate calculations performed by Haley & Aldrich indicate that 5 ft wick drain spacing and $ch/cv=2$ reaches 90% average degree of consolidation in 7.4 months. Where secondary clay compression is calculated, end of primary consolidation and start of secondary compression was assumed to start at about 7.4 months.</p> <p>4. For areas where wick drains are NOT used, single drainage conditions are assumed and the secondary compression is assumed to start from the time it takes to 90% average degree of consolidation (t_{90}). This consol. time varies with clay thickness since there are no wick drains. For t_{90}, the dimensionless time factor $T=0.848$ (uniform stress increase).</p> <p>5. The following post-construction settlement criteria were considered depending on the embankment location: Highway Embankment and Highway Culvert Settlement Criteria: less than or equal to 4 inches in the first 20 yrs. additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs. Bridge Settlement Criteria: less than or equal to 2 inches in the first 5 yrs. additional settlement less than or equal to 2 inches from 5 yrs. to 20 yrs. additional settlement less than or equal to 2 inches from 20 yrs. to 75 yrs. (Box) Culvert Settlement Criteria: less than or equal to 2 inches in the first 100 yrs.</p> <p>6. Settlement was calculated under the estimated maximum height of embankment at stations analyzed (i.e., where the stress increase is maximum). Stress increase in the clay assumed uniform with depth (i.e., surcharge condition).</p> <p>7. Traffic surcharge was not considered in the settlement evaluations.</p> <p>8. Where lightweight fill (LWF) is required to meet the settlement criteria, LWF assumed total unit weight is 15 pcf.</p> <p>9. Pavement section is assumed to be 3 ft thick with unit weight of 135 pcf.</p>				Area	Approx. Stations		CR	RR	C α ϵ	Preconsolidation Pressure, p' _c Profile/Stress History (psf)	1	50+50	83+00	0.17	0.02	0.004	6000-2000 above El. 65, NC below El. 65	2	137+00	143+00	0.17	0.02	0.004	3000-900 above El. 60, NC below El. 60	3	159+00	170+00	0.19	0.02	0.004	9000-2500 above El. 100, 2500-NC below El. 65	4	179+00	186+00	0.18	0.02	0.004	5000-1000 above El. 84, NC below El. 84
Area	Approx. Stations		CR	RR	C α ϵ	Preconsolidation Pressure, p' _c Profile/Stress History (psf)																																
1	50+50	83+00	0.17	0.02	0.004	6000-2000 above El. 65, NC below El. 65																																
2	137+00	143+00	0.17	0.02	0.004	3000-900 above El. 60, NC below El. 60																																
3	159+00	170+00	0.19	0.02	0.004	9000-2500 above El. 100, 2500-NC below El. 65																																
4	179+00	186+00	0.18	0.02	0.004	5000-1000 above El. 84, NC below El. 84																																

Eaton Brook

RESULTS

AREA 1 - Highway Settlement Criteria, Wick Drains Required, LWF may be Required

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
59+00	HB-BE-108	81.8	80.9	17.2	13.2	11.2	-	0	2.0	1.3
59+00	HB-BE-204	81.5	80.4	21.6	12.9	10.9	-	0	3.1	1.6
59+00	HB-BE-205	83.1	80.4	18.4	12.7	10.7	-	0	2.1	1.3
63+00	BB-BFB1-202	80.8	80.6	30.5	16.7	14.7	-	2.25	4.0	2.2
63+00	HB-BE-109	84.4	80.8	15.5	16.7	14.7	-	0	1.6	1.1
65+50	HB-BE-212	81.6	79.85	23.8	19.5	17	-	0	3.9	1.7
68+00	BB-BFB1-101	80.8	80	16.4	21.9	19	-	0	2.3	1.2
82+50	CPT-113	88	88	20	12	10	-	0	2.1	1.5
712+00	HB-BE-105	88.1	83.7	17	21	19	-	0	1.7	1.2
712+00	HB-BE-208	90.1	83	13.8	21	19	-	0	1.4	1.0
712+00	HB-BE-210	84.7	83.4	20.1	21	19	-	0	2.5	1.5
713+50	HB-BE-210	84.7	83.4	20.1	31.3	20	-	3.5	4.0	1.5
907+00	HB-BE-239	82.6	82.6	25.3	33.1	19	-	14	4.0	1.8
907+00	HB-BE-202	81.2	81.2	31.4	33.1	19	-	16.75	4.0	2.3
907+00	HB-BE-203	80.6	80.6	22.8	33.1	19	-	13.25	4.0	1.7

Notes:

Highway Settlement Criteria:

- less than or equal to 4 inches in the first 20 yrs.
- additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

Wick drains required at these stations due to staged embankment construction (i.e., to reduce consolidation wait time).

Some stations have multiple nearest borings or CPT soundings.

Stage 1 embankment height may be controlled by global stability.

AREA 1 - Bridge Settlement Criteria, Wick Drains Required, LWF may be Required

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-5 yrs (in.)	Post-Constr. Settlement 5-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
56+50	HB-BE-204	81.5	80.4	30	15.5	17.5	-	0	1.9	0.9	0.8
53+00	HB-BE-101	82	82	37	21.4	14	-	10.75	2.0	1.1	1.0
53+00	BB-BFB-101	79.4	79.4	34.5	21.4	14	-	10.75	1.9	1.0	1.0
53+00	BB-BFB-202	80.5	80.4	41.8	21.4	14	-	11	2.0	1.2	1.2

Notes:

Bridge Settlement Criteria:

- less than or equal to 2 inches in the first 5 yrs.
- additional settlement less than or equal to 2 inches from 5 yrs. to 20 yrs.
- additional settlement less than or equal to 2 inches from 20 yrs. to 75 yrs.

Wick drains required at these stations due to staged embankment construction (i.e., to reduce consolidation wait time).

Some stations have multiple nearest borings or CPT soundings.

Stage 1 embankment height may be controlled by global stability. Some sections may require stage 1 heights greater than final.

Client: Maine Department of Transportation

Computed by: JLL

Checked by: EMS

Sheet: 2 of 8



File No.: 132076-007

Date: 06JUL2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

Subject: Embankment Construction Settlement Evaluations

RESULTS

AREA 1 - Culvert Settlement Criteria, No Wick Drains, Excavation & LWF Required

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-100 yrs (in.)
64+00	BB-BFB1-201	80.7	80.7	15.8	19.3	19.3	2.25	18.6	2.0
64+00	BB-BFB1-202	80.8	80.8	30.5	19.3	19.3	5.75	22.1	2.0
64+00	BB-BFB1-203	80.6	80.6	23.7	19.3	19.3	5.25	21.6	2.0

Notes:

Culvert Settlement Criteria:

less than or equal to 2 inches in the first 100 yrs.

Required excavation depth is depth of excavation below existing ground surface needed to meet post-construction settlement criteria.

LWF is placed from bottom of excavation to bottom of pavement section, LWF is required to meet post-construction settlement criteria.

Wick drains are not required at these sections.

Some stations have multiple nearest borings or CPT soundings.

AREA 1 - Culvert Settlement Criteria, Wick Drains Required, LWF Required

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-100 yrs (in.)
77+75	BB-BST1-101	86.3	86.3	21.5	19.2	19.2	-	4.5	2.0

Notes:

Culvert Settlement Criteria:

less than or equal to 2 inches in the first 100 yrs.

Wick drains required at these stations due to staged embankment construction (i.e., to reduce consolidation wait time).

AREA 1 - Highway Culvert Settlement Criteria, No Wick Drains, Excavation & LWF Requirements

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
66+75	BB-BFB1-101	80.8	80.8	20	21.5	21.5	0.75	19.3	4.0	0.5
66+75	HB-BE-213	81.1	81.1	21.7	21.5	21.5	1.4	19.9	4.0	0.6
66+75	HB-BE-214	82.3	82.3	11.3	21.5	21.5	0	18.5	2.3	0.3
66+75	HB-BE-204	81	81	26.8	21.5	21.5	3	21.5	4.0	0.7
84+50	BB-BFB2-201	87	87	16	11	11	0	0.0	3.4	0.4

Notes:

Highway Settlement Criteria:

less than or equal to 4 inches in the first 20 yrs.

additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

Required excavation depth is depth of excavation below existing ground surface needed to meet post-construction settlement criteria.

LWF is placed from bottom of excavation to bottom of pavement section, LWF is required to meet post-construction settlement criteria.

Wick drains are not required at these sections.

Some stations have multiple nearest borings or CPT soundings.

Client: Maine Department of Transportation

Computed by: JLL

Checked by: EMS

Sheet: 3 of 8



File No.: 132076-007

Date: 06JUL2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

Subject: Embankment Construction Settlement Evaluations

RESULTS

EMBANKMENT AREA 1 - Highway Settlement Criteria, Wick Drains Required

Station No.	CPT or Boring ID	ASSUMED GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
52+00	HB-BE-201	98	98	26	8	8	-	0	2.4	0.7
52+00	HB-BE-202	98	98	31.4	8	8	-	0	2.9	0.9
52+00	HB-BE-328	98	97.3	17	8	8	-	0	1.4	0.5
717+50	HB-BE-241	100	81.4	15	15	15	-	0	1.3	0.4
801+00	BB-BWS-301	100	88.5	22.1	15.5	13.5	-	0	2.5	0.6
801+00	HB-BE-242	100	83.5	13.9	15.5	13.5	-	0	1.4	0.4
801+00	HB-BE-242A	100	83.4	14.3	15.5	13.5	-	0	1.5	0.4
801+00	HB-BE-243	100	83.1	25	15.5	13.5	-	0	2.4	0.7
908+50	HB-BE-239	115	76	25.3	11.5	11.5	-	0	2.3	0.7
908+50	HB-BE-202	115	81.2	31.4	11.5	11.5	-	0	2.9	0.9
908+50	HB-BE-203	115	80.6	22.8	11.5	11.5	-	0	2.1	0.6

Notes:

Highway Settlement Criteria:

less than or equal to 4 inches in the first 20 yrs.

additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

Wick drains required at these stations due to staged embankment construction (i.e., to reduce consolidation wait time).

Some stations have multiple nearest borings or CPT soundings.

Stage 1 embankment height may be controlled by global stability.

Ground surface at these stations were taken from the contour plans of ground surface elevation, the nearest CPT or boring ground surface is likely different from the assumed value.

Client: Maine Department of Transportation

Computed by: JLL

Checked by: EMS

Sheet: 4 of 8



File No.: 132076-007

Date: 06JUL2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

Subject: Embankment Construction Settlement Evaluations

RESULTS

Eaton Brook

AREA 2 - Highway Settlement Criteria, Wick Drains Required

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
140+00	BB-BEB-202	74.5	74.5	18.2	18	15	-	-	3.8	0.5
143+00	CPT-116	75	75	16.7	10.1	10.1	-	-	1.7	0.5

Notes:

Highway Settlement Criteria:

- less than or equal to 4 inches in the first 20 yrs.
- additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

Wick drains required at these stations due to staged embankment construction (i.e., to reduce consolidation wait time).

Stage 1 embankment height may be controlled by global stability.

AREA 2 - Highway Settlement Criteria, No Wick Drains

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
138+00	CPT-115	85	85	15.3	10.4	10.4	-	-	3.3	0.4
144+00	-	83	83	10.7	6.2	6.2			2.3	0.3

Notes:

Highway Settlement Criteria:

- less than or equal to 4 inches in the first 20 yrs.
- additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

Wick drains are not required at these sections.

Client: Maine Department of Transportation

Computed by: JLL

Checked by: EMS

Sheet: 5 of 8



File No.: 132076-007

Date: 06JUL2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

Subject: Embankment Construction Settlement Evaluations

RESULTS

Eaton Brook

AREA 2 - Bridge Settlement Criteria, Wick Drains Required, LWF may be Required

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-5 yrs (in.)	Post-Constr. Settlement 5-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
140+00	BB-BEB-202	74.5	74.5	18.2	18	15	-	5	1.2	0.5	0.5
142+00	HB-BE-222	76.5	76.5	19.7	14	14	-	4	0.2	0.6	0.5
143+00	CPT-116	75	75	16.7	10.1	10.1	-	0	1.4	0.5	0.5

Notes:

Bridge Settlement Criteria:

- less than or equal to 2 inches in the first 5 yrs.
- additional settlement less than or equal to 2 inches from 5 yrs. to 20 yrs.
- additional settlement less than or equal to 2 inches from 20 yrs. to 75 yrs.

Wick drains required at these stations due to staged embankment construction (i.e., to reduce consolidation wait time).

Stage 1 embankment height may be controlled by global stability.

Client: Maine Department of Transportation

Computed by: JLL

Checked by: EMS

Sheet: 6 of 8



File No.: 132076-007

Date: 06JUL2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

Subject: Embankment Construction Settlement Evaluations

RESULTS

AREA 3 - Highway and Highway Culvert Settlement Criteria, No Wick Drains

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
166+00	HB-BE-223A	109	108.9	15.7	17.4	17.4	-	-	4.5	0.4
167+50	HB-BE-223A	109	109	11.6	20.4	20.4	-	-	4.1	0.3

Notes: (see note below)

Highway and Highway Culver Settlement Criteria:

- less than or equal to 4 inches in the first 20 yrs.
- additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

The estimated post-construction settlement from 0-20 yrs. exceeds 4 inches (4.1 to 4.5 inches), MaineDOT finds this acceptable for these locations (discussion with MaineDOT in May 2021).

Conventional construction can be used here.

Wick drains are not required at these sections.

Client: Maine Department of Transportation

Computed by: JLL

Checked by: EMS

Sheet: 7 of 8



File No.: 132076-007

Date: 06JUL2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

Subject: Embankment Construction Settlement Evaluations

RESULTS

AREA 4 - Highway Settlement Criteria, Wick Drains Required, LWF may be Required

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
180+50	HB-BE-135	93	93	28.3	30	12.5	-	20.5	4.0	2.1
182+00	HB-BE-138	94.2	94.2	11	25.1	19	-	4	2.1	0.8
185+00	HB-BE-138	96	96	12	17	15	-	0	1.8	0.9
181+50		93.5	93.5	19	26	12.5	-	13.5	4.0	1.4
183+50	CPT-124	96	96	12	18	16	-	0	1.8	0.9

Notes:

Highway Settlement Criteria:

less than or equal to 4 inches in the first 20 yrs.

additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

Wick drains required at these stations due to staged embankment construction (i.e., to reduce consolidation wait time).

Some stations have multiple nearest borings or CPT soundings.

Stage 1 embankment height may be controlled by global stability.

AREA 4 - Highway Settlement Criteria, No Wick Drains

Station No.	CPT or Boring ID	GS El. (ft)	GW El. (ft)	Clay Thickness (ft)	Full Emb. Ht. (ft)	Stage 1 Emb. Ht. (ft)	Initial Excav. Depth from Ground Surf. (ft)	Required LWF Thickness (ft)	Post-Constr. Settlement 0-20 yrs (in.)	Post-Constr. Settlement 20-75 yrs (in.)
187+00	-	100	100	10.3	13.7	13.7	-	-	3.0	0.3
186+00	-	97	97	11.15	16.3	16.3	-	-	3.6	0.3

Notes:

Highway Settlement Criteria:

less than or equal to 4 inches in the first 20 yrs.

additional settlement less than or equal to 4 inches from 20 yrs. to 75 yrs.

Wick drains are not required at these sections.

Client: Maine Department of Transportation

Computed by: JLL

Checked by: EMS

Sheet: 8 of 8



File No.: 132076-007

Date: 06JUL2021

Project: I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME

Subject: Embankment Construction Settlement Evaluations

Client:	Maine Department of Transportation
Project:	I-395/Rt. 9 Connector Highway, Brewer-Eddington, ME
Subject:	Prefabricated Vertical Drain (PVD)/Wick Drain Consolidation Time

PROBLEM STATEMENT & OBJECTIVE

Estimate the wick drain consolidation time and spacing.

EXECUTIVE SUMMARY

A wick drain spacing of 5 ft is required to achieve 90% average degree of consolidation in 9 months for the marine clays in the project.

REFERENCES

1. 9th Edition, AASHTO LRFD Bridge Design Specifications, 2020.
2. Prefabricated Vertical Drains, FHWA Report No. FHWA/RD-86/168, Aug. 1986.
3. Yeung, A.T., 1997, Design Curves for Prefabricated Vertical Drains, Journal of Geotechnical and Geoenvironmental Engineering, Vol. 123, No. 8.
4. Saye, S.R., 2001, Assessment of Soil Disturbance by the Installation of Displacement Sand Drains and Prefabricated Vertical Drains, in Symposium on Soil Behavior and Soft Ground Construction Honoring Charles Ladd, 2001.

AVAILABLE INFORMATION

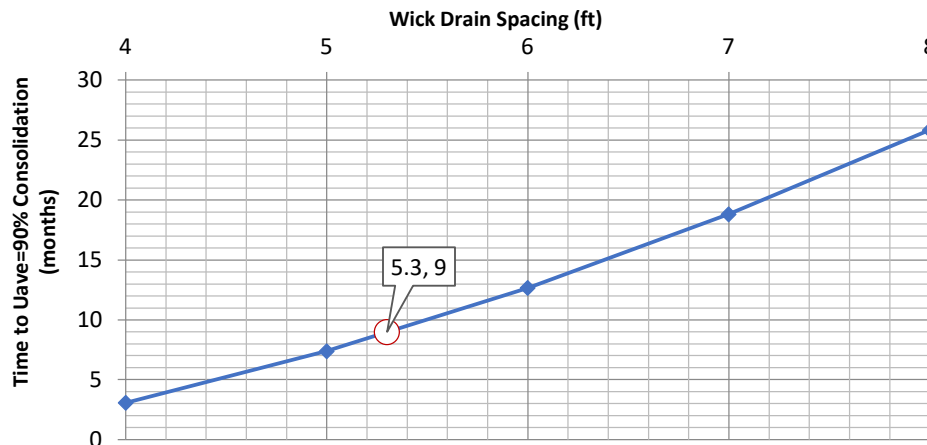
1. Subsurface Data: preliminary and final design phase borings.
2. Laboratory consolidation test results for the marine clay (vertical coefficient of consolidation, c_v).
3. CPT pore pressure dissipation test results (horizontal coefficient of consolidation, c_h).

ASSUMPTIONS

1. PVDs are required to accelerate clay strength gain and settlement under staged construction to help with global stability and reduce post-construction settlement of embankments and structures. Construction stages for strength gain and settlement (preload) cannot exceed 9 months and must achieve at least 90% average degree of consolidation.
2. The vertical coefficient of consolidation (c_v) from laboratory consolidation tests on marine clay ranges from approx. 5×10^{-7} ft²/s to 9×10^{-6} ft²/s (15.8 to 284 ft²/year).
3. The horizontal coefficient of consolidation (c_h) from CPT pore pressure dissipation tests ranges from 113.2 to 396.3 ft²/year.
4. Based on the above results, c_h can be much greater than c_v (i.e., horizontal or radial consolidation can be much faster than vertical consolidation). However, for this analysis, we assumed $c_v = 15.8$ ft²/year and a $c_h/c_v = 2$.
5. Each PVD has dimensions of approx. 4 inches by 0.16 inch. PVDs are arranged in plan in a triangular pattern.
6. Mandrel equivalent diameter ranging from 0.25 ft to 0.5 ft (dependent on mandrel and end anchor).
7. Smear zone diameter 6.5 times mandrel equivalent diameter (Saye, 2001).
8. Soil horizontal permeability to smear zone horizontal permeability ratio assumed equal to 1.5.
9. PVDs /wick drains penetrate the entire thickness of the clay layer.

CALCULATIONS & RESULTS

Using the parameter values summarized above in the design procedure outlined in Yeung (1997), and requiring an average degree of consolidation of 90%, we get the following t_{90} versus wick drain spacing (triangular pattern). For a 9 month-long preload, the spacing required would be 5.3 ft. Suggest a wick drain spacing of 5 ft instead.



Downdrag

PROBLEM STATEMENT & OBJECTIVE

Estimate the downdrag load per pile due to the additional fill placement for the embankments for the abutment piles.

REFERENCES

- 1. American Institute of Steel Construction (AISC) Manual, 13th Edition, 2005.
- 2. AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014.

ASSUMPTIONS

- 1. The soil profile is based on boring BB-BEB-202 for Abutment 1 and BB-BEB-104 for Abutment 2.
- 2. The bottom of the pile cap was assumed at El. 80.5 (Abutment 1) and El. 78.8 (Abutment 2).
- 3. The Nordlund-Thurman method for cohesionless soils and Alpha method for cohesive soils were used for the geotechnical axial resistance based on AASHTO guidance.

PROCEDURE

- 1. Plot the elastic pile compression based on the service load vs. depth along the pile length.*
- 2. Plot the pile group settlement based on the service load along the pile length.*
*Note: Pile settlement was not considered in this analysis. Relative movement was based on soil settlement only and pile was assumed to have zero settlement.
- 3. Plot the total soil settlement surrounding the piles due to the proposed additional fill versus depth.
- 4. Calculate the relative settlement (difference) between the surrounding soil settlement and pile settlement along the pile length.
- 5. Determine the elevation range where downdrag develops:
AASHTO LRFD Bridge Design Specifications, 7th Edition, Section 3.11.8: *"If the settlement in the soil layer is 0.4 in. or greater relative to the pile or shaft, downdrag can be assumed to fully develop."*
- 6. Using the nominal unit side resistances calculated in the pile axial resistance calculations, calculate the unfactored downdrag load on the pile.
*Based on Equation 10.7.3.8.6a-4, AASHTO ($R_s = q_s A_s$):

$DD = H * P * q_s$ where H = height of downdrag zone, P = pile perimeter, q_s = nominal pile axial side resistance

- 7. Calculate the factored downdrag load based on a load factor of 1.05 or 1.4 (AASHTO Table 3.4.1-2)

SUMMARY OF PILE PROPERTIES

Location	Top of Pile Elevation	Estimated Pile Tip Elevation	Pile Length, L (ft)	Steel H-Pile Size	Pile Section Area, A (in ²)	Pile Elastic Modulus, E (ksi)
Abutment 1	80.5	37.3	43.2	HP 14x117	34.4	29,000
Abutment 2	78.8	15.9	62.9	HP 14x117	34.4	29,000

Client: Maine Department of Transportation

Computed by: MMB

Checked by: BCS

Sheet: 1 of 7

HALEYALDRICH

File No.: 132076-007

Date: 4-May-2021

Project: Interstate 395/Route 9 Connector Bridge over Eaton Brook

Subject: Downdrag Analysis

GEOTECHNICAL AXIAL RESISTANCE - AASHTO LRFD

10.7.3.8.6 - Static Analysis

The factored bearing resistance of piles, R_R , may be taken as

$R_R = \phi R_n$ 10.7.3.8.6a-1

or

$R_R = \phi R_n = \phi_{stat} R_p + \phi_{stat} R_s$ 10.7.3.8.6a-2

in which

$R_p = q_p A_p$ 10.7.3.8.6a-3

$R_s = q_s A_s$ 10.7.3.8.6a-4

ϕ_{stat} = resistance factor for the bearing resistance of a single pile specified in Article 10.5.5.2.3
 R_p = pile tip resistance
 R_s = pile side resistance
 q_p = unit tip resistance of pile
 q_s = unit side resistance of pile
 A_s = surface area of pile side
 A_p = area of pile tip

Cohesive Soils

10.7.3.8.6b - α method

$q_s = \alpha S_u$ 10.7.3.8.6b-1

where

S_u = undrained shear strength
 α = adhesion factor applied to S_u

The adhesion factor for this method, α , shall be assumed to vary with the value of the undrained shear strength, S_u , as shown in Figure 10.7.3.8.6b-1

10.7.3.8.6e - Tip Resistance in Cohesive Soils

The nominal unit tip resistances of piles in saturated clay shall be taken as

$q_p = 9S_u$ 10.7.3.8.6e-1

GEOTECHNICAL AXIAL RESISTANCE - AASHTO LRFD (continued)

Cohesionless Soils

10.7.3.8.6f - Nordlund/Thurman Method in Cohesionless Soils

$$q_s = K_{\delta} C_F \sigma_v' \frac{\sin(\delta + \omega)}{\cos \omega}$$
 10.7.3.8.6f-1

where

K_{δ} = coefficient of lateral earth pressure at mid-point of soil layer under consideration from Figures 10.7.3.8.6f-1 through 10.7.3.8.6f-4

C_F = correction factor for K_{δ} when $\delta \neq \phi_f$ from Figure 10.7.3.8.6f-5

σ_v' = effective overburden stress at midpoint of soil layer under consideration

δ = friction angle between pile and soil obtained from Figure 10.7.3.8.6f-6

ω = angle of pile taper from vertical

The nominal unit tip resistance q_p by the Nordlund/Thurman method shall be taken as

$$q_p = \alpha_t N_q' \sigma_v' \leq q_L$$
 10.7.3.8.6f-2

where

α_t = coefficient from Figure 10.7.3.8.6f-7

N_q' = bearing resistance factor from Figure 10.7.3.8.6f-8

σ_v' = effective overburden stress at pile tip ≤ 3.2 ksf

q_L = limiting unit tip resistance from Figure 10.7.3.8.6f-9

GEOTECHNICAL AXIAL RESISTANCE CALCULATIONS

ABUTMENT 1 - HP 14x117 PILE:

Pile Information

Pile Type (HP=1, PC=2, PP=3):	1
Pile Perimeter (ft) =	4.85
Pile Tip Area (ft ²) =	1.47
Pile Volume (ft ³ /ft) =	0.2389

Table of Soil Parameters (Non-Tapered Piles)

							Side Resistance Parameters					
							Nordlund					Tomlinson
Material Type	Soil Layer	Top El. (ft)	Bottom El. (ft)	γ_t (pcf)	ϕ (deg)	s_u (psf)	K_δ	δ/ϕ	δ (deg)	C_F	f_s/σ'_v	α
New Fill	1	80.5	74.5	125	32	0	1.08	0.86	27.50	0.95	0.47	
Marine Deposit	2	74.5	56.3	115	0	550						0.85
Glacial Till - Upper	3	56.3	39.9	130	31	0	1.01	0.86	26.64	0.95	0.43	
Glacial Till - Lower	4	39.9	24.4	130	36	0	1.47	0.86	30.94	0.93	0.70	

Pile Geotechnical Resistance Calculations

Boring Name:	BB-BEB-202	
GS El. =	80.5	bottom of pile cap elevation
GW El. =	76.0	
γ_w (pcf) =	62.4	
RF =	0.35	(Tomlinson)
	0.45	(Nordlund and Thurman)

for side and tip resistance in cohesive soils
for side and tip resistance in cohesionless soils

Soil Layer	Elevation (ft)	Depth (ft)	γ_t (pcf)	σ_v (psf)	p_w (psf)	σ'_v (psf)	σ'_{vL} (psf)	q_s/σ'_v Design	α (Tomlinson)	Nominal Unit Friction, q_s (psf)	ΔL (ft)	ΔR_s (kip)	R_s (kip)	Factored Friction Resist-ance $RF \cdot R_s$ (kip)
1	81	0	125	0	0	0	0	0.47		0	0	0	0	0
1	75	6	125	750	94	656	656	0.47		309	6	4	4	2
2	75	6	115	750	94	656	656		0.85	468	0	0	4	2
2	56	24	115	2843	1229	1614	1614		0.85	468	18	41	46	16
3	56	24	130	2843	1229	1614	1614	0.43		695	0	0	46	21
3	40	41	130	4975	2253	2722	2722	0.43		1172	16	74	120	54
4	40	41	130	4975	2253	2722	2722	0.70		1916	0	0	120	54
4	24	56	130	6990	3220	3770	3200	0.70		2654	16	172	292	131

1. End-bearing resistance based on driving pile to bedrock.

GEOTECHNICAL AXIAL RESISTANCE CALCULATIONS

ABUTMENT 2 - HP 14x117 PILE:

Pile Information	
Pile Type (HP=1, PC=2, PP=3):	1
Pile Perimeter (ft) =	4.85
Pile Tip Area (ft ²) =	1.47
Pile Volume (ft ³ /ft) =	0.2389

Table of Soil Parameters (Non-Tapered Piles)

							Side Resistance Parameters					
							Nordlund					Tomlinson
Material Type	Soil Layer	Top El. (ft)	Bottom El. (ft)	γ _t (pcf)	φ (deg)	s _u (psf)	K _δ	δ/φ	δ (deg)	C _F	f _s /σ' _v	α
New Fill	1	78.8	75.9	125	32	0	1.08	0.86	27.50	0.95	0.47	
Marine Deposit	2	75.9	56.5	115	0	550						0.85
Glacial Till - Upper	3	56.5	37.4	130	31	0	1.01	0.86	26.64	0.95	0.43	
Glacial Till - Lower	4	37.4	15.9	130	36	0	1.47	0.86	30.94	0.93	0.70	

Pile Geotechnical Resistance Calculations

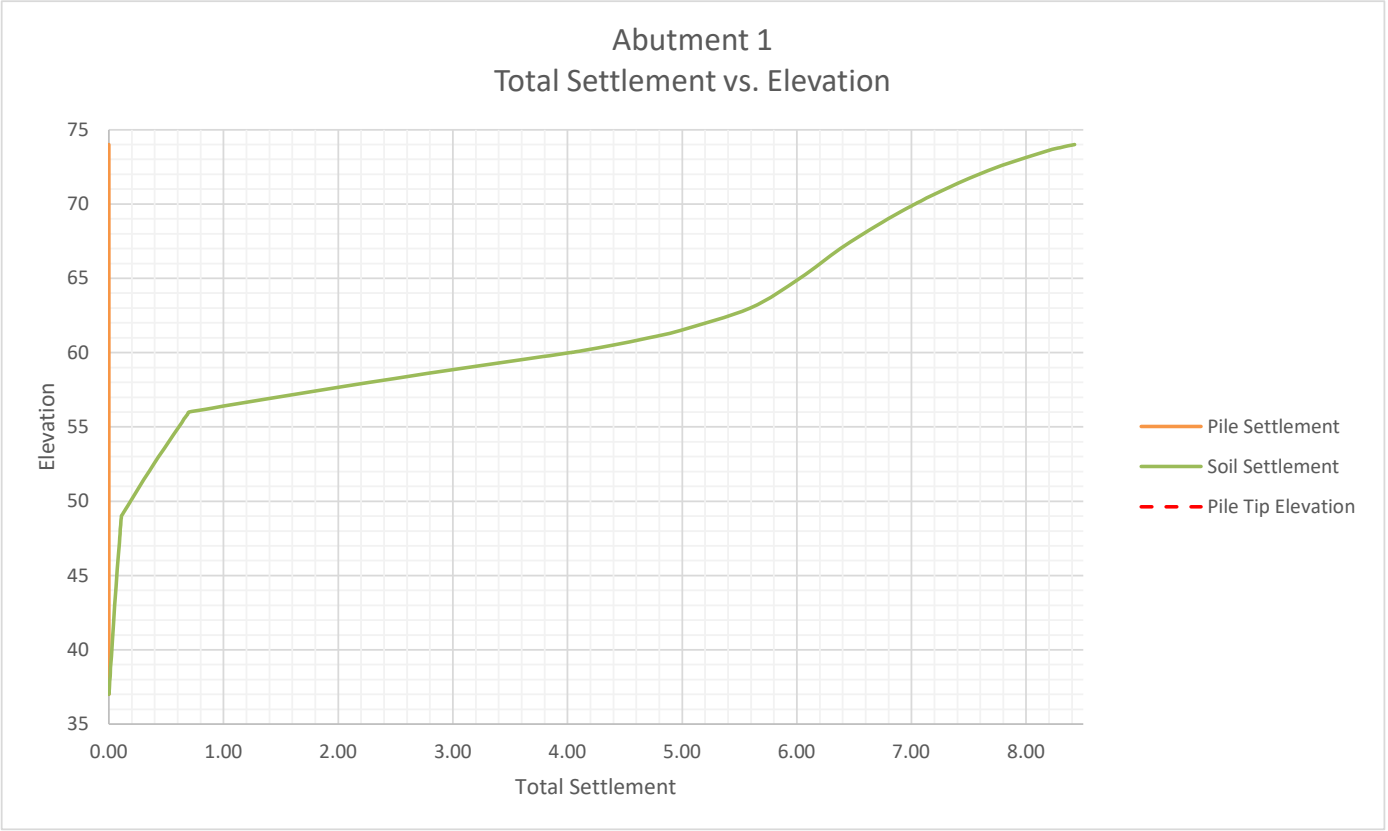
Boring Name:	BB-BEB-104	
GS El. =	78.8	bottom of pile cap elevation
GW El. =	76.0	
γ_w (pcf) =	62.4	
RF =	0.35	(Tomlinson)
	0.45	(Nordlund and Thurman)

for side and tip resistance in cohesive soils
for side and tip resistance in cohesionless soils

Soil Layer	Elevation (ft)	Depth (ft)	γ _t (pcf)	σ _v (psf)	p _w (psf)	σ' _v (psf)	σ' _{vL} (psf)	q _s /σ' _v Design	α (Tomlinson)	Nominal Unit Friction, q _s (psf)	ΔL (ft)	ΔR _s (kip)	R _s (kip)	Factored Friction Resist-ance RF*R _s (kip)
1	79	0	125	0	0	0	0	0.47		0	0	0	0	0
1	76	3	125	362	6	356	356	0.47		168	3	1	1	1
2	76	3	115	362	6	356	356		0.85	468	0	0	1	0
2	57	22	115	2594	1217	1377	1377		0.85	468	19	44	45	16
3	57	22	130	2594	1217	1377	1377	0.43		593	0	0	45	20
3	37	41	130	5077	2409	2668	2668	0.43		1148	19	81	126	57
4	37	41	130	5077	2409	2668	2668	0.70		1878	0	0	126	57
4	16	63	130	7872	3750	4121	3200	0.70		2901	22	249	375	169

1. End-bearing resistance based on driving pile to bedrock.

DOWNDRAG CALCULATIONS - ABUTMENT 1



Based on the relative settlement shown in the plot above, assume downdrag develops between the following elevations:

- El. 80.5 bottom of pile cap
- El. 52.5 bottom of drag zone

From the pile axial resistance calculations, the following nominal unit side resistance value was calculated for the drag zone and the following unfactored and factored downdrag load was calculated:

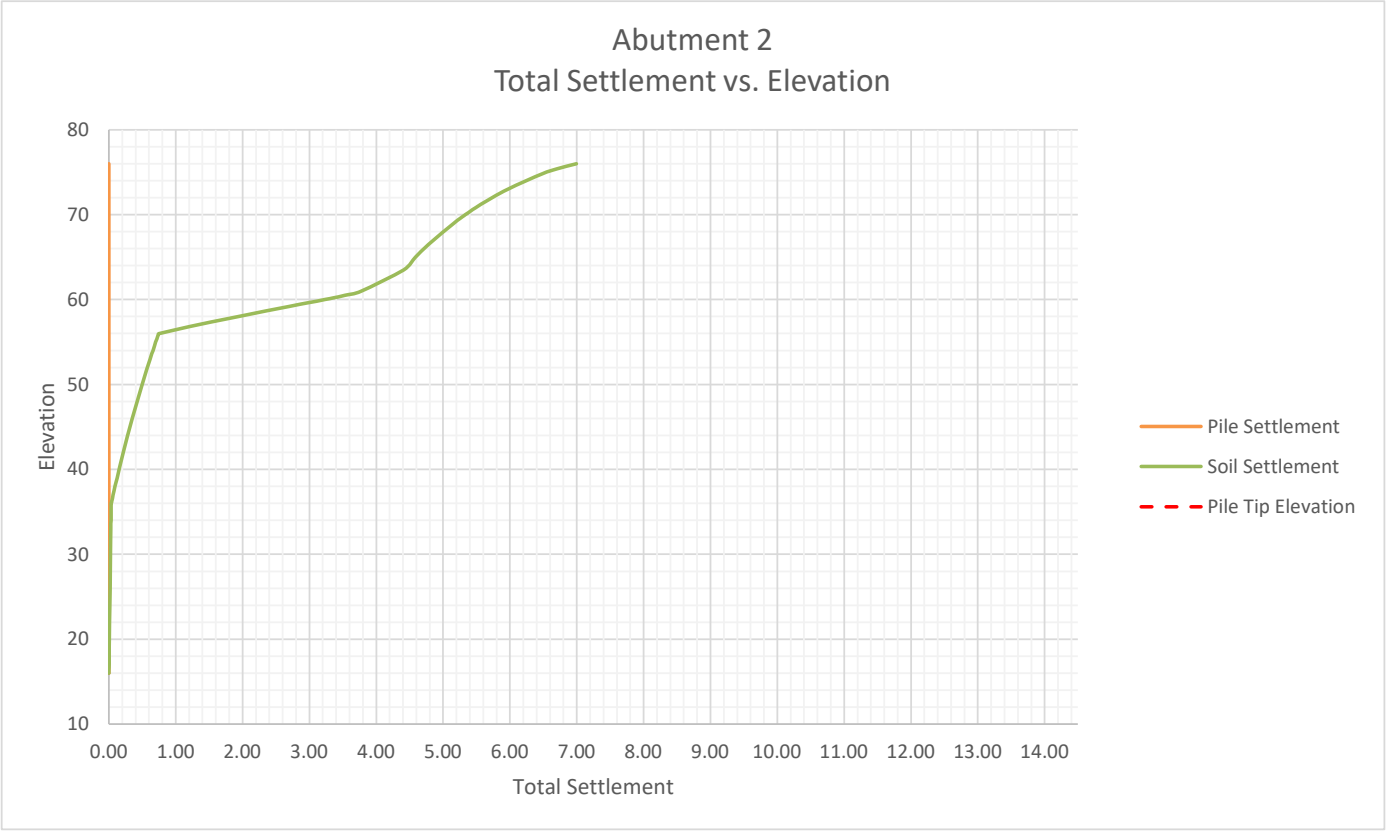
Layer No.	HP 14x117 PILE						
	Nominal Unit Side Resistance Start El.	Nominal Unit Side Resistance End El.	Bottom Elevation of Downdrag Zone in Layer	Nominal Unit Side Resistance (psf)	Unfactored Downdrag Load (kips)	Load Factor	Factored Downdrag Load (kips)
1	80.5	74.5	74.5	154	4.5	1.05	4.7
2	74.5	56.3	56.3	468	41.3	1.40	57.8
3	56.3	39.9	52.5	750	13.8	1.05	14.5

Pile Perimeter (Box)	4.85 ft	Total Factored Downdrag (Box):	77 kips
Pile Perimeter	7.2 ft	Total Factored Downdrag:	88 kips

Client: Maine Department of Transportation
Computed by: MMB
Checked by: BCS
Sheet: 6 of 7

HALEY ALDRICH
File No.: 132076-007
Date: 4-May-2021
Project: Interstate 395/Route 9 Connector Bridge over Eaton Brook
Subject: Downdrag Analysis

DOWNDRAG CALCULATIONS - ABUTMENT 2



Based on the relative settlement shown in the plot above, assume downdrag develops between the following elevations:

- El. 78.8 bottom of pile cap
- El. 47.5 bottom of drag zone

From the pile axial resistance calculations, the following nominal unit side resistance value was calculated for the drag zone and the following unfactored and factored downdrag load was calculated:

Layer No.	HP 14x117 PILE						
	Nominal Unit Side Resistance Start El.	Nominal Unit Side Resistance End El.	Bottom Elevation of Downdrag Zone in Layer	Nominal Unit Side Resistance (psf)	Unfactored Downdrag Load (kips)	Load Factor	Factored Downdrag Load (kips)
1	78.8	75.9	75.9	84	1.2	1.05	1.2
2	75.9	56.5	56.5	468	44.0	1.40	61.6
3	56.5	37.4	47.5	724	31.6	1.05	33.2

Pile Perimeter (Box)	4.85 ft	Total Factored Downdrag (Box):	96 kips
Pile Perimeter	7.2 ft	Total Factored Downdrag:	114 kips

Client: Maine Department of Transportation

Computed by: MMB

Checked by: BCS

Sheet: 7 of 7

HALEYALDRICH

File No.: 132076-007

Date: 4-May-2021

Project: Interstate 395/Route 9 Connector Bridge over Eaton Brook

Subject: Downdrag Analysis

Seismic Site Class

Client	Maine Department of Transportation
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Project	Interstate 395/Route 9 Connector Bridge over Eaton Brook No. 6646
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Subject	Seismic Site Class Evaluation
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PROBLEM STATEMENT & OBJECTIVE

Determine the Seismic Site Class using shear wave velocity data from two sCPTs completed at the proposed bridge abutments.

EXECUTIVE SUMMARY

Based on the subsurface conditions encountered, recommend a **Seismic Site Class D**.

REFERENCES

1. AASHTO LRFD Bridge Design Specifications, 9th edition, 2020

AVAILABLE INFORMATION

1. sCPT data provided by ConeTec, Inc.

ASSUMPTIONS

1. Shear wave velocity of material present below the bottom of the sCPT is equal to last (deepest) shear wave velocity measurement (conservative).

PROCEDURE

1. Check the site against the three categories of Site Class F (see attached Table 3.10.3.1-1), requiring site-specific ground motion response evaluation. If the site corresponds to any of these categories, classify the site as Site Class F and conduct a site-specific ground motion response evaluation.
2. Categorize the site using one of the following three methods (Method A, B, or C).

Method A

Average shear wave velocity for the upper 100 ft of the soil profile:

$$\bar{V}_s = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{V_{si}}}$$

where

V_{si} = shear wave velocity of i th soil (ft/s).

d_i = thickness of i th soil layer (ft).

n = total number of distinctive soil layers in the upper 100 ft of the site profile.

i = any one of the layers between 1 and n .

Client	Maine Department of Transportation
Project	Interstate 395/Route 9 Connector Bridge over Eaton Brook No. 6646
Subject	Seismic Site Class Evaluation

PROCEDURE

Method B

Average standard penetration test (SPT) for the upper 100 ft of the soil profile:

$$\bar{N} = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{N_i}}$$

where

N_i = standard penetration resistance as measured directly in the field, uncorrected blow count, of i th soil layer not to exceed 100 ft (blows/ft).

d_i = thickness of i th soil layer (ft).

n = total number of distinctive soil layers in the upper 100 ft of the site profile.

i = any one of the layers between 1 and n .

Method C

Average standard penetration test (SPT) for the cohesionless layers in the upper 100 ft of the soil profile:

$$\bar{N}_{ch} = \frac{\sum_{i=1}^m d_i}{\sum_{i=1}^m \frac{d_i}{N_i}}$$

where

N_i = standard penetration resistance as measured directly in the field, uncorrected blow count, of i th cohesionless soil layer (blows/ft).

d_i = thickness of i th cohesionless soil layer (ft).

m = total number of distinctive cohesionless soil layers in the upper 100 ft of the site profile.

i = any one of the layers between 1 and m .

Average undrained shear strength for the cohesive layers in the upper 100 ft of the soil profile:

$$\bar{s}_u = \frac{\sum_{i=1}^k d_i}{\sum_{i=1}^k \frac{d_i}{s_{ui}}}$$

where

s_{ui} = undrained shear strength of i th cohesive soil layer (psf), not to exceed 5000 psf

d_i = thickness of i th cohesive soil layer (ft).

k = total number of distinctive cohesive soil layers in the upper 100 ft of the site profile.

i = any one of the layers between 1 and k .

Based on the available information, Method A/B/C will be used for the seismic Site Class evaluation.

Client	Maine Department of Transportation
Project	Interstate 395/Route 9 Connector Bridge over Eaton Brook No. 6646
Subject	Seismic Site Class Evaluation

SITE CLASS DEFINITIONS

(Table from AASHTO LRFD Bridge Design Specifications, 9th edition, 2020.)

Table 3.10.3.1-1—Site Class Definitions

Site Class	Soil Type and Profile
A	Hard rock with measured shear wave velocity, $\bar{v}_s > 5,000$ ft/s
B	Rock with $2,500$ ft/sec $< \bar{v}_s < 5,000$ ft/s
C	Very dense soil and soil rock with $1,200$ ft/sec $< \bar{v}_s < 2,500$ ft/s, or with either $\bar{N} > 50$ blows/ft, or $\bar{s}_u > 2.0$ ksf
D	Stiff soil with 600 ft/s $< \bar{v}_s < 1,200$ ft/s, or with either $15 < \bar{N} < 50$ blows/ft, or $1.0 < \bar{s}_u < 2.0$ ksf
E	Soil profile with $\bar{v}_s < 600$ ft/s or with either $\bar{N} < 15$ blows/ft or $\bar{s}_u < 1.0$ ksf, or any profile with more than 10.0 ft of soft clay defined as soil with $PI > 20$, $w > 40$ percent and $\bar{s}_u < 0.5$ ksf
F	Soils requiring site-specific evaluations, such as: <ul style="list-style-type: none"> Peats or highly organic clays ($H > 10.0$ ft of peat or highly organic clay where H = thickness of soil) Very high plasticity clays ($H > 25.0$ ft with $PI > 75$) Very thick soft/medium stiff clays ($H > 120$ ft)

Exceptions: Where the soil properties are not known in sufficient detail to determine the site class, a site investigation shall be undertaken sufficient to determine the site class. Site classes E or F should not be assumed unless the authority having jurisdiction determines that site classes E or F could be present at the site or in the event that site classes E or F are established by geotechnical data.

where:

\bar{v}_s	=	average shear wave velocity for the upper 100 ft of the soil profile
\bar{N}	=	average Standard Penetration Test (SPT) blow count (blows/ft) (ASTM D1586) for the upper 100 ft of the soil profile
\bar{s}_u	=	average undrained shear strength in ksf (ASTM D2166 or ASTM D2850) for the upper 100 ft of the soil profile
PI	=	plasticity index (ASTM D4318)
w	=	moisture content (ASTM D2216)



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Sounding ID: SCPT20-101B
Date: 28-Oct-2020

Seismic Source: Beam
Source Offset (ft): 3.98
Source Depth (ft): 0
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
2.07	1.41	4.22			
4.10	3.44	5.26	1.04	4.92	212
5.97	5.31	6.64	1.38	2.92	471
10.10	9.45	10.25	3.61	7.93	455
12.14	11.48	12.15	1.90	5.84	325
14.21	13.55	14.12	1.97	6.17	319
16.01	15.35	15.86	1.74	4.81	362
18.14	17.49	17.93	2.07	6.09	340
20.11	19.46	19.86	1.92	2.60	739

	Thickness (T)	Velocity (V)	T/V
4.4	4.4	212	0.0206
7.4	3.0	471	0.0064
10.5	3.1	455	0.0068
12.5	2.1	325	0.0063
14.5	1.9	319	0.0061
16.4	2.0	362	0.0054
18.5	2.1	340	0.0060
	81.5	739	0.1103

100.0

0.1680

595 $\Sigma T / \Sigma V/T$

SAY SITE CLASS D SINCE SHEAR WAVE VELOCITY OF MATERIAL PRESENT BELOW 20 FT LIKELY >> 739 FT/SEC. INCREASING SHEAR WAVE VELOCITY FROM 739 FT/SEC TO 750 FT/SEC RESULTS IN SITE CLASS D.



Job No: 20-53-21525
Client: Haley & Aldrich
Project: I-395 & Route 9 Connector, Brewer & Eddington, ME
Sounding ID: SCPT20-102
Date: 29-Oct-2020

Seismic Source: Beam
Source Offset (ft): 3.98
Source Depth (ft): 0
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
4.04	3.38	5.22			
6.07	5.41	6.72	1.50	1.80	832
8.04	7.38	8.39	1.67	3.20	521
10.01	9.35	10.16	1.78	4.30	413
12.14	11.48	12.15	1.99	4.95	402
14.11	13.45	14.03	1.87	4.75	395
16.08	15.42	15.93	1.90	4.10	463
18.04	17.39	17.84	1.91	3.90	490
20.11	19.46	19.86	2.02	1.91	1057
22.05	21.39	21.76	1.90	2.09	907
24.05	23.39	23.73	1.97	2.22	886
25.98	25.33	25.64	1.91	1.97	968
28.12	27.46	27.75	2.11	1.87	1125
30.12	29.46	29.73	1.98	2.10	943
31.59	30.94	31.19	1.46	1.39	1051

	Thickness (T)	Velocity (V)	T/V
6.4	6.4	832	0.0077
8.4	2.0	521	0.0038
10.4	2.1	413	0.0050
12.5	2.1	402	0.0051
14.4	2.0	395	0.0050
16.4	2.0	463	0.0043
18.4	2.0	490	0.0041
20.4	2.0	1,057	0.0019
22.4	2.0	907	0.0022
24.4	2.0	886	0.0022
26.4	2.0	968	0.0021
28.5	2.1	1,125	0.0018
30.2	1.7	943	0.0018
	69.8	1,051	0.0664

100.0

0.1134

882 $\Sigma T / \Sigma V/T$

SAY SITE CLASS D SINCE SHEAR WAVE VELOCITY > 600 FT/SEC.

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        ]
      ]
    }
  }
}
```

Axial Compressive Pile Resistance

PROBLEM STATEMENT AND OBJECTIVE

Calculate the structural axial pile resistances for Abutments 1 and 2.

REFERENCES

- 1. AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017.

ASSUMPTIONS

- 1. Five sizes of steel H-pile were considered for the structural evaluations.
- 2. A pile yield stress of 50 ksi was considered for the structural resistance evaluations.
- 3. The pile axial structural resistance was evaluated assuming a full steel H pile section (no corrosion).
- 4. The pile unbraced length is 0 ft for the structural axial resistance calculations.

STRUCTURAL RESISTANCE - AASHTO LRFD

Note: This calculation only addresses axial resistance, if the piles are subjected to lateral loads, the structural resistance under combined axial load and flexure should also be evaluated by others.

6.9.2 - Compressive Resistance
6.9.2.1 - Axial Compression

The factored resistance of components in compression, Pr, shall be taken as

$P_r = \phi_c P_n$

Pn = nominal compressive resistance as specified in Article 6.9.4 or 6.9.5 as applicable.

ϕc = resistance factor for compression as specified in Article 6.5.4.2

6.9.4 - Noncomposite Members
6.9.4.1 - Nominal Compressive Resistance

If $\frac{P_e}{P_0} \geq 0.44$, then $P_n = P_0 * (0.658^{\frac{P_0}{P_e}})$ 6.9.4.1.1-1

If $\frac{P_e}{P_0} < 0.44$, then $P_n = 0.877 P_e$ 6.9.4.1.1-2

where

Ag = gross cross-sectional area of the member

Fy = specified minimum yield strength

Pe = elastic critical buckling resistance determined as specified in Article 6.9.4.1.2 for flexural buckling, and as specified in Article 6.9.4.1.3 for torsional buckling or flexural-torisonal buckling as applicable

P0 = nominal yield resistance = FyAg

6.9.4.1.2 - Elastic Flexural Buckling Resistance

The elastic critical buckling resistance, Pe, based on flexural buckling shall be taken as

$P_e = \frac{\pi^2 E}{(\frac{KL}{r_s})^2} A_g$ 6.9.4.1.2-1

where

Ag = gross cross-sectional area of the member

K = effective length factor in the plane of buckling determined as specified in Article 4.6.2.5

l = unbraced length in the plane of buckling

rs = radius of gyration about the axis normal to the plane of buckling

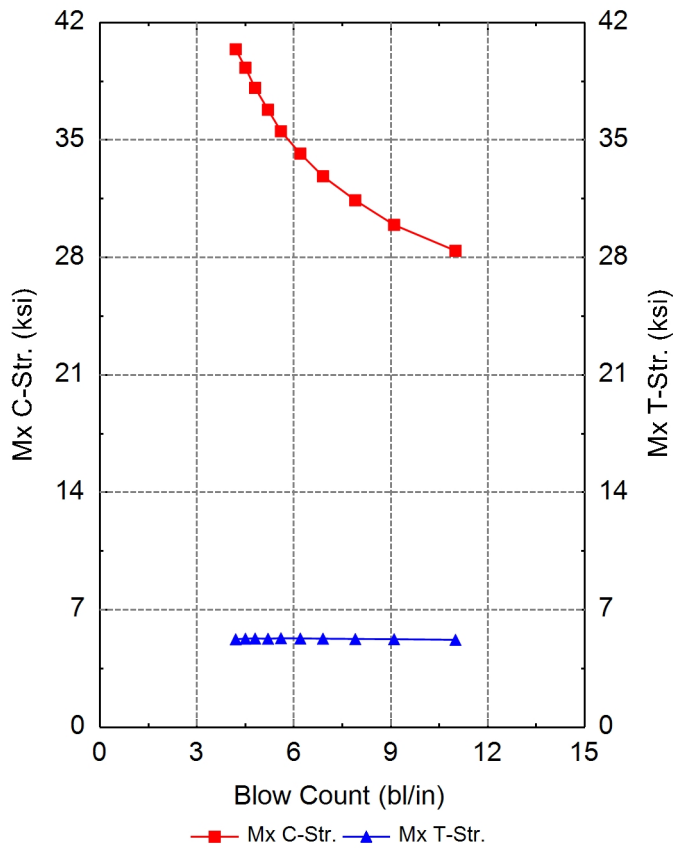
STRUCTURAL AXIAL RESISTANCE CALCULATIONS

Pile Section	Gross Section Area Ag (in²)	Corrosion Allowance (in)	Effective Gross Area Aeff (in²)	Effective Length Factor K	Unbraced Length l (ft)	Yield Stress fy (ksi)	Elastic Modulus E (ksi)	Radius of Gyration rweak (in)	P0 (kips)	Pe (kips)	Pe/P0	Pn (kips)	ϕ (Strength Limit State)	ϕPn (kips)
HP12x53	15.5	0	15.5	2.0	0	50	29000	2.86	775	6.3E+14	8.1E+11	775	0.5	388
HP 12x74	21.8	0	21.8	2.0	0	50	29000	2.92	1090	9.2E+14	8.5E+11	1090	0.5	545
HP 14x73	21.4	0	21.4	2.0	0	50	29000	3.49	1070	1.3E+15	1.2E+12	1070	0.5	535
HP 14x89	26.1	0	26.1	2.0	0	50	29000	3.53	1305	1.6E+15	1.2E+12	1305	0.5	653
HP14x117	34.4	0	34.4	2.0	0	50	29000	3.59	1722	2.2E+15	1.3E+12	1722	0.5	861

SUMMARY

Steel H-pile Section	Nominal Structural Resistance (kips)	Factored Structural Resistance (kips)			Governing Resistance (kips)
		Service Limit State ($\phi=1.0$)	Strength Limit State ($\phi=0.5$)	Extreme Limit State ($\phi=1.0$)	
HP 12x53	775	775	388	775	388
HP 12x74	1,090	1,090	545	1,090	545
HP 14x73	1,070	1,070	535	1,070	535
HP 14x89	1,305	1,305	653	1,305	653
HP14x117	1,722	1,722	861	1,722	861

Drivability Analysis

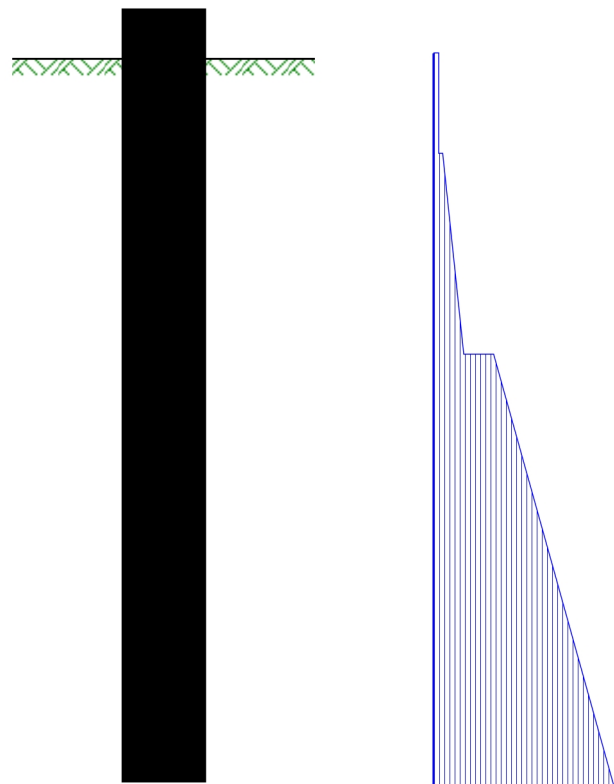
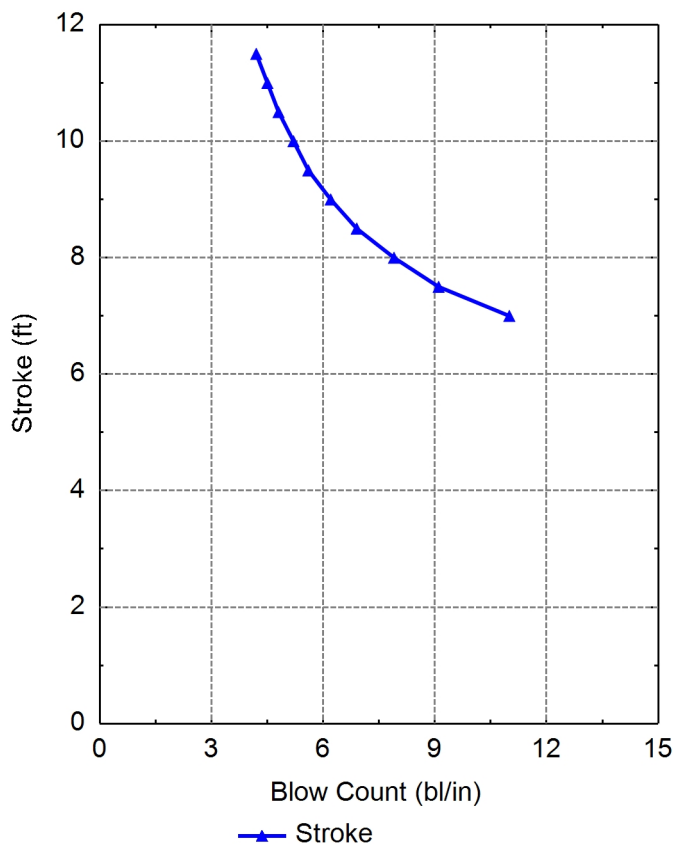


DELMAG D 36-32

Capacity	825.0	kips
Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	1500.0 (100%)	psi
Helmet Weight	3.100	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.050	s/ft
Toe Damping	0.150	s/ft
Pile Length	78.000	ft
Pile Penetration	73.000	ft
Pile Top Area	34.400	in ²

RSA

No

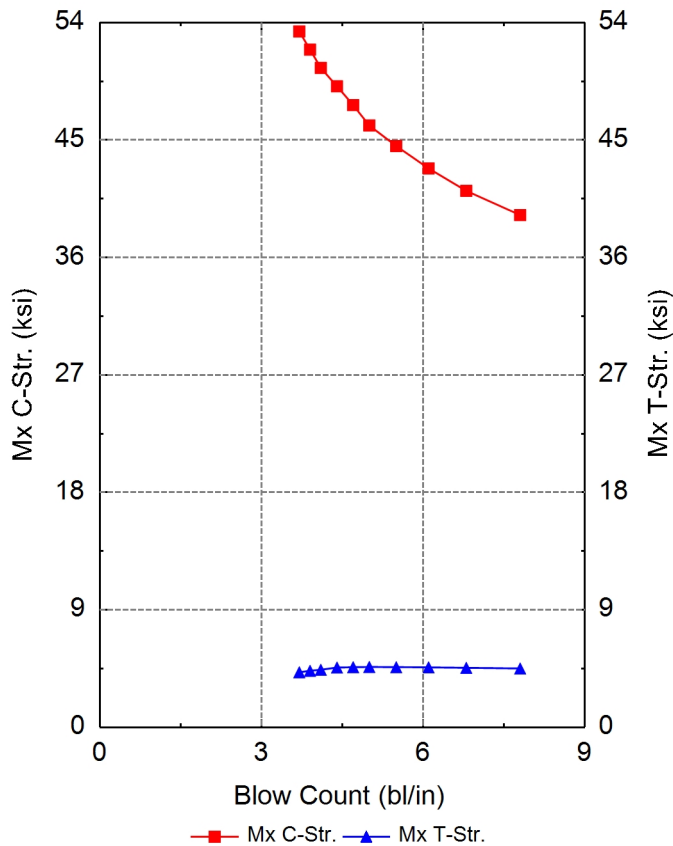


Pile Model

Shaft=44%
(Prop., ST)

Bearing Graph Summary — DELMAG D 36-32

Rut kips	Mx C-Str. ksi	Mx T-Str. ksi	Blow Ct bl/in	Stroke ft	ENTHRU kip-ft	Hammer -
825.0	28.40	5.21	11.0	7.00	35.70	D 36-32
825.0	29.94	5.25	9.1	7.50	38.60	D 36-32
825.0	31.41	5.26	7.9	8.00	41.20	D 36-32
825.0	32.84	5.28	6.9	8.50	43.99	D 36-32
825.0	34.19	5.29	6.2	9.00	46.68	D 36-32
825.0	35.52	5.31	5.6	9.50	49.41	D 36-32
825.0	36.80	5.28	5.2	10.00	51.80	D 36-32
825.0	38.11	5.29	4.8	10.50	54.65	D 36-32
825.0	39.31	5.28	4.5	11.00	57.29	D 36-32
825.0	40.41	5.25	4.2	11.50	59.69	D 36-32

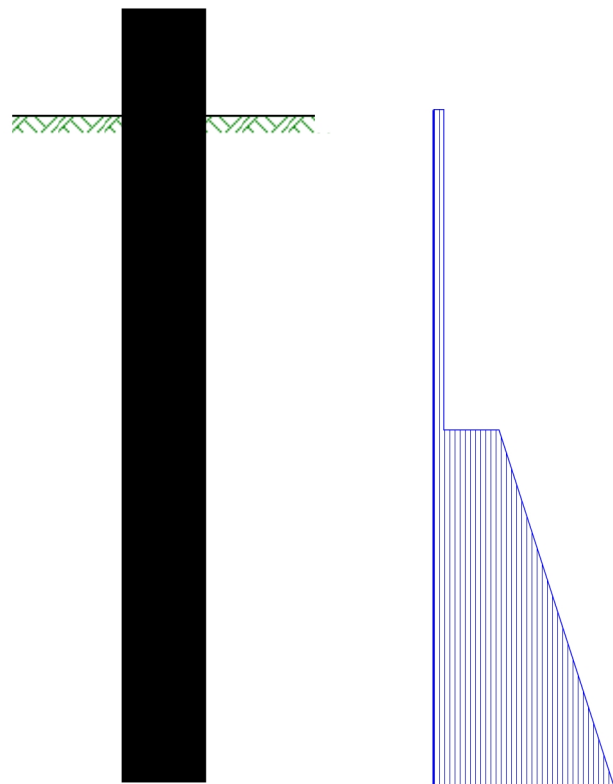
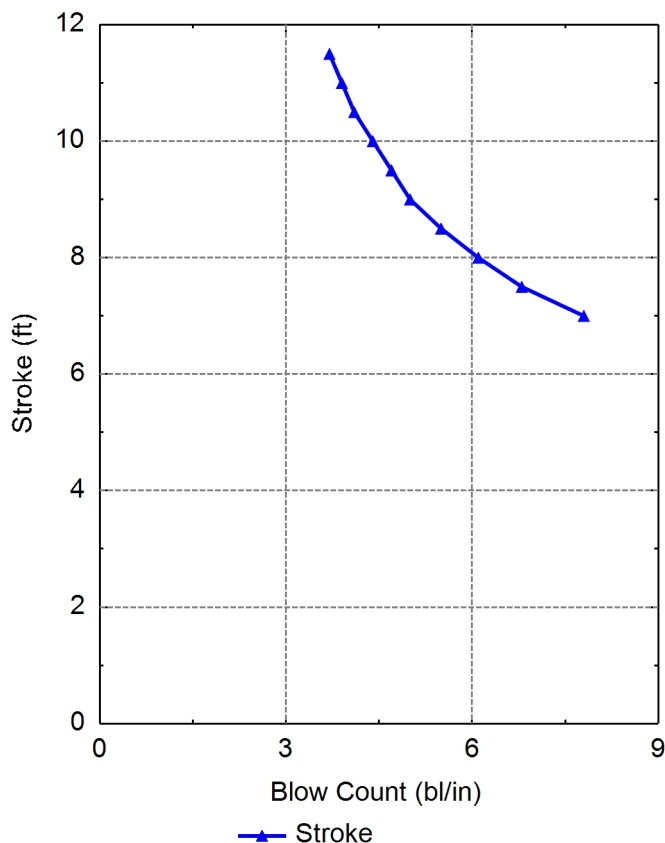


DELMAG D 36-32

Capacity	825.0	kips
Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	1500.0 (100%)	psi
Helmet Weight	3.100	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.040	in
Skin Damping	0.050	s/ft
Toe Damping	0.150	s/ft
Pile Length	44.000	ft
Pile Penetration	38.000	ft
Pile Top Area	34.400	in ²

RSA

No

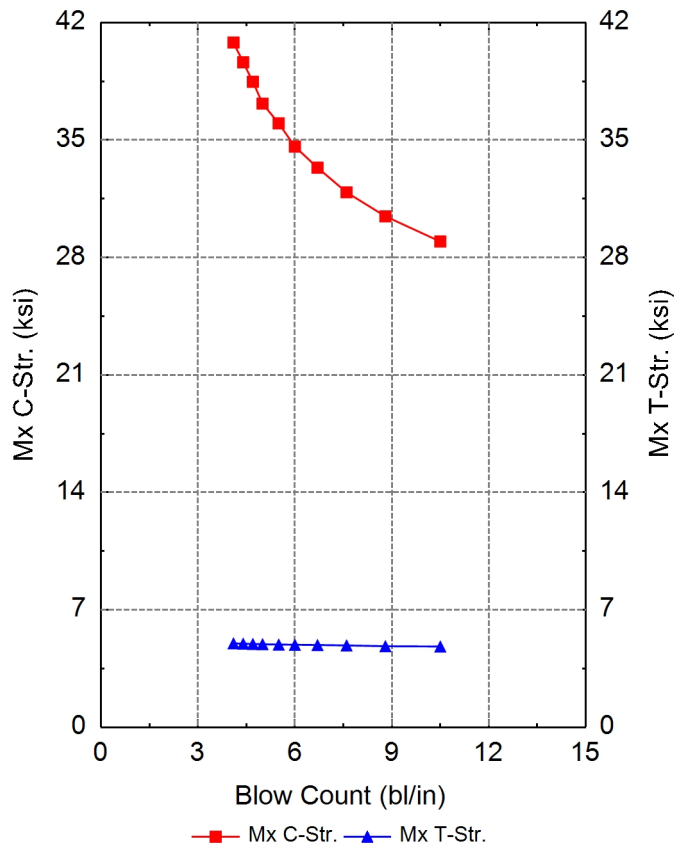


Pile Model

Shaft=17%
(Prop., ST)

Bearing Graph Summary — DELMAG D 36-32

Rut kips	Mx C-Str. ksi	Mx T-Str. ksi	Blow Ct bl/in	Stroke ft	ENTHRU kip-ft	Hammer -
825.0	39.25	4.50	7.8	7.00	30.34	D 36-32
825.0	41.11	4.56	6.8	7.50	32.98	D 36-32
825.0	42.83	4.59	6.1	8.00	35.55	D 36-32
825.0	44.54	4.61	5.5	8.50	38.09	D 36-32
825.0	46.11	4.62	5.0	9.00	40.72	D 36-32
825.0	47.68	4.60	4.7	9.50	43.28	D 36-32
825.0	49.12	4.58	4.4	10.00	45.92	D 36-32
825.0	50.52	4.41	4.1	10.50	48.31	D 36-32
825.0	51.93	4.33	3.9	11.00	50.93	D 36-32
825.0	53.32	4.21	3.7	11.50	53.44	D 36-32

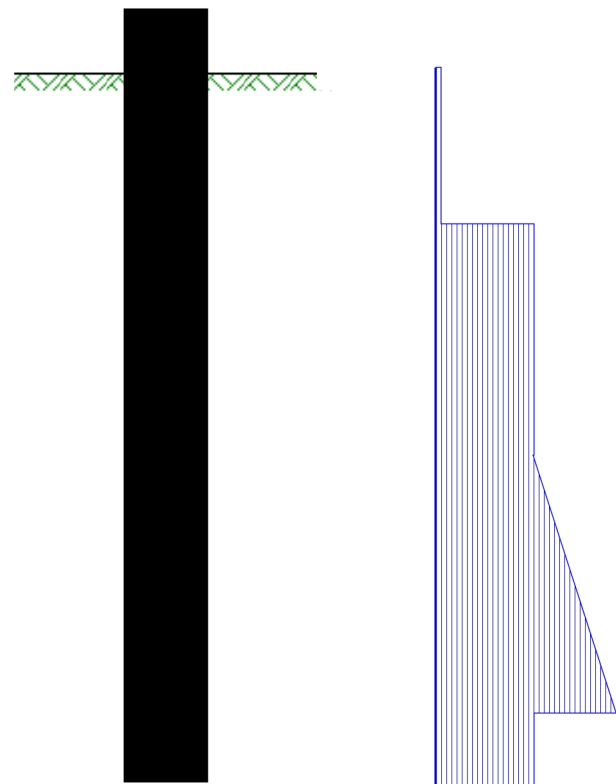
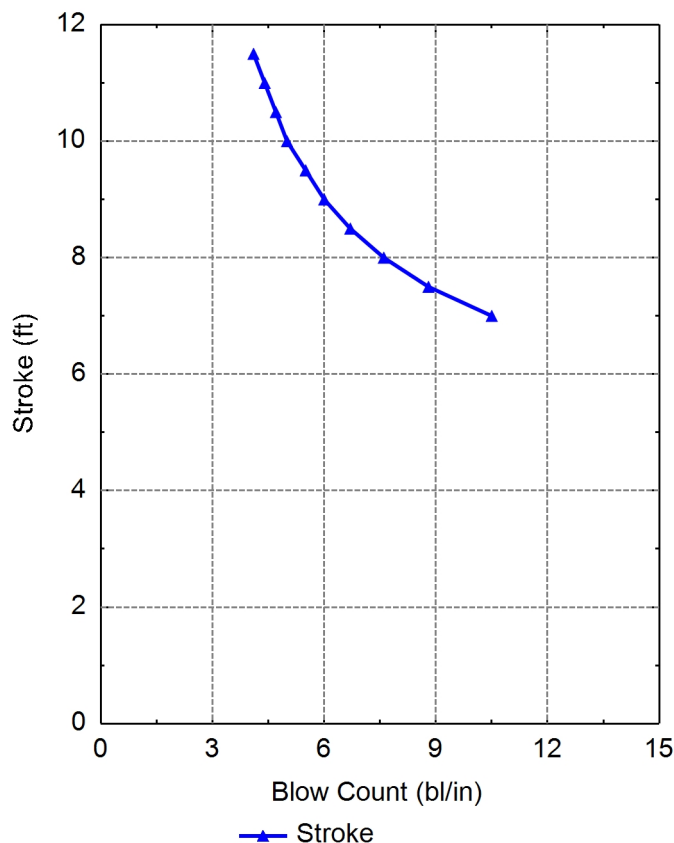


DELMAG D 36-32

Capacity	825.0	kips
Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	1500.0 (100%)	psi
Helmet Weight	3.100	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.040	in
Skin Damping	0.050	s/ft
Toe Damping	0.150	s/ft
Pile Length	85.000	ft
Pile Penetration	78.000	ft
Pile Top Area	34.400	in ²

RSA

No

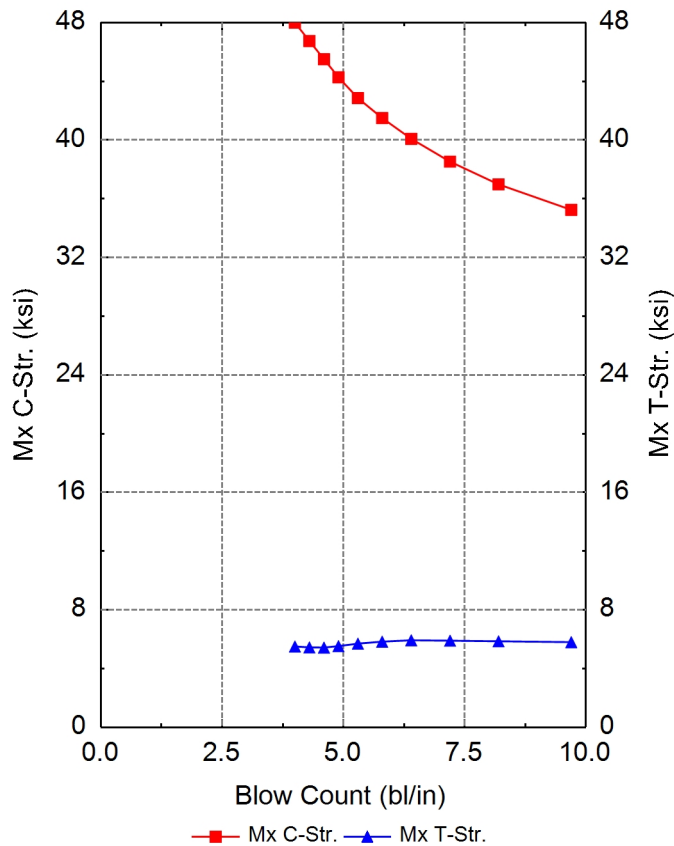


Pile Model

Shaft=46%
(Prop., ST)

Bearing Graph Summary — DELMAG D 36-32

Rut kips	Mx C-Str. ksi	Mx T-Str. ksi	Blow Ct bl/in	Stroke ft	ENTHRU kip-ft	Hammer -
825.0	28.95	4.81	10.5	7.00	35.29	D 36-32
825.0	30.45	4.83	8.8	7.50	38.08	D 36-32
825.0	31.88	4.88	7.6	8.00	40.79	D 36-32
825.0	33.35	4.90	6.7	8.50	43.48	D 36-32
825.0	34.61	4.92	6.0	9.00	46.07	D 36-32
825.0	35.99	4.93	5.5	9.50	48.72	D 36-32
825.0	37.17	4.95	5.0	10.00	51.54	D 36-32
825.0	38.47	4.97	4.7	10.50	54.04	D 36-32
825.0	39.63	4.98	4.4	11.00	56.57	D 36-32
825.0	40.81	5.00	4.1	11.50	59.22	D 36-32

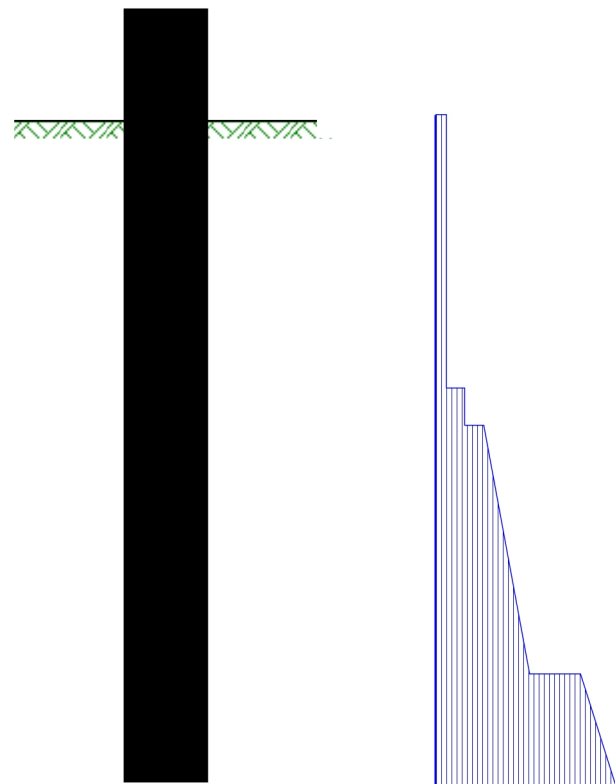
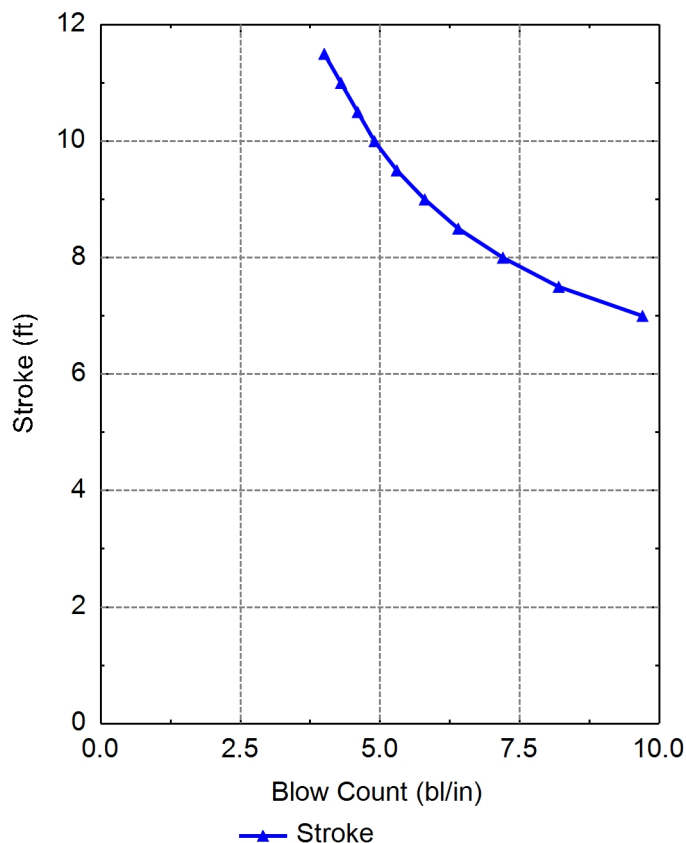


DELMAG D 36-32

Capacity	825.0	kips
Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	1500.0 (100%)	psi
Helmet Weight	3.100	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.040	in
Skin Damping	0.050	s/ft
Toe Damping	0.150	s/ft
Pile Length	63.000	ft
Pile Penetration	54.000	ft
Pile Top Area	34.400	in ²

RSA

No



Pile Model

Shaft=26%
(Prop., ST)

Bearing Graph Summary — DELMAG D 36-32

Rut kips	Mx C-Str. ksi	Mx T-Str. ksi	Blow Ct bl/in	Stroke ft	ENTHRU kip-ft	Hammer -
825.0	35.25	5.80	9.7	7.00	33.95	D 36-32
825.0	36.98	5.86	8.2	7.50	36.74	D 36-32
825.0	38.53	5.90	7.2	8.00	39.41	D 36-32
825.0	40.08	5.93	6.4	8.50	42.22	D 36-32
825.0	41.50	5.83	5.8	9.00	44.80	D 36-32
825.0	42.85	5.70	5.3	9.50	47.51	D 36-32
825.0	44.27	5.53	4.9	10.00	50.10	D 36-32
825.0	45.51	5.43	4.6	10.50	52.63	D 36-32
825.0	46.74	5.44	4.3	11.00	55.36	D 36-32
825.0	47.99	5.50	4.0	11.50	57.93	D 36-32

Frost Evaluation

Client:	Maine Department of Transportation
Project:	Interstate 395/Route 9 Connector over Eaton Brook
Subject:	Frost Penetration Depth Evaluation

OBJECTIVE:

Evaluate maximum depth of frost penetration based on soil and groundwater conditions, as well as geographic site location.

REFERENCES:

1. MaineDOT Bridge Design Guide, 2003 with interim revisions through 2017.
2. Haley & Aldrich boring logs BB-BEB-101, BB-BEB-103, BB-BEB-104, BB-BEB-202, BB-BEB-204, and BB-BEB-205.
3. Preliminary Plan set prepared by MaineDOT dated 3/12/19.

EVALUATION:

1. Gather relevant information from test borings performed near proposed bridge abutment locations:

SUB-STRUCTURE	SUBSTRUCTURE BEARING ELEVATION	TEST BORING NO./GS EL.	GROUND WATER	SAMPLE NO. AND ELEVATION	LAB USCS	MOISTURE CONTENT
ABUTMENT NO. 1	El. 80.5	BB-BEB-101 El. 74.3	El. 76.5 to El. 75.7 in BB-BEB-102 (OW)	1U El. 69.3 - El. 67.3	CL	31.0
		BB-BEB-103 El. 74.1		1U El. 64.1 - El. 62.1	CL	36.0
		BB-BEB-202 El. 74.5		1U El. 69.5 - El. 67.5	CL	32.7
		BB-BEB-202 El. 74.5		2U El. 59.5 - El. 57.5	CL	36.5
ABUTMENT NO. 2	El. 79.0	BB-BEB-104 El. 75.9	Artesian during drilling	3U El. 60.9 - El. 58.9	CL	34.0
		BB-BEB-204 El. 76.7		1U El. 71.7 - El. 69.7	CL	29.3
		BB-BEB-205 El. 77.4		1U El. 67.4 - El. 65.4	CL	36.8

2. The abutments will bear in new embankment fill. Assume the new embankment fill consists of granular material. Cohesive Marine Deposit soils are present between 2 and 6 feet below the proposed abutments.

3. From MaineDOT Bridge Design Guide Figure 5-1, the design freezing index for the site is approximately 1650 °F - days

4. Estimate range in frost penetration depth using MaineDOT Bridge Design Guide Table 5-1 and the design freezing index above.

5. For fine grained soil, from Table 5-1, frost penetration depth is approximately 4.0 ft. For coarse grained soil, from Table 5-1, frost penetration depth is approximately 5.1 ft.

Recommend both proposed abuments be founded at least 4.5 ft below existing ground surface for frost penetration.

Client: Maine Department of Transportation

Date: 7-Apr-2020

Project: Interstate 395/Route 9 Connector over Eaton Brook

Computed by: EMS

Subject: Frost Penetration Depth Evaluation

Checked by: SSM

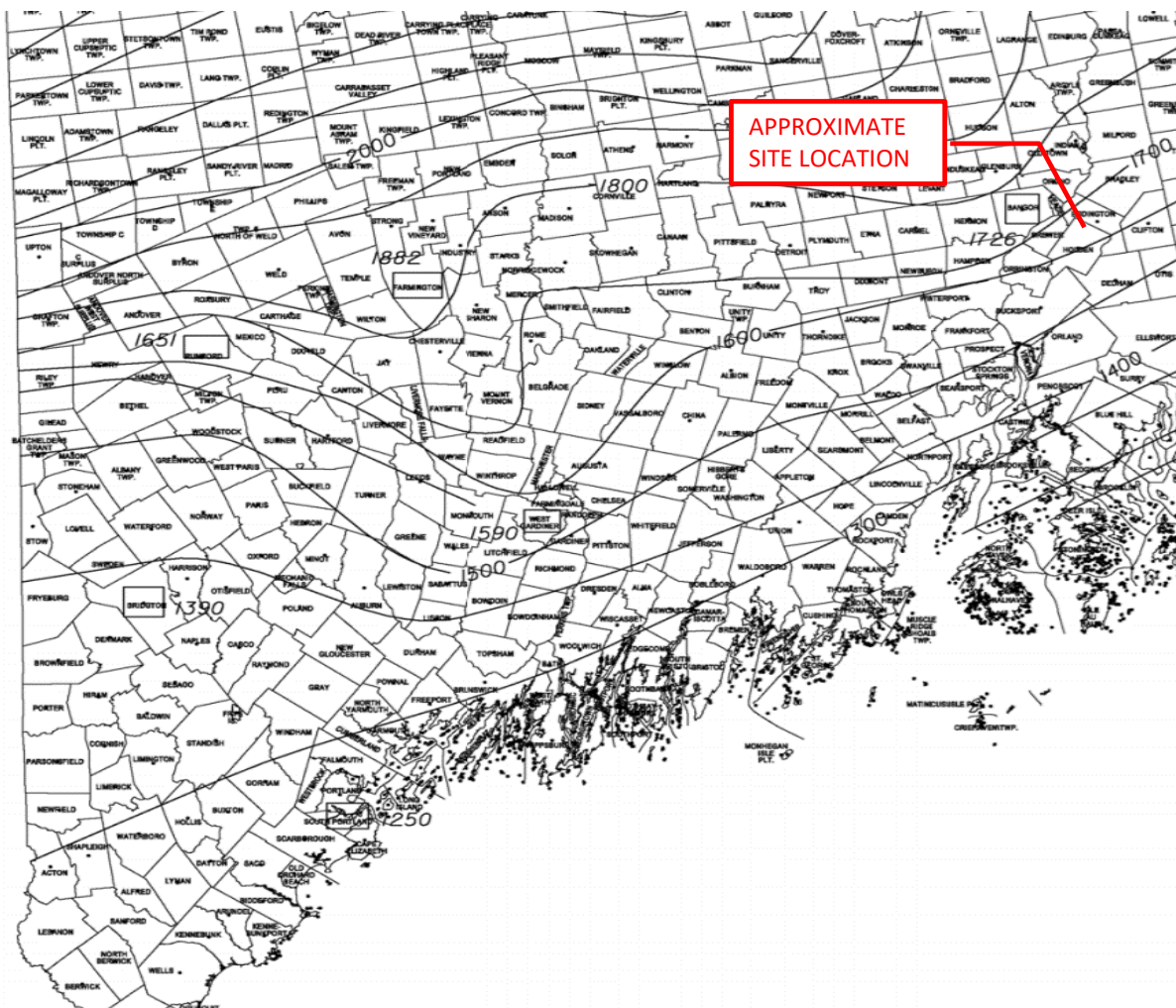


Table 5-1 Depth of Frost Penetration

Design Freezing Index	Frost Penetration (in)					
	Coarse Grained			Fine Grained		
	w=10%	w=20%	w=30%	w=10%	w=20%	w=30%
1000	66.3	55.0	47.5	47.1	40.7	36.9
1100	69.8	57.8	49.8	49.6	42.7	38.7
1200	73.1	60.4	52.0	51.9	44.7	40.5
1300	76.3	63.0	54.3	54.2	46.6	42.2
1400	79.2	65.5	56.4	56.3	48.5	43.9
1500	82.1	67.9	58.4	58.3	50.2	45.4
1600	84.8	70.2	60.3	60.2	51.9	46.9
1700	87.5	72.4	62.2	62.2	53.5	48.4
1800	90.1	74.5	64.0	64.0	55.1	49.8
1900	92.6	76.6	65.7	65.8	56.7	51.1
2000	95.1	78.7	67.5	67.6	58.2	52.5
2100	97.6	80.7	69.2	69.3	59.7	53.8
2200	100.0	82.6	70.8	71.0	61.1	55.1
2300	102.3	84.5	72.4	72.7	62.5	56.4
2400	104.6	86.4	74.0	74.3	63.9	57.6
2500	106.9	88.2	75.6	75.9	65.2	58.8
2600	109.1	89.9	77.1	77.5	66.5	60.0