Final Geotechnical Engineering Report

Maine Turnpike
Exit 35 and 36 Interchange
Improvements
Saco, Maine

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This report presents the results of our preliminary geotechnical exploration program and analysis for the Exit 35 and 36 Interchange Improvement project located in Saco, Maine. Our work involved drilling a preliminary exploration program consisting of seven test borings, a final exploration program consisting of 33 borings, 8 ledge probes, 19 hand augers, one supplemental boring, conducting a laboratory testing program, evaluating the subsurface conditions, and providing geotechnical engineering recommendations for the design of the roadway embankments, toll plazas, overhead tolling equipment, overhead sign structures and toll administration buildings.

Elevations in this report are in feet and referenced to the vertical datum NAVD 88.

Recommendations in this report are made in accordance with the following codes:

- Administration Buildings – 2015 International Building Code 2015 (IBC)
- Toll Gantries, Toll Plazas, Retaining Walls and Slopes – AASHTO LRFD Bridge Design Specifications, 9th Edition/2020 (AASHTO LRFD)

2.0 SITE AND PROJECT INFORMATION

2.1 SITE DESCRIPTION

The existing Maine Turnpike within the project area consists of three northbound lanes and three southbound lanes. Exit 36 consists of on ramps and off ramps associated with I-195. An existing two-span bridge carries the eastbound and westbound lanes of I-195 over the Maine Turnpike. To the south, a two-span bridge carries Route 112 over the Maine Turnpike. The Ramada Inn is connected directly to the Maine Turnpike via a northbound off ramp and northbound on ramp. These ramps provide access only to the hotel and not the surrounding roadways. Currently, there is no direct access to Route 112 from the Maine Turnpike.

In general, the existing roadway embankments range in height from 5 to 15 feet with side slopes as steep as 2 Horizontal to 1 Vertical slope (2H:1V). The area to the west of the project is lightly to moderately developed with residential type structures. The area to the east is moderately developed with a combination of residential, commercial, and light manufacturing type structures. Wetlands are located throughout the project area, particularly along the west side of the Turnpike between the Route 112 and I-195 bridges.

2.2 PROJECT DESCRIPTION

The proposed improvements will consist of providing access to Route 112 via a collector distributor roadway on the southbound side of the Turnpike and an auxiliary lane between Exit 36 and Route 112 on the northbound side of the Turnpike. Traffic signals will be installed at the Route 112 SB and NB Ramp intersections. The collector distributor roadway will consist of two lanes and shoulders. Toll plazas will be constructed at the Exit 35 southbound on ramp and at the Exit 35 northbound on/off ramp. An overhead exit toll point will be constructed at the Exit 35 southbound off ramp. Alignment modifications will be made to the existing Exit 36 ramps. The southbound access to Route 112 will require significant embankment fill to create the on ramp and off ramp. The existing 84-inch diameter culvert for Goosefare Brook will be extended approximately 30 feet to the north and will require a headwall for grade separation.

3.0 EXPLORATION AND TESTING PROCEDURES

3.1 LOCAL GEOLOGY

The project area is located on the Maine Turnpike in Saco, Maine approximately 2.5 miles northeast of where the Turnpike crosses the Saco River. The surficial soils in the project area are mapped on the "Surficial Geology, Old Orchard Beach Quadrangle, Maine," Maine Geological Survey Open File No. 99-94, 1999. Based on a review of this map, the surficial soil in the immediate area of the site is a marine regressive sand deposit. The map indicates the deposit consists of sand deposited in marine water during the regression of the sea from the coastal area of Maine. The surficial sand deposit is typically underlain by the Presumpscot Formation which consists of silt, clay and sand sized particles deposited in deep ocean water. The Presumpscot formation typically has a stiff crust underlain by a very soft normally consolidated clay layer that is compressible. Artificial fill is expected to be present in areas developed within highway and bridge embankments.

The bedrock map in the publication entitled "Bedrock Geology of the Old Orchard Beach 7.5' Quadrangle, Cumberland and York Counties, Maine," Maine Geological Survey Open File No. 03-96, 2003, indicates the bedrock consists of phyllite associated with either the Eliot Formation or the Scarboro Formation.

3.2 EXISTING SUBSURFACE INFORMATION

3.2.1 I-195 over Maine Turnpike

Existing subsurface information is available from the bridge plans for Route I-195 over the Maine Turnpike. The plans are titled "Route I-195 over Maine Turnpike and Route 195 over Industrial Park Main Turnpike" prepared by Howard, Needles, Tammen, and Bergendoff (HNTB) Consulting Engineers and dated November 17, 1981. The plans with the boring logs are presented in Appendix A and boring locations are shown on the Boring Location Plans. The plans indicate the north and south bridge abutments are soil supported stub abutments bearing on the approach embankments. The center pier bears on a soil supported spread footing. Notes on the plans indicate the maximum calculated footing pressure is 4,000 pounds per square foot (psf) and 6,000 psf for the abutment and pier footings, respectively. The plans also indicate that the abutments were surcharged with 15 feet of soil.

The elevation view of the bridge indicated pre-settlement clearance between the bottom of the I-195 bridge and the Turnpike pavement was 17 feet and 3 inches at the time of construction. The bridge elevation view also indicated the estimated post settlement clearance to be 16 feet 3 inches. It is assumed approximately 1 foot of post construction settlement was expected to occur due to the increased load on the underlying soft clay deposit. The plans do not indicate the expected duration over which the secondary consolidation settlement was to occur. Given that the construction of the bridge was completed in the early 1980s, it is assumed that the majority of the settlement due to primary consolidation of the clay has likely occurred.

The plans contain three test borings designated CT-6-75, CT-9-75 and CT-60-73 with one boring located at each foundation structure. The borings generally encountered 25 feet of brown silty sand, 130 feet of gray silty clay and 20 feet of gray silty sand. The samples were not obtained following methods detailed in

ASTM D-1586, therefore the consistency of the soils cannot be compared to the recently drilled test borings. Bedrock was cored at each location and was described as metasiltstone. The top of bedrock was encountered at El. -69.5, El. -67.6, and El. -82.5 at the three boring locations.

The boring logs also contain the results of field and laboratory testing. The field vane shear test produced an undrained shear strength increasing from 800 psf at El. 80 to 1,600 psf at El. -50. The laboratory vane shear test produced an undrained shear strength increasing from 400 psf at El. 80 to 1,200 psf at El. -50. The moisture content average was approximately 40 percent. The plastic limit ranged from approximately 20 to 25 percent. The liquid limit ranged from approximately 35 to 40 percent.

3.2.2 Route 112 (North Street) over Maine Turnpike

Existing subsurface information (Boring Plan and Logs) are available from the bridge plans for Route 112 over the Maine Turnpike. The plans titled "Bridge Replacement, North Street Underpass," prepared by Edwards and Kelcey and dated December 2001 are presented in Appendix B. The plans were prepared for the design and construction of the bridge that carries Route 112 over the Maine Turnpike and indicate the west abutment and center pier are founded on HP 12x53 piles. The piles have a design load of 140 kips using the Allowable Stress Design methodology. It is assumed that the piles were driven to bedrock. The east abutment is founded on a spread footing bearing on 6 to 8 feet of crushed stone reinforced with a geotextile using an allowable bearing capacity of 8 kips per square foot (ksf).

Five test borings were drilled as part of the exploration program. The borings generally encountered approximately 15 to 20 feet of embankment fill associated with the Route 112 roadway, 10 to 20 feet of medium stiff to hard clay, and 5 to 8 feet of dense glacial till. The bedrock was cored at each boring location and was described as schist or phyllite. The top of the bedrock ranged from El. 87.5 to El. 94.5. The borings are designated B33-1 through B33-6.

3.3 PRELIMINARY, FINAL, AND SUPPLEMENTAL BORING PROGRAMS

Preliminary and final boring programs were conducted by Stantec. The preliminary program was conducted from December 12 to 23, 2019. The final program occurred from October 28 to December 11, 2020, and the supplemental boring program was conducted on August 30, 2021. Each program was under the supervision of Stantec personnel who logged the borings, collected soil samples, collected rock cores, visually classified the soil samples and rock core, and observed field vane shear testing. The boring logs for the preliminary program are included in Appendix C. The boring logs for the final and supplemental programs are included in Appendix D. The soil samples were described using the Modified Burmister System. A key for the terms used by the Modified Burmister System is provided with the boring logs. Locations of the borings were determined by either survey or taping from existing site features. The boring locations from each program are shown on Figures 2 through 9. Details of each program are provided in the sections below. A summary of the boring locations is provided in Table 1.

3.3.1 Preliminary Program - 2019

The preliminary exploration program consisted of the drilling of seven borings to provide preliminary information for the subsurface soil, bedrock, and groundwater conditions in the project area. The test borings were drilled by New England Boring Contractors of Hermon, Maine. A track-mounted drill rig

equipped with 4.25-inch inside diameter hollow stem augers or 4-inch inside diameter flush-joint steel casing was used to advance the borings. The drill rig was equipped with a safety hammer for the SPT test (ASTM D1586). Therefore, the raw SPT values are equal to the SPT N60 values.

Seven undisturbed Shelby tube samples were obtained from the clay deposit. The Shelby tubes were attached to the drill rods with an adaptor and were pushed into the clay slowly using the drill rods. The Shelby tubes were allowed to set 15 minutes after being pushed into the clay and then slowly rotated two revolutions prior to extraction from the borehole. After extraction of the Shelby tubes from the boring, the soil samples were preserved using internal wax seals, capped at the ends and a wax seal was applied to the ends of the tubes. The samples were secured vertically and transported to the laboratory.

In-situ field vane shear testing was conducted at the location of two test borings. The vane shear testing equipment was supplied by the New England Boring Contractors. The equipment and test procedures are described later in this report.

Rock core samples were obtained from boring B-103 and B-112 using a NX double-walled core barrel. Photographs of the bedrock are provided in Appendix E.

3.3.2 Final Boring Program - 2020

The final boring program consisted of the drilling of 33 borings and 8 probes to provide additional data to complete the geotechnical analysis and provide final geotechnical design recommendations for the project. The test borings were drilled by New England Boring Contractors of Derry, designations are provided below. Some borings serve more than one purpose. Boring OS-7 was not accessible due to standing water at the proposed location and was not drilled.

- B-Series – Roadway/Embankment Borings
- OS-Series – Overhead Signs
- MA-Series – Mast Arms
- P-Series – Ledge Probes

The off-road borings were drilled with an ATV-mounted Mobile B-57 drill rig equipped with 4-inch inside diameter flush-joint steel casing. The drill rig was equipped with a 140-pound automatic hammer for the SPT test (ASTM D1586). Based on a “SPT Energy Report” provided by NEBC, the automatic hammer on the B-57 ATV rig has an efficiency of 0.87, which results in an energy correction factor of 1.45. Therefore, the field blow counts were multiplied by a factor of 1.45 to determine the SPT N60.

The on-road borings and borings that were located on firm ground were drilled with a truck-mounted Mobile B-57 drill rig equipped with 4-inch inside diameter flush-joint steel casing. The drill rig was equipped with a 140-pound automatic hammer for the SPT test. Based on a “SPT Energy Report” provided by NEBC the automatic hammer on the B-57 truck rig has an efficiency of 0.85, which results in an energy correction factor of 1.42. Therefore, the field blow counts were multiplied by 1.42 to determine the SPT N60.

Fourteen undisturbed Shelby tube samples were obtained from the clay deposit. The Shelby tubes used a hydraulically operated stationary piston sampler. The Shelby tubes were allowed to set 15 minutes after being pushed into the clay and then slowly rotated two revolutions prior to extraction from the borehole.

After extraction of the Shelby tubes from the boring, the soil samples were preserved using internal wax seals, capped at the ends and a wax seal was applied to the ends of the tubes. The samples were secured vertically and transported to the laboratory.

In-situ field vane shear testing was conducted at the location of 12 test borings. The vane shear testing equipment was supplied by the New England Boring Contractors (NEBC). The equipment and test procedures are described later in this report.

Rock core samples were obtained from boring OS-3 and OS-6 using a NX double-walled core barrel. Photographs of the bedrock are provided in Appendix E.

3.3.3 Supplemental Boring Program - 2021

The supplemental boring program consisted of the drilling of one test boring (OS-12) to provide additional data to complete the geotechnical analysis and provide final geotechnical design recommendations for an overhead sign near the Exit 36 SB Off-Ramp. The test boring was drilled by New England Boring Contractors of Derry, New Hampshire. Two field vane-shear tests were attempted but could not be advanced due to the stiffness of the soil.

The boring was drilled with an ATV-mounted Mobile B-57 drill rig equipped with 4-inch inside diameter flush-joint steel casing. The drill rig was equipped with a 140-pound automatic hammer for the SPT test (ASTM D1586). Based on a "SPT Energy Report" provided by NEBC, the automatic hammer on the B-57 ATV rig has an efficiency of 0.87, which results in an energy correction factor of 1.45. Therefore, the field blow counts were multiplied by a factor of 1.45 to determine the SPT N60.

Table 1 – Test Boring Summary

Boring	Ground Elev. (ft)	Station (ft)	Offset (ft)	Baseline	General Location
B-101	100.24	1709+41.93	122.56 LT	Maine Turnpike CL	Exit 35 SB On-Ramp
B-103	106.40	1715+76.23	207.33 LT	Maine Turnpike CL	Exit 35 SB On-Ramp
B-106	103.15	1722+42.83	131.14 LT	Maine Turnpike CL	Exit 35 SB Off-Ramp
B-109	98.05	1734+27.74	78.35 LT	Maine Turnpike CL	SB Mainline
B-111	99.86	1749+46.55	132.04 LT	Maine Turnpike CL	SB Mainline/Exit 36
B-112	116.83	625+70.84	34.20 RT	Exit 35 NB Plaza	Exit 35 NB Plaza
B-113	113.33	625+40.88	88.10 LT	Exit 35 NB Plaza	Exit 35 NB Plaza
B-201	102.31	204+98.20	102.00 RT	Exit 35 SB On Ramp	Exit 35 SB On-Ramp
B-202	103.54	212+22.95	52.21 RT	Exit 35 SB On Ramp	Exit 35 SB On-Ramp
B-203	103.80	215+50.74	40.10 LT	Exit 35 SB On Ramp	Exit 35 SB Plaza

Table 1 – Test Boring Summary (Continued)

Boring	Ground Elev. (ft)	Station (ft)	Offset (ft)	Baseline	General Location
B-204	113.05	1218+59.67	83.92 LT	Exit 35 SB On Ramp	Exit 35 SB Plaza
B-205	112.09	218+47.46	21.41 RT	Exit 35 SB On Ramp	Exit 35 SB On Ramp
B-206	104.52	321+25.07	1.29 LT	Exit 35 SB Off Ramp	Exit 35 SB Off Ramp
B-207	101.12	324+17.04	15.22 LT	Exit 35 SB Off Ramp	Exit 35 SB Off Ramp
B-208	95.48	2732+27.05	25.47 LT	SB C-D Roadway	SB Mainline
B-209	125.81	2744+56.29	51.31 LT	SB C-D Roadway	SB Mainline
B-210	125.95	2745+17.27	57.00 LT	SB C-D Roadway	SB Mainline
B-211	97.78	2750+79.61	26.69 LT	SB C-D Roadway	Exit 36 SB On Ramp
B-212	117.59	2765+18.39	24.44 LT	SB C-D Roadway	SB Mainline
B-213	107.96	413+51.80	10.38 RT	Exit 35 NB Off Ramp	Exit 35 NB Off Ramp
B-214	115.51	625+06.57	45.97 LT	Exit 35 NB Off Ramp	Exit 35 NB Off Ramp
B-215	109.78	208+81.61	125.25 LT	Exit 35 SB On Ramp	Exit 35 SB On Ramp
B-216	103.49	2737+90.55	135.20 LT	SB C-D Roadway	Old Exit 36 SB Off Ramp
B-217	111.60	2741+14.94	528.73	SB C-D Roadway	Old Exit 36 SB Off Ramp
OS-1	118.21	1669+74.65	3.89 RT	Maine Turnpike Centerline	NB Mainline
OS-2	114.60	1669+76.78	80.47 RT	Maine Turnpike Centerline	NB Mainline
OS-3	107.22	1718+48.03	94.55 RT	Maine Turnpike Centerline	NB Mainline
OS-4	98.36	1731+34.05	91.53	Maine Turnpike Centerline	NB Mainline
OS-5	98.18	325+19.32	25.58 LT	Exit 35 SB Off Ramp	Exit 35 SB Off Ramp
OS-6	97.00	325+44.43	34.78 RT	Exit 35 SB Off Ramp	Exit 35 SB Off Ramp
OS-7	-	-	-	-	Not Drilled Due to Access
OS-8	98.89	2728+75.83	19.57 RT	SB C-D Roadway	SB Mainline
OS-9	95.44	2740+54.13	39.56 LT	SB C-D Roadway	SB Mainline

Table 1 – Test Boring Summary (Continued)

Boring	Ground Elev. (ft)	Station (ft)	Offset (ft)	Baseline	General Location
OS-10	99.00	1740+50	82.00 LT	SB C-D Roadway	SB Mainline
OS-11	125.23	1789+68.87	123.27 LT	Maine Turnpike Centerline	SB Mainline
OS-12	120.0	1763+00	122.00 LT	Exit 36 SB Off-Ramp	Exit 36 SB Off-Ramp
MA-1	126.00	147+45.00	7.00 RT	State Route 112	SB Intersection
MA-2	122.70	147+36.00	35.00 LT	State Route 112	SB Intersection
MA-3	130.00	148+58.00	7.00 RT	State Route 112	SB Intersection
MA-4	113.25	165+65	50.00 RT	State Route 112	NB Intersection
MA-5	112.20	164+47.49	36.32 LT	State Route 112	NB Intersection
MA-6	113.75	165+64.98	31.85 LT	State Route 112	NB Intersection
P-1	116.00	622+05.00	59.00 LT	Exit 35 NB Plaza	Exit 35 NB On Ramp
P-2	115.00	621+00.00	53.00 LT	Exit 35 NB Plaza	Exit 35 NB On Ramp
P-3	107.75	414+07.00	59.00 LT	Exit 35 NB Off Ramp	Exit 35 NB Off Ramp
P-4	105.50	413+00.00	55.00 LT	Exit 35 NB Off Ramp	Exit 35 NB Off Ramp
P-5	120.50	614+88.00	44.00 RT	Exit 35 NB Plaza	Exit 35 NB On Ramp
P-6	116.50	506+61.00	50.00 LT	Exit 35 NB On Ramp	Exit 35 NB On Ramp
P-7	114.00	507+00.00	45.00 LT	Exit 35 NB On Ramp	Exit 35 NB On Ramp
P-8	109.50	507+77.00	45.00 LT	Exit 35 NB On Ramp	Exit 35 NB On Ramp

4.0 SUMMARIZED SUBSURFACE CONDITIONS

4.1 RESULTS OF BORING PROGRAM

The subsurface conditions encountered in the borings are based on widely spaced explorations and variations in conditions should be anticipated. In general, the test borings encountered embankment fill, a natural sand deposit (upper and lower), marine clay crust, soft marine clay, glacial till and bedrock. Bedrock was cored at borings B-103, B-112, OS-3 and OS-6. The soil samples were described in accordance with the modified Burmister system. A key for the Burmister system is provided with the boring logs in Appendix C and Appendix D. The subsurface conditions are typical of coastal Maine and are summarized in the following paragraphs.

4.1.1 Asphalt Pavement

A layer of asphalt pavement was encountered in borings B-209, B-210, OS-8, MA-1, MA-3, and MA-6. The thickness of pavement was 9 inches at OS-8 and 6 inches at all other locations.

4.1.2 Topsoil

Topsoil was encountered at borings B-202, B-203, B-204, B-205, B-207, B-211, B-212, B-213, B-216, B-217, OS-1, OS-2, OS-3, OS-4, OS-6, OS-9, OS-10, OS-11, OS-12, MA-4, and MA-5. Topsoil ranged in thickness from 1 to 6 inches.

4.1.3 Embankment Fill

Embankment fill was encountered at borings B-209, B-210, B-215, B-216, B-217, OS-1, OS-2, OS-3, OS-4, OS-5, OS-8, OS-10, MA-1, MA-2, MA-3, and MA-6. The thickness ranged from 0.5 to 26.5 feet. The embankment fill was generally described as light brown/gray, medium to fine sand, with varying lesser amounts of silt and fine gravel. The recorded N-values ranged from 3 to 120 blows per foot (bpf), indicating a very loose to very dense consistency.

4.1.4 Upper Sand Deposit

A natural sand deposit was encountered below the topsoil at borings B-109, B-111, B-202, B-203, B-204, B-205, B-206, B-207, B-209, B-210, B-211, B-212, B-213, B-214, B-215, OS-1, OS-2, OS-4, OS-5, OS-6, OS-9, OS-9, OS-10, OS-11, OS-12, MA-1, MA-2, MA-3, MA-4, MA-5, and MA-6. The upper sand deposit ranged in thickness from 1.7 to 25.4 feet. The deposit generally consisted of gray or brown, fine sand and silt. The recorded N-values ranged from WOH (weight of hammer) to 115 blows per foot (bpf), indicating a very loose to very dense consistency.

4.1.5 Marine Clay Deposit

A deposit of marine clay was encountered in borings B-101, B-103, B-106, B-109, B-111, B-112, B-113, B-201, B-203, B-204, B-205, B-206, B-207, B-208, B-209, B-210, B-211, B-212, B-213, B-214, B-215, B-216, OS-1, OS-2, OS-3, OS-4, OS-5, OS-6, OS-8, OS-9, OS-10, OS-12, MA-1, MA-2, MA-3, MA-4, MA-5, and MA-6. The clay deposit can be divided into a crust layer and an underlying soft layer, which is typical of the Presumpscot Formation. Within the project area the thickness of both layers varied significantly.

The crust layer was encountered at B-101, B-103, B-106, B-112, B-113, B-201, B-203, B-204, B-205, B-206, B-208, B-211, B-213, B-214, B-215, B-216, OS-2, OS-3, OS-4, OS-6, OS-8, OS-9, OS-12, MA-1, MA-2, MA-3, MA-4, MA-5, and MA-6. The crust did not appear to be present in borings B-109, B-111, B-207, B-209, B-210, B-212, OS-1, OS-5, or OS-10. When encountered, the crust ranged in thickness from 1.7 to 13 feet. The recorded N-values ranged from 3 to 39 bpf, indicating a soft to hard consistency. The crust was generally described as gray silty clay.

Below the crust layer was a soft layer in borings B-101, B-103, B-109, B-111, B-201, B-203, B-204, B-205, B-206, B-207, B-208, B-209, B-210, B-211, B-212, B-216, OS-1, OS-2, OS-4, OS-5, OS-6, OS-8, OS-9, OS-10, OS-12, MA-1, MA-2, MA-3, MA-4, MA-5, and MA-6. The soft clay was not encountered in borings B-106, B-112, B-113, B-213, B-214, B-215, or OS-3. When fully penetrated, the soft layer ranged in thickness from 3 to 129 feet. Boring B-111 penetrated 53.5 feet into the soft clay without fully penetrating the deposit. The recorded N-values ranged from 2 to 5 bpf, however the vast majority of the clay was either, weight of hammer (WOH) or weight of rods (WOR) indicating a very soft consistency. Based on the historic borings from the I-195 bridge, the soft clay is about 130 feet thick in the area of the bridge.

4.1.6 Lower Sand Deposit

A lower sand deposit below the marine clay deposit was encountered in borings B-106, B-109, B-203, B-204, B-205, B-207, B-208, B-210, B-213, B-215, OS-4, OS-5, OS-6, OS-8, and MA-5. This lower sand layer was 3 to 13.5 feet thick. The deposit generally consisted of gray, coarse to fine sand and silt with and little fine gravel. The recorded N-values ranged from WOH to 39 bpf, indicating a very loose to dense consistency.

4.1.7 Glacial Till

Glacial till was encountered in borings B-101, B-103, B-106, B-112, B-113, B-202, B-203, B-204, B-205, B-206, B-214, OS-3, and OS-11. When fully penetrated the till ranged in thickness from 2 to 16.8 feet. The layer was described as gray, coarse to fine sand, some fine gravel, some silt. Blow counts of the till ranged from 10 to 88 bpf which indicates a medium dense to very dense consistency. The majority of the glacial till is classified as having a very dense consistency.

4.1.8 Bedrock

Based on drilling resistance and coring, bedrock was encountered at each location except borings B-101 and B-111 during the preliminary program. During the final program, bedrock was encountered at borings B-201, B-203, B-207, B-208, B-213, B-214, OS-1, OS-2, OS-3, OS-4, OS-5, OS-6, OS-8, OS-10, MA-4, MA-5, MA-6, and ledge probes P-1 through P-6. Depth to top of bedrock ranged from 5.5 to 127.0 feet below the ground surface. Bedrock samples were obtained using a NX type core barrel. At borings B-103 and B-112 two five-foot core runs were performed, at OS-3 one five-foot core run was made, and at OS-6 four five-foot core runs were performed. Where bedrock was not cored, the bedrock surface was inferred by split spoon refusal and/or roller bit refusal. Where shallow refusal occurred, such as at boring B-112, the boring was offset approximately 5 feet from the original location and probed with an auger to confirm the refusal was on bedrock. Bedrock depths and how it was determined are provided in Table 2 below. The bedrock was described as hard, fresh, gray, fine grained, gray to black, phyllite with joints that are low angle to moderately dipping, close to moderately spaced and closed.

The recovered rock core runs were measured for percent recovery and rock quality designation (RQD). The recovery for the core runs ranged from 20 to 97 percent. RQD is a rough measure of the degree of jointing or fracture in a rock mass, measured as a percentage of the drill core run. High-quality rock has an RQD of more than 75%; lower quality rock has an RQD of less than 50%. The RQD of the recovered bedrock cores ranged between 0% to 88% percent, indicating poor to good rock mass. Photos of the rock cores are included in Appendix E.

Table 2 – Bedrock Depth and Elevation

Boring	General Location	Ground Elev. (ft)	Top of Bedrock		Cored or Refusal	RQD (%)
			Depth (ft)	Elev. (ft)		
B-101	Exit 35 SB On-Ramp	100.24	--	--	No refusal	--
B-103	Exit 35 SB On-Ramp	106.40	40.3	66.1	Cored	87 and 63
B-106	Exit 35 SB Off-Ramp	103.15	25.0	78.2	Refusal	--
B-109	SB Mainline	98.05	45.0	53.1	Refusal	--
B-111	SB Mainline/Exit 36	99.86	--	--	No refusal	--
B-112	Exit 35 NB Plaza	116.83	10.3	106.5	Cored	35 and 88
B-113	Exit 35 NB Plaza	113.33	6.0	107.3	Refusal	--
B-201	Exit 35 SB On-Ramp	102.31	28.0	74.3	Refusal	--
B-202	Exit 35 SB On-Ramp	103.54	--	--	No refusal	--
B-203	Exit 35 SB Plaza	103.80	40.0	59.8	Refusal	--

Table 2 – Bedrock Depth and Elevation (continued)

Boring	General Location	Ground Elev. (ft)	Top of Bedrock		Cored or Refusal	RQD (%)
			Depth (ft)	Elev. (ft)		
B-204	Exit 35 SB Plaza	113.05	--	--	No refusal	--
B-205	Exit 35 SB On Ramp	112.09	--	--	No refusal	--
B-206	Exit 35 SB Off Ramp	104.52	--	--	No refusal	--
B-207	Exit 35 SB Off Ramp	101.12	24.0	77.1	Refusal	--
B-208	SB Mainline	95.48	30.0	65.5	Refusal	--
B-209	SB Mainline	125.81	--	--	No refusal	--
B-210	SB Mainline	125.95	--	--	No refusal	--
B-211	Exit 36 SB On Ramp	97.78	--	--	No refusal	--
B-212	SB Mainline	117.59	--	--	No refusal	--
B-213	Exit 35 NB Off Ramp	107.96	16.0	92.0	Refusal	--
B-214	Exit 35 NB Plaza	115.51	12.0	103.5	Refusal	--
B-215	Exit 35 SB On Ramp	109.78	--	--	No refusal	--
B-216	Old Exit 36 SB Off Ramp	103.49	--	--	No refusal	--
B-217	Old Exit 36 SB Off Ramp	111.60	--	--	No refusal	--
OS-1	NB Mainline	118.21	62.0	56.2	Refusal	--
OS-2	NB Mainline	114.60	106.0	8.6	Refusal	--
OS-3	NB Mainline	107.22	14.0	93.2	Cored	0
OS-4	NB Mainline	98.36	35.0	63.4	Refusal	--
OS-5	Exit 35 SB Off Ramp	98.18	37.2	61.0	Refusal	--
OS-6	Exit 35 SB Off Ramp	97.00	40.0	57.0	Cored	10, 0, 0, and 13
OS-7	Not Drilled	--	--	--	--	--
OS-8	SB Mainline	98.89	28.0	70.9	Refusal	--
OS-9	SB Mainline	95.44	--	--	No refusal	--

Table 2 – Bedrock Depth and Elevation (continued)

Boring	General Location	Ground Elev. (ft)	Top of Bedrock		Cored or Refusal	RQD (%)
			Depth (ft)	Elev. (ft)		
OS-9	SB Mainline	95.44	--	--	No refusal	--
OS-10	SB Mainline	99.00	127.0	-28.0	Refusal	--
OS-11	SB Mainline	125.23	--	--	No refusal	--
OS-12	Exit 36 SB Off-Ramp	120.0	--	--	No refusal	--
MA-1	SB Intersection	126.00	--	--	No refusal	--
MA-2	SB Intersection	122.70	--	--	No refusal	--
MA-3	SB Intersection	130.00	--	--	No refusal	--
MA-4	NB Intersection	113.25	23.0	90.3	Refusal	--
MA-5	NB Intersection	112.20	22.0	90.2	Refusal	--
MA-6	NB Intersection	113.75	19.0	94.8	Refusal	--
P-1	Exit 35 NB Plaza	116.00	5.5	110.5	Refusal	--
P-2	Exit 35 NB Plaza	115.00	17.5	97.5	Refusal	--
P-3	Exit 35 NB Off Ramp	107.75	11.0	96.8	Refusal	--
P-4	Exit 35 NB Off Ramp	105.50	14.0	91.5	Refusal	--
P-5	Exit 35 NB Plaza	120.50	15.0	105.5	Refusal	--
P-6	Exit 35 NB On Ramp	116.50	9.5	107.0	Refusal	--
P-7	Exit 35 NB On Ramp	114.00	--	--	No refusal	--
P-8	Exit 35 NB On Ramp	109.50	--	--	No refusal	--

4.2 GROUNDWATER

Groundwater levels were obtained from the boreholes at the time of drilling. In general, the water levels are expected to be relatively shallow and coincide with the water level in the wetland. Groundwater will vary over time due to seasonal changes in precipitation and temperature, snowmelt, and surrounding and on-site drainage characteristics.

4.3 FIELD VANE SHEAR TESTING

During the preliminary and final boring programs, a total of 46 in-situ field vane shear tests were conducted at 14 borings. The vane shear testing equipment was supplied by the Hermon office of NEBC and consisted of a vane with a diameter of 2.56 inches (65 mm) and a height of 5.12 inches (130 mm). The rod connected to the vanes had a diameter of 3/8 inch and the lightweight rods used to lower the vane into the borehole had a diameter of ½ inch. A torque wrench capable of measuring foot-pounds was used. The field testing and data reduction was performed in general accordance with ASTM D2573/D2573M-13. The raw torque reading, and the calculated undrained shear strength are recorded on the boring logs for the undisturbed and remolded tests. The undrained shear strength includes a vane correction factor in accordance with the Appendix of ASTM D2573/D2573M-13. The results are summarized in the table below.

Table 3 – Results of Field Vane Shear Testing

Boring No.	Test No.	Depth (feet)	Elevation (feet)	Undrained Shear Strength (psf)	
				Undisturbed	Remolded
B-109	V-1	35.6 – 36.0	62.5 – 62.1	552	0
	V-2	36.6 – 37.0	61.5 – 61.1	504	24
B-111	V-1	42.6 – 43.0	57.3 – 56.9	636	216
	V-2	43.6 – 44.0	56.3 – 55.9	563	168
	V-3	52.6 – 53.0	47.3 – 46.9	451	72
	V-4	53.6 – 54.0	46.3 – 45.9	451	72
	V-5	60.6 – 61.0	39.3 – 38.9	546	96
	V-6	61.6 – 62.0	38.3 – 37.9	498	96
B-205	V-1	12.6 – 13.0	99.5 – 99.1	587	162
	V-2	13.0 – 13.0	99.1 – 99.1	--	--

Table 3 – Results of Field Vane Shear Testing (Continued)

Boring No.	Test No.	Depth (feet)	Elevation (feet)	Undrained Shear Strength (psf)	
				Undisturbed	Remolded
B-207	V-1	11.6 – 12.0	89.5 – 89.1	242	23
	V-2	12.6 – 13.0	88.5 – 88.1	438	92
B-208	V-1	14.0 – 14.4	81.5 – 81.1	331	10
	V-2	14.5 – 14.9	81.0 – 80.6	360	29
	V-3	20.0 – 20.4	75.5 – 75.1	391	19
	V-4	20.5 – 20.9	75.0 – 74.6	550	98
B-209	V-1	55.0 – 55.4	70.8 – 70.4	685	99
	V-2	55.5 – 55.5	70.3	--	--
B-210	V-1	55.6 – 56.0	70.4 – 70.0	586	293
	V-2	56.6 – 57.0	69.4 – 69.0	586	293
	V-3	62.6 – 63.0	63.4– 63.0	488	195
	V-4	63.6 – 64.0	62.4 – 62.0	586	244
B-211	V-1	25.6 – 26.0	72.2 – 71.8	586	147
	V-2	26.6 – 27.0	71.2 – 70.8	586	195
	V-3	35.6 – 36.0	62.2 – 61.8	488	99
	V-4	36.6 – 37.0	61.2 – 60.8	537	147
	V-5	45.6 – 46.0	52.2 – 51.8	546	195
	V-6	46.6 – 47.0	51.2 – 50.8	568	244

Table 3 – Results of Field Vane Shear Testing (Continued)

Boring No.	Test No.	Depth (feet)	Elevation (feet)	Undrained Shear Strength (psf)	
				Undisturbed	Remolded
MA-5	V-1	13.6 – 14.0	98.6 – 98.2	704	119
	V-2	14.6 – 15.0	97.6 – 97.2	1002	262
OS-1	V-1	16.6 – 17.0	101.6 – 101.2	795	198
	V-2	17.6 – 18.0	100.6 – 100.2	795	298
	V-3	22.0 – 22.4	96.2 – 95.8	--	--
OS-4	V-1	15.6 – 16.0	82.8 – 82.4	795	155
	V-2	16.6 – 17.0	81.8 – 81.4	795	155
	V-3	20.6 – 21.0	77.8 – 77.4	496	48
	V-4	21.6 – 22.0	76.8 – 76.4	496	48
OS-6	V-1	10.6 – 11.0	86.4 – 86.0	227	24
	V-2	11.6 – 12.0	85.4 – 85.0	406	48
	V-3	15.6 – 16.0	81.4 – 81.0	416	48
	V-4	16.6 – 17.0	80.4 – 80.0	538	81
OS-8	V-1	13.6 – 14.0	85.3 – 84.9	502	101
	V-2	14.6 – 15.0	84.3 – 83.9	502	101
	V-3	20.6 – 21.0	78.3 – 77.9	507	85
	V-4	21.6 – 22.0	77.3 – 76.9	556	97
OS-10	V-1	25.6 – 26.0	73.4 – 73.0	684	215
	V-2	26.6 – 27.0	72.4 – 72.0	810	253

4.4 MUCK PROBES

In areas where roadway embankment fill will be placed through wetlands, muck probes were conducted using a hand auger to estimate the thickness of organic soil. A table with the locations and thickness is provided below.

Table 4 – Summary of Muck Probes

Station	Offset	Baseline	Muck Thickness (feet)
410+50	90 RT	Exit 35 NB Off Ramp	1.5
411+10	70 RT	Exit 35 NB Off Ramp	1.5
411+40	90 RT	Exit 35 NB Off Ramp	2.0
411+80	45 RT	Exit 35 NB Off Ramp	1.5
411+90	95 RT	Exit 35 NB Off Ramp	2.0
412+30	75 RT	Exit 35 NB Off Ramp	1.5
412+90	100 RT	Exit 35 NB Off Ramp	1.5
211+40	25 RT	Exit 35 SB On Ramp	1.0
211+80	55 RT	Exit 35 SB On Ramp	1.5
211+85	25 RT	Exit 35 SB On Ramp	1.0
326+00	25 LT	Exit 35 SB Off Ramp	1.0
326+15	15 RT	Exit 35 SB Off Ramp	1.0
326+95	5 LT	Exit 35 SB Off Ramp	1.5
327+65	10 LT	Exit 35 SB Off Ramp	2.0
2728+80	30 LT	SB C-D Roadway	2.0
2729+75	30 LT	SB C-D Roadway	2.0
2730+80	30 LT	SB C-D Roadway	1.5
2731+75	25 LT	SB C-D Roadway	1.5
2732+60	35 LT	SB C-D Roadway	1.0

5.0 LABORATORY TESTING

Laboratory tests were conducted on soil samples obtained from the test borings to assist in classification and to evaluate engineering properties. Soil testing consisted of grain size distribution, Atterberg limits, moisture content, consolidation, consolidated undrained triaxial (ASTM D4767) and bedrock compression strength. Laboratory testing was conducted by GeoTesting Express of Acton, MA. Results of the soil tests are included in Appendix F and are summarized in the table below.

Table 5 - Soil Grain Size Distribution and Moisture Content Testing Summary

Boring No.	Sample No.	Depth (feet)	Elevation (feet)	Soil Description	MC (%)	Gravel (%)	Sand (%)	Fines (%)
B-103	S-6	25 - 27	75.2 – 73.2	Glacial Till Coarse to fine Sand, some gravel fine Gravel, some Silt.	11.2	22.9	49.0	28.1
B-106	S-4	15 - 17	88.2 – 86.2	Lower Sand Deposit Coarse to fine Sand and Silt, little fine Gravel.	11.1	11.6	44.2	44.2
B-109	S-1	2 – 4	96.1 – 94.1	Upper Sand Deposit Fine Sand and Silt.	23.8	0	54.3	45.7
B-111	S-3	10 – 12	89.9 – 87.9	Upper Sand Deposit Fine Sand and Silt.	26.8	0.1	59.8	40.1
B-113	S-2	5 – 6	108.3 – 107.3	Glacial Till Coarse to fine Sand and Silt, trace fine Gravel	13.7	5.6	48.4	46.0
B-209	S-4	12 - 14	113.8 – 111.8	Embankment Fill Medium to fine Sand, some Silt, trace coarse to fine Gravel	11.0	7.6	69.1	23.3
B-209	S-6	17 - 19	108.8 – 106.8	Embankment Fill Fine Sand, little Silt, trace fine Gravel	10.4	0.7	81.0	18.3
B-209	S-9	25 - 27	100.8 – 98.8	Embankment Fill Medium to fine Sand, little Silt, trace fine Gravel.	4.7	7.9	81.0	11.1
B-209	S-11	35 - 37	90.8 – 88.8	Upper Sand Deposit Fine Sand, some Silt	23.1	0.0	75.2	24.8
B-209	S-13	45 - 47	80.8 - 78.8	Upper Sand Deposit Fine Sand, some Silt	24.5	0.0	75.2	24.8

Table 5 - Soil Grain Size Distribution and Moisture Content Testing Summary (Continued)

Boring No.	Sample No.	Depth (feet)	Elevation (feet)	Soil Description	MC (%)	Gravel (%)	Sand (%)	Fines (%)
B-210	S-3	5 - 7	121.0 – 119.0	Embankment Fill Medium to fine Sand, some Silt, trace fine Gravel	10.8	0.3	77.8	21.9
B-210	S-7	15 - 17	111.0 – 109.0	Embankment Fill Medium to fine Sand, some Silt, trace fine Gravel	15.0	0.1	68.2	31.7

B-210	S-10	22 - 24	104.0 – 102.0	Embankment Fill Medium to fine Sand, some Silt, trace fine Gravel	14.2	6.5	72.1	21.4
B-210	S-12	30 - 32	96.0 – 94.0	Upper Sand Deposit Fine Sand and Silt	26.3	0.0	46.8	53.2
B-210	S-14	40 - 42	86.0 84.0	Upper Sand Deposit Fine Sand, some Silt	29.3	0.0	77.0	23.0
B-215	S-1	0 -2	109.8 – 107.8	Embankment Fill Medium to fine Sand, little Silt, trace fine Gravel	17.5	9.3	75.7	15.0
B-215	S-2B	3 - 4	106.8 – 105.8	Embankment Fill Medium to fine Sand, trace Silt, trace fine Gravel	21.9	0.5	90.2	9.3
B-215	S-4A	6 – 7	103.8 – 102.8	Embankment Fill Coarse to fine Sand, little Silt, trace fine Gravel	25.0	0.9	88.7	10.4
B-216	S-1	0 - 2	103.5 – 101.5	Embankment Fill Fine Sand and Silt	26.3	0.0	36.8	63.2
B-216	S-3	4 – 6	99.5 – 97.5	Embankment Fill Silt, trace fine Sand	29.1	0.0	7.8	92.2
B-217	S-2	2 – 4	109.6 – 107.6	Embankment Fill Medium to fine Sand and Silt, trace coarse to fine Gravel	10.5	0.2	64.4	35.4
B-217	S-4B	7.5 – 8	104.1 – 103.6	Embankment Fill Medium to fine Sand, little Silt, trace coarse to fine Gravel	8.0	4.0	81.2	14.8
B-217	S-6	10 - 11	101.6 – 100.6	Embankment Fill Fine Sand, some Silt, trace fine Gravel	15.4	0.6	76.8	22.6

Table 6 – Atterberg Limit Summary

Boring No.	Sample No.	Depth (feet)	Elevation (feet)	Soil Description	MC (%)	LL (%)	PL (%)	PI (%)
B-101	S-1	5 - 7	95.2 – 93.2	Marine Clay Deposit Silty Clay	33	47	25	22
B-103	S-2	5 - 7	101.4 – 99.4	Marine Clay Deposit Silty Clay	32	41	21	20

B-103	U-1	15 - 17	91.4 – 89.4	Marine Clay Deposit Silty Clay	36	36	21	15
B-106	U-1	10 - 12	93.2 – 91.2	Lower Sand Deposit Silty fine sand	18	Non-Plastic		
B-109	S-1	10 - 12	88.1 – 86.1	Marine Clay Deposit Silty Clay	38	34	20	14
B-109	S-6	25 - 27	73.1 – 71.1	Marine Clay Deposit Silty Clay	42	43	23	20
B-109	U-1	30 - 32	68.1 – 66.1	Marine Clay Deposit Silty Clay	41	39	20	19
B-109	U-2	40 - 42	58.1 – 56.1	Marine Clay Deposit Silty Clay	22	19	13	6
B-111	U-1	30-32	69.9 – 67.9	Marine Clay Deposit Silty Clay	26	31	19	12
B-111	U-2	40-42	59.9 – 57.9	Marine Clay Deposit Silty Clay	29	36	20	16
B-111	U-3	50-52	49.9 – 47.9	Marine Clay Deposit Silty Clay	38	43	22	21
B-201	S-7	15 – 17	87.3 – 85.3	Marine Clay Deposit Silty Clay	31	32	18	14
B-203	U-1	12 - 14	91.8 – 89.8	Marine Clay Deposit Silty Clay	36	28	16	12
B-205	U-1	17 - 19	95.1 – 93.1	Marine Clay Deposit Silty Clay	31	30	17	13
B-206	U-1	12 - 14	92.5 – 90.5	Marine Clay Deposit Silty Clay	33	30	16	14
B-207	U-1	13 - 15	88.1 – 86.1	Marine Clay Deposit Silty Clay	44	47	21	26
B-208	U-1	10 – 12	85.5 – 83.5	Marine Clay Deposit Silty Clay	44	39	20	19

Table 6 – Atterberg Limit Summary (Continued)

Boring No.	Sample No.	Depth (feet)	Elevation (feet)	Soil Description	MC (%)	LL (%)	PL (%)	PI (%)
B-209	U-1	90 - 92	35.8 – 33.5	Marine Clay Deposit Silty Clay	40	47	23	24
B-210	U-1	65-67	61.0 – 58.0	Marine Clay Deposit Silty Clay	25	34	18	16

B-211	U-1	62 -64	35.8 – 33.8	Marine Clay Deposit Silty Clay	42	45	22	23
B-211	U-2	70 - 72	27.8 – 25.8	Marine Clay Deposit Silty Clay	39	36	18	18
B-212	S-10	29 - 31	88.6 – 86.6	Marine Clay Deposit Silty Clay	22	19	15	4
B-215	S-3A	4 - 5	105.8 – 104.8	Marine Clay Deposit Silty Clay	16	23	16	7
B-215	S-5A	8 - 9	101.8 – 100.8	Marine Clay Deposit Silty Clay	22	32	18	14
OS-4	S-7	15 - 17	83.4 – 81.4	Marine Clay Deposit Silty Clay	42	39	19	20
OS-5	U-1	17 - 19	81.2 – 79.2	Marine Clay Deposit Silty Clay	24	Non-Plastic		
OS-6	S-6	10 – 12	87.0 – 85.0	Marine Clay Deposit Silty Clay	43	42	22	20
OS-6	S-7	15 – 17	82.0 – 80.0	Marine Clay Deposit Silty Clay	40	38	22	16
OS-8	S-7	13 - 15	85.9 – 83.9	Marine Clay Deposit Silty Clay	41	47	21	26
OS-8	S-9	20 – 22	78.9 – 76.9	Marine Clay Deposit Silty Clay	35	38	20	18
OS-10	S-9	25 – 27	74.0 – 72.0	Marine Clay Deposit Silty Clay	31	31	20	11
MA-5	S-6	13 - 15	100.8 – 98.8	Marine Clay Deposit Silty Clay	25	28	15	13

Where: MC = Moisture Content PL = Plastic Limit
PI = Plasticity Index LL = Liquid Limit

Table 7 – Laboratory Consolidation Undrained Triaxial Test

Boring No.	Sample No.	Depth (feet)	Elevation (feet)	Soil Description	Effective Friction Angle (degrees)	Effective Cohesion (psf)
B-203	U-1	12 - 14	91.8 – 89.8	Marine Clay Deposit Silty Clay	31	134
B-208	U-2	18 - 20	77.5 – 75.5	Marine Clay Deposit Silty Clay	29	284

Table 8 – Consolidation Test Summary

Boring No.	Sample No.	Depth (feet)	Elevation (feet)	Void Ratio e_o	CR	RR	Max Past Pressure (psf)	OCR
B-103	U-1	15 - 17	91.4 – 89.4	0.83	0.11	0.015	2,600	2.4
B-106(1)	U-1	10 - 12	93.2 – 91.2	0.63	0.043	0.005	9,000	-
B-109	U-1	30 - 32	68.1 – 66.1	1.25	0.20	0.028	3,400	1.8
B-109	U-2	40 - 42	58.1 – 56.1	0.93	0.16	0.016	3,600	1.5
B-111	U-1	30 - 32	69.9 – 67.9	0.72	0.10	0.013	2,500	1.2
B-111	U-2	40 - 42	59.9 – 57.9	0.75	0.10	0.012	2,800	1.1
B-111	U-3	50 - 52	49.9 – 47.9	1.04	0.16	0.022	3,000	1.0
B-203	U-1	12 – 14	91.8 – 89.8	1.09	0.17	0.023	2,400	2.8
B-205	U-1	17 – 19	95.1 – 93.1	0.84	0.16	0.041	3,200	1.7
B-206	U-1	12 - 14	90.5 – 92.5	1.08	0.21	0.024	3,400	3.4
B-207	U-1	13 – 15	88.1 – 86.1	1.22	0.22	0.031	3,200	2.9
B-208	U-1	10 – 12	85.5 – 83.5	1.21	0.21	0.028	2,600	4.2
B-208	U-2	18 – 20	77.5 – 75.5	0.98	0.18	0.026	3,400	3.3
B-211	U-1	62 – 64	35.8 – 33.8	1.23	0.22	0.030	3,400	1.0
B-211(2)	U-2	70 – 72	27.8 – 25.8	1.05	0.34	0.023	12,200	-
OS-5(1)	U-1	17 - 19	81.2 – 79.2	0.83	-	-	-	-

(1) Sample was determined to be non-plastic; consolidation test was completed. Data should be used with caution.
(2) The high max pressure is not consistent with the soft nature of the clay deposit. The laboratory test result may not valid, or the material tested is not representative of soft clay deposit.
(3) CR = Compression ratio, RR = Recompression ratio, e_o = Initial void ratio

Table 9 – Bedrock Test Result Summary

Boring No.	Core No.	Depth (feet)	Elevation (feet)	Bulk Density (lb/ft^3)	Compressive Strength (lb/in^2)	Failure Type
B-103	C-2	10 - 12	96.4 - 94.4	175	3,972	Intact
B-112	C-1	15 - 17	101.8 - 99.8	167	4,466	Discontinuity

6.0 GENERAL SOIL PROFILE AND SOIL PROPERTIES

6.1 GENERAL SOIL PROFILES

The soil profile varies significantly across the project site. Geologic profiles have been created for the Exit 35 southbound on ramp and Exit 35 southbound off ramps and are shown in Figure 10 and Figure 11, respectively. A general discussion of each project area is provided below.

6.1.1 Collector/Distributor Roadway

The alignment of the collector/distributor roadway is underlain by embankment fill associated with the existing roadway, upper sand deposit, marine clay, lower sand deposit and bedrock. The marine clay ranges in thickness from approximately 17.5 to 37 feet. The upper portion of the clay is the stiff crust. The bedrock was encountered at depths ranging from approximately 28 to 45 feet.

6.1.2 Exit 35 SB On Ramp

The ramp is underlain by the upper sand deposit, marine clay, lower sand deposit, glacial till and bedrock. The marine clay ranges in thickness from approximately 16 to 28 feet. The upper portion of the clay is the stiff crust. The bedrock, when encountered, ranged from 28 to 40 feet below the exiting ground surface.

6.1.3 Exit 35 SB Off Ramp

The ramp is underlain by the upper sand deposit, marine clay, lower sand deposit, glacial till and bedrock. The marine clay ranges in thickness from approximately 11.5 to 19.5 feet. The crust layer in this area appears to be very thin. The bedrock, when encountered, ranged from 24 to 37 feet below the existing ground surface.

6.1.4 Exit 35 NB On/Off Ramp

This area of the project is generally underlain by a deposit of upper sand, marine clay crust, lower sand, glacial till and bedrock. The soft marine clay was not encountered in the borings drilled in this area. The bedrock was encountered at depths ranging from approximately 6 to 16 feet in the test borings. A series of ledge probes encountered the bedrock at depths ranging from 5.5 to 17.5 feet. Bedrock outcrops are exposed at the ground surface in the area of the off ramp.

6.1.5 Exit 36 and I-195 Bridge

Based on the recent test borings and the historic borings from the design of the existing bridge. There is approximately 27 feet of existing embankment fill below the west bridge abutment. The natural soils consist of the upper sand deposit, marine clay and lower sand deposit. The upper sand deposit ranges in thickness from 23 to 25 feet. The marine clay is on the order of 125 feet thick. Bedrock was cored at a depth of approximately 175 feet below the surface of the southbound lanes of the turnpike.

6.2 SOIL PROPERTIES

The properties provided below are based the subsurface information collected from the test borings, laboratory test data and engineering judgement.

Table 10 – Summary of Soil Strength Parameters

Soil Stratum	Unit Weight (lb/ft^3)	Drained Condition		Undrained Condition	
		Effective Friction Angle (degrees)	Cohesion (psf)	Effective Friction Angle (degrees)	Cohesion (psf)
Proposed Embankment Fill	125	34	0	34	0
Existing Embankment Fill	125	34	0	34	0
Upper Sand Layer	120	31 - 32	0	31 - 32	0
Marine Clay – Crust	120	30	0	0	1,000 to 2,000
Marine Clay - Soft	115	30	0	0	400 to 800(1)
Lower Sand Layer	120	30	0	30	0
Glacial Till	135	36 to 38	0	36 to 38	0

Notes: (1) Based on field vane shear test and depends on location and depth.

Table 11 – Summary Consolidation Parameters

Soil Stratum	Compression Ratio - CR	Recompression Ratio - RR	Secondary Compression Index - Cα	Coefficient of Consolidation - Cv (ft^2/day)
Marine Clay – Crust	0.17	0.024	0.010	0.12
Marine Clay - Soft	0.17	0.024	0.010	0.12

7.0 DISCUSSION AND RECOMMENDATIONS

Geotechnical recommendations are based on the plans prepared by Stantec for the 98% submission and the preliminary and final boring programs. For the administration buildings the recommendations are provided using the IBC code. For the tolling facilities and roadways, the design parameters are provided in accordance with the AASHTO LRFD code. The recommendations for the various structures and roadway elements are broken down into areas listed below.

ROADWAY EMBANKMENTS

- Collector/Distributor Roadway
- Exit 35 South Bound On Ramp
- Exit 35 South Bound Off Ramp
- Exit 35 North Bound Plaza and On Ramp
- Exit 35 North Bound Off Ramp

GOOSEFARE BROOK RETAINING WALL

I-195 SOIL NAIL WALL

TOLL ADMINISTRATION BUILDINGS

- Exit 35 SB On-Ramp
- Exit 35 NB On/Off Ramp

TOLLING FACILITIES

- Exit 35 SB On Ramp
- Exit 35 SB Off Ramp (Exit Toll Point)
- Exit 35 NB On/Off Ramp

OVERHEAD SIGN STRUCTURES

TRAFFIC SIGNALS

- Exit 35 SB Ramps and Route 112 Intersection
- Lund Road and Route 112 Intersection

7.1 ROADWAY EMBANKMENTS

The proposed roadway embankments were evaluated for stability and settlement. The stability of the proposed embankments was analyzed using the computer program Slope/W which is part of the GeoStudio suite of programs. Based on AASHTO criteria, slopes that support a structure (bridge or building) require a factor of safety greater than 1.5. Slopes that do not support a structure require a factor of safety of greater than 1.3. Slope stability analyses were conducted as various locations throughout the project area. The stability and settlement calculations are presented in Appendix G.

7.1.1 Collector/Distributor Roadway

A Collector/Distributor (C/D) road will be constructed along the west side of the existing south bound lanes. The C/D roadway will start north of the existing Exit 36 interchange and will terminate south of the proposed Exit 35 interchange. The roadway will consist of two 12-foot-wide lanes and two 6-foot-wide shoulders for a total width of 36 feet. The outboard side slope will have a grade ranging from 6H:1V to 2H:1V. The fill height will range from approximately 3 to 5 feet. The roadway between Sta. 2728+00 and 2733+00 will be constructed in the wetland area that runs along the west side of the project. Based on borings OS-8 and B-208 which were drilled at Sta. 2728+75.83 and Sta. 2732+27.05 respectively, the area is underlain by approximately 22 feet of marine clay. The upper 5 to 8 feet of the clay is the stiff crust.

7.1.1.1 Embankment Slope Stability

A global stability analysis was conducted at Sta 2729+00 and Sta. 2732+50. The analysis indicates the underlying soils are capable of supporting the embankment. The resulting factor of safety was greater than 1.3 for both the short term (undrained) and long-term (drained) conditions. The results are summarized in the table below.

Table 12 – C/D Roadway Slope Stability Summary

Location	Baseline	Factor of Safety		Target Factor of Safety
		Undrained	Drained	
Sta. 2729+00	C/D Roadway	5.1	1.5	1.3
Sta. 2732+50	C/D Roadway	2.6	2.0	1.3

7.1.1.2 Embankment Settlement

A settlement analysis was also conducted at Sta. 2729+00 and Sta. 2732+50. The settlement was based on the soil properties obtained from the borings drilled in the area and the proposed roadway geometry. The settlement was evaluated at four locations across the roadway. The table below presents a summary of the settlement and the expected time for the primary and secondary settlement to occur. The secondary settlement is expected to continue over a long duration. The table provides the estimated settlement for a 20-year period.

Table 13 – C/D Roadway Settlement Summary

Location	Primary Settlement		Secondary	
	Magnitude (Inches)	Duration (Years)	Magnitude (Inches)	Duration (Years)
Edge of proposed pavement	1.4 to 1.8	2	1.2	20
Center of C/D lanes	1.7 to 2.0	2	1.2	20
Median between C/D and mainline	0.8 to 1.0	2	1.2	20
Center of west most mainline lane	0.08 to 0.10	2	1.2	20

As indicated in the table, the primary settlement will occur over a period of approximately 2 years and the secondary settlement will occur over a period of 20 years. We anticipate the settlement can be managed with shimming the pavement as needed to maintain the desired grade and pitch.

7.1.2 Exit 35 South Bound On Ramp

The ramp will start at Route 112 and terminate at approximately Sta. 1698+00 (Turnpike Centerline). The ramp will have 2H:1V side slopes and will require up to approximately 15 feet of fill. The toll plaza will consist of three entry lanes on a cash slab and an administration building. A geologic profile of this area is shown in Figure 10.

7.1.2.1 Embankment Slope Stability

A global stability analysis was conducted at Sta. 215+50 and 217+50. The proposed embankment is approximately 15 feet high with side slopes of 2H:1V. The proposed ramp location is underlain by approximately sand, stiff clay, soft clay, glacial till and bedrock. The analysis indicated that the underlaying soils are capable of supporting the full height of the embankment. The resulting ramp embankment slope stability factor of safety was greater than 1.3 for both the short term and long-term conditions.

Table 14 – Exit 35 SB On Ramp Slope Stability Summary

Location	Baseline	Factor of Safety		Target Factor of Safety
		Undrained	Drained	
Sta. 215+50	Exit 35 SB On Ramp	1.7	1.6	1.3
Sta. 217+50	Exit 35 SB On Ramp	1.3	1.5	1.3

7.1.2.2 Embankment Settlement

A settlement analysis was conducted at Sta. 215+50 and Sta. 217+50. The settlement was based on the soil properties obtained from borings drilled in the area and the proposed embankment fill height and width. The table below presents a summary of the settlement and the expected time for the primary and secondary settlement to occur. The secondary settlement is expected to continue over a long duration. The Summary Table below provides the estimated settlement for a 20-year period.

Table 15 – Exit 35 SB ON Ramp Settlement Summary

Location	Primary Settlement		Secondary	
	Magnitude (Inches)	Duration (Years)	Magnitude (Inches)	Duration (Years)
Sta. 215+50	3.2 to 4.0	2	1.4	20
Sta. 217+50	2.0 to 3.0	1 to 3	1.3	20

The 3 to 4 inches of settlement is expected to be too large for the proposed administration building and tolling equipment. Therefore, the building and tolling facility should be supported on a pile foundation as described later in this report. Since the proposed buildings and tolling facilities will be pile supported, the surrounding ground surface will settle around the pile supported structures. To reduce the differential settlement between the pile supported structures and the surrounding ground surface we recommend the site be preloaded. Additionally, wick drains or Prefabricated Vertical Drains (PVDs) should be used to accelerate the settlement. The PVD would be installed for the entire depth of the clay using a triangular spacing pattern. Analysis has been performed to estimate the time for 95 percent of the consolidation to be completed. It should be noted that the estimated time for settlement is the same regardless of the clay thickness because the excess water is drained horizontally to the PVD rather vertically through the clay mass. The duration of settlement is a function of the PVD spacing and soil parameters. A summary of the duration for the settlement to be completed is provided in the table below.

Table 16 – PVD Spacing and Time for Settlement

Spacing	Estimated Duration of Settlement	
	Days	Months
4 feet	83 – 106	3
5 feet	142 – 183	5 - 6
6 feet	220 – 282	7 - 9

The area of the PVDs should extend from Sta 213+50 to the Route 112 roadway embankment. The drain should extend across the width of the fill area including the area below the administration building.

7.1.3 Exit 35 South Bound Off Ramp

The ramp will start at Route 112 and terminate at the C/D roadway. An exit toll point will be constructed at Sta. 325+65, near the low end of the ramp. The maximum fill height will be approximately 15 feet. The left side slopes will have a grade of 2H:1V. The right side slopes will have a grade of 4H:1V. Borings B-106, B-206, B-207, OS-5 and OS-6 were drilled in the area. The area is underlain by deposits of sand, marine clay till and bedrock. Bedrock ranged from El. 57 to El. 61 near the proposed exit toll point. A geologic profile of this area is shown in Figure 11.

7.1.3.1 Embankment Slope Stability

A global stability analysis was conducted at three locations along the Exit 35 southbound off ramp. The analysis indicates the underlying soils are capable of supporting the proposed embankment. The resulting factor of safety was greater than 1.3 for both the short-term (undrained) and long-term (drained) conditions. The results are summarized in the table below.

Table 17 – Exit 35 SB Off Ramp Slope Stability Summary

Location	Baseline	Slope	Factor of Safety		Target Factor of Safety
			Undrained	Drained	
Sta. 321+50	Exit 35 SB Off Ramp	Left	1.3	1.6	1.3
		Right	1.7	2.7	1.3
Sta. 324+00	Exit 35 SB Off Ramp	Left	1.6	1.6	1.3
		Right	2.3	3.0	1.3
Sta. 325+50	Exit 35 SB Off Ramp	Left	1.8	1.8	1.3
		Right	2.9	3.1	1.3

7.1.3.2 Embankment Settlement

A settlement analysis was also conducted at Sta. 321+50, Sta, 324+00 and Sta. 325+50. The settlement was based on the soil properties obtained from the test boring and the proposed roadway geometry. The settlement is the average across the width of the roadway at the given station. The table below presents a summary of the settlement and the expected time for the primary and secondary settlement to occur. The secondary settlement is expected to continue over a long duration. The table provides the estimated settlement for a 20-year period.

Table 18 – Exit 35 SB Off Ramp Settlement Summary

Location	Primary Settlement		Secondary	
	Magnitude (Inches)	Duration (Years)	Magnitude (Inches)	Duration (Years)
Sta. 321+50	2.9	2	1.3	20
Sta. 324+00	0.8	2	1.1	20
Sta. 325+50	0.8	2	1.3	20

As indicated in the table above, the primary settlement will occur over a period of approximately 2 years and the secondary settlement will occur over a period of 20 years. We anticipate the settlement can be managed with shimming of the pavement as needed to maintain the desired grade and pitch.

7.1.4 Exit 35 North Bound Plaza and On Ramp

Between Sta. 615+00 and Sta. 625+00, the existing ramp alignment will be widened and will be lowered by up to 6 feet. The realignment will require a cut along both sides of the ramp. Settlement and slope stability are not expected to be issues in this area. Based on the ledge probes drilled in the area, bedrock is relatively shallow. Based on the proposed roadway grades and the anticipated bedrock elevation, bedrock removal will be required to lower the roadway grade from approximately Sta. 614+50 to Sta. 617+00 (Exit 35 NB Plaza) and from approximately Sta. 506+50 to Sta. 507+00 (Exit 35 NB On Ramp). The table below provides the bedrock depth and elevation data based on the ledge probes.

Table 19 – Exit 35 NB On Ramp Ledge Probe Summary

Boring/Probe	Location		Baseline	Bedrock	
	Station	Offset		Depth (feet)	Elevation (feet)
P-1	622+05	59 LT	Exit 35 NB Plaza	5.5	110.5
P-2	621+00	53 LT	Exit 35 NB Plaza	17.5	97.5
P-5	614+88	44 RT	Exit 35 NB Plaza	7.5	113.0
P-6	506+61	50 LT	Exit 35 NB On Ramp	9.5	107.0
P-7	507+00	45 LT	Exist 35 NB On Ramp	NE	< 95.0
P-8	507+77	45 LT	Exist 35 NB On Ramp	NE	< 90.5

7.1.5 Exit 35 North Bound Off Ramp

Between Sta. 412+00 and Sta. 416+00 the alignment will be moved to the east. The realignment will require a cut along the right side of the ramp. Based on the cross sections, cuts of up to 5 feet and fills of up to 5 feet will be required. Boring B-213 indicated that the subsurface conditions consist of sand and stiff clay. Settlement and slope stability are not expected to be issues in this area.

The area along the right side of the proposed alignment is a wetland. Muck probes conducted within the wetland indicate the organic muck layer ranges from approximately 1.5 to 2.0 feet thick. Based on the test boring program, bedrock is relatively shallow in the area. The table below provides the bedrock depth and elevation data based on the boring and ledge probes.

Table 20 – Exit 35 NB Off Ramp Ledge Probe Summary

Boring/Probe	Location		Bedrock	
	Station	Offset	Depth (feet)	Elevation (feet)
B-213	413+51.8	10.38 RT	16	91.96
P-3	414+07	59 LT	11	96.75
P-4	413+00	55 LT	14	91.5

7.2 GOOSEFARE BROOK RETAINING WALL

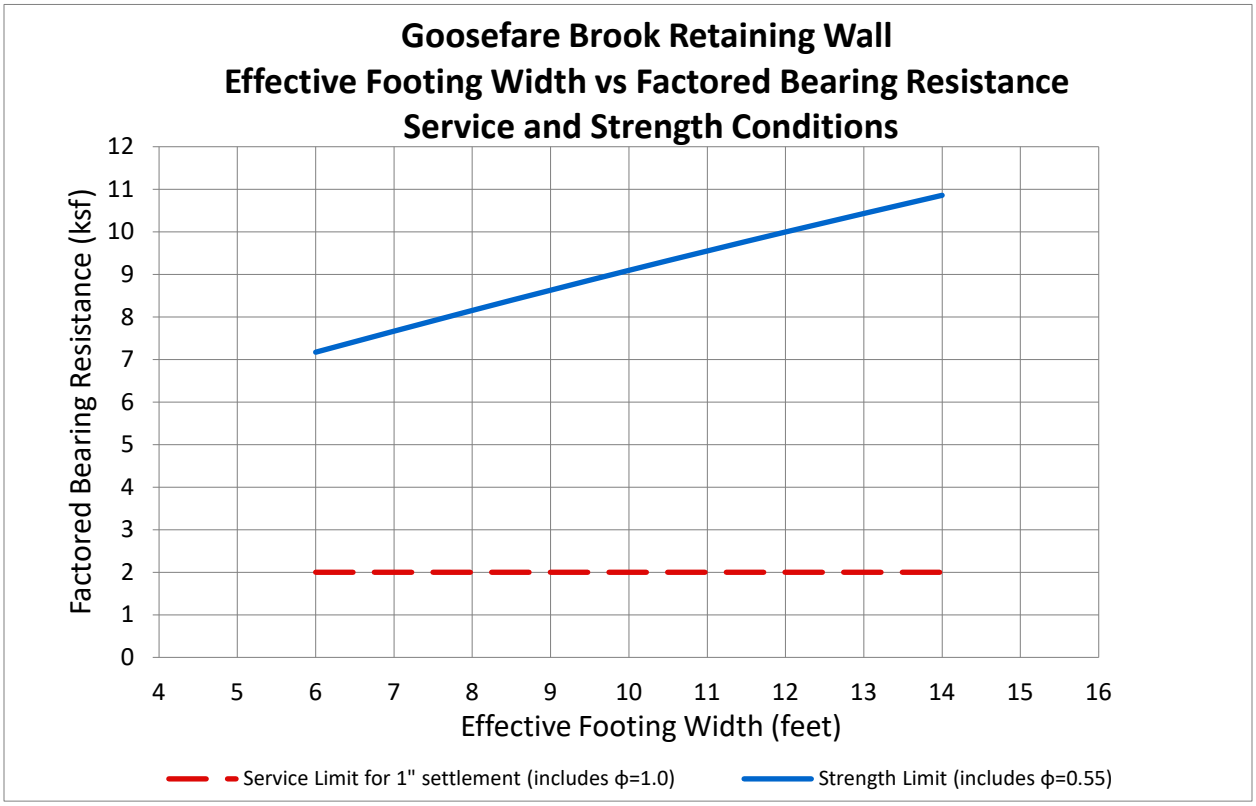
The modifications to the ramps and addition of the Collector/Distributor roadway will require the existing 84-inch diameter reinforced concrete pipe to be extended by approximately 30 feet. Because there is not enough horizontal space for slopes to be constructed at the end of the pipe, a headwall and wingwalls will be constructed at the end of the culvert. The wall will be 70 feet long and have a maximum exposed height of 11 feet near the culvert penetration. The bottom of the wall will step up in elevation towards the ends of the wall. Based on the soil conditions encountered in test boring B-111 and B-211, the walls can be supported on the existing soils using a conventional spread footing.

7.2.1 Bearing Resistance

The bearing resistance for the footings should be evaluated at the service and strength limit states using the figure below. As indicated in Section C10.6.2.1 of the AASHTO LRFD 2020 Code, the design of footings is frequently controlled by settlement at the service limit state. We recommend developing the dimensions of the spread footings at the service limit state and then checking that the strength and extreme limit states are satisfied. The factored bearing resistance at the service limit state (dashed red line), presented in the figure below, is 2.0 ksf. The service condition includes a resistance factor (φb) equal to 1.0 and is based on a maximum settlement of 1 inch.

Once the effective dimensions of the footings are determined, a factored bearing resistance at the strength limit state can be estimated from the solid blue line in the figure below. The factored bearing resistance

must be greater than the applied factored vertical bearing pressure determined by the structural engineer. The vertical bearing pressure should be calculated assuming a uniformly distributed pressure over an effective base area as shown in LRFD figure 11.6.3.2-1. The strength limit state shown in the figure includes a resistance factor (φb) equal to 0.55, which is used for retaining walls.



7.2.2 Lateral Earth Pressure

Walls that are allowed to rotate at the top, such as the proposed Goosefare Brook retaining wall, should be designed based on active pressure (K_a) and compacted granular borrow for underwater backfill (MEDOT 703.19). These walls should be designed using K_a equal to 0.28 and a unit weight of 125 pounds per cubic foot (pcf) for the backfill. Because the walls will have a permanent drainage system, the equivalent fluid pressure does not include hydrostatic pressure. We recommend the walls be backfilled with compacted granular fill. The walls should be designed for a live load surcharge equivalent to the earth fill height summarized in LRFD Tables 3.11.6.4-1 and 3.11.6.4-2.

7.2.3 Sliding Resistance

The following table provides the relevant coefficients for sliding. The coefficient of friction is based on AASHTO LRFD C3.11.5.3 and AASHTO LRFD 10.6.3.4. The nominal sliding resistance should be based on the wall footings bearing on crushed stone or compacted gravel borrow and the following equation:

$$R\tau = CV \tan\varphi_f$$

Where: $R\tau$ = Nominal Sliding Resistance
C = 1.0 for cast-in-place concrete or 0.8 for precast concrete
V = Total Vertical force
$\tan\varphi_f$ = Coefficient of friction

Table 21 – Sliding Coefficients and Resistance Factors

Structure Type	C	Soil Friction Angle (φ_f) (Degrees)	Coefficient of Friction (Tan φ_f)	Resistance Factor (φ_τ) Table 10.5.5.2.2.1
Cast-in-place Concrete	1.0	34	0.67	0.80
Precast Concrete	0.8	34	0.67	0.90

7.3 I-195 BRIDGE SOIL NAIL

The addition of the 32-feet wide collector/distributor roadway along the west side of the turnpike will require the removal of a portion of the existing slope below the west abutment of the I-195 bridge. The bridge is supported on a stub abutment founded directly on the embankment fill. The abutment is not pile supported. The bridge plans indicate that prior to construction of the abutment, the area was filled to El. 126 (preload) and then was surcharged with an additional 15 feet of fill to El. 141. Additionally, a 10-feet high toe berm was installed to improve stability for the surcharge fill. This preload and surcharge induced settlement of the underlying soft clay and increased the shear strength of the clay thus allowing the bridge to be founded on spread footings. It is assumed that the designer chose not to support the bridge on piles because the depth to bedrock is about 170 feet below the ground surface. The piles would have been expensive due the depth and large downdrag loads imposed by surrounding soils as they settled under the approach fills.

Based on the bridge plans, the abutments bear at El. 114 and the proposed adjacent roadway surface will be at El. 103. The total exposed height of the wall will be approximately 13 feet. A retaining wall will be required to provide grade separation between the existing footing and the proposed roadway. The face of the new retaining wall will be approximately 8 feet in front of the existing abutment footing which does not leave adequate horizontal space to construct the new wall without undermining the footing. Installation of temporary shoring would be difficult given the limited overhead clearance. As such we recommend that a permanent soil nail wall be constructed to provide grade separation. The soil nail wall is a top-down construction technique that can be accomplished in areas with limited overhead clearance.

The construction process involves cutting a vertical face in the soil, installing steel tendons surrounded by grout and then connecting the tendons to a temporary shotcrete face. The process is generally completed in vertical lifts of 5-feet extending from the top to bottom of the wall. The soil nails are generally installed on a 5 by 5 foot spacing. The length of the nails is expected to be about 20 feet. Once the nails and shotcrete face are installed a permanent cast-in-place concrete face is poured. The soil that composes the

embankment consists of a medium dense to very dense sand. Because the soil is granular, the standup time of the soil face will be relatively short. The contractor should be prepared to employ methods to keep the face stable during drilling of the soil nails.

The design would need to account for the stresses applied by the bridge footing. Additionally, the design would need to evaluate the potential movement of the soil nail wall and the effect on the existing abutment. It may be necessary to install post tensioned tendons through the existing abutment to prevent excessive horizontal movement of the footing. The main advantage of a soil nail wall is that it allows the construction to be completed without interrupting the traffic flow on the I-195 bridge. A global stability analysis indicated that the final wall configuration will have a factor of safety of 1.60 and 1.96, for the undrained and drained soil conditions, respectively. Both factors of safety exceed the minimum requirement of 1.5 for slopes that support a structure. Because the proposed construction will not increase the load on the underlying soils, the drained soil parameters are more representative of the actual conditions. Generally, soil nail wall designs are performance based with the specialty contractor hiring an engineer to perform the final design.

The performance specifications should include limits on the allowable movement of the existing stub abutment. Additionally, the movement of the stub abutment would be monitored during construction by survey and on-site instrumentation. The specification would provide action triggers and stop work triggers based on the movement recorded by instrumentation.

The construction of the collector/distributor roadway will also require excavation to the north and south of the I-195 bridge abutment. The proposed soil nail wall will extend beyond the limits of the abutment. We recommend continuing the soil nail wall to transition to the lower grades to the north and south of the bridge abutment. Regrading the existing slopes north and south of the bridge abutment is not recommended.

7.4 TOLL ADMINISTRATION BUILDINGS

Recommendations for the proposed Exit 35 southbound and northbound administration building areas are provided in the sections below. The recommendations are based on the IBC code.

7.4.1 Exit 35 SB On Ramp

The proposed administration building will be a one-story structure with a footprint approximately 34 by 25 feet. However, the area around the building will be raised by approximately 15 feet. The grade raise will result in settlement greater than the typical allowable settlement of 1 inch due to the underlying soft compressible marine clay, even after the preloading. Therefore, we recommend founding the proposed building on piles driven to bedrock. The adjacent toll plaza will also be pile supported because the tolling equipment is very sensitive to settlement.

7.4.1.1 Pile Recommendations

We recommend using steel H-piles driven to bedrock to support the proposed administration building. Because the overburden soils surrounding the piles are expected to settle greater than 0.6 inches in relation to the piles due to the grade raise, the piles will need to be designed for downdrag loads. The magnitude of the downdrag force has been calculated using the method as described on page 7.2-211 of the Naval

Facilities Design Manual (NAVFAC DM-7.2). The method is conservative and a factor of safety of 1.0 is recommended for downdrag load.

Installation of battered piles for lateral resistance is not recommended for this site because the subsiding soil will cause bending of battered piles. Lateral resistance can be provided using the passive resistance of the fill surrounding the pile caps and grade beams. Assuming the fill is compacted and above the water table, an equivalent unit weight of 180 pcf and 360 pcf can be used to calculate passive resistance for 0.25 and 0.5 inches of deflection, respectively. If the horizontal spacing between adjacent pile caps or between grade beams is less than twice the height of the subject pile cap or grade beam, then the passive pressure on the inside cap/beam should be ignored to accommodate interaction of the elements. As an alternate to using a passive pressure for calculating lateral resistance, lateral resistance from the vertical piles can be estimated using computer software such as LPile.

The piles should be HP14X117 steel H-piles, constructed of grade 50 steel (ASTM A572). Pile points are recommended to prevent damage to the tips of the piles during the final seating into the bedrock. The piles should have a minimum center to center spacing of at least three pile diameters. Because the piles will be driven to bedrock, a reduction for the geotechnical axial capacity is not necessary for group effects.

The pile lengths will vary depending on the actual depth to bedrock. For cost estimating purposes the piles in the administration building are expected to be 63 feet in length below the cut off elevation. Pile splices, if needed, should be made in accordance with the Section 501.09 of the MEDOT Standard Specifications.

To verify the pile capacity, one dynamic pile load test should be performed with a Pile Dynamic Analyzer (PDA) during pile installation. An additional PDA test will be conducted for the nearby tolling facility which is expected to have similar subsurface conditions.

The ultimate and allowable pile capacity is presented in the table below. The ultimate capacity was determined using the APile, GRL WEAP 2010 and the subsurface soil conditions in the area of the toll plaza. A factor of safety of 2.5 is recommended for the geotechnical capacity assuming a dynamic pile test will be performed with a Pile Dynamic Analyzer (PDA) during pile installation. The downdrag load has been subtracted from the allowable capacity of the pile as noted.

Table 22 – Allowable Geotechnical Capacity

Pile Section	Cross Section Area (in^2)	Ultimate Pile Capacity[(1)] (kips)	Downdrag Load (kips)	Allowable Pile Capacity[(2)(3)] (kips)
HP 14 x 117	34.4	785	100	214

Notes: (1) Based on driveability
(2) Factor of safety = 2.5
(2) Allowable capacity = (Ultimate capacity/Factor of Safety – downdrag load)

We anticipate the piles can be driven to the bedrock surface without overstressing the piles. A wave equation analysis was performed to evaluate preliminary driving criteria and evaluate the stresses in the piles during driving. The results of the analysis are presented in Appendix G of this report. The analysis

used an open-ended diesel hammer (Delmag D36-32) and a HP 14x117 pile section. The results of the analyses indicate the piles can be driven to the bedrock without overstressing the piles and with a reasonable blow count. The driving stresses did not exceed maximum limit of 90% of the steel pile's yield stress (fy), which equates to 45 ksi for grade 50 steel.

The structural design of the piles should be in accordance with Section 1810 of the IBC Code, including the allowable stresses in Table 1810.3.2.6. The structural design should include the combined stresses due to axial load and bending moment.

During construction, a wave equation analysis of the proposed pile-hammer system and a dynamic pile test with signal matching should be conducted. Dynamic pile tests should be performed with a Pile Dynamic Analyzer (PDA) during pile installation. At least two dynamic tests (ASTM D4945) should be performed at the site in order to establish the final driving criteria corresponding to the required nominal pile resistance. One of the tests can be performed at the nearby tolling facility to meet the minimum required tests. The maximum permissible pile stress during driving should be less than 90% of the steel pile's yield stress (fy), which equates to 45 ksi for grade 50 steel.

7.4.2 Exit 35 NB On/Off Ramp

The proposed administration building will be located on the east side of the highway at the end of the Exit 35 northbound off ramp. The building will be a one-story structure. The structure will not have a basement. The building footprint will be approximately 34 by 25 feet. The first floor is expected to be at approximately El. 120. The grade surrounding the proposed building is expected to be raised by up to approximately 5 feet. Given the relatively thin strata of naturally deposited soils overlying the bedrock, settlement due the grade raise is expected to be negligible and will occur as the fill is placed.

7.4.2.1 Bearing Capacity

A spread footing foundation support system is considered to be suitable for supporting the proposed building. The footings are expected to bear on compacted fill placed over the naturally deposited medium to stiff clay. The footings should be sized based using a net allowable bearing pressure of 2 kips per square foot (ksf). The minimum footing width is 18 inches for strip footings and 3 feet for isolated footing. Total settlement is expected to be less than 1-inch and differential settlement is expected to be less than ½-inch over 50 feet.

7.4.2.2 Building Slab

Slabs should be supported by a minimum of 12 inches of compacted fill meeting the requirements of MaineDOT Item No. 703.20, Gravel Borrow, or 12 inches of compacted 3/8-inch crushed stone. A modulus of subgrade reaction, k of no greater than 200 pounds per cubic inch (pci) should be used for the design of the slab. Slab settlements are anticipated be similar to that of the foundations. Please note that some cracking of slabs-on-grade is normal and should be expected. Cracking may occur not only as a result of heave or compression of underlying soil, but also as a result of concrete curing stresses. In order to reduce the potential for floor cracking, it is recommended that the measures listed below be followed during construction:

- The installation of floor slab construction joints as recommended by the American Concrete Institute (ACI) between the columns and walls and between columns to account for differential settlement.
- Backfill in areas supporting floor slabs should be moisture conditioned and compacted.
- Backfill below slabs in utility trenches should be carefully compacted.
- Exterior slabs should be structurally isolated from the building.

A vapor barrier is recommended for slabs on grade that are expected to receive moisture-sensitive floor adhesives or finishes. With the use of vapor barriers, the position of the barrier, materials used for the base course, curing methods for the concrete slab, and scheduling of the floor finishes should be carefully evaluated.

7.5 TOLLING FACILITIES

Three tolling facilities are proposed within the project area: Exit 35 SB on ramp, Exit 35 SB off ramp and Exit 35 NB on/off ramp. The proposed structures include toll booths, ORT mast arm, and ORT equipment slabs. The proposed structures are light weight but are sensitive to settlement. Recommendations for the proposed facilities are provide below and reference the AASHTO LRFD code.

7.5.1 Exit 35 SB On Ramp

The existing grade in the area of the tolling facility will be raised approximately 15 feet. The grade raise will cause approximately 3 to 4 inches of primary settlement in the area, with approximately 1.4 inches of long-term settlement. A preload with wick drains is proposed in the area to decrease the differential settlement along the southbound ramp and between the ramp and proposed structures. However, long-term settlement is still expected and therefore the entire tolling facility should be founded on piles driven to bedrock. Approach slabs should be installed on the approaches to the toll plaza to provide a smooth transition from the roadway to the pile supported structures. As previously discussed, the foundation for the administration building should be supported on piles driven to bedrock.

We recommend using steel H-piles driven to bedrock to support the proposed structures. Because the overburden soils surrounding the piles are expected to settle in relation to the piles, the piles will need to be designed for downdrag loads. Downdrag occurs when the soil adjacent to the piles settles more than 0.6 inches, which is the case here. The magnitude of the downdrag force has been calculated using the Lamba method, which should be factored by 1.05 to determine the factored down drag load. The magnitude of the downdrag load is presented in Table 23.

Installation of battered piles for lateral resistance is not recommended for this site because the subsiding soil will cause bending of battered piles. Lateral resistance can also be provided using the passive resistance of the fill surrounding the pile caps and grade beams. Assuming the fill is compacted and above the water table, an equivalent unit weight of 180 pcf and 360 pcf can be used to calculate passive resistance for 0.25 and 0.5 inches of deflection, respectively. If the horizontal spacing between adjacent pile caps or between grade beams is less than twice the height of the subject pile cap or grade beam, the passive

pressure on the inside cap/beam should be ignored to accommodate interaction of the elements. As an alternate to using a passive pressure for calculating lateral resistance, lateral resistance from the vertical piles can be estimated using software such as LPile.

The piles should be HP14X117 steel H-piles, constructed of grade 50 steel (ASTM A572). Pile points are recommended to prevent damage to the tips of the piles during the final seating into the bedrock. The piles should have a minimum center to center spacing of at least three pile diameters. Because the piles will be driven to bedrock a reduction for the geotechnical axial capacity is not necessary for group effects.

The pile lengths will vary depending on the actual depth to bedrock. For cost estimating purposes the piles at the toll plaza are expected to be 63 feet in length below the cutoff elevation. Pile splices, if needed, should be made in accordance with the Section 501.047 of the MEDOT Standard Specifications.

To verify the pile capacity, one dynamic pile load test should be performed with a Pile Dynamic Analyzer (PDA) during pile installation. An additional PDA test will be conducted for the nearby administration building which is expected to have similar subsurface conditions.

In accordance with LRFD Article 10.7.3.2, the nominal resistance of piles driven to point bearing on hard rock where pile penetration into the rock formation is minimal is controlled by the structural resistance when a resistance factor for severe driving conditions is applied. Based on the rock core retrieved from the test borings, the rock formation is considered to be hard rock and pile penetration is expected to be minimal. Since the piles will be seated in the bedrock, we recommend using a structural resistance factor of Φ_c = 0.5 in accordance with LRFD 6.5.4.2.

The nominal geotechnical pile resistance for an HP 14x117 section is provided in the table below. The nominal resistance was determined using the APile, GRL WEAP 2010 and the subsurface soil conditions in the area of the toll plaza. The result of the analysis is summarized below with the analysis in Appendix G. In accordance with LRFD Table 10.5.5.2.3-1, a resistance factor of 0.65 should be used to determine the factored geotechnical pile resistance.

Table 23 – Factored Geotechnical Resistance

Pile Section	Cross Section Area (in^2)	Nominal Pile Resistance(1) (kips)	Factored Resistance(2) (kips)	Factored Downdrag Load (Kips)	Factored Resistance Less Downdrag load (kips)
HP 14 x 117	34.4	785	510	98	412

Notes: (1) Based on GRL WEAP analysis
(2) Based on a resistance factor of 0.65 for dynamic testing.
(3) Factored Resistance Less Downdrag = [(Nominal Resistance x 0.65) – 98 kips]

We anticipate the piles can be driven to the bedrock surface without overstressing the piles. A wave equation analysis was performed to evaluate preliminary driving criteria and evaluate the stresses in the piles during driving. The results of the analysis are presented in Appendix G of this report. The analysis used an open-ended diesel hammer (Delmag D36-32) and a HP 14x117 pile section. The results of the

analyses indicate the piles can be driven to the bedrock without overstressing the piles and with a reasonable blow count. The driving stresses did not exceed maximum limit of 90% of the steel pile's yield stress (fy), which equates to 45 ksi for grade 50 steel.

During construction, a wave equation analysis of the proposed pile-hammer system and a dynamic pile test with signal matching should be conducted. Dynamic pile tests should be performed with a Pile Dynamic Analyzer (PDA) during pile installation. In accordance with LRFD Table 10.5.5.2.3-1, at least two dynamic tests (ASTM D4945) should be performed at the site in order to establish the final driving criteria corresponding to the required nominal pile resistance. One of the tests can be performed at the nearby administration building to meet the minimum required tests. As per LRFD Table 10.5.5.2.3-1, a resistance factor of 0.65 should be used to estimate the factored pile resistance. In accordance with LRFD 10.7.8 the maximum permissible pile stress during driving should be less than (0.9)(Φda)Fy, where Φda is equal to 1.0 in accordance with AASHTO LRFD Table 6.5.4.2.

7.5.2 Exit 35 SB Off Ramp

The proposed Exit 35 SB off ramp tolling facility will be founded in an area underlain by soft compressible marine clay. The overhead tolling equipment will be mounted on a mast type structure. Additionally, the existing grade will be raised by 4 feet. The underlying soils are not capable of supporting the proposed structures without an excessive amount of settlement. Therefore, we recommend the slab and mast arm be supported on steel H-piles driven to refusal on the bedrock.

The pile lengths will vary depending on the actual depth to bedrock. For cost estimating purposes the piles in the administration building are expected to be 49 feet in length below the cutoff elevation. Pile splices, if needed, should be made in accordance with the Section 501.047 of the MEDOT Standard Specifications.

The recommendations for HP 14x117 piles provided in the section above should be followed, although the pile capacities and downdrag loads in the table below should be used.

Table 24 – Factored Geotechnical Resistance

Pile Section	Cross Section Area (in^2)	Nominal Pile Resistance(1) (kips)	Factored Resistance(2) (kips)	Factored Downdrag Load (Kips)	Factored Resistance Less Downdrag load (kips)
HP 14 x 117	34.4	625	406	54	352

Notes: (1) Based on GRL WEAP analysis
(2) Based on a resistance factor of 0.65 for dynamic testing.
(3) Factored Resistance Less Downdrag = [(Nominal Resistance x 0.65) – 54 kips]

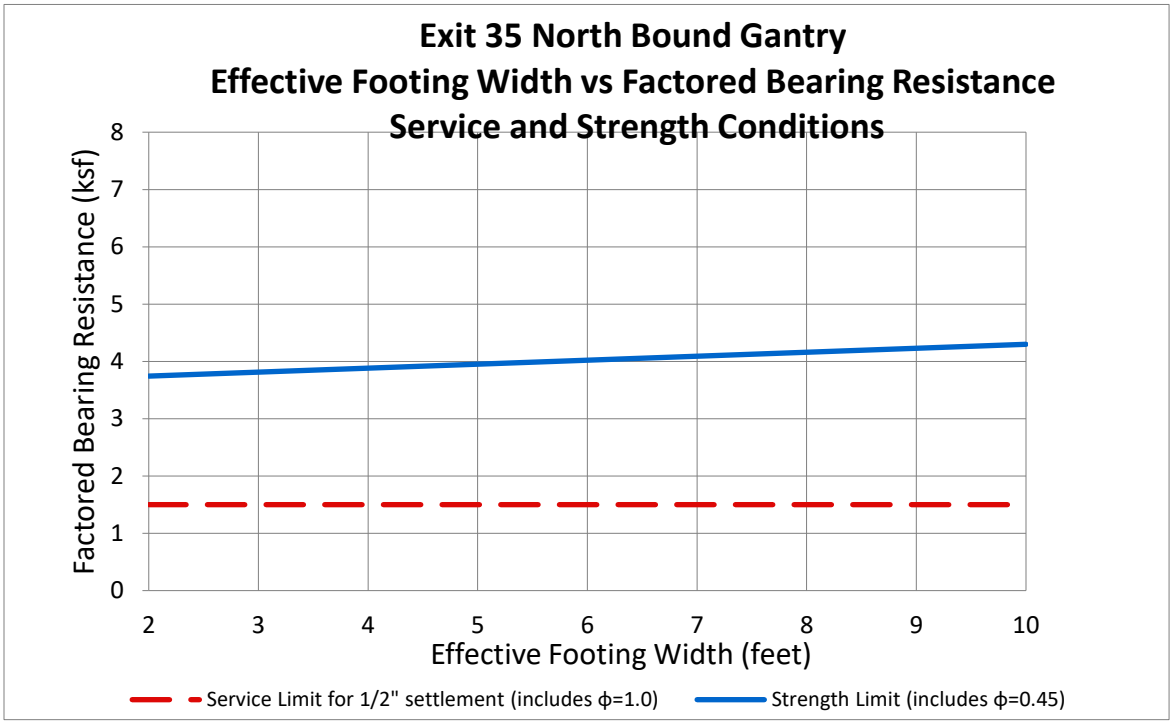
In accordance with LRFD Table 10.5.5.2.3-1, at least two dynamic tests (ASTM D4945) should be performed at this location in order to establish the final driving criteria corresponding to the required nominal pile resistance.

7.5.3 Exit 35 NB On/Off Ramp

The foundations for the proposed tolling facility are expected to bear on the medium stiff to stiff marine clay crust. The grade raise in the area is expected to be approximately 1 to 2 feet. Given the thin layer of clay, shallow glacial till, shallow bedrock, and minor grade raise, the proposed slab and gantry can be supported on conventional spread footings. The slabs can be soil supported and designed using a subgrade modulus of reaction no greater than 150 pound per cubic inch (pci).

The bearing resistance for the footings should be evaluated at the service and strength limit states using the figure below. As indicated in Section C10.6.2.1 of the AASHTO LRFD 2020 Code, the design of footings is frequently controlled by settlement at the service limit state. We recommend developing the dimensions of the spread footings at the service limit state and then checking that the strength and extreme limit states are satisfied. The factored bearing resistance at the service limit state (dashed red line), presented in the figure below, is 1.5 ksf. It includes a resistance factor (φb) equal to 1.0 and is based on a maximum settlement of ½-inch. The settlement will occur immediately after construction and prior to installation of the electronic tolling sensors.

Once the effective dimensions of the footings are determined, a factored bearing resistance at the strength limit state can be estimated from the solid blue line in the figure below. The factored bearing resistance must be greater than the applied factored vertical bearing pressure determined by the structural engineer. The vertical bearing pressure should be calculated assuming a uniformly distributed pressure over an effective base area as shown in LRFD figure 11.6.3.2.-1. The strength limit state shown in the figure includes a resistance factor (φb) equal to 0.45. We recommend a minimum footing width of 4 feet.



7.6 OVERHEAD SIGN STRUCTURES

The project involves construction of seven overhead sign structures. One structure will be a single span bridge and six will be cantilever structures. These types of structures are typically founded on drilled shafts or spread footings. Drilled shafts require a smaller area to construct while spread footings use more conventional construction methods. Within the project area drilled shafts are recommended in areas where the soft marine clay is near the ground surface or where the smaller footprint will reduce wetland impacts. The table below provides the recommended foundation type for each location. Soil parameters for the drilled shaft design are shown in the table in Appendix H. Bearing capacity charts and sliding resistance recommendations for the spread footing design are provided in Appendix H.

The bearing resistance for the footings should be evaluated at the service and strength limit states using the figures in Appendix H. As indicated in Section C10.6.2.1 of the AASHTO LRFD code, the design of footings is frequently controlled by settlement at the service limit state. We recommend developing the dimensions of the footings at the service limit state and then checking that the strength and extreme limit states are satisfied.

Once the effective dimensions of the footings are determined, a factored bearing resistance at the strength limit state can be estimated from the solid blue line in the figures. The factored bearing resistance must be greater than the applied factored vertical bearing pressure determined by the structural engineer. The vertical bearing pressure should be calculated assuming a uniformly distributed pressure over an effective base area as shown in LRFD figure 11.6.3.2.-1. The strength limit state shown in the figures includes a resistance factor (φb) equal to 0.45.

Table 25 – Foundation Type Recommendations

Foundation Location	Structure Type	Foundation Side	Boring	Foundation Type	Comments
1670+75	Bridge	Left	OS-1	Drilled Shaft	In existing median
1670+75		Right	OS-2	Spread Footing	
1718+50	Cantilever	-	OS-3	Spread Footing	
2728+74.77	Cantilever	-	OS-7(1)	Drilled Shaft	Soft ground
2731+30	Cantilever	-	OS-4	Spread Footing	
2740+50	Cantilever	-	OS-9	Spread Footing	
2763+00	Cantilever	-	OS-12	Spread Footing	
1789+00	Cantilever	-	OS-11	Drilled Shaft	Reduce wetland impacts

Notes: (1) Boring not drilled due to access issues, soil design properties are based on OS-8.
(2) OS-5 and OS-6 were drilled for the Exit 35 SB Off Ramp tolling facilities

7.7 TRAFFIC SIGNALS

The following sections provide recommendations for the two signalized intersections proposed to be constructed as part of the project.

7.7.1 Exit 35 SB Ramps and Route 112 Intersection

Three signals are proposed at the intersection of the Exit 35 SB Ramps and Route 112. The borings drilled for this intersection are MA-1, MA-2, and MA-3. The soil conditions generally consist of approximately 13 to 15 feet of compacted embankment fill overlying deposits of sand and marine clay. It is anticipated that the traffic signals will be founded on drilled shaft foundations approximately 15 feet deep. Given the densities and granular nature of the embankment fill, drilled shafts are an appropriate foundation type to support the vertical and lateral loads.

7.7.2 Lund Road and Route 112 Intersection

Four signals are proposed at the intersection of Lund Road and Route 112. The borings drilled for this intersection are MA-4, MA-5, and MA-6. A boring was not drilled at the location of the proposed mast arm to be installed at the southwest corner of the intersection. The soil conditions generally consist of approximately 5 feet of sand or granular fill, underlain by 7 feet of stiff clay, overlying 3 to 7 feet of soft clay. It is anticipated that the traffic signals will be founded on drilled shaft foundations approximately 15 feet deep. Given the density of the granular soils and consistency of the underlying clay, drilled shafts are an appropriate foundation type to support the vertical and lateral loads.

7.8 GENERAL RECOMMENDATIONS

7.8.1 Frost Depth

Local practice is to use a frost depth of 5 feet for design. Therefore, the bottom of footings should be founded at least 5 feet below the surrounding finished ground surface for frost protection.

7.8.2 Seismic Site Class

The seismic site classification was evaluated in accordance with the 2015 International Building Code for each of the three areas that have proposed structures. In accordance with Section 1613.3.2 of the IBC code which references ASCE 7, Chapter 20, the site classifications are provided in the table below.

The seismic site classification was also evaluated in accordance with Section 3.10.3.1 of the AASHTO LRFD Code. In accordance with Table 3.10.3.1-1 the site classifications are provided in the table below. For both analyses a value of 100 blows per foot was used for the bedrock.

Table 26 – Seismic Site Summary

Location	Site Seismic Class	
	IBC 2015	AASHTO LRFD
Exit 35 SB On Ramp Toll Plaza	E	E
Exit 35 SB Off Ramp Toll Plaza	E	E
Exit 35 NB On/Off Ramp Toll Plaza	C	C

7.8.3 Liquefaction Analysis

Liquefaction is a condition when a soil undergoes continued deformation during the course of cyclic stress applications induced by an earthquake where pore water pressure becomes equal to the confining pressure (e.g., effective stress approaches zero) and large deformations occur. Significant factors influencing liquefaction include grain size distribution of sand, fines content, in-situ density, and vibration characteristics (e.g., design earthquake and acceleration coefficient). Liquefaction generally occurs in saturated, relatively loose (N values less than 15 bpf) sandy soils with low fines content (less than 15 percent). Based upon the density of the soil and elevated silt content, the soils at the site are not considered to be susceptible to liquefaction.

8.0 CONSTRUCTION CONSIDERATIONS

8.1 ADMINISTRATION BUILDING AND PARKING AREA

The following recommendations are specific to the administration building and associated parking area.

8.1.1 Subgrade Preparation

Once rough graded and immediately prior to placing fill, the building and pavement subgrade should be proof rolled. In open areas, proof-rolling should be performed with a minimum of six passes using a steel drum roller with a minimum static weight of 10 tons. In areas of silty subgrade, the proof-rolling should be conducted without vibration to prevent disturbance to the subgrade. In confined areas, proof-compaction can be performed with six passes of a large reversible plate compactor. The proof-rolling is intended to detect evidence of pumping, rutting or weaving, which is indicative of unstable and unsuitable materials, and should be completed under the observation of the resident engineer.

Unsuitable soils or soils that become disturbed during construction should be completely excavated from the subgrade and replaced with compacted granular borrow. Granular borrow should conform to MaineDOT Standard Specification 703.19, Granular Borrow. The granular borrow should be compacted to 95 percent of the Modified Proctor maximum dry density (ASTM D1557).

If the unstable material is granular but too wet, then the material can be stockpiled and allowed to dry. Any excavated soil that is unsuitable for reuse at the site should be transported from the site and disposed in accordance with all appropriate federal, state and local regulations.

8.1.2 Backfill Structural fill, Placement and Compaction

The proposed administration building foundation will be supported on spread footings. The floor slab will be soil supported. New fill needed to raise grade within the area of the administration building should consist of granular borrow meeting the requirements of MaineDOT Item No. 703.19, Granular Borrow. Below the basement floor slab, 12 inches of soil meeting the requirements of MaineDOT Item No. 703.20, Gravel Borrow should be placed to provide a firm surface for the floor slabs.

One gradation test should be performed for each source of imported Granular Borrow and Gravel Borrow. The soil moisture content range should be ±3 percent of its optimum moisture content as determined per ASTM D-1557 (Modified Proctor) and compacted fill should be placed in uniform lifts not exceeding 12 inches loose thickness when large vibratory rollers are used. When large reversible plate compactors are used, the maximum loose lift shall be 6 inches. One Modified Proctor Test should be performed for each source of imported Structural Fill. Compaction should be at least 95% of the maximum dry density per ASTM D1557 (Modified Proctor). The percent compaction is determined in the field by ASTM D-6938 (nuclear density meter). A minimum of two in place density tests should be performed for each lift of fill placed.

8.2 TEMPORARY EXCAVATION BRACING

The installation of below grade structures (e.g., footings, foundation elements, culvert) may require temporary earth support to retain soil during construction. Relatively shallow excavations can be supported using cantilevered sheet pile walls. Deeper excavations may require internal bracing or tiebacks. The earth support system should be designed by a professional engineer licensed in the State of Maine.

Extraction of temporary sheet piles may cause settlement of the ground surface around the sheet piles. Areas of settlement should be backfilled with compacted granular borrow conforming to MaineDOT Standard Specification 703.19, Granular Borrow.

8.3 EMBANKMENT SLOPE CONSTRUCTION

Construction of embankment slopes shall be conducted in accordance with Section 203, Excavation and Embankment of the MaineDOT Standard Specification. Maximum lift thickness and minimum compaction requirements are provided in Section 203. The embankments should be constructed of soil meeting the requirements of MaineDOT Item No. 703.18, Common Borrow.

Prior to placing fill for embankment construction, existing vegetation, unsuitable existing fill materials, asphalt, topsoil and other organic or deleterious material should be removed to expose suitable subgrade soils. Where proposed slopes are constructed against existing slopes, the existing slope should be continuously benched by excavating steps into the existing slope in accordance with Standard Specification Section 203.09 of the MaineDOT Standard Specifications. The entire area of the new embankment should be constructed in horizontal lifts and compacted. Unsuitable materials should not be used in the outer portion of fill slopes. Offsite waste disposal areas for unsuitable material shall be established in accordance with Section 203.06 of the MaineDOT Standard Specifications.

We anticipate that slopes that are 2 H:1V or flatter will be treated with loam and seed to provide long term erosion control. Temporary erosion control can be provided by temporary erosion control matting, MEDOT Item No. 613.319. Slopes steeper than 2H:1V should be treated with a 4-inch cellular confinement system or a two-foot-thick layer of stone fill.

Unsuitable soils or soils that become disturbed during construction should be completely excavated from the subgrade and replaced with compacted granular borrow. Granular borrow should conform to MaineDOT Standard Specification 703.19, Granular Borrow. The granular borrow should be compacted to 92 percent of the Modified Proctor maximum dry density (AASHTO T-180).

8.4 TRENCH EXCAVATIONS

The contractor should prevent surface water from entering trench excavations and install a dewatering system to remove groundwater that enters the excavation to allow fill to be place in-the-dry. OSHA standards for trenches should be enforced by the contractor.

8.5 CONSTRUCTION DEWATERING

Dewatering may be required for some excavations, in particular the excavation for the Goosefare Brook culvert extension and the areas along the collector-distributor roadway. It is anticipated that temporary dewatering can be accomplished by a system of shallow sumps and pumps. The dewatering system should be capable of lowering the groundwater to a depth of 2 feet below the bottom of the excavation. It should be noted that the marine clay soils present at the site is highly sensitive to moisture and will lose strength when saturated. Sumps should be equipped with filter fabric to prevent the loss of fine-grained soils during pumping. Water pumped from the excavations should be discharged to settling ponds or frac tanks to allow fine particles to settle out prior to discharge. Water should be discharged in accordance with all applicable federal, state and local permits and regulations.

8.6 PILE INSTALLATION AND TESTING

We recommend a dynamic pile test with signal matching be performed with a Pile Dynamic Analyzer (PDA) during pile installation. At least two dynamic tests (ASTM D4945) should be performed at the site in order to establish the final driving criteria corresponding to the required nominal pile resistance.

9.0 LIMITATIONS

9.1 USE OF REPORT

This report has been prepared for the exclusive use of the Maine Turnpike Authority (MTA) and their respective assigns and designees. This report is not intended for the use or reliance of other (third) parties, without the express consent of Stantec and MTA. Any use, which a third party makes of this report, or any reliance on decisions made based on this report, is the responsibility of such third parties. Further, the findings of this study apply only to the specific Site and project described herein. The findings herein are inapplicable to other Sites, and to developments of different grading, layout, loading, and performance requirements. Stantec accepts no responsibility for damages, real or perceived, suffered by parties as a result of decisions made or actions based on the unintended and/or inappropriate use of this report.

The Geotechnical Report provides recommendations, and is intended for informational use, requiring interpretation by the owner, design team, and contractor for the design and construction of the project, and interpretation of final quantities and construction costs. The Geotechnical Report is not intended, or suitable, by itself, for use as a technical specification or to determine quantities. Anticipated quantities and/or costs may be provided in the Geotechnical Report; such information is an Engineer's interpretation, and may vary dramatically from contractor bids, which are based on potentially differing interpretations, and several other variables not available or considered by the Engineer.

9.2 SUBSEQUENT INVOLVEMENT

The geotechnical process incorporates initial exploration and recommendations as summarized herein and is followed by continuous involvement during key design and construction benchmarks. The recommendations provided herein are based on preliminary information and assumptions regarding proposed site grading, structural loading and performance requirements. It is recommended that Stantec review final foundation, grading, and other applicable plans to assess whether or not these recommendations require modification.

During construction, additional soil samples should be analyzed in the laboratory for moisture content, gradation, and moisture density relationship tests to evaluate the reuse of onsite soils (existing fill and natural sand strata) as backfill material.

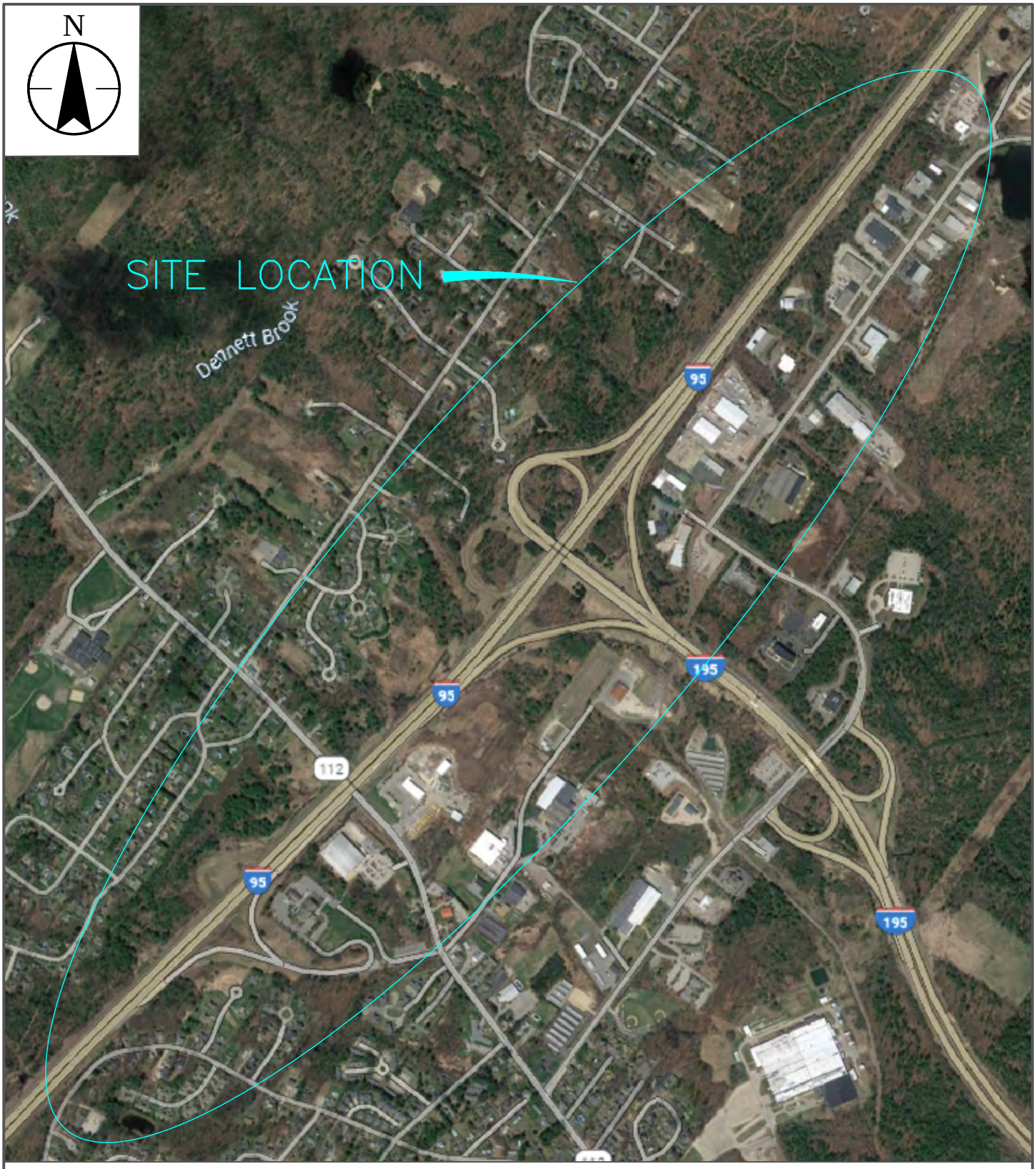
Stantec should be retained to observe excavations and subgrade preparation to assess whether the intent of these recommendations is followed during construction, and whether or not other appropriate and/or cost-effective solutions may be warranted based on the actual conditions encountered. Further, a soil exploration is a random sampling of a Site. Should any conditions at the Site at any point during the project be encountered that differ from those summarized in the report, Stantec should be notified immediately in order to permit reassessment of these conditions and the recommendations contained in the report.

9.3 REPRESENTATION AND INTERPRETATION OF DATA

Surficial and subsurface information presented herein is based on field measurements obtained during the course of the exploration and site reconnaissance. The precision and accuracy of surficial data is a function of the references, benchmarks, methods and instruments employed, as summarized in the report. Subsurface data is based on measurements within the borehole or test pit using the sampling methods described on the exploration logs. The completeness, precision, and accuracy of such data is a function of the frequency and type of exploration and sampling employed, as well as the precision and accuracy of the surface location and elevation of the borehole and may vary from actual conditions encountered during excavations. Subsurface conditions between, beyond and below explorations, may vary dramatically from the nearest exploration, due to natural geologic action, deposition and weathering, or man-made activities.

Groundwater levels were recorded during the time periods and frequencies noted on the explorations. It is important to note that groundwater levels are disrupted by the exploration, and require equilibration periods to determine actual hydrostatic levels, which exceed the duration of the measurement period. Multiple hydrostatic groundwater levels may exist, including perched or trapped water, which may not necessarily be accurately represented by one water level reading. Groundwater levels fluctuate due to seasonal variations, adjacent surface water bodies, precipitation, and on-Site and nearby land use.

FIGURES



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MAINE TURNPIKE AUTHORITY
EXIT 35/36 INTERCHANGE,
SACO, MAINE

Project No.
179450125

Title
SITE LOCATION PLAN

Revision	Date
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Reference Sheet	Figure No.
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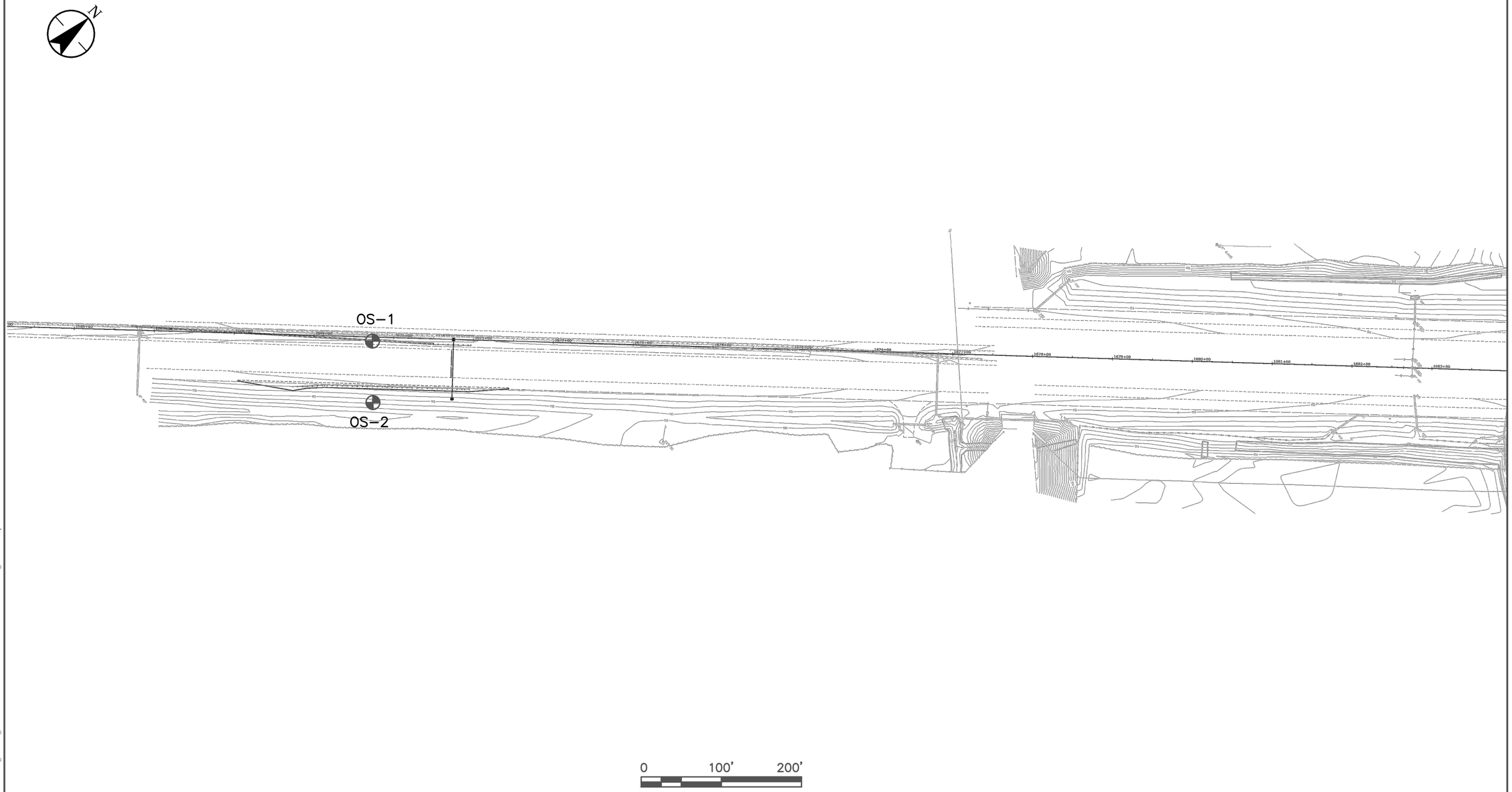

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Notes

1. PRELIMINARY TEST BORINGS WERE DRILLED DURING THE PERIOD FROM DECEMBER 10, 2019 TO 23, 2019 AND FINAL TEST BORINGS WERE DRILLED FROM OCTOBER 26, 2020 TO DECEMBER 11, 2020. THE BORINGS WERE DRILLED BY NEW ENGLAND BORING CONTRACTORS OF HERMON, MAINE OR DERRY, NEW HAMPSHIRE UNDER THE SUPERVISION OF STANTEC PERSONNEL.
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3. HISTORICAL TEST BORINGS WERE DRILLED FOR THE DESIGNS OF ROUTE I–195 BRIDGE OVER MAINE TURNPIKE AND ROUTE 112 BRIDGE OVER MAINE TURNPIKE.

Legend

B–101	LOCATION AND DESIGNATION OF TEST BORING (PRELIMINARY PROGRAM)	P–1	LOCATION AND DESIGNATION OF LEDGE PROBE (FINAL PROGRAM)
B–201	LOCATION AND DESIGNATION OF TEST BORING (FINAL PROGRAM)		
OS–1	LOCATION AND DESIGNATION OF OVERHEAD SIGN BORING (FINAL PROGRAM)	B33–1	LOCATION AND DESIGNATION OF I–195 BRIDGE BORINGS
MA–1	LOCATION AND DESIGNATION OF MAST ARM BORING (FINAL PROGRAM)	CT–6–75	LOCATION AND DESIGNATION OF RT. 112 BRIDGE BORINGS

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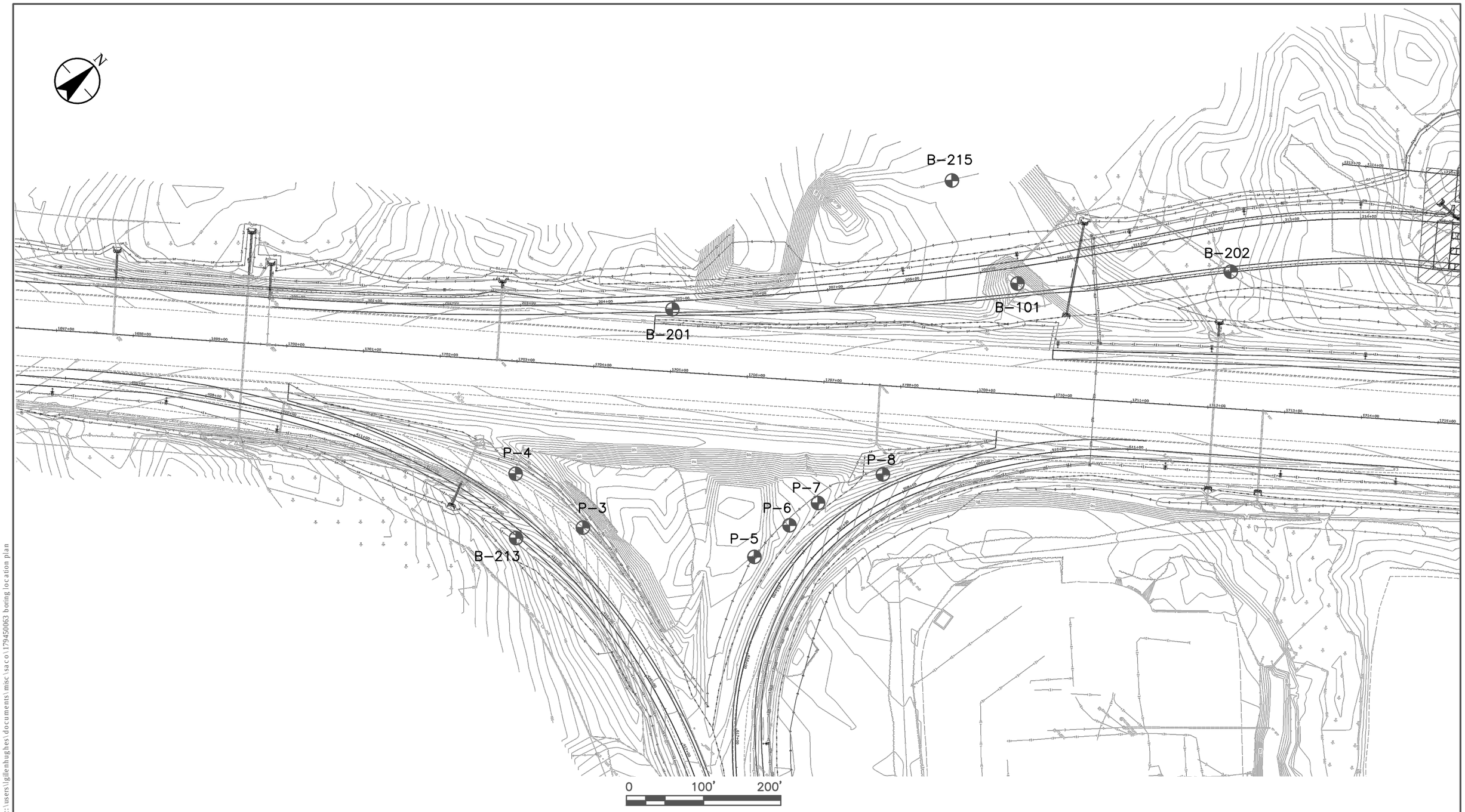

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EXIT 35/36 INTERCHANGE,
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Figure No.
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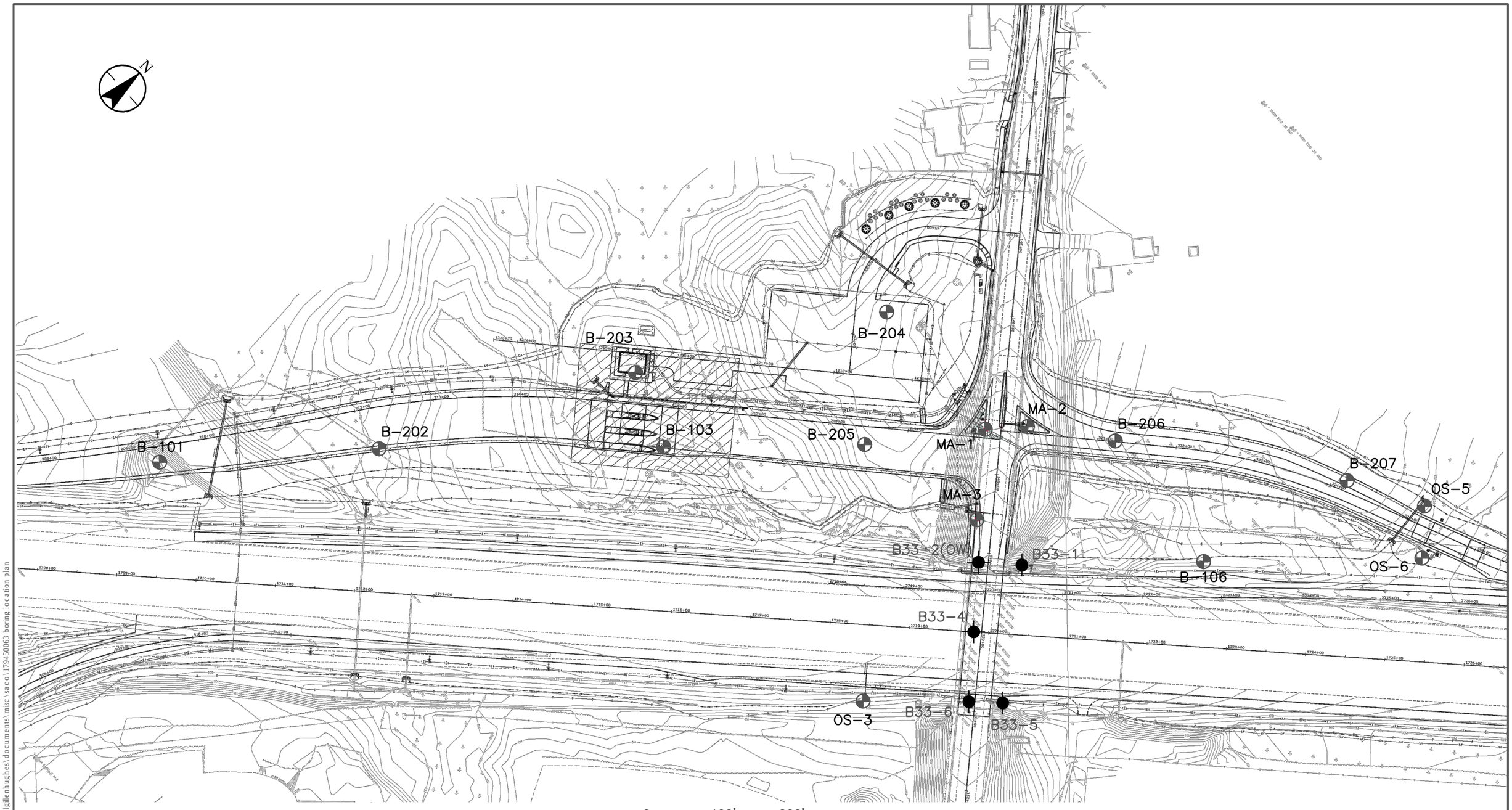

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Legend

B-101	LOCATION AND DESIGNATION OF TEST BORING (PRELIMINARY PROGRAM)	P-1	LOCATION AND DESIGNATION OF LEDGE PROBE (FINAL PROGRAM)
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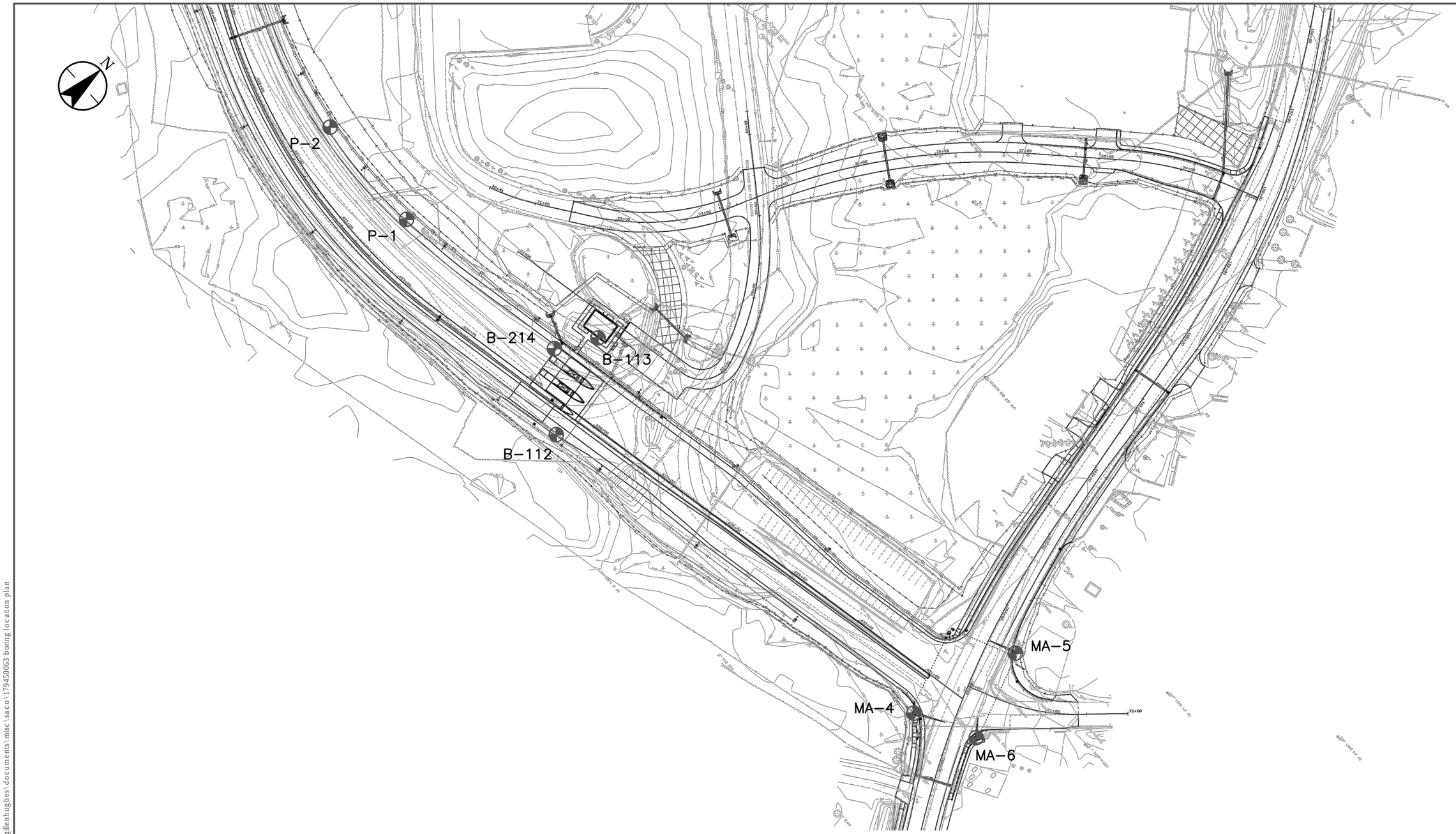

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Notes

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2. LOCATIONS OF THE TEST BORINGS WERE DETERMINED BY SURVEY OR MEASURING FROM EXISTING SITE FEATURES AND WERE DRILLED UNDER THE SUPERVISION OF STANTEC.
3. HISTORICAL TEST BORINGS WERE DRILLED FOR THE DESIGNS OF ROUTE I–195 BRIDGE OVER MAINE TURNPIKE AND ROUTE 112 BRIDGE OVER MAINE TURNPIKE.

Legend

B–101	LOCATION AND DESIGNATION OF TEST BORING (PRELIMINARY PROGRAM)	P–1	LOCATION AND DESIGNATION OF LEDGE PROBE (FINAL PROGRAM)
B–201	LOCATION AND DESIGNATION OF TEST BORING (FINAL PROGRAM)		
OS–1	LOCATION AND DESIGNATION OF OVERHEAD SIGN BORING (FINAL PROGRAM)	B33–1	LOCATION AND DESIGNATION OF I–195 BRIDGE BORINGS
MA–1	LOCATION AND DESIGNATION OF MAST ARM BORING (FINAL PROGRAM)	CT–6–75	LOCATION AND DESIGNATION OF RT. 112 BRIDGE BORINGS

Client/Project
MAINE TURNPIKE AUTHORITY
EXIT 35/36 INTERCHANGE,
SACO, MAINE

Project No.
179450125

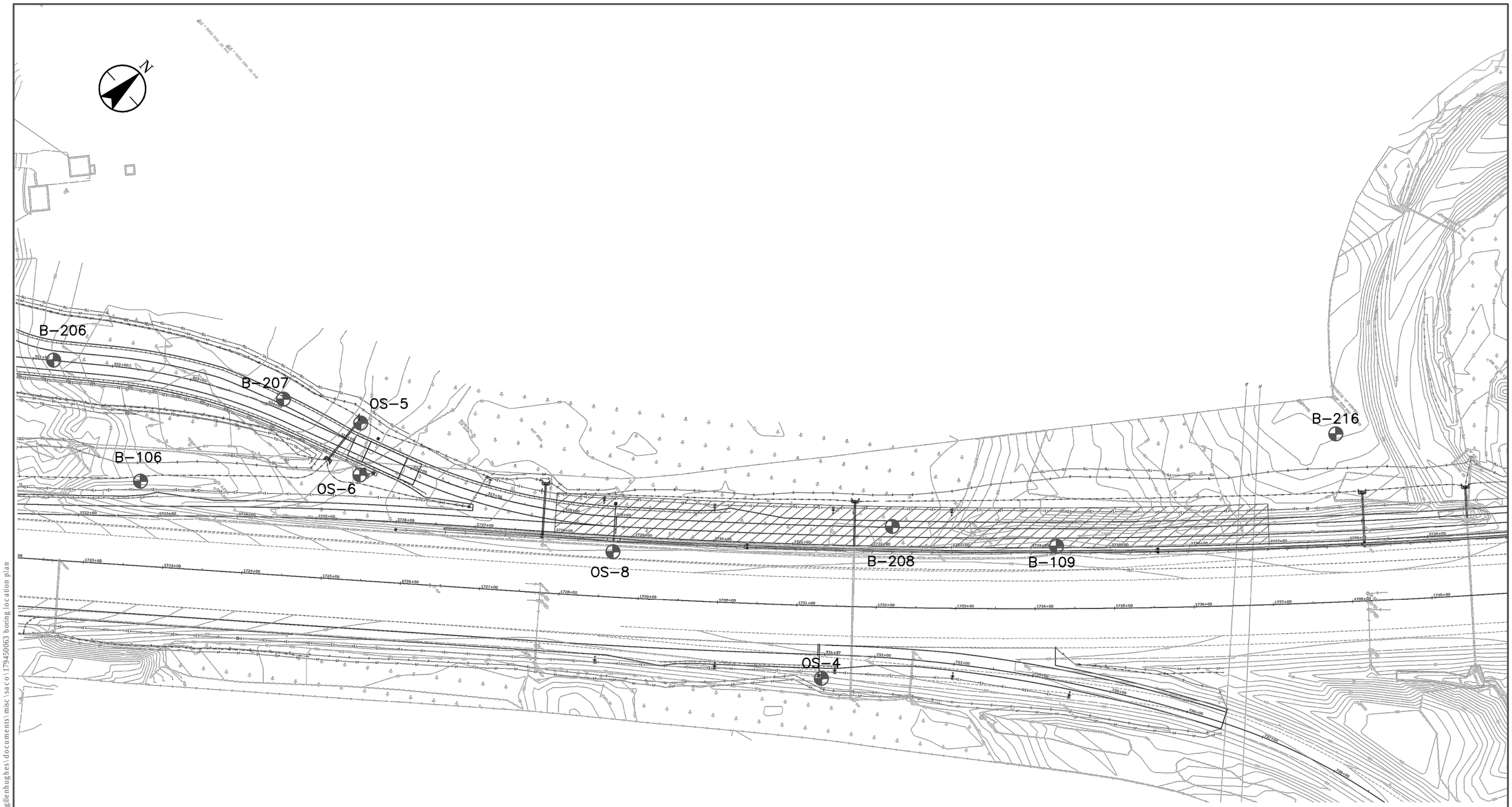
Title
BORING LOCATION PLAN

Revision
#0

Date
2021.02.04

Reference Sheet
-

Figure No.
5



Stantec

Stantec Consulting Services Inc.
2211 Congress Street
Portland, ME
www.stantec.com

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Client/Project
MAINE TURNPIKE AUTHORITY
EXIT 35/36 INTERCHANGE,
SACO, MAINE

Project No.
179450125

Title
BORING LOCATION PLAN

Revision
#0

Date
2021.02.04

Reference Sheet
-

Figure No.
6

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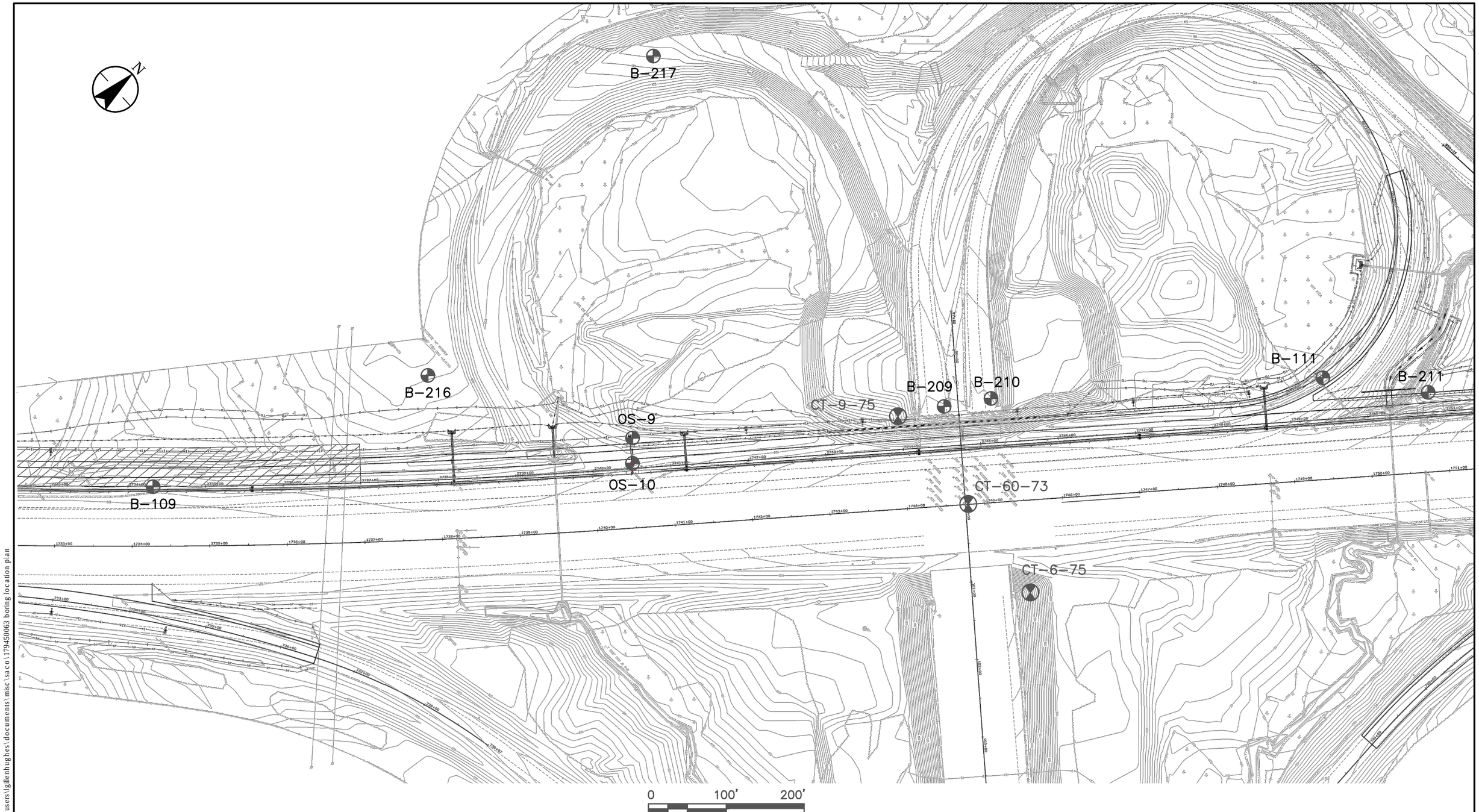

Stantec

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Portland, ME
www.stantec.com

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Client/Project
MAINE TURNPIKE AUTHORITY
EXIT 35/36 INTERCHANGE,
SACO, MAINE

Project No.
179450125

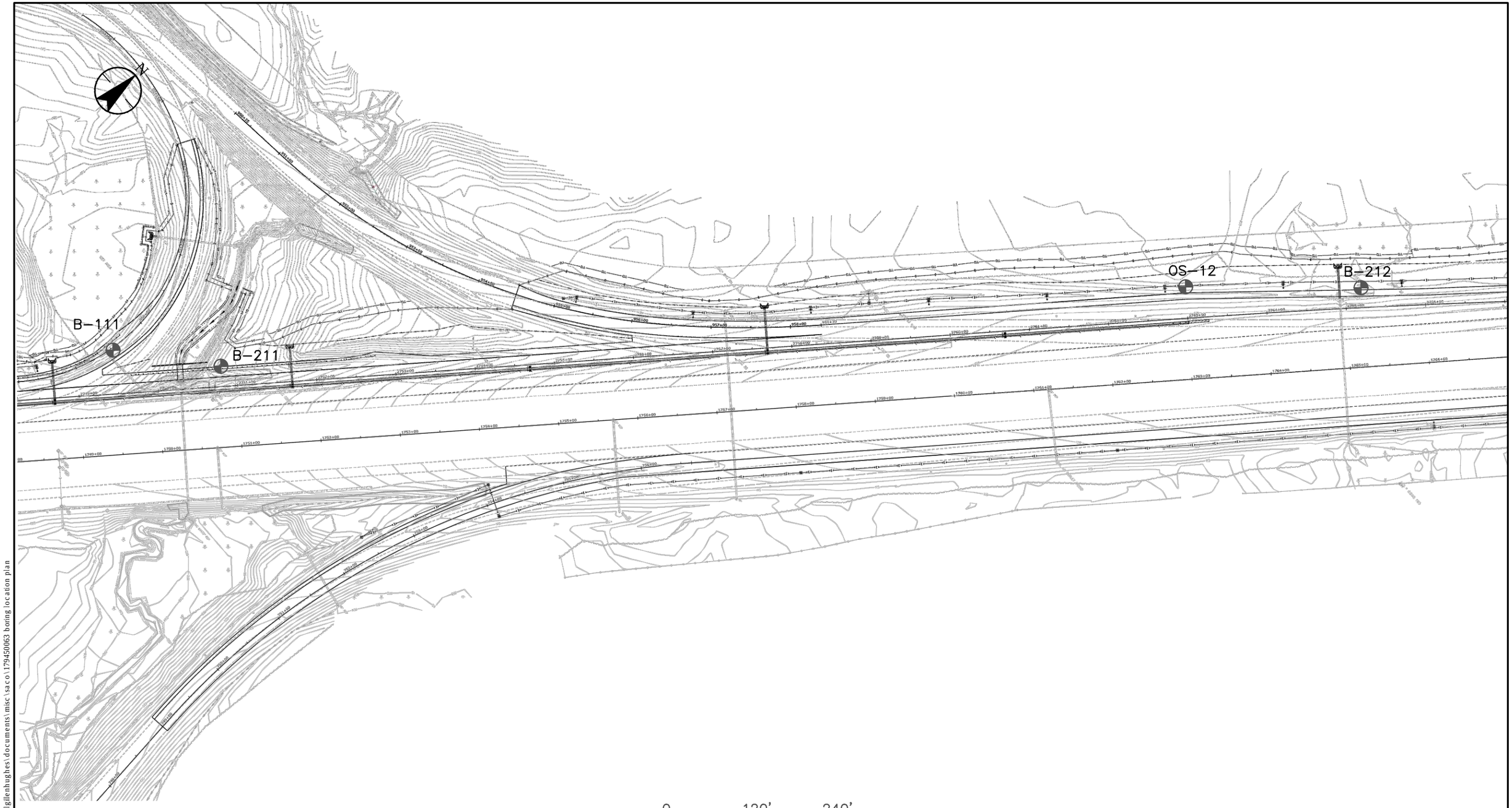
Title
BORING LOCATION PLAN

Revision
#0

Date
2021.02.04

Reference Sheet
-

Figure No.
7



Stantec

Stantec Consulting Services Inc.
2211 Congress Street, Suite 380
Portland, ME 04102-1955
Tel: 603.669.8672
www.stantec.com

Notes

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Client/Project
MAINE TURNPIKE AUTHORITY
EXIT 35/36 INTERCHANGE,
SACO, MAINE

Project No.
179450125

Title
BORING LOCATION PLAN

Revision: #0
Date: 2022.05.09
Reference Sheet: -
Figure No.: 8

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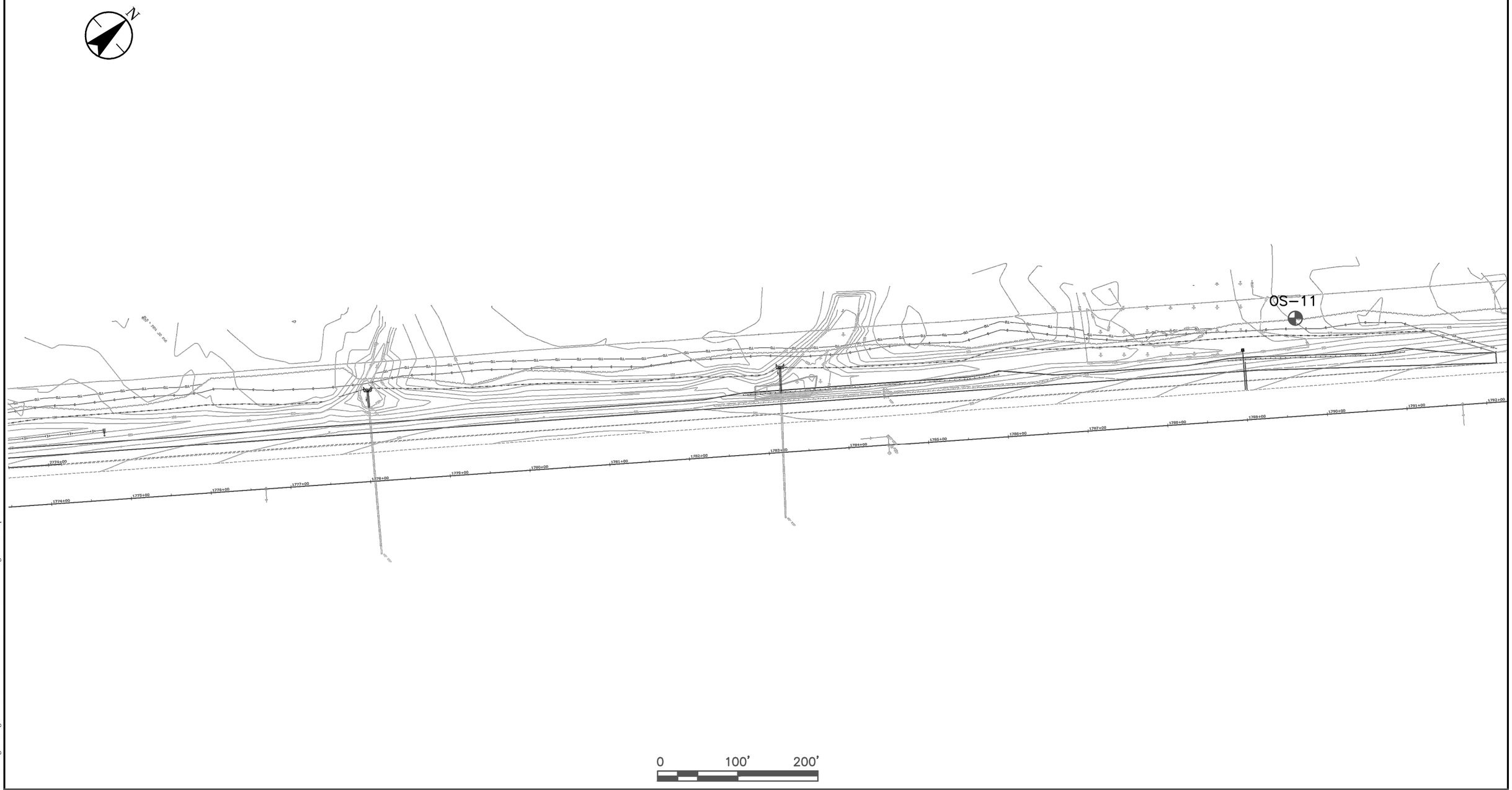

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Stantec

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2211 Congress Street
Portland, ME
www.stantec.com

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Client/Project
MAINE TURNPIKE AUTHORITY
EXIT 35/36 INTERCHANGE,
SACO, MAINE

Project No.
179450125

Title
BORING LOCATION PLAN

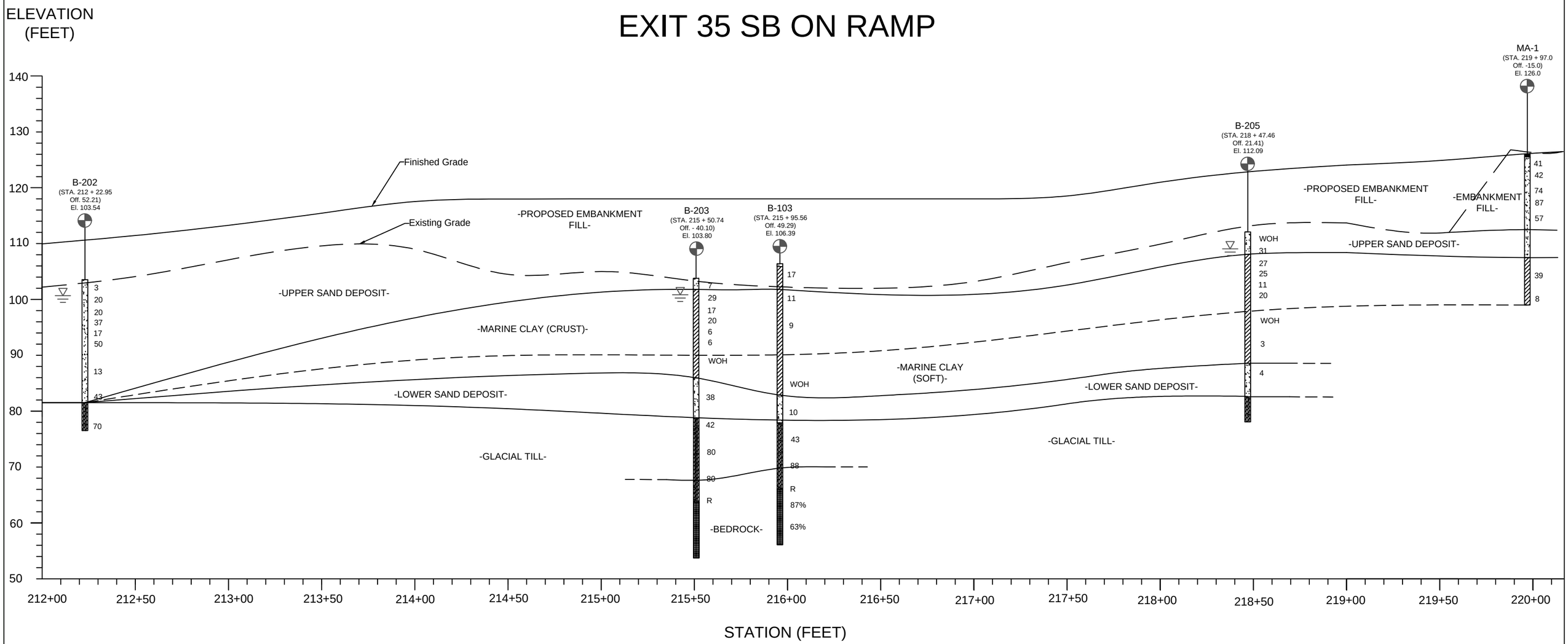
Revision
#0

Date
2021.02.04

Reference Sheet
-

Figure No.
9

EXIT 35 SB ON RAMP



ORIGINAL SHEET - ANSI B

MARCH 2021
179450125

Stantec

428 PAYNE ROAD
SCARBOROUGH, ME
www.stantec.com

B-201
(STA. 212+50 Off. 40)
El. 226.5
22
WOH
R
80%

BORING DESIGNATION
EXIT 35 SB ON RAMP BASELINE STATION/OFFSET
GROUND SURFACE ELEVATION
STANDARD PENETRATION TEST(SPT) N-VALUE
GROUNDWATER LEVEL
WEIGHT OF HAMMER
SPLIT SPOON/ROLLER BIT REFUSAL
RQD OF CORE RUN

Legend

= SAND DEPOSIT
= EMBANKMENT FILL
= MARINE CLAY
= GLACIAL TILL
= BEDROCK

Notes

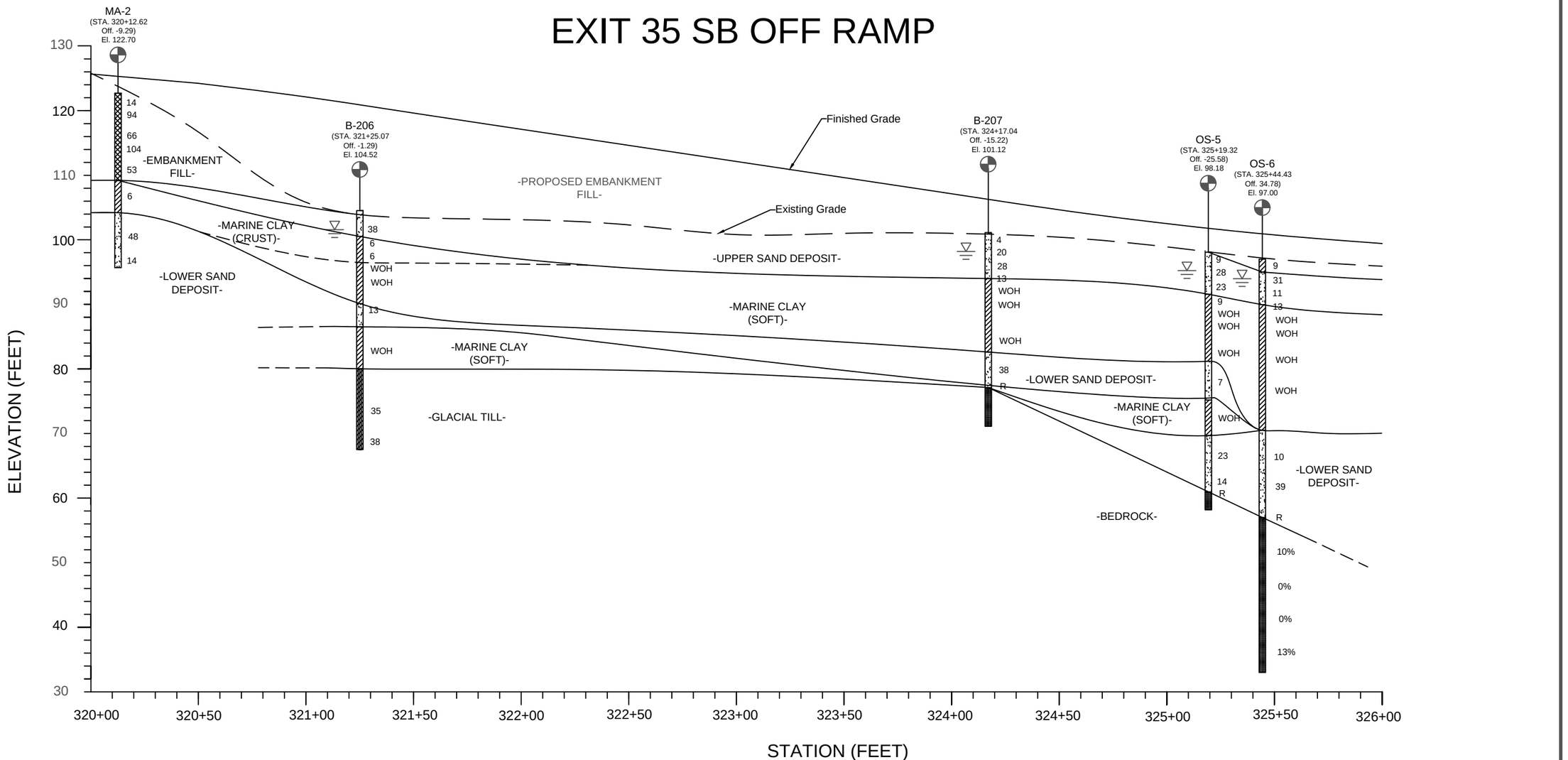
1) GEOLOGIC PROFILE WAS DEVELOPED FROM WIDELY SPACED BORINGS DRILLED BY NEW ENGLAND BORING CONTRACTORS OF HERMON, ME AND DERRY, NH UNDER SUPERVISION OF STANTEC FROM DECEMBER 16, 2019 THROUGH NOVEMBER 30, 2020.
2) BORING LOCATIONS ARE REFERENCED FROM THE EXIT 35 SB ON RAMP BASELINE.
3) ELEVATIONS SHOWN ARE IN FEET AND REFERENCED TO NAVD 1988.
4) TOP OF BEDROCK WAS DETERMINED BY ROLLER BIT REFUSAL OR BY ROCK CORE.
5) STRATA LINES ARE BASED ON LINEAR INTERPOLATION BETWEEN TEST BORINGS. ACTUAL CONDITIONS WILL VARY FROM THE CONDITIONS SHOWN.
6) GROUNDWATER ELEVATIONS WERE INTERPOLATED FROM SOIL SAMPLES AND DRILL CUTTINGS.
7) LOCATIONS OF TEST BORINGS WERE DETERMINED BY SURVEYING METHODS.

Client/Project
MAINE TURNPIKE AUTHORITY
EXITS 35 & 36 INTERCHANGE IMPROVEMENTS
SACO, MAINE

Figure No.
10

Title
GEOLOGIC PROFILE
STATION 212+00 TO 219+00

EXIT 35 SB OFF RAMP



ORIGINAL SHEET - ANSI B

FEBRUARY 2021
179450125

Stantec

2211 Congress Street
Portland, ME
www.stantec.com

B-201
(STA. 212+50 Off. 40)
El. 226.5
BORING DESIGNATION
EXIT 35 SB ON RAMP BASELINE STATION/OFFSET
GROUND SURFACE ELEVATION
22 STANDARD PENETRATION TEST(SPT) N-VALUE
GROUNDWATER LEVEL
WOH WEIGHT OF HAMMER
R SPLIT SPOON/ROLLER BIT REFUSAL
80% RQD OF CORE RUN

Legend

= SAND DEPOSIT
= EMBANKMENT FILL
= MARINE CLAY
= GLACIAL TILL
= BEDROCK

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Client/Project
MAINE TURNPIKE AUTHORITY
EXITS 35 & 36 INTERCHANGE IMPROVEMENTS
SACO, MAINE

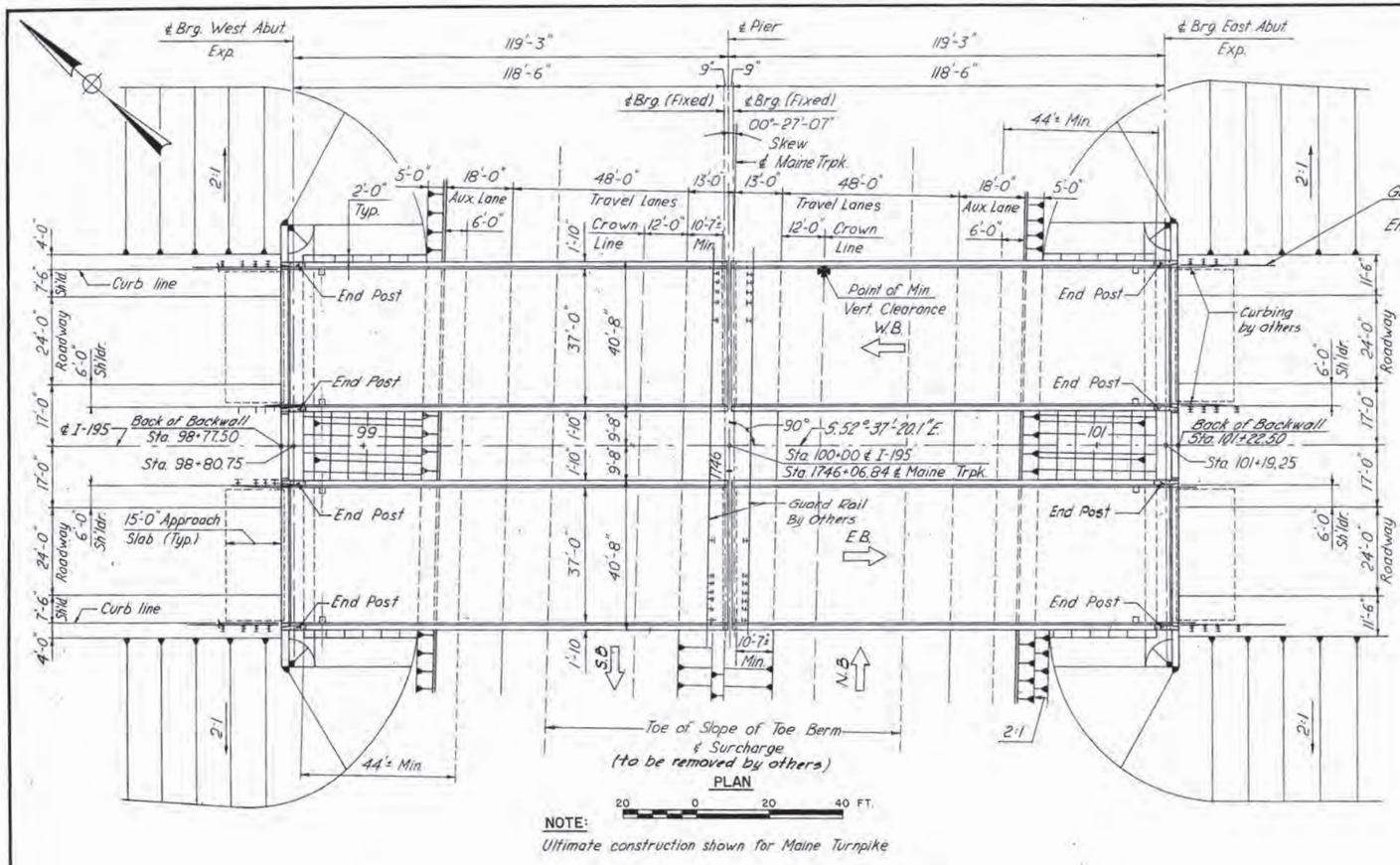
Figure No.
11

Title
GEOLOGIC PROFILE
STATION 320+00 TO 326+00

APPENDICES

Appendix A I-195 Bridge Plans

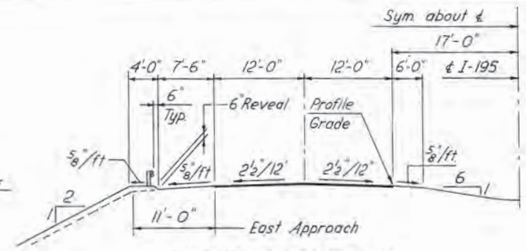
F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	IG-195-2(9)	2	37



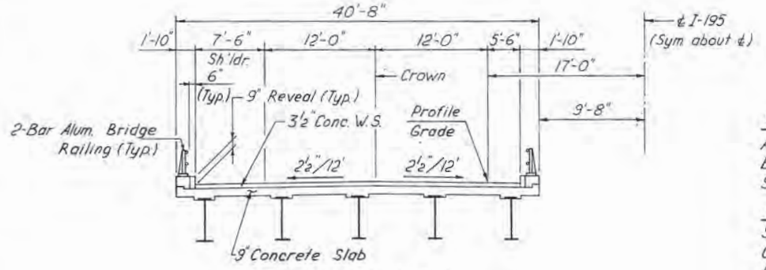
PLAN

20 0 20 40 FT.

NOTE:
Ultimate construction shown for Maine Turnpike



HALF SECTION-ROUTE I-195



TYPICAL CROSS SECTION

DESIGN

AASHTO Specifications for Highway Bridges' 1977 and Interim Specifications 1978 & 1979

CONTRACT

State of Maine, State Highway Commission, Standard Specifications Highway and Bridges, Revision of June 1968.

DESIGN LOADING

LIVE LOAD

HS25 as modified for Interstate

MATERIALS

CONCRETE

Wearing Surface _____ Class AA
Slope Protection _____ Class Y
All Others _____ Class A

REINFORCING STEEL

ASTM A615 Grade 60

STRUCTURAL STEEL

Welded Girders ASTM { A572, Grade 50 Flanges / A36 Webs
High Strength Bolts - ASTM A325
Joints ASTM A588 (any grade)
All Others ASTM A36

BASIC ALLOWABLE STRESSES

REINFORCING STEEL

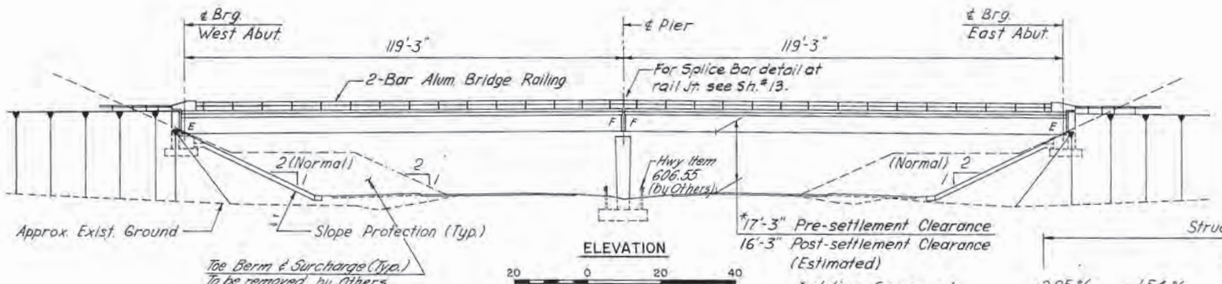
f_s = 24,000 p.s.i.

STRUCTURAL STEEL

ASTM	A588	f_s = 27,000 p.s.i.
ASTM	A36	f_s = 20,000 p.s.i.
ASTM	A325	f_v = 25,000 p.s.i.
ASTM	A572	f_s = 27,000 p.s.i.

CONCRETE

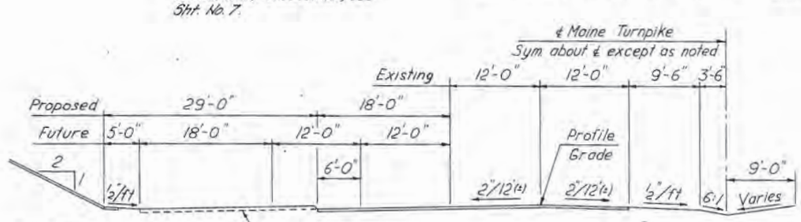
f_c = 1,200 p.s.i. n = 9



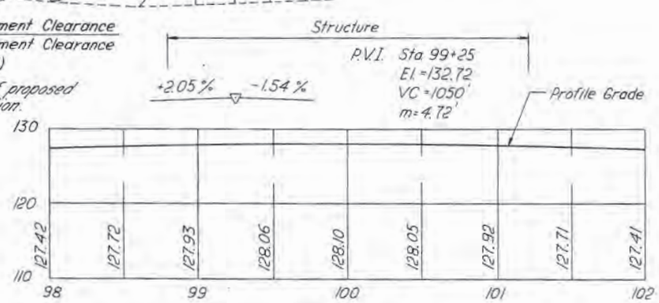
ELEVATION

20 0 20 40

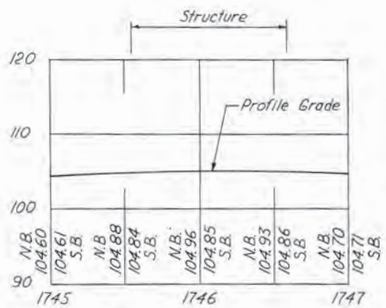
Horizontal & Vertical Scale in Feet



HALF SECTION-MAINE TURNPIKE



PROFILE - I-195



PROFILE - MAINE TURNPIKE

NO.	REVISION	BY	DATE

	BY	DATE
MADE	V.G.	4-81
TRACED		
CHECKED	N.F.O.	4-81
IN CHARGE OF J.A.E.		

R92-193

HOWARD NEEDLES TAMMEN & BERGENDOFF
CONSULTING ENGINEERS BOSTON

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

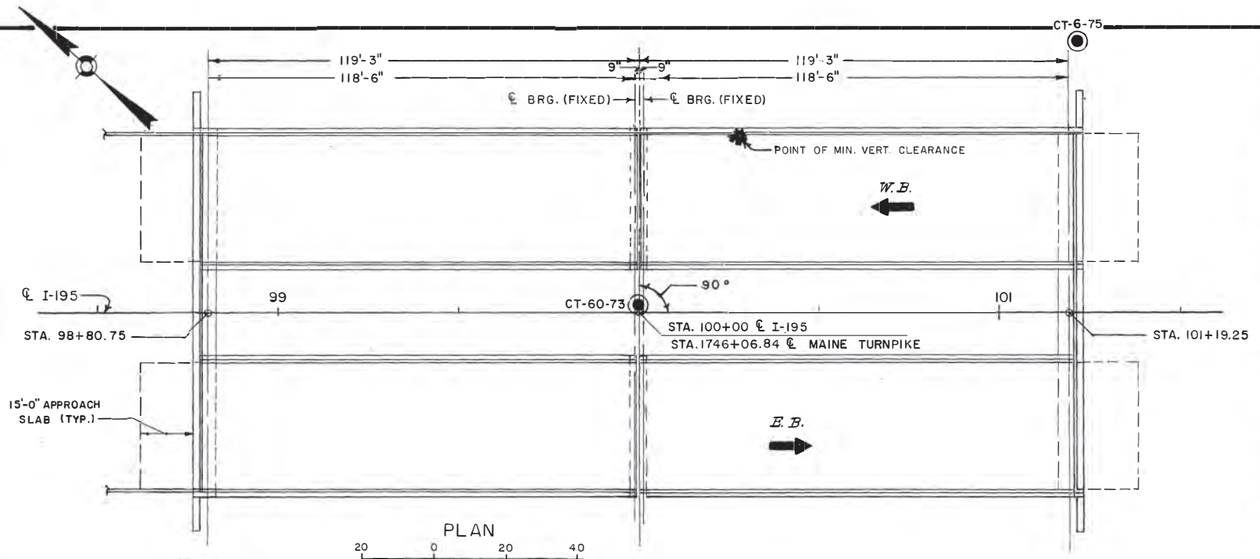
ROUTE I-195
OVER
MAINE TURNPIKE

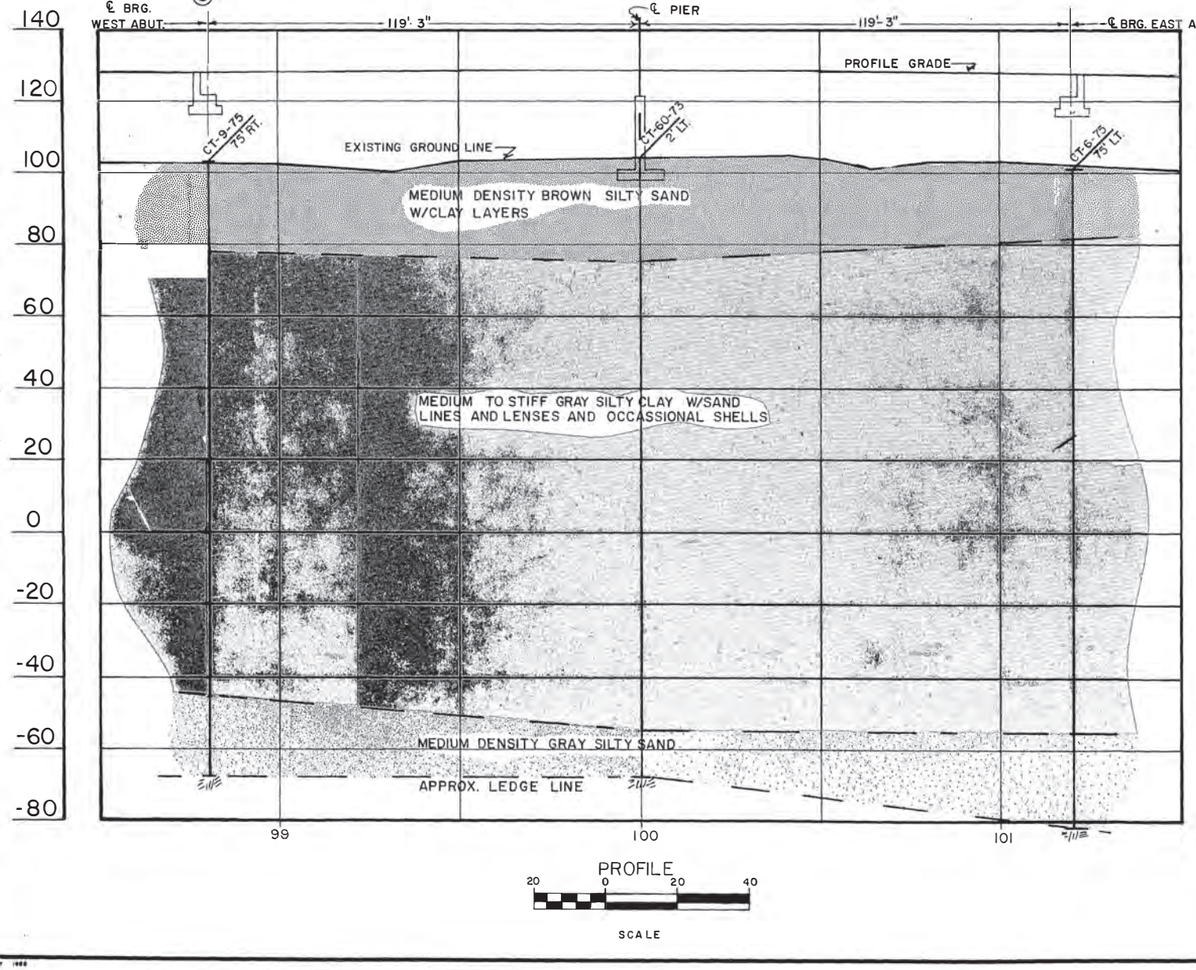
GENERAL PLAN

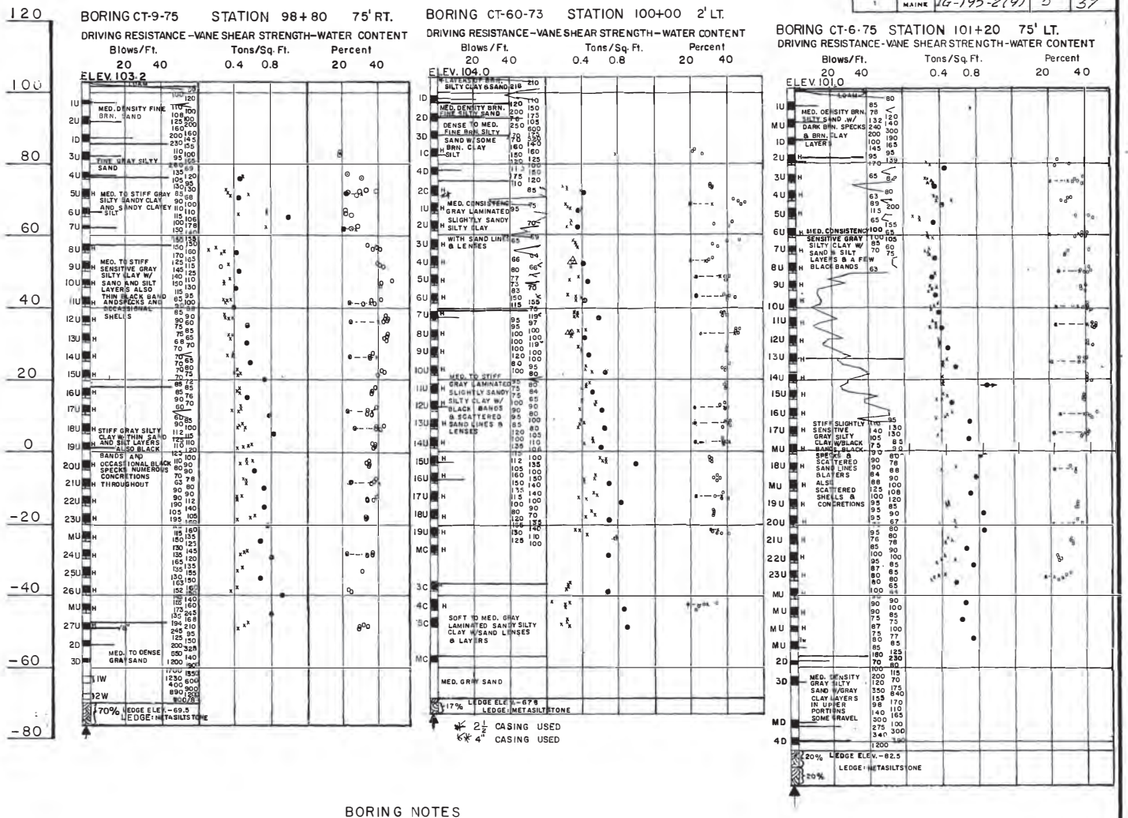
SACO, MAINE

SHEET 2 OF 16 AUGUSTA, MAINE

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	IG-195-2(9)	5	37







BORING NOTES

All samples and vanes are made ahead of casing
2-1/2" & 4" Casing used

- Number of blows required to drive extra heavy casing one foot with 400 ft. lbs. of energy per blow
- Location of sample or sample attempt
- Number and type of dry sample
  - ID — S&H Sampler #1290's
  - IC — 2" O.D. 16 ga. seamless tubing
  - IU — 3-1/2" O.D. 16 ga. seamless tubing
  - IW — Wash sample and number
  - MD — Unsuccessful sample attempt and type of sampler
- Number of blows required to drive spoon or tubing one foot with 350 ft. lbs. of energy per blow
- H — Sampling spoon or seamless tubing driven by static weight of drill rods and hammer
- P — Piston sampler
- Field vane test
- Bottom of boring (may not be bottom of soil strata)
- 71% — Locations cored by diamond bit and percent recovery of rock

SHEAR NOTES

- ● Field vane shear strengths
- X Laboratory vane shear strengths
- → Shear strengths in excess of capacity of equipment
- △ Triaxe shear strengths

WATER CONTENT NOTES

- O Natural water content, given as percent of dry weight
- ⊗--X Plastic and liquid limits

PROJECT DESIGN ENGINEER

PLANS	DESIGN - DETAILED	CHECKED	REVISIONS	FIELD CHANGES
BY				
DATE				

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

ROUTE I-195
OVER
MAINE TURNPIKE
IN THE CITY OF
SACO
YORK COUNTY

FOUNDATION SURVEY
SHEET 5 OF 16 AUGUSTA, MAINE

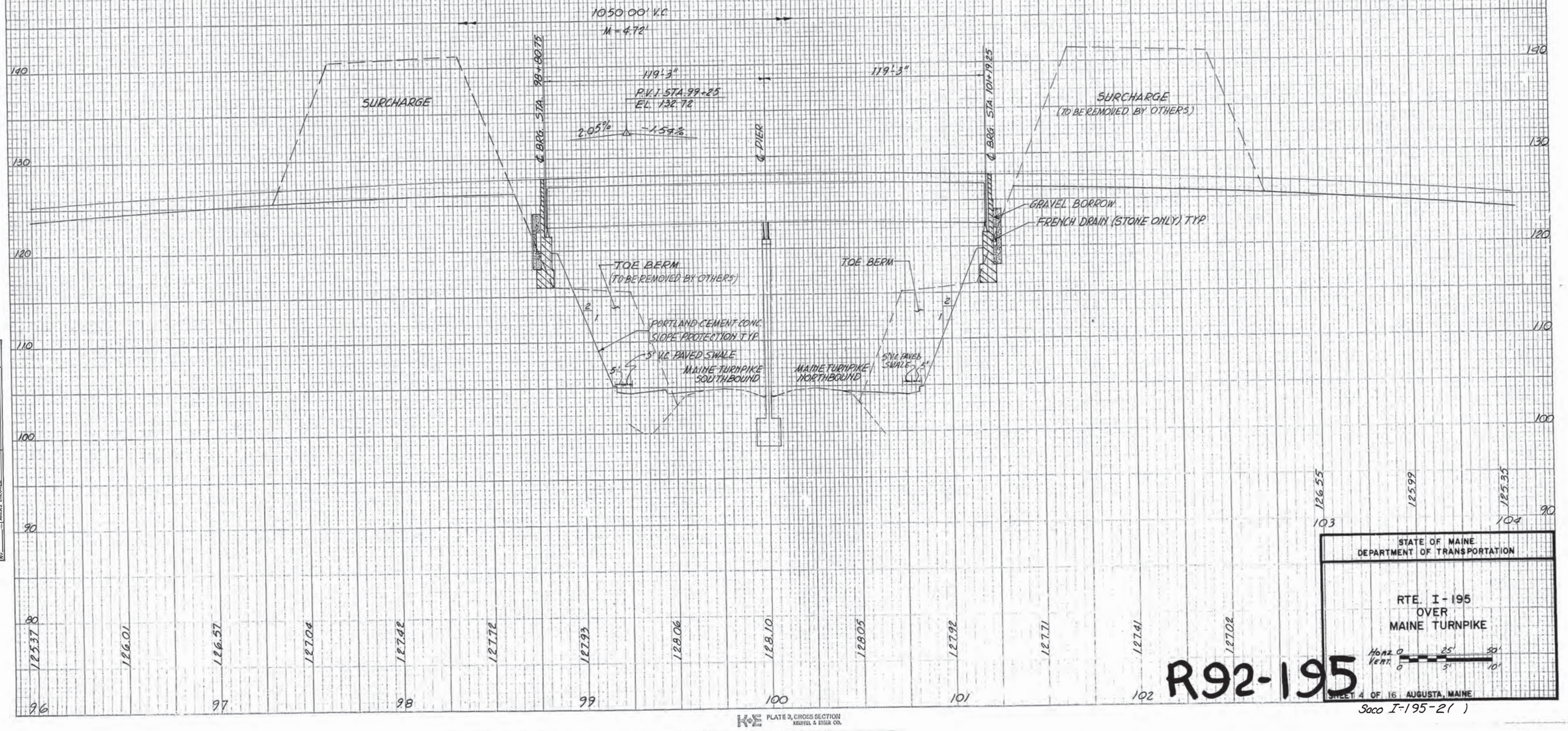
R92-196

JANUARY 1988

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	IG-195-2(9)	4	37

FINAL SURVEY	BY	DATE
NOTE BOOK	SURVEYED	
NO.	PLOTTED	
	TEMPLATE	
	AREAS	
	AREAS CHECKED	

ORIGINAL SURVEY	BY	DATE
NOTE BOOK	SURVEYED	
NO.	PLOTTED	
	TEMPLATE	
	AREAS	
	AREAS CHECKED	



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

RTE. I-195
OVER
MAINE TURNPIKE

Horiz. 0 25' 50'
Vert. 0 5' 10'

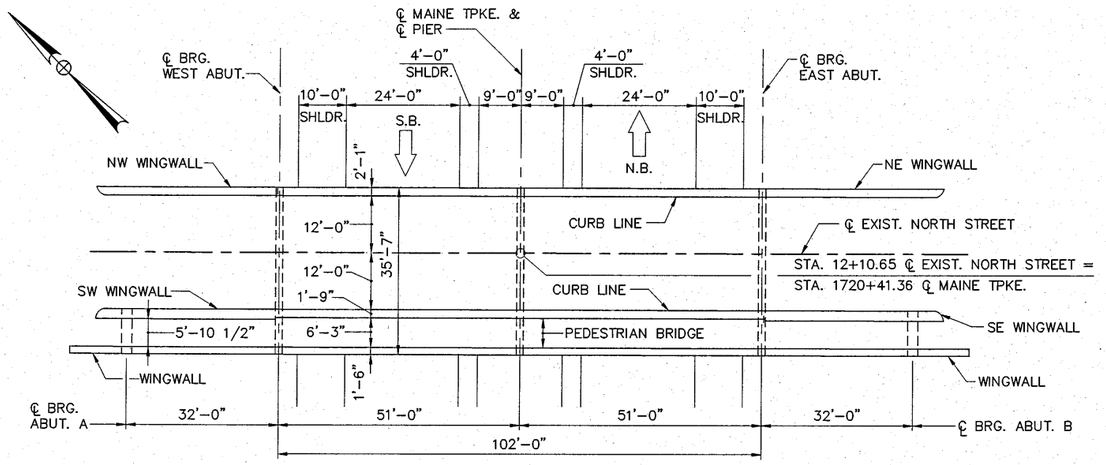
SHEET 4 OF 16 AUGUSTA, MAINE

R92-195

Saco I-195-2( )

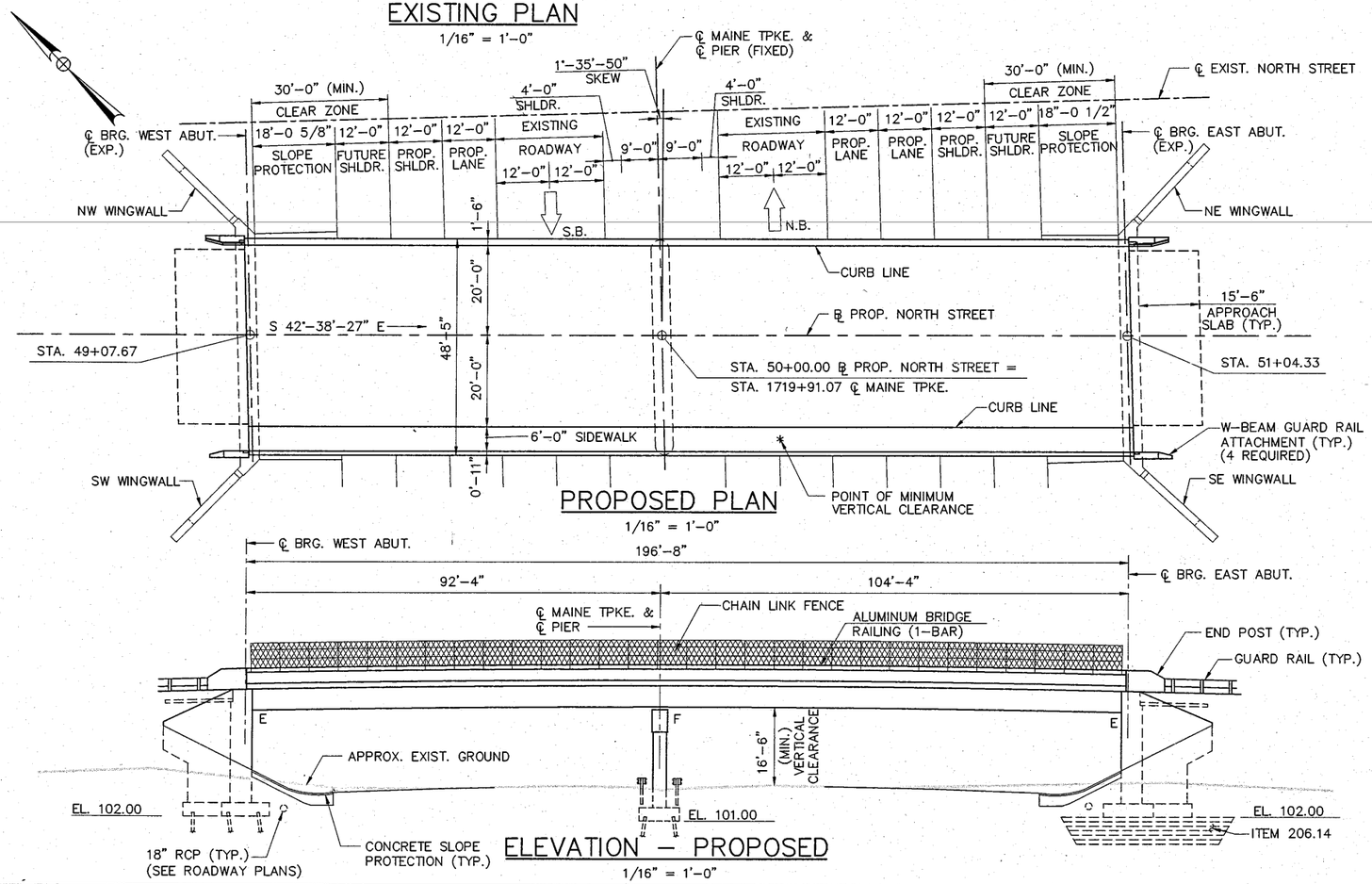
K+E PLATE 3, CROSS SECTION
KEUFFEL & ESSER CO.

Appendix B Route 112 Bridge Plans



EXISTING PLAN

1/16" = 1'-0"

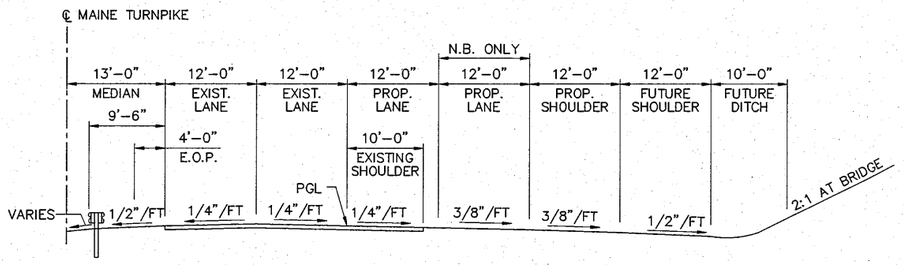


PROPOSED PLAN

1/16" = 1'-0"

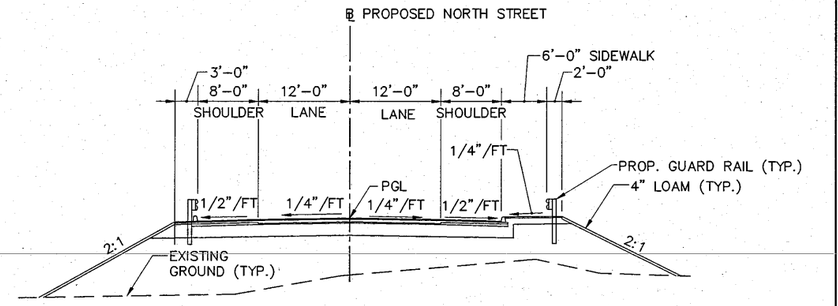
ELEVATION — PROPOSED

1/16" = 1'-0"



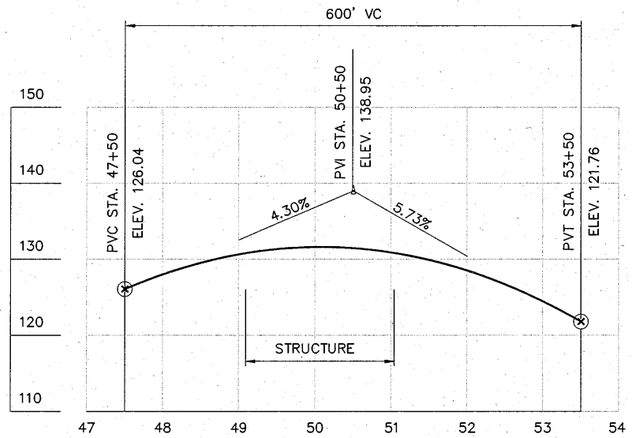
HALF APPROACH SECTION MAINE TURNPIKE

1" = 10'



APPROACH SECTION NORTH STREET

1" = 10'



PROPOSED PROFILE

HORIZ. 1" = 100'
VERT. 1" = 10'

Scale:

No.	Revision	By	Date

Designed by: Edwards and Kelcey
THE SCHRAFFT CENTER
529 MAIN STREET, SUITE 203
BOSTON, MASSACHUSETTS 02129-1107
PHONE: (617) 242-9222
FAX: (617) 242-9824

	By	Date		By	Date
Designed	SBH	DEC. 2001	Checked	DWC	DEC. 2001
Drawn	SMG	DEC. 2001	In Charge of	DWC	DEC. 2001

PE Stamp:

Approved by: HNTB
HNTB CORPORATION
ARCHITECTS ENGINEERS PLANNERS
2 Thomas Drive
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 772-7410

MAINE TURNPIKE AUTHORITY
MODERNIZATION
AND WIDENING PROJECT
The Widening

BRIDGE REPLACEMENT
NORTH STREET UNDERPASS
PLAN & ELEVATION

SHEET NUMBER: NS-S1
CONTRACT: 2002.01
191 OF 257

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GENERAL NOTES

SPECIFICATIONS

DESIGN

AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES SIXTEENTH EDITION 1996 WITH LATEST INTERIM REVISIONS.

CONSTRUCTION

STATE OF MAINE, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS, HIGHWAYS AND BRIDGES, REVISION OF APRIL 1995.

DESIGN LOADING

LIVE LOAD

HS 25–44, 500,000 CYCLES

DESIGN METHOD

LOAD FACTOR DESIGN

MATERIALS

CONCRETE

f'c = 4,500 P.S.I. (CLASS AAA)

REINFORCING STEEL

AASHTO M31 GRADE 60, (EPOXY–COATED AND UNCOATED BARS).

fy = 60,000 P.S.I.

STRUCTURAL STEEL

WELDED GIRDERS: FLANGES, WEBS, SPLICE PLATES, BEARING STIFFENERS AND BEARING REINFORCEMENT PLATES SHALL BE AASHTO M270, GRADE 50, Fy = 50,000 P.S.I.

ALL OTHER STRUCTURAL STEEL SHALL BE AASHTO M270, GRADE 36, Fy = 36,000 P.S.I.

HIGH STRENGTH BOLTS SHALL BE AASHTO M164

SUMMARY OF BRIDGE QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
202.1933	REMOVING EXISTING BRIDGE – NORTH STREET	L.S.	1
206.082	STRUCTURAL EARTH EXCAVATION – MAJOR STRUCTURES	C.Y.	3000
206.10	STRUCTURAL EARTH EXCAVATION – PIERS	C.Y.	150
206.14	SPECIAL BACKFILL	C.Y.	770
304.10	AGGREGATE SUBBASE COURSE – GRAVEL	C.Y.	1850
403.08	HOT BITUMINOUS PAVEMENT, GRADING C	TON	150
501.231	DYNAMIC LOADING TEST	EACH	2
501.40	STEEL H–BEAM PILES 53 LBS/FT, DELIVERED	L.F.	1350
501.401	STEEL H–BEAM PILES 53 LBS/FT, IN PLACE	L.F.	1350
501.90	PILE TIPS	EACH	89
502.2192	STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS – NORTH STREET (830 C.Y.)*	L.S.	1
502.239	STRUCTURAL CONCRETE PIERS (84 C.Y.)*	L.S.	1
502.263	STRUCTURAL CONCRETE ROADWAY AND END POSTS ON STEEL BRIDGES (280 C.Y.)*	L.S.	1
502.264	STRUCTURAL CONCRETE PARAPETS (39 C.Y.)*	L.S.	1
502.265	STRUCTURAL CONCRETE SIDEWALK (58 C.Y.)*	L.S.	1
502.31	STRUCTURAL CONCRETE APPROACH SLAB (30 C.Y.)*	L.S.	1
503.12	REINFORCING STEEL, FABRICATED AND DELIVERED	LB.	68,200
503.13	REINFORCING STEEL, PLACING	LB.	68,200
503.14	EPOXY–COATED REINFORCING STEEL, FABRICATED AND DELIVERED	LB.	128,400
503.15	EPOXY–COATED REINFORCING STEEL, PLACING	LB.	128,400
504.702	STRUCTURAL STEEL FABRICATED AND DELIVERED, WELDED (21,100 LBS. GRADE 36, 259,300 LBS. GRADE 50)*	L.S.	1
504.71	STRUCTURAL STEEL ERECTION (280,400 LBS.)*	L.S.	1
505.09	STUD WELDED SHEAR CONNECTORS (2,800 EA.)*	L.S.	1
506.30	SHOP COATING OF STRUCTURAL STEEL (280,400 LBS.)*	L.S.	1
506.31	FIELD REPAIR OF DAMAGED COATING	L.S.	1
507.091	ALUMINUM BRIDGE RAILING, 1–BAR (202 L.F.)*	L.S.	1
507.0922	ALUMINUM BRIDGE RAILING, 2–BAR (202 L.F.)*	L.S.	1
508.132	MEMBRANE WATERPROOFING – NORTH STREET (950 S.Y.)*	L.S.	1
511.0912	TEMPORARY EARTH SUPPORT SYSTEM – NORTH STREET	L.S.	1
512.0812	FRENCH DRAINS (180 L.F.)* – NORTH STREET	L.S.	1
513.09	SLOPE PROTECTION – PORTLAND CEMENT CONCRETE	S.Y.	240
514.06	CURING BOX FOR CONCRETE CYLINDERS	EACH	1
515.202	CLEAR PROTECTIVE COATING FOR CONCRETE SURFACES	S.Y.	670
520.221	EXPANSION DEVICE – LOCKING COMPRESSION SEAL WITH STEEL EDGE BEAMS (95 L.F.)*	EACH	2
523.31	ELASTOMERIC BEARING ASSEMBLY	EACH	18
524.40	PROTECTIVE SHIELD	S.Y.	1000
607.18	CHAIN LINK FENCE, 9–FT.–2–IN.	L.F.	196
609.132	VERTICAL BRIDGE CURB TYPE 1B	L.F.	213
609.15	SLOPED CURB TYPE 1	L.F.	214

* QUANTITIES FOR ESTIMATING PURPOSES ONLY

INDEX OF DRAWINGS

NOTES

1. COPIES OF AS–BUILT PLANS ARE ON FILE AT THE MAINE TURNPIKE AUTHORITY. A PORTION OF THESE PLANS ARE INCLUDED IN THIS CONTRACT FOR THE CONTRACTOR'S CONVENIENCE. THE COMPLETENESS AND ACCURACY OF THESE PLANS IS NOT GUARANTEED.
2. ALL PROPOSED ELEVATIONS REFERENCE THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988. THE ELEVATIONS REFERENCED ON THE AS–BUILT PLANS MAY DIFFER.
3. FOR ADDITIONAL DETAILS REFERENCED OR NOT SHOWN IN THESE DRAWINGS, SEE THE STATE OF MAINE, DEPARTMENT OF TRANSPORTATION, STANDARD DETAILS, HIGHWAYS AND BRIDGES, APRIL 1997.
4. ALL EXISTING DIMENSIONS AND DETAILS ARE TAKEN FROM ORIGINAL DESIGN DRAWINGS AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND EXISTING DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENT AND SURVEY.
5. NORTH STREET WAS FORMERLY KNOWN AS BUXTON ROAD – STATE ROUTE 112.

ABBREVIATIONS

S.B.	SOUTHBOUND
N.B.	NORTHBOUND
N.F.	NEAR FACE
F.F.	FAR FACE
E.F.	EACH FACE
T	TOP
B	BOTTOM
&	AND
TYP.	TYPICAL
EXIST.	EXISTING
PROP.	PROPOSED
ABUT.	ABUTMENT
U.O.N.	UNLESS OTHERWISE NOTED

AS–BUILT PLANS

SHEET NO.	TITLE
IC83.1	GENERAL PLAN AND ELEVATION
IC83.2	ABUTMENTS
IC83.3	CENTER PIER
IC83.4	FRAMING PLAN AND BEAM DETAILS
11 OF 17	DECK REINFORCING
2	GENERAL PLAN & ELEVATION
3	FOOTING PLAN, ABUTMENTS & WINGWALL DETAILS
4	PIER DETAILS
5	FRAMING PLAN & STEEL DETAILS
6	DECK PLAN & DETAILS

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Scale:

No.	Revision	By	Date

Designed by: Edwards AND Kelcey

THE SCHRAFFT CENTER
529 MAIN STREET, SUITE 203
BOSTON, MASSACHUSETTS 02129-1107
PHONE: (617) 242-9222
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Designed	JJW	DEC. 2001	Checked	SBH	DEC. 2001
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Approved by: HNTB

HNTB CORPORATION
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MAINE TURNPIKE AUTHORITY
MODERNIZATION
AND WIDENING PROJECT

THINKING AHEAD The Widening

BRIDGE REPLACEMENT
NORTH STREET UNDERPASS
INDEX & QUANTITIES

SHEET NUMBER: NS–S2

CONTRACT: 2002.01

TEST PIT LOG B33-1

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 125.3
Ground Water Depth: 20' ±
Client: HNTB Corporation
Date: 7-27-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
0			S-1	Asphalt (0.4').	12	67	120		
				FILL: gravelly sand, very dense, dry, coarse to fine sand, some gravel, trace silt, brown (roadway base/subbase material).		50			
				FILL: sand, dense, dry then moist, medium to fine sand, trace to little silt, brown.					
5			S-2		14	15 25 30	55		
			S-3		16	13 25	50	13	GS
10			S-4		14	34 16 20	44		
			S-5	Becomes silty.	14	24 25	70		
			S-6		20	10 30 40	35		
15				SILTY CLAY (CL); hard, dry, olive-brown.		23			
			S-7	Pocket Penetrometer: Su = 4.5 ksf.	24	21 14 16	34		
						9 9			
20			S-8	Becomes moist.	24	25 36	77		
						18 30			
						47 51			
25			S-9	Some thick (6" to 8") sand-silty sand seams/lenses, stratified.	24	32 13	24		
						11 10			
				GRAVELLY SILTY SAND (SM); dense, wet, coarse to fine sand, some coarse to fine gravel, little silt, trace cobbles, brown then gray (Glacial Till).					
30			S-10		20	28 25	42		
						13 21			
			S-11		10	8			

R.W. Gillespie & Associates, Inc.
Saco, Maine

TEST PIT LOG B33-1

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 125.3
Ground Water Depth: 20' ±
Client: HNTB Corporation
Date: 7-27-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
35				Top of Bedrock at 34.8'.		31	56+		
				Began 2" diameter rock core at 36'.		4			
				R-1 (36' to 41'); medium hard, moderately weathered, light gray, fine grain PHYLITE, Cape Elizabeth Formation with close, moderately dipping		25/0			
40				to high angle, undulating, smooth, decomposed, closed foliation joints with some secondary mineralization and healed jointing.					
				Recovery = 36/60, RQD = 0					
				Depth (Ft) Time (min)					
				36.0 to 37.0 1.0					
				37.0 to 38.0 3.0					
45				38.0 to 39.0 5.0					
				39.0 to 40.0 6.0					
				40.0 to 41.0 6.0					
				R-2 (41 to 46'); same as R-1.					
				Rec. = 40/60 RQD = 6					
50				41.0 to 42.0 5.0					
				42.0 to 43.0 5.0					
				43.0 to 44.0 6.0					
				44.0 to 45.0 7.0					
55				45.0 to 46.0 6.0					
				Bottom of Exploration at 46.0'.					
60									
65									

R.W. Gillespie & Associates, Inc.
Saco, Maine

TEST PIT LOG B33-2-OW

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 109.8
Ground Water Depth: 6.8'
Client: HNTB Corporation
Date: 07-07-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
0			S-1	Topsoil and Organic Material (0.8').	12	7	36	17	MC
				SILTY CLAY (CL); hard, dry, olive brown.		18 18			
						28			
5			S-2	Becomes moist.	12	19 30	65	21	MC
						35 48			
			S-3	Becomes coarse at 8.5'.	24	4	13	31	MC
10				Pocket Penetrometer: Undrained Shear Strength, Su = 1.0 ksf		7 9			
				Becomes stiff to medium stiff.					
				Seam of fine sand (1") thick at 9.5'.					
15			S-4	Cobble at 13.5'.	24	WOR/		31	AL
				Becomes wet, gray.		24"			
				Seam of fine sand (1/4") thick at 15.5'.					
				Atterberg Limits: L = 25, PL = 15.					
				Attempted Field Vane at 17.1', too stiff, probable cobble.					
20			S-5	GRAVELLY SILTY SAND (SM); very dense, wet, coarse to fine sand, some coarse to fine gravel, trace silt, gray, (GLACIAL TILL).	0.5	15 33	54		
						29 28			
				Top of bedrock at 22.3'.					
				Began 2" diameter rock core at 24'.					
25				R-1 (24.0' to 29.0'); moderately hard, slightly to moderately weathered, gray, fine grained, SCHIST, Cape Elizabeth Formation, extremely to very close, high angle joints, undulating, slickensided, discolored, partly open with secondary mineralization.					
				Recovery= 87%, RQD= 0					
				Depth (Ft) Time (min)					
30				24.0 to 25.0 5.5					
				25.0 to 26.0 3.5					
				26.0 to 27.0 3.0					
				27.0 to 28.0 3.5					
				28.0 to 29.0 4.0					
				R-2 (29.0 to 34.0); same as R-1 except medium to soft, moderately to					

R.W. Gillespie & Associates, Inc.
Saco, Maine

TEST PIT LOG B33-2-OW

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 109.8
Ground Water Depth: 6.8'
Client: HNTB Corporation
Date: 07-07-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
35				highly weathered, discolored to decomposed.					
				Recovery= 40%, RQD= 0					
				29.0 to 30.0 5.5					
				30.0 to 31.0 3.5					
				31.0 to 32.0 3.0					
40				32.0 to 33.0 2.0					
				33.0 to 34.0 1.5					
				Bottom of Exploration at 34.0'.					
45									
50									
55									
60									
65									

R.W. Gillespie & Associates, Inc.
Saco, Maine

GENERAL NOTES

1 SOIL AND ROCK (WHERE ENCOUNTERED) CLASSIFICATION, PROPERTIES AND DESCRIPTIONS ARE BASED ON ENGINEERING INTERPRETATION OF AVAILABLE SUBSURFACE INFORMATION BY R.W. GILLESPIE AND ASSOCIATES, INC. AND MAY NOT NECESSARILY REFLECT ACTUAL VARIATIONS IN SUBSURFACE CONDITIONS THAT MAY BE ENCOUNTERED BETWEEN INDIVIDUAL BORING OR SAMPLE LOCATIONS.

2 OBSERVED WATER LEVELS AND/OR WATER CONDITIONS INDICATED ARE AS RECORDED AT THE TIME OF EXPLORATION AND MAY VARY ACCORDING TO THE PREVAILING RAINFALL, METHODS OF EXPLORATION AND OTHER FACTORS.

3 SOUND ENGINEERING JUDGEMENT WAS EXERCISED IN PREPARING THE SUBSURFACE INFORMATION PRESENTED HEREIN. ANALYSIS AND INTERPRETATION OF SUBSURFACE DATA WAS PERFORMED AND INTENDED FOR AUTHORITY DESIGN AND ESTIMATE PURPOSES ONLY. PRESENTATION OF THE INFORMATION ON THE PLANS OR ELSEWHERE IS FOR THE PURPOSE OF PROVIDING INTENDED USERS WITH ACCESS TO THE SAME DATA AVAILABLE TO THE AUTHORITY. THE SUBSURFACE INFORMATION IS PRESENTED IN GOOD FAITH AND IS NOT INTENDED AS A SUBSTITUTE FOR PERSONAL INVESTIGATION, INDEPENDENT INTERPRETATIONS, INDEPENDENT ANALYSIS OR JUDGEMENT BY THE CONTRACTOR.

4 THE SURFACE EXPLORATIONS SHOWN HEREIN WERE MADE BETWEEN JUNE 28, 1999 AND JULY 27, 1999 BY NORTHEAST DRILLING. BORING LOGS WERE MADE BY R.W. GILLESPIE AND ASSOCIATES, INC.

5 BORINGS ARE TAKEN FOR THE PURPOSE OF DESIGN, AND SHOW CONDITIONS OF BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.

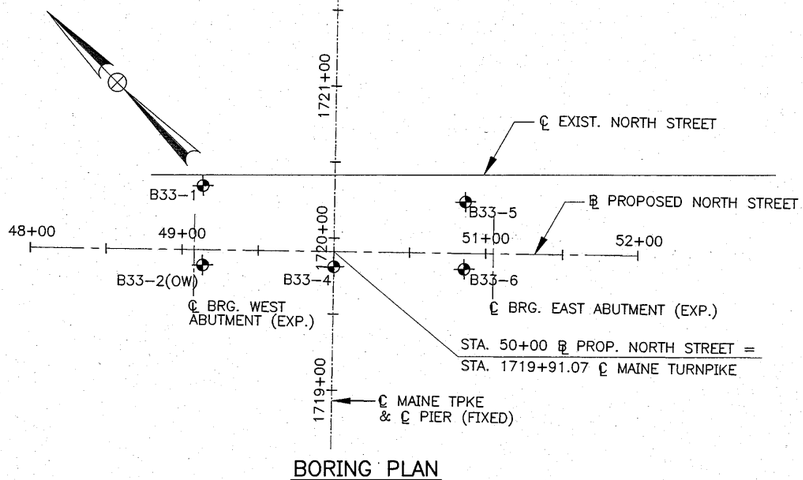
6 MEAN SEA LEVEL DATUM (NAVD 1988) IS USED THROUGHOUT.

7 AS-DRILLED BORING LOCATIONS WERE SURVEYED BY DES LAURIERS ASSOCIATES OF SCARBOROUGH, MAINE.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Topsoil
	Silty low plasticity clay
	Clayey sand and gravel
	Basalt (or generic rock)
	Paving
	Fill

Symbol	Description
Strata symbols	
	Weathered
	Clayey sand
Misc. Symbols	
	Water table during drilling
Soil Samplers	
	California sampler
	EXTRA: (generic sampling interval)



BORING PLAN

SCALE: 1" = 50'

Scale:

No.	Revision	By	Date

Designed by: Edwards AND Kelcey
THE SCHRAFFT CENTER
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MAINE TURNPIKE AUTHORITY
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THINKING AHEAD The Widening

BRIDGE REPLACEMENT
NORTH STREET UNDERPASS
BORING PLAN AND LOGS

SHEET NUMBER: NS-S3
CONTRACT: 2002.01
193 OF 257

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TEST PIT LOG B33-4

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 107.9
Ground Water Depth: 1.5'
Client: HNTB Corporation
Date: 06-28-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
0				Asphalt (0.5').					
			S-1	FILL: sandy gravel, loose, wet, coarse to fine gravel, some sand, gray-brown.	1	8 5 6	10		
			S-2	SILTY CLAY (CL); hard, moist, olive brown. Pocket Penetrometer: Undrained Shear Strength, Su= 4.5 ksf	24	11 16 D/D D/D 3	37		
			S-3			6 D/D D/D	9		
10				Becomes gray, stiff to medium stiff and wet at 10.0'.					
			FV	Field Vane: Su= 1.02 ksf, Remolded Su= 0.12 ksf					
			S-4	GRAVELLY SILTY SAND (SM); dense, wet, coarse to fine sand, medium to fine gravel, trace silt, gray (Glacial Till).	1	13 14 D/D D/D 21	35		
15				Trace weathered Bedrock in washings at 18.3'.					
			S-5	Top of bedrock at 19.0'. R-1 (19.0' to 24.0'); moderately hard, slightly weathered, fine grained, SCHIST, Cape Elizabeth Formation, very close to close, high angle, undulating, slickensided, discolored, open joints. Recovery= 100%, RQD= 68% Depth (ft) Time (min) 19.0 to 20.0 7.5 20.0 to 21.0 5.0 21.0 to 22.0 3.5 22.0 to 23.0 4.5 23.0 to 24.0 5.0 R-2 (24.0 to 29.0); same as R-1. Recovery= 98%, RQD= 38% 24.0 to 25.0 5.5 25.0 to 26.0 5.0 26.0 to 27.0 4.5 27.0 to 28.0 5.0 28.0 to 29.0 6.0	0.5	100/ 1"			
20									
25									
30				Bottom of Exploration at 29.0'.					

R. W. Gillespie & Associates, Inc.
Saco, Maine

TEST PIT LOG B33-5

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 125.6
Ground Water Depth: 19' ±
Client: HNTB Corporation
Date: 7-23-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
0				Asphalt (0.5').					
			S-1	FILL: gravelly sand, medium dense, dry, coarse to fine sand, little gravel, trace silt, brown.	10	24 30 34 30	64		
			S-2	FILL: sand, dense, dry to moist, medium to fine sand, trace silt, brown.	12	18 21 29 34	50		
10			S-3		14	12 15 20 34	38		
			S-4		16	13 D/D D/D	43	17	GS
			S-5	Becomes silty.	14	24 11 15	30		
15			S-6		15	15 17 12	37		
			S-7		16	17 20 22	31		
			S-8	SILTY CLAY (CL); hard to very stiff, moist, olive-brown. Pocket Penetrometer: Undrained Shear Strength, Su = 3.5 to 4.0 ksf.	24	20 19 12 17	28		
20						10 11 17			
			S-9	Becomes stiff, wet. Pocket Penetrometer: Su = 1.5 to 2.0 ksf	24	22 9 10	23		
25						13 11			
			S-10	Becomes gray with thin sand seams.	24	2 2 2	3		
30						1			
				GRAVELLY SILTY SAND (SM); dense, wet, coarse to fine sand, little gravel, little silt, gray (Glacial Till).					
			S-11		16	27			

R. W. Gillespie & Associates, Inc.
Saco, Maine

TEST PIT LOG B33-5

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 125.6
Ground Water Depth: 19' ±
Client: HNTB Corporation
Date: 7-23-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
35						20/0 24 44	49		
				Top of Bedrock at 36.0'. Began 2" diameter rock core at 38'.					
40				R-1 (38' to 43'); Soft, highly weathered, light gray, fine grained PHYLITE, Cape Elizabeth Formation, with close, moderatly to high angle, undulating, smooth, decomposed, closed foliation joints with mineralization and healed jointing. Recovery = 14/60, RQD = 0 Depth (ft) Time (min) 38.0 to 39.0 2.5 39.0 to 40.0 2.5 40.0 to 41.0 3.0 41.0 to 42.0 2.5 42.0 to 43.0 4.0					
45									
50				R-2 (43' to 48'); Transitions to: medium hard, fresh, light gray, fine grained PHYLLITE with closely spaced, moderately dipping, undulating, smooth, fresh to decomposed, closed foliation joints. Rec. 48/60 RQD = 20% Depth (ft) Time (min) 43.0 to 44.0 4.0 44.0 to 45.0 4.0 45.0 to 46.0 4.5 46.0 to 47.0 5.0 47.0 to 48.0 5.0 47.0 to 48.0 5.0					
55									
60									
65				Bottom of Exploration at 48.0'.					

R. W. Gillespie & Associates, Inc.
Saco, Maine

TEST PIT LOG B33-6

Project: Buxton Road Bridge
Location: Saco, Maine
Approximate Surface Elevation: 109.2
Ground Water Depth: 1.0' ±
Client: HNTB Corporation
Date: 7-20-99
Project No. 600-36

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	GRAIN SIZE %	Lab Tests
0			S-1	Topsoil and Organic Materials (1.0').	10	2 D/D 4 5	9		
				SILTY CLAY (CL); very stiff, moist, olive-brown.					
			S-2	Pocket Penetrometer: Undrained Shear Strength, Su = 3.5 to 4 ksf.	24	6 9 16 18	25		
5			S-3	Becomes stiff.	24	3 D/D 5	16		
				Pocket Penetrometer: Su = 1.5 to 2.0 ksf.					
10				SILTY SAND (SP-SM); medium dense, wet, medium to fine sand, little to trace silt, with silt seans, stratified, brown.		11 13			
			S-4	GRAVELLY SILTY SAND (SM); dense, wet, coarse to fine sand, coarse to fine gravel, little silt, gray (Glacial Till).	10	9 50/ 5" 50/ 0"	100+		
15				Top of bedrock at 14.9'. Began 2" diameter rock core at 16'.					
				R-1 (16' to 21') soft to medium hard, slightly weathered, dark gray, fine grained PHYLITE, Cape Elizabeth Formation with very close, high angle undulating, smooth, discolored to decomposed closed jointing (except open fracture from 18.3 to 18.8) trace secondary mineralization. Recovery = 36/60 RQD = 0 Depth (ft) Time (min) 16.0 to 17.0 4.0 17.0 to 18.0 3.5 18.0 to 19.0 3.0 19.0 to 20.0 7.0 20.0 to 21.0 8.0 R-2 (24' to 26'); same as R-1. Rec. = 58/60 RQD = 45 21.0 to 22.0 4.0 22.0 to 23.0 6.0 23.0 to 24.0 7.0 24.0 to 25.0 8.0 25.0 to 26.0 8.0					
20									
25									
30				Bottom of exploration at 26'.					

R. W. Gillespie & Associates, Inc.
Saco, Maine

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Scale:

No.	Revision	By	Date

Designed by:

Edwards AND Kelcey
THE SCHRAFFT CENTER
529 MAIN STREET, SUITE 203
BOSTON, MASSACHUSETTS 02129-1107
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	By	Date		By	Date
Designed	JJW	DEC. 2001	Checked	SBH	DEC. 2001
Drawn	SMG	DEC. 2001	In Charge of	DWC	DEC. 2001

PE Stamp:

Approved by:

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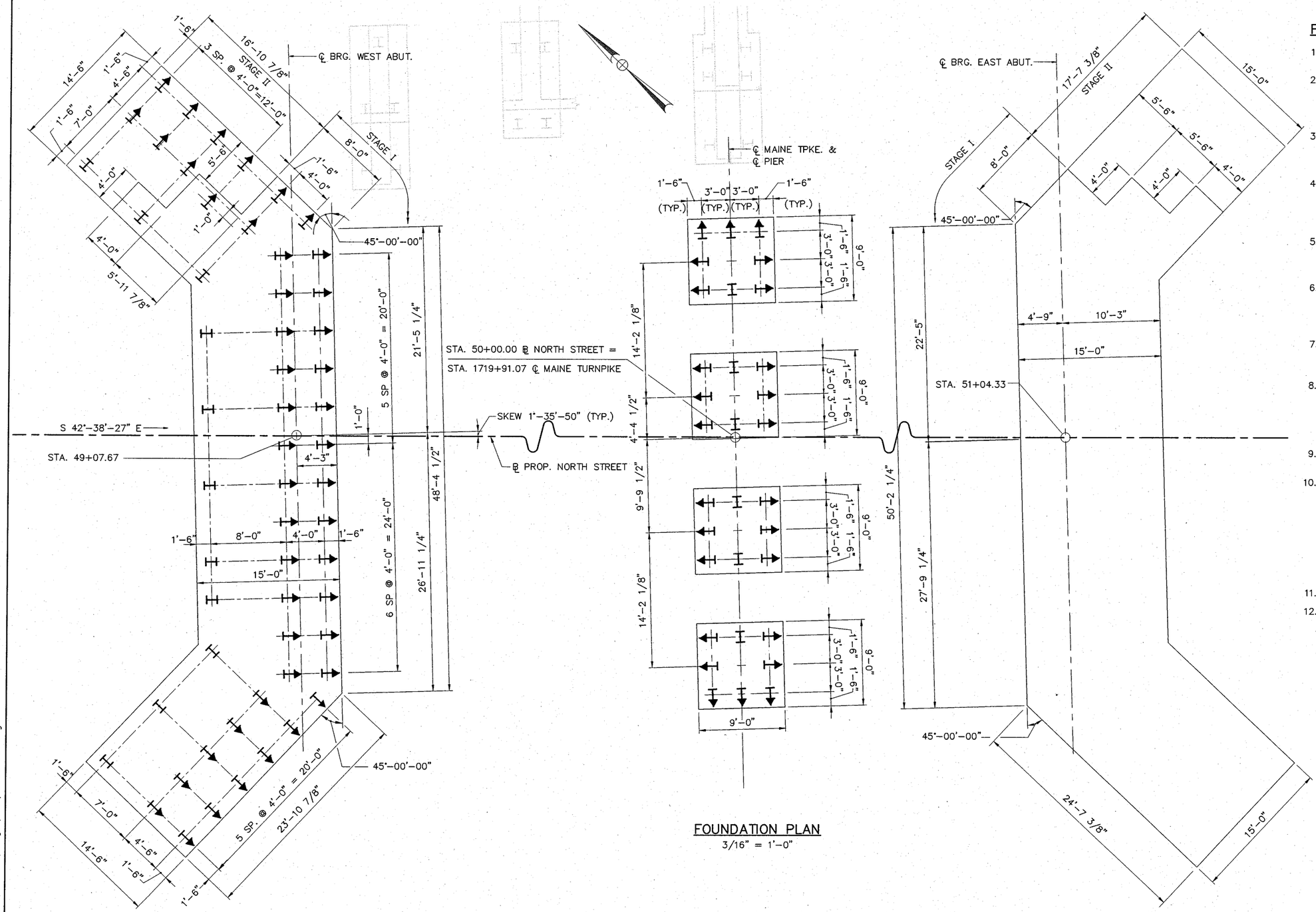
MAINE TURNPIKE AUTHORITY
MODERNIZATION
AND WIDENING PROJECT

The Widening

BRIDGE REPLACEMENT
NORTH STREET UNDERPASS
BORING LOGS

CONTRACT: 2002.01

SHEET NUMBER: NS-S4
194 OF 257



FOUNDATION PLAN
3/16" = 1'-0"

FOUNDATION NOTES:

1. ALL PROPOSED PILES SHALL CONFORM TO AASHTO DESIGNATION M270, GRADE 50.
2. PROPOSED PILE LAYOUT SHALL BE VERIFIED IN THE FIELD NOT TO INTERFERE WITH THE EXISTING PILES. ANY CHANGES TO PROPOSED PILE LAYOUT SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
3. ⊢ – INDICATES VERTICAL PILES
   ⊢→ – INDICATES PILES BATTERED 3 IN./FT. IN DIRECTION OF ARROW
4. ESTIMATE OF PILES REQUIRED:
   WEST ABUTMENT: 57–HP12x53 @ 15' = 855'
   PIER: 32–HP12x53 @ 15' = 480'
   THESE PILE LENGTHS SHALL BE CONSIDERED A MINIMUM LENGTH FOR EACH LOCATION.
5. PIER:
   HP 12x53 PILES SHALL BE DRIVEN TO AN ULTIMATE CAPACITY OF 320 KIPS. DESIGN LOAD = 140 KIPS AND F.S. = 2.25.
6. WEST ABUTMENT:
   HP 12x53 PILES SHALL BE DRIVEN TO AN ULTIMATE CAPACITY OF 350 KIPS. DESIGN LOAD = 140 KIPS WITH AN ALLOWANCE OF 30 KIPS FOR DOWNDRAG AND F.S. = 2.25.
7. EAST ABUTMENT:
   SPREAD FOOTING – 8.0 KIPS/SF ALLOWABLE SOIL BEARING PRESSURE.
8. CONSTRUCTION CONTROL: WAVE EQUATION ANALYSIS AND DYNAMIC LOADING TEST (MEASUREMENT AND ANALYSIS) ARE REQUIRED FOR TWO (2) PILES PRIOR TO INSTALLATION OF PRODUCTION PILES. CONDUCT ONE (1) TEST AT WEST ABUTMENT AND PIER LOCATIONS.
9. FOR PIER FOOTING DOWELS AND SPIRAL REINFORCING DETAILS, SEE SHEET NO. NS–S16.
10. PILES SHALL BE DRIVEN TO THE REQUIRED PENETRATION RESISTANCE DETERMINED BY WAVE EQUATION ANALYSIS, VERIFIED BY DYNAMIC TESTING, AND APPROVED OF BY THE ENGINEER. THE AVERAGE RESISTANCE, FOR THE FINAL SIX INCHES OF DRIVING, SHOULD EQUAL OR EXCEED THE ESTABLISHED CRITERIA. IF ABRUPT REFUSAL IS ENCOUNTERED, DRIVING MAY BE TERMINATED WHEN THE PILE PENETRATION IS LESS THAN 1/2 INCH FOR TEN SUCCESSIVE HAMMER BLOWS.
11. EXISTING PILES SHALL BE CUT AT EL. 103.0.
12. A TEMPORARY EARTH SUPPORT SYSTEM IS REQUIRED TO BE IN PLACE, AT THE PIER LOCATIONS, PRIOR TO PILE DRIVING.

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Scale: AS NOTED

No.	Revision	By	Date

Designed by:

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Designed	JJW	DEC. 2001	Checked	SBH	DEC. 2001
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MAINE TURNPIKE AUTHORITY
MODERNIZATION
AND WIDENING PROJECT

THINKING AHEAD T e Wide i ·

BRIDGE REPLACEMENT
NORTH STREET UNDERPASS

FOUNDATION PLAN

SHEET NUMBER: NS–S5

CONTRACT: 2002.01

Appendix C Boring Logs from Preliminary Program

TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION – Modified Burmister System

Component Definitions by Gradation

Material	Fraction	Sieve Limits	
		Upper	Lower
Boulders	--	--	12 inches
Cobbles	--	12 inches	3 inches
Gravel	Coarse	3 inches	¾ inches
	Fine	¾ inches	¼ inch
Sand	Coarse	No. 4 (1/4 in)	No. 10 (1/8 in)
	Medium	No. 10 (1/8 in)	No. 40 (1/32 in)
	Fine	No. 40 (1/32 in)	No. 200
Silt	--	No. 200	(non-plastic)
Clay	--	No. 200	(plastic)

Terminology describing component proportions:

Descriptive Term	Range of Proportion
Major Component	≥ 50%
And	35 – 50
Some	20 – 35
Little	10 – 20
Trace	0 – 10
With	Amount cannot be determined

Terminology describing compactness of cohesionless soils:

Density	**SPT N-Value**
Very Loose	<5
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	>50

Terminology describing consistency of cohesive soils:

Consistency	**SPT N-Value**	**Undrained Shear Strength (ksf)**
Very Soft	< 2	<0.25
Soft	2 – 4	<0.25 – 0.5
Medium Stiff	4 – 8	0.5 – 1.0
Stiff	8 – 15	1.0 – 2.0
Very Stiff	15 – 30	2.0 – 4.0
Hard	> 30	>4.0

Plasticity	**General Soil Type**	**Thread Diameter (in.)**
Non-plastic	Silt	Cannot role
Slightly	Clayey SILT	1/4
Low	SILT and Clay	1/8
Medium	CLAY and Silt	1/16
Highly	Silty CLAY	1/32
Very High	CLAY	1/64

BOREHOLE LOG

B-101

CLIENT **Maine Turnpike Authority** STATION **1709+41.93 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **122.56 LT** EXPLORATION No. **B-101**

EXPLORATION DATE **12/19/2019 to 12/19/2019** GROUND EL. **100.24** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	100.2				in.			
0	99.7	6 inches of topsoil. Upper 2 feet was frozen and was not sampled with SPT.						
	98.2	Very stiff, gray, silty CLAY.	SS	1	22	4 8 11 10	19	19
	96.2	- MARINE CLAY (CRUST)-						
5	95.2	Very stiff, gray, silty CLAY.	SS	2	19	6 11 13 13	24	24
	93.2							
	91.7							
10	90.2	Very soft, gray, silty CLAY, some fine sand.	SS	3	24	1 1 1 1	2	2
	88.2	-MARINE CLAY (SOFT)-						
		- GLACIAL TILL -						
15	85.2	Dense, gray, fine SAND, some silt, little angular gravel.	SS	4	12	25 16 25 33	41	41
	83.2							
		Bottom of boring at 17 feet below ground surface. No refusal.						
20								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC MTA EXITS 35-36 INTERCHANGE SACO.GPJ JW NHP.GDT 2/17/20

Stantec

BOREHOLE LOG

B-103

CLIENT **Maine Turnpike Authority** STATION **1715+76.23 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **207.33 LT** EXPLORATION No. **B-103**

EXPLORATION DATE **12/16/2019 to 12/16/2019** GROUND EL. **106.4** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	106.4						in.			
0	105.9	6 inches of topsoil. Upper 2 feet was frozen and was not sampled with SPT.								
	104.4	Very stiff, gray, silty CLAY. TV = 600 psf			SS	1	16	8 7 10 12	17	17
	102.4									
5	101.4	Stiff, gray, silty CLAY. TV = 400 psf			SS	2	20	5 5 6 8	11	11
	99.4	- MARINE CLAY (CRUST) -								
10	96.4	Stiff, gray, silty CLAY.			SS	3	24	5 4 5 4	9	9
	94.4									
	92.9									
15	91.4	Pushed Shelby Tube from 15-17 feet.			U	1	24	PUSH	-	-
	89.4	-MARINE CLAY (SOFT)-								
20	86.4	Attempted vane at 20 feet. Could not advance.								
	84.4	Stiff, gray, silty CLAY, trace fine sand. TV = 200 tsf			SS	4 5	24	6 WOH/18"	-	-

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-103

CLIENT **Maine Turnpike Authority** STATION **1715+76.23 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **207.33 LT** EXPLORATION No. **B-103**

EXPLORATION DATE **12/16/2019 to 12/16/2019** GROUND EL. **106.4** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
		Some gravel in wash return around 23.5 feet.								
	82.9									
25	81.4	Medium dense, gray, coarse to fine SAND, some angular fine gravel, some silt.			SS	6	8	4 5 5 8	10	10
	79.4									
30	76.4	Dense, gray, fine SAND, and silt, some angular gravel.			SS	7	7	17 18 25 20	43	43
	74.4	- GLACIAL TILL -								
35	71.4	Very dense, gray, fine SAND, some silt, some angular gravel.			SS	8	15	25 33 55 48	88	88
	69.4									
40	66.4									
	66.1	Spoon refusal at 40.3 feet. Black/gray weathered rock in tip of spoon. Hard, fresh, fine grained, gray, PHYLLITE. Joints are closed, low angle to moderately dipping, moderately close. Recovery = 90% (54 inches)			C	1	54	min/ft 3.0 3.5 3.0 3.5	-	

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-103

CLIENT **Maine Turnpike Authority** STATION **1715+76.23 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **207.33 LT** EXPLORATION No. **B-103**

EXPLORATION DATE **12/16/2019 to 12/16/2019** GROUND EL. **106.4** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
							in.			
		RQD = 87% (52 inches)						3.0		
45	61.1	Hard, fresh, fine grained, gray, PHYLLITE. Joints are closed, low angle to moderately dipping, moderately close.						min/ft		
		Recovery = 93% (56 inches) RQD = 63% (38 inches)			C	2	56	2.5 3.0 3.0 3.0 2.5	-	
50	56.1	Bottom of boring at 50.3 feet, in bedrock.								
55										
60										
65										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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BOREHOLE LOG

B-106

CLIENT **Maine Turnpike Authority** STATION **1722+42.83 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **131.14 LT** EXPLORATION No. **B-106**

EXPLORATION DATE **12/13/2019 to 12/13/2019** GROUND EL. **103.15** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	103.2						in.			
0	102.7	6 inches of topsoil. Upper 2 feet was frozen and was not sampled with SPT.								
	101.2	Very stiff, gray, silty CLAY. TV = 700 psf			SS	1	24	8 11 10 12	21	21
	99.2	-MARINE CLAY (CRUST)-								
5	98.2	Stiff, gray, silty CLAY. TV = 1100 psf			SS	2	24	4 5 6 7	11	11
	96.2									
10	93.2	Pushed Shelby Tube from 10 to 12 feet. Based on lab description the sample was silty sand and is not plastic.			U	1	24	PUSH	-	-
	91.2	Attempted vane at 12 feet. Could not advance. Loose, gray/light brown, fine SAND, and silt, some clay.			SS	3	7	3 4 3 1	7	7
15	88.2	Attempted vane at 15 feet. Could not advance. Loose, gray, coarse to fine SAND and silt, little fine gravel.			SS	4	24	3 4 4 3	8	8
	86.2	- LOWER SAND DEPOSIT -								
20	83.2	Medium dense, gray, fine SAND, and silt, some angular gravel.			SS	5	10	5 14 15 21	29	29
	81.2									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-106

CLIENT **Maine Turnpike Authority** STATION **1722+42.83 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **131.14 LT** EXPLORATION No. **B-106**

EXPLORATION DATE **12/13/2019 to 12/13/2019** GROUND EL. **103.15** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
		Advanced roller bit through gravel and cobbles to 25 feet.								
25	78.2	Bottom of boring at 25 feet below ground surface. Roller bit refusal on probable bedrock.								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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BOREHOLE LOG

B-109

CLIENT **Maine Turnpike Authority** STATION **1734+27.74 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **78.35 LT** EXPLORATION No. **B-109**

EXPLORATION DATE **12/12/2019 to 12/12/2019** GROUND EL. **98.05** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	98.1						in.			
0	97.6	6 inches of topsoil. Upper 2 feet was frozen and was not sampled with SPT.								
	96.1	Medium dense, gray, fine SAND and silt. - UPPER SAND DEPOSIT -			SS	1	17	10 11 13 15	24	24
	94.1									
	93.1									
5		Soft, gray, silty CLAY.			SS	2	14	1 2 1 1	3	3
	91.1									
	88.1									
10		Soft, gray, silty CLAY.			SS	3	16	WOH/24"	-	-
	86.1	- MARINE CLAY (SOFT)-								
	83.1									
15		Very soft, gray, silty CLAY.			SS	4	21	WOH/24"	-	-
	81.1									
	78.1									
20		Very soft, gray, silty CLAY.			SS	5	3	WOH/24"	-	-
	76.1									

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-109

CLIENT **Maine Turnpike Authority** STATION **1734+27.74 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **78.35 LT** EXPLORATION No. **B-109**

EXPLORATION DATE **12/12/2019 to 12/12/2019** GROUND EL. **98.05** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
25	73.1	Very soft, gray, silty CLAY.			SS	6	24	WOH/24"	-	-
	71.1									
30	68.1	Pushed Shelby Tube from 30 to 32 feet.			U	1	24	PUSH	-	-
	66.1	- MARINE CLAY (SOFT)-								
35	63.1	No recovery from spoon sampler, two attempts. V-1 35.6-36.0 ft: Tmax = 23 ft-lbs / Tr = 0 ft-lbs Su = 552 psf/ 0 psf V-2 36.6-37.0 ft: Tmax = 21 ft-lbs / Tr = 1 ft-lbs Su = 504 psf/ 24 psf			SS	-	0	WOR/24"	-	-
	61.1									
40	58.1	Pushed Shelby Tube from 40 to 42 feet. Note: Bottom of tube slightly bent.			U	2	23	PUSH	-	-
	56.1	-LOWER SAND DEPOSIT-								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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STN13-GEO-I-VOC MTA EXITS 35-36 INTERCHANGE SACO.GPJ JW NHP.GDT 2/17/20

Stantec

BOREHOLE LOG

B-109

CLIENT **Maine Turnpike Authority** STATION **1734+27.74 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **78.35 LT** EXPLORATION No. **B-109**

EXPLORATION DATE **12/12/2019 to 12/12/2019** GROUND EL. **98.05** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
45	53.1									
	52.1	Spoon refusal at 45 feet. Black/gray weathered rock in tip. Advanced roller bit to 46 feet in probable bedrock.			SS	7	1	50/1"	R	R
		Bottom of boring at 46 feet. Roller bit refusal in probable bedrock.								
50										
55										
60										
65										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

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□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC MTA EXITS 35-36 INTERCHANGE SACO.GPJ JW NHP.GDT 2/17/20

Stantec

BOREHOLE LOG

B-111

CLIENT **Maine Turnpike Authority** STATION **1749+46.55 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **132.04 LT** EXPLORATION No. **B-111**

EXPLORATION DATE **12/20/2019 to 12/23/2019** GROUND EL. **99.86** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	99.9						in.			
0	99.4	6 inches of topsoil. Upper 2 feet was frozen and was not sampled with SPT.								
	97.9	Very loose, brown, medium SAND, some silt.			SS	1	10	3 1 0 2	1	1
	95.9									
5	94.9	Loose, gray/black, medium to fine SAND, some silt.			SS	2	20	3 2 4 4	6	6
	92.9									
10	89.9	Medium dense, brown, fine SAND and silt.			SS	3	12	6 8 7 14	15	15
	87.9	- UPPER SAND DEPOSIT -								
15	84.9	Medium dense, light brown/gray, fine SAND, some silt.			SS	4	13	8 10 13 11	23	23
	82.9									
20	79.9	Dense, light brown/gray, fine SAND, some silt.			SS	5	14	14 19 21 19	40	40
	77.9									

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

B-111

CLIENT **Maine Turnpike Authority** STATION **1749+46.55 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **132.04 LT** EXPLORATION No. **B-111**

EXPLORATION DATE **12/20/2019 to 12/23/2019** GROUND EL. **99.86** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
		- UPPER SAND DEPOSIT								
25	74.9	Very loose, gray, fine SAND, and silt, some clay.			SS	6	24	WOR/12" WOH/6" 2	-	-
	72.9									
	71.4	Clay starting to appear in washings.								
30	69.9	Pushed Shelby Tube from 30 t0 32 feet.			U	1	24	PUSH	-	-
	67.9									
35	64.9	Attempted vane shear at 35 feet. Unable to advance vane.			SS	7	24	WOR/12" 5 1	5	5
	62.9	Very soft, gray, clay. - MARINE CLAY (SOFT)-								
40	59.9	Pushed Shelby Tube from 40 to 42 feet.			U	2	24	PUSH	-	-
	57.9	Very soft, gray, silty CLAY. V-1 42.6-43.0 ft: Tmax = 26 ft-lbs / Tr = 9 ft-lbs Su = 636 psf/ 216 psf			SS	8	24	WOR/24"	-	-

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

B-111

CLIENT **Maine Turnpike Authority** STATION **1749+46.55 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **132.04 LT** EXPLORATION No. **B-111**

EXPLORATION DATE **12/20/2019 to 12/23/2019** GROUND EL. **99.86** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
45	54.9	V-2 43.6-44.0 ft: Tmax = 23 ft-lbs / Tr = 7 ft-lbs Su = 563 psf/ 168 psf								
50	49.9	Pushed Shelby Tube from 50 to 52 feet.			U	3	24	PUSH	-	-
	47.9	Very soft, gray, silty CLAY. V-3 52.6-53.0 ft: Tmax = 19 ft-lbs / Tr = 3 ft-lbs Su = 451 psf/ 72 psf V-4 53.6-54.0 ft: Tmax = 19 ft-lbs / Tr = 3 ft-lbs Su = 19 ft-lbs / Tr = 3 ft-lbs								
55	44.9	- MARINE CLAY (SOFT)-								
60	39.9	Very soft, gray, silty CLAY. V-5 60.6-61 ft: Tmax = 23 ft-lbs / Tr = 4 ft-lbs Su = 546 psf/ 96 psf								
	37.9	V-6 61.6-62 ft: Tmax = 21 ft-lbs / Tr = 4 ft-lbs Su = 498 psf/ 96 psf -MARINE CLAY (SOFT)-								
65										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-111

CLIENT **Maine Turnpike Authority** STATION **1749+46.55 MTA CL** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **132.04 LT** EXPLORATION No. **B-111**

EXPLORATION DATE **12/20/2019 to 12/23/2019** GROUND EL. **99.86** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
70		- MARINE CLAY (SOFT)-								
75										
80	17.9									
		Due to time constraints, advanced boring as roller bit probe from 62 to 82 feet. Based on wash water return soil consists of silty clay. Boring terminated at 82 feet, likely still in marine clay layer.								
85										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon/Shelby tube sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC MTA EXITS 35-36 INTERCHANGE SACO.GPJ JW NHP.GDT 2/17/20

Stantec BOREHOLE LOG B-112

CLIENT Maine Turnpike Authority
LOCATION Exits 35/36 Interchange, Saco, Maine
EXPLORATION DATE 12/10/2019 to 12/10/2019
STATION 625+70.84 Exit 35 NB Plaza 34.20 RT
OFFSET
GROUND EL. 116.83
WATER LEVEL NR
PROJECT No. 179450063
EXPLORATION No. B-112
DATUM NAVD 88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	116.8				in.			
0	116.5	6 inches of topsoil. Upper 2 feet was frozen and was not sampled with SPT.						
	116.3	Light brown/gray, medium SAND, trace fine sand.						
	114.8	Medium stiff, gray, CLAY, some silt, trace fine sand.	SS	1	16	2 3 3 3	6	6
	112.8	-MARINE CLAY (CRUST)-						
5	111.8	Stiff, gray, CLAY, trace silt, trace weathered rock.	SS	2	24	6 7 9 10	16	16
	109.8							
	108.3							
	107.8	Some gravel in washings around 8.5 feet. -GLACIAL TILL-						
10	106.8							
	106.5	Spoon refusal at 10.3 feet.	SS	3	1	50/4"	R	R
		Hard, fresh, fine grained, black, PHYLLITE. Joints are closed, low angle to moderately dipping, and close to moderately close. Recovery = (33 inches) RQD = 35% Likely lost recovery within first two feet based core times/differing coloration of rock.	C	1	33	min/ft 1.0 1.0 1.5 2.0 2.5	-	-
15	101.5							
		Hard, fresh, fine grained, black, PHYLLITE. Joints are closed, low angle to moderately dipping, and moderately close. Recovery = 97% (58 inches) RQD = 88% (53 inches)	C	2	58	min/ft 2.5 2.5 2.5 2.5 2.5	-	-
20	96.5							
		Bottom of boring at 20.3 feet in bedrock.						

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch casing; split spoon sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC SACO 100 SERIES _ USE_STA_OFF_ LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-113

CLIENT **Maine Turnpike Authority** STATION **625+40.88 Exit 35 NB On Plaza** PROJECT No. **179450063**

LOCATION **Exits 35/36 Interchange, Saco, Maine** OFFSET **88.10 LT** EXPLORATION No. **B-113**

EXPLORATION DATE **12/10/2019 to 12/10/2019** GROUND EL. **113.33** WATER LEVEL **NR** DATUM **NAVD 88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	113.3						in.			
0	112.8	6 inches of topsoil. Upper 2 feet was frozen and was								
	112.3	not sampled with SPT.								
		Stiff, gray, CLAY, some silt.			SS	1	18	4 4 7 9	11	11
	110.3									
	109.8	-MARINE CLAY (CRUST)-								
		-GLACIAL TILL-								
5	108.3									
		Gray, coarse to fine SAND and silt, trace fine gravel.			SS	2	10	5 27 50/1"	R	R
	107.3	Spoon refusal at 6 feet on probable bedrock.								
		Three offsets at a distance of 3 feet, auger refusal at 6.5, 7.5, and 8.3 feet on probable bedrock.								
10										
15										
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Diedrich D-50; Hammer type: safety hammer; 4 inch augers; split spoon sampling; Supervisor: Liam Gillen-Hughes (Stantec)

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC MTA EXITS 35-36 INTERCHANGE SACO.GPJ JW NHP.GDT 2/17/20

Appendix D Boring Logs from Final/Supplemental Programs

TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION – Modified Burmister System

Component Definitions by Gradation

Material	Fraction	Sieve Limits	
		Upper	Lower
Boulders	--	--	12 inches
Cobbles	--	12 inches	3 inches
Gravel	Coarse	3 inches	¾ inches
	Fine	¾ inches	¼ inch
Sand	Coarse	No. 4 (1/4 in)	No. 10 (1/8 in)
	Medium	No. 10 (1/8 in)	No. 40 (1/32 in)
	Fine	No. 40 (1/32 in)	No. 200
Silt	--	No. 200	(non-plastic)
Clay	--	No. 200	(plastic)

Terminology describing component proportions:

Descriptive Term	Range of Proportion
Major Component	≥ 50%
And	35 – 50
Some	20 – 35
Little	10 – 20
Trace	0 – 10
With	Amount cannot be determined

Terminology describing compactness of cohesionless soils:

Density	**SPT N-Value**
Very Loose	<5
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	>50

Terminology describing consistency of cohesive soils:

Consistency	**SPT N-Value**	**Undrained Shear Strength (ksf)**
Very Soft	< 2	<0.25
Soft	2 – 4	<0.25 – 0.5
Medium Stiff	4 – 8	0.5 – 1.0
Stiff	8 – 15	1.0 – 2.0
Very Stiff	15 – 30	2.0 – 4.0
Hard	> 30	>4.0

Plasticity	**General Soil Type**	**Thread Diameter (in.)**
Non-plastic	Silt	Cannot role
Slightly	Clayey SILT	1/4
Low	SILT and Clay	1/8
Medium	CLAY and Silt	1/16
Highly	Silty CLAY	1/32
Very High	CLAY	1/64

B-Series Boring Logs

Stantec BOREHOLE LOG B-201

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 12/1/2020 to 12/1/2020
STATION 204+98.20 Exit 35 SB On Ramp
OFFSET 102 RT
GROUND EL. 102.31
WATER LEVEL 3.0
PROJECT No. 179450125
EXPLORATION No. B-201
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	102.3						in.			
0		Medium stiff, light brown/gray, silty CLAY.			SS	1	17	1 1 3 4	4	6
	100.3	Very stiff, light brown/gray, silty CLAY, little fine sand.		▽	SS	2	20	4 8 12 10	20	28
	98.3	Medium stiff, light brown/gray, silty CLAY.								
5		- MARINE CLAY (CRUST) -			SS	3	23	2 4 3 5	7	10
	96.3	Stiff, light brown/gray, silty CLAY.			SS	4	24	3 9 5 6	14	20
	94.3	Soft, gray, silty CLAY.			SS	5	24	1 1 1 2	2	3
10	92.3	Medium stiff, gray, clayey SILT.			SS	6	24	2 2 2 1	4	6
	90.3									
	87.3	Very soft, gray, clayey SILT.								
15		- MARINE CLAY (SOFT) -			SS	7	24	WOH/24"	-	-
	85.3									
20	82.3									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-201

CLIENT **Maine Turnpike Authority** STATION **204+98.20 Exit 35 SB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **102 RT** EXPLORATION No. **B-201**

EXPLORATION DATE **12/1/2020 to 12/1/2020** GROUND EL. **102.31** WATER LEVEL **3.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
		Very soft, gray, clayey SILT, little fine SAND.			SS	8	24	1/12" 1/12"	-	-
	80.3	- MARINE CLAY (SOFT) -								
	77.3									
25		Medium stiff, gray, SILT and fine sand, little fine, angular gravel.			SS	9	14	2 3 4 4	7	10
	75.3									
	74.3	Roller bit through dark gray/black weathered/fractured bedrock from 28 - 30 feet.								
	72.3									
30		Bottom of boring at 30 feet below ground surface in probable bedrock.								
35										
40										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-202

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/30/2020 to 11/30/2020
STATION 212+22.95 Exit 35 SB On Ramp
OFFSET 52.21 RT
GROUND EL. 103.54
WATER LEVEL 3.0
PROJECT No. 179450125
EXPLORATION No. B-202
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	103.5						in.			
0	103.2	3 inches Topsoil.								
		Loose, brown, medium to fine SAND, some silt.			SS	1	7	1 1 1 1	2	3
	101.5	Medium dense, light brown/gray, fine SAND and silt.			SS	2	23	4 6 8 9	14	20
	99.5	- UPPER SAND DEPOSIT -								
5		SS-3A: Medium dense, light brown/gray, fine SAND and silt.			SS	3A	13	4 5 9	14	20
	98.2	SS-3B: Medium dense, light brown, fine SAND and silt.			SS	3B	7	7	-	-
	97.5	SS-4A: Medium dense, light brown, fine SAND and silt.			SS	4A	18	11 14 12	26	37
	96.0	SS-4B: Medium dense, light brown/gray, fine SAND and silt, little coarse to fine, angular gravel.			SS	4B	6	12	-	-
	95.5	Medium dense, light brown/gray, fine SAND and silt, trace fine, angular to sub angular gravel.			SS	5	15	6 5 7 7	12	17
10	93.5	Medium dense, light brown/gray, fine SAND and silt, trace fine, angular to sub angular gravel.			SS	6	21	8 9 26 20	35	50
	91.5									
	88.5	Loose, gray, fine SAND and silt, little fine sub angular to sub rounded gravel.			SS	7	10	2 3 6 7	9	13
15	86.5									
	83.5									
20										

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-202

CLIENT **Maine Turnpike Authority** STATION **212+22.95 Exit 35 SB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **52.21 RT** EXPLORATION No. **B-202**

EXPLORATION DATE **11/30/2020 to 11/30/2020** GROUND EL. **103.54** WATER LEVEL **3.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	81.5	Dense, gray, fine SAND and silt, little fine sub angular to sub rounded gravel. - UPPER SAND DEPOSIT -			SS	8	3	9 15 15 14	30	43
		- GLACIAL TILL -								
25	78.5	Dense, gray, fine SAND and silt, little fine sub angular to sub rounded gravel.			SS	9	9	13 25 24 27	49	70
	76.5	Bottom of boring at 27 feet below ground surface. No refusal.								
30										
35										
40										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec

BOREHOLE LOG

B-203

CLIENT **Maine Turnpike Authority** STATION **215+50.74 Exit 35 SB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **40.10 LT** EXPLORATION No. **B-203**

EXPLORATION DATE **11/25/2020 to 11/25/2020** GROUND EL. **103.80** WATER LEVEL **3.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	103.8						in.			
0	103.5	3 inches Topsoil.								
		Loose, light brown/gray, medium to fine SAND, some silt.			SS	1	7	1 2 3 5	5	7
	101.8	- UPPER SAND DEPOSIT -								
		Very stiff, gray/light brown, silty CLAY.								
		TV = 1,200 psf		▽	SS	2	24	8 9 12 14	21	29
	99.8									
		Stiff, gray/light brown, silty CLAY.								
5		- MARINE CLAY (CRUST) -			SS	3	24	3 5 7 9	12	17
	97.8									
		Stiff, gray/light brown, silty CLAY.								
		TV = 1,300 PSF			SS	4	24	9 7 7 6	14	20
	95.8									
		Soft, gray/light brown, silty CLAY.								
		TV = 900 psf			SS	5	24	1 2 2 3	4	6
10	93.8									
		Soft, gray/light brown, silty CLAY.								
		TV = 900 psf			SS	6	24	2 2 2 1	4	6
	91.8									
		Pushed Shelby Tube from 12 - 14 feet.								
		- MARINE CLAY (SOFT) -			U	1	24	PUSH	-	-
	89.8									
		Very soft, gray, silty CLAY.								
15					SS	7	24	WOH/24"	-	-
	87.8									
	85.8									
		- LOWER SAND DEPOSIT -								
	83.8									
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-203

CLIENT Maine Turnpike Authority
STATION 215+50.74 Exit 35 SB On Ramp
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 40.10 LT
EXPLORATION No. B-203
EXPLORATION DATE 11/25/2020 to 11/25/2020
GROUND EL. 103.80
WATER LEVEL 3.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	81.8	Medium dense, gray, fine SAND and silt, some coarse to fine, sub angular to sub rounded gravel.			SS	8	9	3 7 20 13	27	38
		- LOWER SAND DEPOSIT -								
25	78.8	Dense, gray, fine SAND and silt, some coarse to fine, sub angular to sub rounded gravel.			SS	9	24	15 15 15 20	30	42
	76.8	- GLACIAL TILL -								
30	73.8	Very dense, gray, fine SAND and silt, some coarse to fine, sub angular to sub rounded gravel.			SS	10	20	25 30 27 30	57	80
	71.8									
35	68.8	Very dense, gray, fine SAND and silt, some coarse to fine, sub angular to sub rounded gravel.			SS	11	12	27 27 30 29	57	80
	66.8									
40	63.8									

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-203

CLIENT Maine Turnpike Authority | STATION 215+50.74 Exit 35 SB On Ramp | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 40.10 LT | EXPLORATION No. B-203

EXPLORATION DATE 11/25/2020 to 11/25/2020 | GROUND EL. 103.80 | WATER LEVEL 3.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
40										
		Very dense, dark gray/black, fractured bedrock.			SS	12	5	28 46 69 92	115	161
	61.8	Advanced roller bit through bedrock to refusal at 50 feet.								
		- BEDROCK -								
45										
	53.8									
50	53.6	Spoon refusal at 50.1 feet. Dark gray/black rock in tip of sampler.			SS	13	1	50/1"	-	-
		Bottom of boring at 50.1 feet below ground surface in bedrock. Split spoon refusal.								
55										
60										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

BOREHOLE LOG

B-204

CLIENT: Maine Turnpike Authority
STATION: 1218+59.67 SB Park and Ride Lot
PROJECT No.: 179450125
LOCATION: Exit 35/36 Interchange, Saco, Maine
OFFSET: 83.92 LT
EXPLORATION No.: B-204
EXPLORATION DATE: 11/24/2020 to 11/24/2020
GROUND EL.: 113.05
WATER LEVEL: 3.0
DATUM: NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	113.1				in.			
0	112.6	6 inches Topsoil.						
		Loose, gray/brown, fine SAND and silt.	SS	1	15	1 3 4 7	7	10
	111.1	- UPPER SAND DEPOSIT -						
		Medium dense, gray/brown, fine SAND and silt.	SS	2	23	6 8 12 17	20	28
	109.1							
5		Dense, gray/brown, fine SAND and silt.	SS	3	20	6 12 20 15	32	45
	107.1							
		Dense, gray/brown, fine SAND and silt.	SS	4	24	15 14 16 20	30	42
	105.1							
	103.1	Soft, gray, silty CLAY. TV = 600 psf - MARINE CLAY (CRUST) -	SS	5	24	2 1 1 2	2	3
10		Soft, gray, silty CLAY. TV = 700 psf	SS	6	24	2 2 2 2	4	6
	101.1							
		- MARINE CLAY (SOFT) -						
	98.1							
15		Soft, gray, silty CLAY.	SS	7	24	WOH/24"	-	-
	96.1							
	93.1							
20								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-204

CLIENT Maine Turnpike Authority | STATION 1218+59.67 SB Park and Ride Lot | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 83.92 LT | EXPLORATION No. B-204

EXPLORATION DATE 11/24/2020 to 11/24/2020 | GROUND EL. 113.05 | WATER LEVEL 3.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
20		Soft, gray, silty CLAY. 1 inch layer of fine sand at 21 feet.			SS	8	24	WOH/12" 1 1	-	-
	91.1	- MARINE CLAY (SOFT) -								
25	88.1	SS-9A: Soft, gray, silty CLAY.			SS	9A	18	WOH/18"	-	-
	86.6									
	86.1	SS-9B: Very loose, gray, medium to fine SAND and silt.			SS	9B	6	1	-	-
	85.1									
	84.1	Boulder from 28 - 29 feet.								
30	83.1	Very loose, gray, fine SAND and silt, some coarse to fine, sub angular to sub rounded gravel.			SS	10	24	WOH/24"	-	-
	81.1	- LOWER SAND DEPOSIT -								
35	78.1	Medium dense, gray, silt and fine SAND, some coarse to fine sub angular to sub rounded gravel.			SS	11	6	12 14 15 18	29	41
	76.1	- GLACIAL TILL -								
		Bottom of boring at 37 feet below ground surface. No refusal.								
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-205

CLIENT Maine Turnpike Authority | STATION 218+47.46 Exit 35 SB On Ramp | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 21.41 RT | EXPLORATION No. B-205

EXPLORATION DATE 11/24/2020 to 11/24/2020 | GROUND EL. 112.09 | WATER LEVEL 3.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	112.1						in.			
0	111.6	6 inches Topsoil.								
		Soft, brown, fine SAND, some silt.			SS	1	14	WOH/12" 3 3	-	-
	110.1	Medium dense, gray/brown, fine SAND and silt. - UPPER SAND DEPOSIT -		▽	SS	2	23	5 10 12 13	22	31
	108.1	Very stiff, gray, silty CLAY.								
5		TV = 1,100 psf			SS	3	24	5 8 11 12	19	27
	106.1	Very stiff, gray, silty CLAY. - MARINE CLAY (CRUST) -			SS	4	24	7 9 9 8	18	25
	104.1	Stiff, gray, silty CLAY. TV = 900 psf			SS	5	24	3 3 5 8	8	11
10	102.1	Stiff, gray, silty CLAY.			SS	6	24	6 7 7 8	14	20
	100.1	Very soft, gray, silty CLAY.								
	99.1	V-1 12.6-13.0 ft: Tmax = 23.5 ft-lbs / Tr = 6.5 ft-lbs Su = 587 psf/ 162 psf V-2: Could not advance vane.								
15	97.1	- MARINE CLAY (SOFT) - Very soft, gray, silty CLAY.			SS	7	24	WOH/24"	-	-
	95.1	Pushed Shelby Tube from 17 - 19 feet.			U	1	24	PUSH	-	-
	93.1	Soft, gray, clayey SILT.						1 1		
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-205

CLIENT **Maine Turnpike Authority** STATION **218+47.46 Exit 35 SB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **21.41 RT** EXPLORATION No. **B-205**

EXPLORATION DATE **11/24/2020 to 11/24/2020** GROUND EL. **112.09** WATER LEVEL **3.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20	91.1	- MARINE CLAY (SOFT) -			SS	8	8	1 1	2	3
	88.6									
	88.1	Gravel/cobble layer from 23.5 - 24 feet based on drill action.								
25	87.1	Very loose, gray, fine SAND and silt.			SS	9	16	1 1 2 2	3	4
	85.1	- LOWER SAND DEPOSIT -								
	82.6									
30		Boulder from 29.5 - 32 feet.								
	80.1									
	79.1	- GLACIAL TILL -								
		Gravel/cobble layer from 33 to 34 feet based on drill action.								
	78.1									
35		Bottom of boring at 34 feet below ground surface. No refusal.								
40										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-206

CLIENT Maine Turnpike Authority | STATION 321+25.07 Exit 35 SB Off Ramp | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 1.29 LT | EXPLORATION No. B-206

EXPLORATION DATE 11/23/2020 to 11/23/2020 | GROUND EL. 104.52 | WATER LEVEL 3.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	104.5						in.			
0		Light brown/gray, medium to fine SAND and silt, some fine, angular gravel.			SS	1	14	WOH/12" 2 8	-	-
		- UPPER SAND DEPOSIT -								
	102.5	SS-2A: Medium dense, brown, medium to fine SAND.		▽	SS	2A	8	10 14	-	-
	101.5	SS-2B: Medium dense, brown/gray, fine SAND and silt.			SS	2B	8	13 7	-	-
	100.5	Medium stiff, gray, silty CLAY.			SS	3	24	1 2 2 2	4	6
5	98.5	- MARINE CLAY (CRUST) -								
		Medium stiff, gray, silty CLAY.			SS	4	24	2 2 2 1	4	6
	96.5	Very soft, gray, silty CLAY.			SS	5	24	WOH/24"	-	-
		- MARINE CLAY (SOFT) -								
10	94.5	Very soft, gray, silty CLAY.			SS	6	24	WOH/24"	-	-
	92.5	Pushed Shelby Tube from 12 -14 feet.			U	1	23	PUSH	-	-
	90.5									
	90.1	SS-7A: Very soft, gray, silty CLAY.			SS	7A	5	WOH/6"	-	-
15		SS-7B: Medium dense, gray, fine SAND, some silt.			SS	7B	19	3 6 13	9	13
	88.5									
	86.5									
20	84.5									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

SPT N(60) VALUE: 10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

B-206

CLIENT: Maine Turnpike Authority
STATION: 321+25.07 Exit 35 SB Off Ramp
PROJECT No.: 179450125
LOCATION: Exit 35/36 Interchange, Saco, Maine
OFFSET: 1.29 LT
EXPLORATION No.: B-206
EXPLORATION DATE: 11/23/2020 to 11/23/2020
GROUND EL.: 104.52
WATER LEVEL: 3.0
DATUM: NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
		Very soft, gray, silty CLAY.			SS	8	8	WOH/24"	-	-
	82.5	- MARINE CLAY (SOFT) -								
	80.0	Boulder from 24.5 - 27 feet.								
25	77.5									
	74.5	Medium dense, gray, fine SAND and silt, some coarse to fine, sub rounded gravel.			SS	9	16	9 11 14 25	25	35
30	72.5	- GLACIAL TILL -								
	69.5	Medium dense, gray, fine SAND and silt, some coarse to fine, sub rounded gravel.			SS	10	16	13 15 12 20	27	38
35	67.5	Bottom of boring at 37 feet below ground surface. No refusal.								
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-207

CLIENT Maine Turnpike Authority | STATION 324+17.04 Exit 35 SB Off Ramp | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 15.22 LT | EXPLORATION No. B-207

EXPLORATION DATE 11/20/2020 to 11/20/2020 | GROUND EL. 101.12 | WATER LEVEL 3.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	101.1							
0	100.8	4 inches Topsoil.						
		Very loose, brown/light brown, coarse to medium SAND, little fine, angular gravel, trace silt.	SS	1	16	1 1 2 2	3	4
	99.1	- UPPER SAND DEPOSIT - Medium dense, brown, coarse to medium SAND, trace silt.	SS	2	13	3 4 10 12	14	20
	97.1	Medium dense, light brown/gray, medium to fine SAND, some silt.	SS	3	12	6 10 10 5	20	28
5	95.1	SS-4A: Medium dense, light brown/gray, medium to fine SAND, some silt.	SS	4A	12	4 4	-	-
	94.1	SS-4B: Stiff, gray, silty CLAY.	SS	4B	12	5 5	-	-
	93.1	Very soft, gray, silty CLAY.	SS	5	24	WOH/24"	-	-
	91.1	Very soft, gray, silty CLAY. V-1 11.6-12.0 ft: Tmax = 10.5 ft-lbs / Tr = 1 ft-lbs Su = 242 psf/ 23 psf	SS	6	24	WOH/24"	-	-
10	89.1	V-2 12.6-13.0 ft: Tmax = 19 ft-lbs / Tr = 4 ft-lbs Su = 438 psf/ 92 psf						
	88.1	Pushed Shelby Tube from 13 - 15 feet. - MARINE CLAY (SOFT) -	U	1	24	PUSH	-	-
	86.1	Very soft, gray, silty CLAY.	SS	7	7	WOH/24"	-	-
15	84.1							
	82.6							
20	81.1							

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-207

CLIENT Maine Turnpike Authority
STATION 324+17.04 Exit 35 SB Off Ramp
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 15.22 LT
EXPLORATION No. B-207
EXPLORATION DATE 11/20/2020 to 11/20/2020
GROUND EL. 101.12
WATER LEVEL 3.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	79.1	Medium dense, gray, fine SAND, trace silt. - LOWER SAND DEPOSIT -			SS	8	8	3 13 14 4	27	38
	77.1									
25	75.1	Very dense, dark gray/black, highly fractured bedrock. Rolled to 30 feet with no change in drill action. - WEATHERED/FRACTURED BEDROCK -			SS	9	24	35 47 39 53	86	120
30	71.1	Bottom of boring at 30 feet in fractured bedrock.								
35										
40										

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-208

CLIENT Maine Turnpike Authority | STATION 2732+27.05 SB C-D Roadway | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 25.47 LT | EXPLORATION No. B-208

EXPLORATION DATE 12/3/2020 to 12/4/2020 | GROUND EL. 95.48 | WATER LEVEL 1.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	95.5						in.			
0		Very soft, gray/brown SILTY CLAY, trace roots. Mottled.		▽	SS	1	18	1 1 2 4	3	4
	93.5	Stiff, gray/brown CLAY. Mottled.			SS	2	20	4 5 9 15	14	20
	91.5	Stiff, brown/gray CLAY.								
5		- MARINE CLAY (CRUST) -			SS	3	24	2 4 5 6	9	13
	89.5	Medium stiff, gray CLAY. Softer at 7 feet.			SS	4	24	4 5 2 3	7	10
	87.5	Very soft, gray CLAY. 1 sand varve in sample.			SS	5	24	WOH/18" 1	1	1
10	85.5	Pushed Shelby Tube from 10 - 12 feet.			U	1	24	-	-	-
	83.5	Very soft, gray CLAY.								
		- MARINE CLAY (SOFT) -			SS	6	24	WOR/18" WOH	-	-
	81.5	Very soft, gray CLAY.								
15		V-1 14.0 - 14.4 ft: Tmax = 13.8 ft-lb / Tr = 0.4 ft-lb Su = 331 psf / 10 psf			SS	7	24	WOR/24"	-	-
	79.5	V-2 14.5 -14.9 ft: Tmax = 15 ft-lb / Tr = 1.2 ft-lb Su = 360 psf / 29 psf								
	77.5	Pushed Shelby Tube from 18 - 20 feet.			U	2	24	-	-	-
20	75.5									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-208

CLIENT **Maine Turnpike Authority** STATION **2732+27.05 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **25.47 LT** EXPLORATION No. **B-208**

EXPLORATION DATE **12/3/2020 to 12/4/2020** GROUND EL. **95.48** WATER LEVEL **1.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	73.5	Very soft, gray CLAY. Sand at bottom of sample. V-3 20.0 - 20.4 ft: Tmax = 16.25 ft-lb / Tr = 0.8 ft-lb Su = 391 psf / 19 psf			SS	8	24	WOR/18" 1	-	-
		V-4 20.5 - 20.9 ft: Tmax = 22.9 ft-lb / Tr = 0.41 ft-lb Su = 550 psf / 98 psf Tip of vane in test V-4 in sand layer.								
	71.5	Very loose, gray fine SAND, little silt.								
25		- LOWER SAND DEPOSIT -			SS	9	24	WOR WOH/12" 1	-	-
	66.5									
	65.5	Very loose, gray fine SAND, and silt, trace fine gravel, trace clay. Refusal on bedrock.			SS	10	24	WOR 100/5"	-	-
30		Roller bit through green/gray bedrock to 35 feet. -FRACTURED BEDROCK-								
	60.5									
35		Bottom of boring at 35 feet below ground surface in probable bedrock.								
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

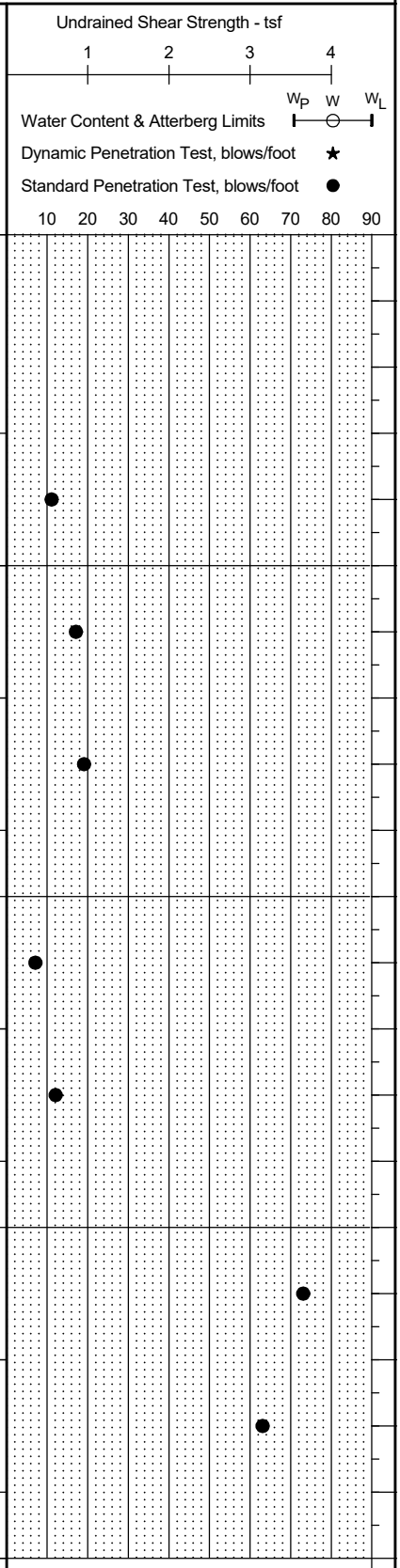
✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-209

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/2/2020 to 11/3/2020
STATION 2744+56.29 SB C-D Roadway
OFFSET 51.31 LT
GROUND EL. 125.81
WATER LEVEL 29.0
PROJECT No. 179450125
EXPLORATION No. B-209
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	125.8						in.			
0	125.3	6" Asphalt pavement								
		Dense, light brown, medium to fine SAND, some medium to coarse, angular gravel.								
	123.5									
	122.8	8" Concrete bridge approach slab								
		Dense, light brown, medium to fine SAND, some medium to coarse, angular gravel.			SS	1	12	3 5 6 6	11	16
5	120.8									
		Dense, light brown, medium to fine SAND, some medium to coarse, angular gravel.			SS	2	17	9 8 9 11	17	25
	118.8									
		Dense, light brown, medium to fine SAND, some medium to coarse, angular gravel.			SS	3	24	9 10 9 7	19	28
	116.8									
		-EMBANKMENT FILL-								
10	115.8									
		Rock in tip of sampler. No recovery			SS		0	3 3 4 5	7	10
	113.8									
		Dense, light brown, medium to fine SAND, trace silt, some medium to coarse, angular gravel.			SS	4	13	8 6 6 8	12	17
	111.8									
15	110.8									
		Very dense, light brown, fine SAND.			SS	5	16	17 33 40 41	73	106
	108.8									
		Very dense, light brown, fine SAND. Some iron staining at approx. 18 feet.			SS	6	10	20 23 40 38	63	91
	106.8									
20	105.8									



Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

B-209

CLIENT Maine Turnpike Authority
STATION 2744+56.29 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 51.31 LT
EXPLORATION No. B-209
EXPLORATION DATE 11/2/2020 to 11/3/2020
GROUND EL. 125.81
WATER LEVEL 29.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
20								
		Very dense, light brown, fine SAND.	SS	7	14	22 36 33 41	69	100
	103.8	Very dense, light brown, fine SAND.	SS	8	15	23 32 42 40	74	107
	101.8	- EMBANKMENT FILL -						
25	100.8	Very dense, light brown/gray, medium to fine SAND, little fine, angular gravel.	SS	9	17	25 37 37 28	74	107
	98.8							
	95.8	Medium dense, brown, fine SAND, some silt, little fine, angular gravel.	SS	10	13	15 8 9 15	17	25
30	93.8							
	90.8	Medium dense, brown/gray, fine SAND, little silt.	SS	11	15	6 9 10 11	19	28
35	88.8	-UPPER SAND DEPOSIT-						
40	85.8							

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
SPT N(60) VALUE: 10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-209

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/2/2020 to 11/3/2020
STATION 2744+56.29 SB C-D Roadway
OFFSET 51.31 LT
GROUND EL. 125.81
WATER LEVEL 29.0
PROJECT No. 179450125
EXPLORATION No. B-209
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
40										
	83.8	Loose, brown/gray, fine SAND, and silt. Some iron staining at approx. 41 feet.			SS	12	13	5 6 3 3	9	13
		- UPPER SAND DEPOSIT -								
45	80.8	Dense, brown, fine SAND, trace silt.			SS	13	14	15 17 16 15	33	48
	78.8									
50	75.8	Very soft, gray, SILT, and clay, some fine sand.			SS	14	24	WOH/24"	-	-
	73.8									
55	70.8	Very soft, gray, silty CLAY.			SS	15	14	WOR/24"	-	-
		V-1 55.0 - 55.4 ft: Tmax = 29 ft-lbs / Tr = 4 ft-lbs Su = 685 psf/ 99 psf								
	68.8	V-2: Could not advance vane past 55.5'.								
		- MARINE CLAY (SOFT) -								
60	65.8									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-209

CLIENT Maine Turnpike Authority
STATION 2744+56.29 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 51.31 LT
EXPLORATION No. B-209
EXPLORATION DATE 11/2/2020 to 11/3/2020
GROUND EL. 125.81
WATER LEVEL 29.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
60										
	63.8	Very soft, gray, silty CLAY.			SS	16	23	WOR/12" WOH/12"	-	-
65	60.8	Very soft, gray, silty CLAY.								
	58.8	- MARINE CLAY (SOFT) -								
70	55.8	Very soft, gray, silty CLAY.			SS	17	8	WOR/6" WOH/18"	-	-
	53.8									
75	50.8	Pushed Shelby tube from 65 - 67 feet.			U	1	24	PUSH	-	-
	48.8									
80	45.8									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-209

CLIENT **Maine Turnpike Authority** STATION **2744+56.29 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **51.31 LT** EXPLORATION No. **B-209**

EXPLORATION DATE **11/2/2020 to 11/3/2020** GROUND EL. **125.81** WATER LEVEL **29.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
80										
	125.81	Very soft, gray, silty CLAY.			SS	19	13	WOR/24"	-	-
	43.8									
85		- MARINE CLAY (SOFT) -								
90	35.8	Pushed Shelby tube from 90 - 92 feet.			U	2	24	PUSH	-	-
	33.8	Bottom of boring at 92 feet below ground surface. No refusal.								
95										
100										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-210

CLIENT **Maine Turnpike Authority** STATION **2745+17.27 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **57 LT** EXPLORATION No. **B-210**

EXPLORATION DATE **10/28/2020 to 10/30/2020** GROUND EL. **125.95** WATER LEVEL **29.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	126.0						in.			
0	125.5	6" Asphalt pavement								
		Dense, light brown, medium to fine SAND, some coarse to fine angular Gravel.			SS	1	16	12 20 24 50/0"	44	64
	123.5									
	123.0	Dense, light brown, medium to fine SAND.			SS	2	20	12 15 21 20	36	52
5	121.0	Dense, light brown, medium to fine SAND.			SS	3	18	23 20 21 18	41	59
	119.0	Dense, light brown, medium to fine SAND.			SS	4	19	15 15 15 13	30	44
	117.0	-EMBANKMENT FILL-								
10	116.0	Dense, light brown, medium to fine SAND, trace Silt.			SS	5	14	16 23 24 30	47	68
	114.0	SS-6A: Dense, light brown, medium to fine SAND, some Silt.			SS	6A	12	22 20	-	-
	113.0	SS-6B: Dense, light brown, medium to fine SAND. Some iron staining at approximately 13.5 feet.			SS	6B	12	23 26	-	-
	112.0									
15	111.0	Very dense, light brown, medium to fine SAND, trace Silt.			SS	7	21	17 27 31 37	58	84
	109.0	Very dense, light brown, medium to fine SAND, trace Silt.			SS	8	22	24 38 45 50	83	120
	107.0									
20	106.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-210

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 10/28/2020 to 10/30/2020
STATION 2745+17.27 SB C-D Roadway
OFFSET 57 LT
GROUND EL. 125.95
WATER LEVEL 29.0
PROJECT No. 179450125
EXPLORATION No. B-210
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
		Very dense, light brown/gray, medium to fine SAND.			SS	9	15	30 40 45 42	85	123
	104.0									
		Very dense, light brown, medium to fine SAND, little Silt.			SS	10	18	19 36 37 31	73	106
		- EMBANKMENT FILL -								
	102.0									
	101.0									
25		SS-11A: Very dense, light brown, medium to fine SAND, little Silt.			SS	11A	12	25 45 35	80	116
	99.5									
	99.0	SS-11B: Very dense, medium to fine SAND, and gravel, little silt.			SS	11B	4	20	--	-
				▽						
	96.0									
30		Dense, light brown/gray, fine SAND.			SS	12	13	16 16 20 21	36	52
	94.0									
		-UPPER SAND DEPOSIT-								
	91.0									
35		Medium dense, light brown/gray, fine SAND.			SS	13	12	7 10 10 11	20	29
	89.0									
	86.0									
40										

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
SPT N(60) VALUE: 10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

B-210

CLIENT: Maine Turnpike Authority
STATION: 2745+17.27 SB C-D Roadway
PROJECT No.: 179450125
LOCATION: Exit 35/36 Interchange, Saco, Maine
OFFSET: 57 LT
EXPLORATION No.: B-210
EXPLORATION DATE: 10/28/2020 to 10/30/2020
GROUND EL.: 125.95
WATER LEVEL: 29.0
DATUM: NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
40										
	84.0	Medium dense, light brown/gray, fine SAND. Some iron staining at approximately 41 feet.			SS	14	14	8 9 8 4	17	25
		-UPPER SAND DEPOSIT-								
45	81.0	Medium dense, gray, fine SAND, trace silt.			SS	15	14	12 10 10 10	20	29
	79.0									
	76.0									
50		Very soft, gray, silty CLAY.			SS	16	9	WOR/24"	-	-
	74.0									
		-MARINE CLAY (SOFT)-								
	71.0									
55		Very soft, gray, silty CLAY.			SS	17	12	WOR/24"	-	-
		V-1 55.6-56.0 ft: Tmax = 25 ft-lbs / Tr = 12.5 ft-lbs Su = 586 psf/ 293 psf								
	69.0	V-2 56.6-57.0 ft: Tmax = 25 ft-lbs / Tr = 12.5 ft-lbs Su = 586 psf/ 293 psf								
		Pushed rock with roller bit from 58 - 62 feet. Could not attempt Shelby Tube at 60 feet.								
60										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

SPT N(60) VALUE: 10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

B-210

CLIENT **Maine Turnpike Authority** STATION **2745+17.27 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **57 LT** EXPLORATION No. **B-210**

EXPLORATION DATE **10/28/2020 to 10/30/2020** GROUND EL. **125.95** WATER LEVEL **29.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
60	64.0	Very soft, gray, CLAY, trace silt.								
		V-3 62.6-63.0 ft: Tmax = 20.8 ft-lbs/ Tr = 8.3 ft-lbs Su = 488 psf/ 195 psf			SS	18	24	WOR/24"	-	-
	62.0	V-4 63.6-64.0 ft: Tmax = 25 ft-lbs/ Tr = 10.4 ft-lbs Su = 586 psf/244 psf								
65	61.0	Pushed Shelby Tube from 65 - 67 feet.			U	1	24	PUSH	-	-
	59.0	Gravel/cobbles at approx. 68 feet based on drill action.								
	58.0	- MARINE CLAY (SOFT) -								
70	56.0	Very soft, gray, silty CLAY.			SS	19	24	WOR/24"	-	-
	54.0									
75										
80	46.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-210

CLIENT Maine Turnpike Authority
STATION 2745+17.27 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 57 LT
EXPLORATION No. B-210
EXPLORATION DATE 10/28/2020 to 10/30/2020
GROUND EL. 125.95
WATER LEVEL 29.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
80										
	125.95	Very soft, gray, silty CLAY.			SS	20	24	WOR/24"	-	-
	44.0									
85										
	39.0	- MARINE CLAY (SOFT) -								
	36.0	Very soft, gray, silty CLAY.			SS	21	20	WOR/24"	-	-
90	34.0									
95										
100	26.0									

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-210

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 10/28/2020 to 10/30/2020
STATION 2745+17.27 SB C-D Roadway
OFFSET 57 LT
GROUND EL. 125.95
WATER LEVEL 29.0
PROJECT No. 179450125
EXPLORATION No. B-210
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
100										
	125.95	Very soft, gray, silty CLAY.			SS	22	24	WOR/24"	-	-
	24.0									
105	21.0	Pushed Shelby Tube from 105 - 107 feet.			U	2	18	PUSH	-	-
	19.0	- MARINE CLAY (SOFT) -								
110	16.0	Very soft, gray, silty CLAY.			SS	23	24	WOR/24"	-	-
	14.0									
115										
120	6.0									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-210

CLIENT Maine Turnpike Authority
STATION 2745+17.27 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 57 LT
EXPLORATION No. B-210
EXPLORATION DATE 10/28/2020 to 10/30/2020
GROUND EL. 125.95
WATER LEVEL 29.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
120										
	125.95	Very soft, gray, silty CLAY.			SS	24	12	WOR/24"	-	-
	4.0									
125										
	-1.1	- MARINE CLAY (SOFT) -								
	-4.1	Very soft, gray, silty CLAY.			SS	25	22	WOR/24"	-	-
130	-6.1									
135										
140	-14.1									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-210

CLIENT Maine Turnpike Authority
STATION 2745+17.27 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 57 LT
EXPLORATION No. B-210
EXPLORATION DATE 10/28/2020 to 10/30/2020
GROUND EL. 125.95
WATER LEVEL 29.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
140										
		Very soft, gray, silty CLAY.			SS	26	15	WOR/24"	-	-
	-16.1									
145										
	-21.1									
		- MARINE CLAY (SOFT) -								
	-24.1									
150		Very soft, gray, silty CLAY.			SS	27	10	WOR/24"	-	-
	-26.1									
155										
160										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-210

CLIENT Maine Turnpike Authority
STATION 2745+17.27 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 57 LT
EXPLORATION No. B-210
EXPLORATION DATE 10/28/2020 to 10/30/2020
GROUND EL. 125.95
WATER LEVEL 29.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
160										
165										
	-41.1	- MARINE CLAY (SOFT) -								
170	-44.1	Very soft, gray, silty CLAY.			SS	28	12	WOR/24"	-	-
	-46.1									
175										
	-53.1									
180	-54.1	Wash started returned sand at approximately 179 feet. Advanced roller bit for 3 feet into sand.								

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-210

CLIENT **Maine Turnpike Authority** STATION **2745+17.27 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **57 LT** EXPLORATION No. **B-210**

EXPLORATION DATE **10/28/2020 to 10/30/2020** GROUND EL. **125.95** WATER LEVEL **29.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
180		- LOWER SAND DEPOSIT -								
	-56.1	Bottom of boring at 182 feet below ground surface. No refusal.								
185										
190										
195										
200										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Stantec BOREHOLE LOG B-211

CLIENT Maine Turnpike Authority | STATION 2750+79.61 SB C-D Roadway | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 26.69 LT | EXPLORATION No. B-211

EXPLORATION DATE 11/12/2020 to 11/12/2020 | GROUND EL. 97.78 | WATER LEVEL 4.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	97.8						in.			
0	97.5	4 inches Topsoil								
		Loose, light brown, fine SAND, trace silt.			SS	1	16	1 2 2 3	4	6
	95.8	SS-2A: Loose light brown, fine SAND, trace silt.			SS	2A	14	2 2 2	4	6
	94.1									
	93.8	SS-2B: Loose, brown/gray, fine SAND, some organics, little silt.		▽	SS	2B	6	2	-	-
5		Very loose, dark brown/gray, fine SAND, some silt, trace organics.			SS	3	14	1 1 2 2	3	4
	91.8	Loose, dark brown/gray, fine SAND, some silt, trace organics.			SS	4	13	2 3 3 7	6	8
	89.8	Loose, gray, medium to fine SAND, little silt. - UPPER SAND DEPOSIT -			SS	5	10	2 4 5 5	9	13
10	87.8	Loose, gray, medium to fine SAND, little silt.			SS	6	12	2 4 7 4	11	15
	85.8	SS-7A: Loose, gray, medium to fine SAND, trace silt.			SS	7A	10	3 2	-	-
	84.8	SS-7B: Light brown, fine SAND, some silt.			SS	7B	10	5 8	-	-
	83.8	Medium dense, light brown, fine SAND, some silt.			SS	8	13	2 5 10 10	15	21
15	81.8	Medium dense, light brown, fine SAND, some silt.			SS	9	24	5 9 9 9	18	25
	79.8									
	79.5	SS-10A: Medium dense, light brown, fine SAND, some silt.			SS	10A	4	5	-	-
		SS-10B: Stiff, light brown/gray, silty CLAY, some fine sand. -MARINE CLAY (CRUST)-			SS	10B	14	3 2 2	5	7
20	77.8									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-211

CLIENT Maine Turnpike Authority
STATION 2750+79.61 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 26.69 LT
EXPLORATION No. B-211
EXPLORATION DATE 11/12/2020 to 11/12/2020
GROUND EL. 97.78
WATER LEVEL 4.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20		Very soft, gray, silty CLAY.			SS	11	24	WOH/24"	-	-
	75.8	- MARINE CLAY (SOFT) -								
25	72.8	Very soft, gray, silty CLAY.			SS	12	24	WOH/24"	-	-
		V-1 25.6-26.0 ft: Tmax = 25.0 ft-lbs/ Tr = 6.3 ft-lbs Su = 586 psf/ 147 psf								
	70.8	V-2 26.6-27.0 ft: Tmax = 25.0 ft-lbs/ Tr = 8.3 ft-lbs Su = 586 psf/ 195 psf								
		- MARINE CLAY (SOFT) -								
30	67.8	Very soft, gray, silty CLAY.			SS	13	24	WOH/24"	-	-
	65.8									
35	62.8	Very soft, gray, silty CLAY.			SS	14	24	WOH/24"	-	-
		V-3 35.6-36.0 ft: Tmax = 20.8 ft-lbs/ Tr = 4.2 ft-lbs Su = 488 psf/ 99 psf								
	60.8	V-4 36.6-37.0 ft: Tmax = 22.9 ft-lbs/ Tr = 6.3 ft-lbs Su = 537 psf/ 147 psf								
40	57.8									

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-211

CLIENT Maine Turnpike Authority
STATION 2750+79.61 SB C-D Roadway
PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine
OFFSET 26.69 LT
EXPLORATION No. B-211
EXPLORATION DATE 11/12/2020 to 11/12/2020
GROUND EL. 97.78
WATER LEVEL 4.0
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
40										
		Very soft, gray, silty CLAY.			SS	15	24	WOR/24"	-	-
	55.8	- MARINE CLAY (SOFT) -								
45	52.8	Very soft, gray, silty CLAY.			SS	16	24	WOR/24"	-	-
		V-5 45.6-46.0 ft: Tmax = 23.3 ft-lbs/ Tr = 8.3 ft-lbs Su = 546 psf/ 195 psf								
	50.8	V-6 46.6-47.0 ft: Tmax = 24.2 ft-lbs/ Tr = 10.4 ft-lbs Su = 568 psf/ 244 psf								
		- MARINE CLAY (SOFT) -								
50	47.8	Very soft, gray, silty CLAY.			SS	17	24	WOR/24"	-	-
	45.8									
55	42.8	Very soft, gray, silty CLAY.			SS	18	24	WOR/24"	-	-
	40.8									
60	37.8									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

B-211

CLIENT **Maine Turnpike Authority** STATION **2750+79.61 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **26.69 LT** EXPLORATION No. **B-211**

EXPLORATION DATE **11/12/2020 to 11/12/2020** GROUND EL. **97.78** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
60										
		Pushed Shelby Tube from 60 - 62 feet. No recovery.			U	-	0	PUSH	-	-
	35.8									
		Pushed Shelby Tube from 62 - 64 feet.			U	1	23	PUSH	-	-
		Very soft, gray, silty CLAY.								
	33.8									
	32.8									
65		Very soft, gray, silty CLAY.			SS	19	24	WOR/24"	-	-
	30.8									
		- MARINE CLAY (SOFT) -								
	27.8									
70		Pushed Shelby Tube from 70 - 72 feet.			U	2	22	PUSH	-	-
		Very soft, gray, silty CLAY.								
	25.8									
75										
80	17.8									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-211

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/12/2020 to 11/12/2020
STATION 2750+79.61 SB C-D Roadway
OFFSET 26.69 LT
GROUND EL. 97.78
WATER LEVEL 4.0
PROJECT No. 179450125
EXPLORATION No. B-211
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
80										
	97.8	Very soft, gray, silty CLAY.			SS	20	24	WOR/24"	-	-
	15.8									
85		- MARINE CLAY (SOFT) -								
	7.8									
90		Very soft, gray, silty CLAY.			SS	21	24	WOR/24"	-	-
	5.8									
95										
	-2.2									
100										

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

B-211

CLIENT **Maine Turnpike Authority** STATION **2750+79.61 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **26.69 LT** EXPLORATION No. **B-211**

EXPLORATION DATE **11/12/2020 to 11/12/2020** GROUND EL. **97.78** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
							in.			
100		Very soft, gray, silty CLAY.			SS	22	24	WOR/24"	-	-
		- MARINE CLAY (SOFT) -								
	-4.2	Bottom of boring at 102 feet below ground surface. No refusal.								
105										
110										
115										
120										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-212

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 12/2/2020 to 12/3/2020
STATION 2765+18.39 SB C-D Roadway
OFFSET 24.44 LT
GROUND EL. 117.59
WATER LEVEL 6.0
PROJECT No. 179450125
EXPLORATION No. B-212
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	117.6							
0	117.5	Very loose, dark brown fine SAND, some silt, some roots.	SS	1	18	1 1 1 3	2	3
		Very loose, dark brown fine SAND, and silt, trace roots.						
	115.6	Medium dense, tan fine SAND, little silt.	SS	2	12	2 7 9 9	15	21
	113.6	Medium dense, gray fine SAND, little silt. 1" clay seam in sample. Iron staining.	SS	3	12	6 7 8 10	28	39
5	111.6	Medium dense, gray fine SAND, trace silt.	SS	4	24	12 11 17 17	25	35
	109.6	Medium dense, gray to brown meidum to fine SAND, trace silt.	SS	5	17	7 10 15 21	46	64
10	107.6	Dense, brown medium to fine SAND, trace silt.	SS	6	24	17 21 25 30	32	45
	105.6	- UPPER SAND DEPOSIT -						
	103.6	Dense, brown fine SAND, some silt.	SS	7	21	11 14 18 12	28	39
15	102.1							
	101.6	Dense, gray fine SAND, little silt.						
	100.6	Clay on rods at 17 feet.						
	98.6	Medium dense, brown fine SAND, trace silt.						
20								

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
SPT N(60) VALUE: 10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-212

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 12/2/2020 to 12/3/2020
GROUND EL. 117.59
STATION 2765+18.39 SB C-D Roadway
OFFSET 24.44 LT
WATER LEVEL 6.0
PROJECT No. 179450125
EXPLORATION No. B-212
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
20	96.6	- UPPER SAND DEPOSIT -						
	93.6	Very soft, gray SILTY CLAY, trace coarse sand.	SS	8	13	WOH 1 1 1	2	3
25	92.6	Very soft, gray CLAYEY SILT, little sand.						
	91.6							
	88.6	Very soft, gray SILTY CLAY, little sand.	SS	9	24	WOR/12" WOH/12"	-	-
30	86.6	- MARINE CLAY (SOFT) -						
	83.6	Very soft, gray CLAY.	SS	10	24	WOH/24"	-	-
35	81.6							
	78.6	Very soft, gray CLAY.						
40								

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-212

CLIENT **Maine Turnpike Authority** STATION **2765+18.39 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **24.44 LT** EXPLORATION No. **B-212**

EXPLORATION DATE **12/2/2020 to 12/3/2020** GROUND EL. **117.59** WATER LEVEL **6.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
40	76.6	Probe for harder material with roller bit.			SS	11	24	WOR/24"	-	-
45	69.6	- MARINE CLAY (SOFT) -								
50										
55										
60										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-212

CLIENT **Maine Turnpike Authority** STATION **2765+18.39 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **24.44 LT** EXPLORATION No. **B-212**

EXPLORATION DATE **12/2/2020 to 12/3/2020** GROUND EL. **117.59** WATER LEVEL **6.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
60										
	49.6	- MARINE CLAY (SOFT) -								
65										
70										
75										
80										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG B-212

CLIENT **Maine Turnpike Authority** STATION **2765+18.39 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **24.44 LT** EXPLORATION No. **B-212**

EXPLORATION DATE **12/2/2020 to 12/3/2020** GROUND EL. **117.59** WATER LEVEL **6.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
80										
	29.6	- MARINE CLAY (SOFT) -								
90										
95										
	18.6	Bottom of boring at 100 feet below ground surface. No refusal.								
100	17.6									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-213

CLIENT Maine Turnpike Authority | STATION 413+51.80 Exit 35 NB Off Ramp | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 10.38 RT | EXPLORATION No. B-213

EXPLORATION DATE 12/11/2020 to 12/11/2020 | GROUND EL. 107.96 | WATER LEVEL 7.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	108.0				in.			
0	107.7	3 inches Topsoil.						
		Very loose, brown/light brown, fine SAND and silt.	SS	1	9	1 1 2 4	3	4
	106.0	Medium dense, brown/light brown, fine SAND and silt.						
		- UPPER SAND DEPOSIT -	SS	2	15	4 7 14 11	21	29
	104.0	Stiff, gray/light brown, silty CLAY.						
5		TV = 1,000 psf	SS	3	21	3 5 6 7	11	15
	102.0	- MARINE CLAY (CRUST) -						
		SS-4A: Stiff, gray/light brown, silty CLAY.	SS	4A	24	7 7	-	-
	101.0	SS-4B: Medium dense, gray, fine SAND and silt, trace fine, sub rounded gravel	SS	4B	24	6 5	-	-
	100.0	SS-5A: Very soft, gray, clayey SILT.	SS	5A	22	WOH/6" 2	-	-
	99.0	SS-5B: Medium dense, gray, medium to fine SAND and silt, some coarse to fine sub rounded gravel.	SS	5B	2	10 12	-	-
10	98.0	Loose, gray, medium to fine SAND and silt, trace fine, sub rounded gravel.						
		- LOWER SAND DEPOSIT -	SS	6	24	3 2 2 1	4	6
	96.0	Medium dense, gray, medium to fine SAND and silt, trace fine, sub rounded gravel.	SS	7	24	2 9 10 8	19	27
	94.0	SS-8A: Medium dense, gray, medium to fine SAND and silt, trace fine, sub rounded gravel.						
15			SS	8A	22	4 3 8 27/4"	11	15
	92.2							
	92.0	SS-8B: Dark gray/black, weathered rock in tip of sampler. Spoon refusal at 16 feet.	SS	8B	2	50/2"	-	-
		Bottom of boring at 16 feet below ground surface. Spoon refusal on probable weathered/fractured bedrock.						
20								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

SPT N(60) VALUE: 10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4.25" Hollow Stem Auger, 1 3/8" inside diameter split spoon; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-214

CLIENT **Maine Turnpike Authority** STATION **625+06.57 Exit 35 NB Plaza** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **45.97 RT** EXPLORATION No. **B-214**

EXPLORATION DATE **12/10/2020 to 12/10/2020** GROUND EL. **115.51** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	115.5						in.			
0		- UPPER SAND DEPOSIT - Very loose, light brown, medium to fine, silty SAND.			SS	1	15	1 1 3 5	4	6
	113.5									
	113.0	Light brown, medium to fine, silty SAND.								
		9-24": Very stiff, olive brown, clayey SILT.			SS	2	24	5 8 10 11	18	25
	111.5									
		Stiff, olive brown, CLAY and silt.								
5		TV = 1,100 psf		▽	SS	3	24	3 5 7 7	12	17
	109.5	- MARINE CLAY (CRUST) -								
		Very stiff, olive brown, clayey SILT, with medium to coarse sand lenses.			SS	4	24	12 11 14 14	25	35
	107.5									
		Very dense, orange, coarse to medium SAND and gravel, some clayey silt/till.			SS	5	3	50/3"	-	-
		- GLACIAL TILL -								
10	105.5									
		Very dense, silty medium to coarse SAND and gravel. Till.			SS	6	3	100/3"	-	-
	103.5									
	103.0	Gray, fractured rock.			SS	7	0	50/0"	-	-
		Bottom of boring at 12.5 feet below ground surface. Auger refusal on probable bedrock.								
15										
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4.25" Hollow Stem Auger, 1 3/8" inside diameter split spoon; Supervisor: Jason Ward

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

Stantec BOREHOLE LOG B-215

CLIENT **Maine Turnpike Authority** STATION **208+81.61 Exit 35 NB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **125.25 LT** EXPLORATION No. **B-215**

EXPLORATION DATE **12/1/2020 to 12/1/2020** GROUND EL. **109.78** WATER LEVEL **10.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	109.8						in.			
0		Medium dense, brown/gray, medium to fine SAND, little silt, trace fine gravel.			SS	1	13	1 3 6 6	9	13
	107.8	- EMBANKMENT FILL -								
		SS-2A: Medium dense, brown, coarse to fine, SAND, some silt, trace fine gravel.			SS	2A	8	6 6	-	-
	106.8	SS-2B: Medium dense, light brown, fine SAND, trace silt.			SS	2B	9	7 12	-	-
	105.8	SS-3A: Medium dense, gray, clayey SILT.			SS	3A	15	5 8 7	15	21
5	104.3	SS-3B: Medium dense, gray/light brown, fine SAND, little silt.			SS	3B	6	8	-	-
	103.8	SS-4A: Medium dense, light brown, coarse to fine SAND, little silt.			SS	4A	10	7 5	-	-
	102.8	SS-4B: Stiff, gray, clayey SILT, some fine sand.			SS	4B	10	4 4	-	-
	101.8	SS-5A: Medium stiff, gray, silty CLAY. - MARINE CLAY (CRUST) -			SS	5A	10	3 5	-	-
	100.8	SS-5B: Medium stiff, gray, SILT and fine sand, trace fine, sub rounded gravel.		▽	SS	5B	10	6 6	-	-
10	99.8	Dense, gray, fine sand, little silt.			SS	6	15	10 15 19 17	34	48
	97.8	- UPPER SAND DEPOSIT -								
		SS-7A: Medium dense, gray, fine SAND, some silt.			SS	7A	15	11 6	-	-
	96.8	SS-7B: Very stiff, gray, clayey SILT, some fine sand.			SS	7B	8	9 9	-	-
	95.8	Very stiff, gray, clayey SILT.			SS	8	18	8 8 11 16	19	27
15		- MARINE CLAY (CRUST) -								
	93.8	SS-9A: Dense, medium to fine SAND and silt.			SS	9A	15	21 19	-	-
	92.3	- LOWER SAND DEPOSIT -								
	91.8	SS-9B: Dense, light brown, medium to fine SAND, some silt.			SS	9B	6	16 18	-	-
		Boring terminated at 18 feet below ground surface. No refusal.								
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Stantec

BOREHOLE LOG

B-216

CLIENT **Maine Turnpike Authority** STATION **2737+90.55 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **135.20 LT** EXPLORATION No. **B-216**

EXPLORATION DATE **11/17/2020 to 11/17/2020** GROUND EL. **103.49** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	103.5						in.			
0	103.2	3 inches Topsoil.								
		Very loose, light brown, SILT and fine SAND.			SS	1	15	1 1 1 1	2	3
	101.5	Medium dense, light brown/gray, SILT and fine SAND. Some iron staining around 3.5 feet.			SS	2	14	3 4 11 13	15	21
	99.5	Medium dense, light brown/gray, SILT, trace fine sand.			SS	3	18	11 12 12 12	24	34
5	97.5	- EMBANKMENT FILL - Dense, light brown/gray, SILT and fine sand.			SS	4	22	6 11 20 21	31	43
	95.5	Dense, light brown, SILT and fine sand.			SS	5	24	12 16 17 25	33	46
10	93.5	Dense, light brown, SILT and fine sand.			SS	6	14	23 24 26 32	50	70
	91.5									
	90.0									
	88.5	SS-7A: Very soft, light brown/gray, silty CLAY. - MARINE CLAY (SOFT) -			SS	7A	18	WOH/18"	-	-
15	87.0									
	86.5	SS-7B: Very soft, gray, silty CLAY.			SS	7B	6	WOH/6"	-	-
		Bottom of boring at 17 feet below ground surface. No refusal.								
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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BOREHOLE LOG

B-217

CLIENT **Maine Turnpike Authority** STATION **2741+14.94 SB C-D Roadway** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **528.73 LT** EXPLORATION No. **B-217**

EXPLORATION DATE **11/17/2020 to 11/17/2020** GROUND EL. **111.60** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	111.6				in.			
0	111.3	4 inches Topsoil.						
		Medium dense, brown, medium to fine SAND, some fine angular gravel, some silt.	SS	1	16	3 7 9 12	16	22
	109.6							
		Medium dense, gray/light brown, medium to fine SAND, trace fine angular gravel, some silt.	SS	2	17	12 14 14 13	28	39
	107.6							
5		Dense, light brown, fine SAND, trace some.	SS	3	13	12 15 19 33	34	48
	105.6							
		SS-4A: Very dense, light brown/gray, fine SAND, some silt. - EMBANKMENT FILL -	SS	4A	10	30 45 37	82	115
	104.1							
	103.6	SS-4B: Very dense, brown/light brown, medium to fine SAND, little silt, trace fine angular gravel.	SS	4B	5	40	-	-
		Very dense, light brown, fine SAND, some silt.	SS	5	16	14 21 33 35	54	76
10	101.6							
		Very dense, gray, medium to fine SAND, some silt.	SS	6	12	55 51 50/1"	-	-
	99.6							
	96.6							
15		Dense, gray, fine SAND, some silt, trace organics (leaves/twigs).	SS	7	13	10 14 20 21	34	48
	94.6							
		Bottom of boring at 17 feet below ground surface. No refusal.						
20								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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OS-Series Boring Logs

Stantec BOREHOLE LOG OS-1

CLIENT **Maine Turnpike Authority** STATION **1669+74.65 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **3.89 RT** EXPLORATION No. **OS-1**

EXPLORATION DATE **11/9/2020 to 11/9/2020** GROUND EL. **118.21** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	118.2				in.			
0	117.9	3" Topsoil						
		Loose, brown/gray, medium to fine SAND, some coarse to fine, angular gravel, little silt.	SS	1	13	1 4 5 4	9	13
	116.2	-EMBANKMENT FILL-						
	115.7	Loose, brown/gray, medium to fine SAND, some coarse to fine, angular gravel, little silt.	SS	2	15	2 3 3 5	6	8
	114.2	Loose, gray, fine SAND, some silt, trace fine angular gravel.						
5		- UPPER SAND DEPOSIT - Medium dense, gray/light brown, fine sand, trace silt.	SS	3	14	8 12 15 16	27	38
	112.2	Dense, gray/light brown, fine sand, trace silt.	SS	4	24	12 16 17 21	33	46
	110.2	Dense, gray/light brown, fine sand, trace silt. Some iron staining around 9 feet.	SS	5	12	19 21 20 18	41	57
10	108.2	Medium dense, gray, fine SAND and silt.	SS	6	24	11 12 11 9	23	32
	106.2							
	104.2	Very soft, gray, silty CLAY.						
15		- MARINE CLAY (SOFT) -	SS	7	24	WOH/24"	-	-
	102.2	Very soft, gray, silty CLAY. V-1 16.6-17.0 ft: Tmax >33.3 ft-lbs / Tr = 8.3 ft-lbs Su = >795 psf/ 198 psf						
	100.2	V-2 17.6-18.0 ft: Tmax >33.3 ft-lbs / Tr = 12.5 ft-lbs Su = >795 psf/ 298 psf						
20	98.2							

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG OS-1

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/9/2020 to 11/9/2020
STATION 1669+74.65 MTA CL
OFFSET 3.89 RT
GROUND EL. 118.21
WATER LEVEL 5.0
PROJECT No. 179450125
EXPLORATION No. OS-1
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20	97.6	Attempted vane shear at 20.0 feet, unable to advance. SS-8A: Very loose, gray, fine SAND, trace silt.			SS	8	12	2 1 1 1	2	3
	96.2	SS-8B: Very soft, gray, clayey SILT, trace fine sand. Advanced vane shear at 22.0 feet, too stiff to shear.								
25	93.2	Very soft, gray, clayey SILT, trace fine sand.			SS	9	24	WOH/24"	-	-
	91.2	End of sampling. Begin advancing roller bit to refusal.								
30										
	85.2	- MARINE CLAY (SOFT) -								
35										
40	78.2									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-1

CLIENT **Maine Turnpike Authority** STATION **1669+74.65 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **3.89 RT** EXPLORATION No. **OS-1**

EXPLORATION DATE **11/9/2020 to 11/9/2020** GROUND EL. **118.21** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
40										
	69.2	- MARINE CLAY (SOFT) -								
45	68.2	No change in drill action.								
50										
55										
60	58.2									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG OS-1

CLIENT **Maine Turnpike Authority** STATION **1669+74.65 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **3.89 RT** EXPLORATION No. **OS-1**

EXPLORATION DATE **11/9/2020 to 11/9/2020** GROUND EL. **118.21** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
							in.			
60		Roller bit refusal at 60 feet. Rolled to 62 feet with no change in drill action.								
	56.2	-FRACTURED BEDROCK -								
		Bottom of boring at 62 feet below ground surface in probable fractured bedrock.								
65										
70										
75										
80										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

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Stantec BOREHOLE LOG OS-2

CLIENT **Maine Turnpike Authority** STATION **1669+76.78 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **80.47 RT** EXPLORATION No. **OS-2**

EXPLORATION DATE **11/10/2020 to 11/10/2020** GROUND EL. **114.60** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	114.6						in.			
0	114.1	6 inches Topsoil			SS	1A	4	1	-	-
	113.6	SS-1A: Loose, brown, medium to fine SAND, trace silt.			SS	1B	14	3 5 8	8	11
	112.6	-EMBANKMENT FILL-								
		SS-1B: Loose, medium dense, gray/brown, fine SAND, some silt, little sub rounded to sub angular gravel.			SS	2	19	7 7 10 6	17	24
	110.6	Medium dense, gray, fine SAND, little silt. - UPPER SAND DEPOSIT -								
5		Medium stiff, gray, clayey SILT, little fine sand.		▽	SS	3	18	1 1 5 5	6	8
	108.6	Very stiff, gray, SILT and fine sand.			SS	4	20	5 9 10 9	19	27
	106.6	Medium dense, brown/gray, medium to fine SAND, little silt.			SS	5	20	8 14 15 12	29	41
10	104.6	Very dense, brown, medium to fine SAND, little silt. Some iron staining around 11 feet.			SS	6	17	20 23 31 36	54	76
	102.6									
15	99.6	SS-7A: Medium dense, brown/gray, medium to fine SAND, little silt.			SS	7A	12	12 13	-	-
	98.6	SS-7B: Very stiff, gray/brown, clayey SILT, some fine sand.			SS	7B	12	9 14	-	-
	97.6	- MARINE CLAY (CRUST) -								
20	94.6									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG OS-2

CLIENT **Maine Turnpike Authority** STATION **1669+76.78 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **80.47 RT** EXPLORATION No. **OS-2**

EXPLORATION DATE **11/10/2020 to 11/10/2020** GROUND EL. **114.60** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20		Stiff, gray, clayey SILT, little fine SAND. TV = 700 psf			SS	8	21	1 3 5 5	8	11
	92.6	- MARINE CLAY (CRUST) -								
	91.1	- MARINE CLAY (SOFT) -								
25	89.6	SS-9A: Very soft, gray, silty CLAY, trace fine sand.			SS	9A	18	WOR WOH/9"	-	-
	88.1									
	87.6	SS-9B: Dense, gray, fine SAND, little silt.			SS	9B	6	11/3" 25	-	-
		End of sampling. Begin advancing roller bit to refusal.								
30	80.6	- MARINE CLAY (SOFT) -								
35										
40	74.6									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-2

CLIENT **Maine Turnpike Authority** STATION **1669+76.78 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **80.47 RT** EXPLORATION No. **OS-2**

EXPLORATION DATE **11/10/2020 to 11/10/2020** GROUND EL. **114.60** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
40										
	65.6	- MARINE CLAY (SOFT) -								
45	64.6	No change in drill action.								
50										
55										
60	54.6									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

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BOREHOLE LOG

OS-2

CLIENT **Maine Turnpike Authority** STATION **1669+76.78 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **80.47 RT** EXPLORATION No. **OS-2**

EXPLORATION DATE **11/10/2020 to 11/10/2020** GROUND EL. **114.60** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
60										
	45.6	- MARINE CLAY (SOFT) -								
70	44.6	No change in drill action.								
80	34.6									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-2

CLIENT **Maine Turnpike Authority** STATION **1669+76.78 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **80.47 RT** EXPLORATION No. **OS-2**

EXPLORATION DATE **11/10/2020 to 11/10/2020** GROUND EL. **114.60** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
80										
85	25.6	- MARINE CLAY (SOFT) -								
90	24.6	No change in drill action.								
95										
100	14.6									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-2

CLIENT **Maine Turnpike Authority** STATION **1669+76.78 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **80.47 RT** EXPLORATION No. **OS-2**

EXPLORATION DATE **11/10/2020 to 11/10/2020** GROUND EL. **114.60** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
100										
		- MARINE CLAY (SOFT) -								
105	8.6									
		Roller bit refusal at 106 feet. Rolled to 108 feet with no change in drill action.								
	6.6	- FRACTURED BEDROCK -								
		Bottom of boring at 108 feet below ground surface in probable fractured bedrock.								
110										
115										
120										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG OS-3

CLIENT **Maine Turnpike Authority** STATION **1718+48.03 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **94.55 RT** EXPLORATION No. **OS-3**

EXPLORATION DATE **11/5/2020 to 11/5/2020** GROUND EL. **107.22** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	107.2						in.			
0	106.7	5" Topsoil								
	106.2	Dense, brown, medium to fine SAND, some coarse, angular gravel, trace silt.			SS	1	13	11 30 10 9	40	58
	104.2	-EMBANKMENT FILL- Medium dense, brown, fine SAND, little silt, trace coarse, angular gravel.			SS	2	19	11 13 14 10	27	39
5	102.2	SS-3A: Medium dense, brown, SILT and fine sand.		▽	SS	3A	10	9 5	-	-
	101.2	SS-3B: Stiff, brown/gray, clayey SILT, little fine sand.			SS	3B	10	5 5	-	-
	100.2	Medium dense, brown, SILT and fine sand, trace sub rounded gravel. - MARINE CLAY (CRUST) -			SS	4	22	10 8 4 5	12	17
	98.2	Cobbles/boulders based on drill action.								
10	97.2	Dense, brown, fine SAND, some medium sand, some coarse to fine, angular gravel, little silt. - GLACIAL TILL -			SS	5	12	14 25 21 11	46	67
	95.2									
	93.2	Wash returning black rock beginning at 14 feet.								
15	92.2									
	91.9	Black, fractured rock in split spoon. Spoon refusal at 15.3 feet.			SS	6	3	50/3"	-	-
	91.7	Hard, weathered, fine grained, gray/black, PHYLLITE. Joints are open, low angle, moderately close. Recovery = 30% (18 inches) RQD = 0% (0 inches) Core barrel was broken when pulled from hole. Naturally worn out according to driller.			C	1	18	min/ft 2 1.5 2.5 3 3	-	-
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

SPT N(60) VALUE: 10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-3

CLIENT **Maine Turnpike Authority** STATION **1718+48.03 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **94.55 RT** EXPLORATION No. **OS-3**

EXPLORATION DATE **11/5/2020 to 11/5/2020** GROUND EL. **107.22** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20	86.7	Bottom of boring at 20.5 feet below ground surface in fractured bedrock.								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

Stantec BOREHOLE LOG OS-4

CLIENT **Maine Turnpike Authority** STATION **1731+34.05 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **91.53 RT** EXPLORATION No. **OS-4**

EXPLORATION DATE **11/6/2020 to 11/6/2020** GROUND EL. **98.36** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	98.4						in.			
0	98.1	3" Topsoil								
		Medium dense, brown, medium to fine SAND, some medium to coarse, angular gravel, trace silt.			SS	1	10	5 8 12 10	20	29
	96.4	-EMBANKMENT FILL-								
		Medium dense, brown, medium to fine SAND, some medium to coarse, angular gravel, trace silt.			SS	2	4	10 9 5 5	14	20
	94.4	Boulder approximately 1 foot in diameter at 2.5 feet.								
5		Medium dense, dark brown, medium to fine SAND, some silt, trace fine, sub angular gravel.		▽	SS	3	3	4 5 5 6	10	50
	92.4	- UPPER SAND DEPOSIT -								
		Medium dense, dark brown/black, fine SAND and silt, trace fine, sub angular gravel.			SS	4	3	5 5 7 9	12	17
	90.4									
		Very stiff, gray/light brown, silty CLAY.			SS	5	24	11 11 12 13	23	33
		TV = 1,300 psf								
10	88.4	- MARINE CLAY (CRUST) -								
		Medium stiff, gray/light brown, silty CLAY.			SS	6	24	2 3 2 3	5	7
		TV = 1,300 psf								
	86.4									
		- MARINE CLAY (SOFT) -								
15	83.4									
		Very soft, gray, silty CLAY.			SS	7	24	WOR/24"	-	-
		V-1 15.6-16.0 ft: Tmax >33.3 ft-lbs / Tr = 6.5 ft-lbs Su >795 psf/ 155 psf								
	81.4	V-2 16.6-17.0 ft: Tmax >33.3 ft-lbs / Tr = 6.5 ft-lbs Su >795 psf/ 155 psf								
20	78.4									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG OS-4

CLIENT **Maine Turnpike Authority** STATION **1731+34.05 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **91.53 RT** EXPLORATION No. **OS-4**

EXPLORATION DATE **11/6/2020 to 11/6/2020** GROUND EL. **98.36** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
20										
	76.4	No recovery. Based on lack of blows, very soft, silty CLAY. V-3 20.6-21.0 ft: Tmax = 21 ft-lbs / Tr = 2 ft-lbs Su = 496 psf/ 48 psf V-4 21.6-22.0 ft: Tmax = 21 ft-lbs / Tr = 2 ft-lbs Su = 496 psf/ 48 psf			SS	-	0	WOR/24"	-	-
	73.4	- MARINE CLAY - (SOFT)								
25		No recovery. Based on lack of blows, very soft, silty CLAY.			SS	-	0	WOR/24"	-	-
	71.4									
	69.9									
	68.4	Medium dense, gray, fine SAND, trace silt.			SS	8	13	5 6 7 5	13	19
30	66.4	- LOWER SAND DEPOSIT -								
	63.4	Very dense, dark gray, black, fractured bedrock. - FRACTURED BEDROCK -			SS	9	11	22 33 41 50	74	107
35	61.4	Bottom of boring at 37 feet below ground surface in probable fractured bedrock.								
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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BOREHOLE LOG

OS-5

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/19/2020 to 11/19/2020**
STATION **325+19.32 Exit 35 SB Off Ramp**
OFFSET **25.58 LT**
GROUND EL. **98.18**
WATER LEVEL **3.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-5**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	98.2						in.			
0		Loose, brown, coarse to medium SAND, little fine, angular gravel, trace silt.			SS	1	11	1 2 4 7	6	9
	96.2	- EMBANKMENT FILL -								
		Medium dense, brown/gray, medium to fine SAND, little silt.		▽	SS	2	15	8 9 11 12	20	28
	94.2	- UPPER SAND DEPOSIT -								
5		Medium dense, brown/gray, medium to fine SAND, little silt.			SS	3	13	5 7 9 9	16	23
	92.2									
	91.7	SS-4A: Medium dense, brown/gray, medium to fine SAND, little silt.			SS	4A	6	3	-	-
		SS-4B: Medium stiff, gray, silty CLAY.			SS	4B	18	3 3 3	6	9
	90.2	Very soft, gray, silty CLAY.			SS	5	24	WOH/24"	-	-
10	88.2	Very soft, gray, silty CLAY.			SS	6	24	WOH/24"	-	-
	86.2	- MARINE CLAY (SOFT) -								
15	83.2	Very soft, gray, silty CLAY.			SS	7	7	WOH/24"	-	-
	81.2	Pushed Shelby tube from 17 - 19 feet.			U	1	24	PUSH	-	-
	79.2	Loose, gray, fine SAND, trace silt.						3 4		
20										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG OS-5

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/19/2020 to 11/19/2020
STATION 325+19.32 Exit 35 SB Off Ramp
OFFSET 25.58 LT
GROUND EL. 98.18
WATER LEVEL 3.0
PROJECT No. 179450125
EXPLORATION No. OS-5
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20	77.2	- LOWER SAND DEPOSIT -			SS	8	23	3 7	7	10
	75.2									
25	73.2	Very soft, gray, clayey SILT. - MARINE CLAY (SOFT) -			SS	9	24	WOH/12" 2 3	-	-
	71.2									
	69.7									
30	68.2	Medium dense, fine SAND and silt, trace fine, sub rounded gravel.			SS	10	24	4 8 8 5	16	23
	66.2	- LOWER SAND DEPOSIT -								
35	63.2	Medium dense, fine SAND and silt, trace fine, sub rounded gravel.			SS	11	24	4 5 5 9	10	14
	61.2									
	61.0	Roller bit refusal at 37.2 feet. Rolled to 40 feet with no change in drill action. - FRACTURED BEDROCK -								
40	58.2	Bottom of boring at 40 feet below ground surface in								

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-5

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/19/2020 to 11/19/2020**
STATION **325+19.32 Exit 35 SB Off Ramp**
OFFSET **25.58 LT**
GROUND EL. **98.18**
WATER LEVEL **3.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-5**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
							in.			
40		probable fractured bedrock.								
45										
50										
55										
60										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Stantec

BOREHOLE LOG

OS-6

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/18/2020 to 11/18/2020**
STATION **325+44.43 Exit 35 SB Off Ramp**
OFFSET **34.78 RT**
GROUND EL. **97.00**
WATER LEVEL **3.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-6**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	97.0						in.			
0	96.7	4 inches Topsoil.								
		Medium stiff, gray, silty CLAY.			SS	1	19	1 3 3 5	6	9
	95.0	Medium dense, gray, coarse to medium SAND, some silt.		▽	SS	2	15	6 11 11 9	22	31
	93.0	- UPPER SAND DEPOSIT -								
5		Loose, gray, coarse to medium SAND, some silt.			SS	3	17	3 3 5 8	8	11
	91.0	SS-4A: Loose, gray, coarse to medium SAND, some silt.			SS	4A	12	4 4	-	-
	90.0	SS-4B: Stiff, gray, silty CLAY			SS	4B	12	4 5	-	-
	89.0	Very soft, gray, silty CLAY.			SS	5	24	WOH/24"	-	-
10	87.0	Very soft, gray, silty CLAY.			SS	6	24	WOH/24"	-	-
		V-1 10.6-11.0 ft: Tmax = 9.5 ft-lbs / Tr = 1 ft-lbs Su = 227 psf/ 24 psf								
	85.0	V-2 11.6-12.0 ft: Tmax = 17 ft-lbs / Tr = 2 ft-lbs Su = 406 psf/ 48 psf								
		- MARINE CLAY (SOFT) -								
15	82.0	Very soft, gray, silty CLAY.			SS	7	24	WOR/12" WOH/12"	-	-
		V-3 15.6-16.0 ft: Tmax = 17 ft-lbs / Tr = 2.0 ft-lbs Su = 416 psf/ 49 psf								
	80.0	V-4 16.6-17.0 ft: Tmax = 22 ft-lbs / Tr = 3.3 ft-lbs Su = 538 psf/ 81 psf								
20	77.0									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG OS-6

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/18/2020 to 11/18/2020
STATION 325+44.43 Exit 35 SB Off Ramp
OFFSET 34.78 RT
GROUND EL. 97.00
WATER LEVEL 3.0
PROJECT No. 179450125
EXPLORATION No. OS-6
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
		Very soft, gray, silty CLAY.			SS	8	24	WOR/12" WOH/12"	-	-
	75.0	- MARINE CLAY (SOFT) -								
	72.0									
25		SS-9A: Very soft, gray, silty CLAY.			SS	9A	18	WOR/12" 3	-	-
	70.5									
	70.0	SS-9B: Loose, gray, fine SAND, some silt.			SS	9B	6	4	-	-
	67.0									
30		Loose, gray, fine SAND and silt, some coarse to fine, sub angular to sub rounded gravel.			SS	10	24	1 2 5 9	7	10
	65.0	- LOWER SAND DEPOSIT -								
	62.0									
35		Medium dense, gray, fine SAND and silt, some coarse to fine, sub rounded gravel.			SS	11	4	5 12 16 20	28	39
	60.0									
	57.0									
40										

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

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BOREHOLE LOG

OS-6

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/18/2020 to 11/18/2020
STATION 325+44.43 Exit 35 SB Off Ramp
OFFSET 34.78 RT
GROUND EL. 97.00
WATER LEVEL 3.0
PROJECT No. 179450125
EXPLORATION No. OS-6
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
							in.			
40	55.9	Very dense, dark gray/black, highly fractured bedrock. Spoon refusal at 41.1 feet. Advanced roller bit to 44 feet and began coring. - BEDROCK -			SS	12	12	60 65 50/1"	-	-
	53.0	Hard, slightly weathered, fine grained, gray/dark gray, PHYLLITE. Joints are open to closed, low angle to dipping, close to moderately close. Recovery = 42% (25 inches) RQD = 10% (6 inches)			C	1	25	min/ft 1.5 2 2 3 3	-	-
45	48.0	Hard, slightly weathered, fine grained, gray/black, PHYLLITE. Joints are open, low angle, moderately close. Recovery = 22% (13 inches) RQD = 0% (0 inches)			C	2	13	min/ft 3 3 2.5 3 3.5	-	-
50	43.0	Hard, slightly weathered, fine grained, gray/black, PHYLLITE. Joints are open, low angle, moderately close. Recovery = 70% (42 inches) RQD = 0% (0 inches)			C	3	42	min/ft 2.5 3 3 3.5 3.5	-	-
55	38.0	Hard, slightly weathered, fine grained, gray/black, PHYLLITE. Joints are closed, low angle to								
60										

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-6

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/18/2020 to 11/18/2020**
STATION **325+44.43 Exit 35 SB Off Ramp**
OFFSET **34.78 RT**
GROUND EL. **97.00**
WATER LEVEL **3.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-6**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
							in.			
60		moderately dipping, moderately close. Recovery = 88% (53 inches) RQD = 13% (8 inches)			C	4	53	min/ft 3.5 3.5 4 4 3.5	-	-
	33.0	Bottom of boring at 64 feet below ground surface in bedrock.								
65										
70										
75										
80										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Stantec BOREHOLE LOG OS-8

CLIENT: Maine Turnpike Authority
LOCATION: Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE: 11/4/2020 to 11/4/2020
GROUND EL.: 98.89
STATION: 2728+75.83 SB C-D Roadway
OFFSET: 19.57 RT
WATER LEVEL: 3.0
PROJECT No.: 179450125
EXPLORATION No.: OS-8
DATUM: NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	98.9				in.			
0	98.1	9" Asphalt Pavement						
	97.9	Dense, brown, medium to fine SAND, some coarse, angular gravel.	SS	1	15	14 17 22 12	39	57
	95.9	Dense, brown, medium to fine SAND, some coarse, angular gravel, litte silt. - EMBANKMENT FILL -	SS	2	16	14 18 30 33	48	70
5	93.9	Dense, brown, medium to fine SAND, some coarse, angular gravel, litte silt.	SS	3	20	35 15 8 8	23	33
	92.9	Very stiff, gray/brown, silty CLAY TV = 1,600 psf	SS	4	18	9 7 9 10	16	23
	91.9	Very stiff, gray/brown, silty CLAY TV = 1,600 psf	SS	5	2	2 2 2 3	4	6
10	89.9	Soft, gray, silty CLAY. - MARINE CLAY (CRUST) -	SS	6	24	1 1 1 WOH/6"	2	3
	87.9		SS	7	14	WOH/24"	-	-
	85.9	Very soft, gray, silty CLAY. V-1 13.6-14.0 ft: Tmax= 20.8 ft-lbs/Tr = 4.17 ft-lbs Su = 502 psf/ 101 psf V-2 14.6-15.0 ft: Tmax= 20.8 ft-lbs/Tr = 4.17 ft-lbs Su = 502 psf/ 101 psf	SS	8	16	WOH/24"	-	-
15	83.9	Very soft, gray, silty CLAY.						
	81.9	- MARINE CLAY (SOFT) -						
20	78.9							

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-8

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/4/2020 to 11/4/2020**
GROUND EL. **98.89**
STATION **2728+75.83 SB C-D Roadway**
OFFSET **19.57 RT**
WATER LEVEL **3.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-8**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20		Very soft, gray, silty CLAY.			SS	9	12	WOH/24"	-	-
		V-3 20.6-21.0 ft: Tmax = 21 ft-lbs / Tr = 3.5 ft-lbs Su = 507 psf/ 85 psf								
	76.9	V-4 21.6-22.0 ft: Tmax = 23 ft-lbs / Tr = 4 ft-lbs Su = 556 psf/ 97 psf								
		- MARINE CLAY - (SOFT)								
	75.4									
	73.9									
25		Very loose, gray, fine SAND, and silt.			SS	10	9	WOR/12" 1/12"	-	-
		- LOWER SAND DEPOSIT -								
	71.9									
	70.9									
		Roller bit refusal at 28 feet. Rolled to 30 feet with no change in drill action.								
		- FRACTURED BEDROCK -								
30	68.9									
		Bottom of boring at 30 feet below ground surface in probable fractured bedrock.								
35										
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Truck Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Stantec BOREHOLE LOG OS-9

CLIENT Maine Turnpike Authority
LOCATION Exit 35/36 Interchange, Saco, Maine
EXPLORATION DATE 11/16/2020 to 11/16/2020
STATION 2740+54.13 SB C-D Roadway
OFFSET 39.56 LT
GROUND EL. 95.44
WATER LEVEL NR
PROJECT No. 179450125
EXPLORATION No. OS-9
DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	95.4						in.			
0	95.1	3 inches Topsoil.								
		Loose, gray, medium to fine SAND, little silt.			SS	1	13	1 3 4 5	7	10
	93.4	Medium dense, brown/gray, medium to fine SAND, little silt.			SS	2	13	9 10 9 10	19	27
	91.4	Medium dense, brown/gray, medium to fine SAND, little silt.			SS	3	14	8 10 14 14	24	34
5	89.4	Medium dense, brown, fine SAND, some silt. Some iron staining around 8 feet.			SS	4	16	4 6 10 20	16	22
	87.4	Medium dense, gray, fine SAND, little silt. - UPPER SAND DEPOSIT -			SS	5	12	6 11 13 9	24	34
	85.4	Medium dense, gray, fine SAND, some silt.			SS	6	21	4 7 10 12	17	24
10	83.4									
	80.4									
15	79.9	SS-7A: Medium dense, gray, fine SAND, some silt.			SS	7A	6	6	-	-
		SS-7B: Medium stiff, gray, silty CLAY starting at 15.5 feet.			SS	7B	17	3 3 2	6	8
	78.4	TV = 1,100 psf - MARINE CLAY (CRUST) -								
	76.4									
20	75.4									

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-9

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/16/2020 to 11/16/2020**
STATION **2740+54.13 SB C-D Roadway**
OFFSET **39.56 LT**
GROUND EL. **95.44**
WATER LEVEL **NR**
PROJECT No. **179450125**
EXPLORATION No. **OS-9**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
		Very soft, gray, silty CLAY.			SS	8	24	WOR/18" WOH/6"	-	-
	73.4	- MARINE CLAY (SOFT) -								
	70.4									
25		Very soft, gray, silty CLAY.			SS	9	24	WOH/24"	-	-
	68.4									
		Bottom of boring at 27 feet below ground surface. No refusal.								
30										
35										
40										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Stantec

BOREHOLE LOG

OS-10

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/13/2020 to 11/13/2020**
STATION **1740+50.00 SB C-D Roadway**
OFFSET **82 LT**
GROUND EL. **99.00**
WATER LEVEL **5.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-10**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	TYPE	NUMBER	RECOVERY (in.)	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	99.0							
0	98.7	4 inches Topsoil.						
		Medium dense, brown, medium to fine SAND, some medium to coarse, angular gravel, little silt.	SS	1	9	2 5 10 7	15	210
	97.0	-EMBANKMENT FILL-						
		Medium to dense, gray, fine SAND, trace silt.	SS	2	15	7 10 14 14	24	34
	95.0	Medium dense, gray/brown, fine SAND, some silt.						
5			SS	3	18	7 12 13 13	25	35
	93.0	Medium dense, gray/brown, fine SAND, some silt.						
			SS	4	13	8 9 10 9	19	27
	91.0	Dense, gray/brown, fine SAND, some silt.						
		- UPPER SAND DEPOSIT -	SS	5	14	13 15 18 14	33	46
10	89.0	Dense, gray/brown, fine SAND, some silt.						
			SS	6	24	11 14 28 35	42	59
	87.0							
	84.0	Dense, gray/brown, fine SAND, some silt.						
15			SS	7	20	6 13 12 14	25	35
	82.0							
	80.5							
20	79.0							

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-10

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/13/2020 to 11/13/2020**
STATION **1740+50.00 SB C-D Roadway**
OFFSET **82 LT**
GROUND EL. **99.00**
WATER LEVEL **5.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-10**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20		Very soft, gray, silty CLAY.			SS	8	24	WOH/12" 1 1	-	-
	77.0	- MARINE CLAY (SOFT) -								
25	74.0	Very soft, gray, silty CLAY. V-1 25.6 - 26.0 ft: Tmax = 27 ft-lbs / Tr = 8.5 ft-lbs Su = 684 psf/ 215 psf V-2 26.6 - 27.0 ft: Tmax = 32 ft-lbs / Tr = 10 ft-lbs Su = 810 psf/ 253 psf			SS	9	24	WOH/24"	-	-
	72.0	End of sampling. Begin advancing roller bit to refusal.								
30										
35										
40	59.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-10

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/13/2020 to 11/13/2020**
STATION **1740+50.00 SB C-D Roadway**
OFFSET **82 LT**
GROUND EL. **99.00**
WATER LEVEL **5.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-10**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
40										
	50.0	- MARINE CLAY (SOFT) -								
45	49.0	No change in drill action.								
50										
55										
60	39.0									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-10

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/13/2020 to 11/13/2020**
STATION **1740+50.00 SB C-D Roadway**
OFFSET **82 LT**
GROUND EL. **99.00**
WATER LEVEL **5.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-10**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
60										
	30.0	- MARINE CLAY (SOFT) -								
70	29.0	No change in drill action.								
80	19.0									

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-10

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/13/2020 to 11/13/2020**
STATION **1740+50.00 SB C-D Roadway**
OFFSET **82 LT**
GROUND EL. **99.00**
WATER LEVEL **5.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-10**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
80										
85										
	10.0	- MARINE CLAY (SOFT) -								
90	9.0	No change in drill action.								
95										
100	-1.0									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-10

CLIENT **Maine Turnpike Authority**
STATION **1740+50.00 SB C-D Roadway**
PROJECT No. **179450125**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
OFFSET **82 LT**
EXPLORATION No. **OS-10**
EXPLORATION DATE **11/13/2020 to 11/13/2020**
GROUND EL. **99.00**
WATER LEVEL **5.0**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
100										
	-10.0	- MARINE CLAY (SOFT) -								
105	-11.0	No change in drill action.								
110										
115										
120	-21.0									

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-10

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **11/13/2020 to 11/13/2020**
STATION **1740+50.00 SB C-D Roadway**
OFFSET **82 LT**
GROUND EL. **99.00**
WATER LEVEL **5.0**
PROJECT No. **179450125**
EXPLORATION No. **OS-10**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
120		- MARINE CLAY (SOFT) -								
125	-28.0	Roller bit refusal at 127 feet. Rolled to 130 feet with no change in drill action.								
		- FRACTURED BEDROCK -								
130	-31.0	Bottom of boring at 130 feet below ground surface in probable fractured bedrock.								
135										
140										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec BOREHOLE LOG OS-11

CLIENT Maine Turnpike Authority | STATION 1789+68.87 MTA CL | PROJECT No. 179450125
LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 123.27 LT | EXPLORATION No. OS-11
EXPLORATION DATE 12/2/2020 to 12/2/2020 | GROUND EL. 125.23 | WATER LEVEL 5.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	125.2						in.			
0	125.1	Loose, dark brown fine SAND, and silt, some roots.								
		Loose, brown/gray fine SAND, some silt. Mottled.			SS	1	14	WOH/12" 4 4	4	6
	123.2									
		Very stiff, gray/brown SILT, trace clay, trace sand.			SS	2	20	4 5 12 11	17	24
	121.7									
	121.2	Medium dense, medium to fine SAND, little silt.								
		Medium dense, brown medium to fine SAND, trace silt.			SS	3	14	2 4 7 10	11	15
5	119.2									
		Medium dense, brown medium to fine SAND, trace silt.			SS	4	18	12 14 15 20	29	41
	117.2									
		Medium dense, brown medium to fine SAND, trace silt.			SS	5	16	7 10 15 15	25	35
10	115.2									
		Medium dense, brown medium to fine SAND, trace silt.			SS	6	16	4 8 11 13	18	25
	113.2									
		- UPPER SAND DEPOSIT -								
	112.2									
		Casing driving harder at 13 feet.								
	111.2									
		Medium dense, brown medium to fine SAND, trace silt.			SS	7	17	5 8 12 15	20	28
15	109.2									
	107.2									
		Clay on rods at 18 feet.								
	106.2									
		Medium dense, brown fine SAND, trace silt.						3 5		
20										

Undrained Shear Strength - tsf: 1 2 3 4
Water Content & Atterberg Limits: W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG OS-11

CLIENT **Maine Turnpike Authority** STATION **1789+68.87 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **123.27 LT** EXPLORATION No. **OS-11**

EXPLORATION DATE **12/2/2020 to 12/2/2020** GROUND EL. **125.23** WATER LEVEL **5.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20					SS	8	20	7 12	12	17
	104.2	- UPPER SAND DEPOSIT -								
	101.2	Dense, brown fine SAND, trace silt.			SS	9	19	10 19 27 32	46	64
25	99.7									
	99.2	Dense, gray/brown medium to fine SAND, some silt, trace gravel. -GLACIAL TILL-								
		Bottom of boring at 26 feet below ground surface.								
30										
35										
40										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Brian Foley

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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BOREHOLE LOG

OS-12

CLIENT **Maine Turnpike Authority** STATION **1763+00 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **122.00 LT** EXPLORATION No. **OS-12**

EXPLORATION DATE **8/30/2021 to 8/30/2021** GROUND EL. **120.00** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLES TYPE	NUMBER	RECOVERY (in.)	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	120.0							
0	119.5	6 inches TOPSOIL						
		Loose, brown, fine SAND, some silt	SS	1	7	1 2 3 4	5	
	118.0	Medium dense, light brown, fine SAND, little silt	SS	2	13	2 5 5 7	10	
	116.0	Medium dense, light brown, fine SAND, little silt	SS	3	16	8 10 10 11	20	
5	114.0	Medium dense, light brown/gray, fine SAND, little silt	SS	4	15	11 11 11 11	22	
	112.0	Medium dense, light brown/gray, fine SAND, little silt	SS	5	16	8 11 11 12	22	
10	110.0	Medium dense, light brown/gray, fine SAND, little silt	SS	6	20	5 8 11 13	19	
	108.0	- UPPER SAND DEPOSIT -						
15	105.0	Medium dense, gray, fine SAND, some silt. Some iron staining throughout.	SS	7	22	5 6 8 15	14	
	103.0							
20	100.0							

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: Mobile ATV Rig; Hammer Type: Auto hammer; Method: Drive and Wash, 1 3/8" inside diameter split spoon; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-12

CLIENT Maine Turnpike Authority | STATION 1763+00 MTA CL | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 122.00 LT | EXPLORATION No. OS-12

EXPLORATION DATE 8/30/2021 to 8/30/2021 | GROUND EL. 120.00 | WATER LEVEL 4.0 | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	98.0	Medium dense, gray, fine SAND, some silt			SS	8	13	4 4 17 20	21	
		- UPPER SAND DEPOSIT -								
25	95.0									
		Very soft, gray, SILT and fine sand, trace clay. Attempted vane shear test at 28 feet but could not turn vane.			SS	9	12	2 1 WOH WOH	1	
	93.0	- MARINE CLAY (CRUST) -								
30	90.0									
		Stiff, gray, SILT and fine sand, trace clay			SS	10	18	5 6 6 8	12	
	88.0									
	86.5									
		Bottom of Zone of Influence = 2B								
35	85.0									
		Very soft, gray, CLAY and silt. Attempted vane shear test at 38 feet but could not turn vane.			SS	11	24	WOR WOR WOH WOH	0	
	83.0	- MARINE CLAY (SOFT) -								
40	80.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: Mobile ATV Rig; Hammer Type: Auto hammer; Method: Drive and Wash, 1 3/8" inside diameter split spoon; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

BOREHOLE LOG

OS-12

CLIENT **Maine Turnpike Authority** STATION **1763+00 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **122.00 LT** EXPLORATION No. **OS-12**

EXPLORATION DATE **8/30/2021 to 8/30/2021** GROUND EL. **120.00** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
40		Attempted vane shear test at 40 feet but could not turn vane.								
		Advanced roller bit as probe to 100 feet.								
	78.0									
45										
50	70.0	No change in drill action.								
55										
60	60.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: Mobile ATV Rig; Hammer Type: Auto hammer; Method: Drive and Wash, 1 3/8" inside diameter split spoon; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

OS-12

CLIENT **Maine Turnpike Authority** STATION **1763+00 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **122.00 LT** EXPLORATION No. **OS-12**

EXPLORATION DATE **8/30/2021 to 8/30/2021** GROUND EL. **120.00** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
60										
	50.0	No change in drill action.								
80	40.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: Mobile ATV Rig; Hammer Type: Auto hammer; Method: Drive and Wash, 1 3/8" inside diameter split spoon; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

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BOREHOLE LOG

OS-12

CLIENT **Maine Turnpike Authority** STATION **1763+00 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **122.00 LT** EXPLORATION No. **OS-12**

EXPLORATION DATE **8/30/2021 to 8/30/2021** GROUND EL. **120.00** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
80										
85										
90	30.0	No change in drill action.								
95										
100	20.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: Mobile ATV Rig; Hammer Type: Auto hammer; Method: Drive and Wash, 1 3/8" inside diameter split spoon; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

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BOREHOLE LOG

OS-12

CLIENT **Maine Turnpike Authority** STATION **1763+00 MTA CL** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **122.00 LT** EXPLORATION No. **OS-12**

EXPLORATION DATE **8/30/2021 to 8/30/2021** GROUND EL. **120.00** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
							in.			
100		Bottom of boring at 100 feet below ground surface. No refusal.								

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: Mobile ATV Rig; Hammer Type: Auto hammer; Method: Drive and Wash, 1 3/8" inside diameter split spoon; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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MA-Series Boring Logs

Stantec BOREHOLE LOG MA-1

CLIENT **Maine Turnpike Authority** STATION **147+45 Route 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **7 RT** EXPLORATION No. **MA-1**

EXPLORATION DATE **12/9/2020 to 12/9/2020** GROUND EL. **126.00** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	126.0						in.			
0	125.5	6 inches Asphalt Pavement.								
		Medium dense, light brown, medium to fine SAND, little silt, some coarse to fine, sub angular gravel, with 6 - 8 inch cobbles from 1.5 - 2 feet.			SS	1	5	13 15 14	29	41
	124.0	Dense, light brown, medium to fine SAND, little silt, trace coarse to fine, sub angular gravel.			SS	2	14	10 12 18 21	30	42
	122.0	- EMBANKMENT FILL -								
5	121.0	Very dense, light brown, medium to fine SAND, some silt, little coarse to fine, sub angular gravel.			SS	3	13	13 24 29 25	53	74
	119.0	Very dense, light brown, medium to fine SAND, some silt, little coarse to fine, sub angular gravel.			SS	4	21	14 23 39 33	62	87
	117.0									
10	116.0	Dense, light brown, medium to fine SAND, little silt.			SS	5	19	12 18 24 26	42	57
	114.0									
	112.5									
15	111.0	SS-6A: Medium dense, light brown/gray, fine SAND and silt.			SS	6A	10	3 6	-	-
	110.0	- UPPER SAND DEPOSIT -			SS	6B	8	35 48	-	-
	109.0	SS-6B: Very dense, gray, medium to fine SAND, some silt, some coarse to fine, sub angular to sub rounded gravel.								
	107.5									
20	106.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

MA-1

CLIENT **Maine Turnpike Authority** STATION **147+45 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **7 RT** EXPLORATION No. **MA-1**

EXPLORATION DATE **12/9/2020 to 12/9/2020** GROUND EL. **126.00** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20		Very stiff, gray/light brown, silty CLAY. TV = 1,700 psf			SS	7	22	7 12 16 18	28	39
	104.0	- MARINE CLAY (CRUST) -								
25	101.0	Medium stiff, graym silty CLAY. 0.5 inches of fine, gray sand in tip of sampler.			SS	8	24	2 3 3 3	6	8
	99.0	Bottom of boring at 27 feet below ground surface. No Refusal.								
30										
35										
40										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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Stantec

BOREHOLE LOG

MA-2

CLIENT **Maine Turnpike Authority** STATION **147+36 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **35 LT** EXPLORATION No. **MA-2**

EXPLORATION DATE **12/8/2020 to 12/8/2020** GROUND EL. **122.70** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	122.7						in.			
0		Medium dense, brown, coarse to medium SAND, little silt, trace coarse to fine, angular gravel.			SS	1	6	1 2 8 11	10	14
	120.7									
		SS-2A: Very dense, brown, medium to fine SAND and coarse to fine, sub angular gravel, some silt.			SS	2A	8	20 42	-	-
	119.7									
		SS-2B: Very dense, light brown, medium to fine SAND, trace silt.			SS	2B	7	24 33	-	-
	118.7									
		- EMBANKMENT FILL -								
	117.7									
5		Dense, light brown, medium to fine SAND, trace silt.			SS	3	10	13 22 25 26	47	66
	115.7									
		Very dense, light brown, medium to fine SAND, trace silt.			SS	4	14	23 26 48 36	74	104
	113.7									
	112.7									
10		Dense, light brown, medium to fine SAND, little silt.			SS	5	12	10 18 20 23	38	53
	110.7									
	109.2									
	107.7									
15		Medium stiff, gray, silty CLAY.								
		TV = 400 psf			SS	6	9	5 2 2 3	4	6
	105.7	- MARINE CLAY (CRUST) -								
	104.2									
20	102.7									

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG MA-2

CLIENT **Maine Turnpike Authority** STATION **147+36 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **35 LT** EXPLORATION No. **MA-2**

EXPLORATION DATE **12/8/2020 to 12/8/2020** GROUND EL. **122.70** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY in.	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	100.7	Dense, gray, fine SAND and silt, little fine, sub rounded to sub angular gravel. 1 inch gray rock in middle of sampler.			SS	7	8	5 20 14 6	34	48
		- UPPER SAND DEPOSIT -								
25	97.7	Meidum dense, gray, fine SAND and silt, little fine, sub rounded to sub angular gravel.			SS	8	2	4 5 5 4	10	14
	95.7	Bottom of boring at 27 feet below ground surface. No refusal.								
30										
35										
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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Stantec BOREHOLE LOG MA-3

CLIENT **Maine Turnpike Authority** STATION **148+58 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **7 RT** EXPLORATION No. **MA-3**

EXPLORATION DATE **12/9/2020 to 12/9/2020** GROUND EL. **130.00** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	130.0						in.			
0	129.5	6 inches Asphalt Pavement.								
		Dense, light brown, medium to fine SAND, little silt, some coarse to fine, sub angular gravel, with 6 - 8 inch cobbles from 1.5 - 2 feet.			SS	1	8	12 21 18	39	55
	128.0	Dense, light brown, medium to fine SAND, little silt, trace coarse to fine, sub angular gravel.			SS	2	17	18 16 17 16	33	46
	126.0	- EMBANKMENT FILL -								
5	125.0	Medium dense, light brown, medium to fine SAND, some silt, trace coarse to fine, sub angular gravel.			SS	3	18	10 12 11 19	23	32
	123.0	Medium dense, light brown, medium to fine SAND, some silt, trace coarse to fine, sub angular gravel.			SS	4	23	14 11 15 17	26	36
	121.0									
	120.0									
10		Dense, light brown, medium to fine SAND, some silt, trace coarse to fine, sub angular gravel.			SS	5	19	10 15 18 20	33	46
	118.0									
	115.0									
15		Very dense, gray, medium to fine SAND, some coarse to fine, sub rounded to rounded gravel, some silt.			SS	6	20	12 33 49 52	82	115
	113.0	- UPPER SAND DEPOSIT -								
20	110.0									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec BOREHOLE LOG MA-3

CLIENT **Maine Turnpike Authority** STATION **148+58 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **7 RT** EXPLORATION No. **MA-3**

EXPLORATION DATE **12/9/2020 to 12/9/2020** GROUND EL. **130.00** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
		Medium dense, gray, medium to fine SAND, some silt, little coarse to fine, sub rounded to rounded gravel.			SS	7	12	25 18 11 11	29	41
	108.0	- UPPER SAND DEPOSIT -								
	106.5									
	105.0	- MARINE CLAY (CRUST) -								
25		Very stiff, gray, silty CLAY. TV = 1,600 psf			SS	8	24	12 11 17 11	28	39
	103.0									
		Bottom of boring at 27 feet below ground surface. No refusal.								
30										
35										
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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Stantec BOREHOLE LOG MA-4

CLIENT **Maine Turnpike Authority** STATION **165+65 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **50 RT** EXPLORATION No. **MA-4**

EXPLORATION DATE **12/7/2020 to 12/7/2020** GROUND EL. **113.25** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	113.3						in.			
0	113.0	4 inches Topsoil.								
		Loose, gray/brown, medium to fine SAND, some silt.			SS	1	11	1 2 2 1	4	6
	111.3	- UPPER SAND DEPOSIT -								
		SS-2A: Medium dense, gray/light brown, fine SAND and silt, little medium sand.			SS	2A	9	5 7	-	-
	110.3									
		SS-2B: Medium dense, light brown, fine SAND, some silt, little medium sand.			SS	2B	9	9 11	-	-
	109.3			▽						
	108.3									
5		Stiff, gray/light brown, SILT, some fine sand.			SS	3	20	8 5 4 7	9	13
	106.3									
		Very stiff, gray/light brown, silty CLAY.			SS	4	24	6 10 11 13	21	29
		TV = 1,200 psf								
	104.3									
		- MARINE CLAY (CRUST) -								
	103.3									
10		Medium stiff, gray/light brown, silty CLAY.			SS	5	24	2 3 4 7	7	10
		TV = 400 psf								
	101.3									
	98.3									
15		Very soft, gray, silty CLAY.			SS	6	24	WOH/24"	-	-
		- MARINE CLAY (SOFT) -								
	96.3									
	94.8									
	93.3									
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

MA-4

CLIENT **Maine Turnpike Authority** STATION **165+65 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **50 RT** EXPLORATION No. **MA-4**

EXPLORATION DATE **12/7/2020 to 12/7/2020** GROUND EL. **113.25** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	91.3	Dense, gray, coarse to fine SAND, some silt, trace fine, sub angular gravel. - GLACIAL TILL -			SS	7	19	12 16 14 14	30	42
	90.3	Roller bit refusal at 23 feet. Advanced roller bit to 25 feet with no change in drill action. - FRACTURED BEDROCK -								
25	88.3	Bottom of boring at 25 feet below ground surface in likely fractured bedrock.								
30										
35										
40										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Stantec

BOREHOLE LOG

MA-5

CLIENT **Maine Turnpike Authority** STATION **164+47.49 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **36.32 LT** EXPLORATION No. **MA-5**

EXPLORATION DATE **12/7/2020 to 12/7/2020** GROUND EL. **112.20** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
	112.2						in.			
0	111.7	6 inches Topsoil.								
		Very loose, brown/light brown, medium to fine SAND, little silt.			SS	1	18	1 1 2 2	3	4
	110.2	Medium dense, brown/light brown, medium to fine SAND, some silt.			SS	2	15	4 4 9 8	13	18
		- UPPER SAND DEPOSIT -		▽						
	108.2									
5	107.2	Stiff, gray/light brown, silty CLAY. TV = 500 psf			SS	3	24	3 4 6 7	10	14
	105.2	Stiff, gray/light brown, silty CLAY. TV = 700 psf			SS	4	24	6 8 7 5	15	21
	103.2	- MARINE CLAY (CRUST) -								
10	102.2	Medium stiff, gray/light brown, silty CLAY. TV = 400 psf			SS	5	14	1 3 2 4	5	7
	100.2									
	99.2	- MARINE CLAY (SOFT) - Very soft, gray, silty CLAY. V-1 13.6-14.0 ft: Tmax = 29.5 ft-lbs / Tr = 5 ft-lbs Su = 704 psf/ 119 psf			SS	6	24	WOH/18" 3	-	-
15	97.2	V-2 14.6-15.0 ft: Tmax = 42 ft-lbs / Tr = 11 ft-lbs Su = 1002 psf/ 262 psf Loose, gray, fine SAND and silt.			SS	7	13	6 4 3 3	7	10
	95.2	- LOWER SAND DEPOSIT -								
20	92.2									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

MA-5

CLIENT **Maine Turnpike Authority**
LOCATION **Exit 35/36 Interchange, Saco, Maine**
EXPLORATION DATE **12/7/2020 to 12/7/2020**
GROUND EL. **112.20**
STATION **164+47.49 RT 112**
OFFSET **36.32 LT**
WATER LEVEL **4.0**
PROJECT No. **179450125**
EXPLORATION No. **MA-5**
DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (in.)	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	SPT N(60) VALUE
20										
	90.2	Medium dense, gray, medium to fine SAND, some silt, little coarse to fine, sub angular gravel. Some dark gray/black fractured bedrock in tip of sampler.			SS	8	21	1 1 13 19	14	20
	87.2	Advanced roller bit to 25 feet through fractured bedrock based on drill action. - FRACTURED BEDROCK -								
25		Boring terminated at 25 feet below ground surface in likely fractured bedrock.								
30										
35										
40										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✖ Pocket Penetrometer / Torvane

Stantec

BOREHOLE LOG

MA-6

CLIENT **Maine Turnpike Authority** STATION **165+64.98 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **31.85 LT** EXPLORATION No. **MA-6**

EXPLORATION DATE _____ GROUND EL. **113.75** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	113.8						in.			
0	113.3	6 inches Asphalt Pavement.								
		Medium dense, brown, medium to fine SAND, little silt, little coarse to fine sub rounded gravel.			SS	1	13	10 11 8	19	27
	111.8	- FILL -								
	111.3	Medium dense, brown, medium to fine SAND, little silt, little coarse to fine sub rounded gravel.			SS	2A	2	6 6	-	-
		Medium dense, fine SAND and silt. Smells strongly of gasoline.		▽	SS	2B	6	13 11	-	-
	109.8	- UPPER SAND DEPOSIT -								
5	108.8	Stiff, gray/light brown, silty CLAY, trace fine, angular gravel.			SS	3	7	4 6 8 7	14	20
		TV = 800 psf								
	106.8	Stiff, gray/light brown, silty CLAY, trace fine, angular gravel.			SS	4	14	7 7 7 5	14	20
	104.8	- MARINE CLAY (CRUST) -								
10	103.8	Soft, gray/light brown, silty CLAY.			SS	5	24	1 2 2 2	4	6
	101.8	- MARINE CLAY (SOFT) -								
15	98.8	Very soft gray, silty CLAY.			SS	6	24	WOH/24"	-	-
	96.8									
	94.8	Roller bit refusal at 19 feet, advanced roller bit to 21 feet with no change in drill action.								
20	93.8									

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Continued Next Page

Stantec

BOREHOLE LOG

MA-6

CLIENT **Maine Turnpike Authority** STATION **165+64.98 RT 112** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **31.85 LT** EXPLORATION No. **MA-6**

EXPLORATION DATE _____ GROUND EL. **113.75** WATER LEVEL **4.0** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
							in.			
20	92.8	- FRACTURED BEDROCK -								
		Bottom of boring at 21 feet below ground surface in probable fractured bedrock.								
25										
30										
35										
40										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" casing, 1 3/8" inside diameter split spoon; Hammer Type: Auto hammer; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

Ledge Probes

Stantec

BOREHOLE LOG

P-1

CLIENT **Maine Turnpike Authority** STATION **622+05 Exit 35 NB Plaza** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **59 LT** EXPLORATION No. **P-1**

EXPLORATION DATE **12/10/2020 to 12/10/2020** GROUND EL. **116.00** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	116.0						in.			
0		Easy drilling, silty cuttings.								
5	110.5	Auger grinding at 5.5 feet.								
		- FRACTURED BEDROCK -								
	107.8	Bottom of probe at 8.2 feet below ground surface in probable bedrock.								
10										
15										
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Jason Ward

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

BOREHOLE LOG

P-2

Stantec

621+00

CLIENT **Maine Turnpike Authority** STATION **Exit 35 NB Plaza** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **53 LT** EXPLORATION No. **P-2**

EXPLORATION DATE **12/10/2020 to 12/10/2020** GROUND EL. **115.00** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	115.0						in.			
0		Easy drilling, silty cuttings.								
	102.0									
	101.5	Auger grinding at 13 feet. Probable cobble.								
15		Easy drilling.								
	97.5									
	97.0	Auger grinding at 17.5 feet.								
20		Bottom of probe at 18 feet below groud surface on likely bedrock.								

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Jason Ward

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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BOREHOLE LOG 414+07

P-3

CLIENT **Maine Turnpike Authority** STATION **Exit 35 NB Off Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **59 LT** EXPLORATION No. **P-3**

EXPLORATION DATE **12/11/2020 to 12/11/2020** GROUND EL. **107.75** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	107.8						in.			
0		Easy drilling, brown, SAND, some silt in cuttings.								
10	96.8	Bottom of probe at 11 feet below ground surface on likely bedrock.								
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

Stantec

BOREHOLE LOG 413+00

P-4

CLIENT Maine Turnpike Authority | STATION Exit 35 NB Off Ramp | PROJECT No. 179450125

LOCATION Exit 35/36 Interchange, Saco, Maine | OFFSET 55 LT | EXPLORATION No. P-4

EXPLORATION DATE 12/11/2020 to 12/11/2020 | GROUND EL. 105.50 | WATER LEVEL NR | DATUM NAVD88

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	105.5						in.			
0		Easy drilling, brown/light brown, SAND, some silt in cuttings.								
	91.5	Bottom of probe at 14 feet below ground surface on likely bedrock.								
5										
10										
15										
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Liam Gillen-Hughes

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW NHP.GDT 3/18/21

Stantec

BOREHOLE LOG 614+88

P-5

CLIENT **Maine Turnpike Authority** STATION **Exit 35 NB Plaza** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **44 RT** EXPLORATION No. **P-5**

EXPLORATION DATE **12/10/2020 to 12/10/2020** GROUND EL. **120.50** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	120.5						in.			
0		Easy drilling, gray/brown silty cuttings.								
5	113.0	Auger grinding at 7.5 feet. Cuttings are soft, gray rock.								
10		Cuttings are still soft, gray rock.								
15	105.5	Bottom of probe at 15 feet below ground surface on likely bedrock.								
20										

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Jason Ward

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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Stantec

BOREHOLE LOG 506+61

P-6

CLIENT **Maine Turnpike Authority** STATION **Exit 35 NB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **50 LT** EXPLORATION No. **P-6**

EXPLORATION DATE **12/10/2020 to 12/10/2020** GROUND EL. **116.50** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	116.5						in.			
0		Easy drilling, brown, silty cuttings.								
	107.0									
10		Auger grinding at 9.5 feet.								
	102.5									
		Bottom of bedrock at 14 feet below ground surface on likely bedrock.								
15										
20										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Jason Ward

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

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BOREHOLE LOG 507+00

P-7

CLIENT **Maine Turnpike Authority** STATION **Exit 35 NB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **45 LT** EXPLORATION No. **P-7**

EXPLORATION DATE **12/10/2020 to 12/10/2020** GROUND EL. **114.00** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	114.0						in.			
0		Easy drilling. No cuttings coming out of hole. Silty CLAY sticking to auger.								
	95.0									
	94.0	Bottom of probe at 20 feet below ground surface. No refusal.								
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Jason Ward

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

Stantec

BOREHOLE LOG 507+77

P-8

CLIENT **Maine Turnpike Authority** STATION **Exit 35 NB On Ramp** PROJECT No. **179450125**

LOCATION **Exit 35/36 Interchange, Saco, Maine** OFFSET **45 LT** EXPLORATION No. **P-8**

EXPLORATION DATE **12/10/2020 to 12/10/2020** GROUND EL. **109.50** WATER LEVEL **NR** DATUM **NAVD88**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	SPT N(60) VALUE
	109.5						in.			
0		Easy drilling. No cuttings coming out of hole. Silty CLAY sticking to auger.								
	90.5									
	89.5	Bottom of probe at 20 feet below ground surface. No refusal.								
20										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: New England Boring Contractors; Rig Type: B-57 Track Rig, 4" Solid Stem Auger; Supervisor: Jason Ward

△ Unconfined Compression Test

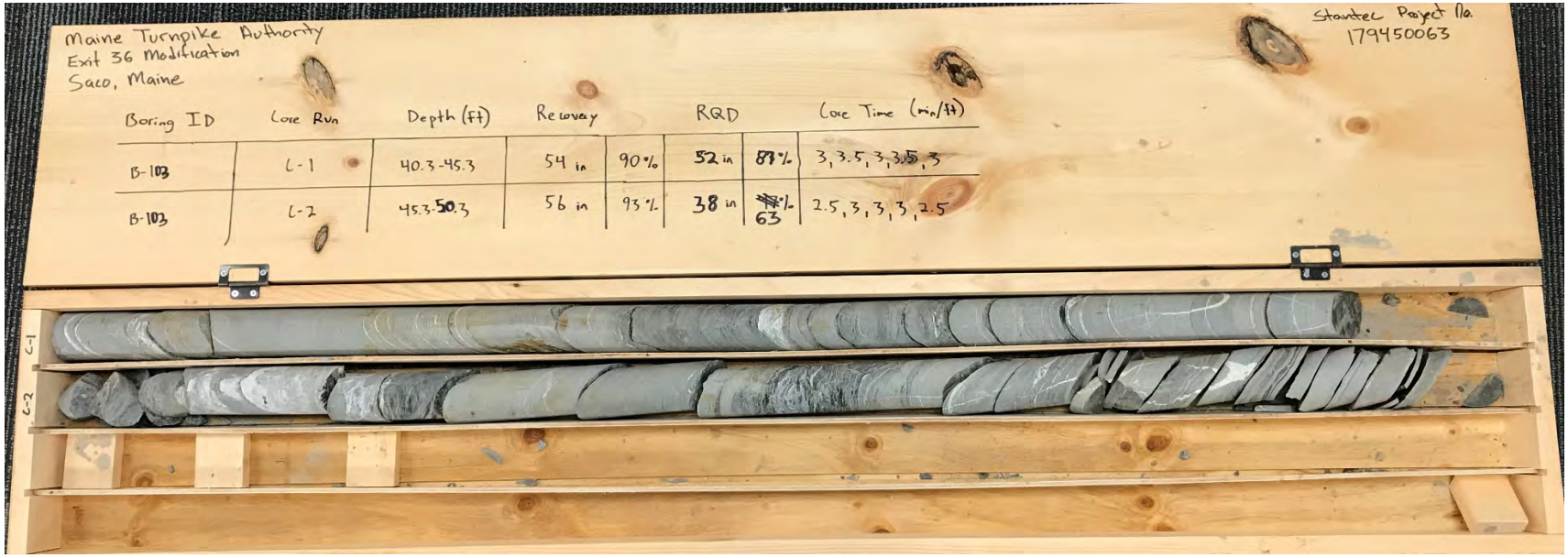
□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 179450125 - SACO_USE_STA_OFF_LIBRARY.GPJ JW.NHP.GDT 3/18/21

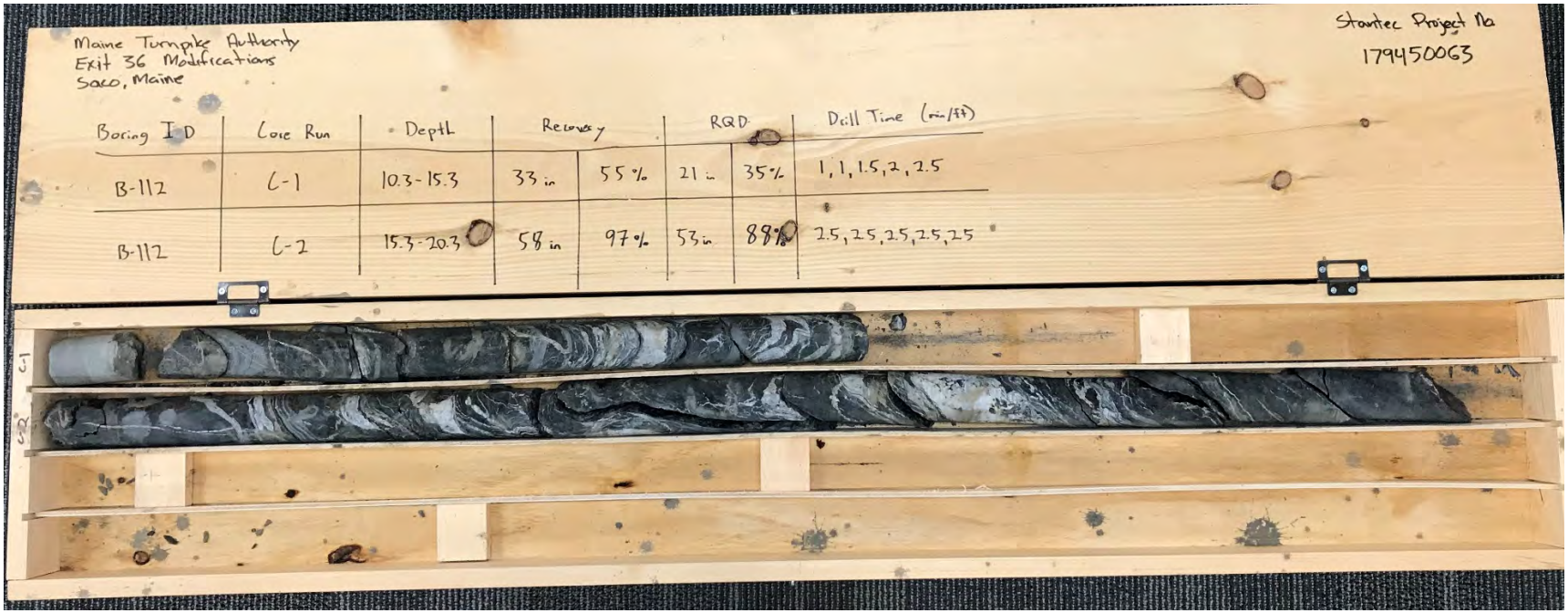
Appendix E Rock Core Photos

APPENDIX E
Exit 35/36 Interchange Improvements
Saco, Maine



B-103, C-1
B-103, C-2

APPENDIX E
Exit 35/36 Interchange Improvements
Saco, Maine



B-112, C-1
B-112, C-2

APPENDIX E
Exit 35/36 Interchange Improvements
Saco, Maine

OS-6, C-1, C-2, C-3, C-4
OS-3, C-1

Appendix F Laboratory Test Results

MOISTURE CONTENTS

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	---	Sample Type:	---	Tested By:	ckg
Sample ID:	---	Test Date:	01/13/20	Checked By:	emm
Depth :	---	Test Id:	537008		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content, %
B-103	6	25-27	Moist, olive gray silty sand with gravel	11.2
B-106	4	15-17	Moist, olive gray silty sand	11.1
B-109	1	2-4	Moist, gray silty sand	23.8
B-111	3	10-12	Moist, brownish gray silty sand	26.8
B-113	2	~~3.5-4.5~~ 5 to 6	Moist, dark grayish brown silty sand	13.7

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	---	Sample Type:	---	Tested By:	ckg
Sample ID:	---	Test Date:	01/12/21	Checked By:	emm
Depth :	---	Test Id:	606994		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
B-209	S- 4	12-14	Moist, light brown silty sand	11.0
B-209	S- 6	17-19	Moist, yellowish brown silty sand	10.4
B-209	S- 9	25-27	Moist, yellowish brown sand with silt	4.7
B-209	S- 11	33-37	Moist, yellowish brown silty sand	23.1
B-209	S- 13	45-47	Moist, light brown silty sand	24.5
B-210	S- 3	5-7	Moist, yellowish brown silty sand	10.8
B-210	S- 7	15-17	Moist, light yellowish brown silty sand	15.0
B-210	S- 10	22-24	Moist, yellowish brown silty sand	14.2
B-210	S- 12	30-32	Moist, pale brown sandy silt	26.3
B-210	S- 14	40-42	Moist, pale brown and reddish yellow silty sand	29.3

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	---	Sample Type:	---	Tested By:	ckg
Sample ID:	---	Test Date:	01/12/21	Checked By:	emm
Depth :	---	Test Id:	606984		

Moisture Content of Soil and Rock - ASTM D2216

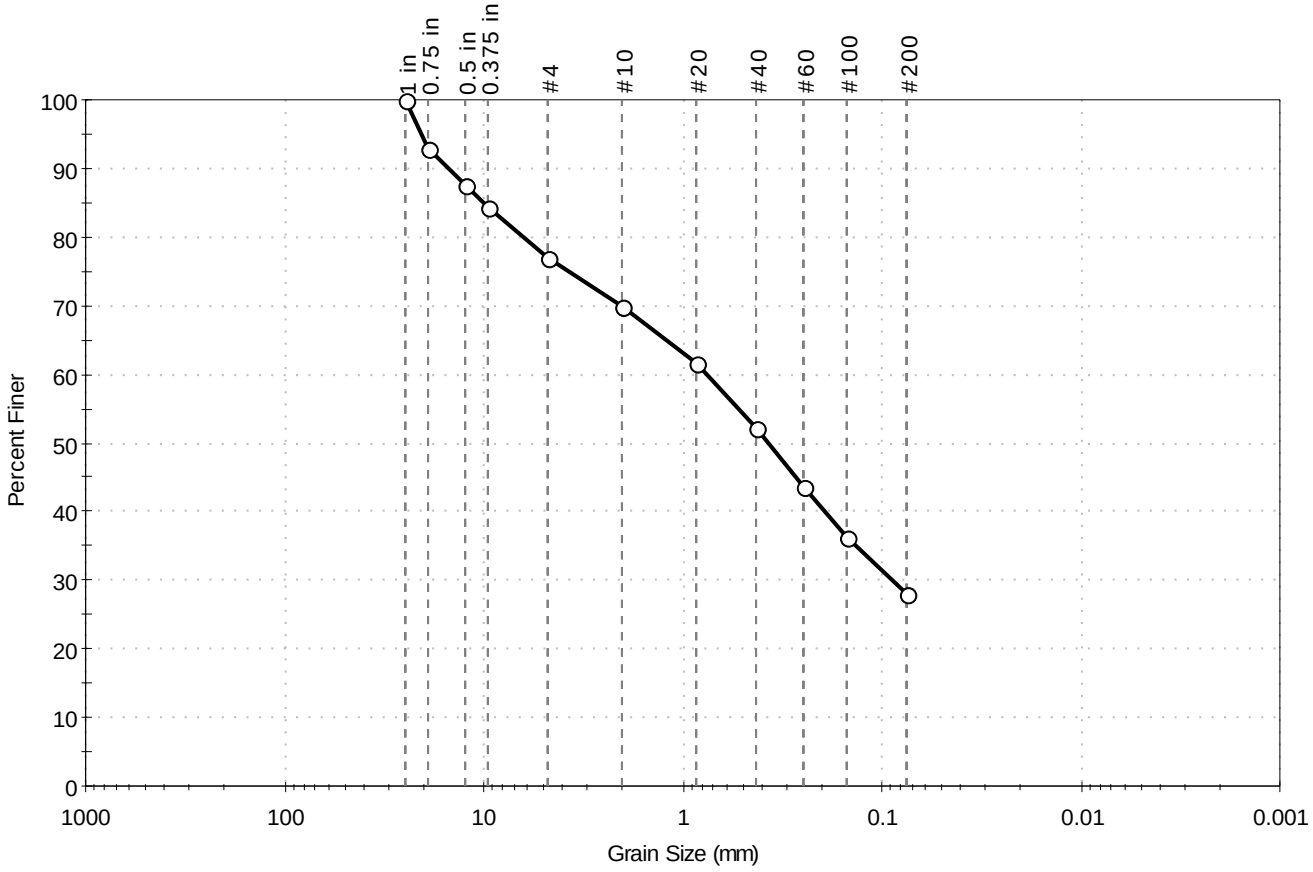
Boring ID	Sample ID	Depth	Description	Moisture Content,%
B-215	S- 1	0-2	Moist, brown silty sand	17.5
B-215	S- 2B	3-4	Moist, light brown sand with silt	21.9
B-215	S- 4A	6-7	Moist, grayish brown sand with silt	25.0
B-216	S- 1	0-2	Moist, yellowish brown sandy silt	26.3
B-216	S- 3	4-6	Moist, olive brown silt	29.1
B-217	S- 2	2-4	Moist, light yellowish brown silty sand	10.5
B-217	S- 4B	7.5-8	Moist, brown silty sand	8.0
B-217	S- 6	10-11	Moist, pale brown silty sand	15.4

Notes: Temperature of Drying : 110° Celsius

PARTICLE SIZE ANALYSIS

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-103	Sample Type:	jar	Tested By:	ckg
Sample ID:	6	Test Date:	01/09/20	Checked By:	emm
Depth :	25-27	Test Id:	536999		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	22.9	49.0	28.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	93		
0.5 in	12.50	88		
0.375 in	9.50	84		
#4	4.75	77		
#10	2.00	70		
#20	0.85	62		
#40	0.42	52		
#60	0.25	44		
#100	0.15	36		
#200	0.075	28		

Coefficients

D_{85} = 9.9780 mm
D_{30} = 0.0882 mm
D_{60} = 0.7464 mm
D_{15} = N/A
D_{50} = 0.3687 mm
D_{10} = N/A
C_u = N/A
C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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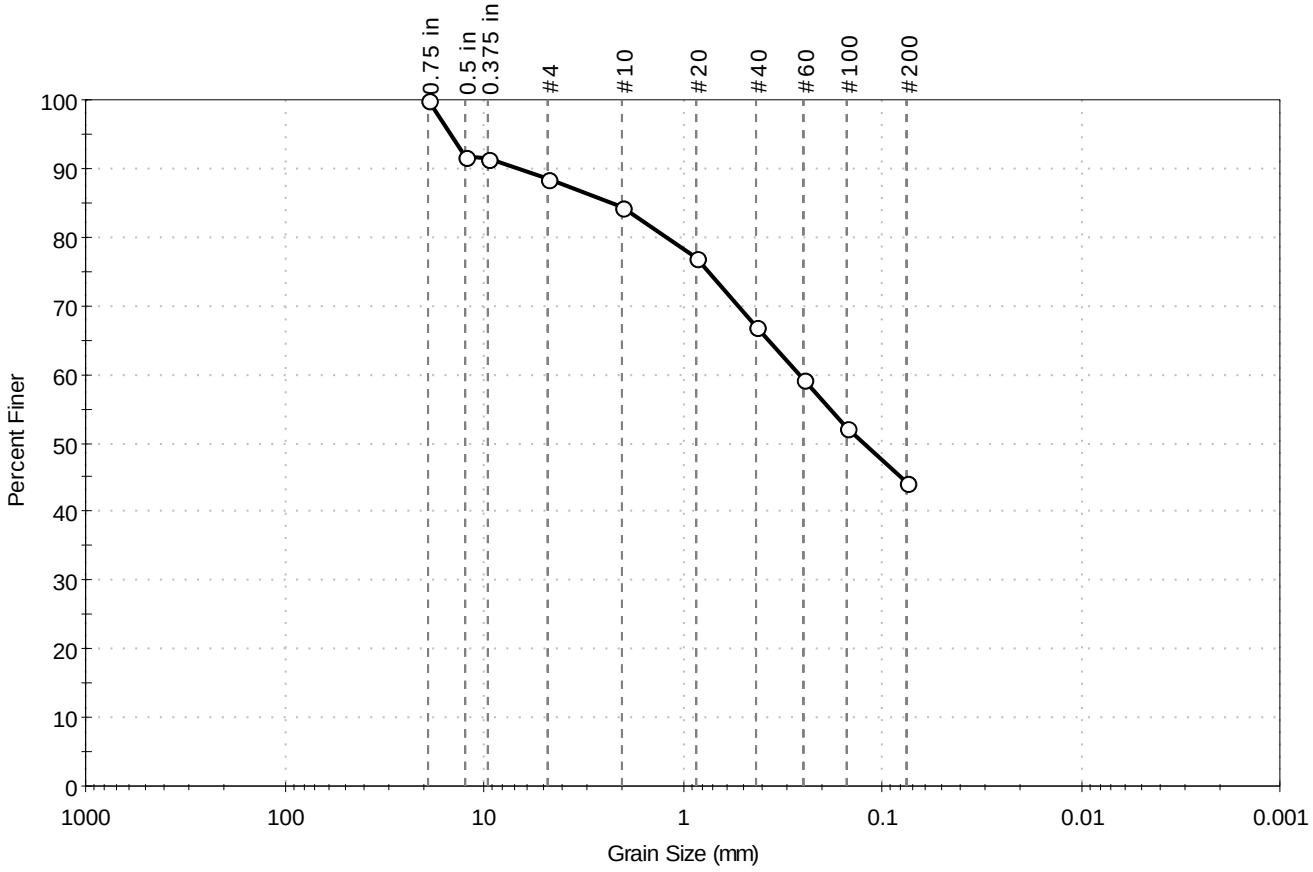
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-106	Sample Type:	jar	Tested By:	ckg
Sample ID:	4	Test Date:	01/09/20	Checked By:	emm
Depth :	15-17	Test Id:	537000		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	11.6	44.2	44.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	92		
0.375 in	9.50	91		
#4	4.75	88		
#10	2.00	84		
#20	0.85	77		
#40	0.42	67		
#60	0.25	59		
#100	0.15	52		
#200	0.075	44		

Coefficients

D_{85} = 2.3272 mm D_{30} = N/A

D_{60} = 0.2642 mm D_{15} = N/A

D_{50} = 0.1248 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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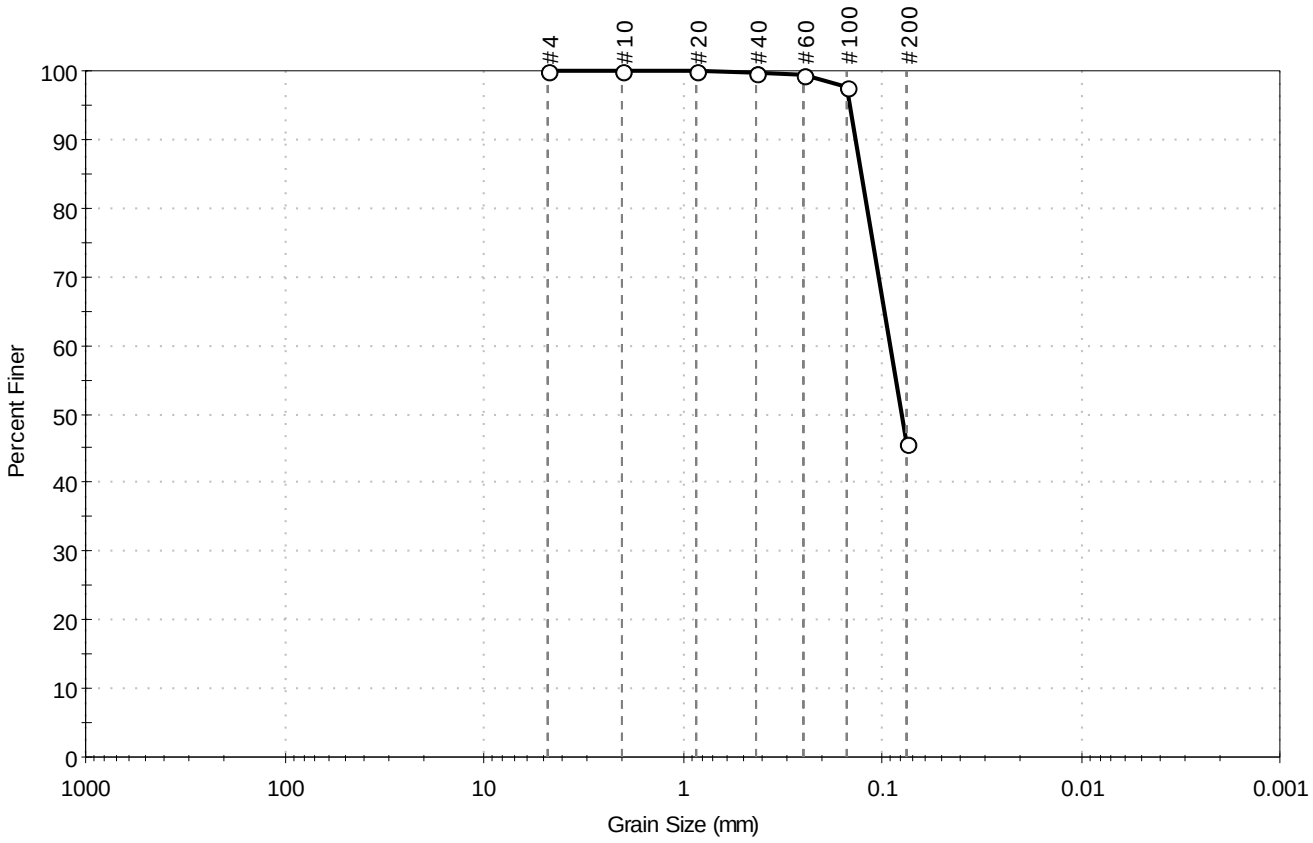
Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-109	Sample Type:	jar	Tested By:	ckg
Sample ID:	1	Test Date:	01/09/20	Checked By:	emm
Depth :	2-4	Test Id:	537001		
Test Comment:	---				
Visual Description:	Moist, gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.0	54.3	45.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	98		
#200	0.075	46		

Coefficients

D_{85} = 0.1268 mm D_{30} = N/A

D_{60} = 0.0908 mm D_{15} = N/A

D_{50} = 0.0795 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

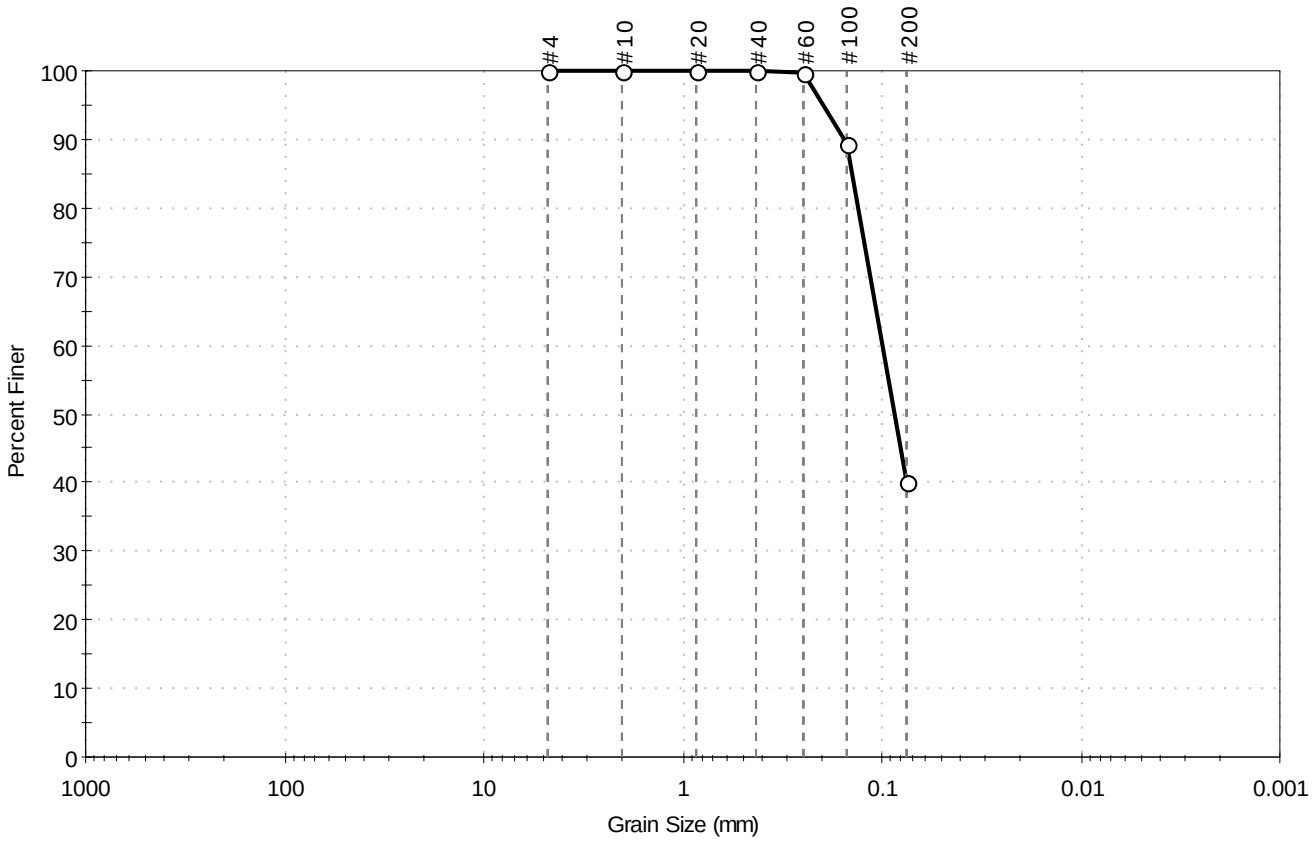
Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-111	Sample Type:	jar	Tested By:	ckg
Sample ID:	3	Test Date:	01/09/20	Checked By:	emm
Depth :	10-12	Test Id:	537002		
Test Comment:	---				
Visual Description:	Moist, brownish gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.1	59.8	40.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	89		
#200	0.075	40		

Coefficients

D_{85} = 0.1408 mm	D_{30} = N/A
D_{60} = 0.0991 mm	D_{15} = N/A
D_{50} = 0.0861 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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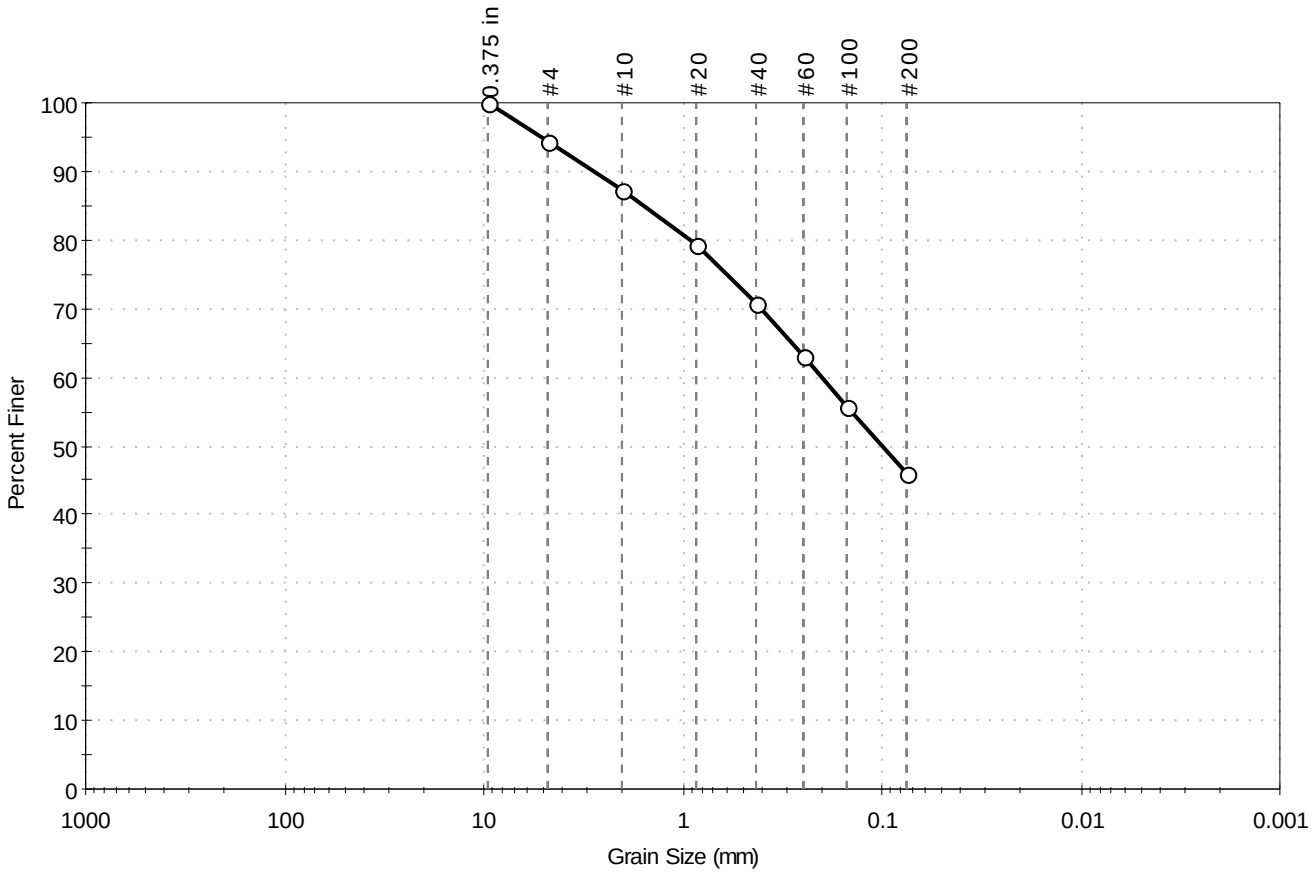
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-113		Sample Type: jar	Tested By:	ckg
Sample ID:	2	5 to 6	Test Date: 01/09/20	Checked By:	emm
Depth :	~~3.5-4.5~~		Test Id: 537003		
Test Comment:	---				
Visual Description:	Moist, dark grayish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	5.6	48.4	46.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	94		
#10	2.00	87		
#20	0.85	79		
#40	0.42	71		
#60	0.25	63		
#100	0.15	56		
#200	0.075	46		

Coefficients

D_{85} = 1.5482 mm	D_{30} = N/A
D_{60} = 0.2012 mm	D_{15} = N/A
D_{50} = 0.0998 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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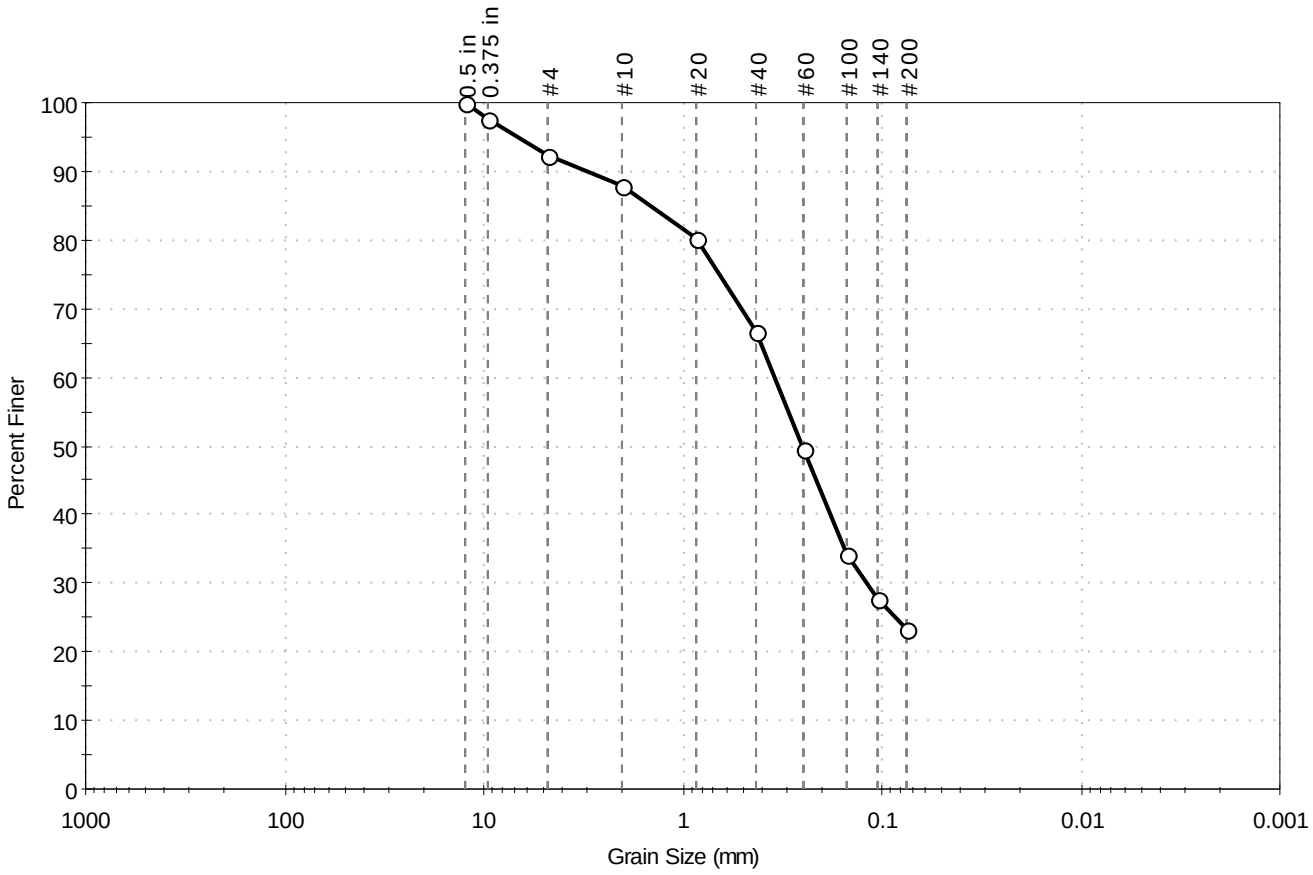
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-209	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-4	Test Date:	01/13/21	Checked By:	emm
Depth :	12-14	Test Id:	606967		
Test Comment:	---				
Visual Description:	Moist, light brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	7.6	69.1	23.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	92		
#10	2.00	88		
#20	0.85	80		
#40	0.42	67		
#60	0.25	50		
#100	0.15	34		
#140	0.11	28		
#200	0.075	23		

Coefficients

D_{85} = 1.4648 mm	D_{30} = 0.1204 mm
D_{60} = 0.3456 mm	D_{15} = N/A
D_{50} = 0.2528 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

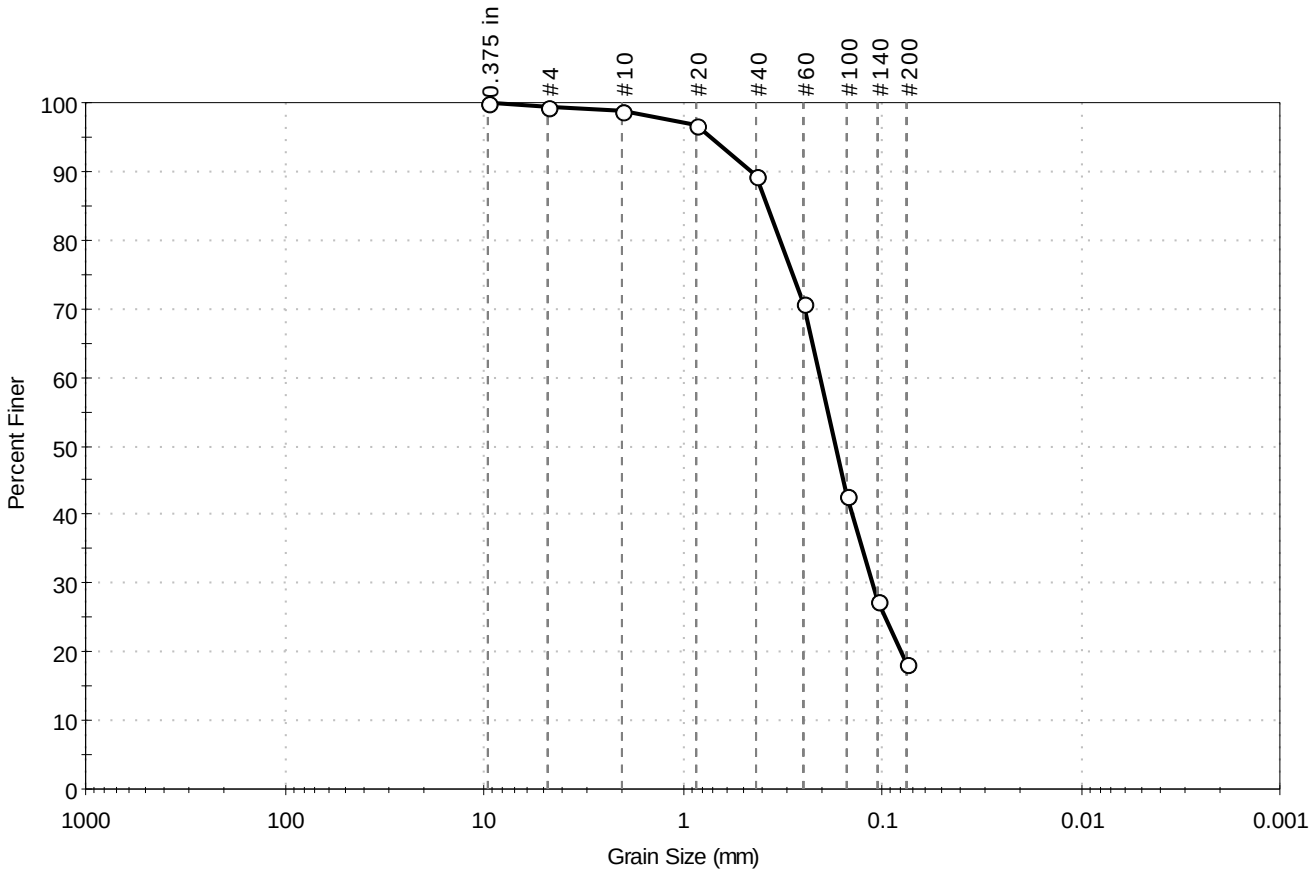
Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-209	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-6	Test Date:	01/13/21	Checked By:	emm
Depth :	17-19	Test Id:	606968		
Test Comment:	---				
Visual Description:	Moist, yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.7	81.0	18.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	99		
#20	0.85	97		
#40	0.42	90		
#60	0.25	71		
#100	0.15	43		
#140	0.11	28		
#200	0.075	18		

Coefficients

D_{85} = 0.3741 mm
D_{30} = 0.1122 mm
D_{60} = 0.2057 mm
D_{15} = N/A
D_{50} = 0.1715 mm
D_{10} = N/A
C_u = N/A
C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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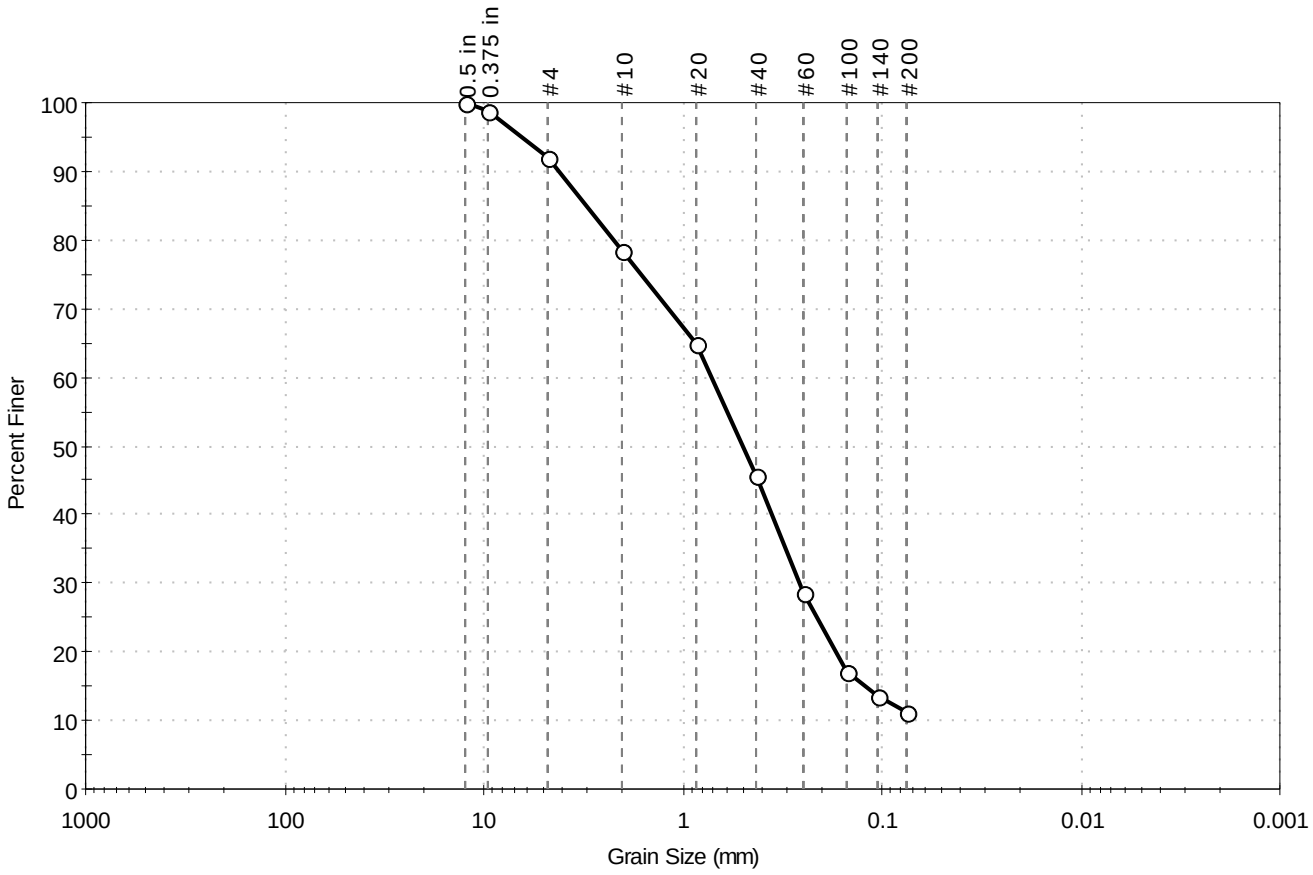
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-209	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-9	Test Date:	01/13/21	Checked By:	emm
Depth :	25-27	Test Id:	606969		
Test Comment:	---				
Visual Description:	Moist, yellowish brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	7.9	81.0	11.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	92		
#10	2.00	79		
#20	0.85	65		
#40	0.42	46		
#60	0.25	29		
#100	0.15	17		
#140	0.11	13		
#200	0.075	11		

Coefficients

D_{85} = 3.0116 mm
D_{30} = 0.2614 mm
D_{60} = 0.7136 mm
D_{15} = 0.1221 mm
D_{50} = 0.4956 mm
D_{10} = N/A
C_u = N/A
C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

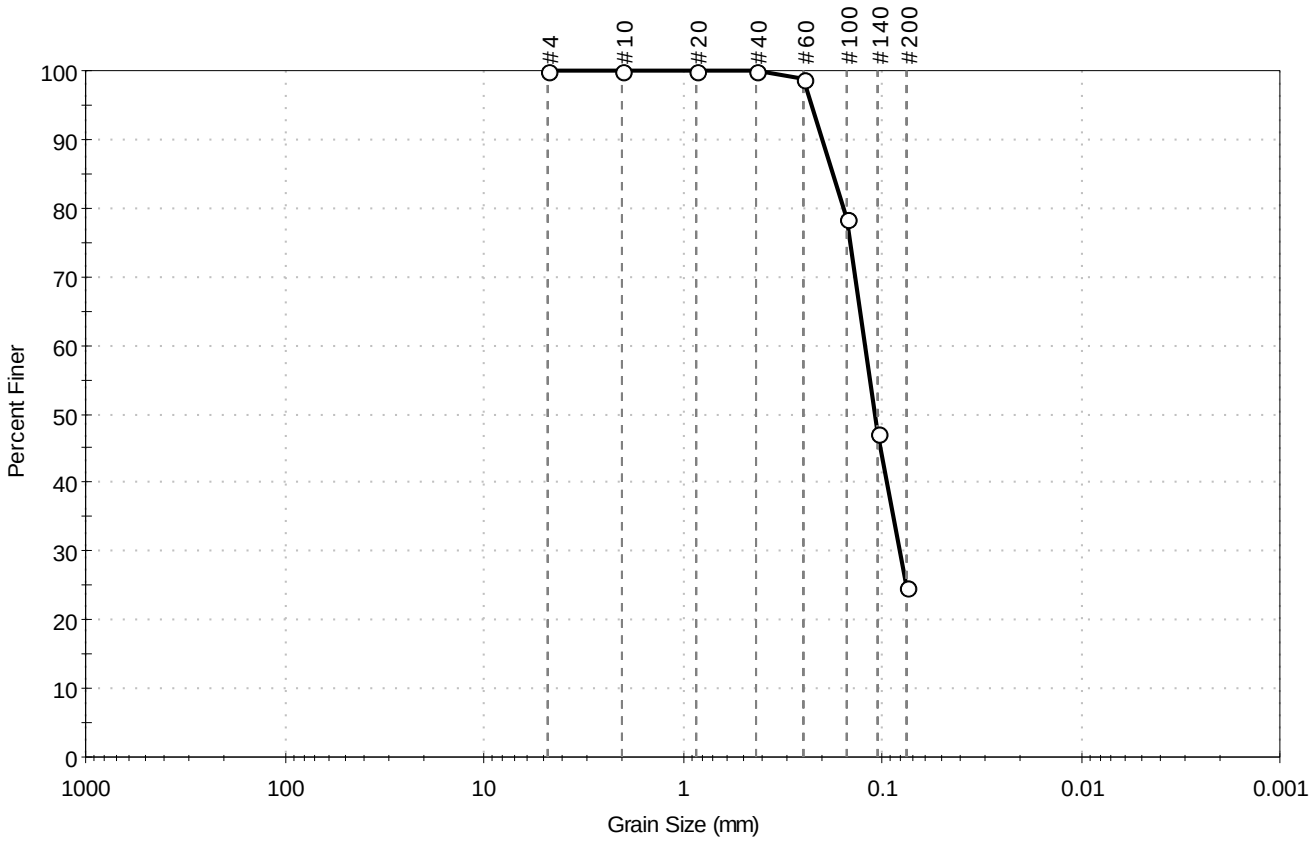
Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-209	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-11	Test Date:	01/13/21	Checked By:	emm
Depth :	33-37	Test Id:	606970		
Test Comment:	---				
Visual Description:	Moist, yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.0	75.2	24.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	78		
#140	0.11	47		
#200	0.075	25		

Coefficients

D_{85} = 0.1770 mm	D_{30} = 0.0813 mm
D_{60} = 0.1223 mm	D_{15} = N/A
D_{50} = 0.1094 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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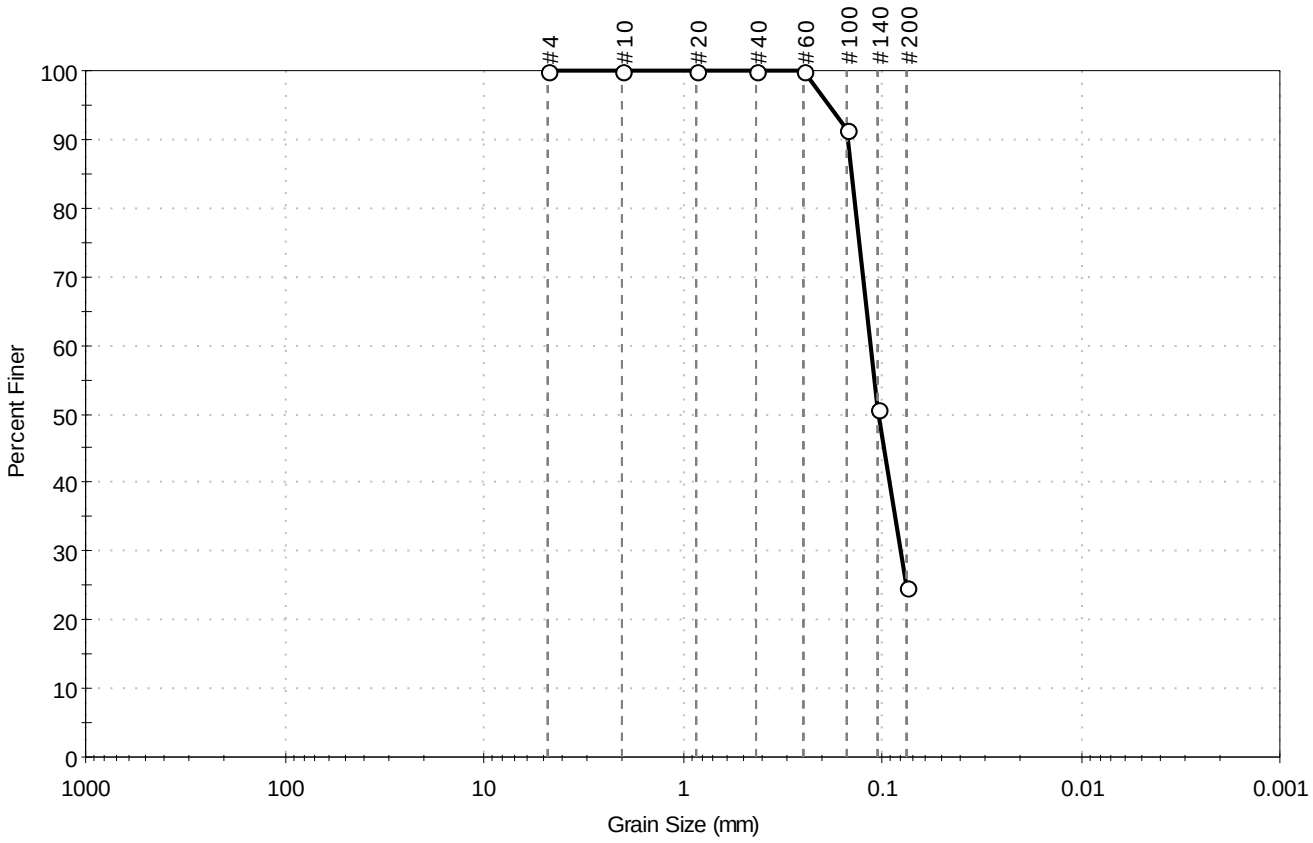
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-209	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-13	Test Date:	01/13/21	Checked By:	emm
Depth :	45-47	Test Id:	606971		
Test Comment:	---				
Visual Description:	Moist, light brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.0	75.2	24.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	92		
#140	0.11	51		
#200	0.075	25		

Coefficients

D_{85} = 0.1419 mm	D_{30} = 0.0804 mm
D_{60} = 0.1148 mm	D_{15} = N/A
D_{50} = 0.1051 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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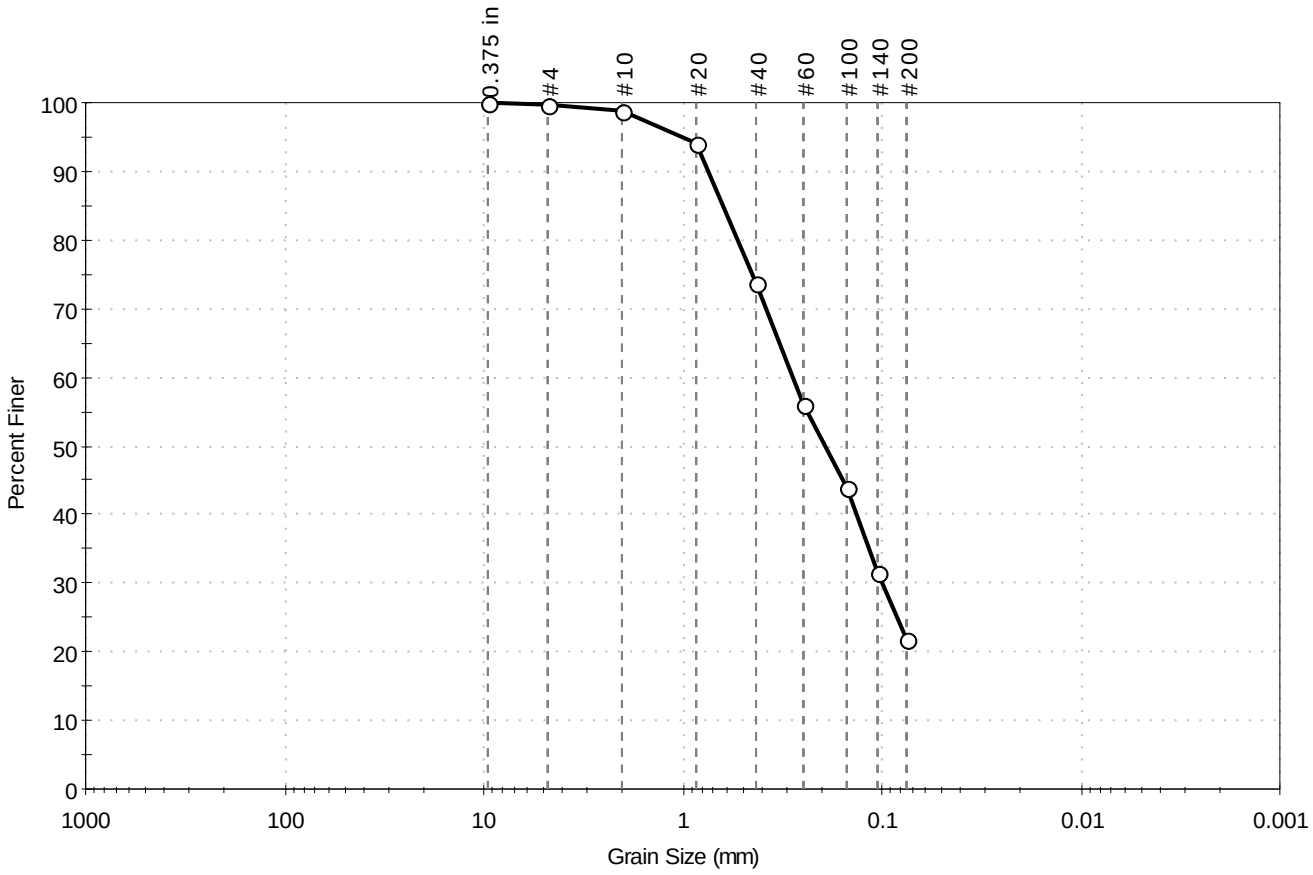
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-210	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-3	Test Date:	01/14/21	Checked By:	emm
Depth :	5-7	Test Id:	606972		
Test Comment:	---				
Visual Description:	Moist, yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.3	77.8	21.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	94		
#40	0.42	74		
#60	0.25	56		
#100	0.15	44		
#140	0.11	31		
#200	0.075	22		

Coefficients

D_{85} = 0.6226 mm	D_{30} = 0.1007 mm
D_{60} = 0.2822 mm	D_{15} = N/A
D_{50} = 0.1945 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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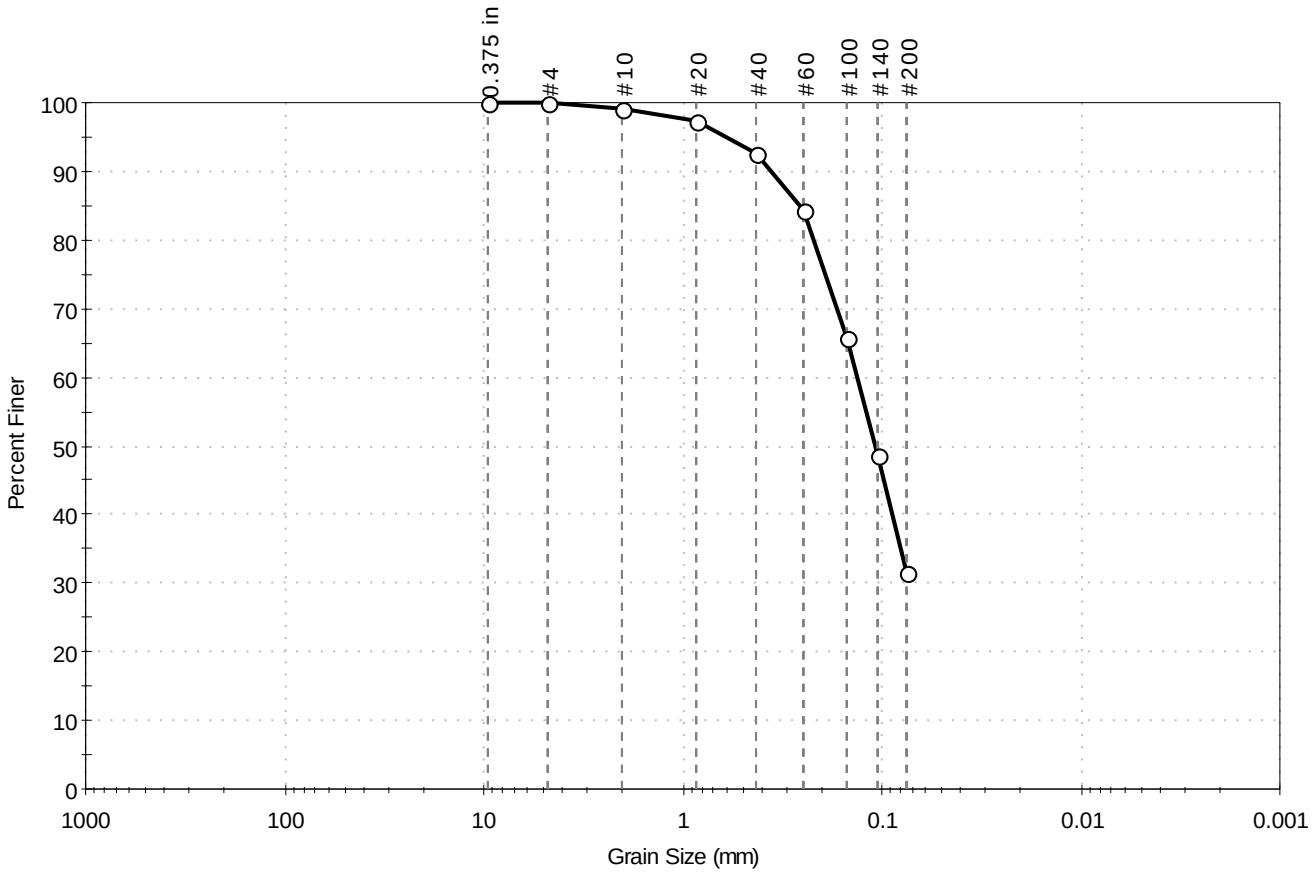
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-210	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-7	Test Date:	01/13/21	Checked By:	emm
Depth :	15-17	Test Id:	606973		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.1	68.2	31.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	97		
#40	0.42	93		
#60	0.25	84		
#100	0.15	66		
#140	0.11	49		
#200	0.075	32		

Coefficients

D_{85} = 0.2596 mm D_{30} = N/A

D_{60} = 0.1332 mm D_{15} = N/A

D_{50} = 0.1087 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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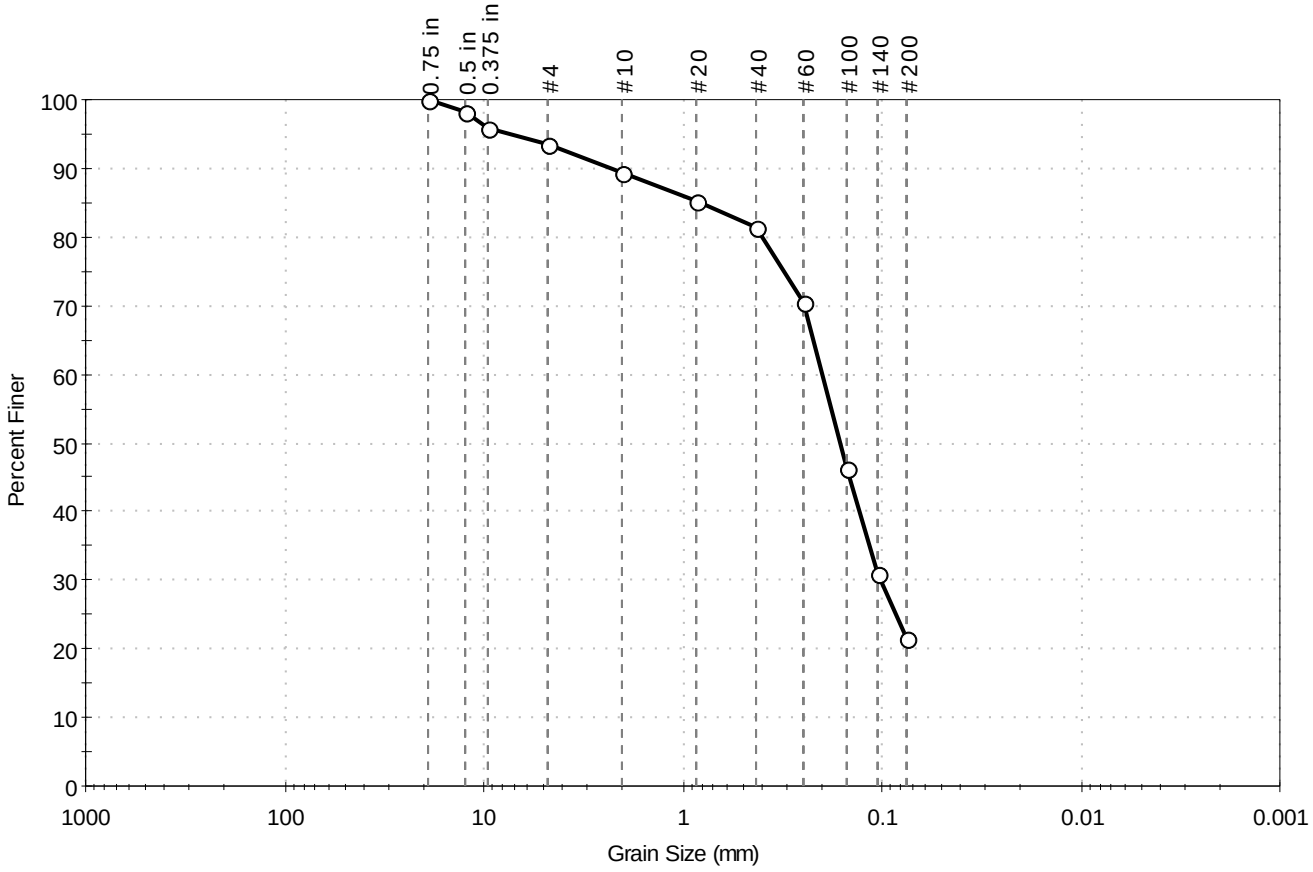
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-210	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-10	Test Date:	01/14/21	Checked By:	emm
Depth :	22-24	Test Id:	606974		
Test Comment:	---				
Visual Description:	Moist, yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	6.5	72.1	21.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	98		
0.375 in	9.50	96		
#4	4.75	93		
#10	2.00	89		
#20	0.85	85		
#40	0.42	82		
#60	0.25	70		
#100	0.15	46		
#140	0.11	31		
#200	0.075	21		

Coefficients

D_{85} = 0.8047 mm	D_{30} = 0.1020 mm
D_{60} = 0.2004 mm	D_{15} = N/A
D_{50} = 0.1619 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

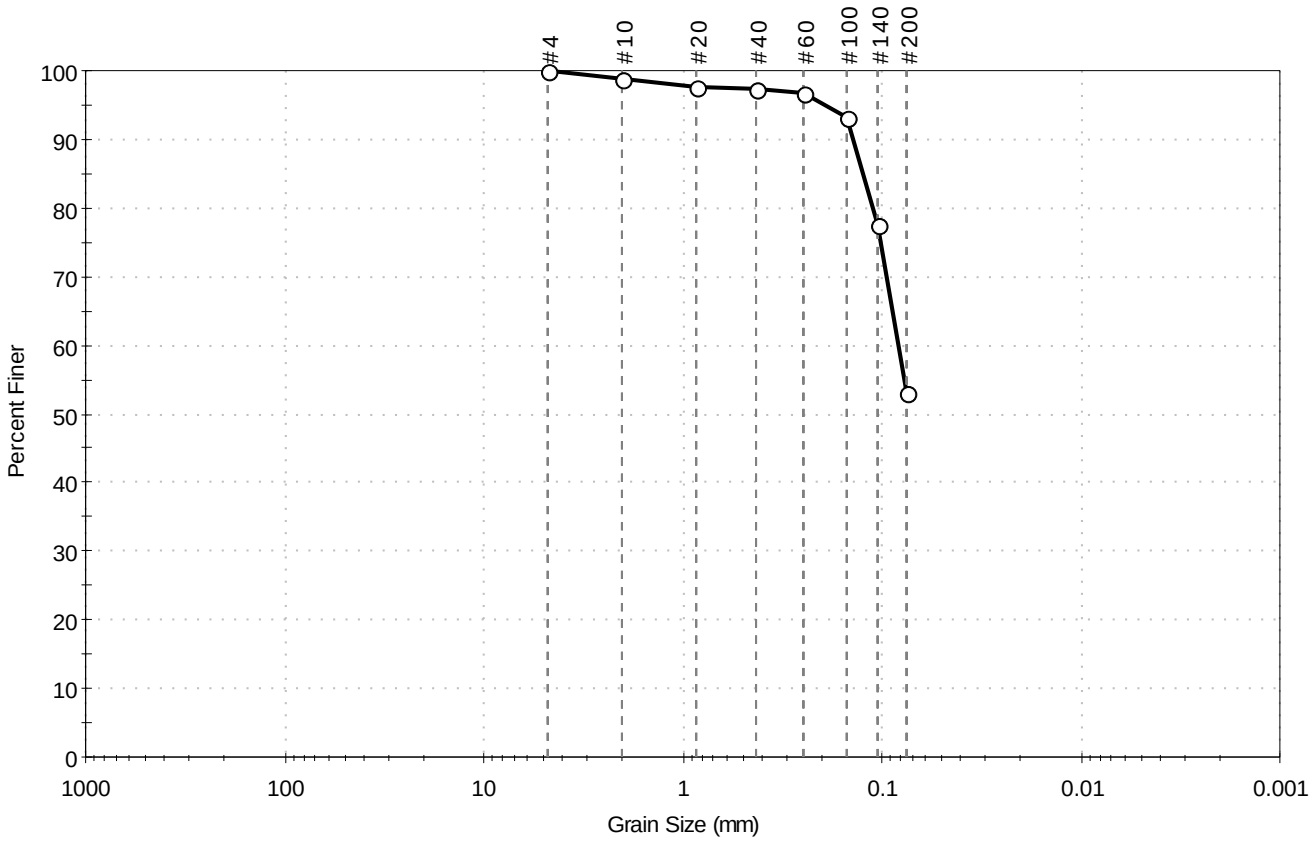
Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-210	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-12	Test Date:	01/14/21	Checked By:	emm
Depth :	30-32	Test Id:	606975		
Test Comment:	---				
Visual Description:	Moist, pale brown sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.0	46.8	53.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	98		
#40	0.42	97		
#60	0.25	97		
#100	0.15	93		
#140	0.11	78		
#200	0.075	53		

Coefficients

D_{85} = 0.1248 mm D_{30} = N/A

D_{60} = 0.0825 mm D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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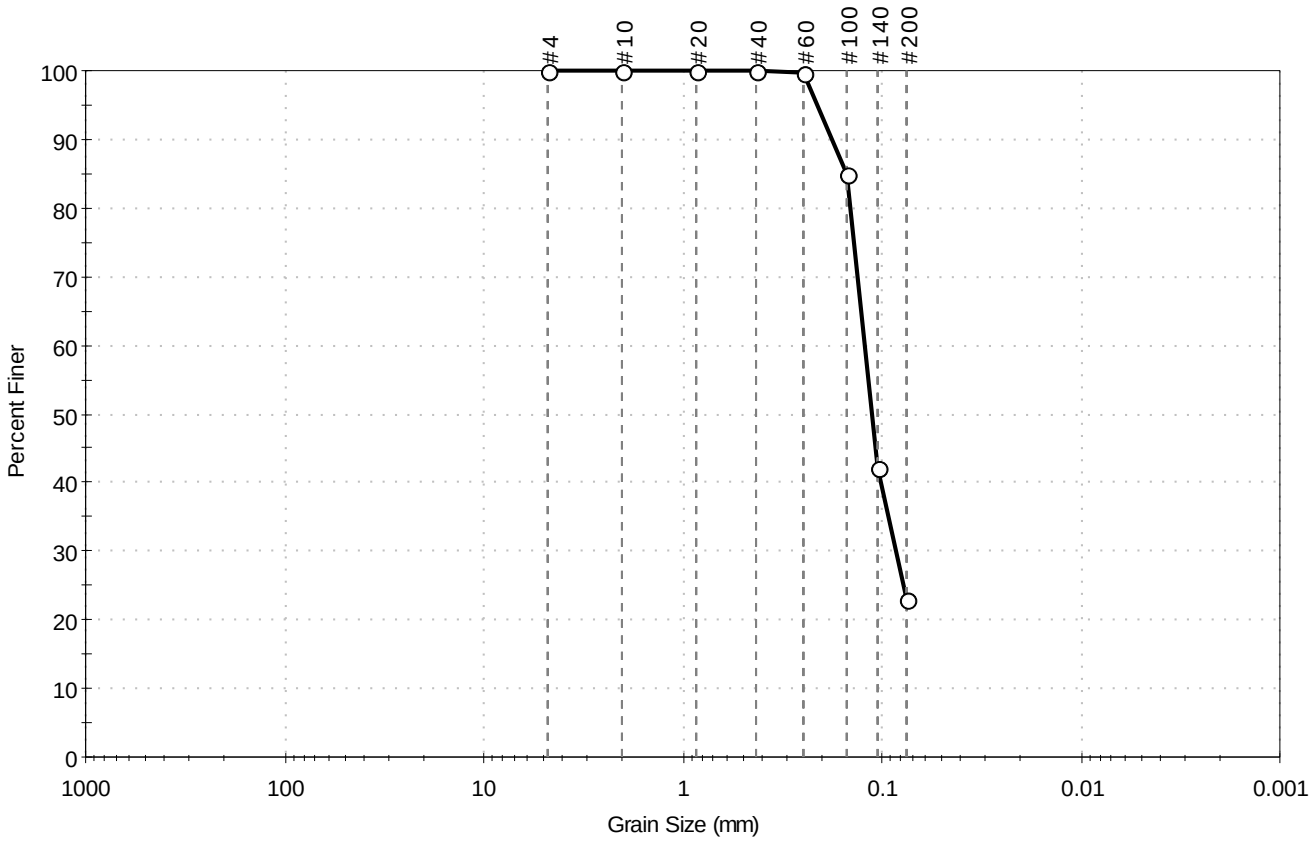
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-210	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-14	Test Date:	01/14/21	Checked By:	emm
Depth :	40-42	Test Id:	606976		

Test Comment: ---
Visual Description: Moist, pale brown and reddish yellow silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.0	77.0	23.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	85		
#140	0.11	42		
#200	0.075	23		

Coefficients

D_{85} = 0.1505 mm D_{30} = 0.0851 mm
D_{60} = 0.1225 mm D_{15} = N/A
D_{50} = 0.1130 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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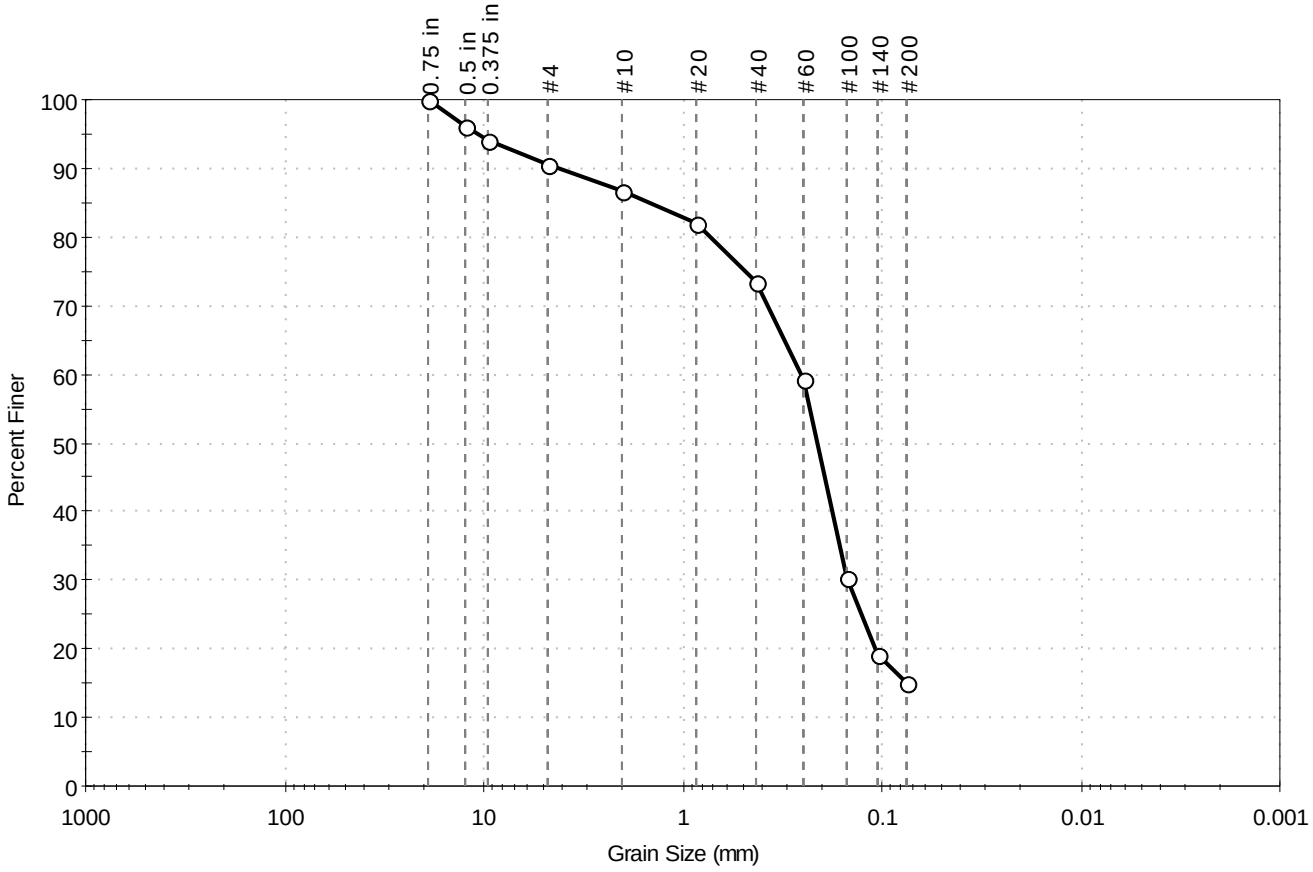
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-215	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-1	Test Date:	01/14/21	Checked By:	emm
Depth :	0-2	Test Id:	606959		
Test Comment:	---				
Visual Description:	Moist, brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	9.3	75.7	15.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	94		
#4	4.75	91		
#10	2.00	87		
#20	0.85	82		
#40	0.42	73		
#60	0.25	59		
#100	0.15	30		
#140	0.11	19		
#200	0.075	15		

Coefficients

D_{85} = 1.4441 mm D_{30} = 0.1479 mm
D_{60} = 0.2558 mm D_{15} = 0.0752 mm
D_{50} = 0.2118 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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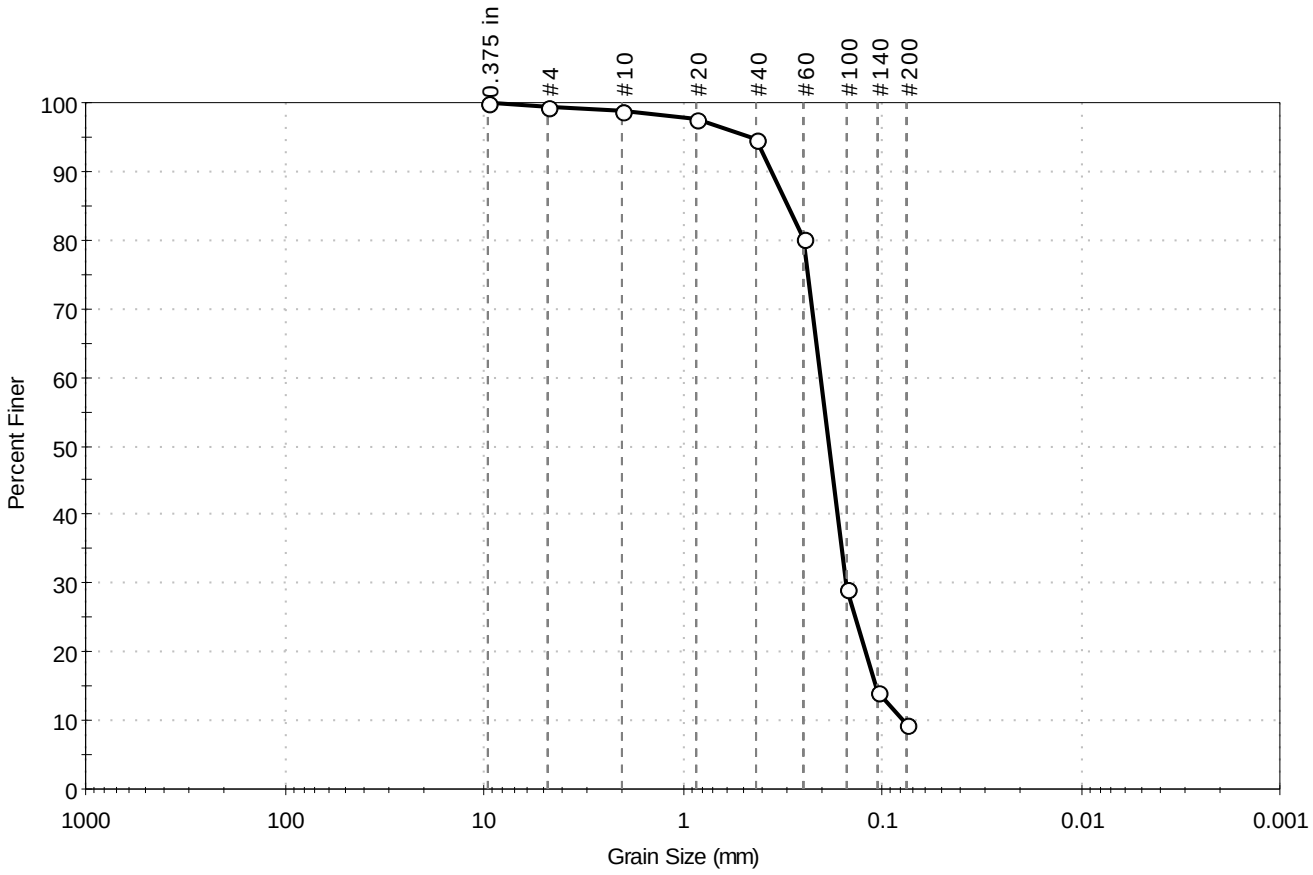
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-215	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-2B	Test Date:	01/14/21	Checked By:	emm
Depth :	3-4	Test Id:	606960		
Test Comment:	---				
Visual Description:	Moist, light brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.5	90.2	9.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	98		
#40	0.42	95		
#60	0.25	80		
#100	0.15	29		
#140	0.11	14		
#200	0.075	9.3		

Coefficients

D_{85} = 0.2975 mm	D_{30} = 0.1510 mm
D_{60} = 0.2040 mm	D_{15} = 0.1080 mm
D_{50} = 0.1845 mm	D_{10} = 0.0786 mm
C_u = 2.595	C_c = 1.422

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

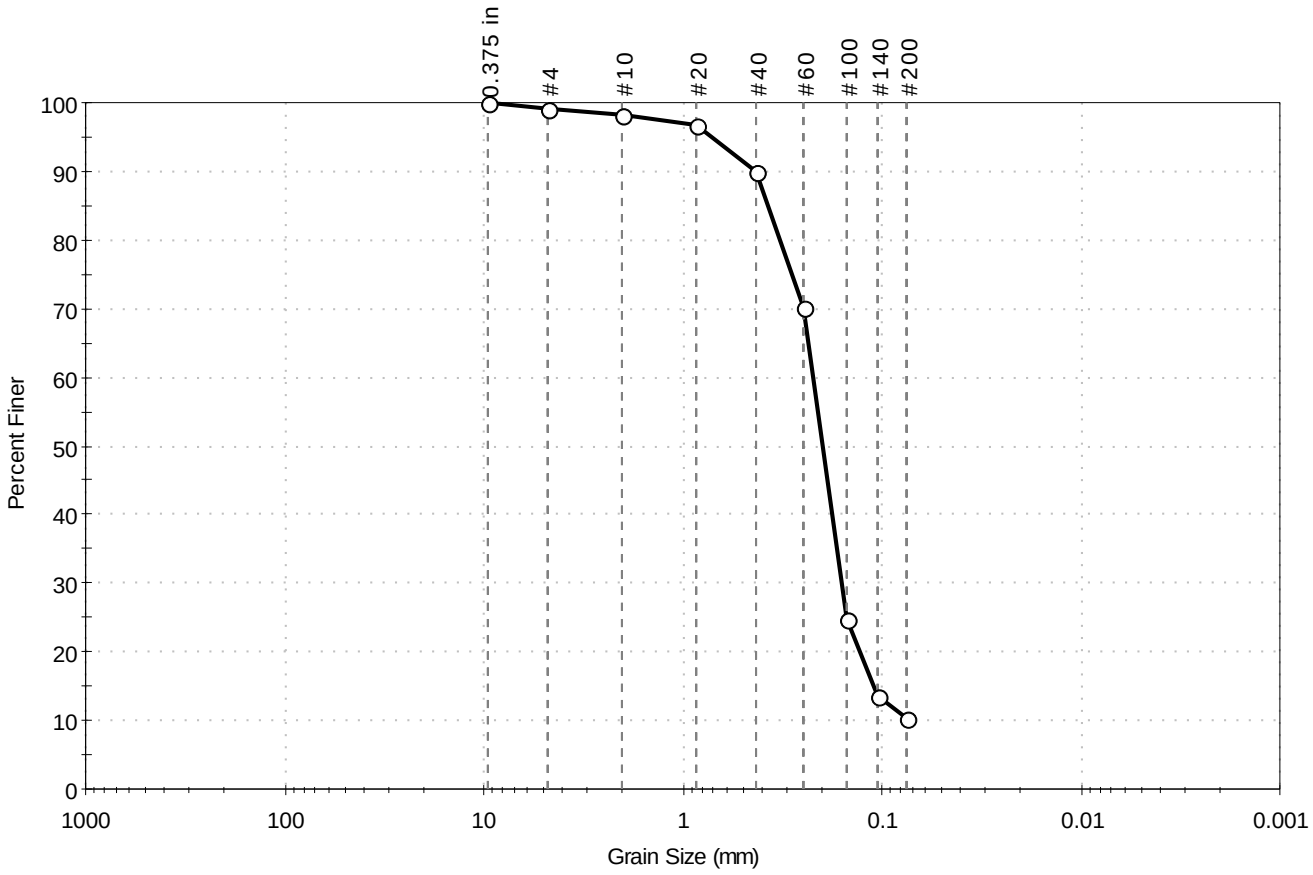
Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-215	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-4A	Test Date:	01/14/21	Checked By:	emm
Depth :	6-7	Test Id:	606961		
Test Comment:	---				
Visual Description:	Moist, grayish brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.9	88.7	10.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	98		
#20	0.85	97		
#40	0.42	90		
#60	0.25	70		
#100	0.15	25		
#140	0.11	13		
#200	0.075	10		

Coefficients

D_{85} = 0.3706 mm	D_{30} = 0.1592 mm
D_{60} = 0.2228 mm	D_{15} = 0.1112 mm
D_{50} = 0.1992 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

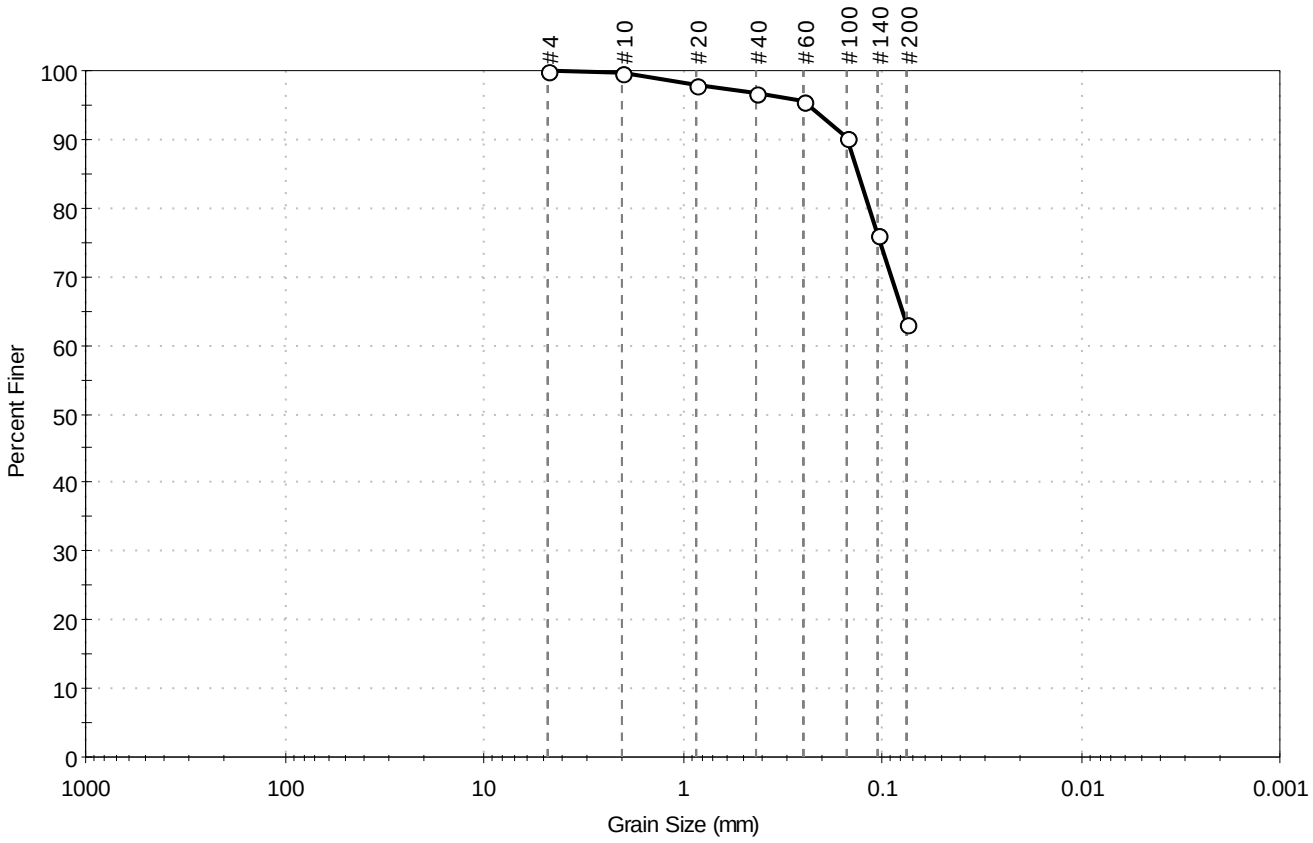
Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-216	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-1	Test Date:	01/14/21	Checked By:	emm
Depth :	0-2	Test Id:	606962		
Test Comment:	---				
Visual Description:	Moist, yellowish brown sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.0	36.8	63.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	98		
#40	0.42	97		
#60	0.25	96		
#100	0.15	90		
#140	0.11	76		
#200	0.075	63		

Coefficients

D_{85} = 0.1320 mm	D_{30} = N/A
D_{60} = N/A	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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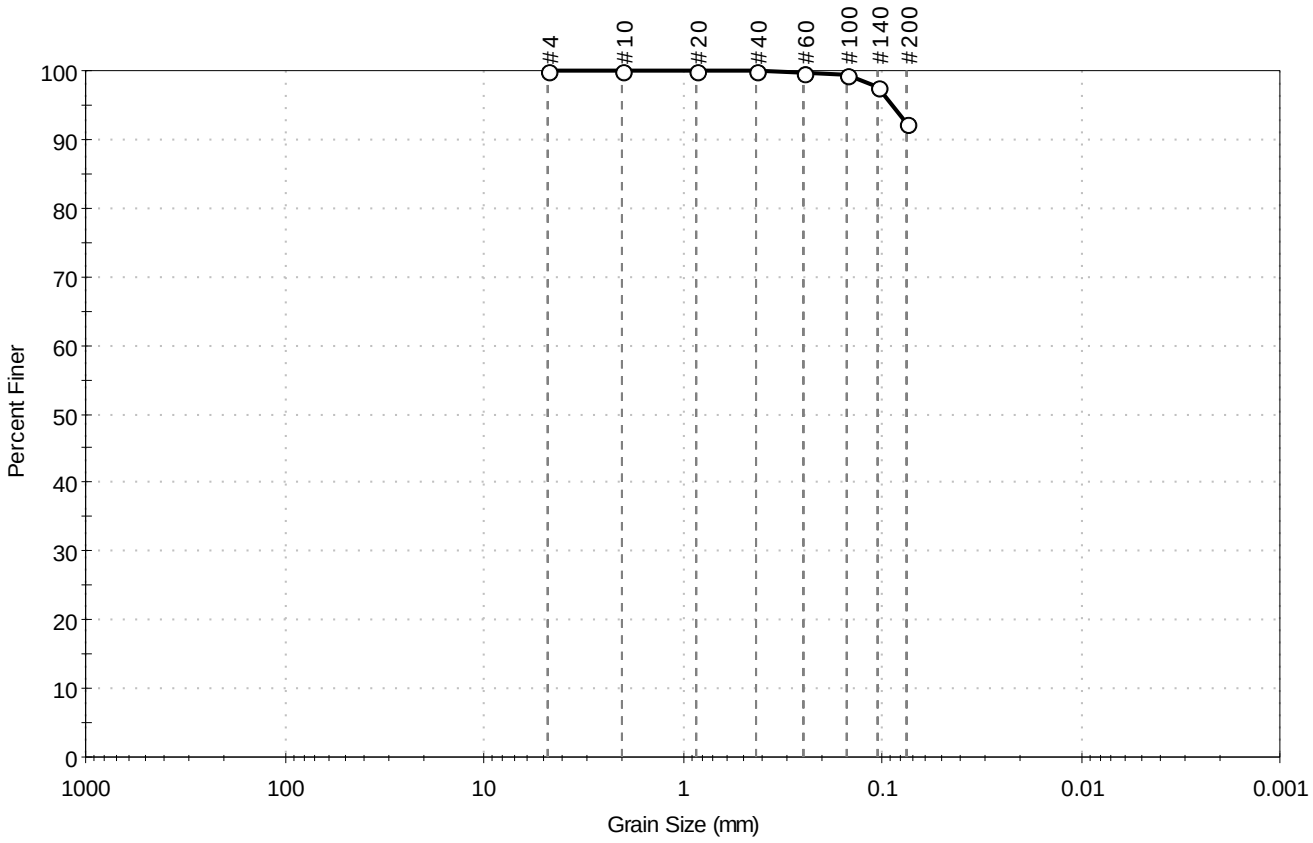
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-216	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-3	Test Date:	01/14/21	Checked By:	emm
Depth :	4-6	Test Id:	606963		
Test Comment:	---				
Visual Description:	Moist, olive brown silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.0	7.8	92.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#140	0.11	98		
#200	0.075	92		

Coefficients

D_{85} = N/A	D_{30} = N/A
D_{60} = N/A	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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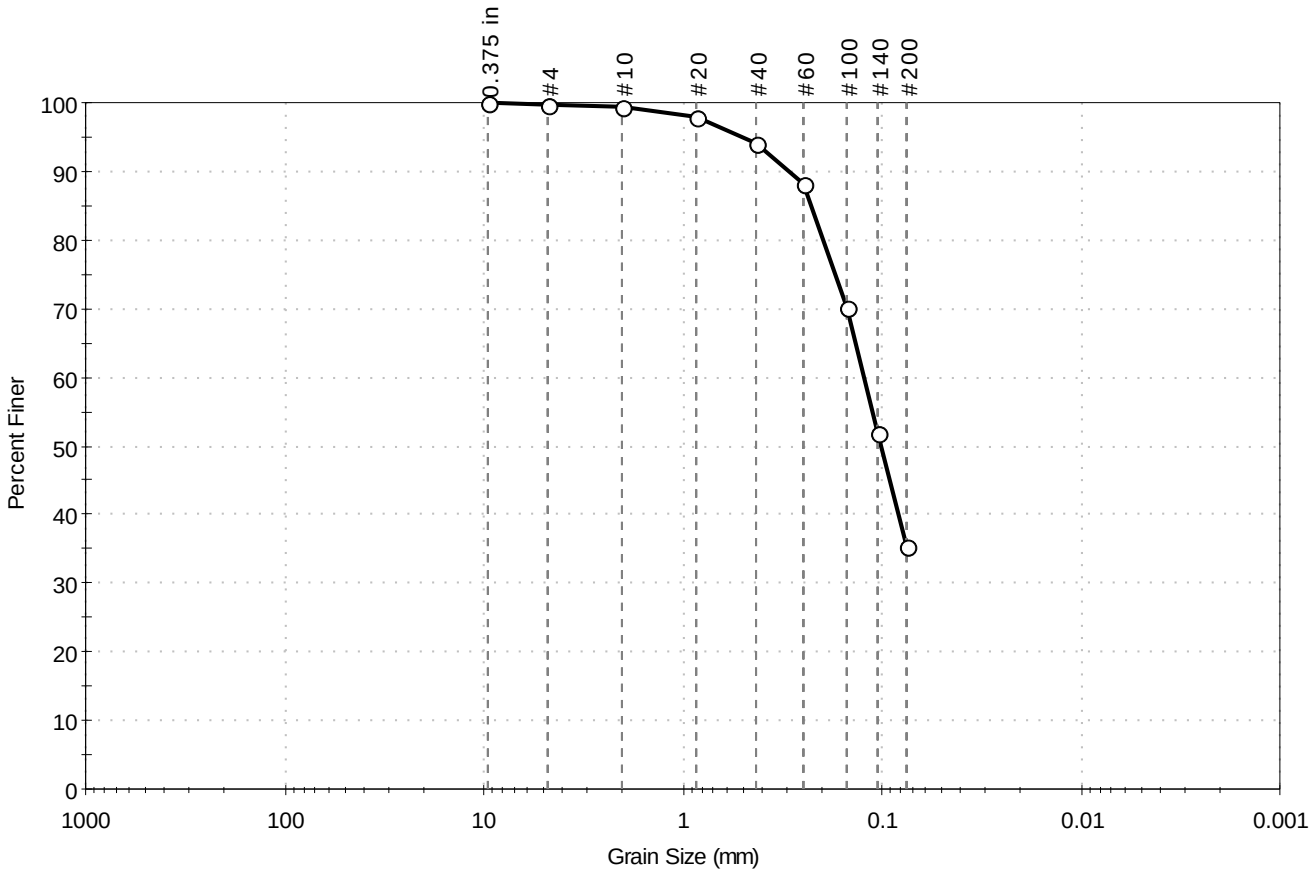
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-217	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-2	Test Date:	01/14/21	Checked By:	emm
Depth :	2-4	Test Id:	606964		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.2	64.4	35.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	98		
#40	0.42	94		
#60	0.25	88		
#100	0.15	70		
#140	0.11	52		
#200	0.075	35		

Coefficients

D_{85} = 0.2279 mm	D_{30} = N/A
D_{60} = 0.1235 mm	D_{15} = N/A
D_{50} = 0.1020 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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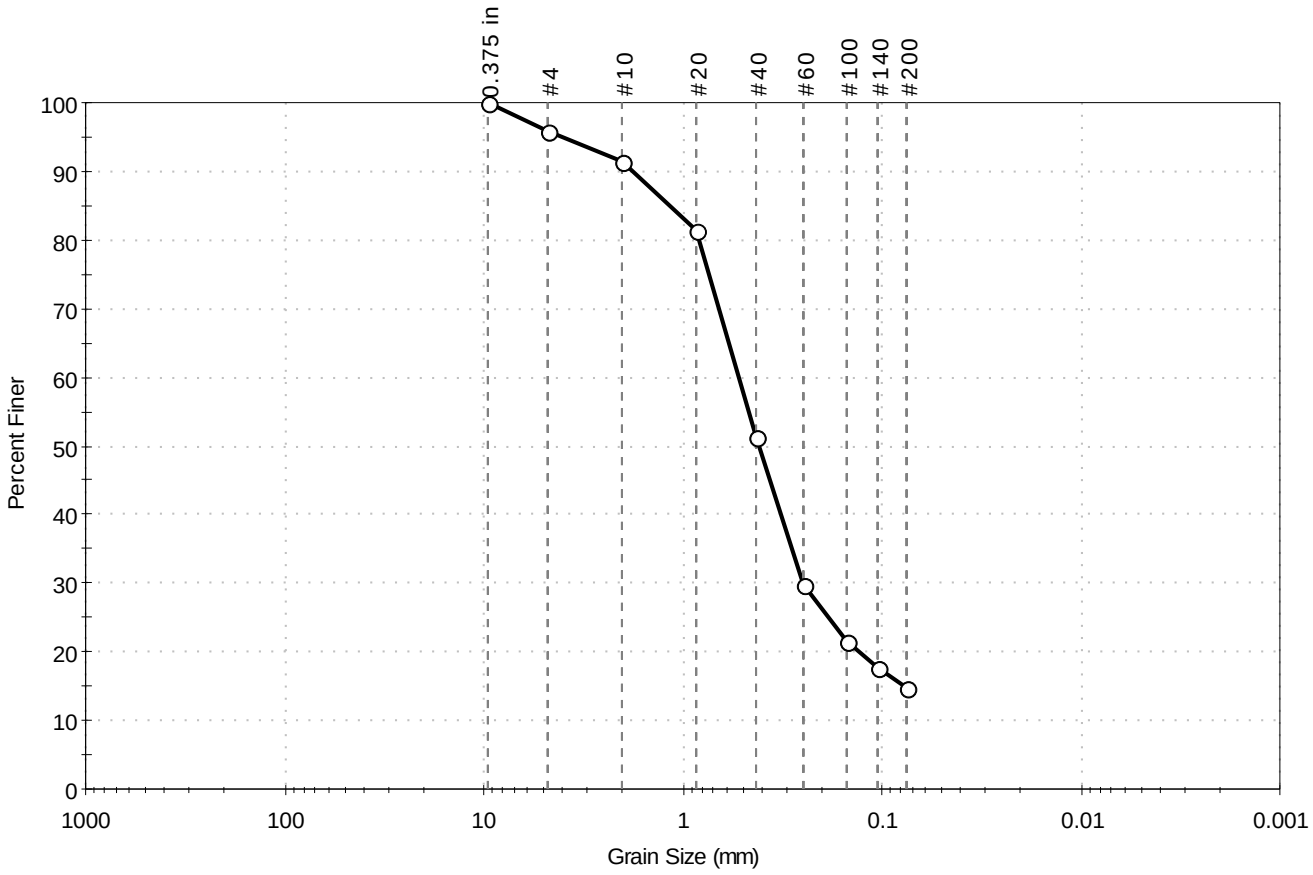
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-217	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-4B	Test Date:	01/14/21	Checked By:	emm
Depth :	7.5-8	Test Id:	606965		
Test Comment:	---				
Visual Description:	Moist, brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	4.0	81.2	14.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	96		
#10	2.00	91		
#20	0.85	82		
#40	0.42	51		
#60	0.25	30		
#100	0.15	22		
#140	0.11	18		
#200	0.075	15		

Coefficients

D_{85} = 1.1527 mm
D_{30} = 0.2518 mm
D_{60} = 0.5181 mm
D_{15} = 0.0769 mm
D_{50} = 0.4107 mm
D_{10} = N/A
C_u = N/A
C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

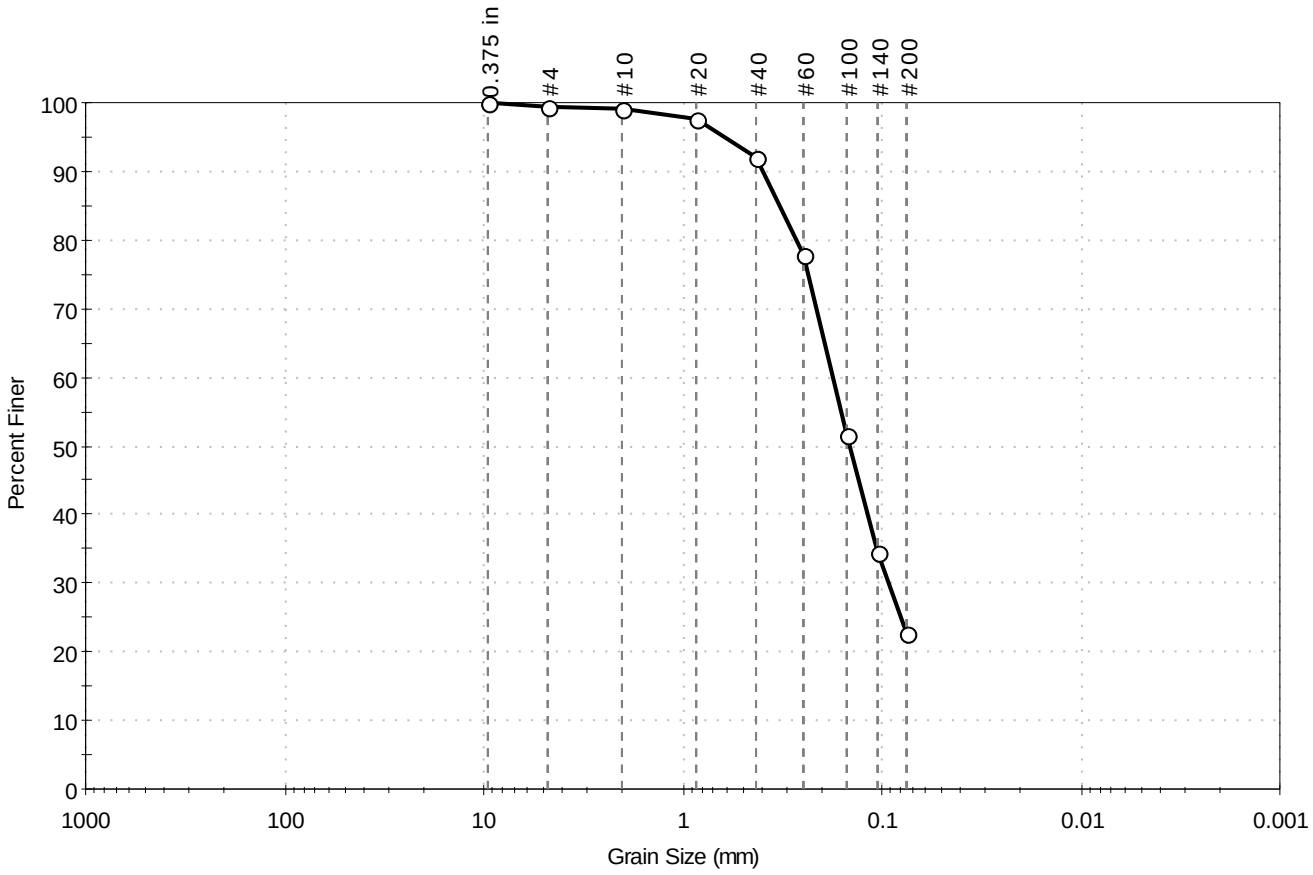
Sample / Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-217	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-6	Test Date:	01/14/21	Checked By:	emm
Depth :	10-11	Test Id:	606966		
Test Comment:	---				
Visual Description:	Moist, pale brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



%Cobble	%Gravel	%Sand	%Silt & Clay Size
---	0.6	76.8	22.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	99		
#20	0.85	98		
#40	0.42	92		
#60	0.25	78		
#100	0.15	52		
#140	0.11	34		
#200	0.075	23		

Coefficients

D_{85} = 0.3264 mm	D_{30} = 0.0931 mm
D_{60} = 0.1764 mm	D_{15} = N/A
D_{50} = 0.1450 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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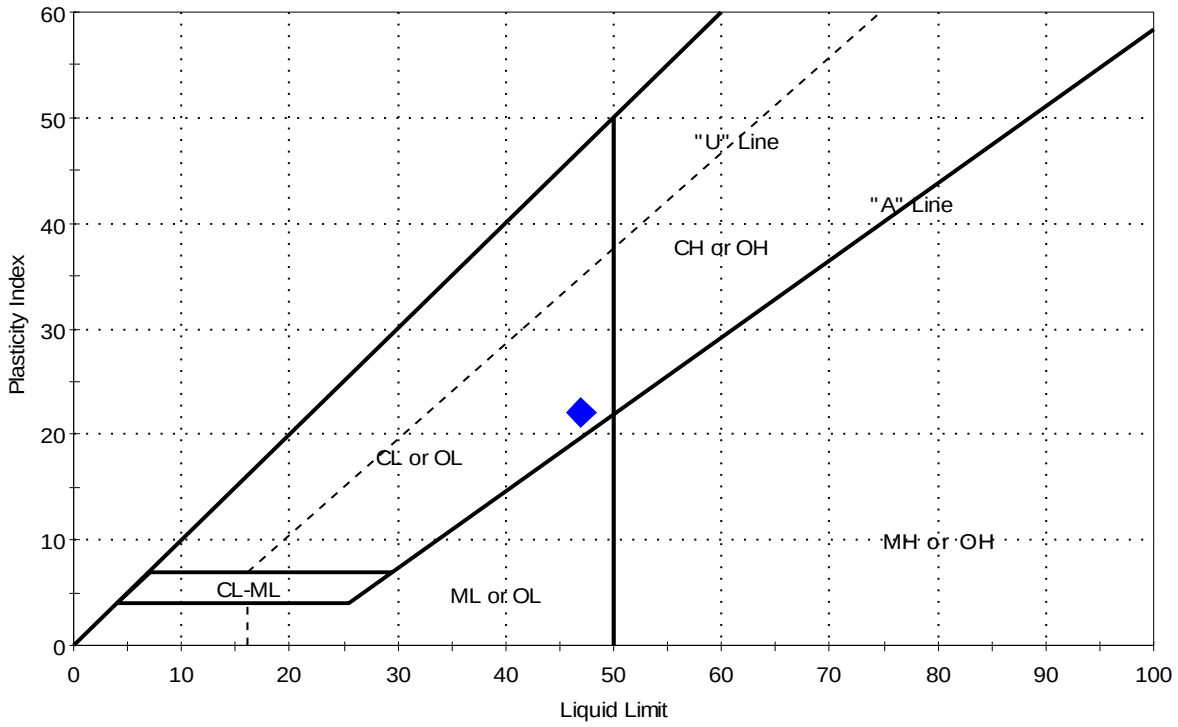
ATTERBERG LIMITS

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-101	Sample Type:	jar	Tested By:	cam
Sample ID:	2	Test Date:	01/13/20	Checked By:	emm
Depth :	5-7	Test Id:	536958		
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
◆	2	B-101	5-7	33	47	25	22	0.4	

Sample Prepared using the WET method

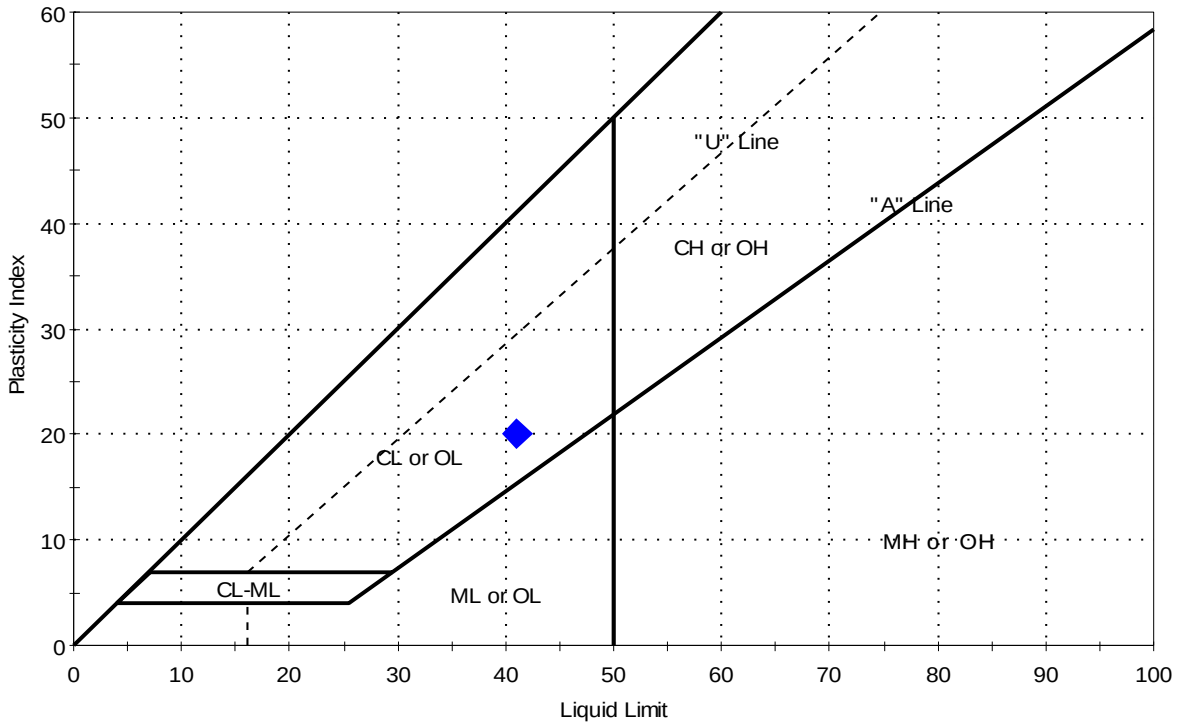
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-103	Sample Type:	jar	Tested By:	cam
Sample ID:	2	Test Date:	01/10/20	Checked By:	emm
Depth :	5-7	Test Id:	536959		
Test Comment:	---				
Visual Description:	Moist, olive 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
◆	2	B-103	5-7	32	41	21	20	0.6	

Sample Prepared using the WET method

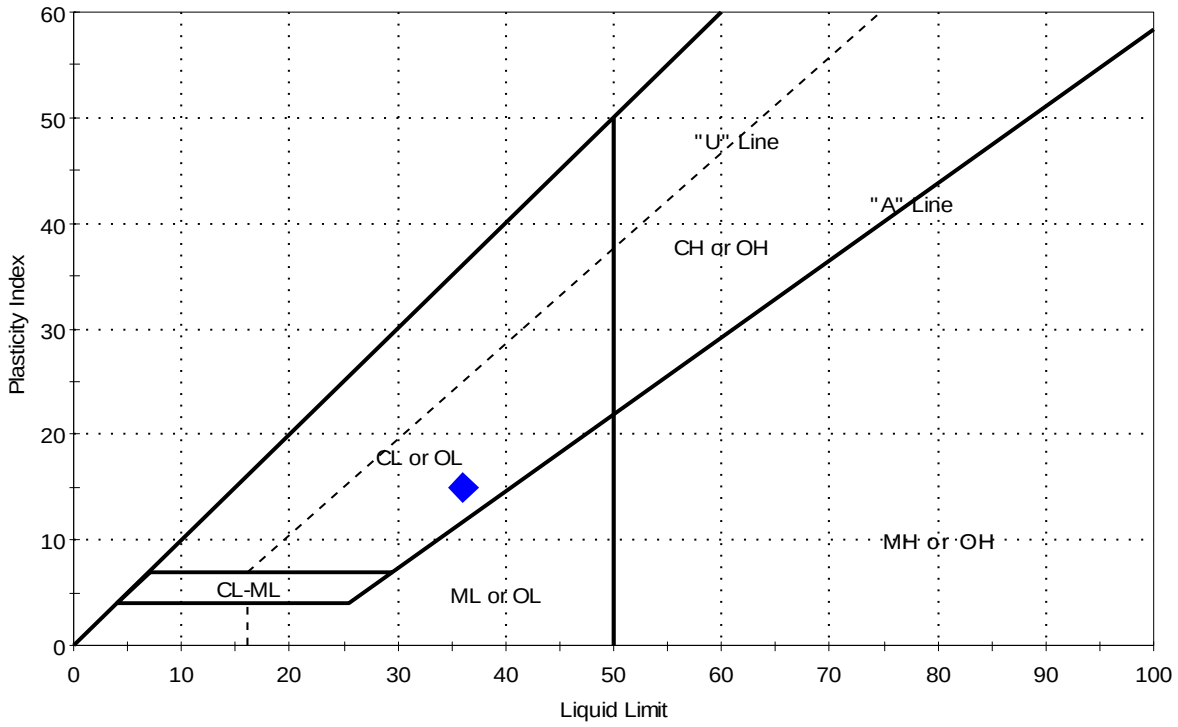
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-103	Sample Type:	tube	Tested By:	GA
Sample ID:	U-1	Test Date:	01/10/20	Checked By:	emm
Depth :	15-17	Test Id:	536601		
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
◆	U-1	B-103	15-17	36	36	21	15	1	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-106	Sample Type:	tube	Tested By:	GA
Sample ID:	U-1	Test Date:	01/10/20	Checked By:	emm
Depth :	10-12	Test Id:	535412		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U-1	B-106	10-12	18	n/a	n/a	n/a	n/a	

Dry Strength: LOW

Dilatancy: RAPID

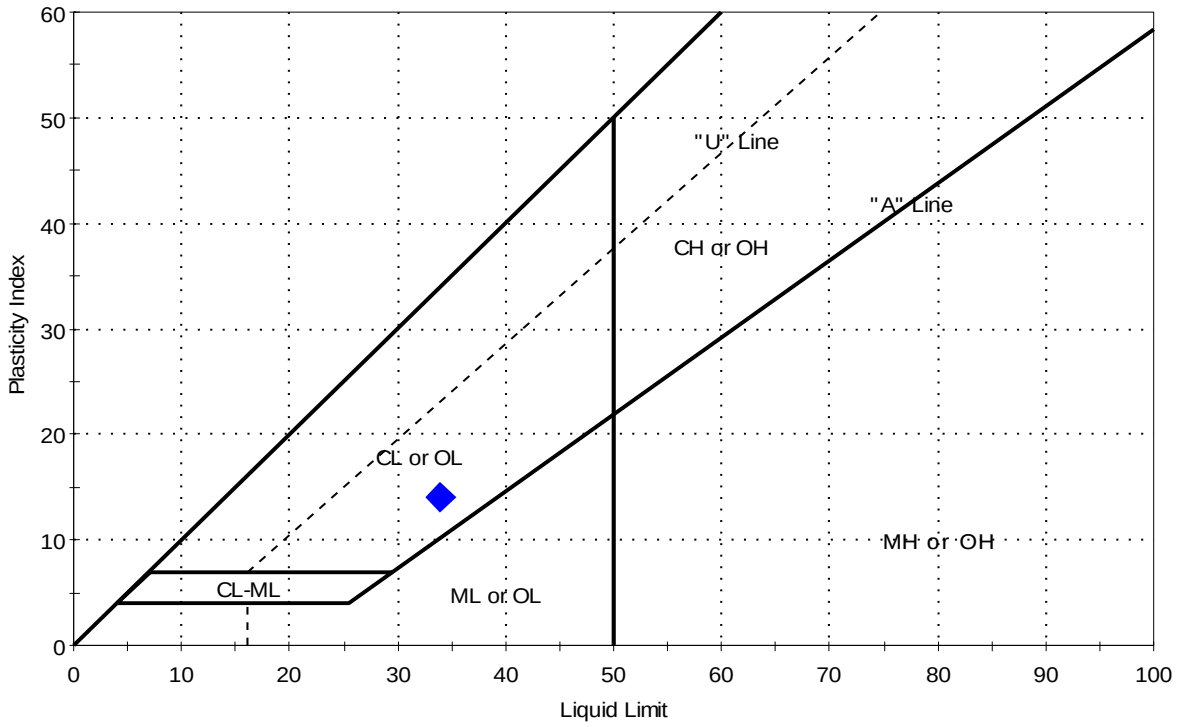
Toughness: n/a

The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-109	Sample Type:	jar	Tested By:	cam
Sample ID:	3	Test Date:	01/10/20	Checked By:	emm
Depth :	10-12	Test Id:	536960		
Test Comment:	---				
Visual Description:	Wet, olive 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
◆	3	B-109	10-12	38	34	20	14	1.3	

Sample Prepared using the WET method

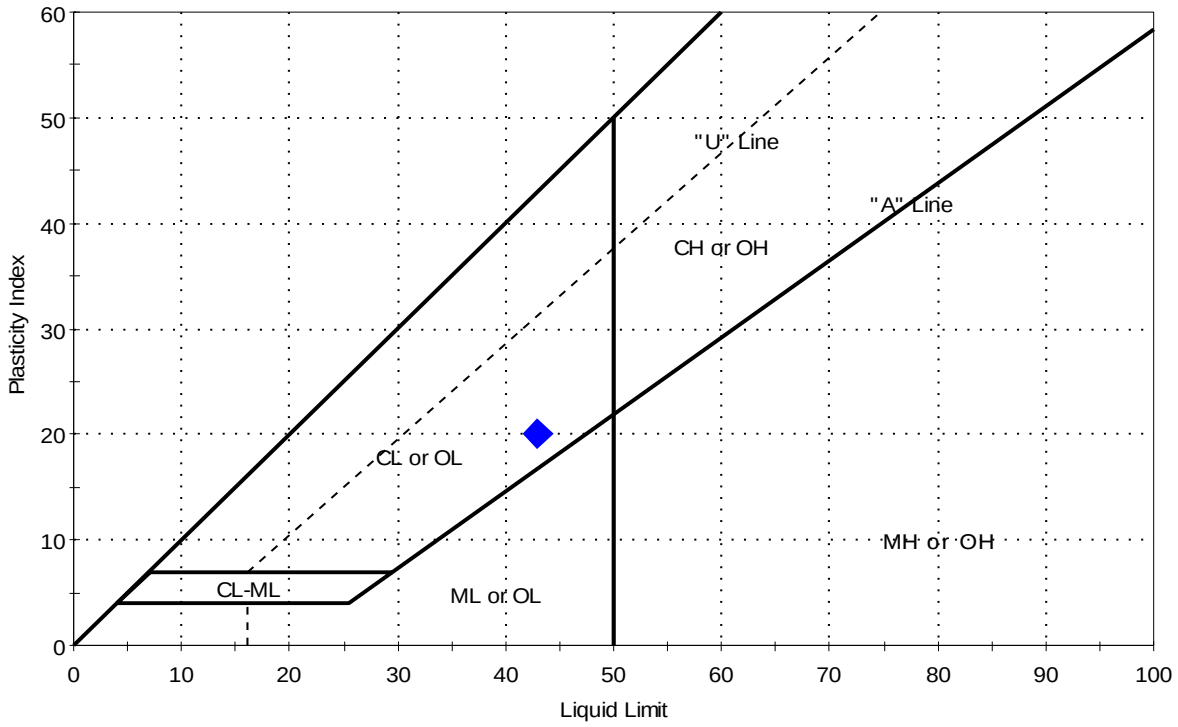
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-109	Sample Type:	jar	Tested By:	cam
Sample ID:	6	Test Date:	01/13/20	Checked By:	emm
Depth :	25-27	Test Id:	536961		
Test Comment:	---				
Visual Description:	Moist, olive 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
◆	6	B-109	25-27	42	43	23	20	0.9	

Sample Prepared using the WET method

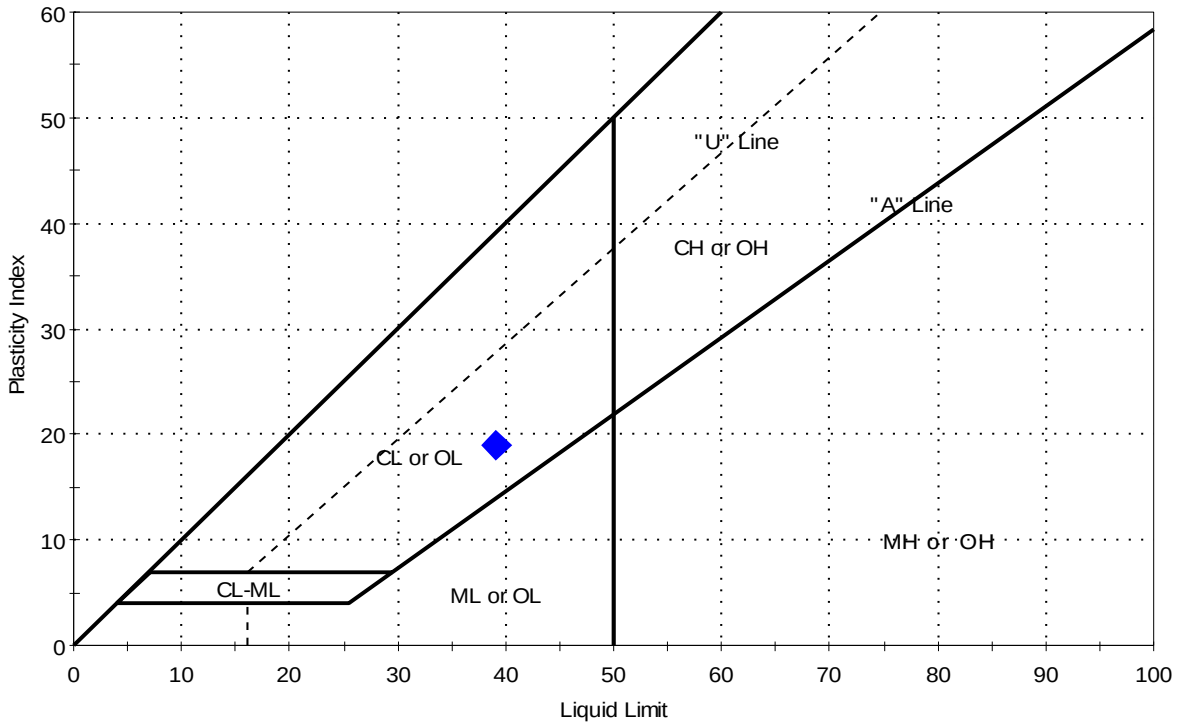
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-109	Sample Type:	tube	Tested By:	GA
Sample ID:	U-1	Test Date:	01/10/20	Checked By:	emm
Depth :	30-32	Test Id:	535410		
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
◆	U-1	B-109	30-32	41	39	20	19	1.1	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

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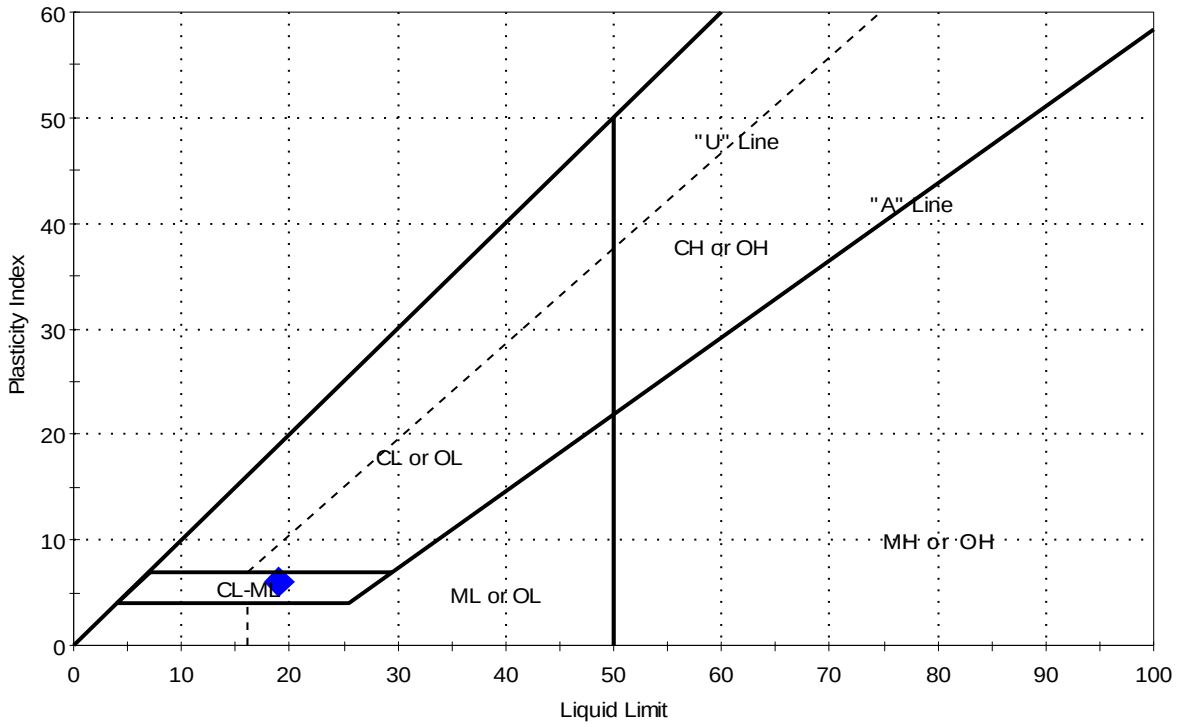
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-109	Sample Type:	tube	Tested By:	GA
Sample ID:	U-2	Test Date:	01/10/20	Checked By:	emm
Depth :	40-42	Test Id:	535411		
Test Comment:	---				
Visual Description:	Moist, gray silty clayey sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U-2	B-109	40-42	22	19	13	6	1.5	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

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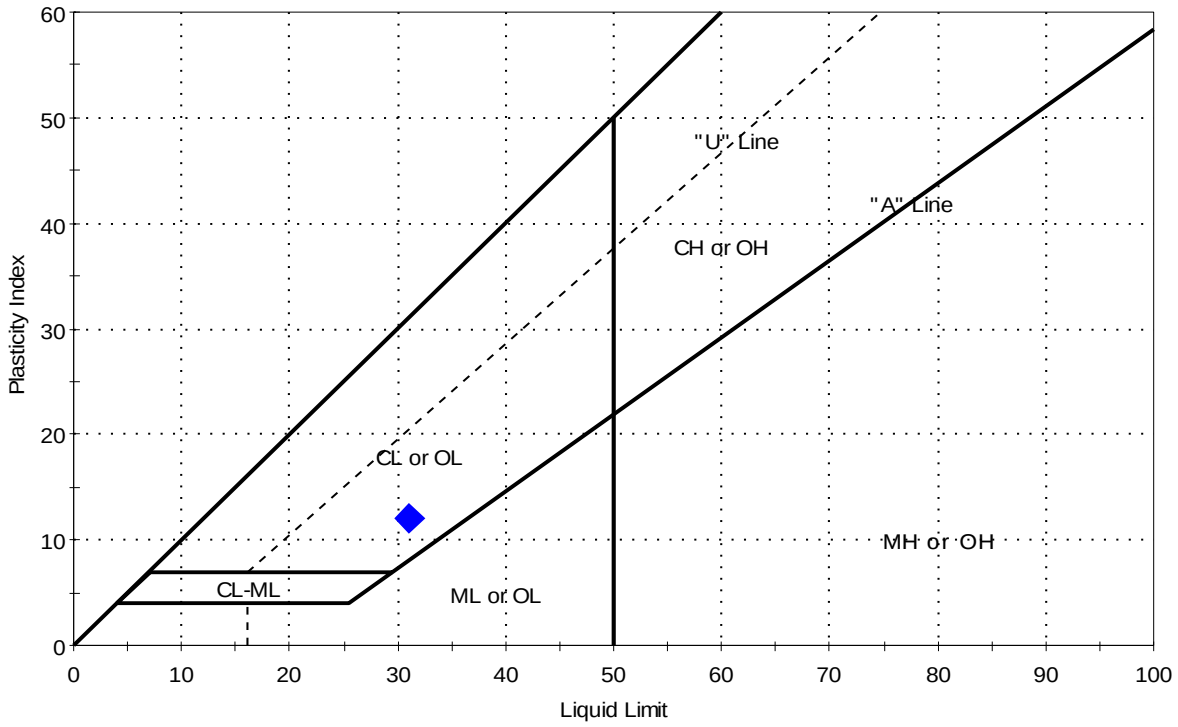
Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-111	Sample Type:	tube	Tested By:	GA
Sample ID:	U-1	Test Date:	01/10/20	Checked By:	emm
Depth :	30-32	Test Id:	536598		
Test Comment:	---				
Visual Description:	Moist, 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
◆	U-1	B-111	30-32	26	31	19	12	0.6	

Sample Prepared using the WET method

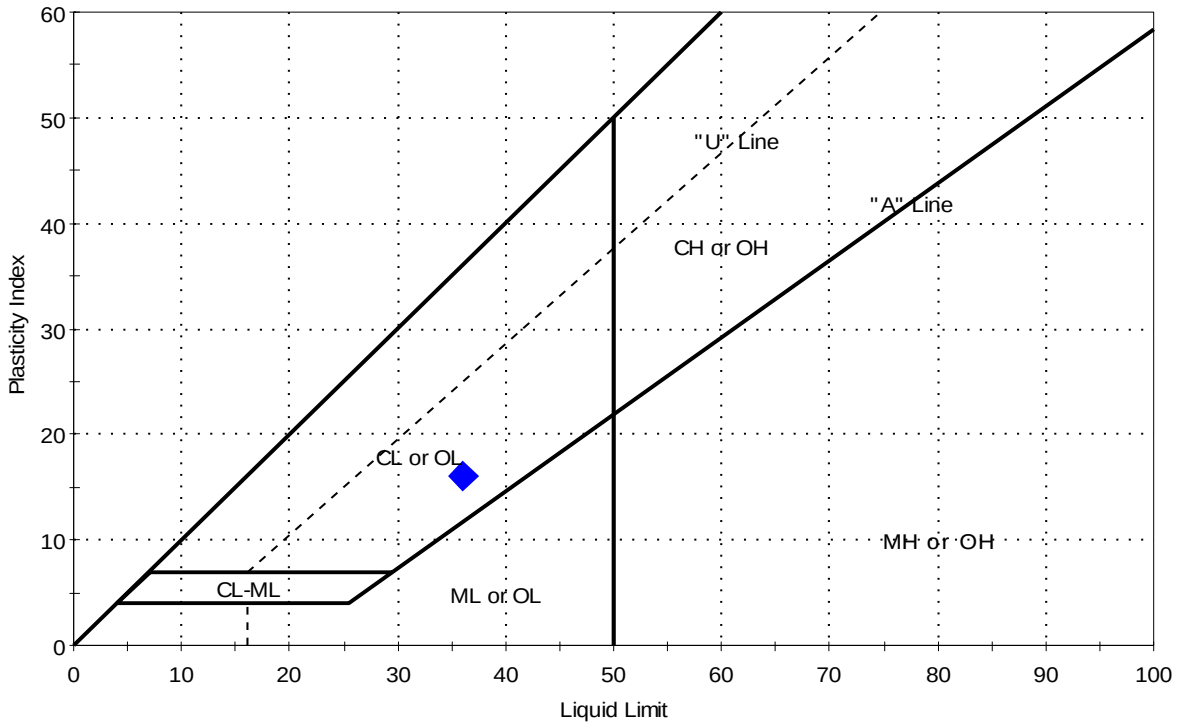
Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-111	Sample Type:	tube	Tested By:	GA
Sample ID:	U-2	Test Date:	01/10/20	Checked By:	emm
Depth :	40-42	Test Id:	536599		
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
◆	U-2	B-111	40-42	29	36	20	16	0.6	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

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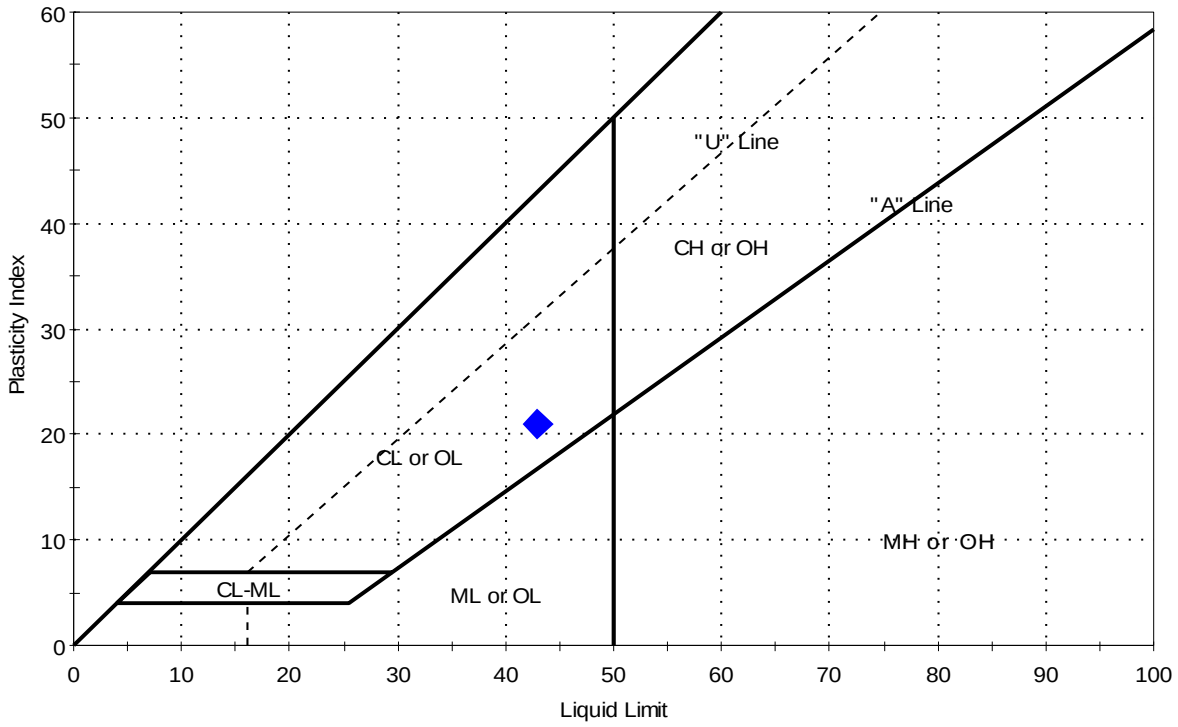
Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	B-111	Sample Type:	tube	Tested By:	GA
Sample ID:	U-3	Test Date:	01/10/20	Checked By:	emm
Depth :	50-52	Test Id:	536600		
Test Comment:	---				
Visual Description:	Moist, olive 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
◆	U-3	B-111	50-52	38	43	22	21	0.8	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

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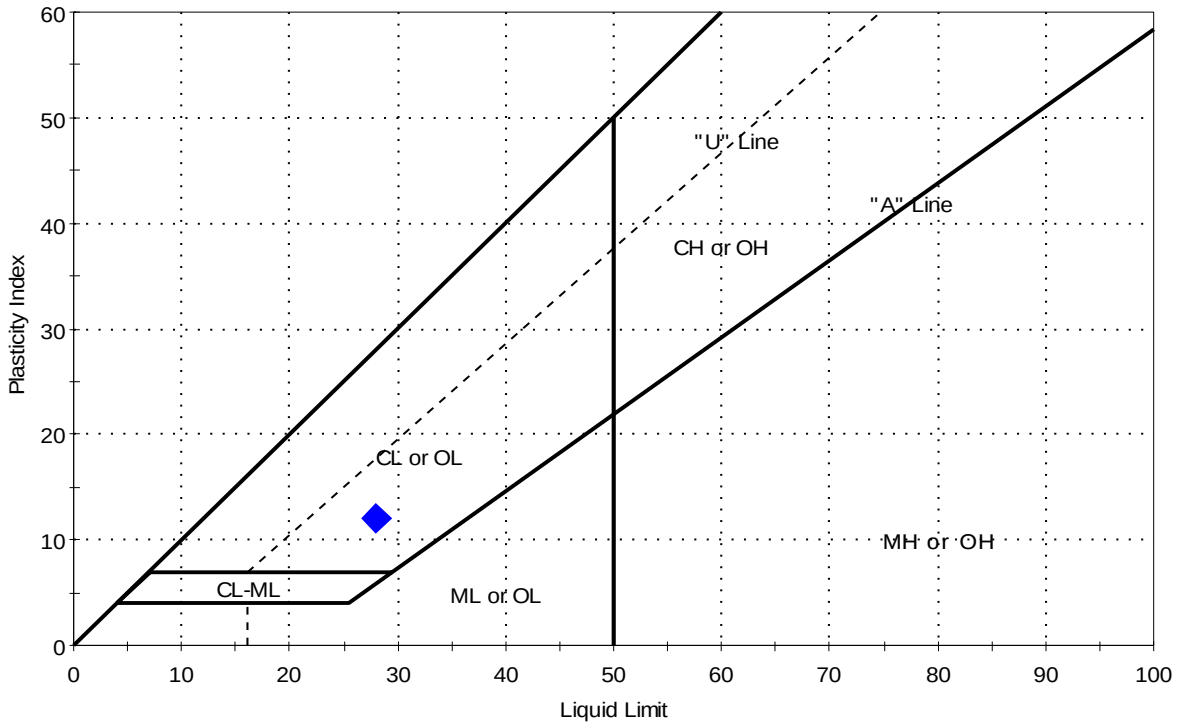
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-203	Sample Type:	tube	Tested By:	cam
Sample ID:	U-1	Test Date:	12/22/20	Checked By:	jsc
Depth :	12-14	Test Id:	597029		
Test Comment:	---				
Visual Description:	Moist, gray 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
◆	U-1	B-203	12-14	36	28	16	12	1.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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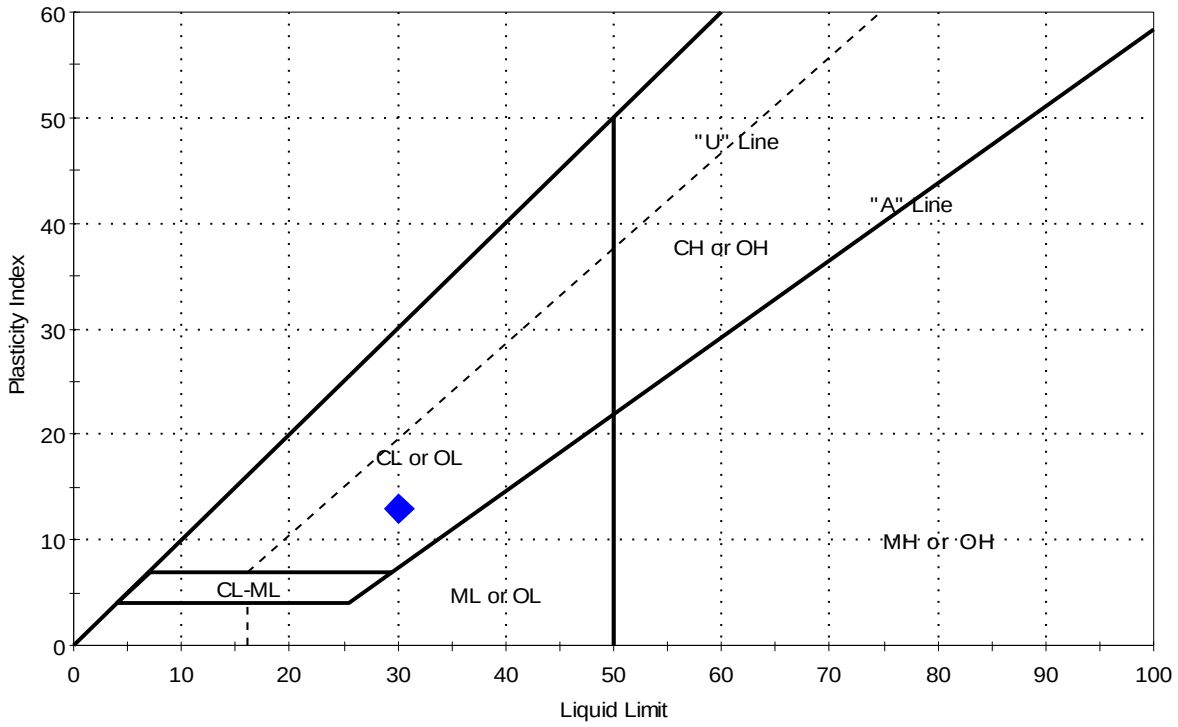
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-205	Sample Type:	tube	Tested By:	cam
Sample ID:	U-1	Test Date:	12/22/20	Checked By:	jsc
Depth :	17-19	Test Id:	597030		
Test Comment:	---				
Visual Description:	Moist, gray 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
◆	U-1	B-205	17-19	31	30	17	13	1.1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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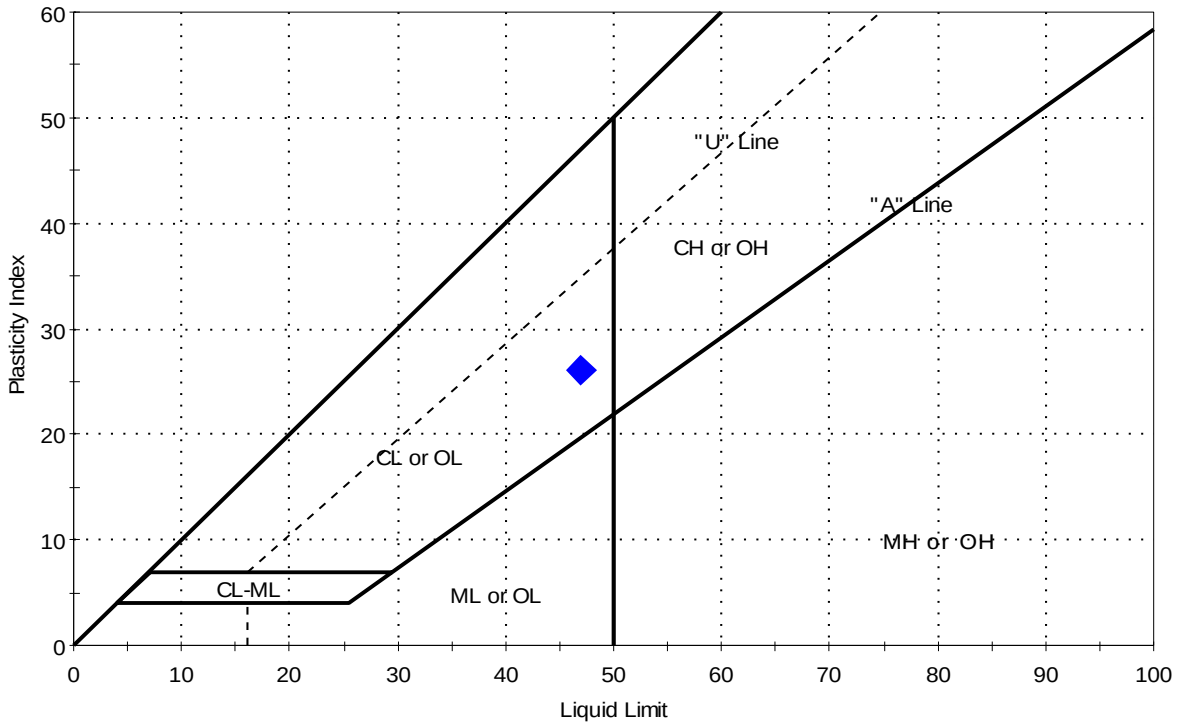
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-207	Sample Type:	tube	Tested By:	GA
Sample ID:	U-1	Test Date:	12/30/20	Checked By:	bfs
Depth :	13-15 ft	Test Id:	595893		
Test Comment:	---				
Visual Description:	Moist, gray 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
◆	U-1	B-207	13-15 ft	44	47	21	26	0.9	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: NONE

Toughness: MEDIUM

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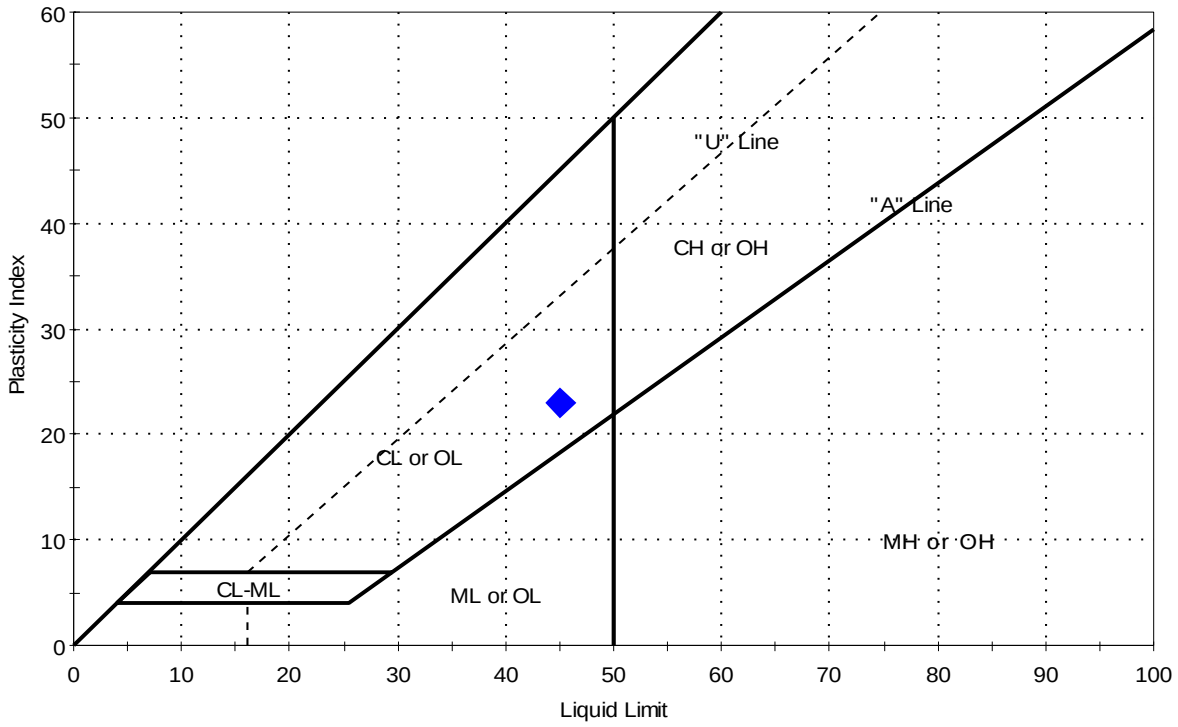
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-211	Sample Type:	tube	Tested By:	GA
Sample ID:	U-1	Test Date:	12/30/20	Checked By:	bfs
Depth :	62-64 ft	Test Id:	595896		
Test Comment:	---				
Visual Description:	Moist, gray 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
◆	U-1	B-211	62-64 ft	42	45	22	23	0.9	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: NONE

Toughness: MEDIUM

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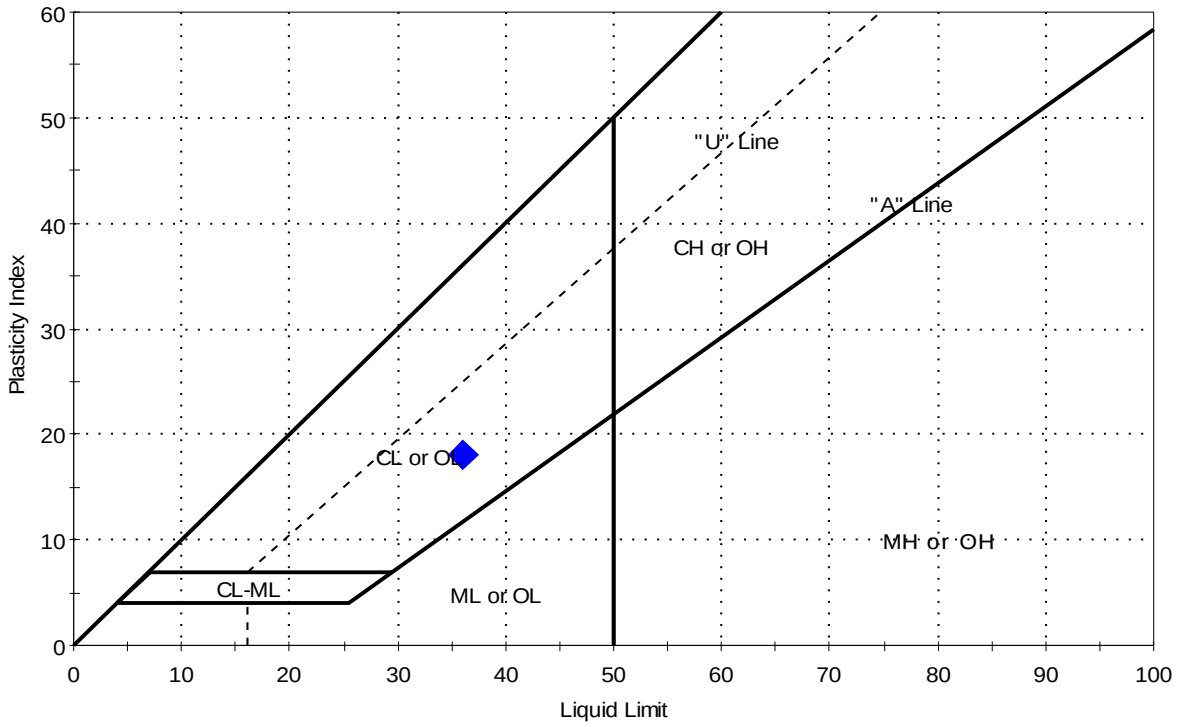
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-211	Sample Type:	tube	Tested By:	GA
Sample ID:	U-2	Test Date:	12/30/20	Checked By:	bfs
Depth :	70-72 ft	Test Id:	595897		
Test Comment:	---				
Visual Description:	Moist, gray 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
◆	U-2	B-211	70-72 ft	39	36	18	18	1.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: NONE

Toughness: MEDIUM

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	OS-5	Sample Type:	tube	Tested By:	cam
Sample ID:	U-1	Test Date:	12/02/20	Checked By:	bfs
Depth :	17-19 ft	Test Id:	595898		
Test Comment:	---				
Visual Description:	Moist, gray silty sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	U-1	OS-5	17-19 ft	24	n/a	n/a	n/a	n/a	

Dry Strength: LOW

Dilatancy: RAPID

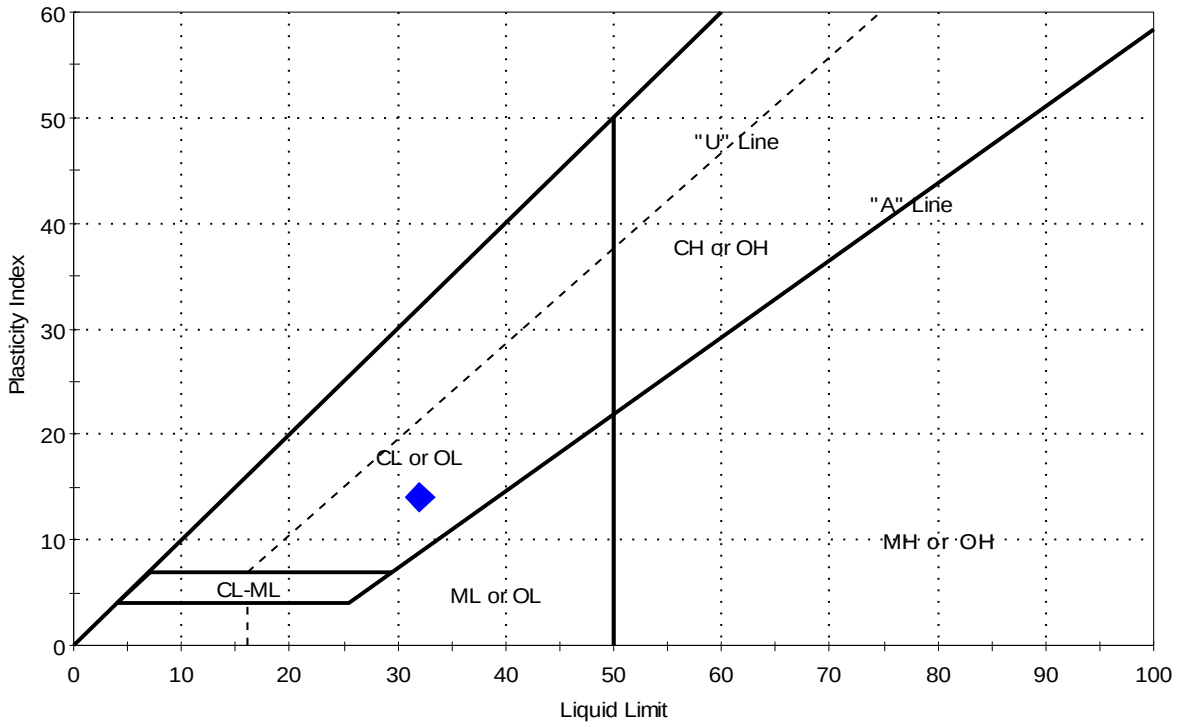
Toughness: n/a

The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-201	Sample Type:	jar	Tested By:	cam
Sample ID:	S-7	Test Date:	01/20/21	Checked By:	emm
Depth :	15-17	Test Id:	606958		
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
◆	S-7	B-201	15-17	31	32	18	14	0.9	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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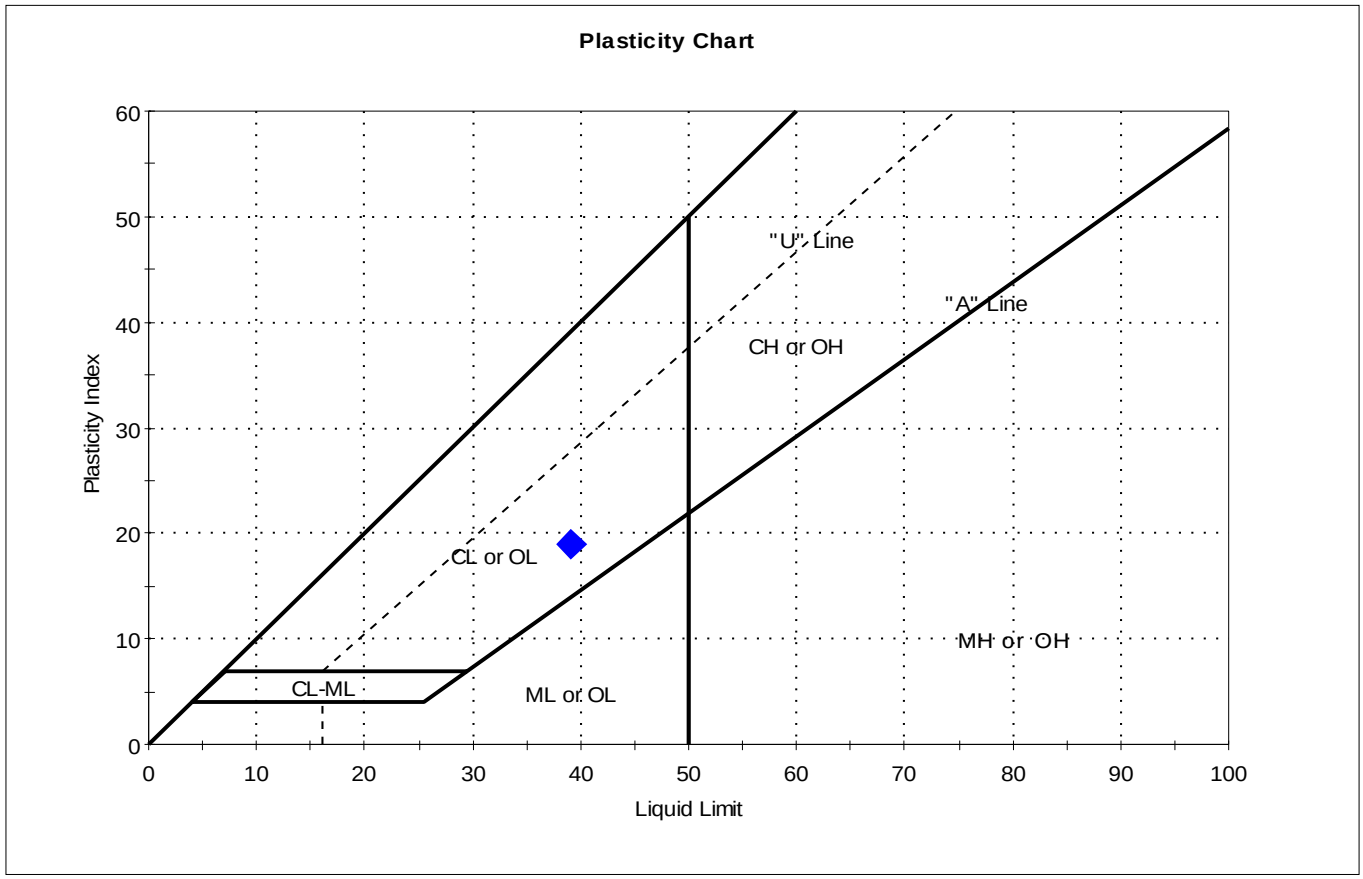
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-208	Sample Type:	tube	Tested By:	cam
Sample ID:	U-1	Test Date:	01/21/21	Checked By:	emm
Depth :	10-12	Test Id:	607185		
Test Comment:	---				
Visual Description:	Wet, gray 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
◆	U-1	B-208	10-12	44	39	20	19	1.3	

Sample Prepared using the WET method

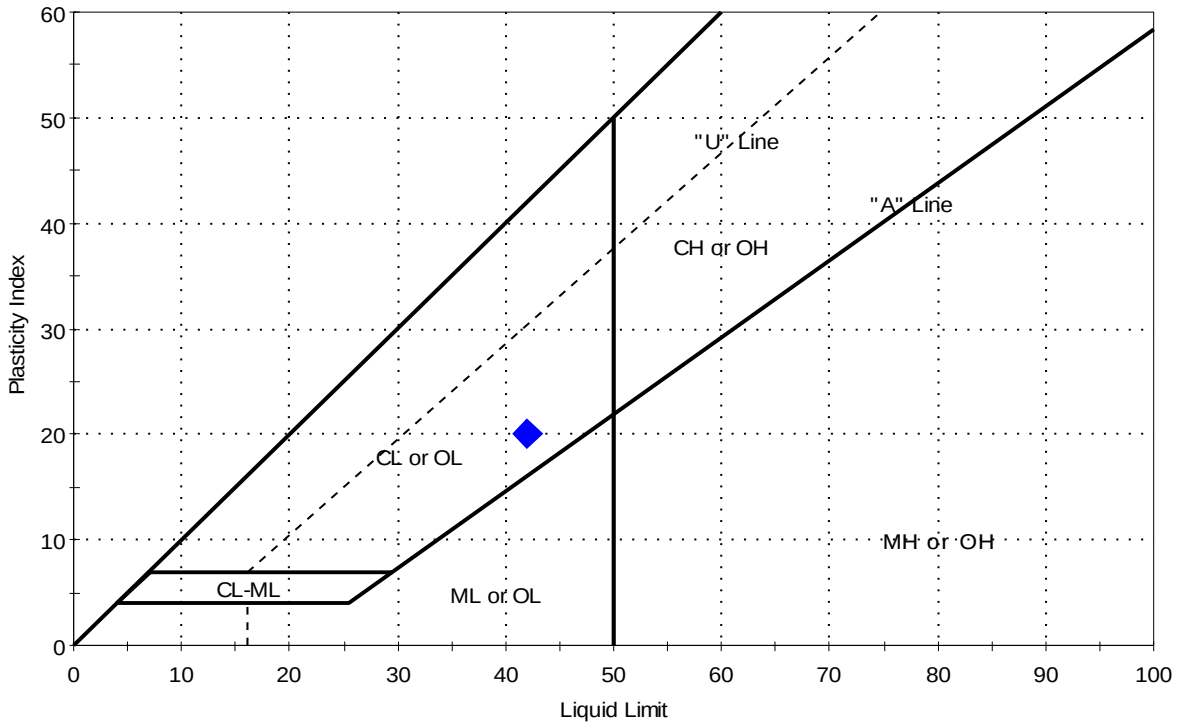
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	OS-6	Sample Type:	jar	Tested By:	cam
Sample ID:	S-6	Test Date:	01/22/21	Checked By:	emm
Depth :	10-12	Test Id:	606952		
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
◆	S-6	OS-6	10-12	43	42	22	20	1.1	

Sample Prepared using the WET method

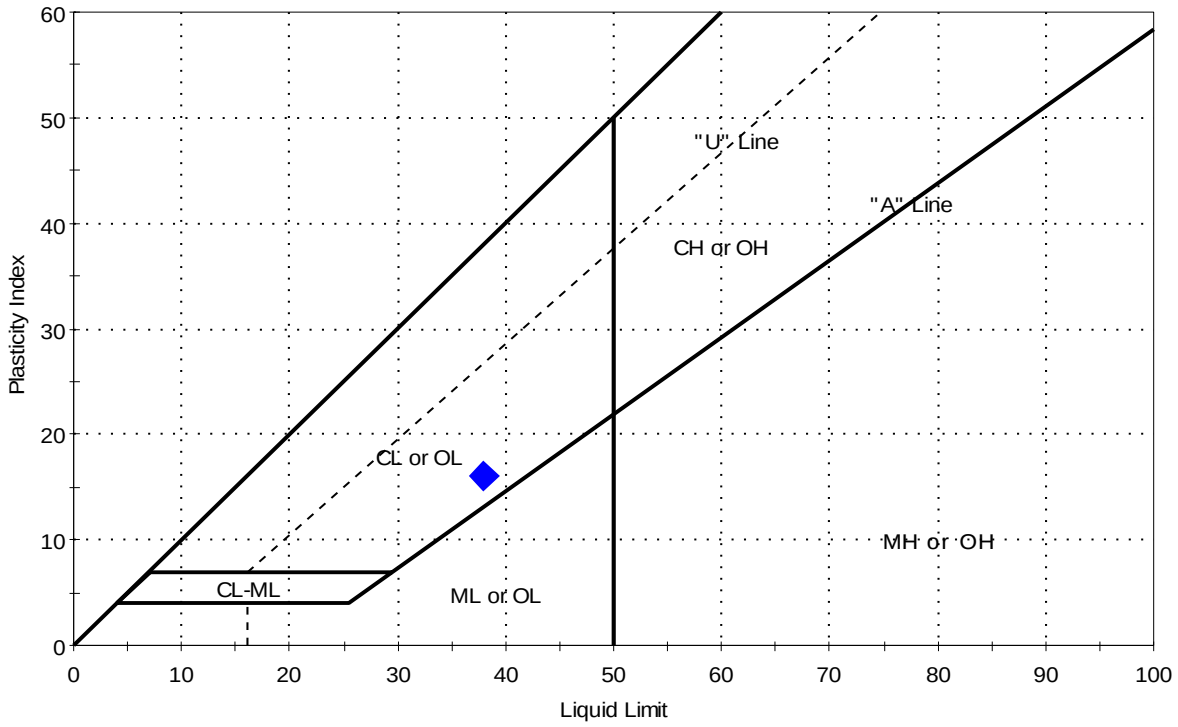
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	OS-6	Sample Type:	jar	Tested By:	cam
Sample ID:	S-7	Test Date:	01/22/21	Checked By:	emm
Depth :	15-17	Test Id:	606953		
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
◆	S-7	OS-6	15-17	40	38	22	16	1.1	

Sample Prepared using the WET method

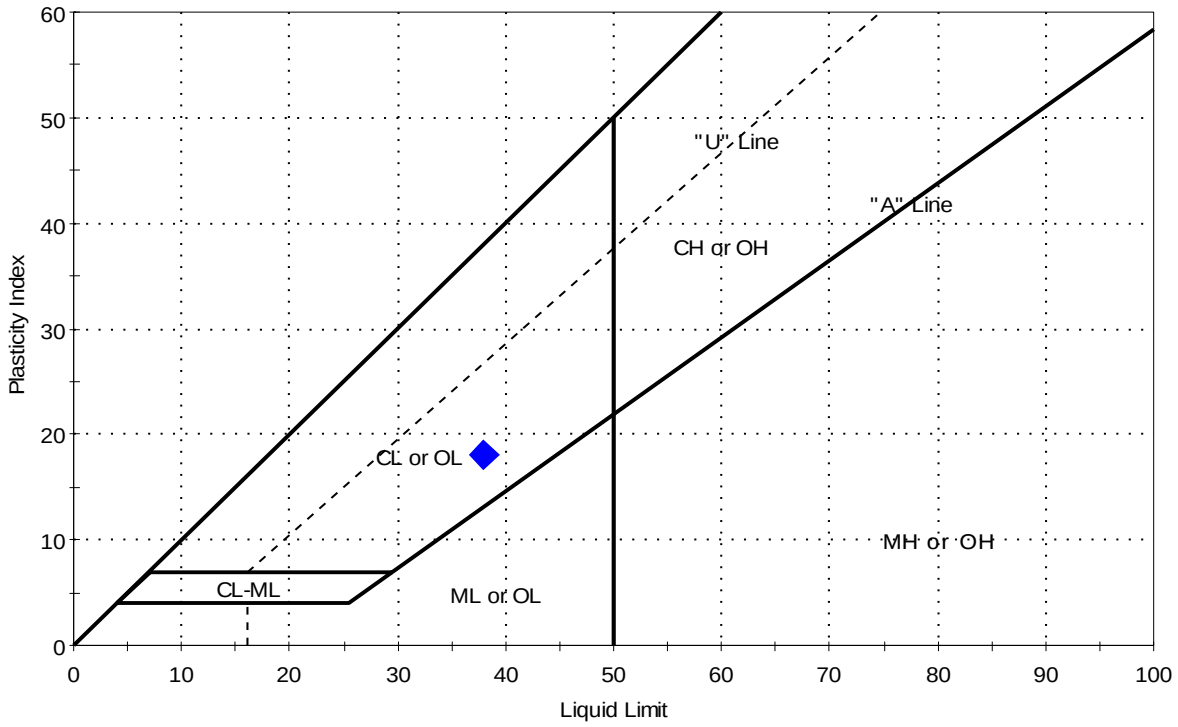
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	OS-8	Sample Type:	jar	Tested By:	cam
Sample ID:	S-9	Test Date:	01/22/21	Checked By:	emm
Depth :	20-22	Test Id:	606955		
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
◆	S-9	OS-8	20-22	35	38	20	18	0.8	

Sample Prepared using the WET method

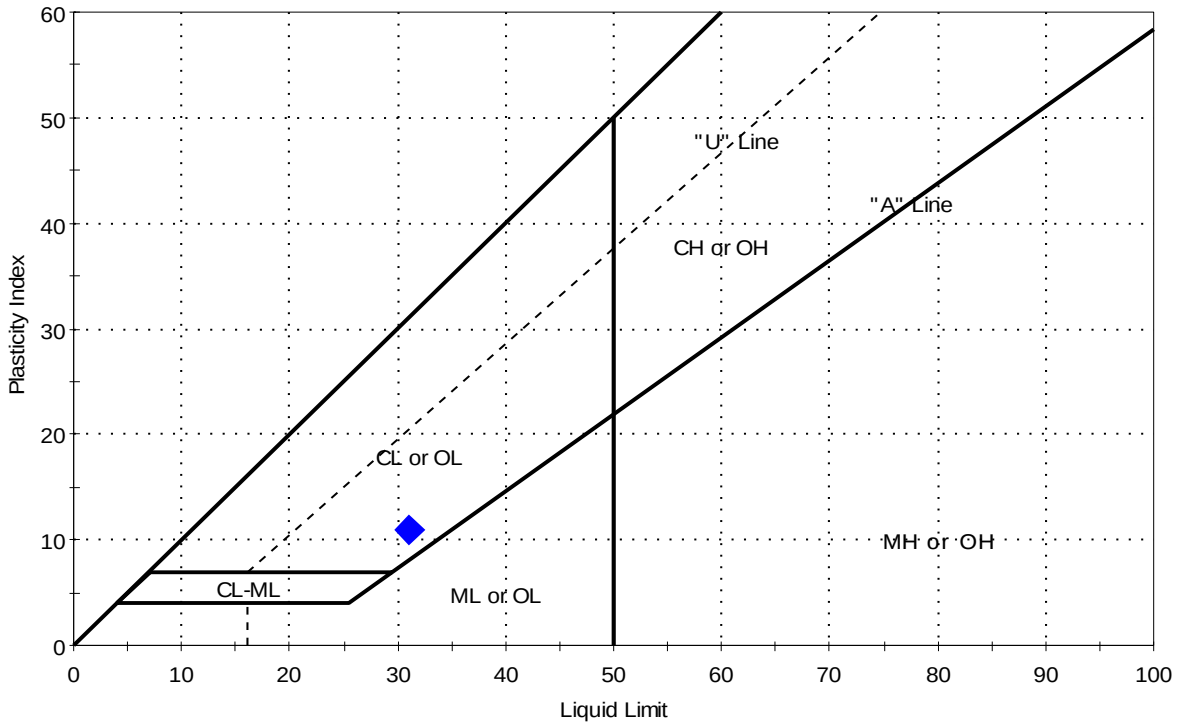
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	OS-10	Sample Type:	jar	Tested By:	cam
Sample ID:	S-9	Test Date:	01/22/21	Checked By:	emm
Depth :	25-27	Test Id:	606956		
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
◆	S-9	OS-10	25-27	31	31	20	11	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

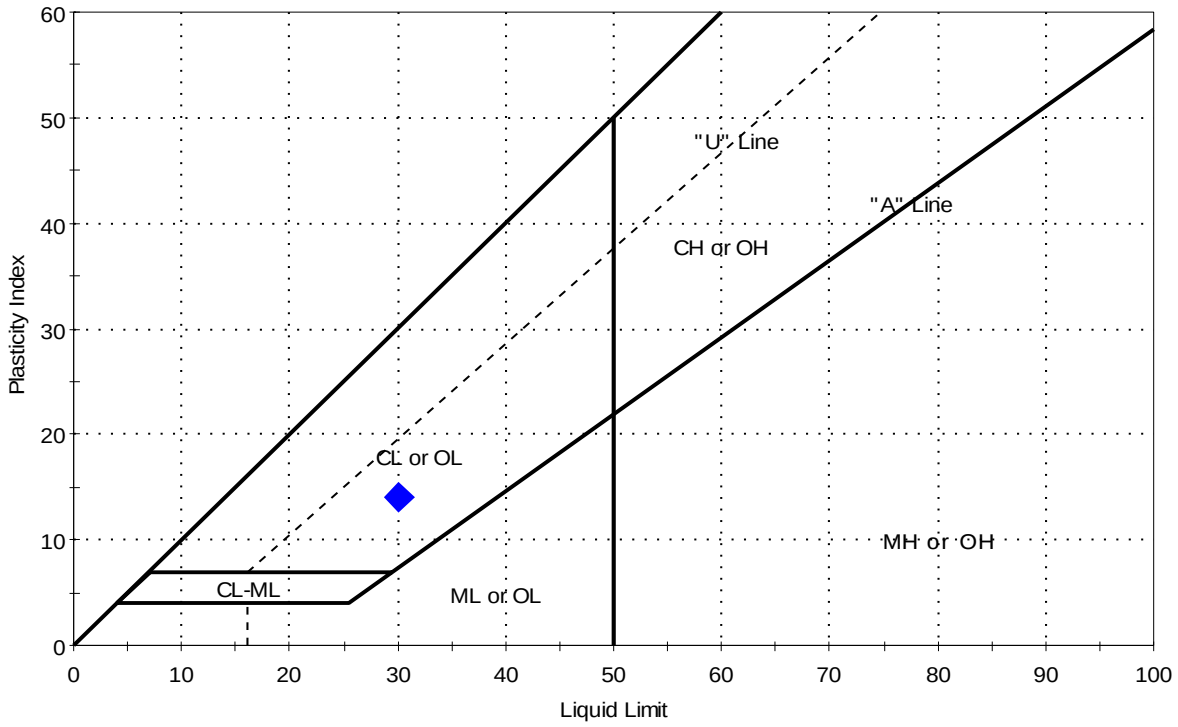
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-206	Sample Type:	tube	Tested By:	cam
Sample ID:	U-1	Test Date:	02/01/21	Checked By:	emm
Depth :	12-14	Test Id:	607133		
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
◆	U-1	B-206	12-14	33	30	16	14	1.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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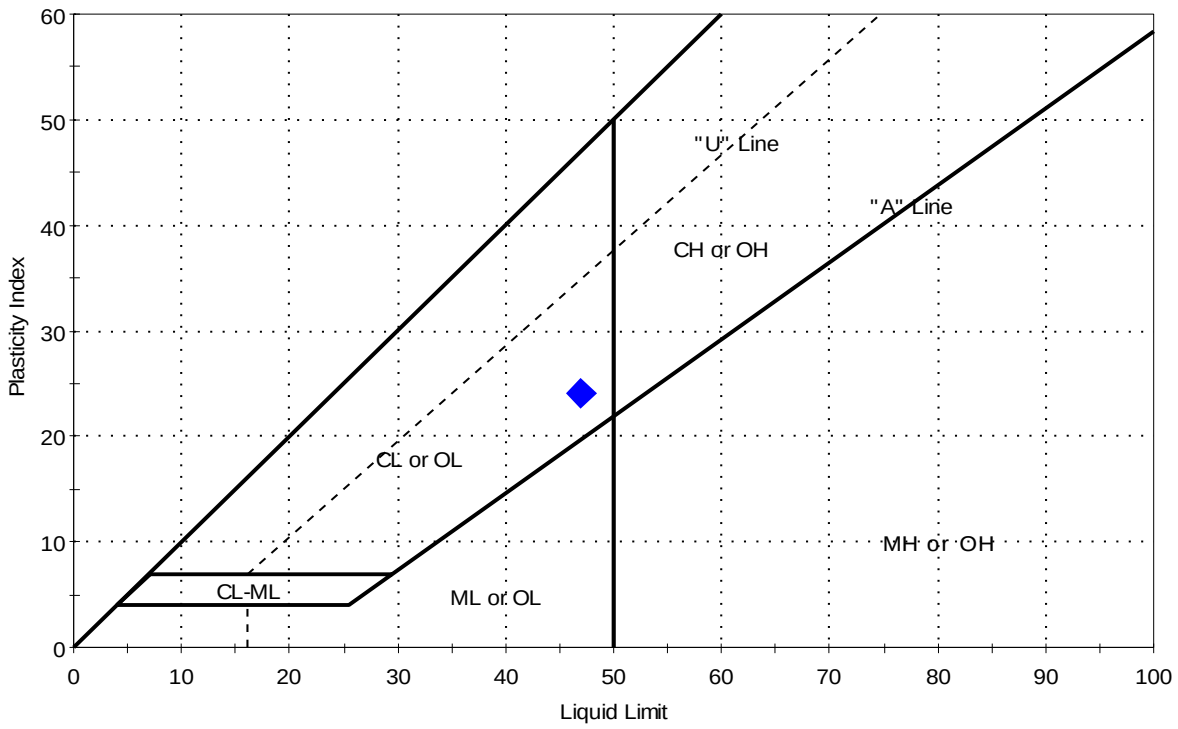
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-209	Sample Type:	tube	Tested By:	cam
Sample ID:	U-2	Test Date:	02/01/21	Checked By:	emm
Depth :	90-92 ft	Test Id:	595894		
Test Comment:	---				
Visual Description:	Moist, 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
◆	U-2	B-209	90-92 ft	40	47	23	24	0.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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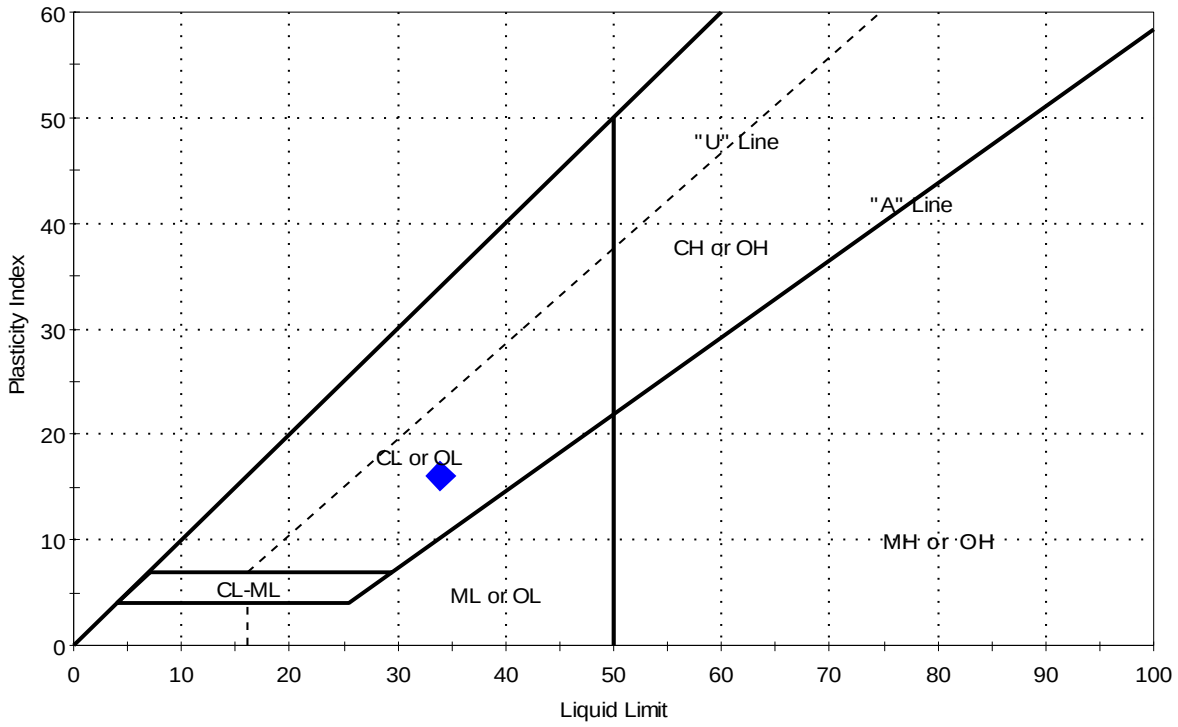
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-210	Sample Type:	tube	Tested By:	cam
Sample ID:	U-1	Test Date:	01/29/21	Checked By:	emm
Depth :	65-67 ft	Test Id:	595895		
Test Comment:	---				
Visual Description:	Moist, 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
◆	U-1	B-210	65-67 ft	25	34	18	16	0.4	

Sample Prepared using the WET method

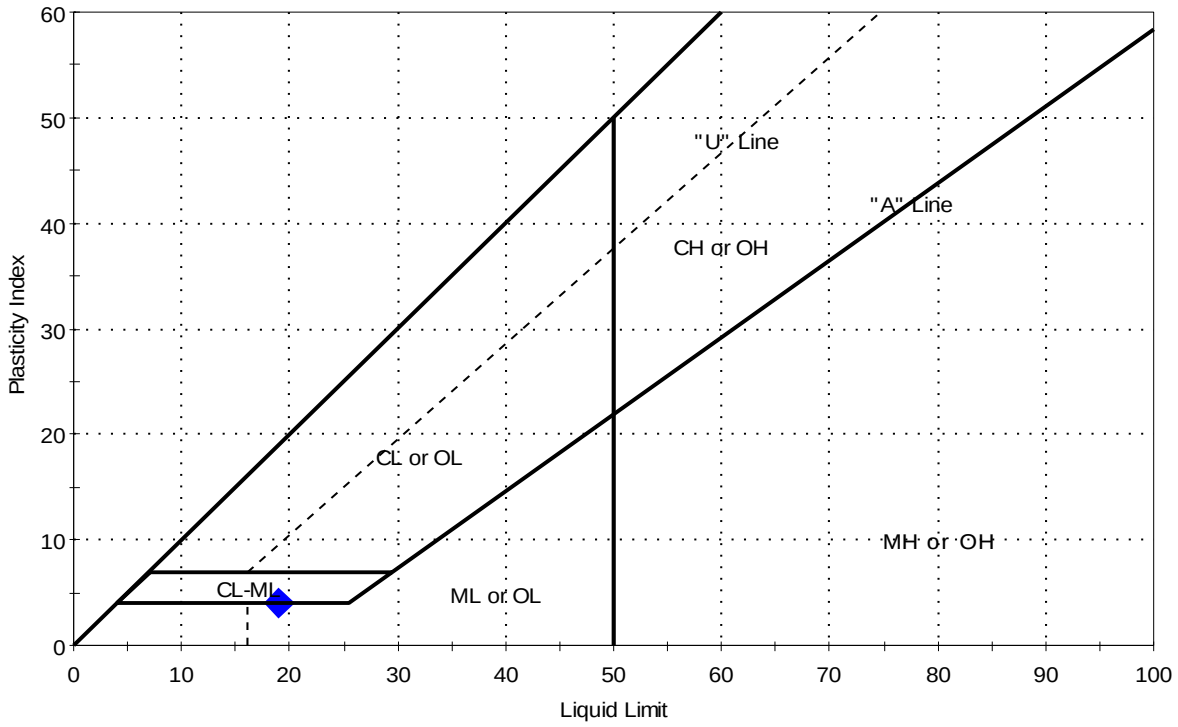
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-212	Sample Type:	jar	Tested By:	cam
Sample ID:	S-10	Test Date:	01/29/21	Checked By:	emm
Depth :	29-31	Test Id:	606950		
Test Comment:	---				
Visual Description:	Moist, gray silty 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
◆	S-10	B-212	29-31	22	19	15	4	1.7	

Sample Prepared using the WET method

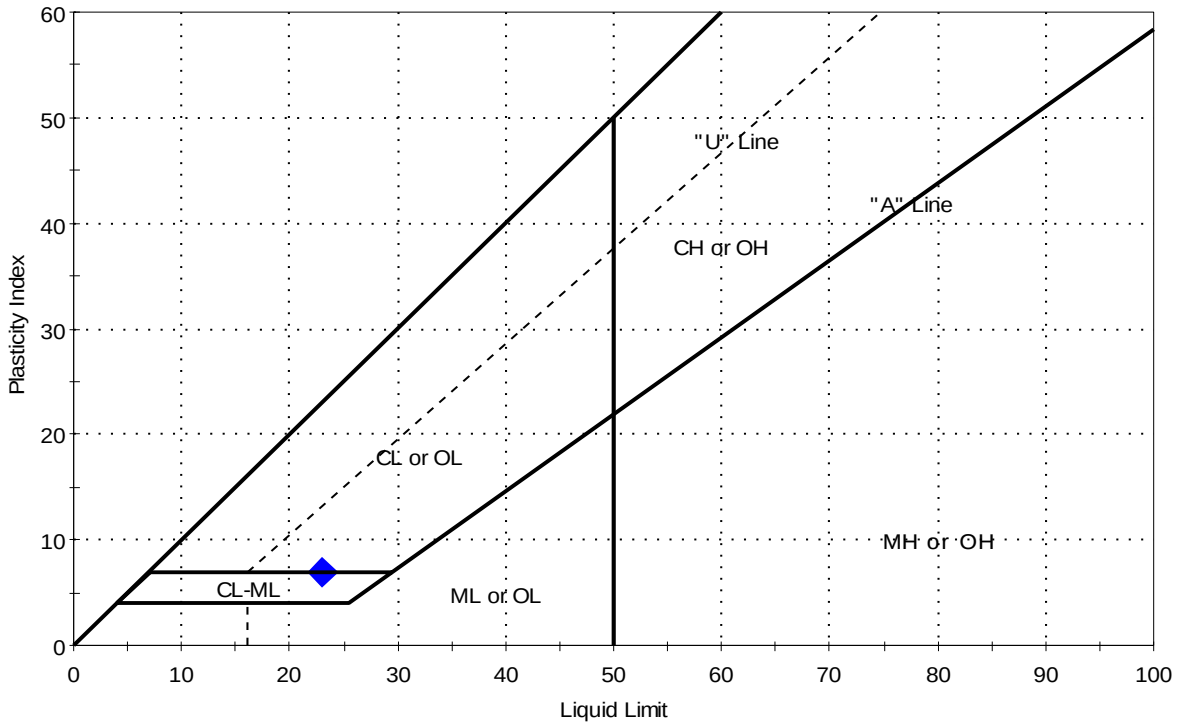
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-215	Sample Type:	jar	Tested By:	cam
Sample ID:	S-3A	Test Date:	01/28/21	Checked By:	emm
Depth :	4-5	Test Id:	606948		
Test Comment:	---				
Visual Description:	Moist, olive silty 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
◆	S-3A	B-215	4-5	16	23	16	7	0.1	

Sample Prepared using the WET method

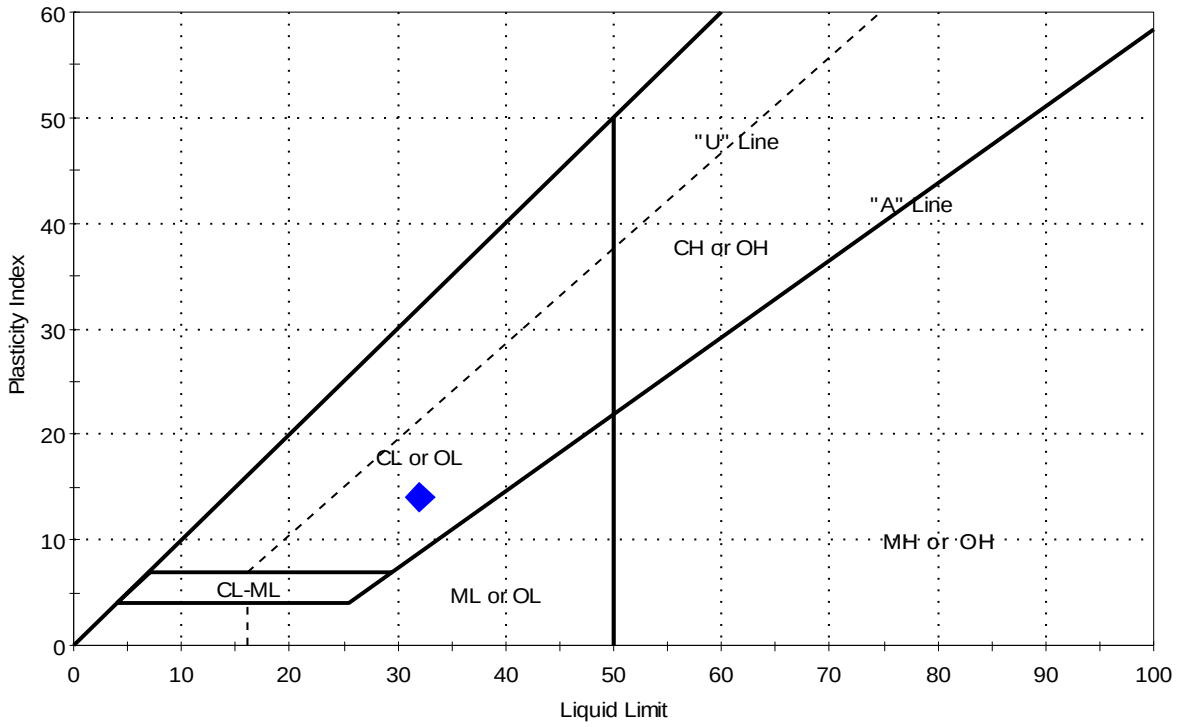
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	B-215	Sample Type:	jar	Tested By:	cam
Sample ID:	S-5A	Test Date:	01/28/21	Checked By:	emm
Depth :	8-9	Test Id:	606949		
Test Comment:	---				
Visual Description:	Moist, olive 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
◆	S-5A	B-215	8-9	22	32	18	14	0.3	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

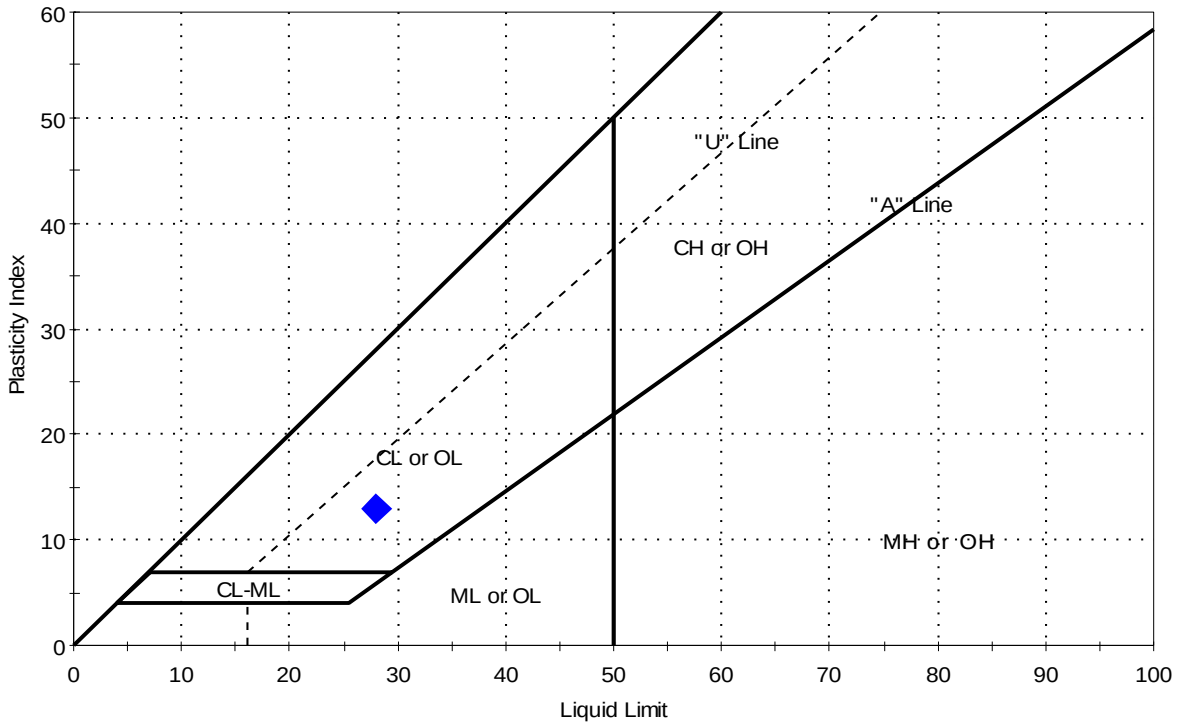
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	MA-5	Sample Type:	jar	Tested By:	cam
Sample ID:	S-6	Test Date:	01/28/21	Checked By:	emm
Depth :	13-15	Test Id:	606957		
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
◆	S-6	MA-5	13-15	25	28	15	13	0.8	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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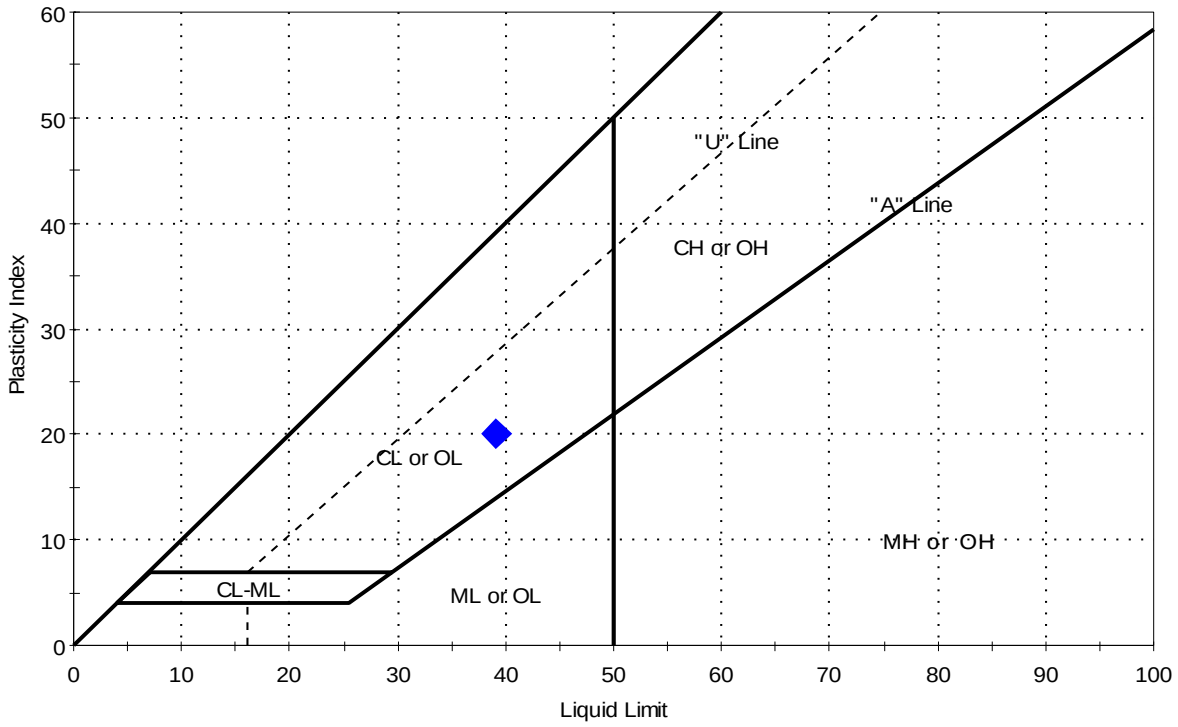
GeoTesting EXPRESS

Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	OS-4	Sample Type:	jar	Tested By:	cam
Sample ID:	S-7	Test Date:	01/28/21	Checked By:	emm
Depth :	15-17	Test Id:	606951		
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
◆	S-7	OS-4	15-17	42	39	19	20	1.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

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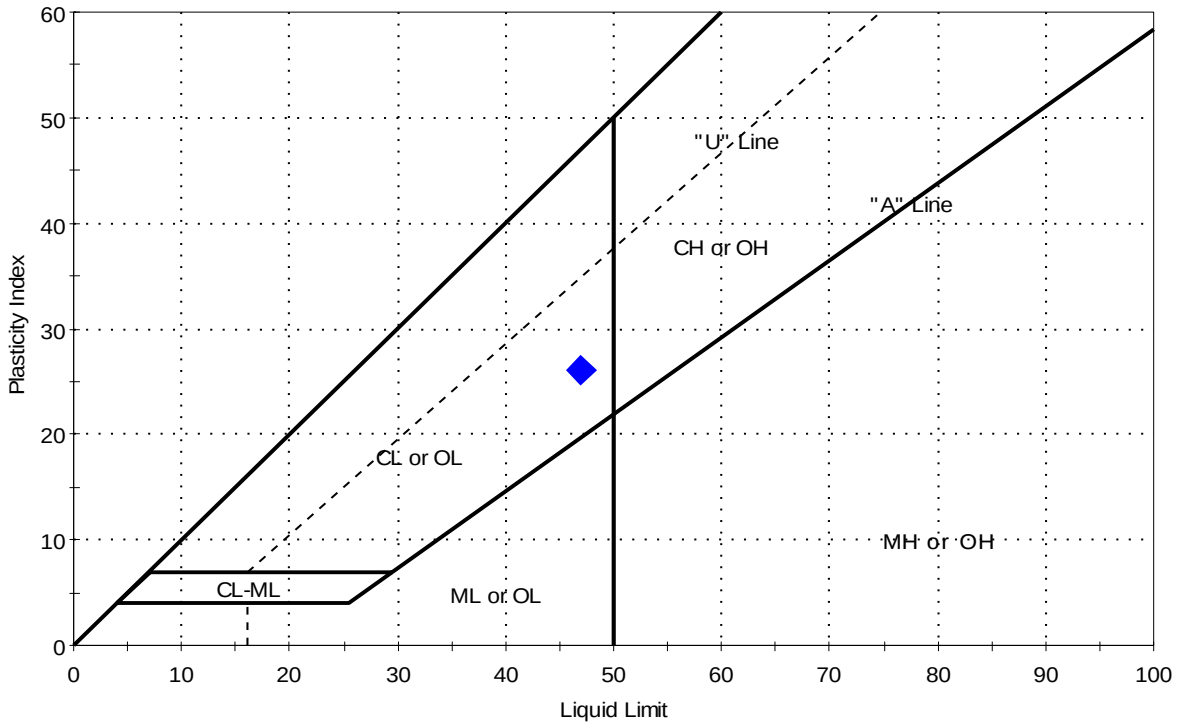
Client:	Stantec Inc.				
Project:	Saco Interch. Improv. Ex. 35 & 36				
Location:	Saco, ME			Project No:	GTX-312785
Boring ID:	OS-8	Sample Type:	jar	Tested By:	cam
Sample ID:	S-7	Test Date:	01/28/21	Checked By:	emm
Depth :	13-15	Test Id:	606954		
Test Comment:	---				
Visual Description:	Moist, gray 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
◆	S-7	OS-8	13-15	41	47	21	26	0.8	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

TUBE HANDLING WITH: MC, DENSITY, TORVANE, VISUAL

Client:	Stantec Inc.		
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange		
Project Location:	Saco, ME		
GTX #:	311093	Tested By:	md
Test Date:	01/13/20	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-103	U-1	15-17	Top	Moist, gray clay	118.4	27.9	92.5	0.19	0.21	0.25	0.22
			Middle	Moist, gray clay	113.7	30.1	87.4	0.30	0.20	0.25	0.25
			Bottom	Moist, gray clay	103.7	39.9	74.1	0.10	0.15	0.16	0.14
B-106	U-1	10-12	Top	Moist, olive gray silty sand	126.0	32.5	95.1	0.35	0.30	0.35	0.33
			Middle	Moist, olive gray silty sand	125.6	19.0	105.6	0.20	0.25	0.24	0.23
			Bottom	Moist, olive gray silty sand	122.7	20.1	102.2	0.30	0.35	0.30	0.32
B-109	U-1	30-32	Top	Moist, gray clay	113.2	38.3	81.9	0.25	0.25	0.30	0.27
			Middle	Moist, gray clay	112.5	40.5	80.1	0.20	0.20	0.22	0.21
			Bottom	Moist, gray clay	110.1	42.7	77.2	0.25	0.15	0.15	0.18
B-109	U-2	40-42	Top	Moist, gray silty clayey sand	118.9	30.8	90.9	0.22	0.25	0.25	0.24
			Middle	Moist, gray silty clayey sand	141.9	10.4	128.5	0.10	0.20	0.12	0.14
			Bottom	Moist, gray silty clayey sand	138.6	10.7	125.1	0.18	0.17	0.23	0.19

Client:	Stantec Inc.		
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange		
Project Location:	Saco, ME		
GTX #:	311093	Tested By:	md
Test Date:	01/13/20	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-111	U-1	30-32	Top	Moist, gray clay	119.1	27.5	93.5	0.33	0.32	0.28	0.31
			Middle	Moist, gray clay	119.2	26.8	94.0	0.29	0.25	0.34	0.29
			Bottom	Moist, gray clay	116.1	26.9	91.5	0.30	0.32	0.35	0.32
B-111	U-2	40-42	Top	Moist, gray clay	114.9	26.6	90.8	0.65	0.55	0.50	0.57
			Middle	Moist, gray clay	114.1	27.0	89.9	0.55	0.56	0.57	0.56
			Bottom	Moist, gray clay	115.6	27.8	90.5	0.30	0.40	0.34	0.35
B-111	U-3	50-52	Top	Moist, olive gray clay	111.6	36.9	81.5	0.22	0.25	0.25	0.24
			Middle	Moist, olive gray clay	111.8	34.4	83.2	0.25	0.20	0.22	0.22
			Bottom	Moist, olive gray clay	108.9	38.8	78.5	0.23	0.25	0.26	0.25

Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes
Moisture content determined by ASTM D2216 at 110^o C

Client:	Stantec Inc.		
Project Name:	Saco Interch. Improv. Ex. 35 & 36		
Project Location:	Saco, ME		
GTX #:	312785	Tested By:	md
Test Date:	10/15/19	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-203	U-1	12-14	Top	Moist, gray clay	113.2	29.6	87.3	0.30	0.30	0.29	0.30
			Middle	Moist, gray clay	123.0	30.2	94.5	0.41	0.36	0.40	0.39
			Bottom	Moist, gray clay	117.2	34.2	87.3	0.20	0.23	0.21	0.21
B-207	U-1	13-15	Top	Moist, gray clay	108.6	41.9	76.6	0.35	0.31	0.31	0.32
			Middle	Moist, gray clay	107.4	46.2	73.5	0.25	0.25	0.24	0.25
			Bottom	Moist, gray clay	103.6	43.8	72	0.31	0.30	0.32	0.31
B-211	U-1	62-64	Top	Moist, gray clay	109.0	42.8	76.3	0.25	0.27	0.28	0.27
			Middle	Moist, gray clay	109.0	41.5	77.1	0.26	0.30	0.28	0.28
			Bottom	Moist, gray clay	109.1	41.6	77.0	0.30	0.30	0.29	0.30
B-211	U-1	70-72	Top	Moist, gray clay	116.4	31.6	88.5	0.34	0.36	0.34	0.35
			Middle	Moist, gray clay	109.9	40.4	78.3	0.39	0.34	0.33	0.35
			Bottom	Moist, gray clay	114.9	38.9	83	0.31	0.30	0.36	0.32

Client:	Stantec Inc.		
Project Name:	Saco Interch. Improv. Ex. 35 & 36		
Project Location:	Saco, ME		
GTX #:	312785	Tested By:	md
Test Date:	10/15/19	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
OS-5	U-1	17-19	Top	Moist, gray silty sand	117.0	34.3	87.1	0.35	0.32	0.30	0.32
			Middle	Moist, gray silty sand	112.0	37.1	81.7	0.27	0.32	0.28	0.29
			Bottom	Moist, gray silty sand	112.8	24.1	91.0	0.34	0.30	0.30	0.31

Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes
Moisture content determined by ASTM D2216 at 110^o C

Client:	Stantec Inc.		
Project Name:	Saco Interch. Improv. Ex. 35 & 36		
Project Location:	Saco, ME		
GTX #:	312785	Tested By:	md
Test Date:	01/28/21	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-206	U-1	12-14	Top	Moist, dark gray clay	108.5	29.3	83.9	0.40	0.40	0.40	0.40
			Middle	Moist, dark gray clay	111.6	37.8	81.0	0.20	0.20	0.20	0.20
			Bottom	Moist, dark gray clay	113.9	40.7	81.0	0.30	0.30	0.35	0.32
B-209	U-2	90-92	Top	Moist, dark gray clay	115.6	37.8	83.9	0.35	0.35	0.35	0.35
			Middle	Moist, dark gray clay	109.7	39.1	78.9	0.40	0.40	0.40	0.40
			Bottom	Moist, dark gray clay	112.2	40.0	80.1	0.28	0.25	0.28	0.27
B-210	U-1	65-67	Top	Moist, dark gray clay	120.8	28.3	94.2	0.40	0.38	0.40	0.39
			Middle	Moist, dark gray clay	123.6	27.8	96.7	0.35	0.33	0.38	0.35
			Bottom	Moist, dark gray clay	124.6	25.2	99.5	0.30	0.32	0.35	0.32

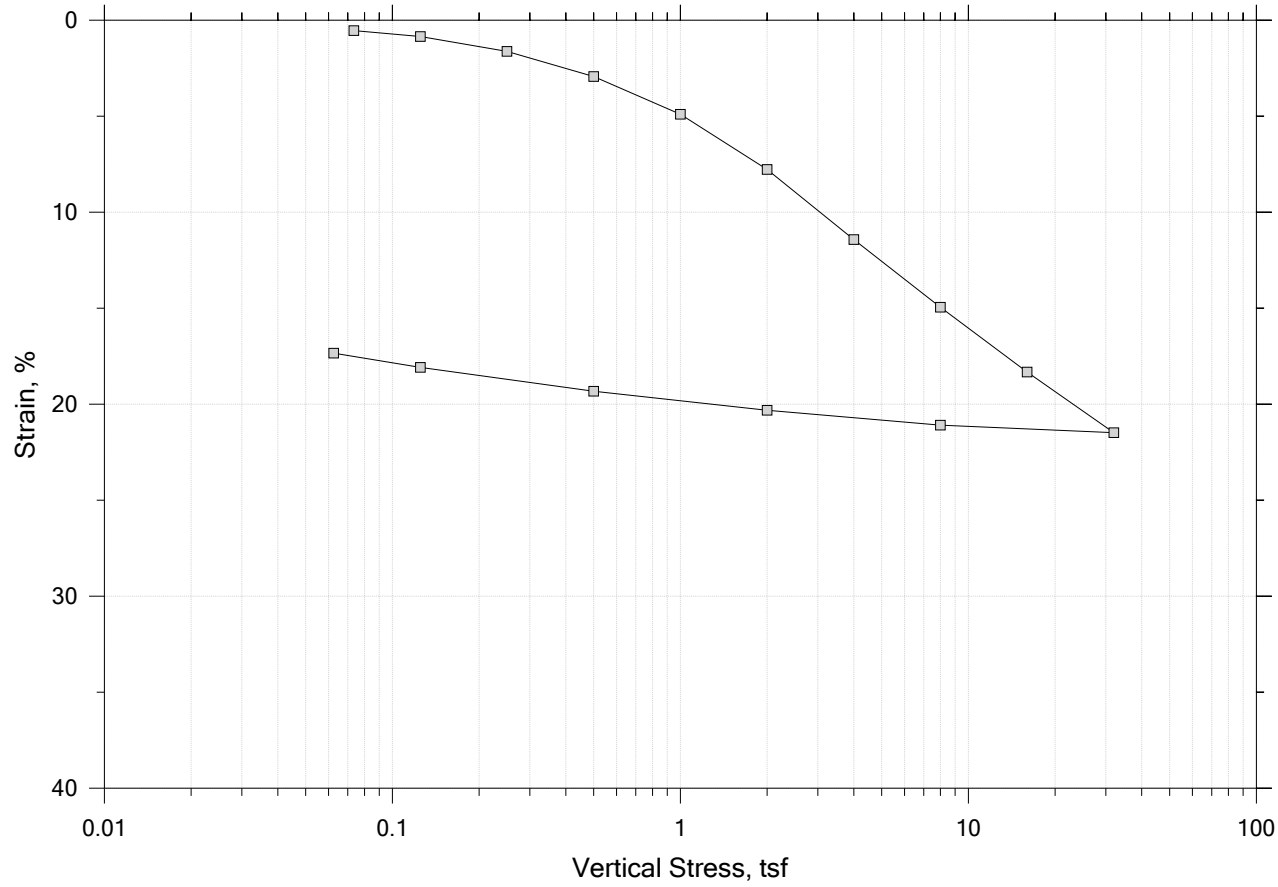
Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes
Moisture content determined by ASTM D2216 at 110^o C

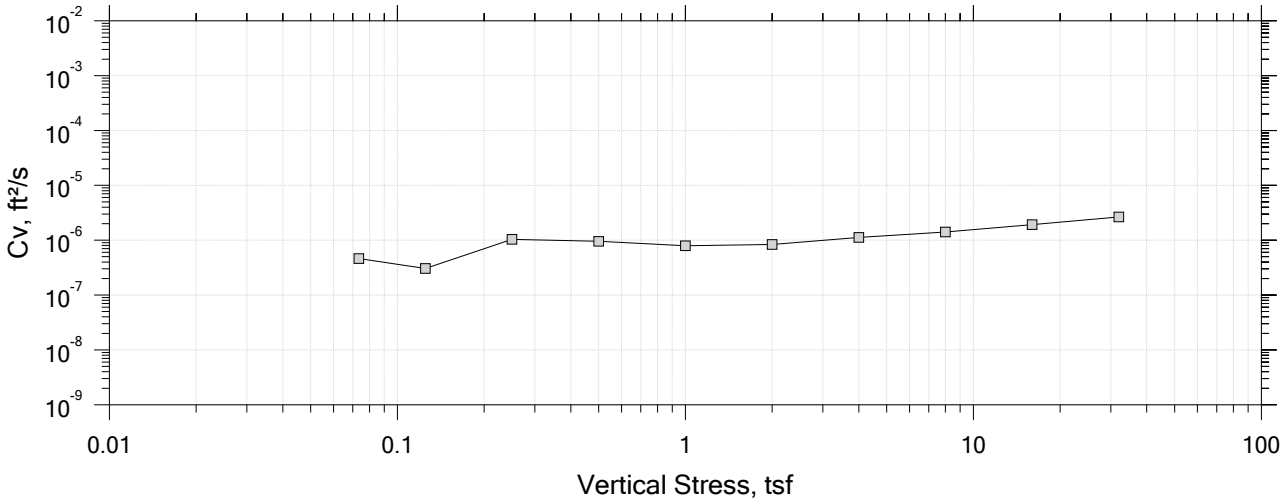
CONSOLIDATION TESTING

B-103 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





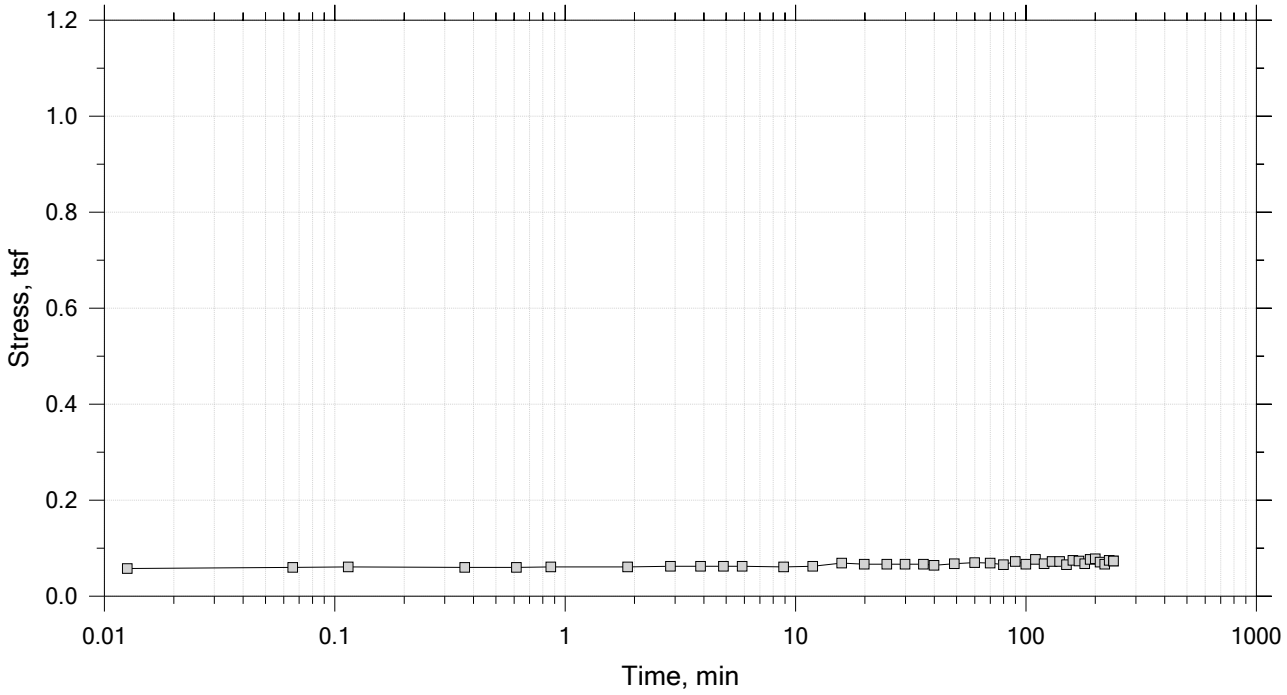
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		
	Displacement at End of Increment		

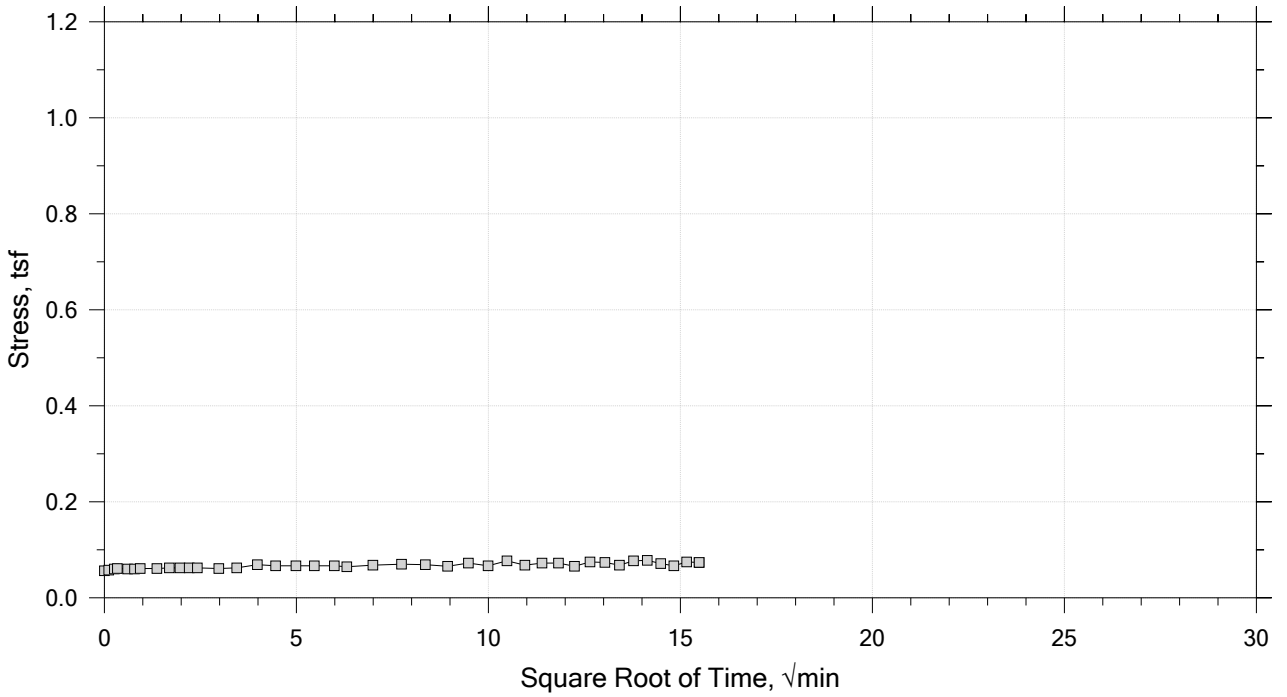
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0734 tsf

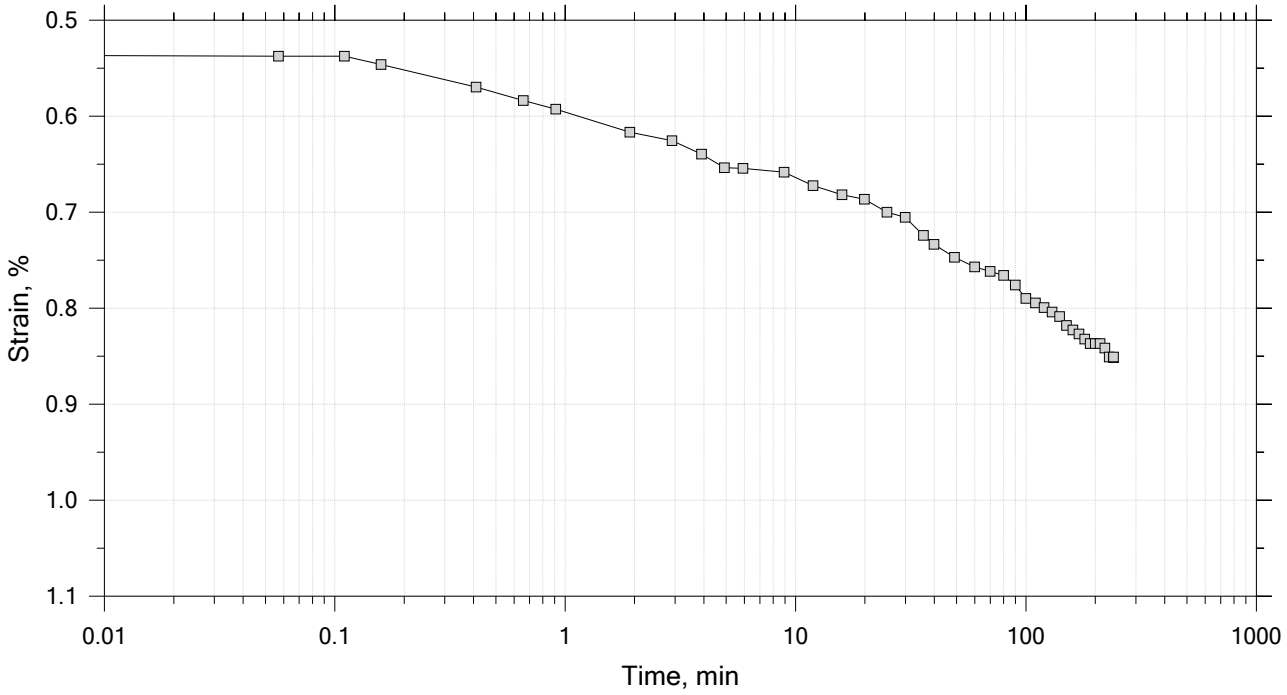


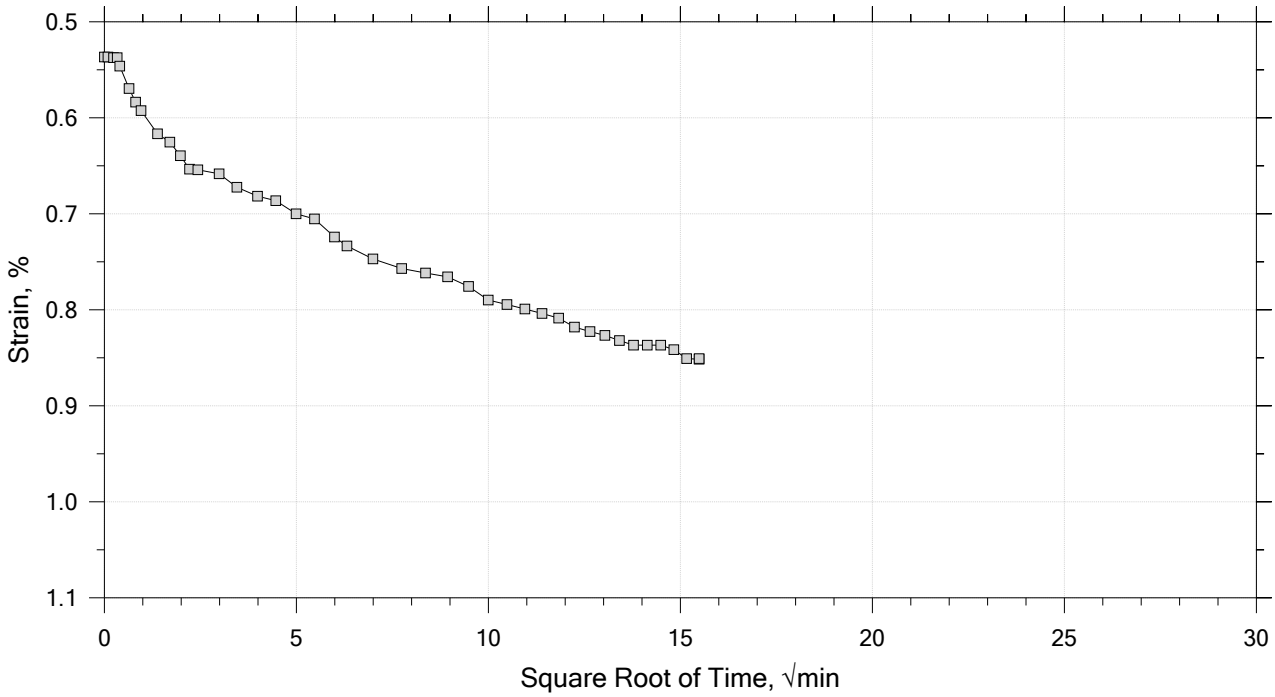


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

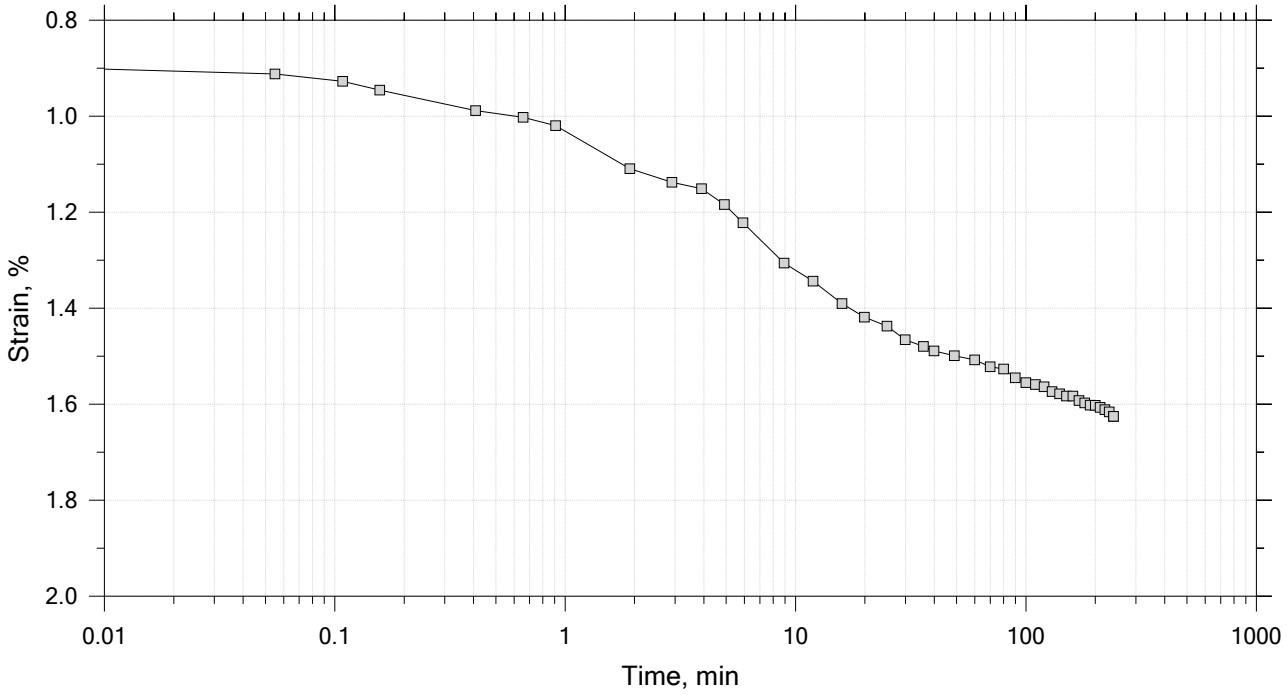


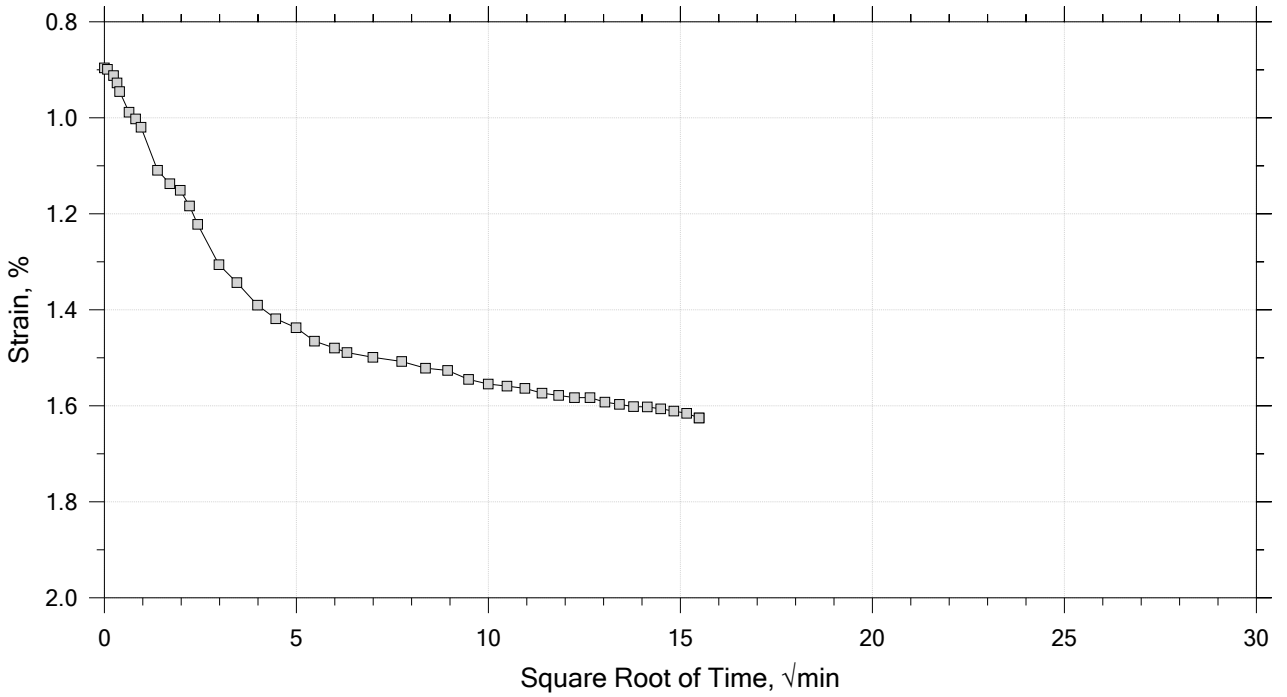


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





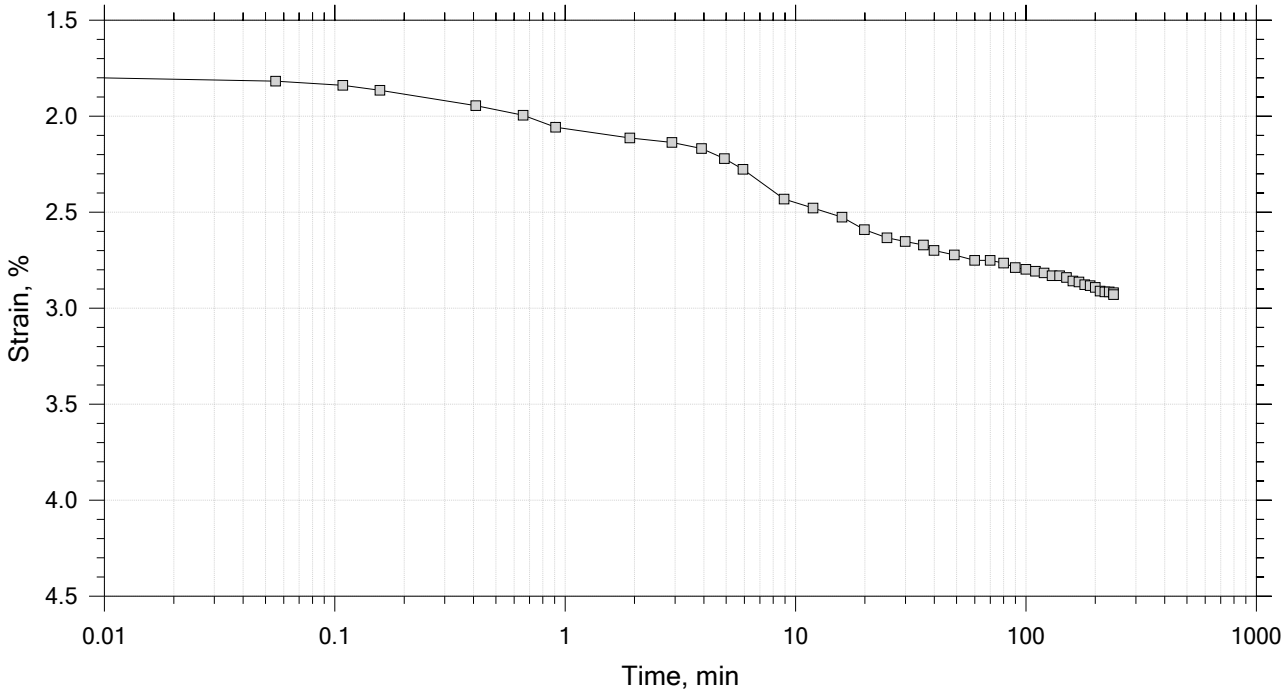
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-103	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
Test No.: IP-6B	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System F, Swell Pressure = 0.0734 tsf		

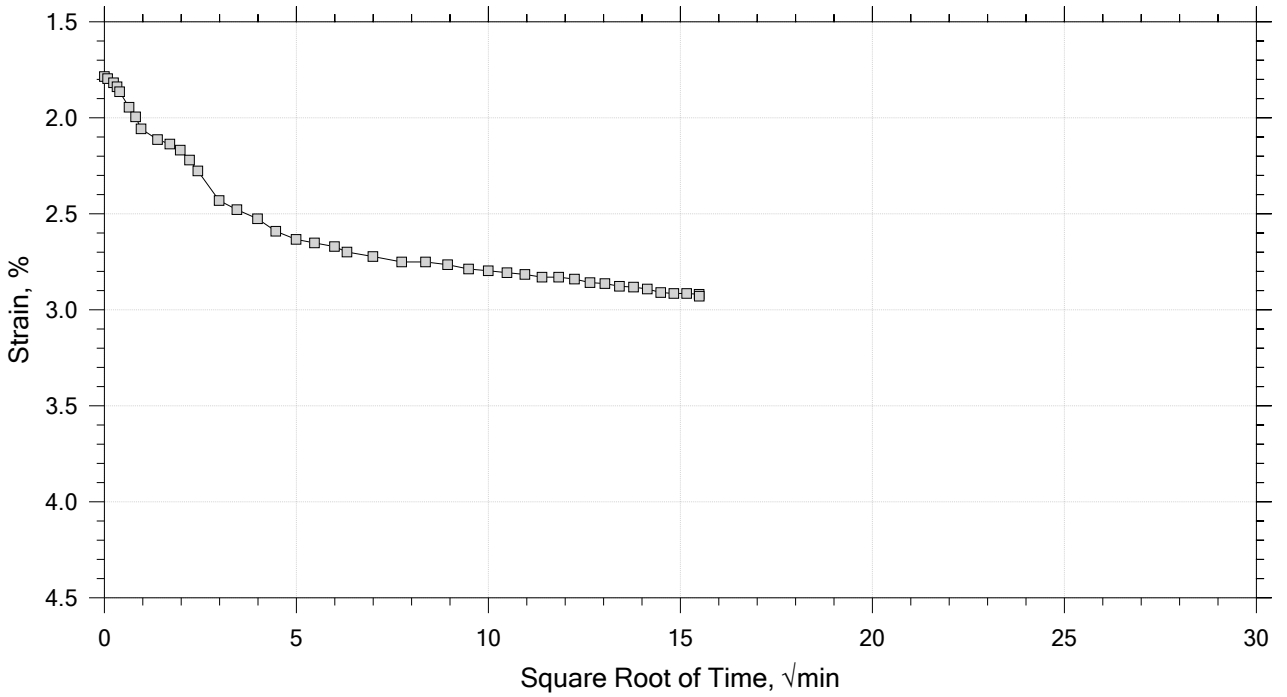
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





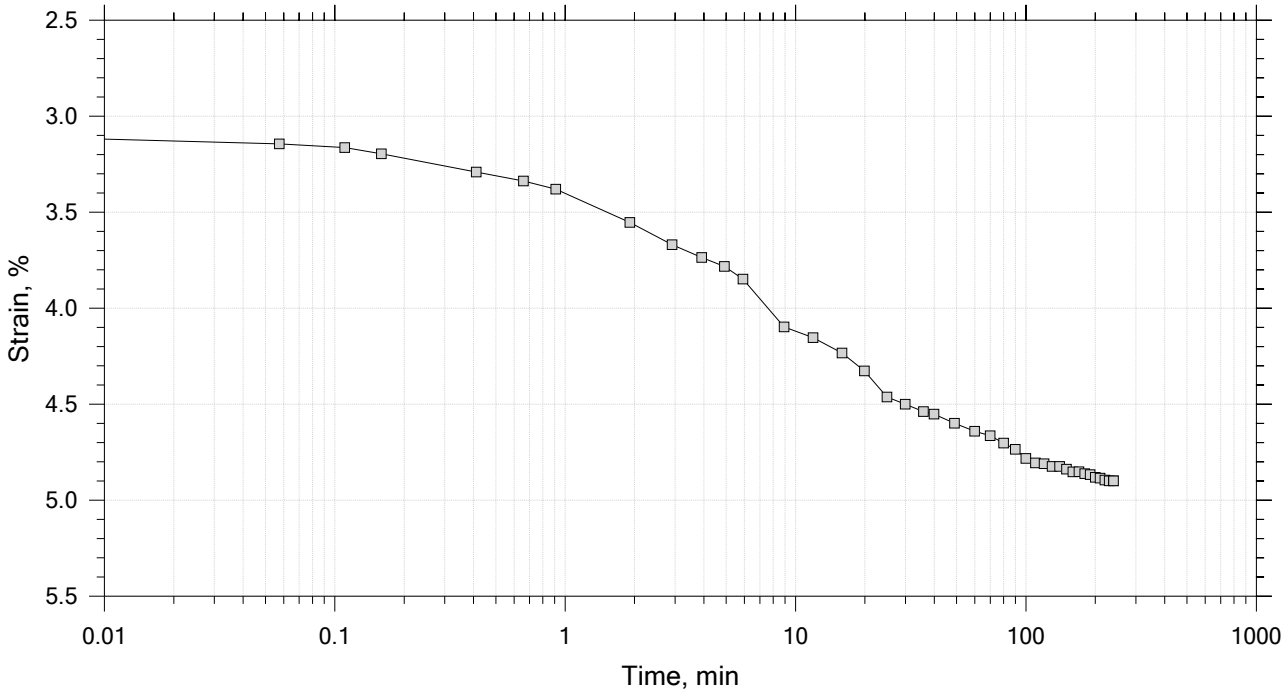
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-103	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
Test No.: IP-6B	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System F, Swell Pressure = 0.0734 tsf		

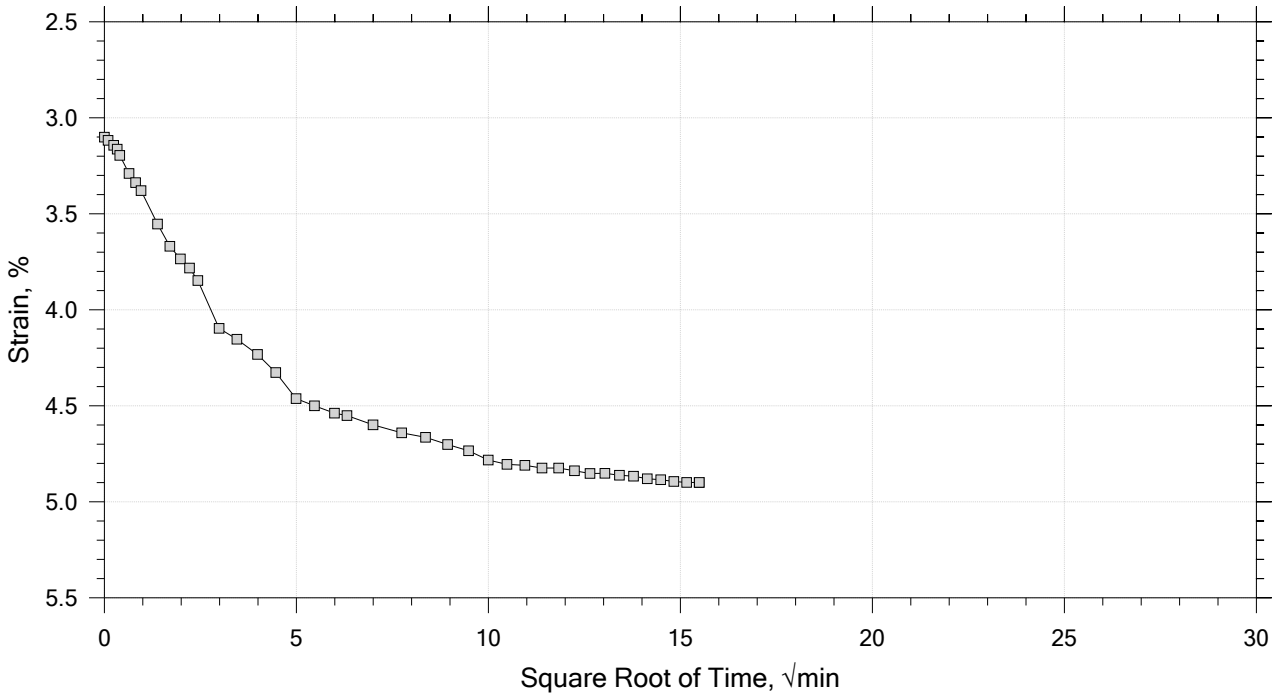
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





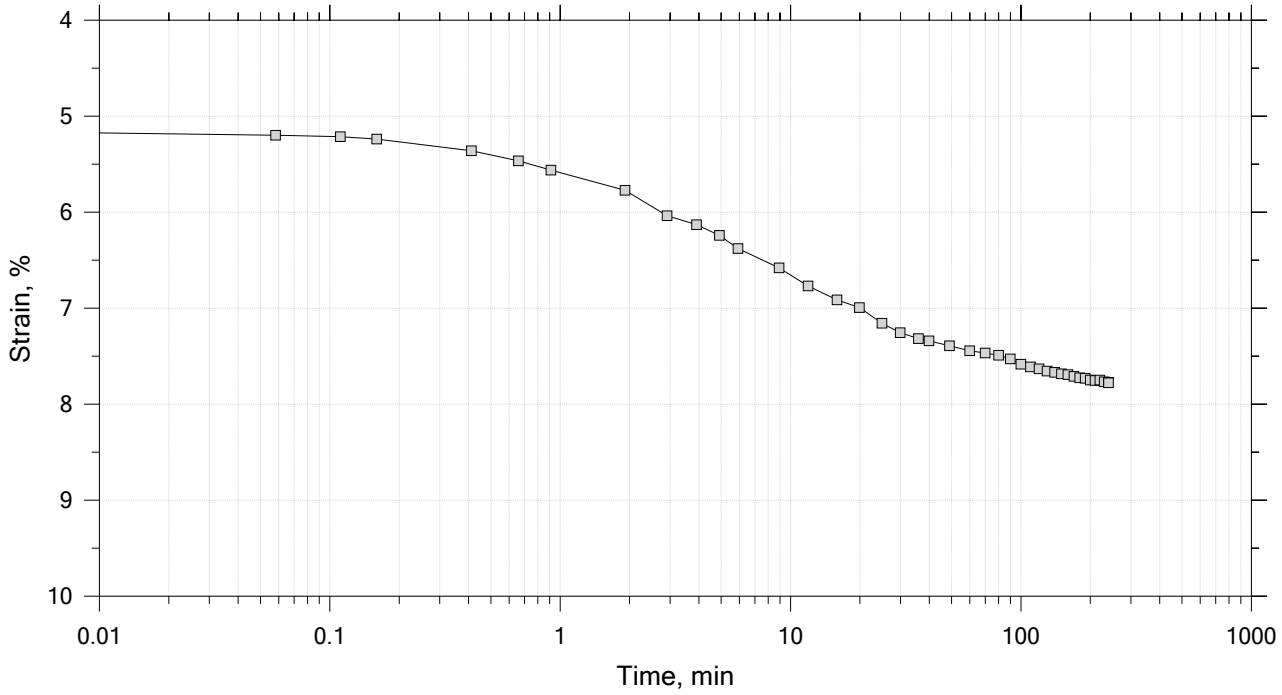
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

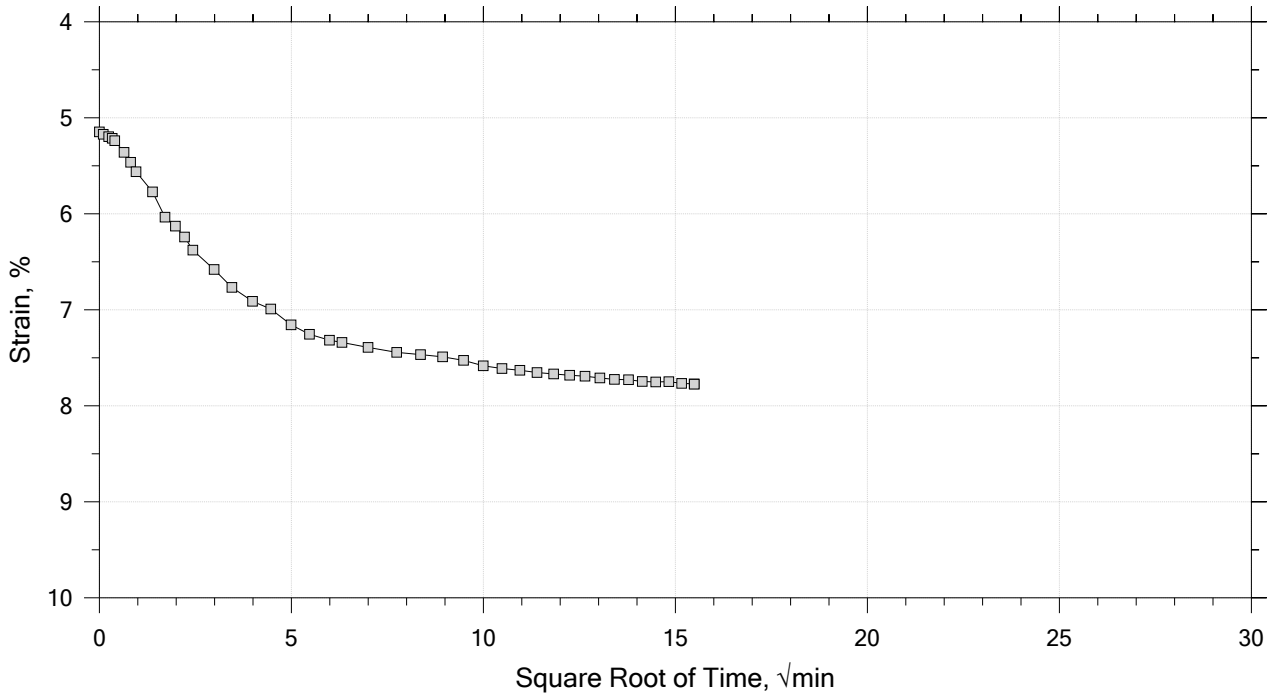
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





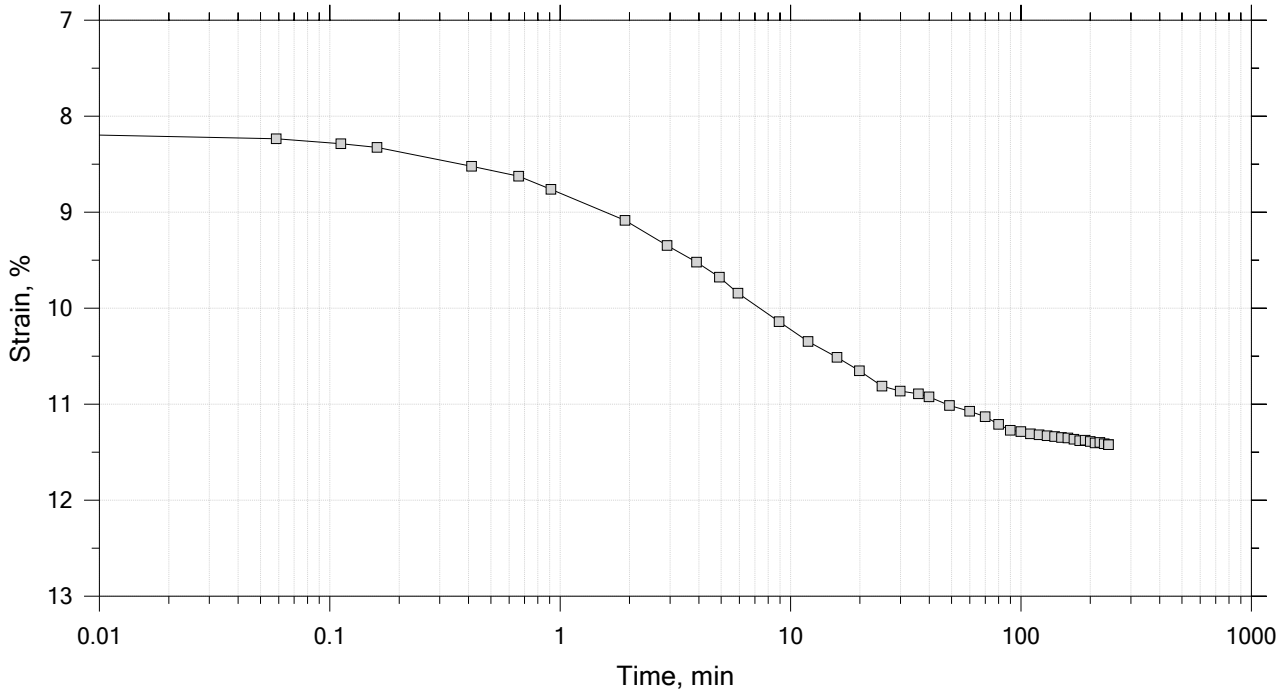
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

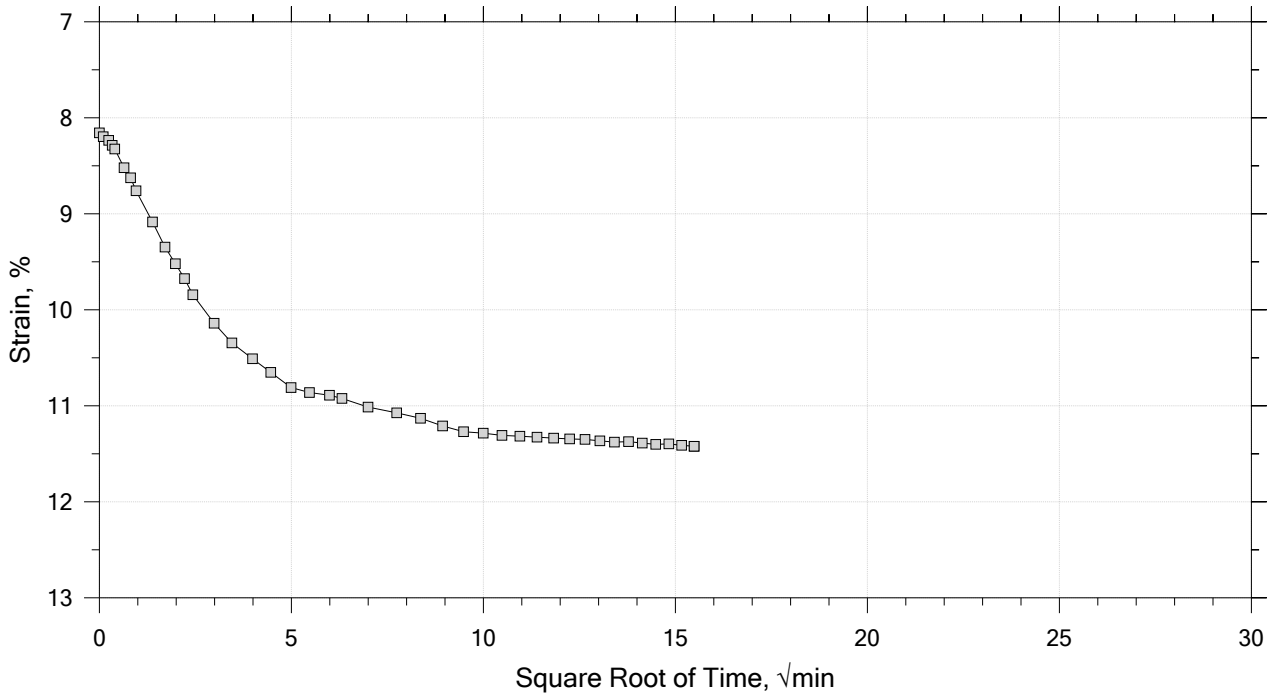
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





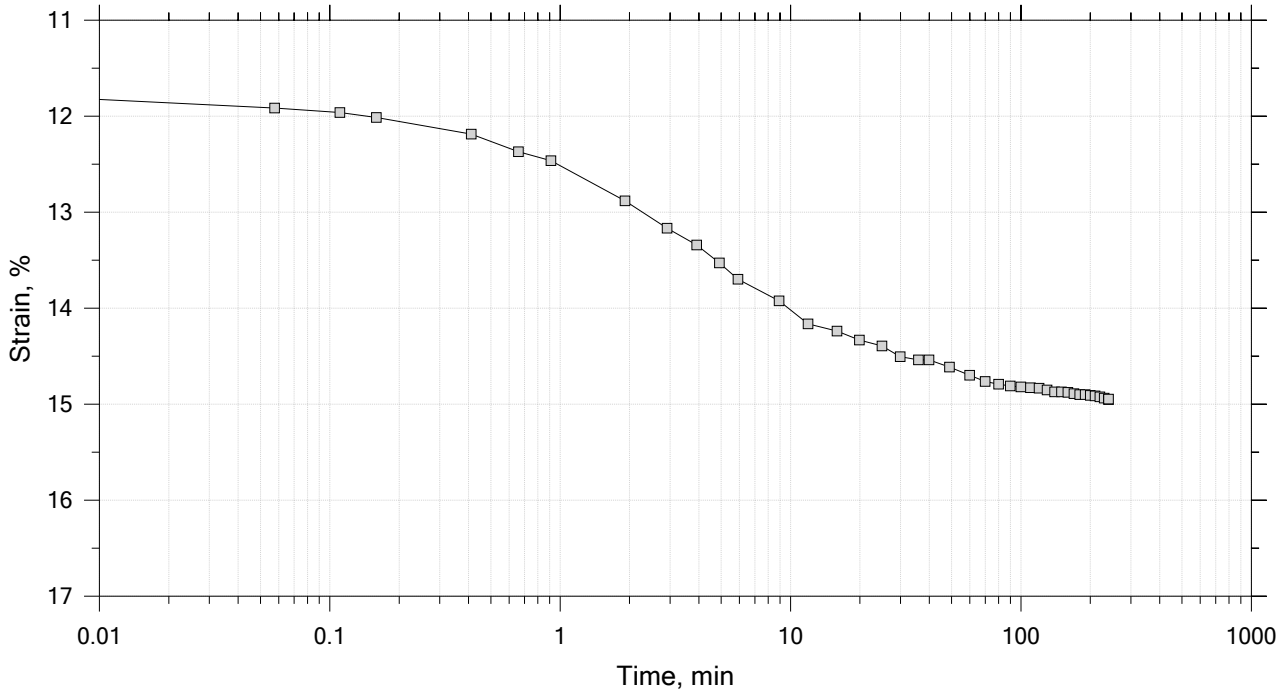
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

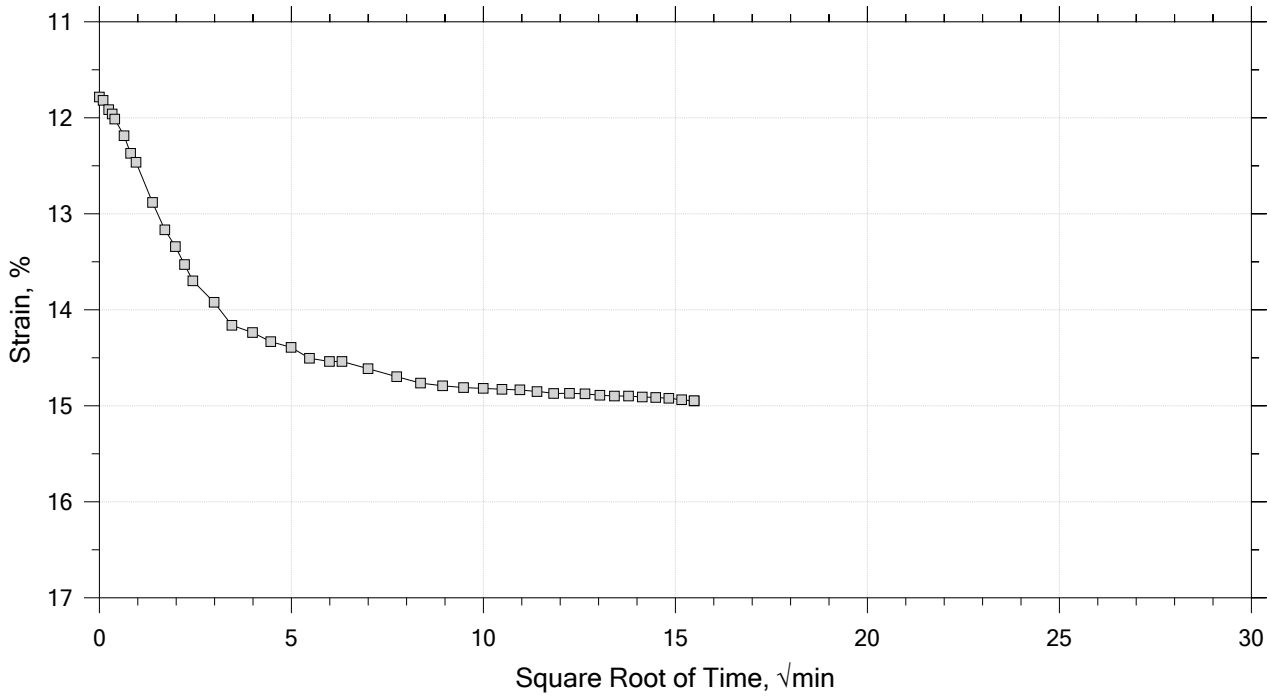
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





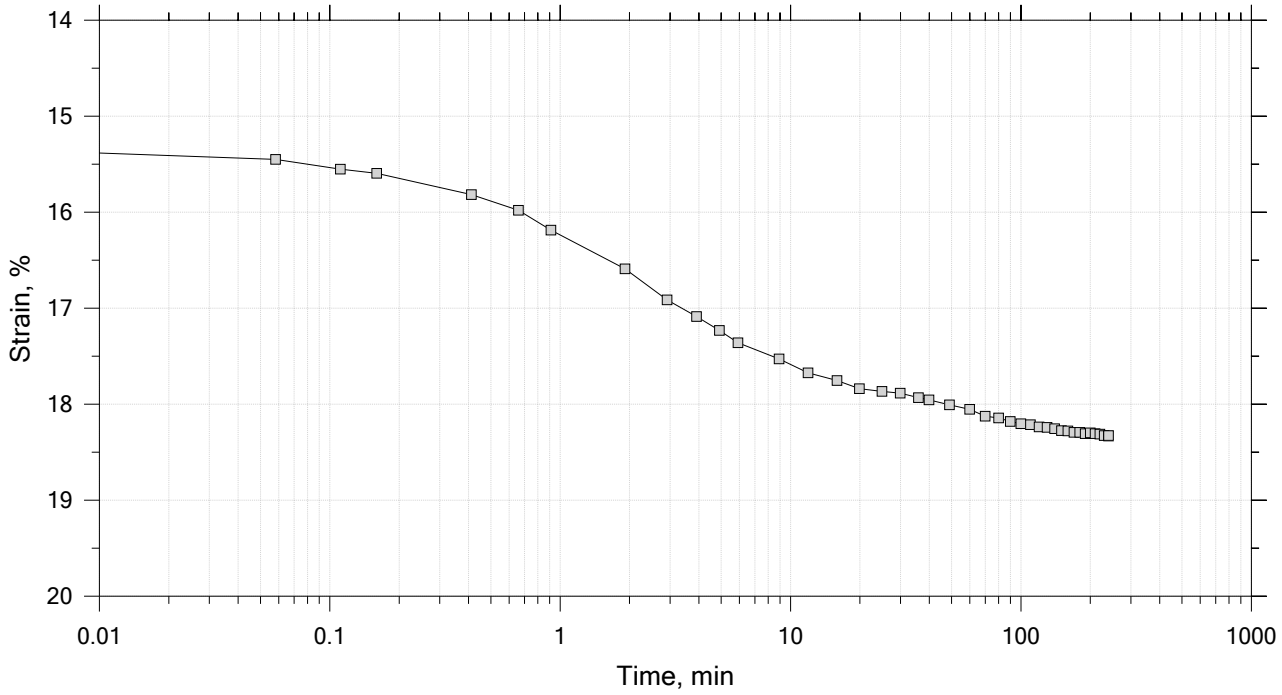
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

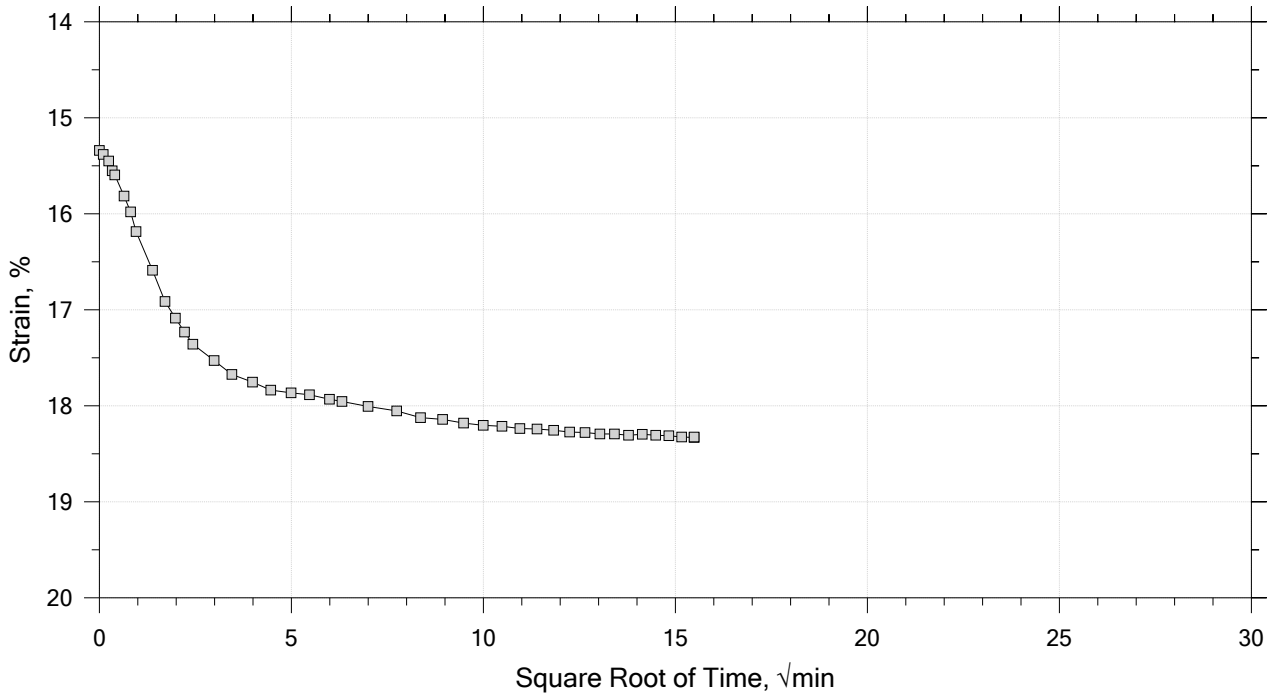
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

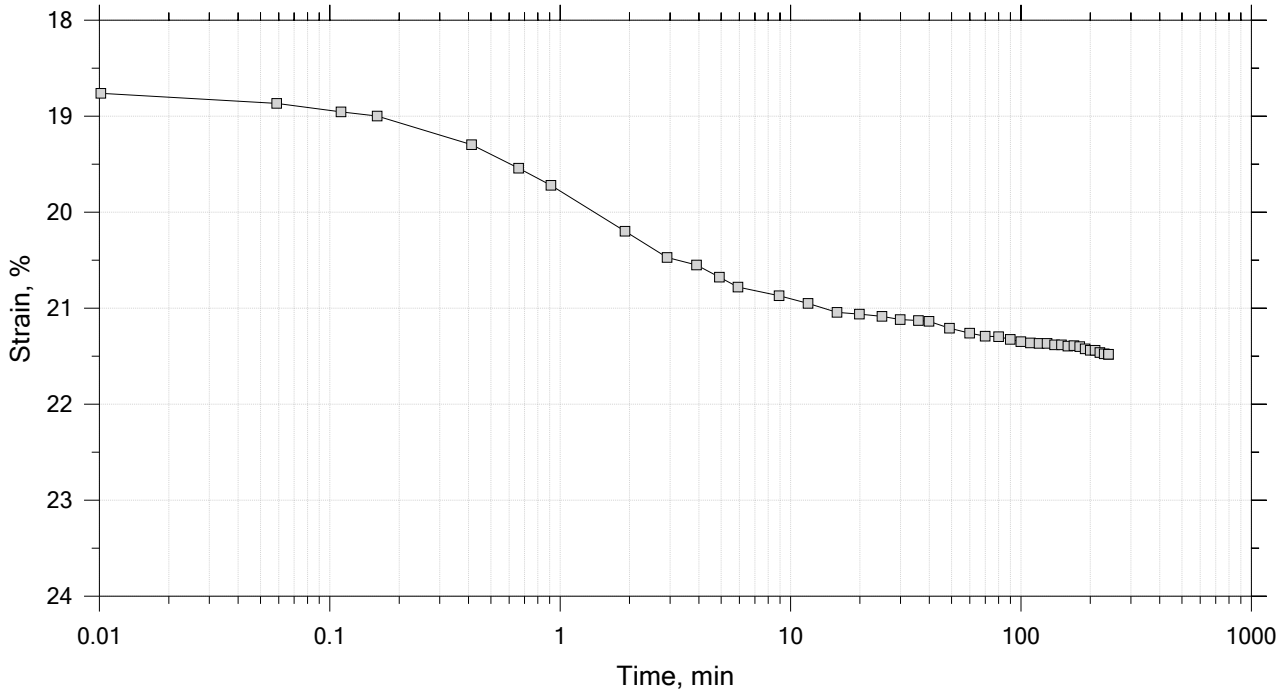


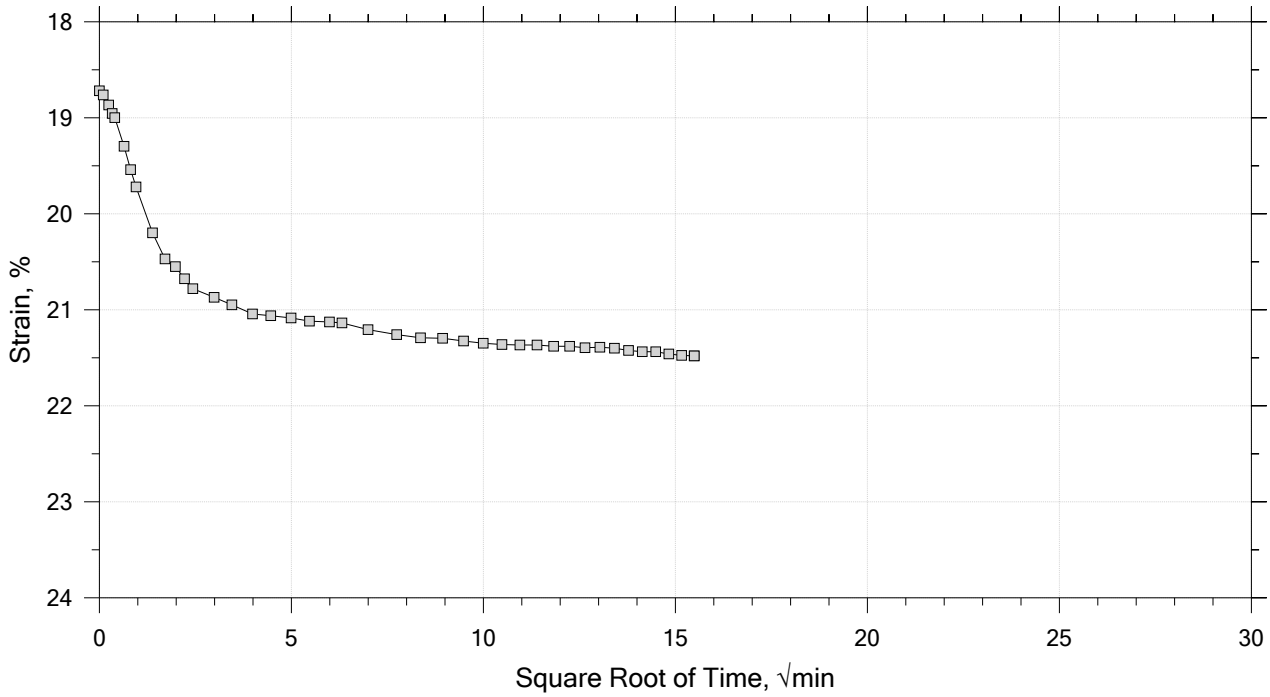


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

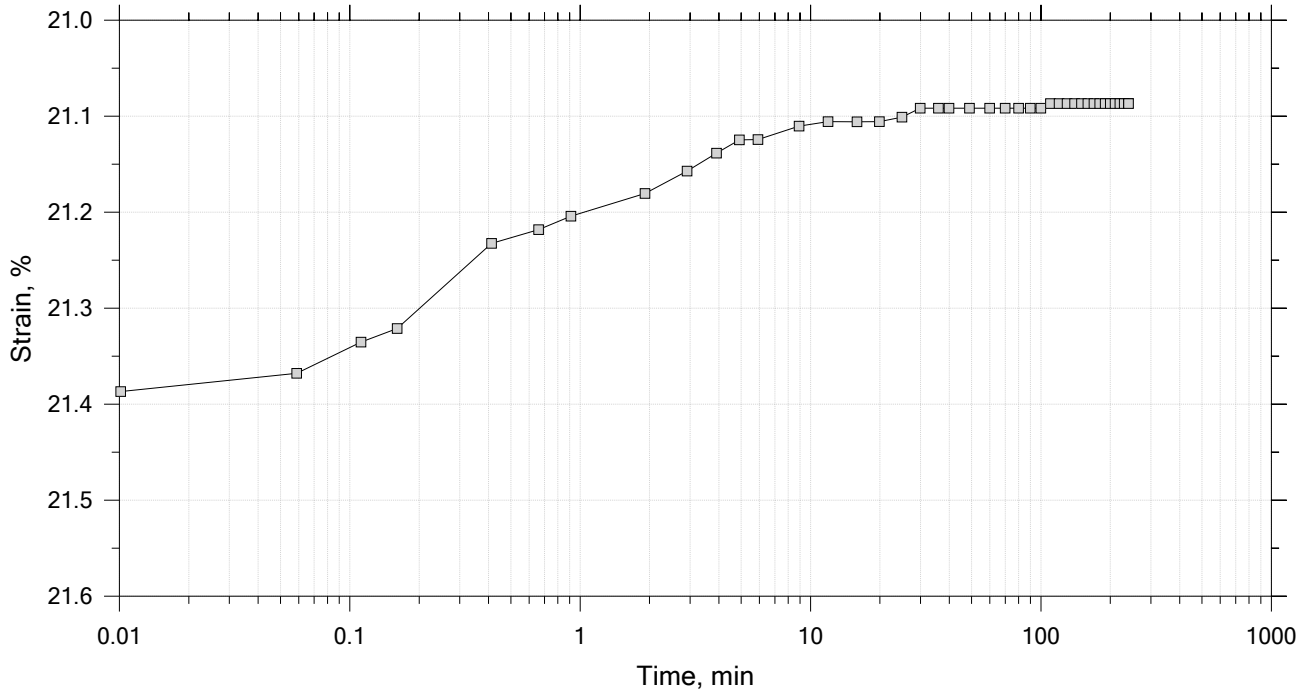


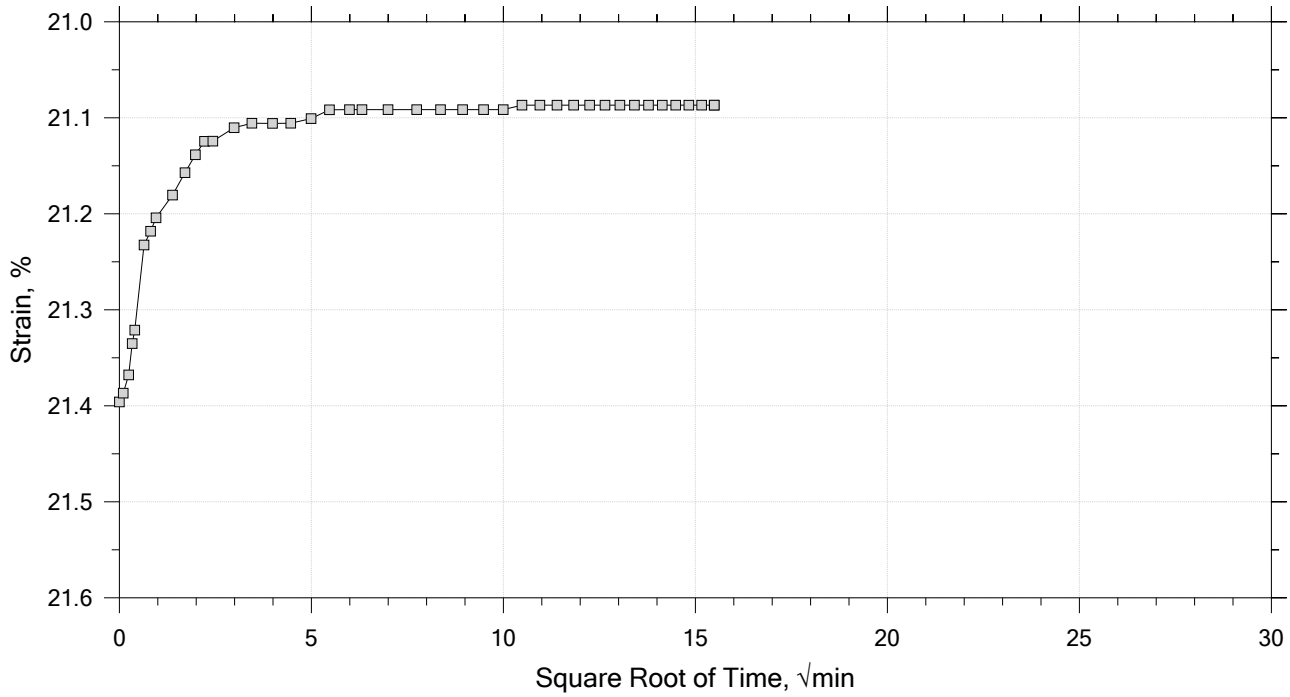


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf

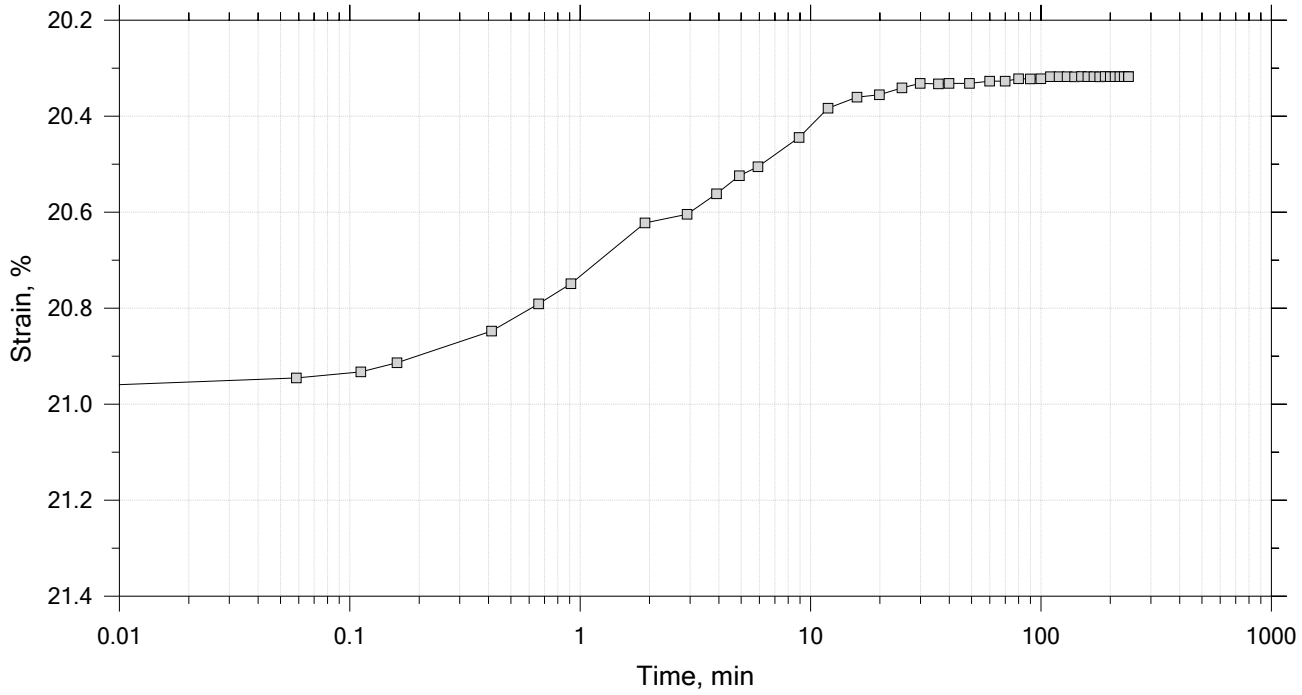


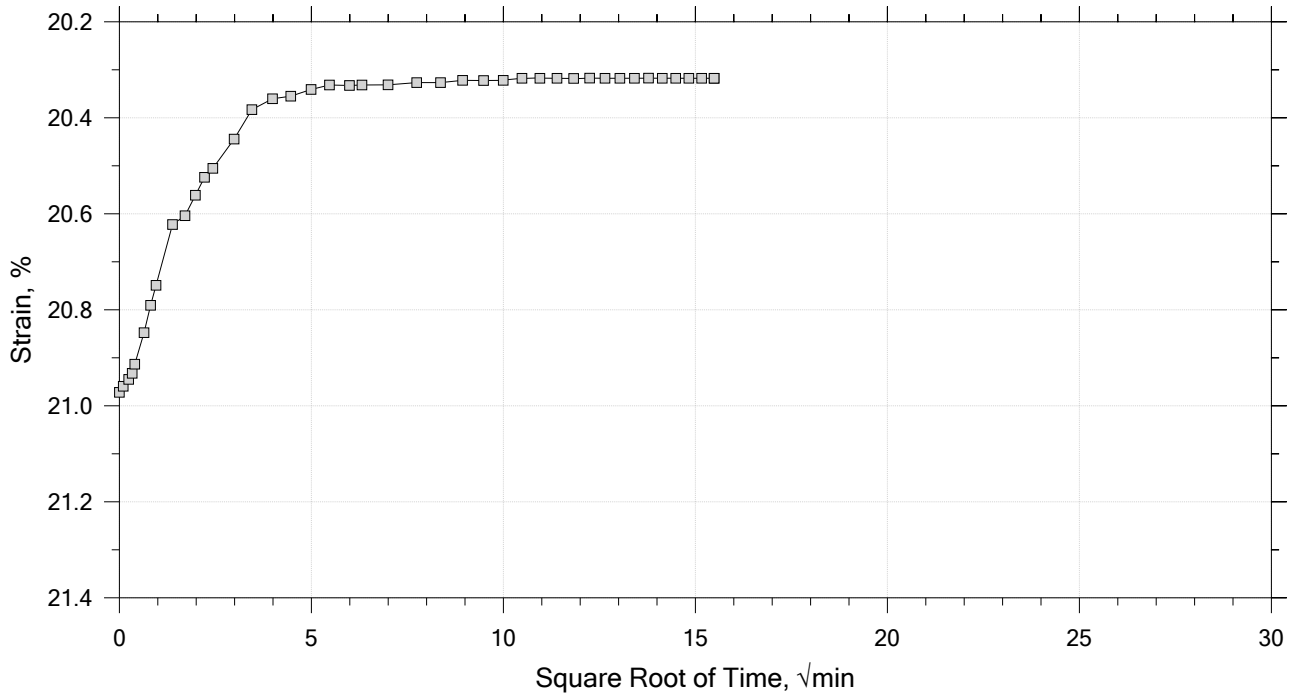


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

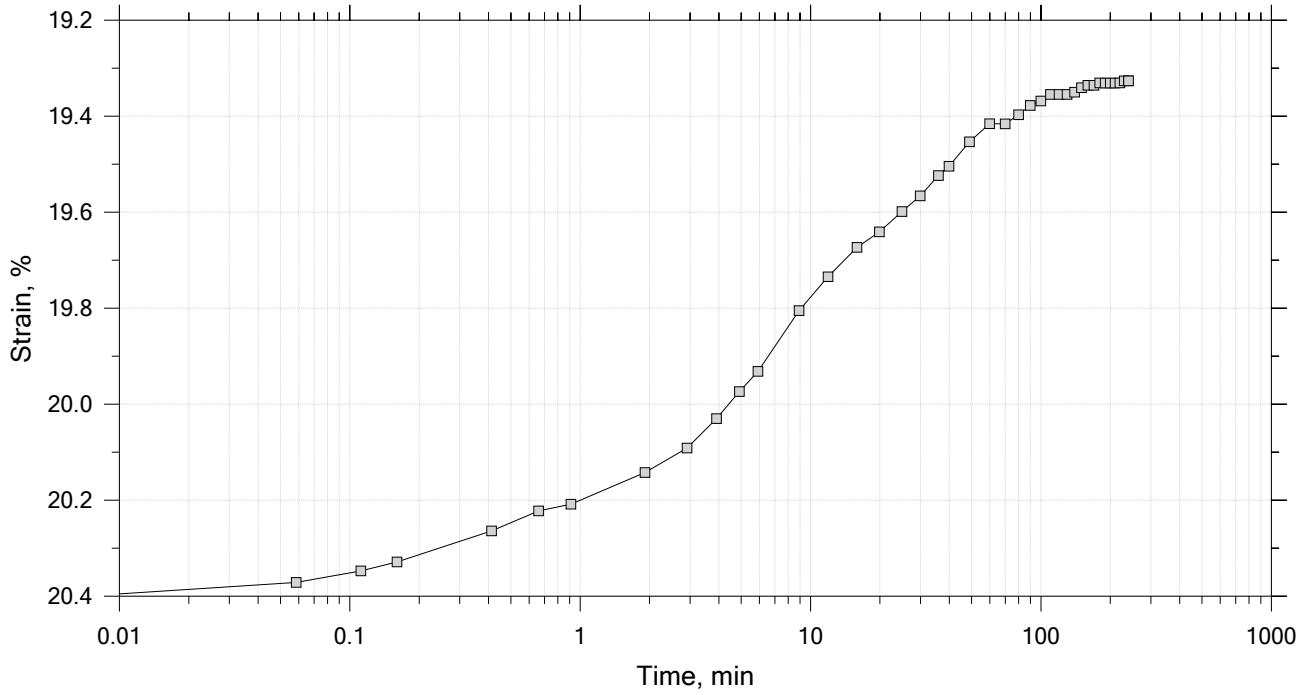


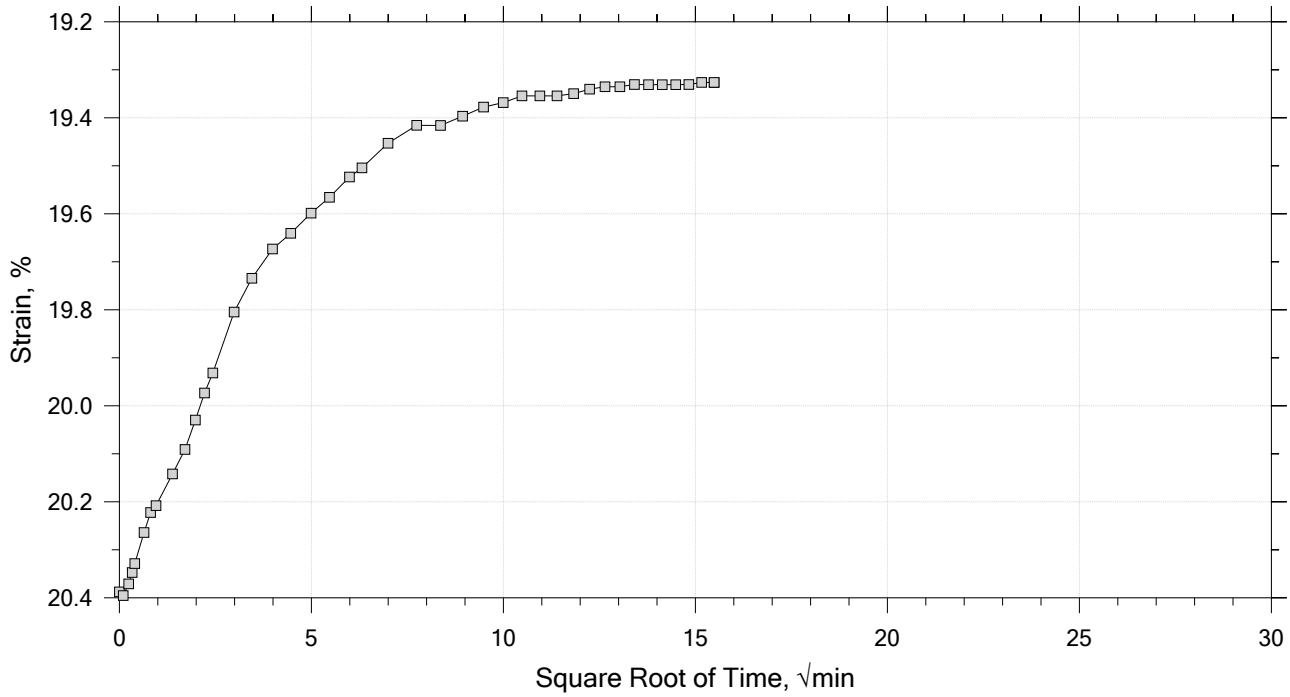


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

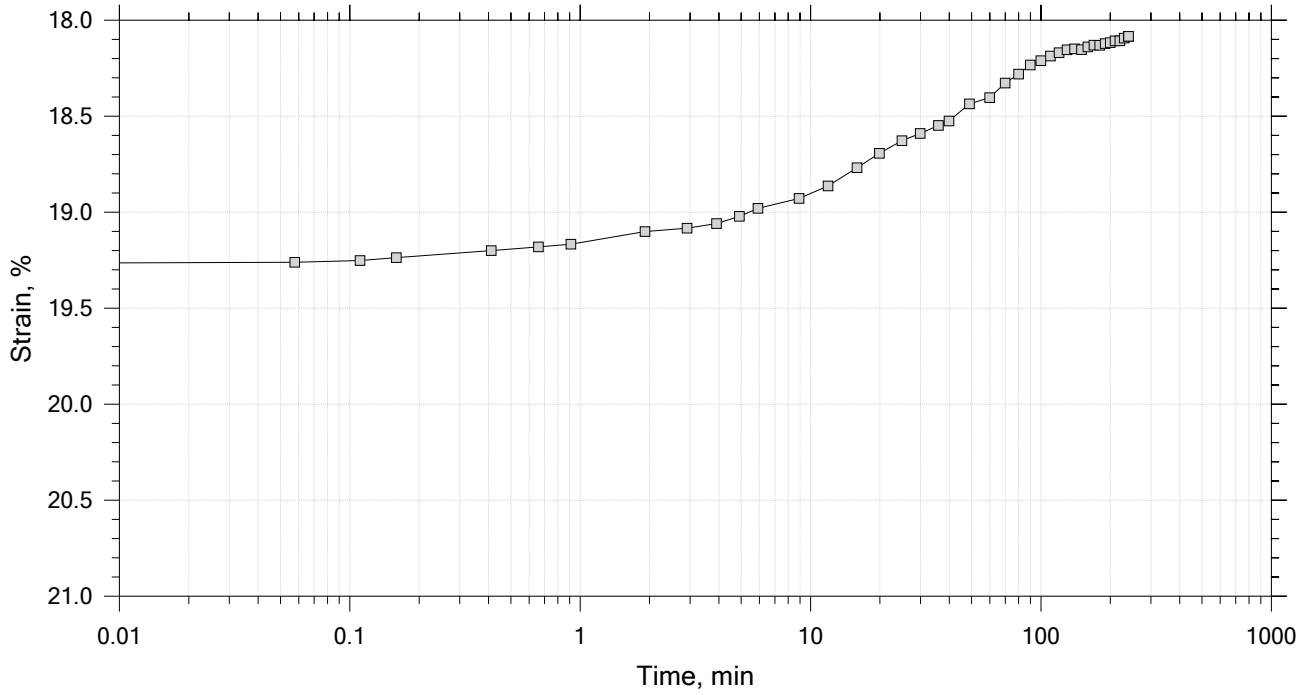


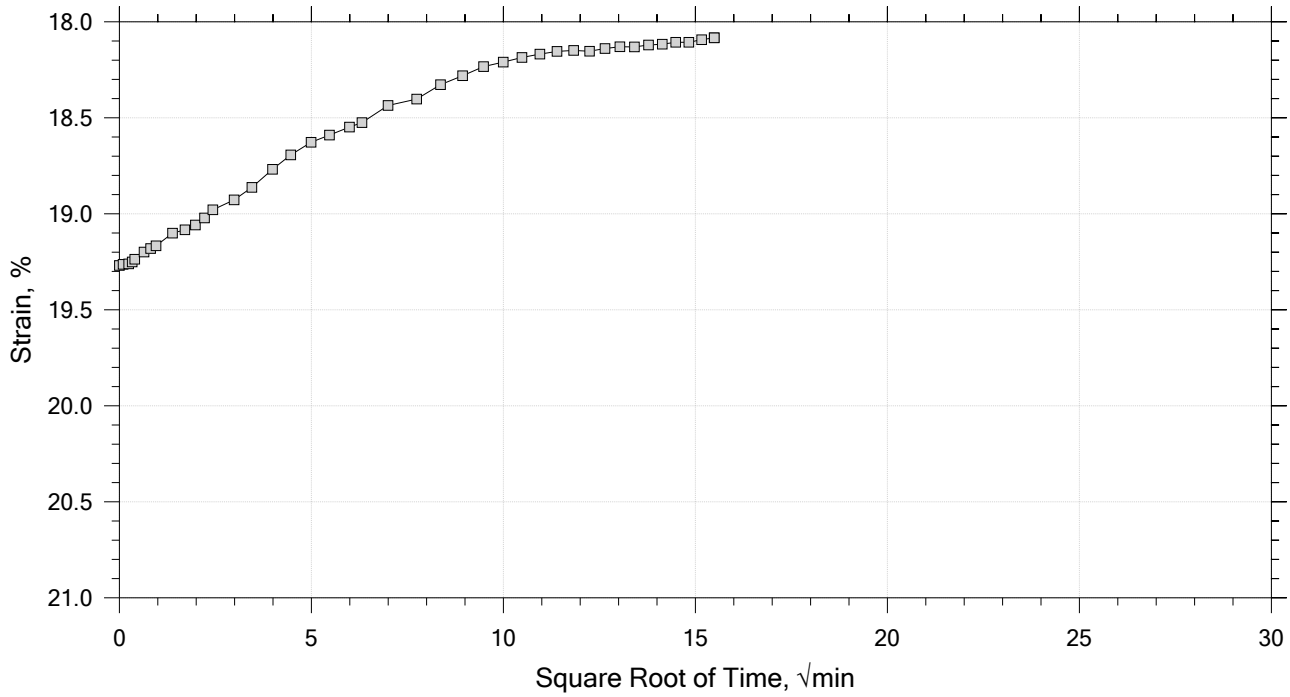


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

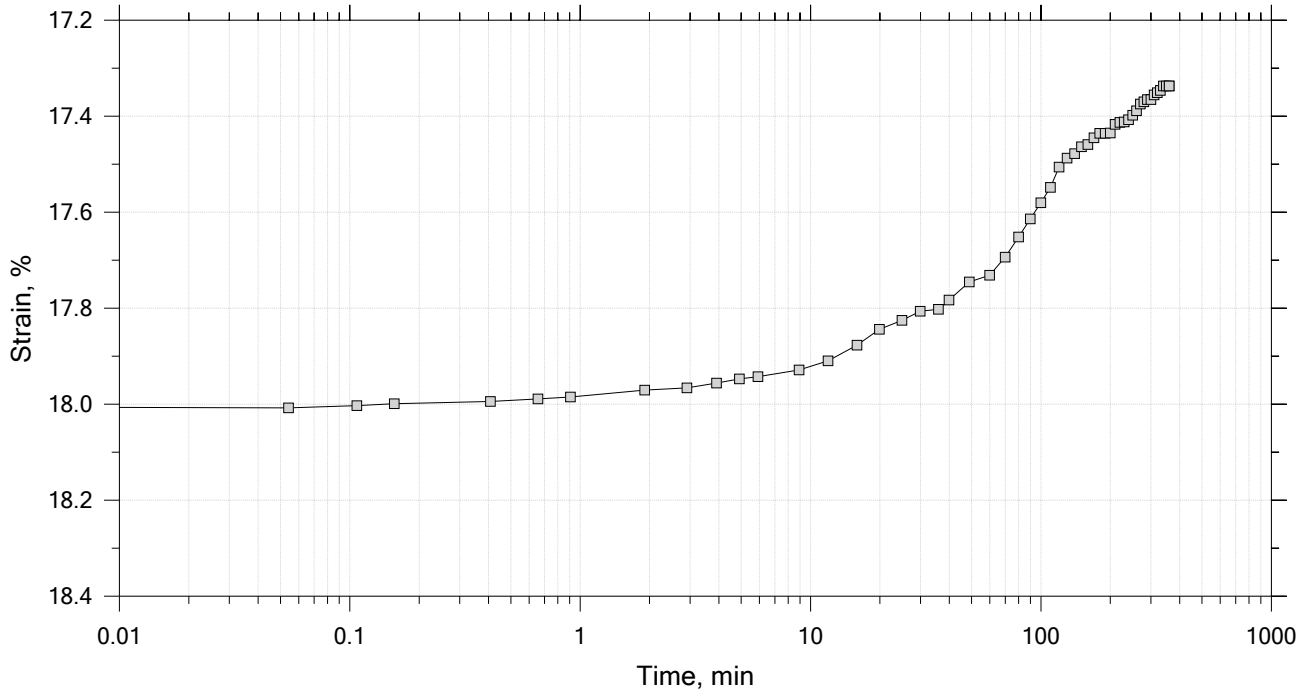


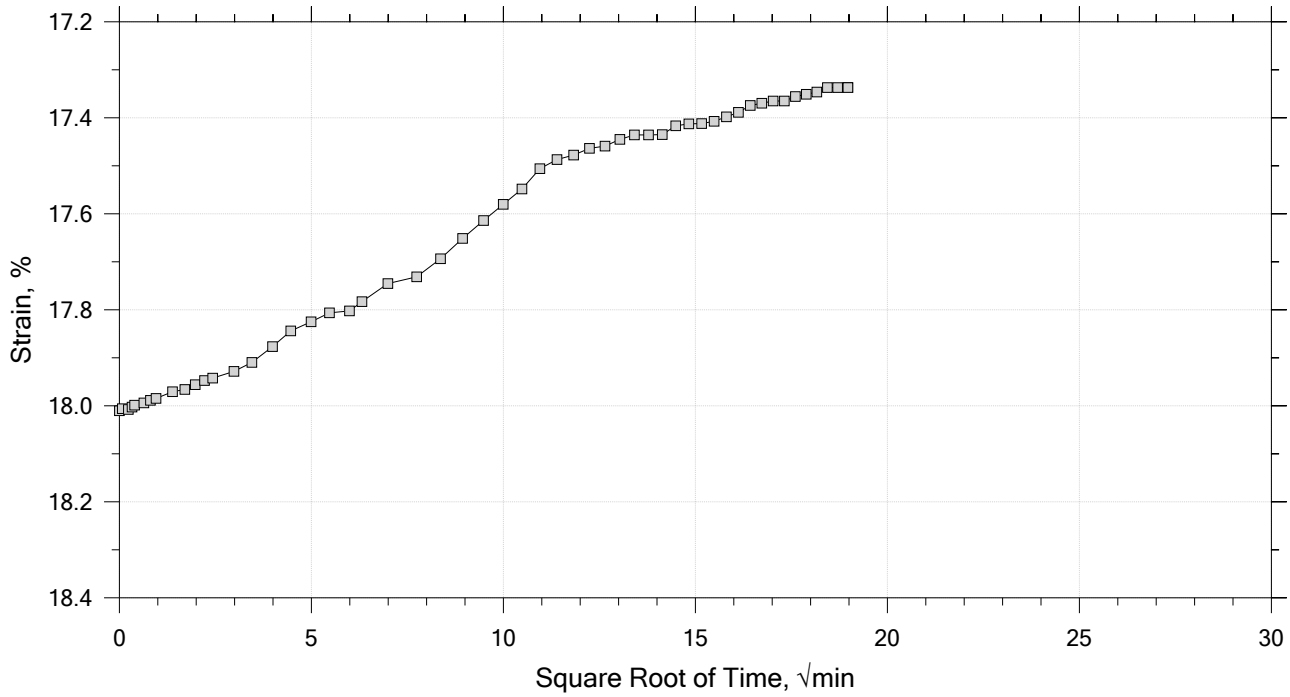


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-103	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
Test No.: IP-6B	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-103	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
Test No.: IP-6B	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 36
Initial Height: 1.00 in	Initial Void Ratio: 0.829	Plastic Limit: 20
Final Height: 0.82 in	Final Void Ratio: 0.5	Plasticity Index: 16

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D1807	RING		C-2235
Mass Container, gm	8.3	107.98	107.98	9.42
Mass Container + Wet Soil, gm	196.41	263.07	250.65	151.47
Mass Container + Dry Soil, gm	152.08	228.67	228.67	129.59
Mass Dry Soil, gm	143.78	120.69	120.69	120.17
Water Content, %	30.83	28.50	18.21	18.21
Void Ratio	---	0.83	0.50	---
Degree of Saturation, %	---	94.35	100.00	---
Dry Unit Weight, pcf	---	93.669	114.23	---

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.

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0734	0.005365	0.819	0.536	0.000	0.00e+00	7.31e-02	0.00e+00	0.00e+00
2	0.125	0.008509	0.813	0.851	0.000	0.00e+00	6.09e-02	0.00e+00	0.00e+00
3	0.250	0.01625	0.799	1.63	5.752	9.67e-07	6.20e-02	1.61e-04	0.00e+00
4	0.500	0.02929	0.775	2.93	6.014	9.05e-07	5.22e-02	1.27e-04	0.00e+00
5	1.00	0.04899	0.739	4.90	6.593	7.98e-07	3.94e-02	8.48e-05	0.00e+00
6	2.00	0.07776	0.687	7.78	6.372	7.85e-07	2.88e-02	6.09e-05	0.00e+00
7	4.00	0.1142	0.620	11.4	4.298	1.08e-06	1.82e-02	5.33e-05	0.00e+00
8	8.00	0.1495	0.555	14.9	2.883	1.49e-06	8.81e-03	3.54e-05	0.00e+00
9	16.0	0.1833	0.494	18.3	1.936	2.05e-06	4.22e-03	2.33e-05	0.00e+00
10	32.0	0.2148	0.436	21.5	1.368	2.67e-06	1.97e-03	1.42e-05	0.00e+00
11	8.00	0.2109	0.443	21.1	0.000	0.00e+00	1.64e-04	0.00e+00	0.00e+00
12	2.00	0.2032	0.457	20.3	0.000	0.00e+00	1.28e-03	0.00e+00	0.00e+00
13	0.500	0.1933	0.475	19.3	4.911	7.46e-07	6.61e-03	1.33e-05	0.00e+00
14	0.125	0.1808	0.498	18.1	0.000	0.00e+00	3.31e-02	0.00e+00	0.00e+00
15	0.0625	0.1734	0.512	17.3	73.228	5.27e-08	1.19e-01	1.70e-05	0.00e+00

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

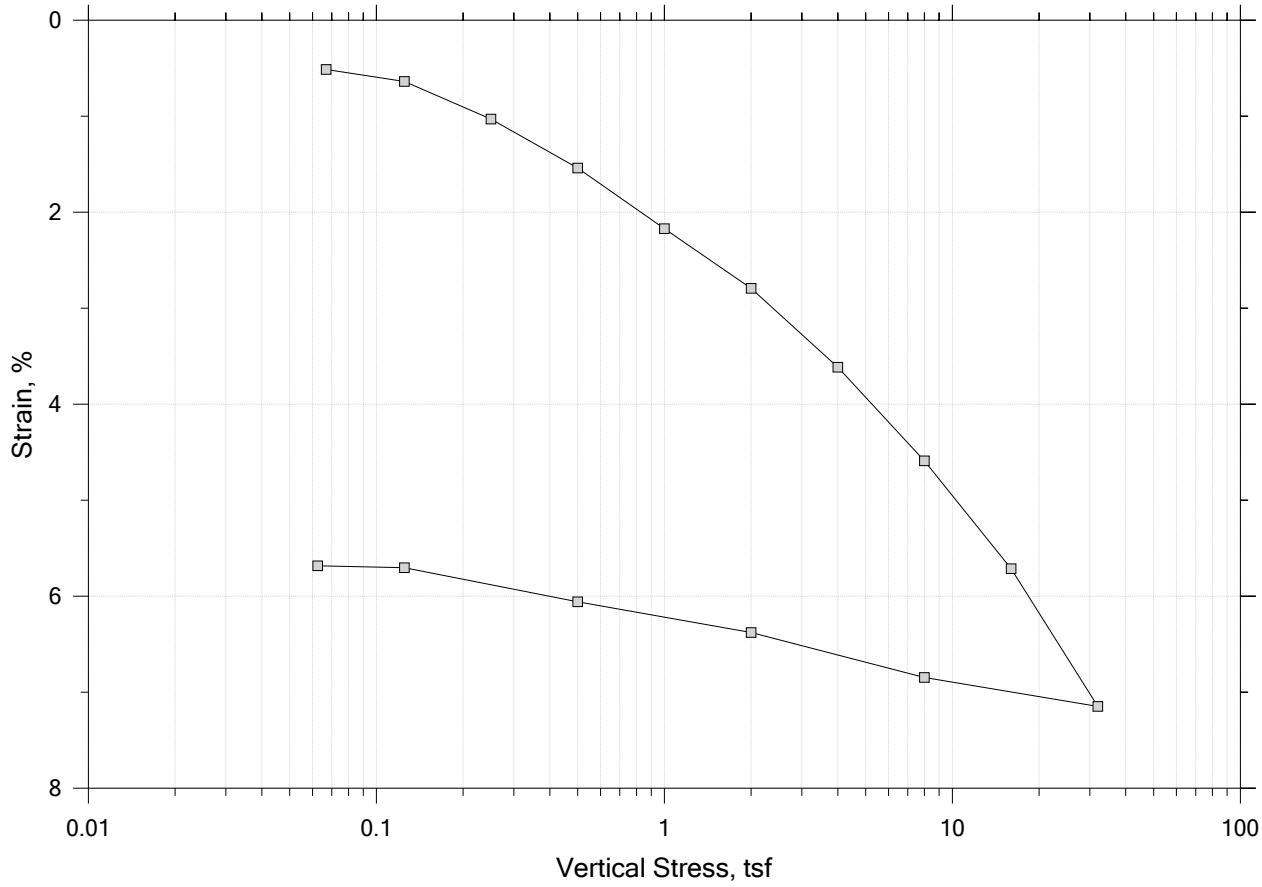
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0734	0.005365	0.819	0.536	51.875	4.70e-07	7.31e-02	9.27e-05
2	0.125	0.008509	0.813	0.851	67.442	3.59e-07	6.09e-02	5.90e-05
3	0.250	0.01625	0.799	1.63	19.901	1.20e-06	6.20e-02	2.01e-04
4	0.500	0.02929	0.775	2.93	20.930	1.12e-06	5.22e-02	1.57e-04
5	1.00	0.04899	0.739	4.90	30.224	7.50e-07	3.94e-02	7.97e-05
6	2.00	0.07776	0.687	7.78	26.566	8.10e-07	2.88e-02	6.29e-05
7	4.00	0.1142	0.620	11.4	18.123	1.11e-06	1.82e-02	5.44e-05
8	8.00	0.1495	0.555	14.9	15.075	1.23e-06	8.81e-03	2.92e-05
9	16.0	0.1833	0.494	18.3	10.641	1.60e-06	4.22e-03	1.83e-05
10	32.0	0.2148	0.436	21.5	7.155	2.20e-06	1.97e-03	1.17e-05
11	8.00	0.2109	0.443	21.1	2.998	5.07e-06	1.64e-04	2.24e-06
12	2.00	0.2032	0.457	20.3	9.627	1.60e-06	1.28e-03	5.54e-06
13	0.500	0.1933	0.475	19.3	27.397	5.76e-07	6.61e-03	1.03e-05
14	0.125	0.1808	0.498	18.1	110.989	1.46e-07	3.31e-02	1.31e-05
15	0.0625	0.1734	0.512	17.3	324.936	5.11e-08	1.19e-01	1.65e-05

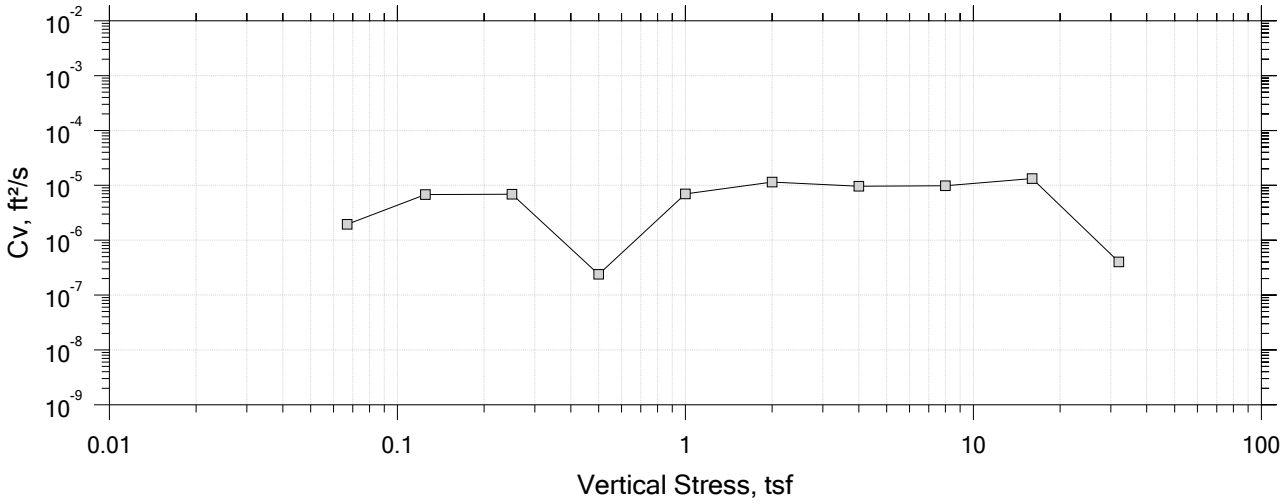
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		
	Displacement at End of Increment		

B-106 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





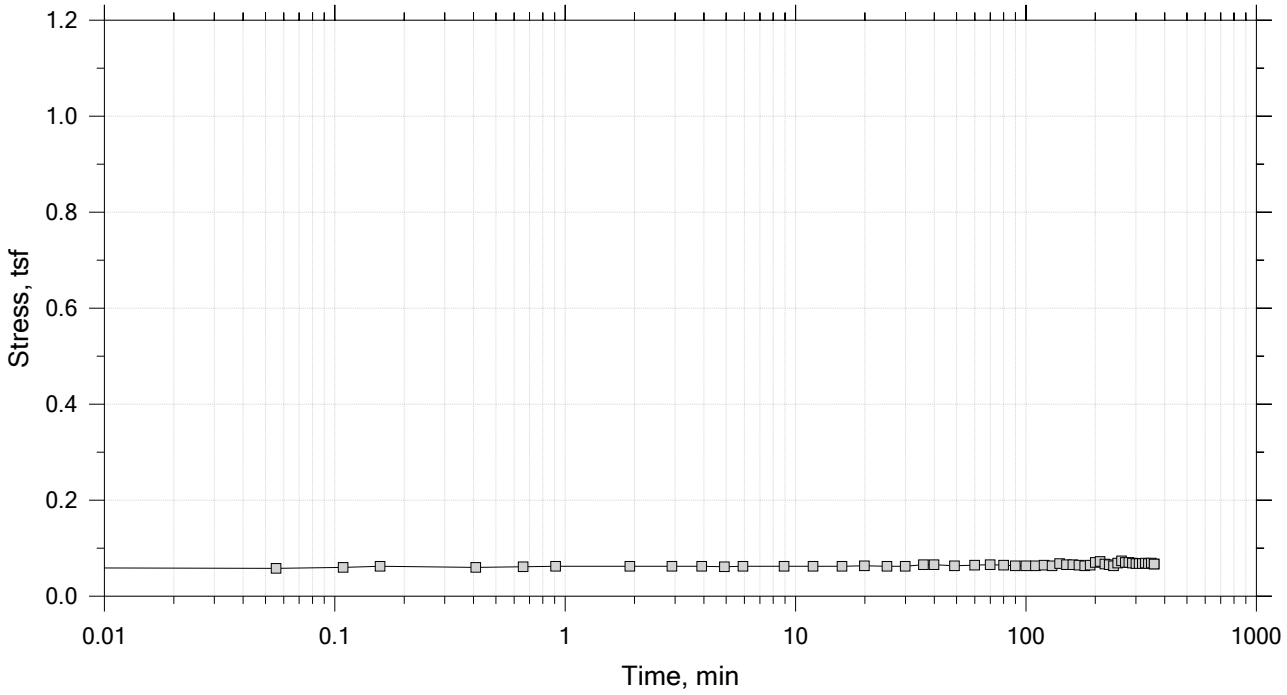
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		
	Displacement at End of Increment		

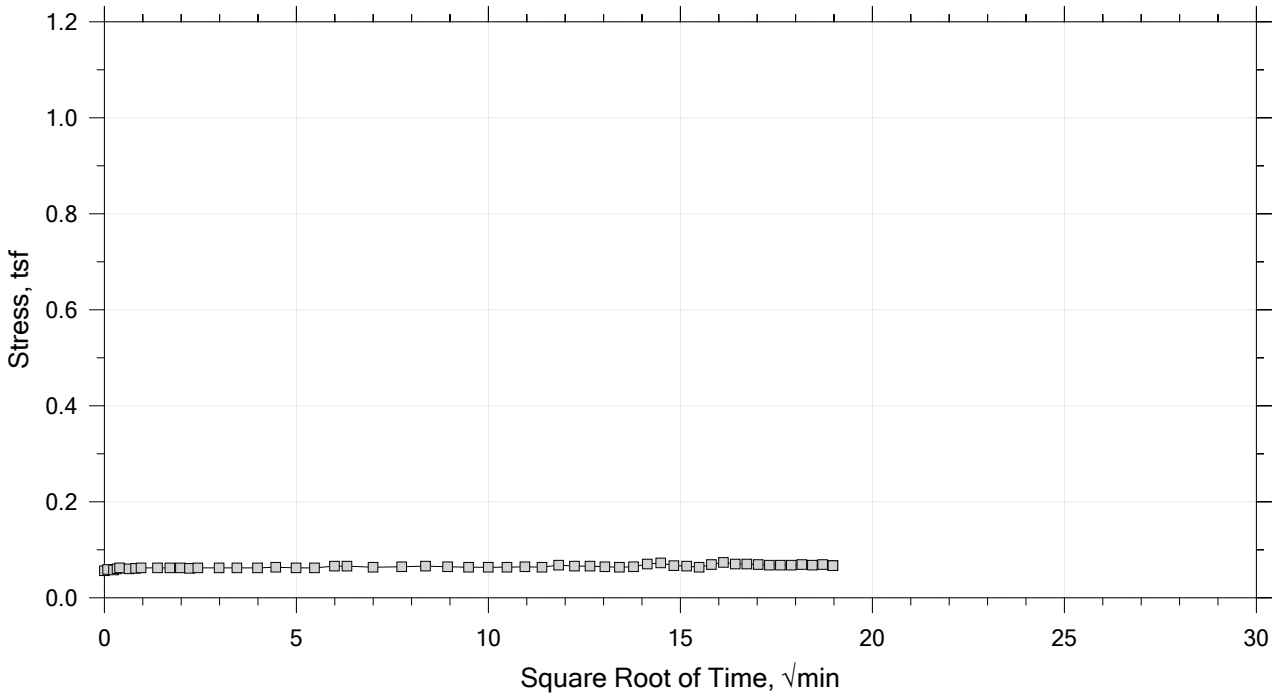
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0669 tsf

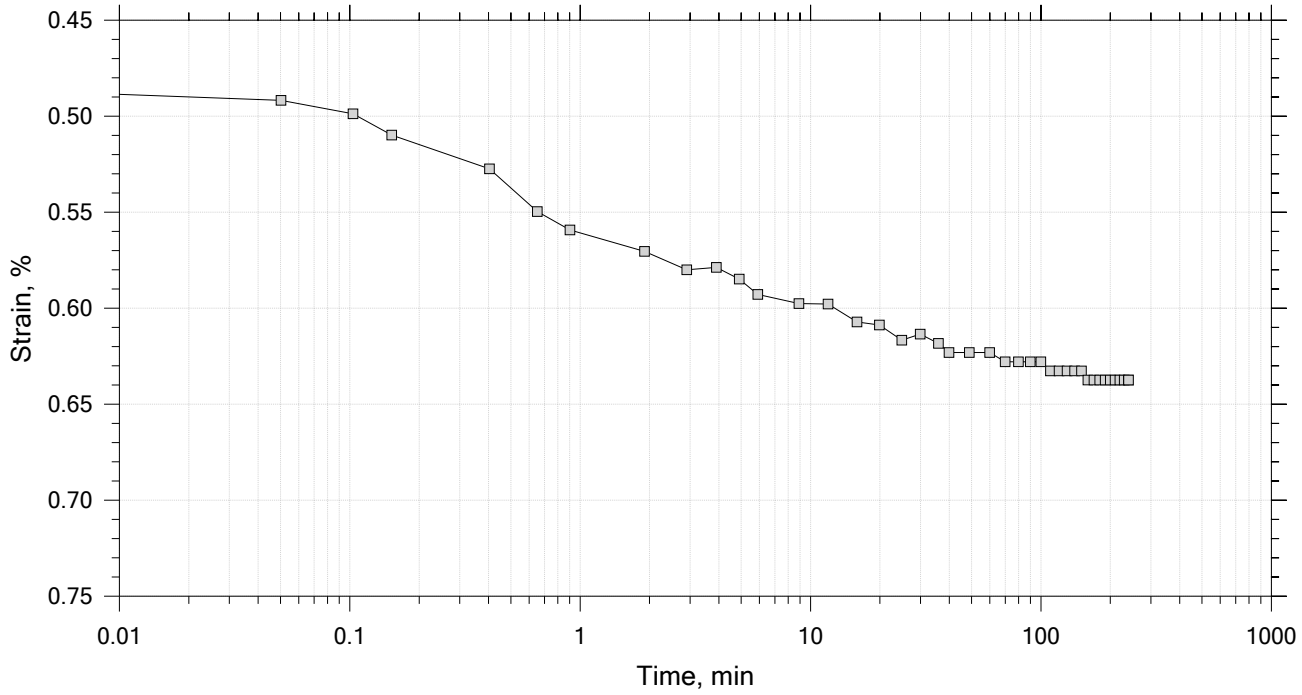


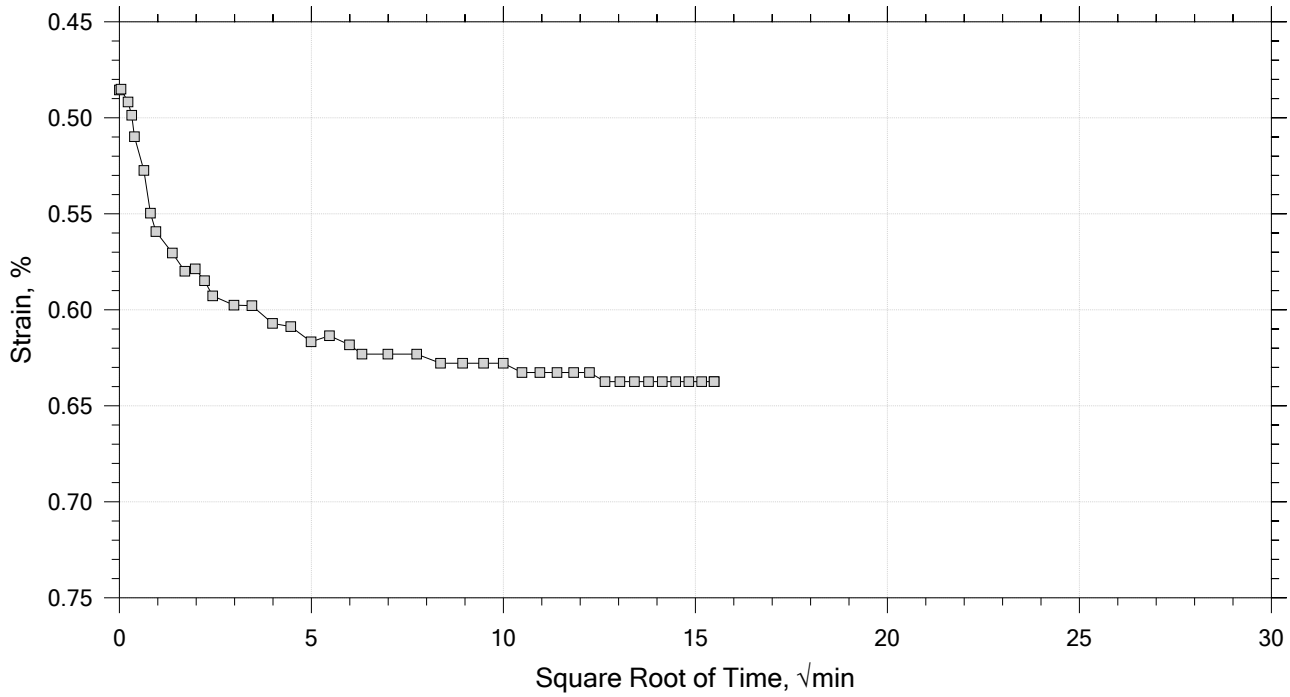


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

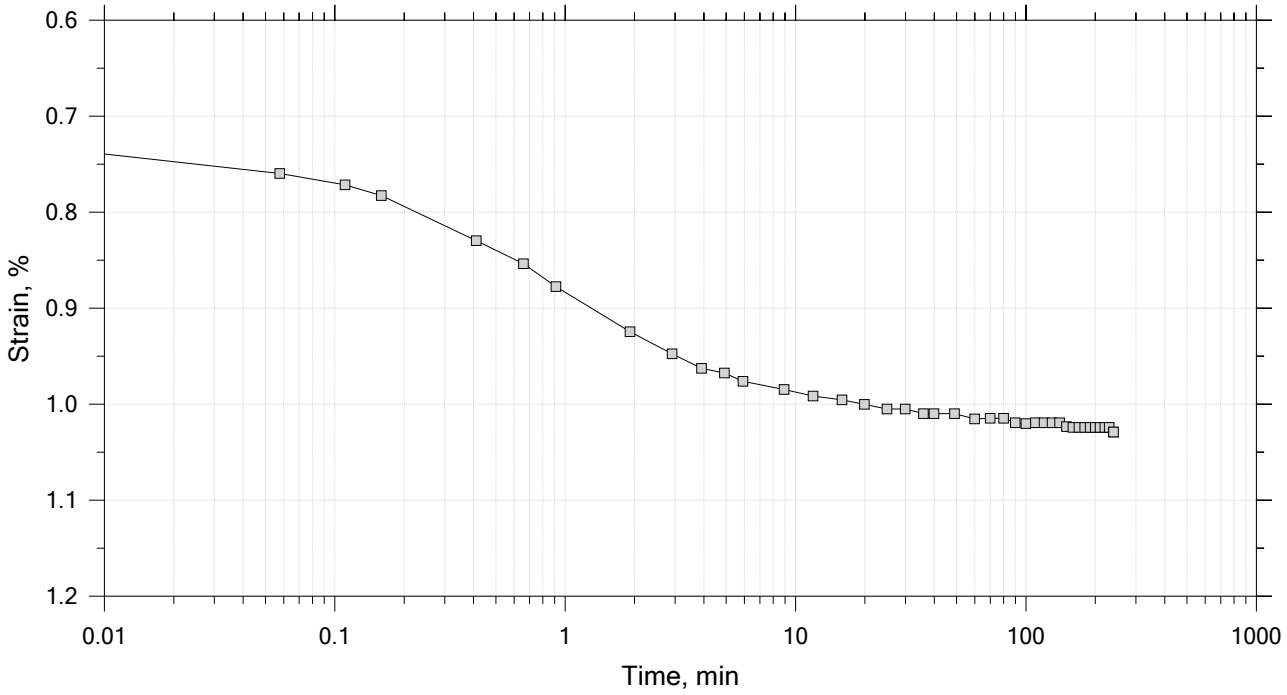


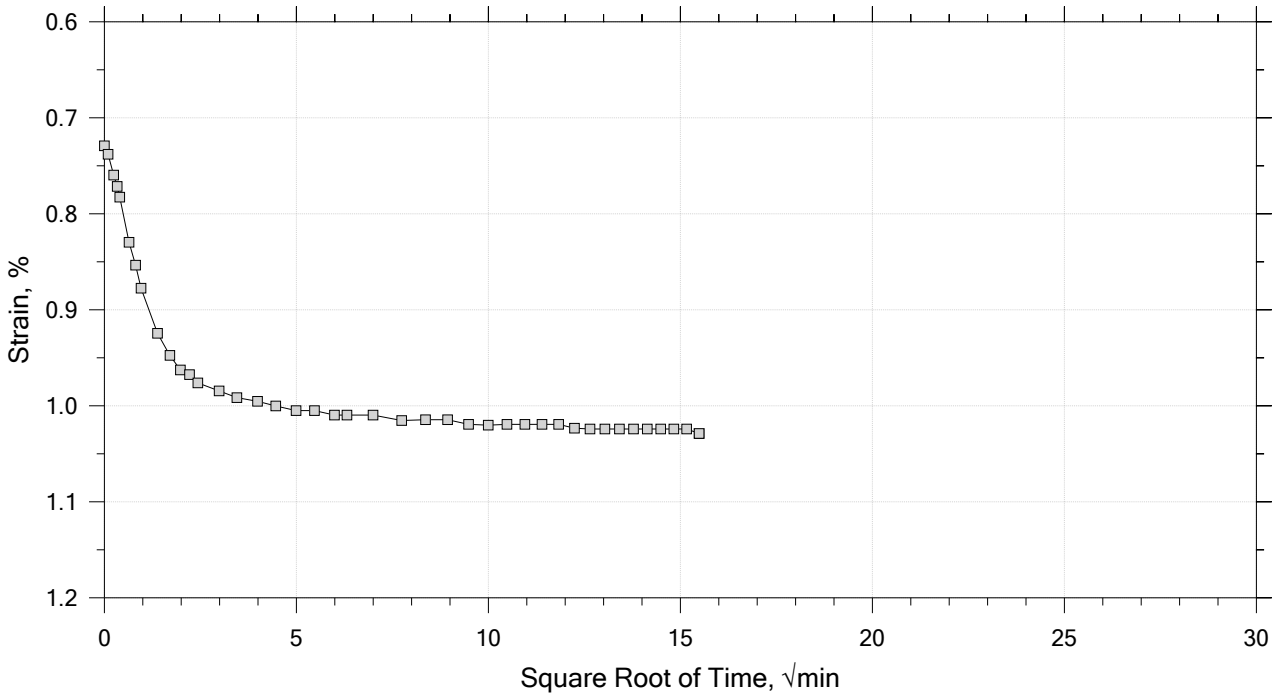


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





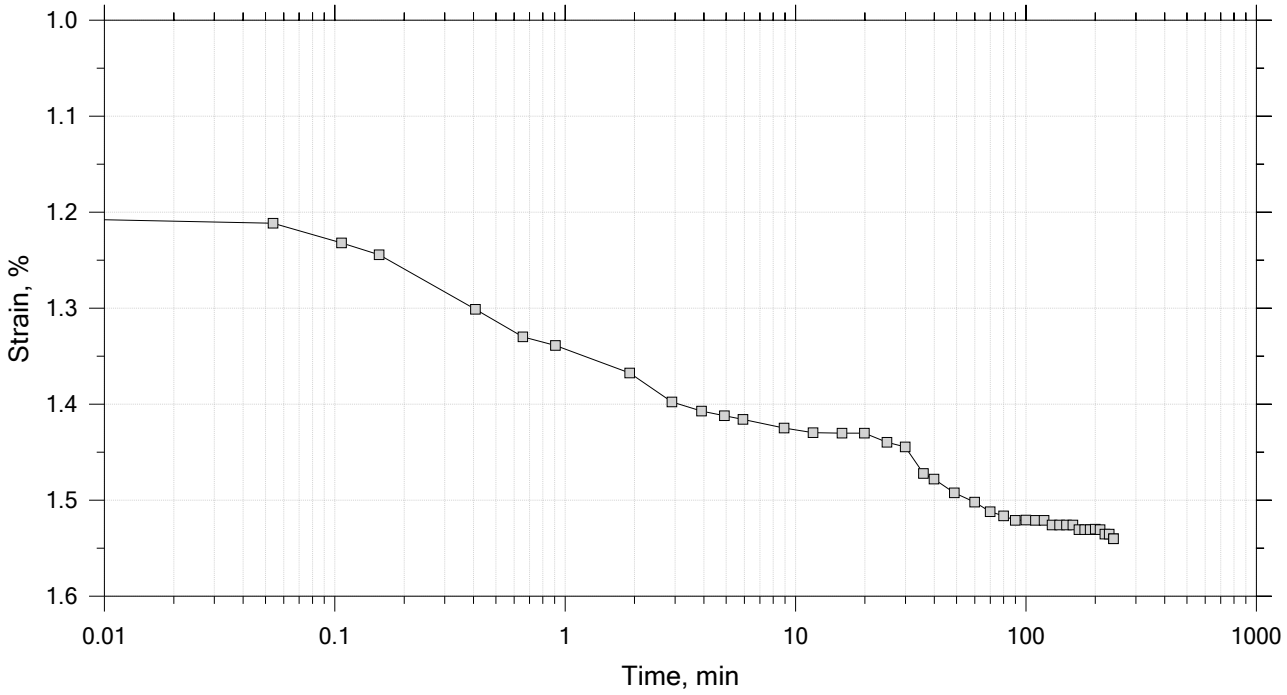
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		

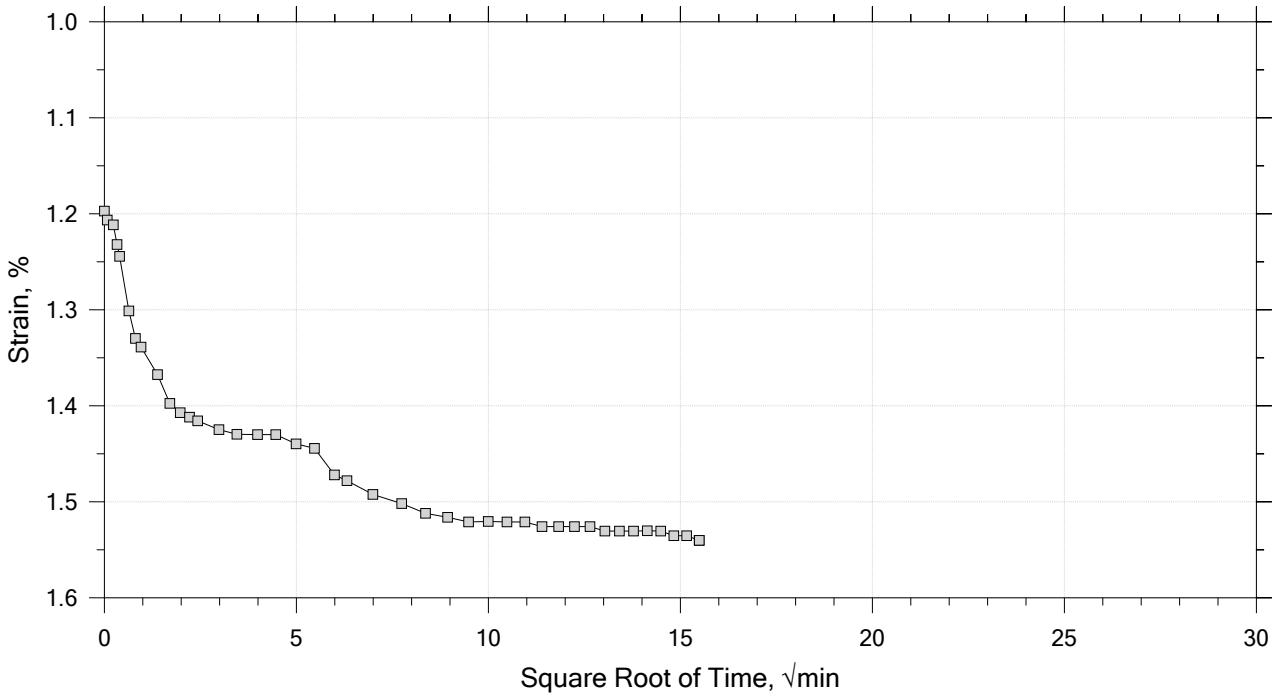
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





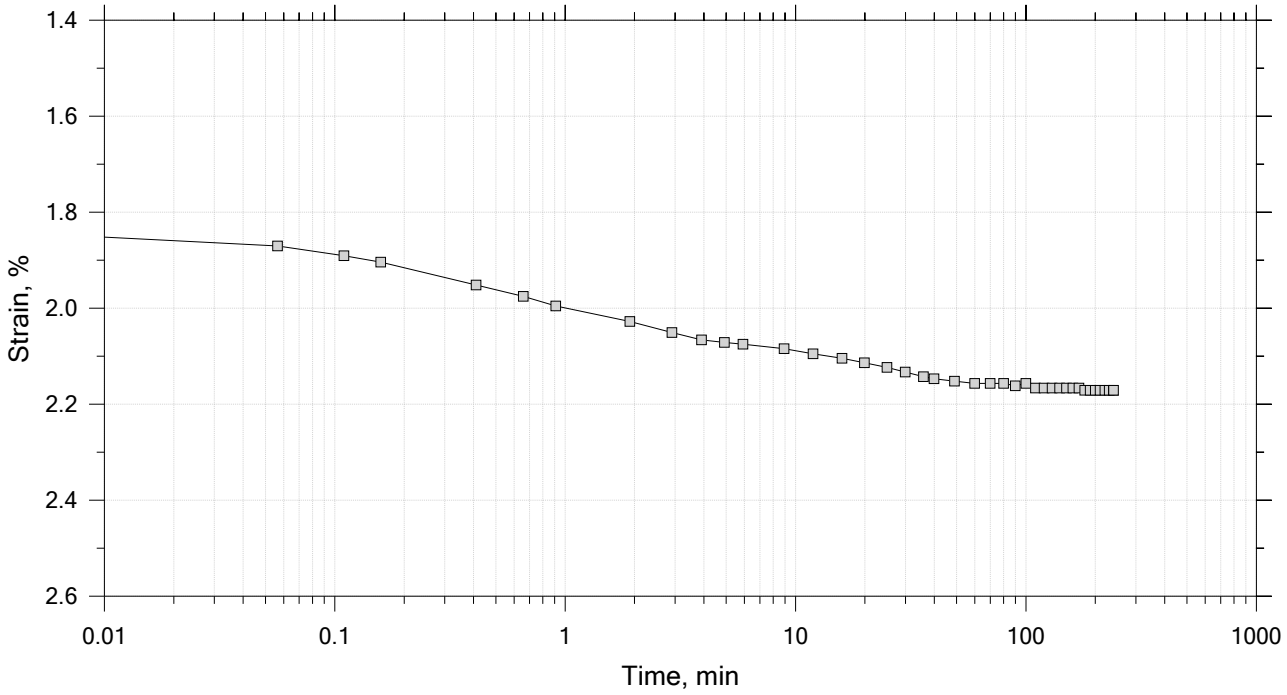
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		

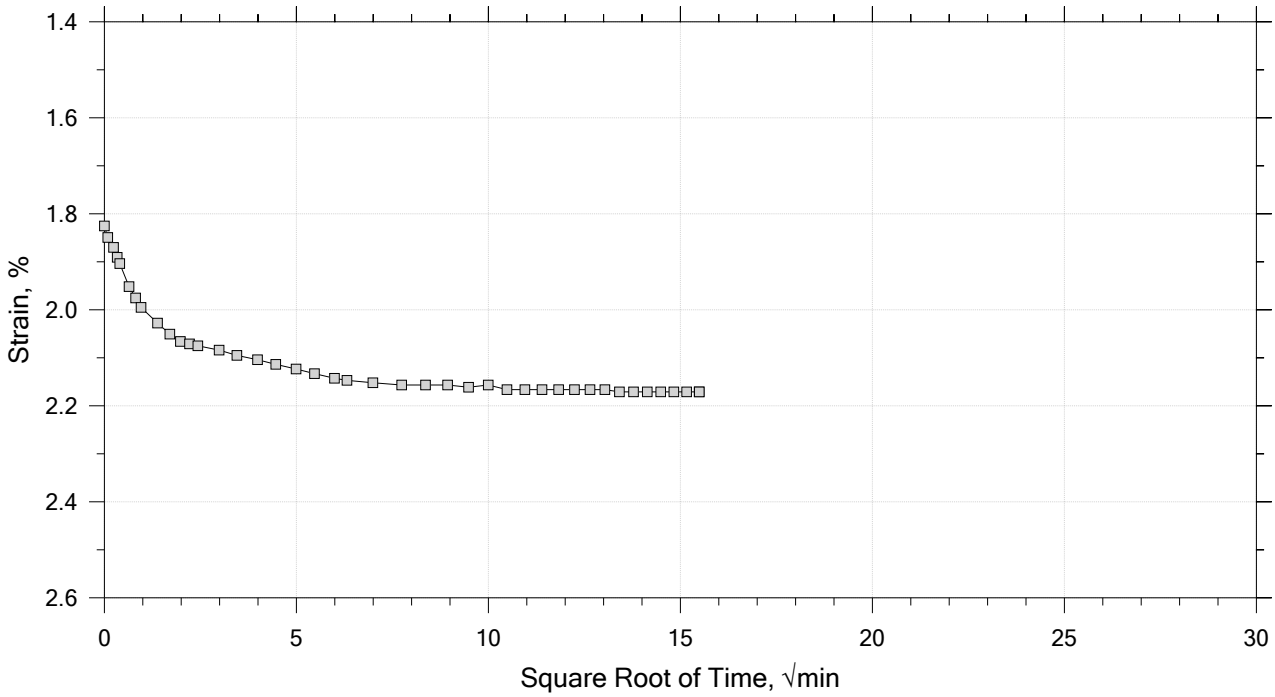
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





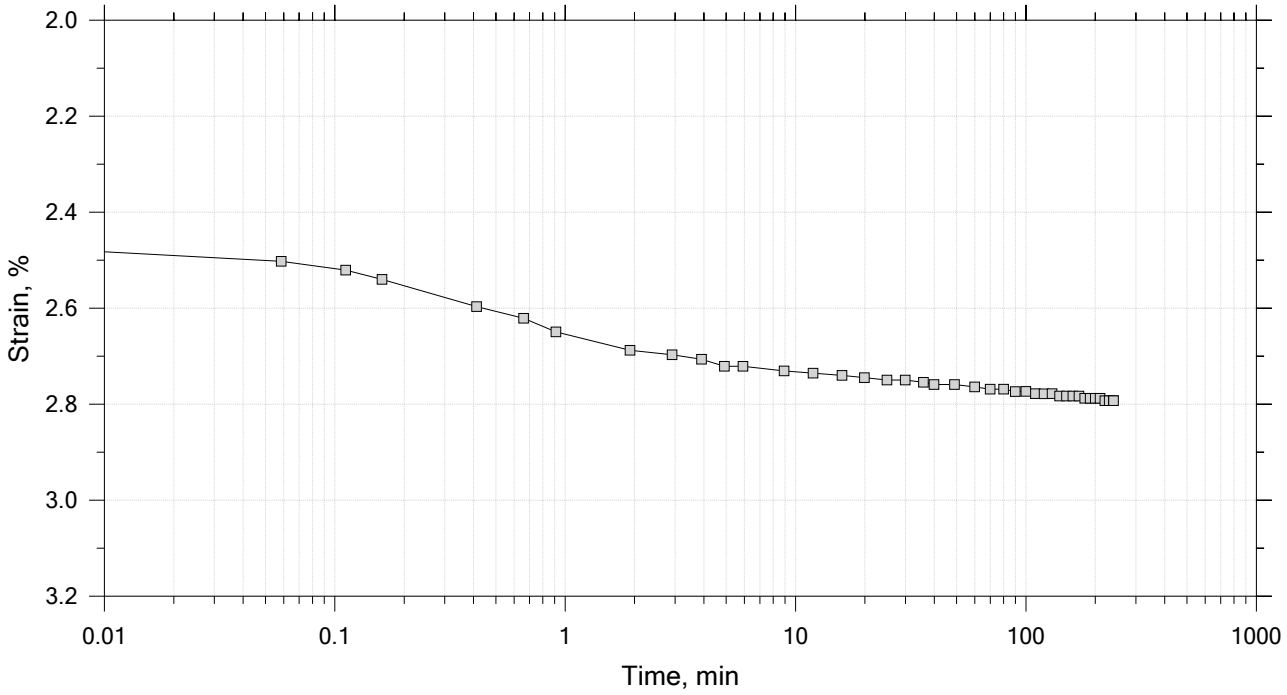
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

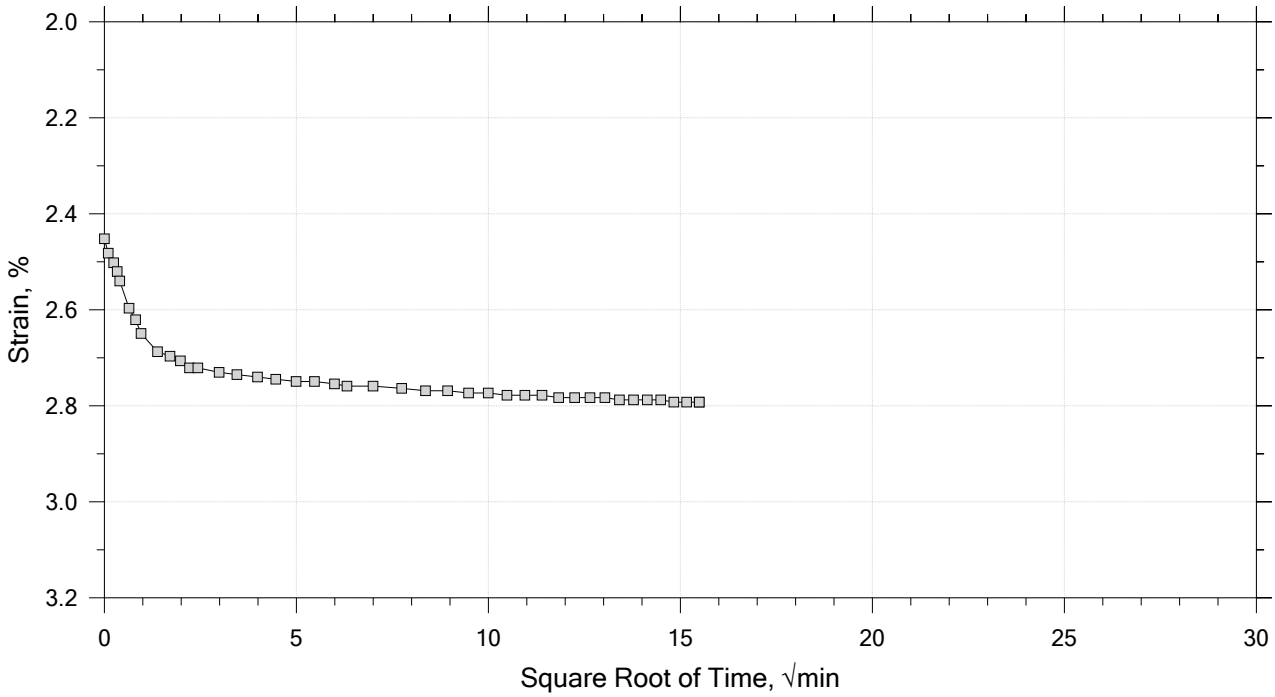
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





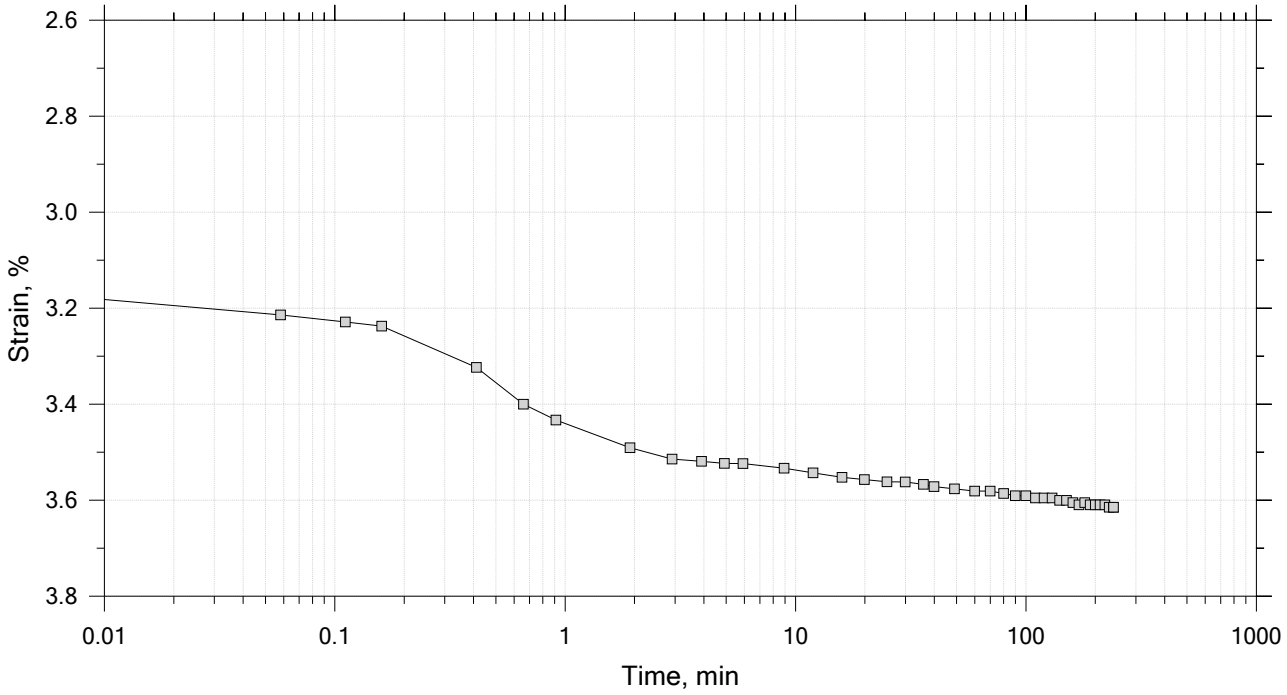
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

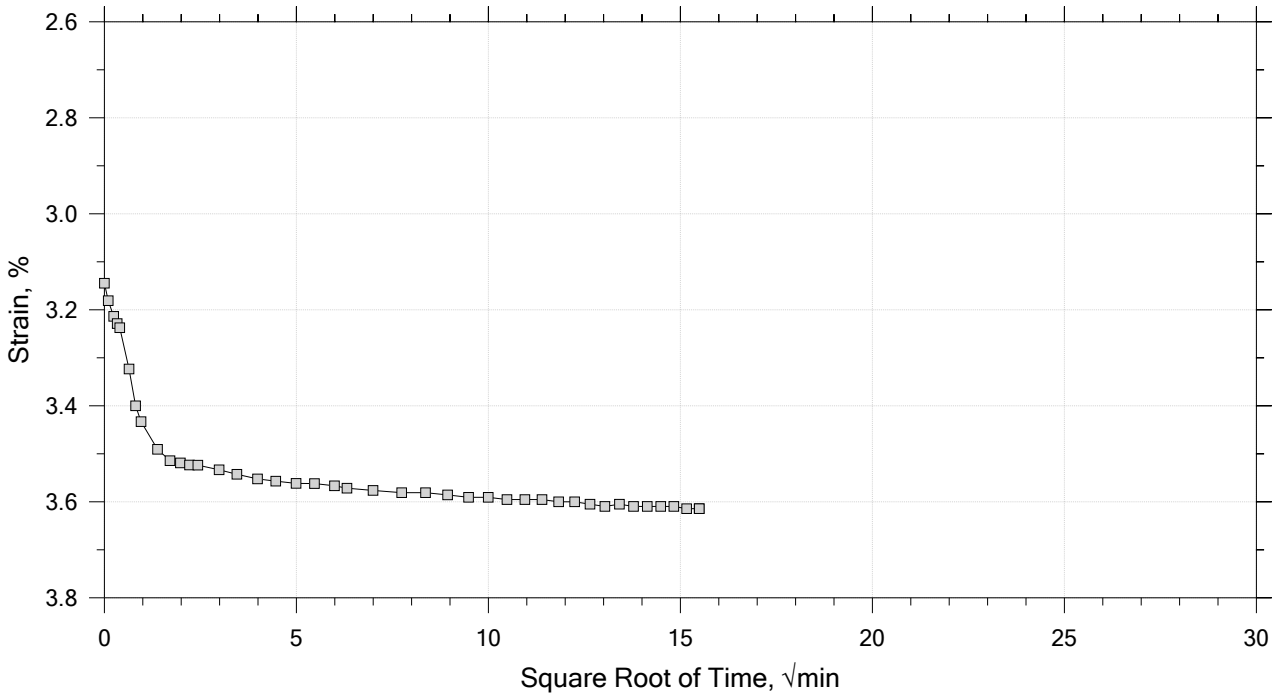
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





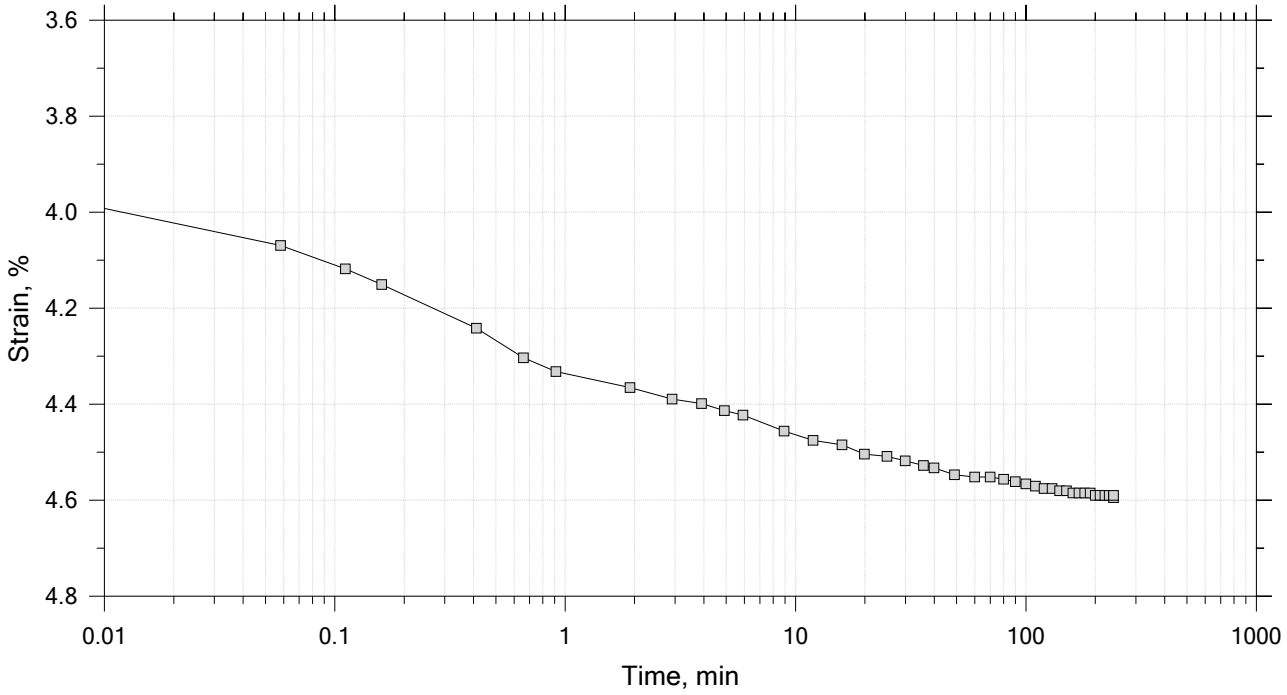
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

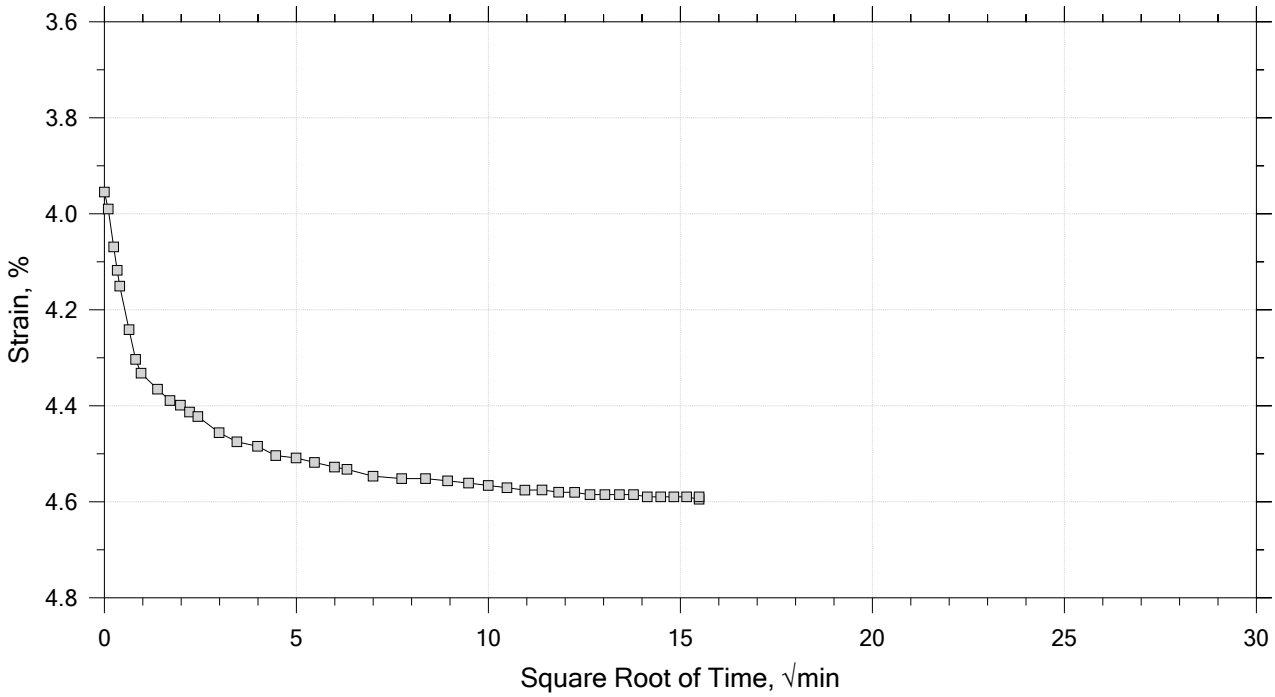
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





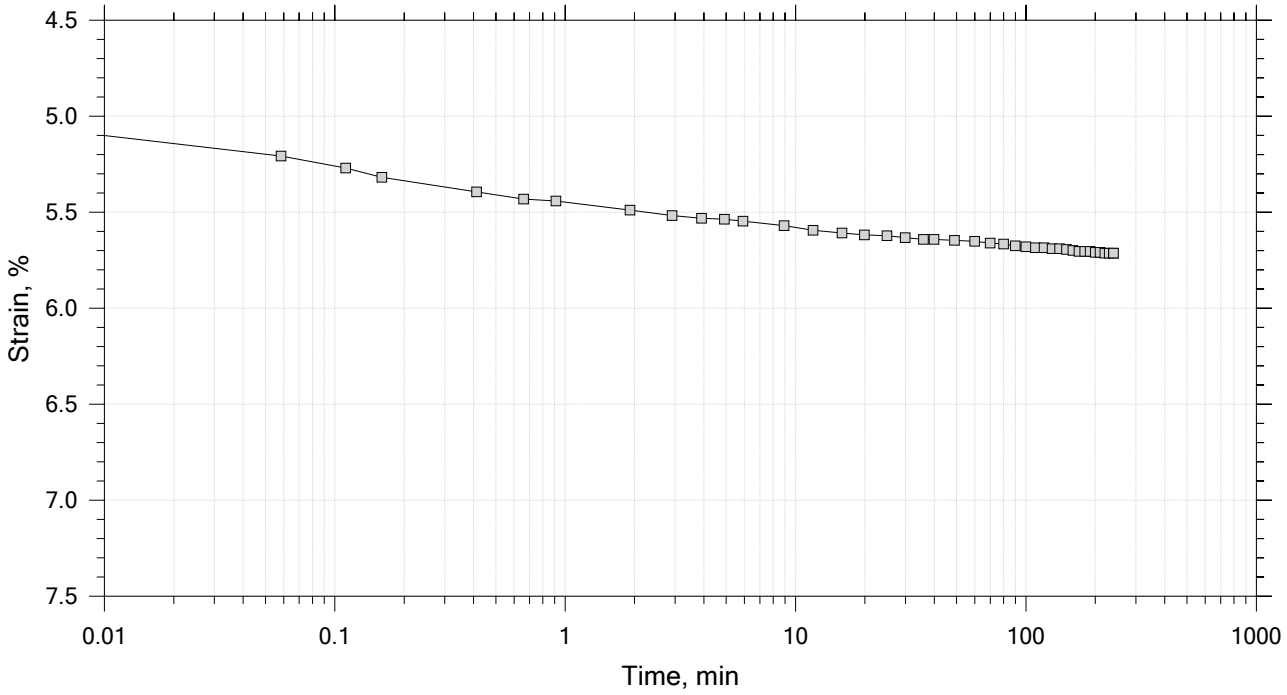
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		

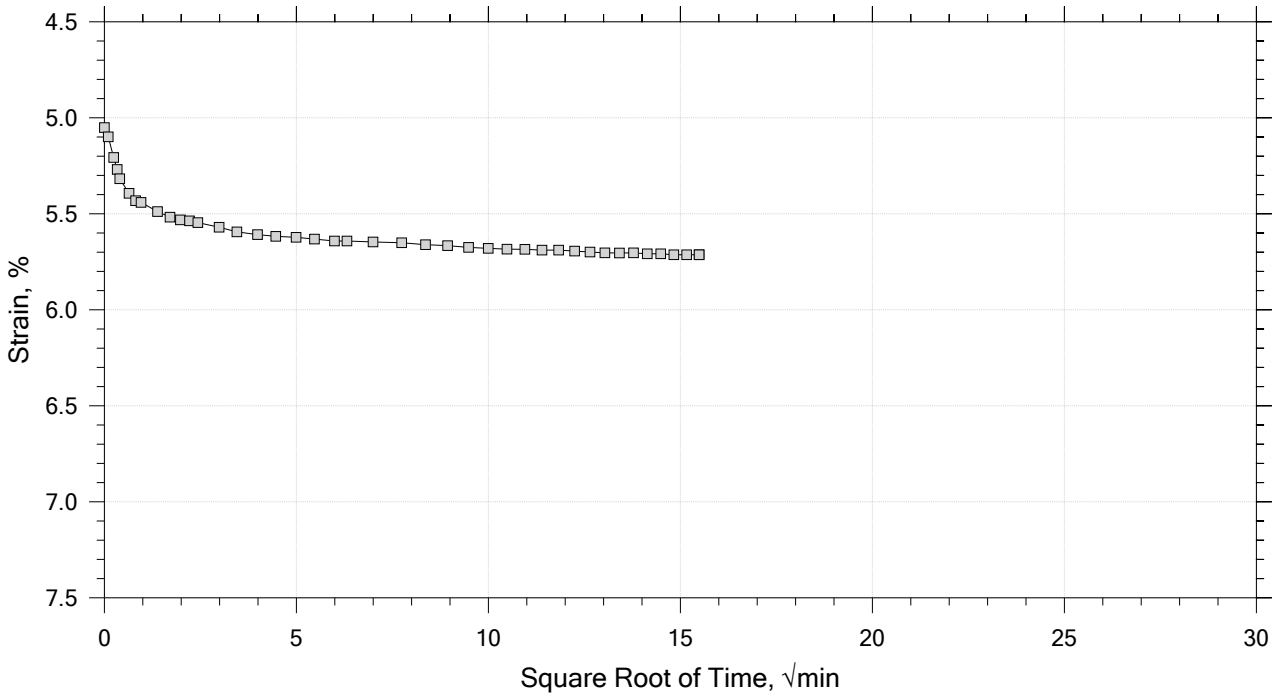
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

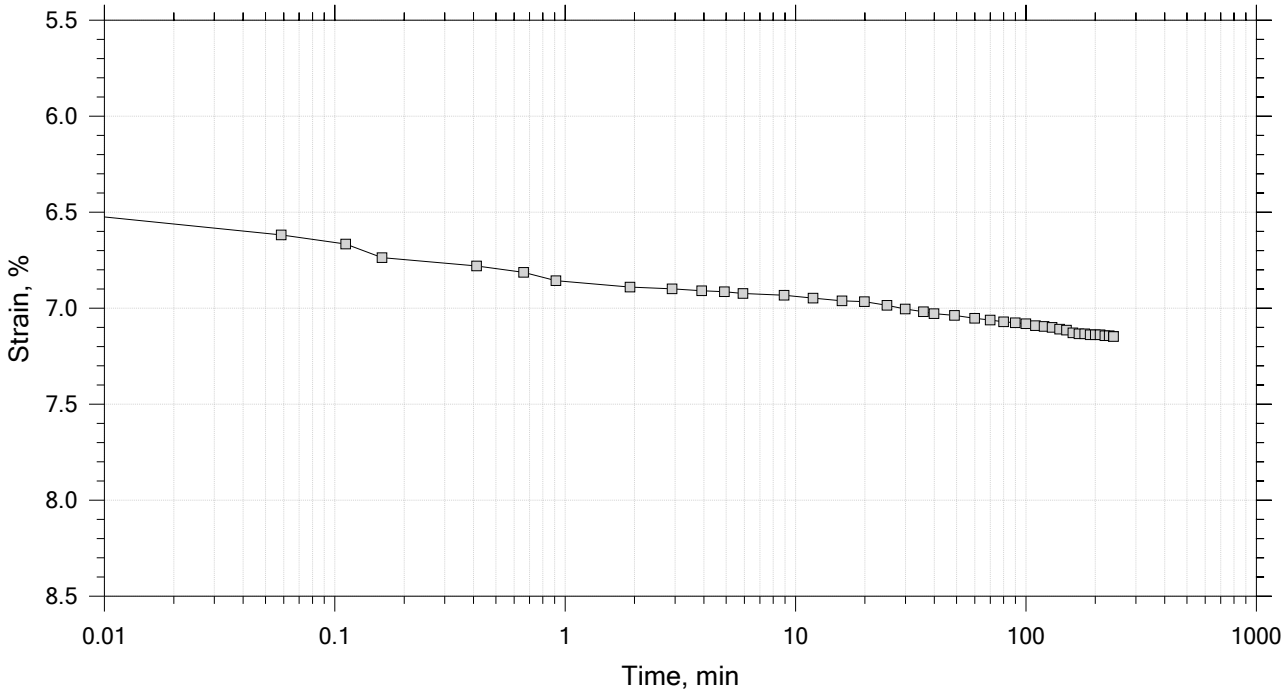


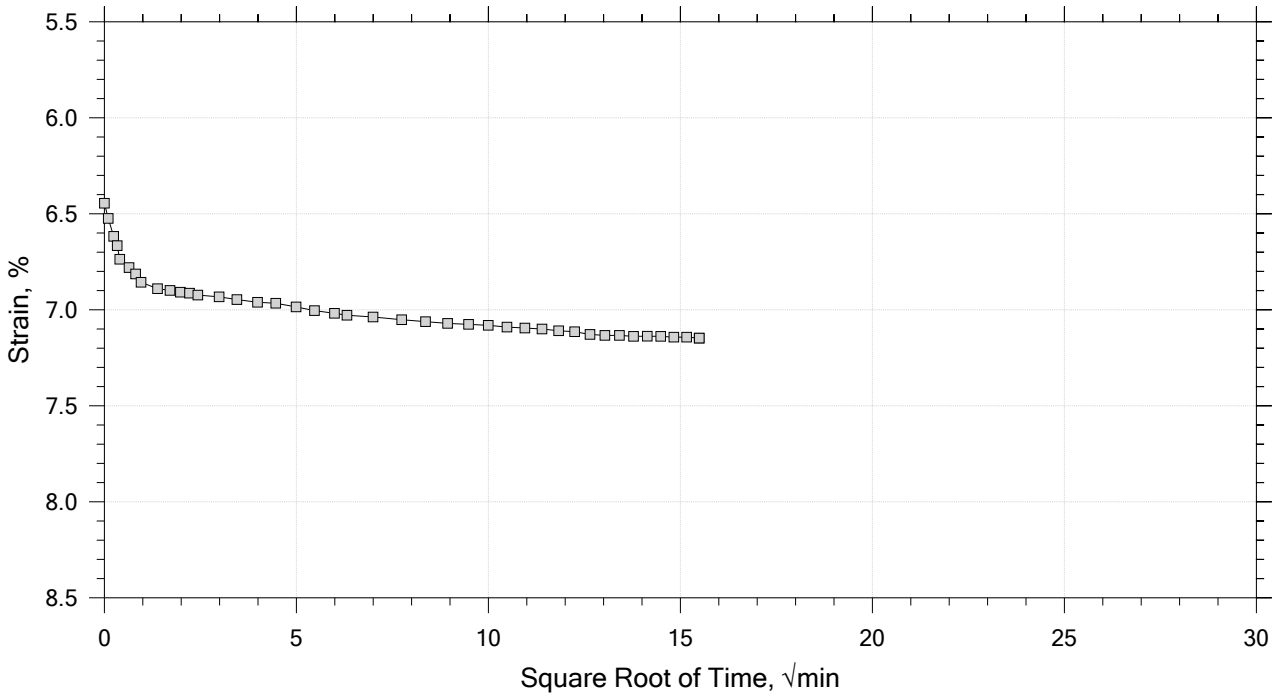


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

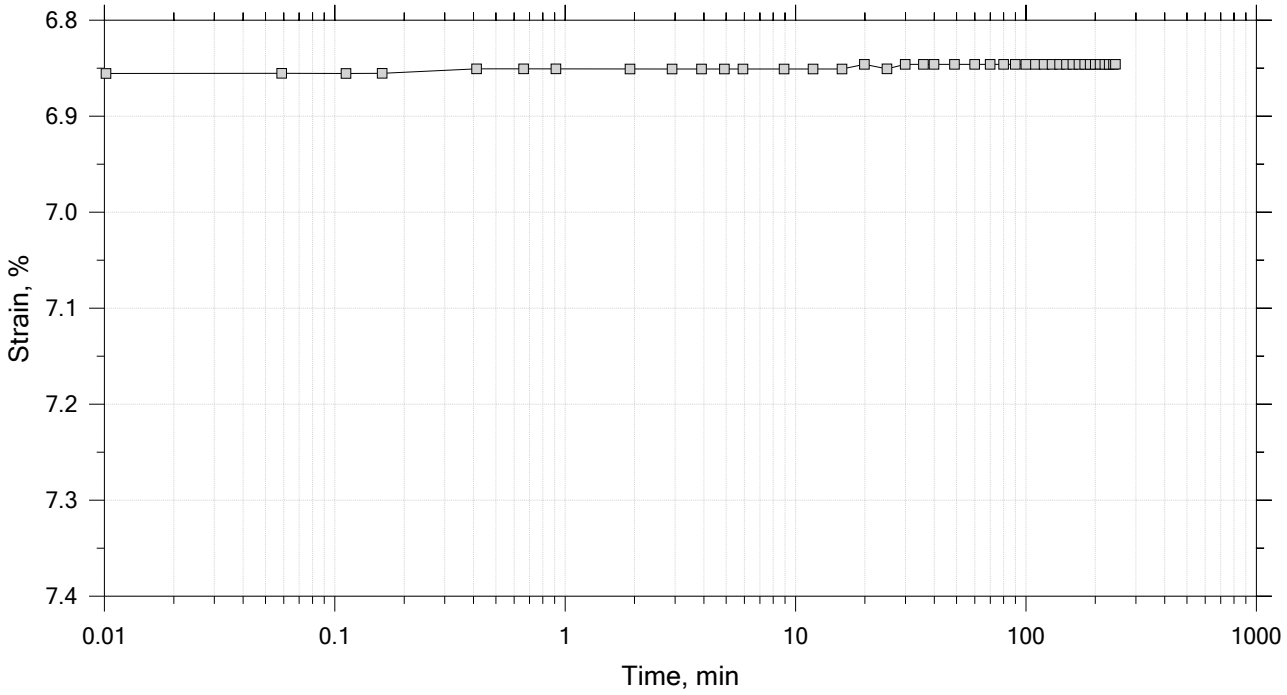


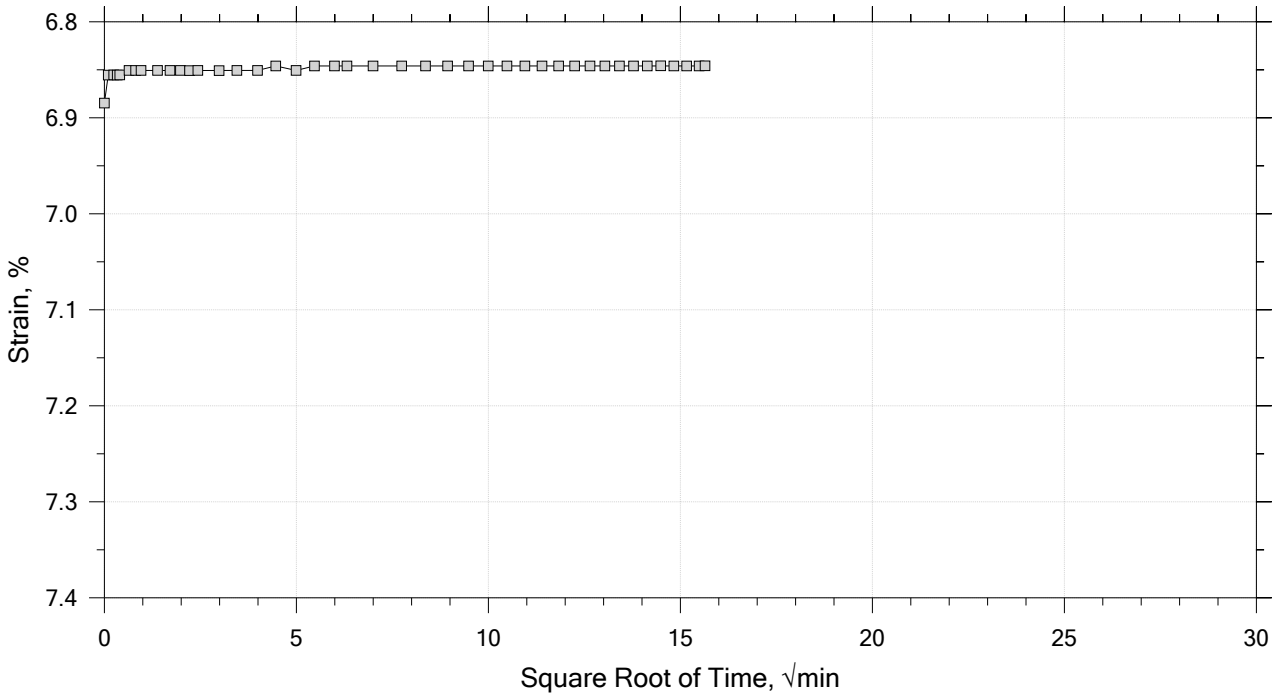


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





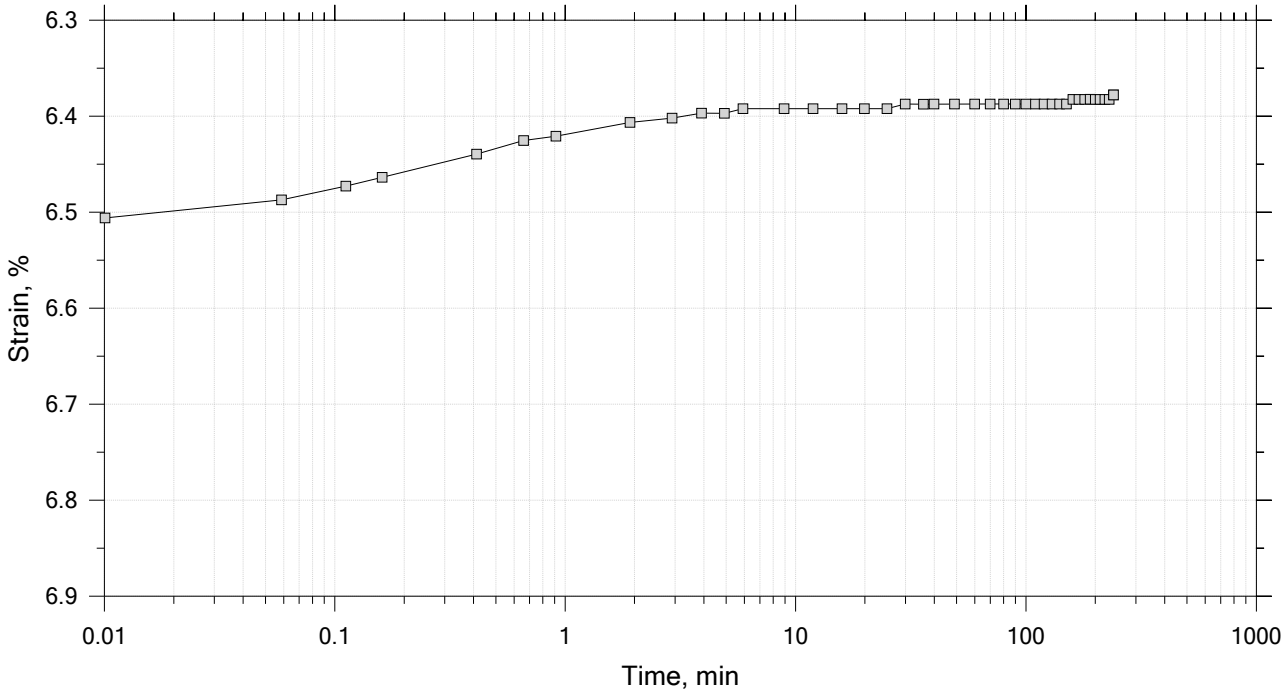
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

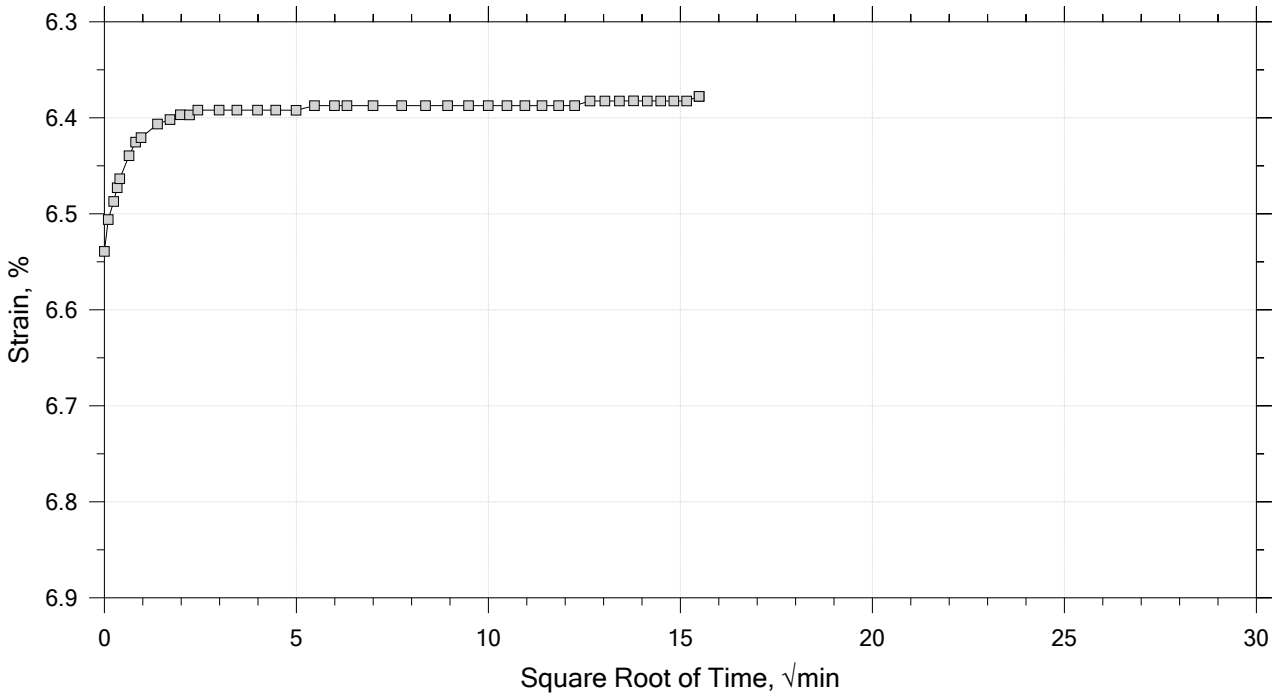
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

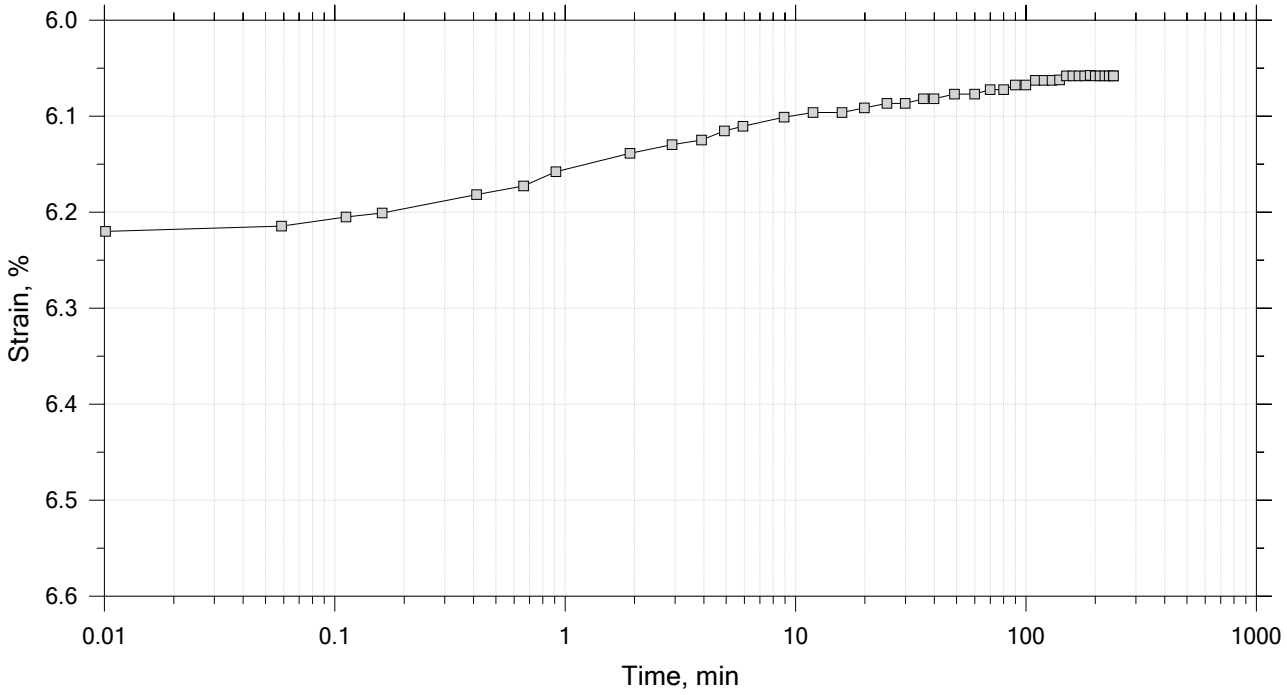


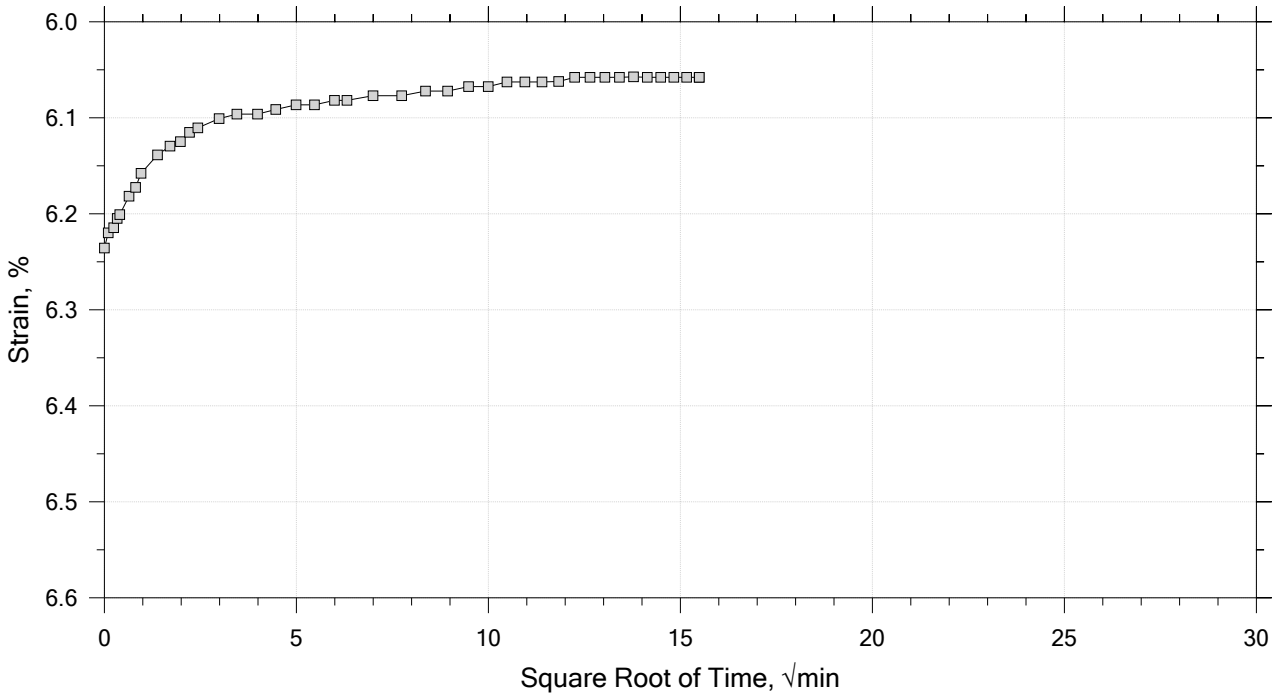


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

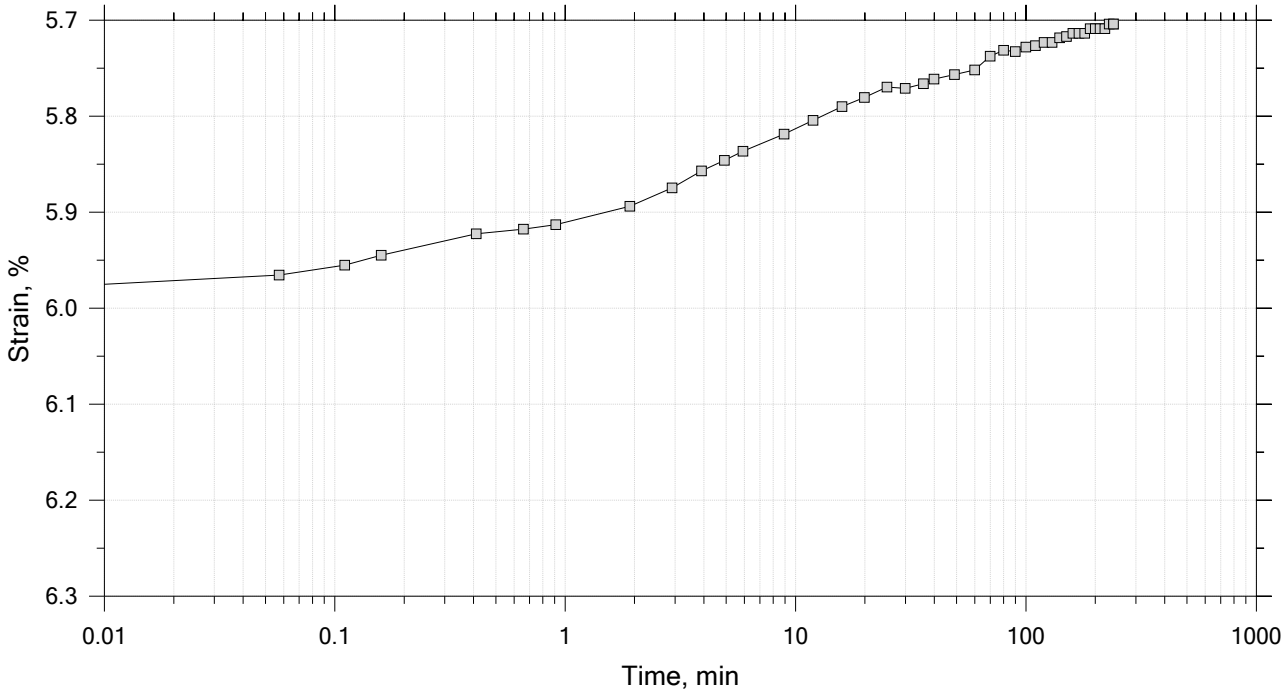


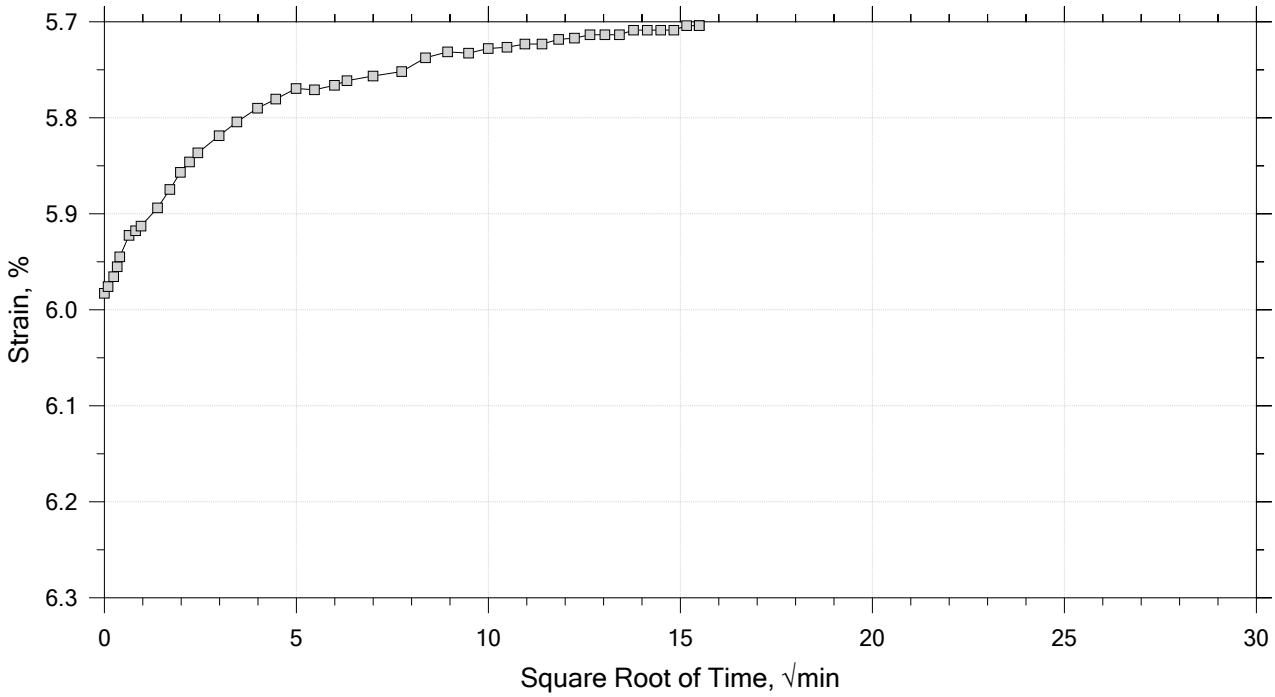


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

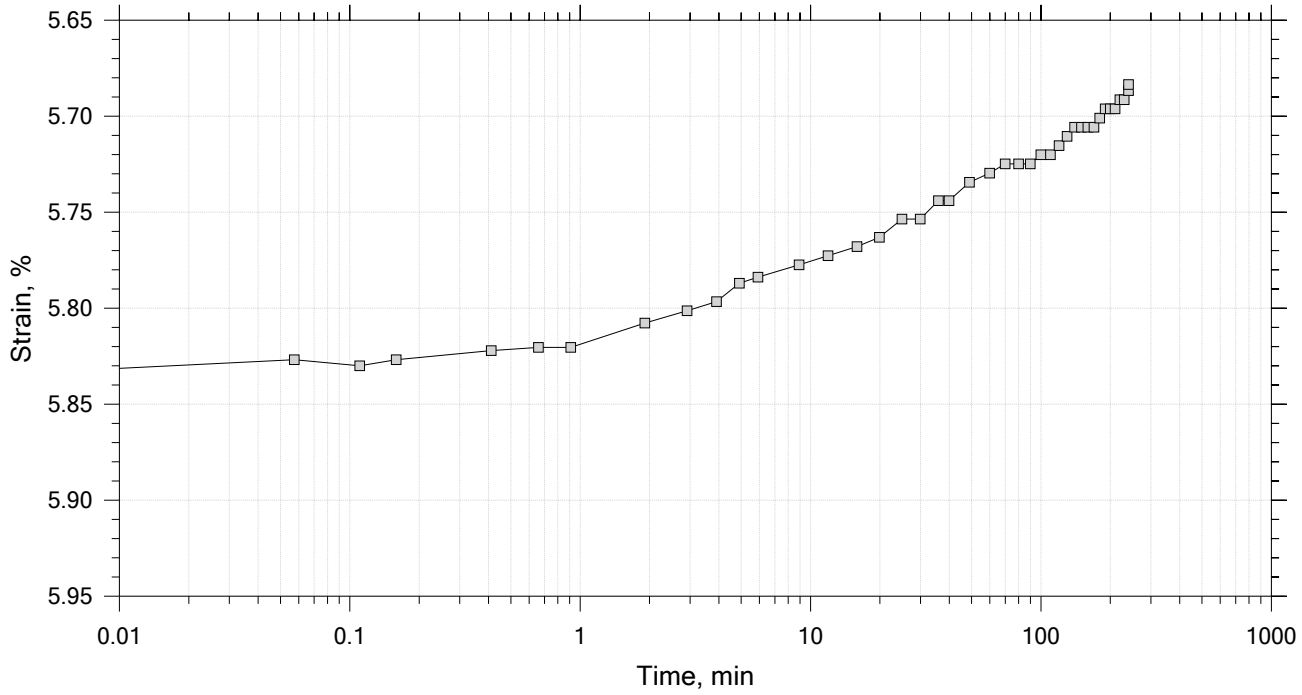


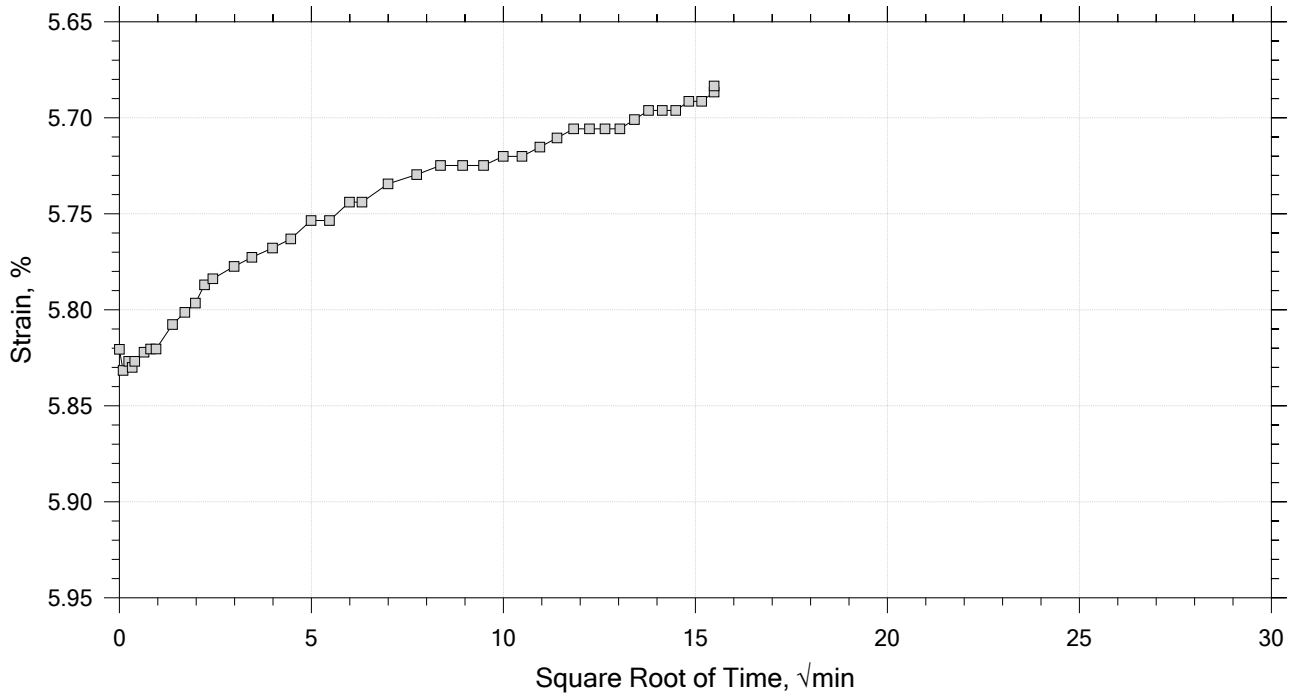


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-106	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, olive gray silty sand		
Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.72	Liquid Limit: NP
Initial Height: 1.00 in	Initial Void Ratio: 0.63	Plastic Limit: NP
Final Height: 0.93 in	Final Void Ratio: 0.516	Plasticity Index: NP

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	C1082	RING		D-2016
Mass Container, gm	8.27	106.26	106.26	8.32
Mass Container + Wet Soil, gm	69.85	269.27	265.94	166.28
Mass Container + Dry Soil, gm	59.55	240.47	240.47	141.08
Mass Dry Soil, gm	51.28	134.21	134.21	132.76
Water Content, %	20.09	21.46	18.98	18.98
Void Ratio	---	0.63	0.52	---
Degree of Saturation, %	---	92.60	100.00	---
Dry Unit Weight, pcf	---	104.15	111.99	---

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.

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0669	0.005135	0.622	0.513	0.000	0.00e+00	7.68e-02	0.00e+00	0.00e+00
2	0.125	0.006374	0.620	0.637	0.000	0.00e+00	2.13e-02	0.00e+00	0.00e+00
3	0.250	0.01029	0.614	1.03	0.000	0.00e+00	3.13e-02	0.00e+00	0.00e+00
4	0.500	0.01540	0.605	1.54	0.000	0.00e+00	2.05e-02	0.00e+00	0.00e+00
5	1.00	0.02171	0.595	2.17	0.673	8.16e-06	1.26e-02	2.78e-04	0.00e+00
6	2.00	0.02793	0.585	2.79	0.454	1.19e-05	6.21e-03	2.00e-04	0.00e+00
7	4.00	0.03615	0.572	3.61	0.519	1.03e-05	4.11e-03	1.14e-04	0.00e+00
8	8.00	0.04590	0.556	4.59	0.382	1.37e-05	2.44e-03	9.02e-05	0.00e+00
9	16.0	0.05713	0.537	5.71	0.203	2.53e-05	1.40e-03	9.57e-05	0.00e+00
10	32.0	0.07148	0.514	7.15	0.000	0.00e+00	8.96e-04	0.00e+00	0.00e+00
11	8.00	0.06846	0.519	6.85	0.000	0.00e+00	1.26e-04	0.00e+00	0.00e+00
12	2.00	0.06378	0.527	6.38	0.000	0.00e+00	7.80e-04	0.00e+00	0.00e+00
13	0.500	0.06058	0.532	6.06	0.000	0.00e+00	2.13e-03	0.00e+00	0.00e+00
14	0.125	0.05704	0.537	5.70	3.498	1.44e-06	9.44e-03	3.67e-05	0.00e+00
15	0.0625	0.05683	0.538	5.68	0.000	0.00e+00	3.28e-03	0.00e+00	0.00e+00

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

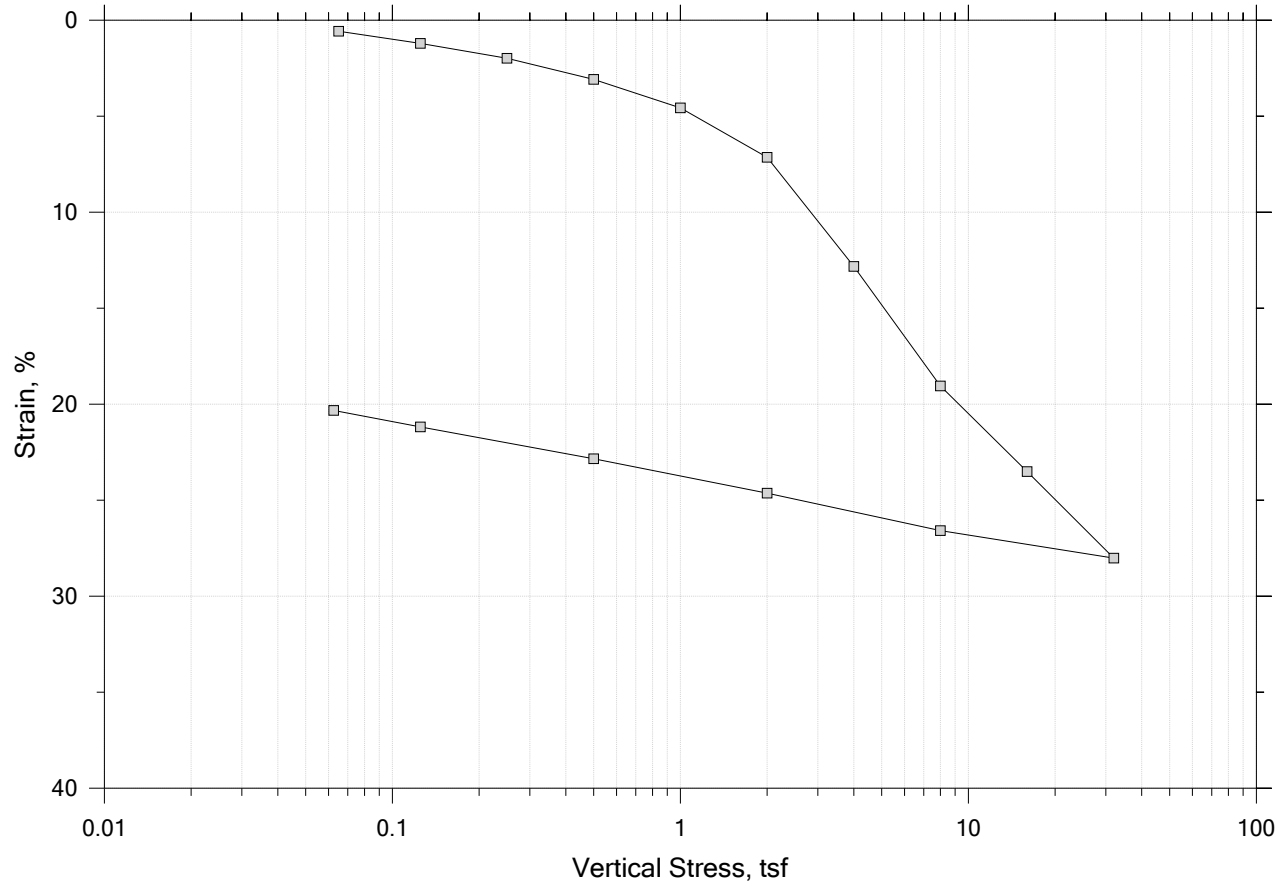
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0669	0.005135	0.622	0.513	16.070	1.52e-06	7.68e-02	3.15e-04
2	0.125	0.006374	0.620	0.637	6.530	3.71e-06	2.13e-02	2.14e-04
3	0.250	0.01029	0.614	1.03	4.526	5.33e-06	3.13e-02	4.50e-04
4	0.500	0.01540	0.605	1.54	89.293	2.68e-07	2.05e-02	1.48e-05
5	1.00	0.02171	0.595	2.17	5.536	4.27e-06	1.26e-02	1.45e-04
6	2.00	0.02793	0.585	2.79	2.981	7.83e-06	6.21e-03	1.31e-04
7	4.00	0.03615	0.572	3.61	3.865	5.95e-06	4.11e-03	6.59e-05
8	8.00	0.04590	0.556	4.59	5.347	4.22e-06	2.44e-03	2.78e-05
9	16.0	0.05713	0.537	5.71	4.187	5.27e-06	1.40e-03	2.00e-05
10	32.0	0.07148	0.514	7.15	48.227	4.45e-07	8.96e-04	1.08e-06
11	8.00	0.06846	0.519	6.85	19.909	1.07e-06	1.26e-04	3.62e-07
12	2.00	0.06378	0.527	6.38	1.863	1.15e-05	7.80e-04	2.42e-05
13	0.500	0.06058	0.532	6.06	6.786	3.18e-06	2.13e-03	1.83e-05
14	0.125	0.05704	0.537	5.70	18.699	1.16e-06	9.44e-03	2.96e-05
15	0.0625	0.05683	0.538	5.68	63.953	3.41e-07	3.28e-03	3.02e-06

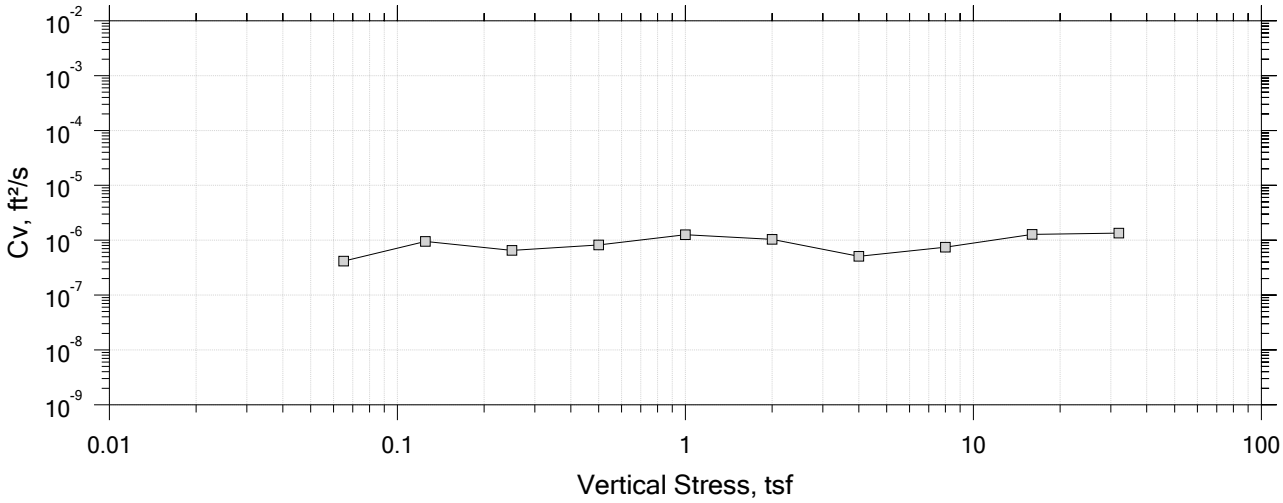
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		
	Displacement at End of Increment		

B-109 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





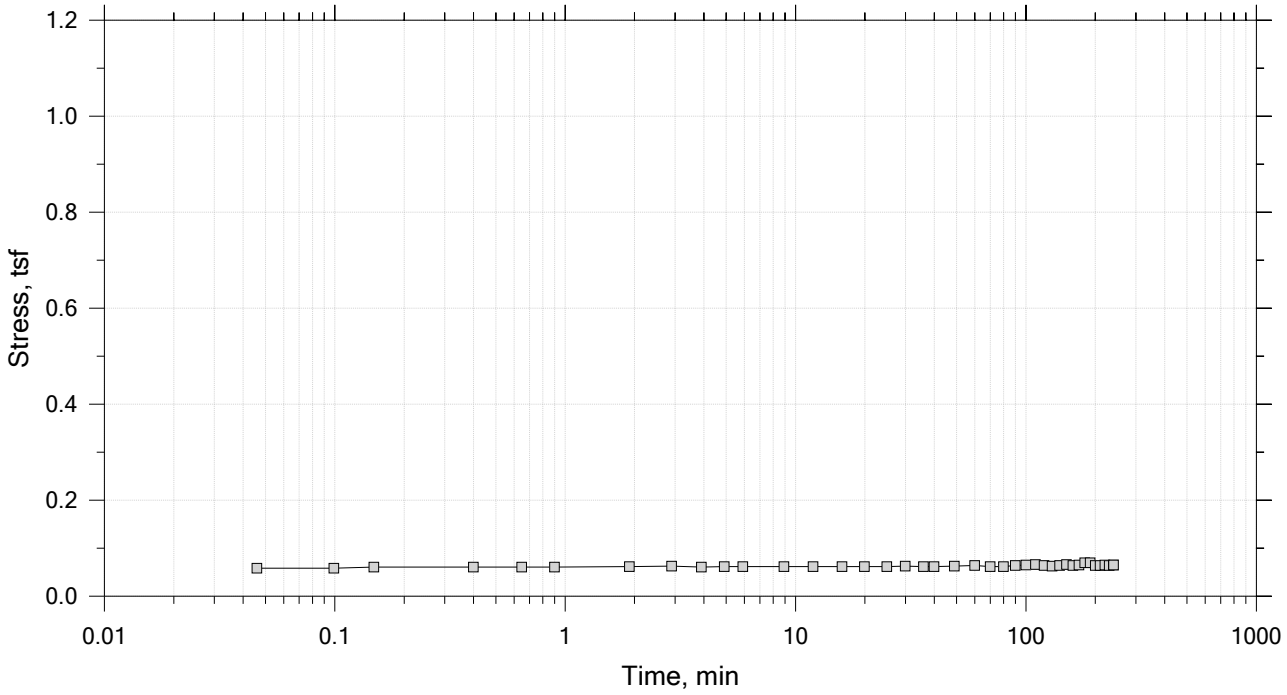
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

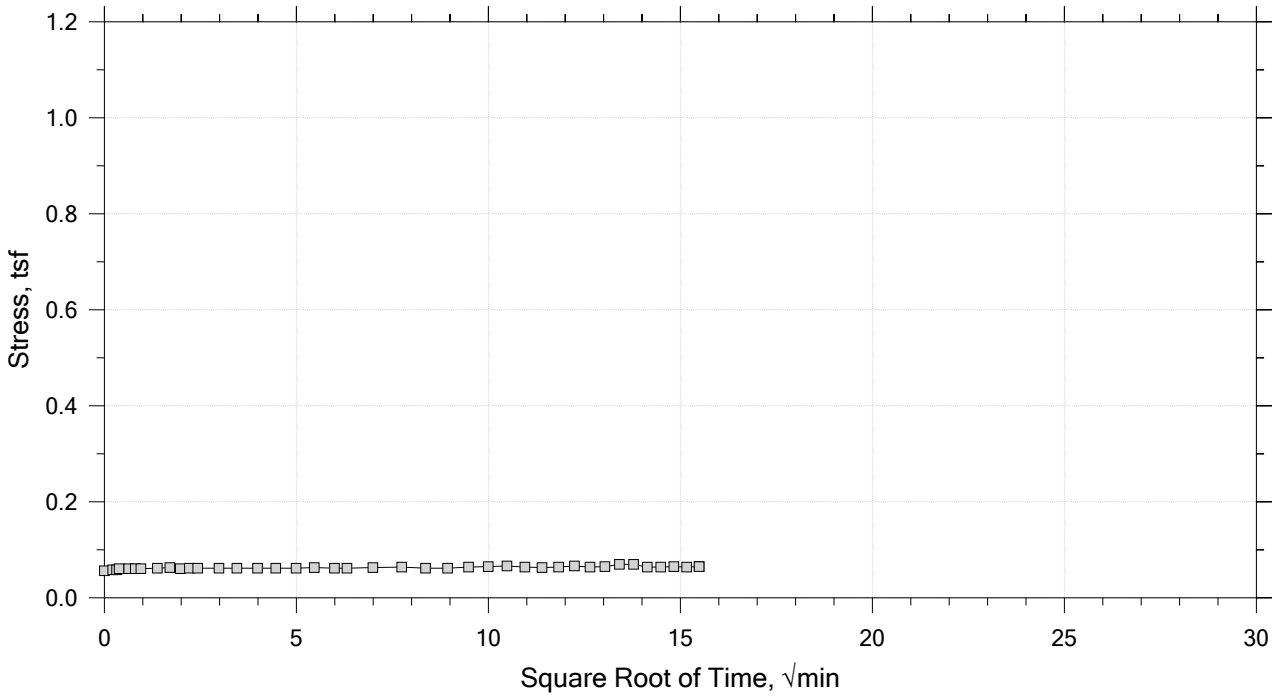
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0651 tsf

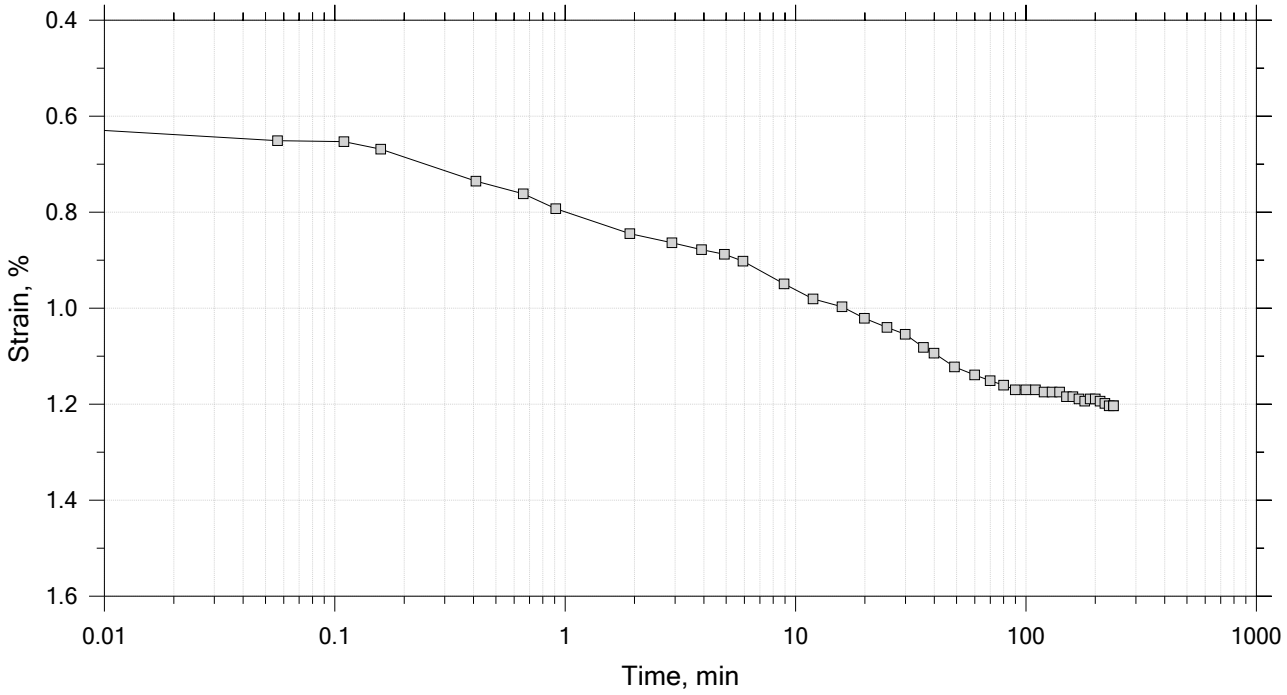


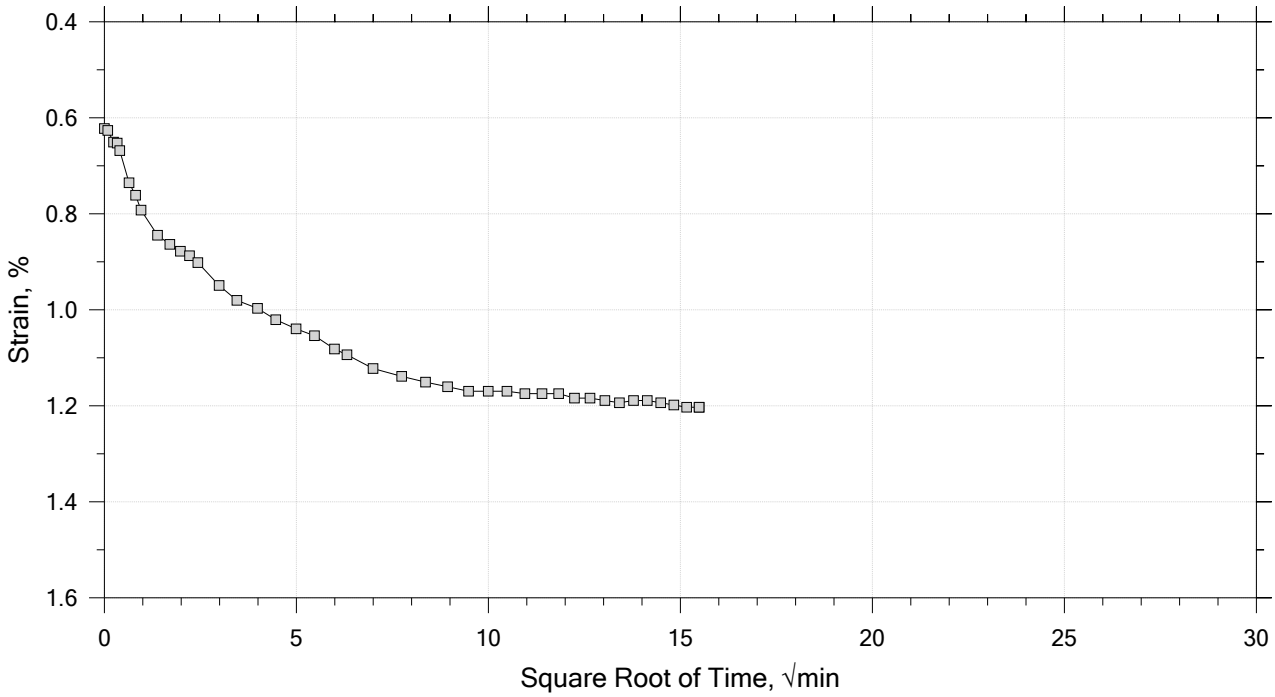


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

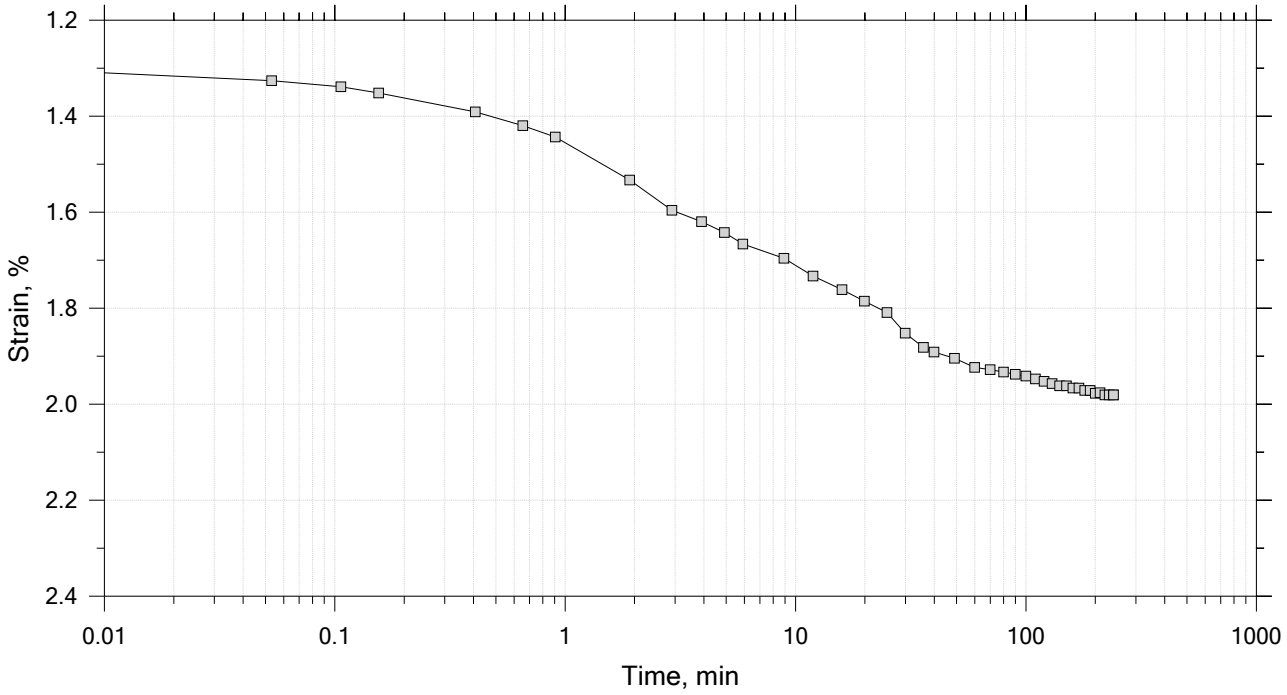


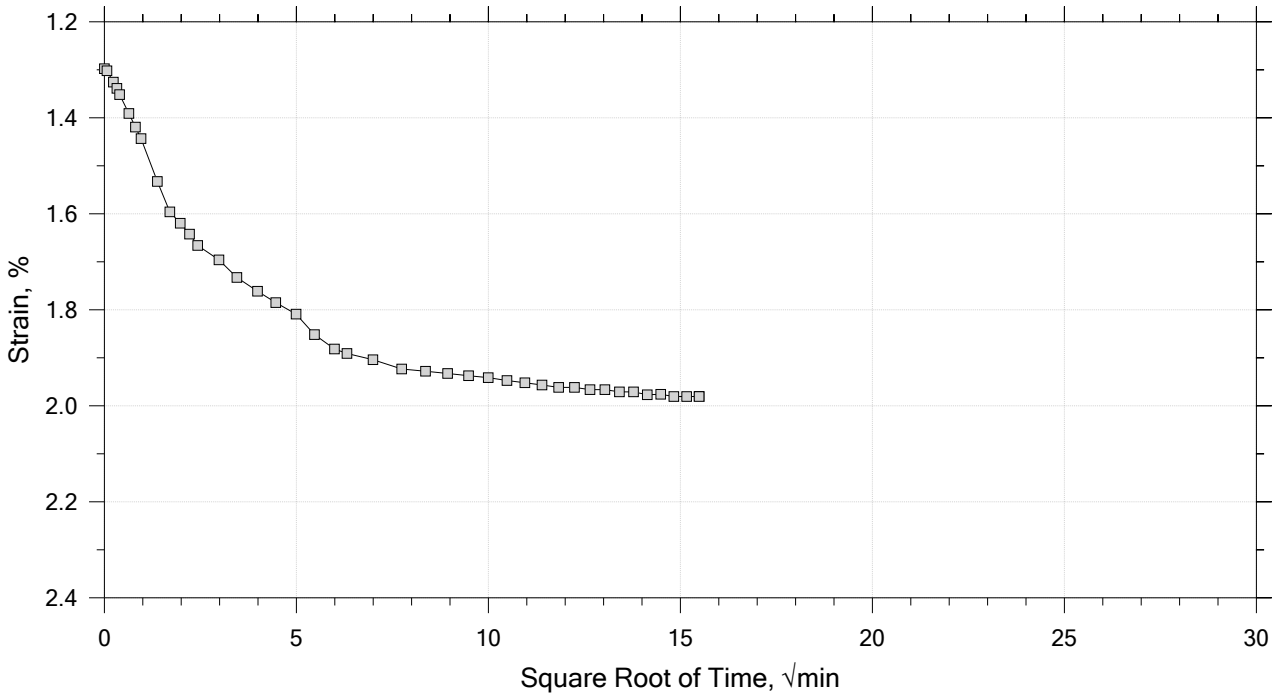


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

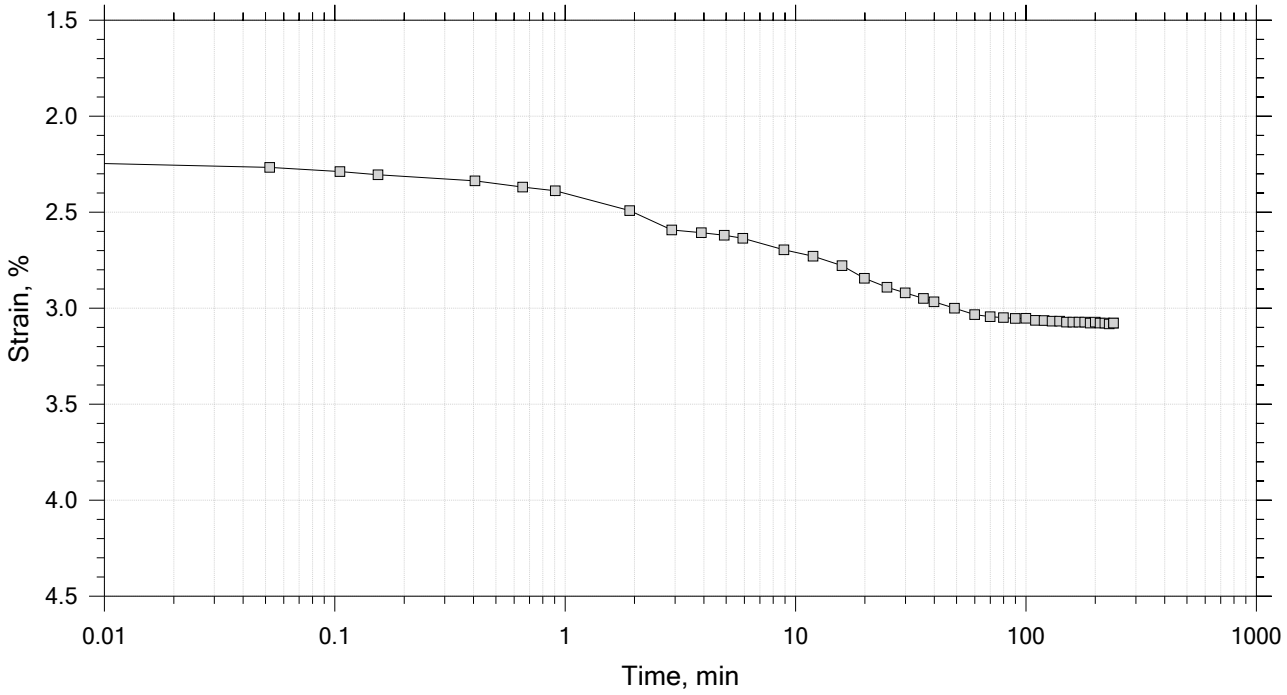


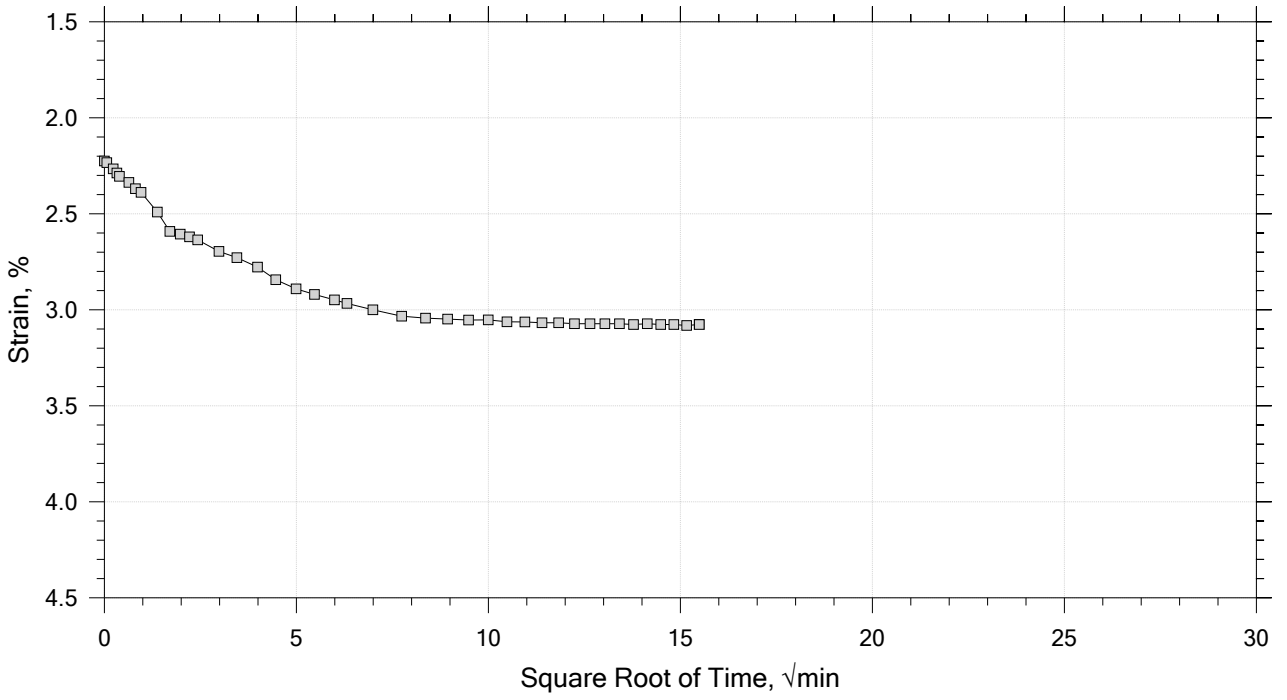


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





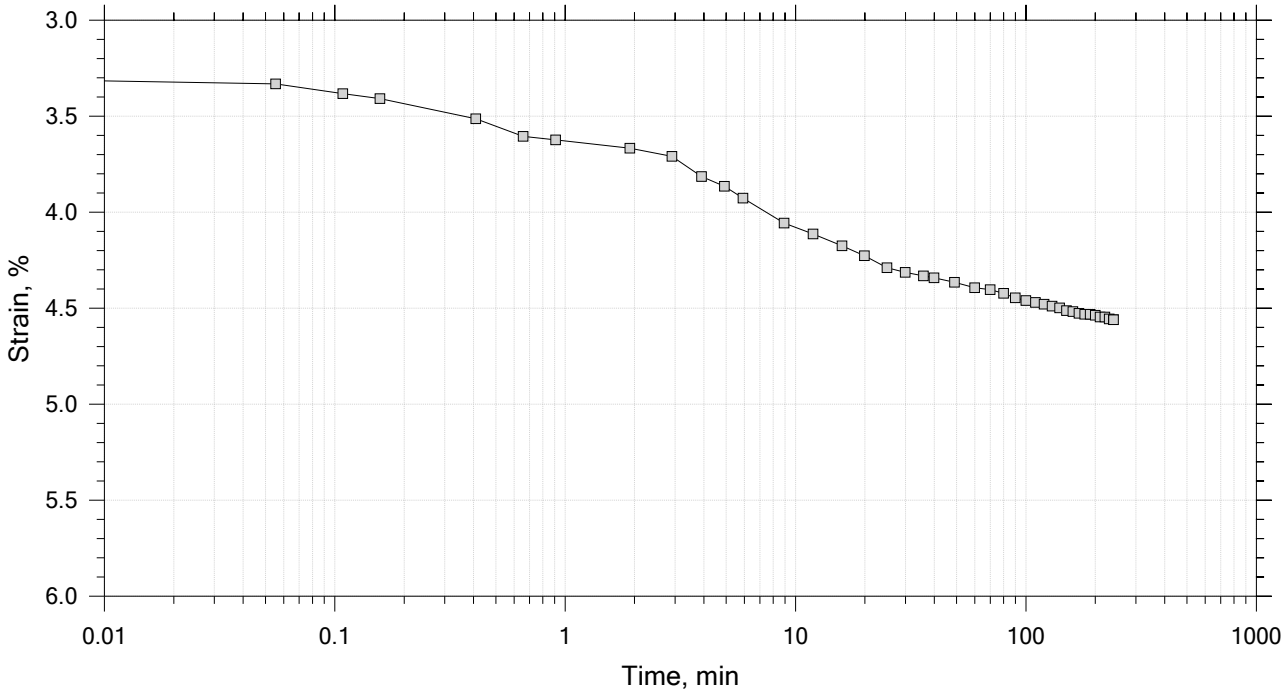
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

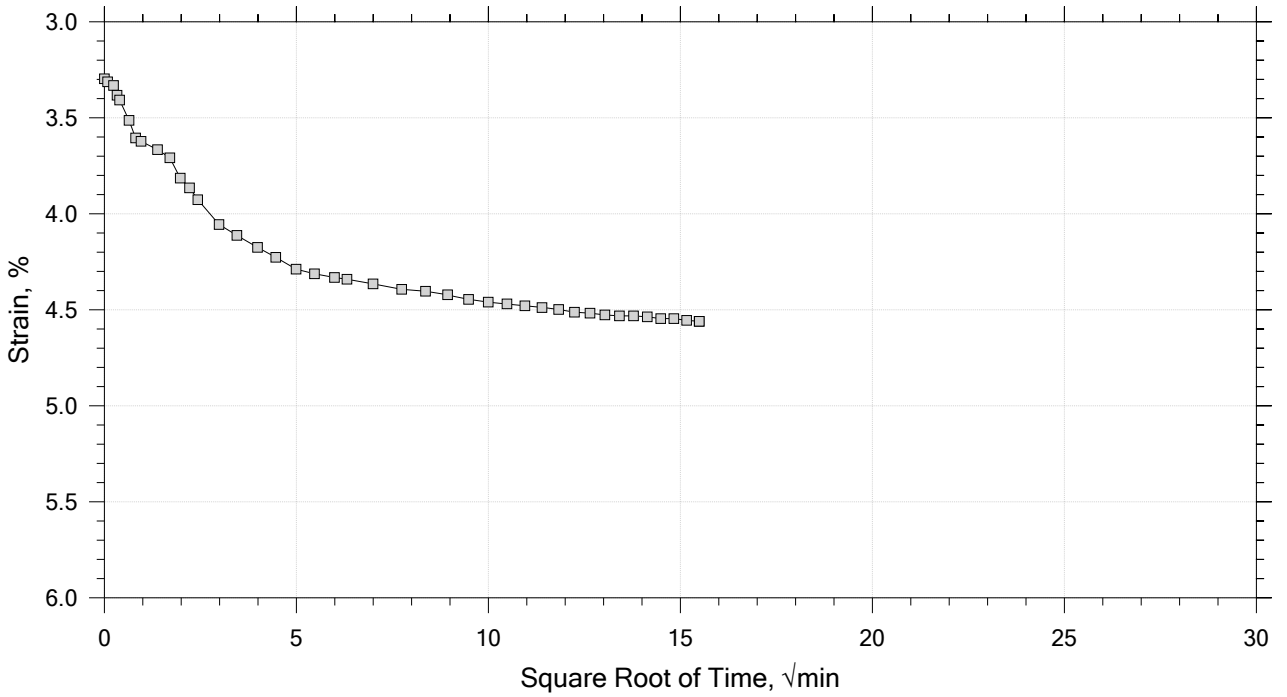
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





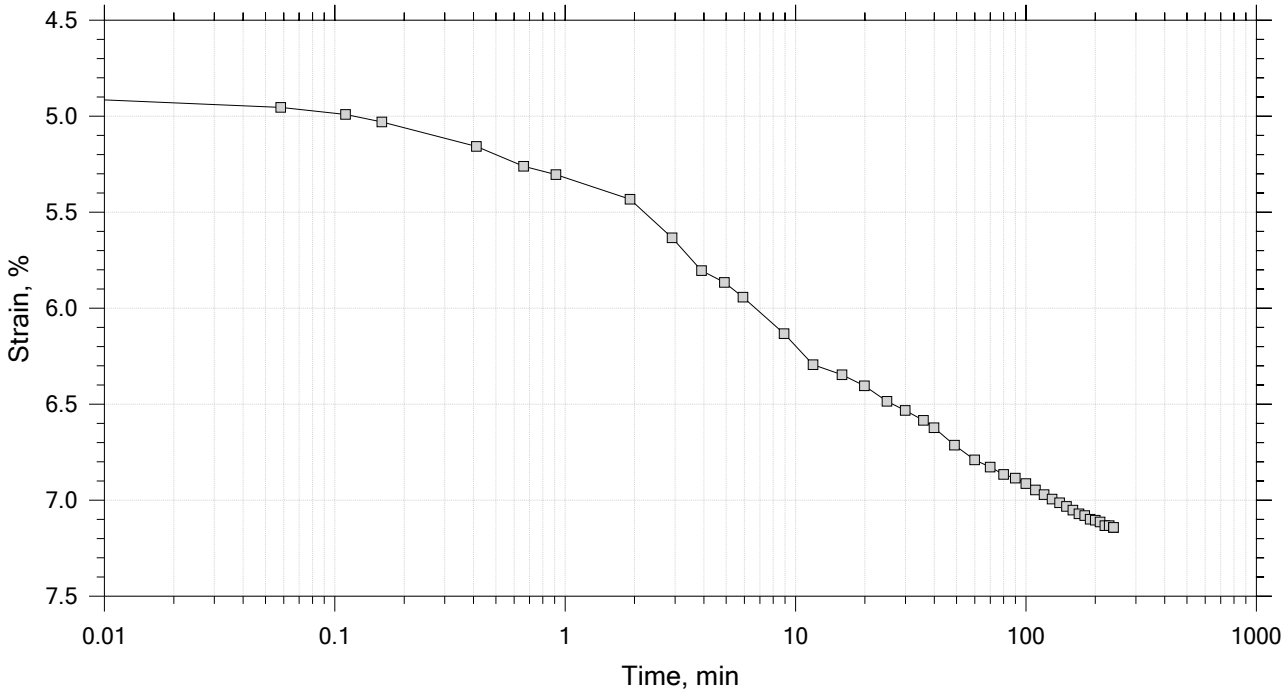
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

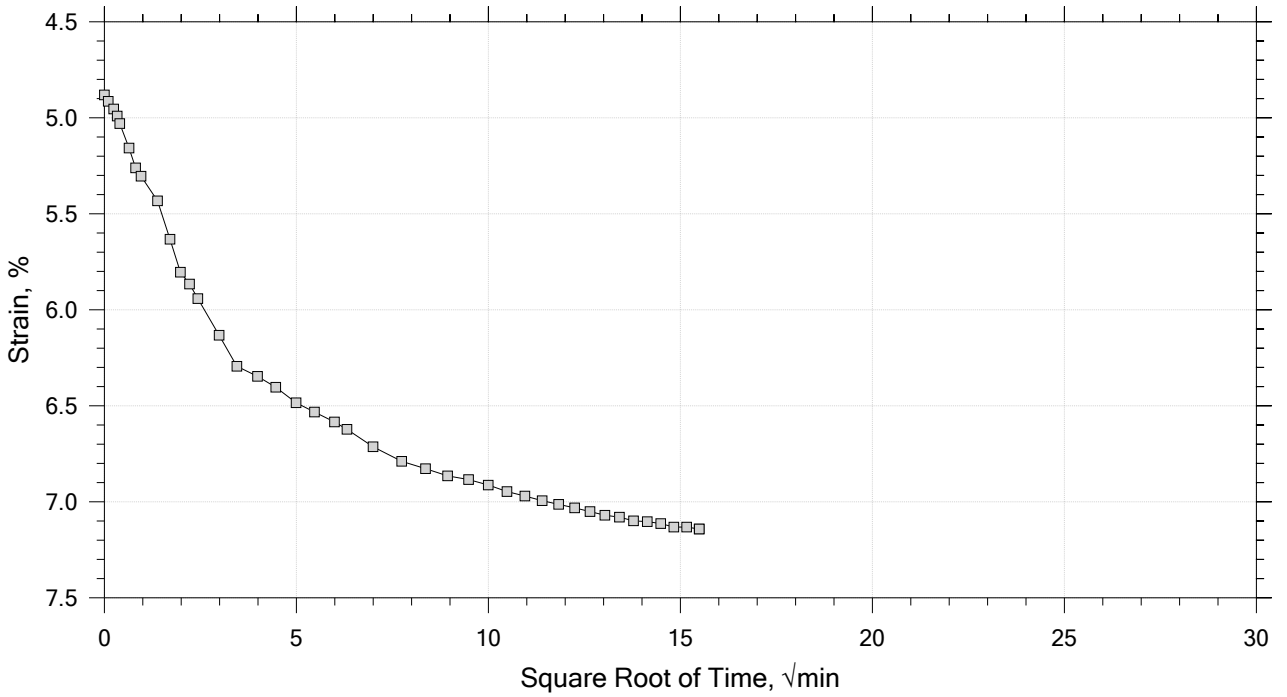
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





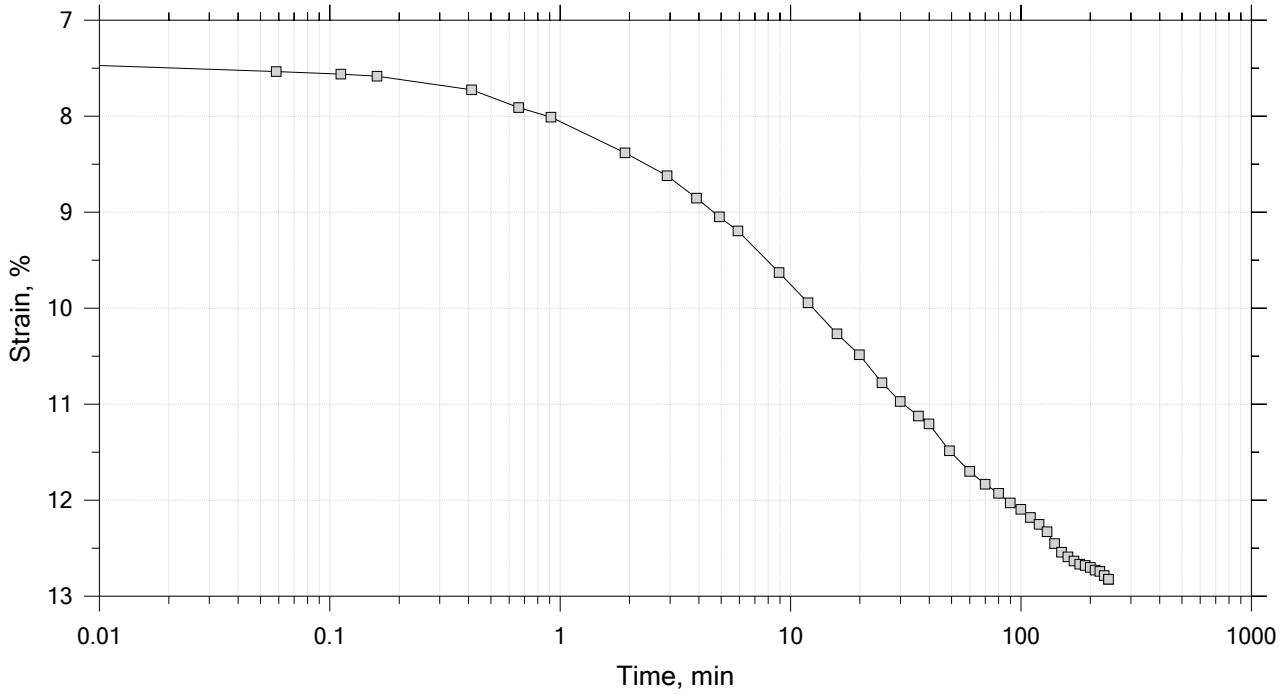
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

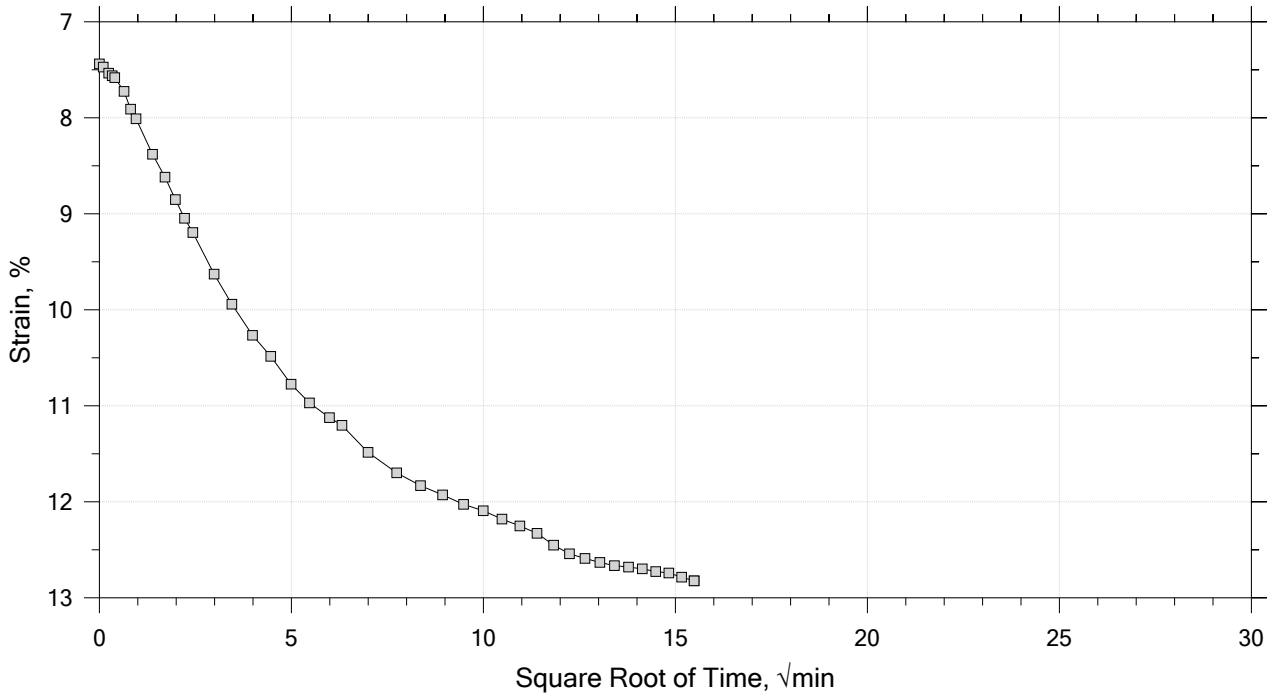
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





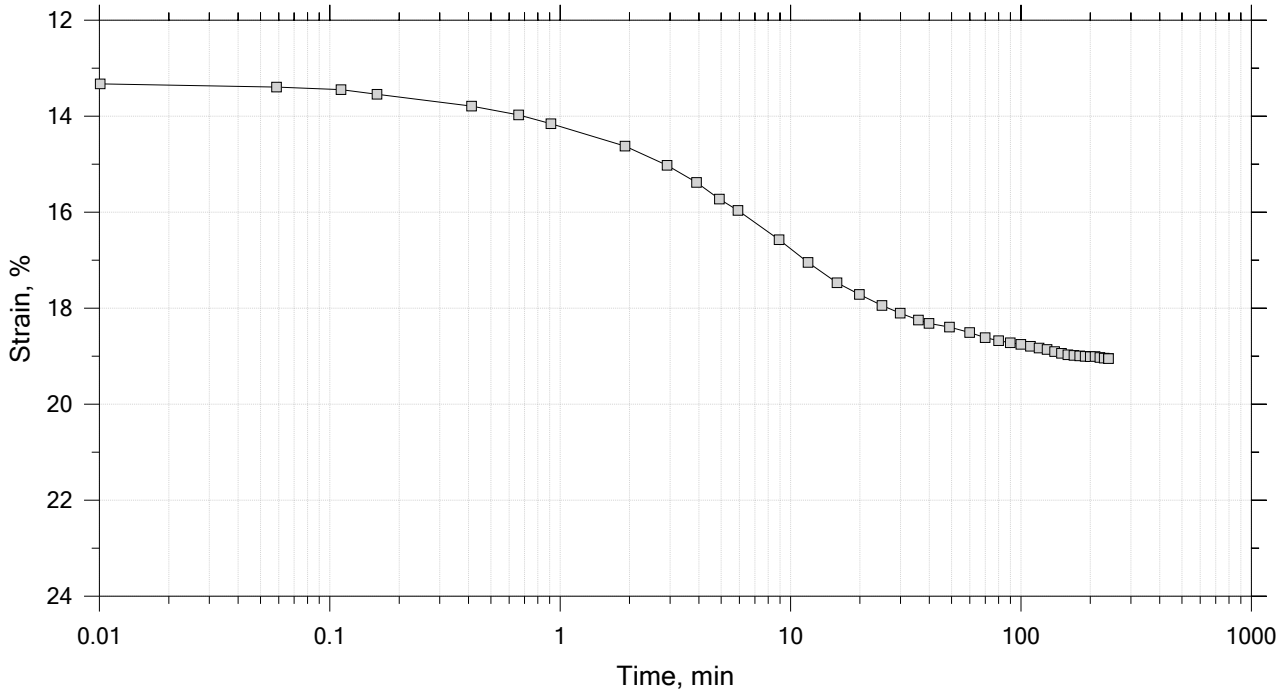
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

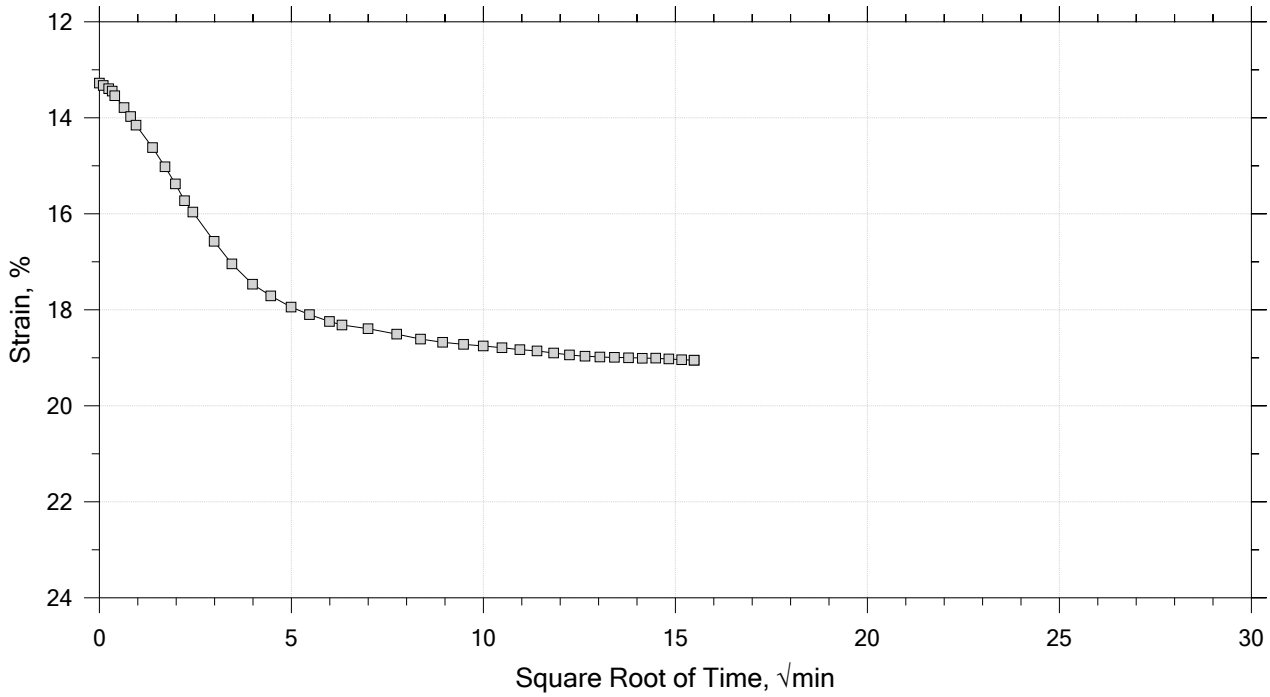
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





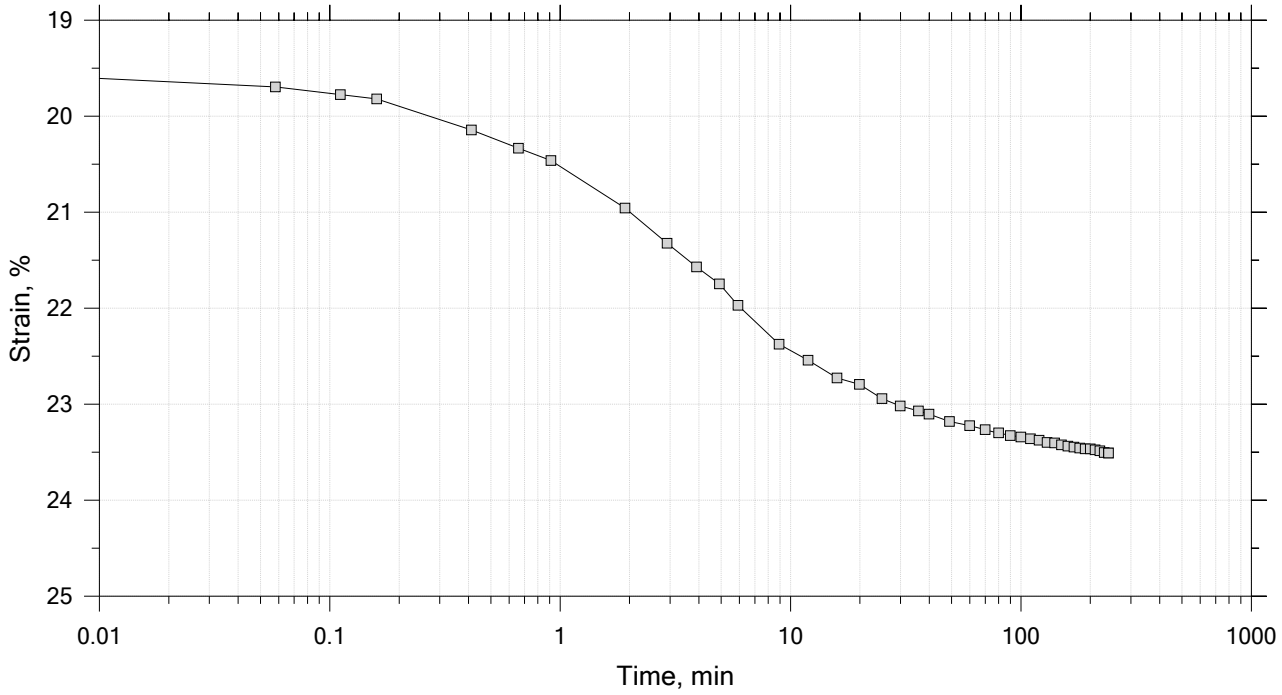
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

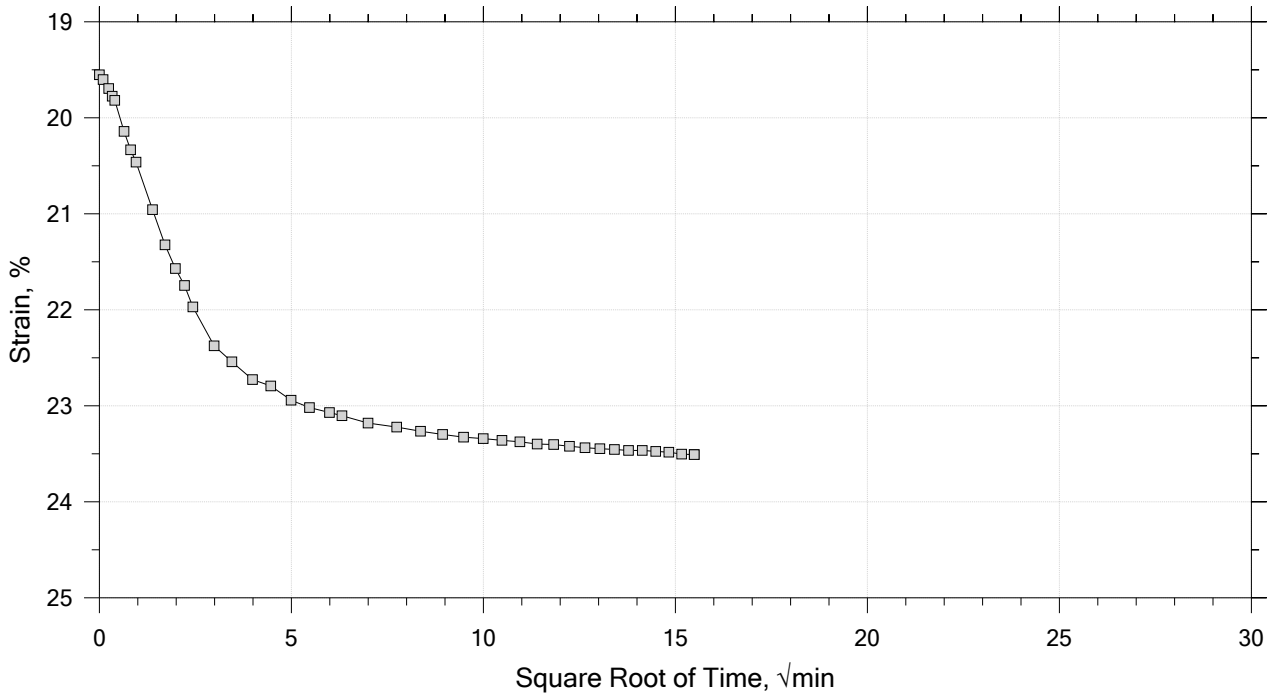
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

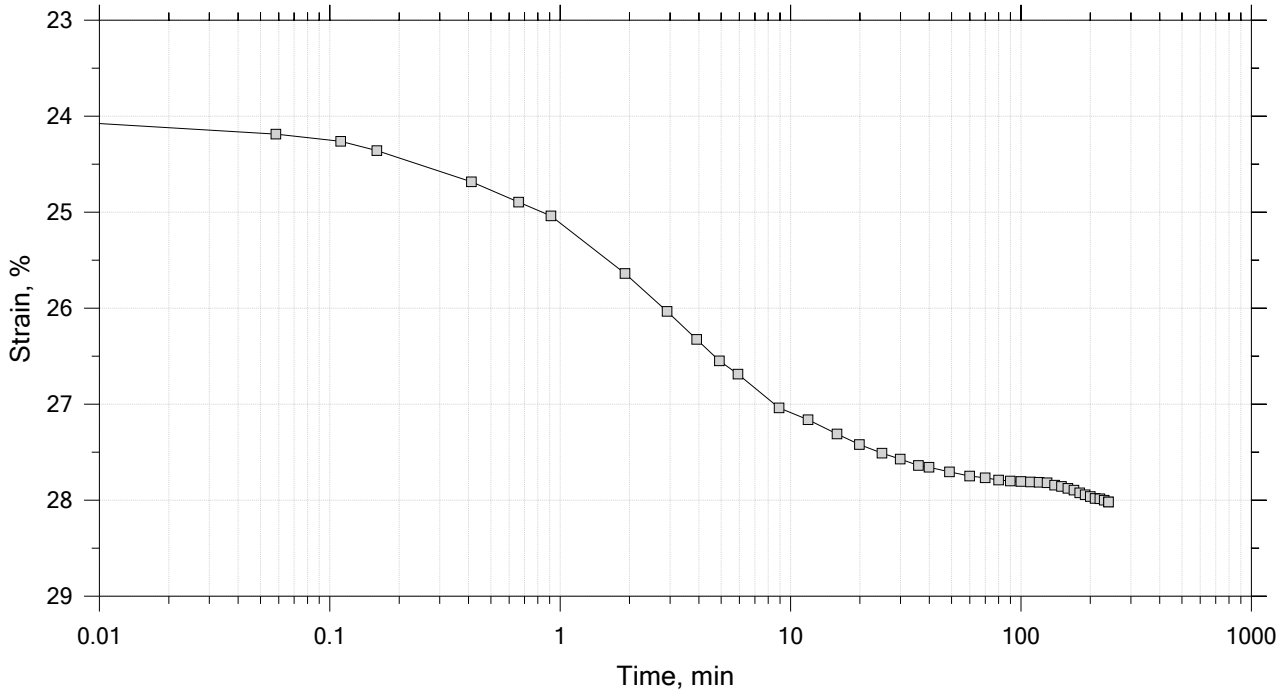


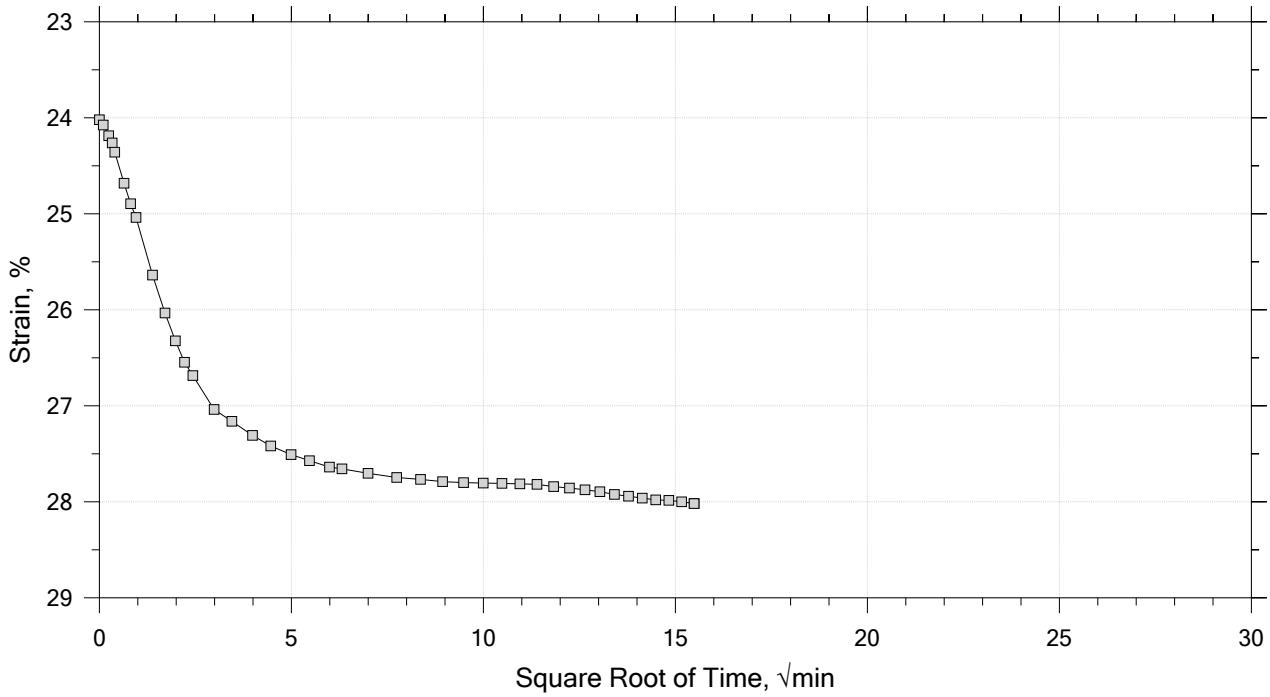


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

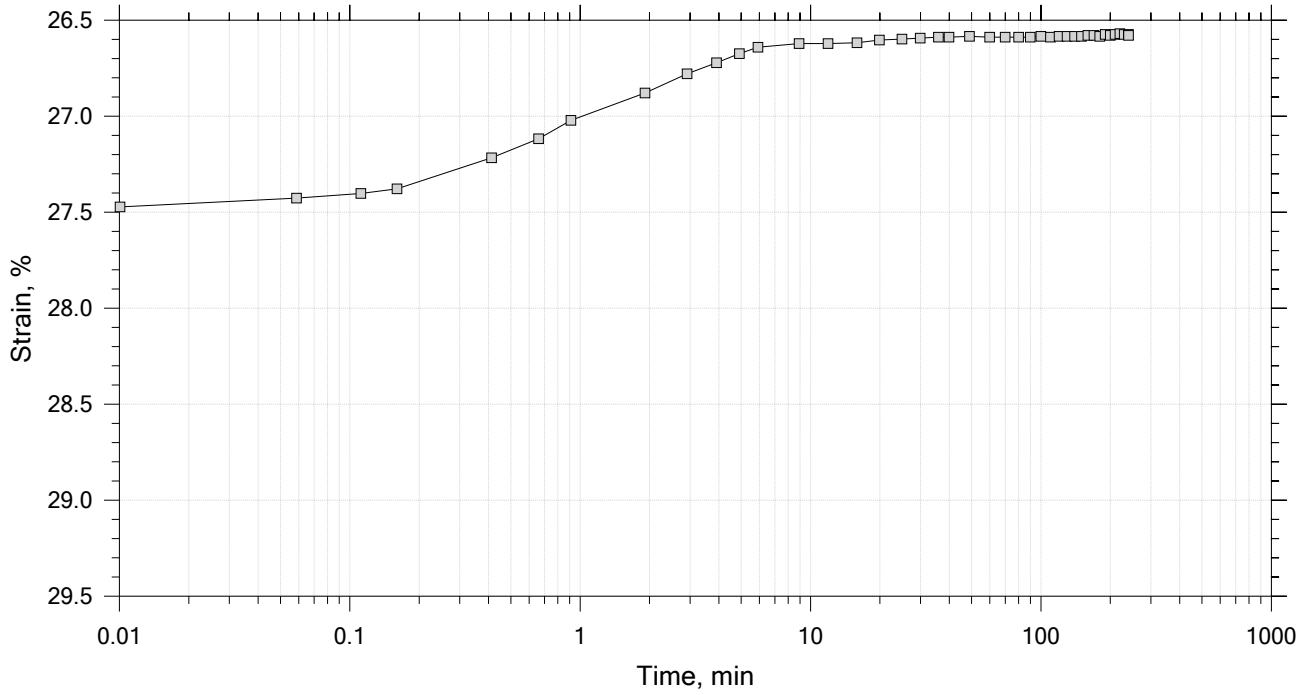


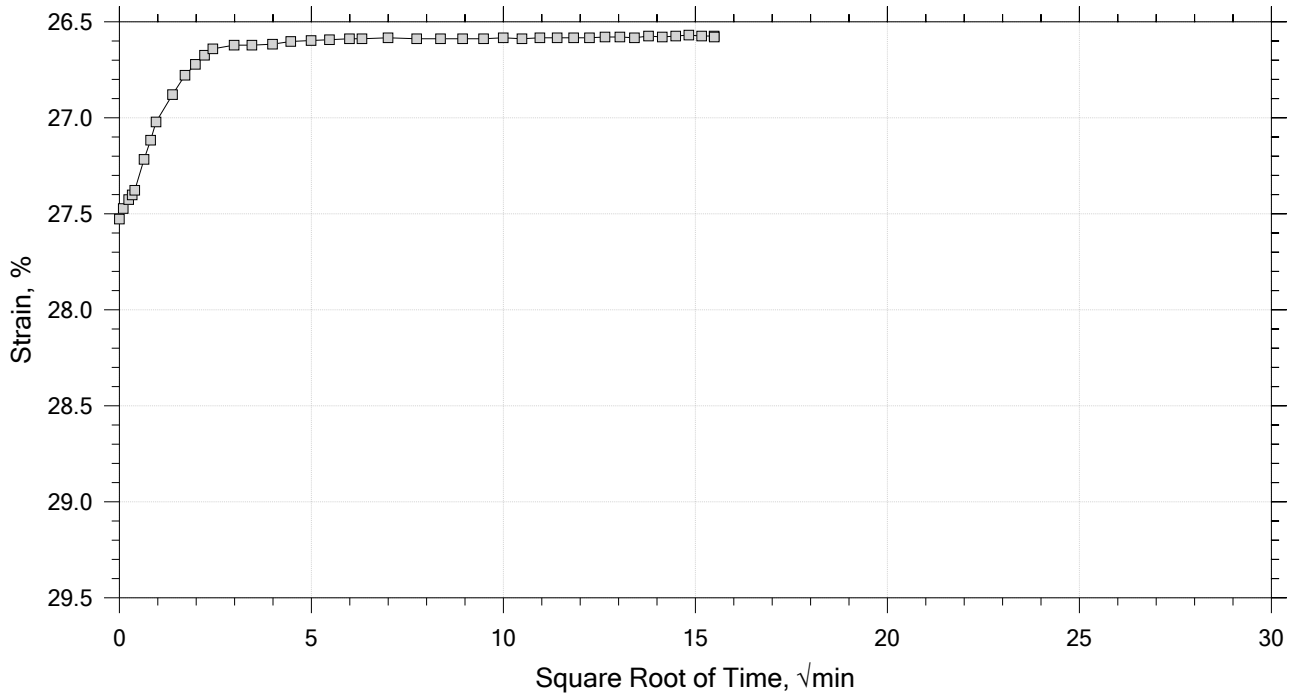


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf

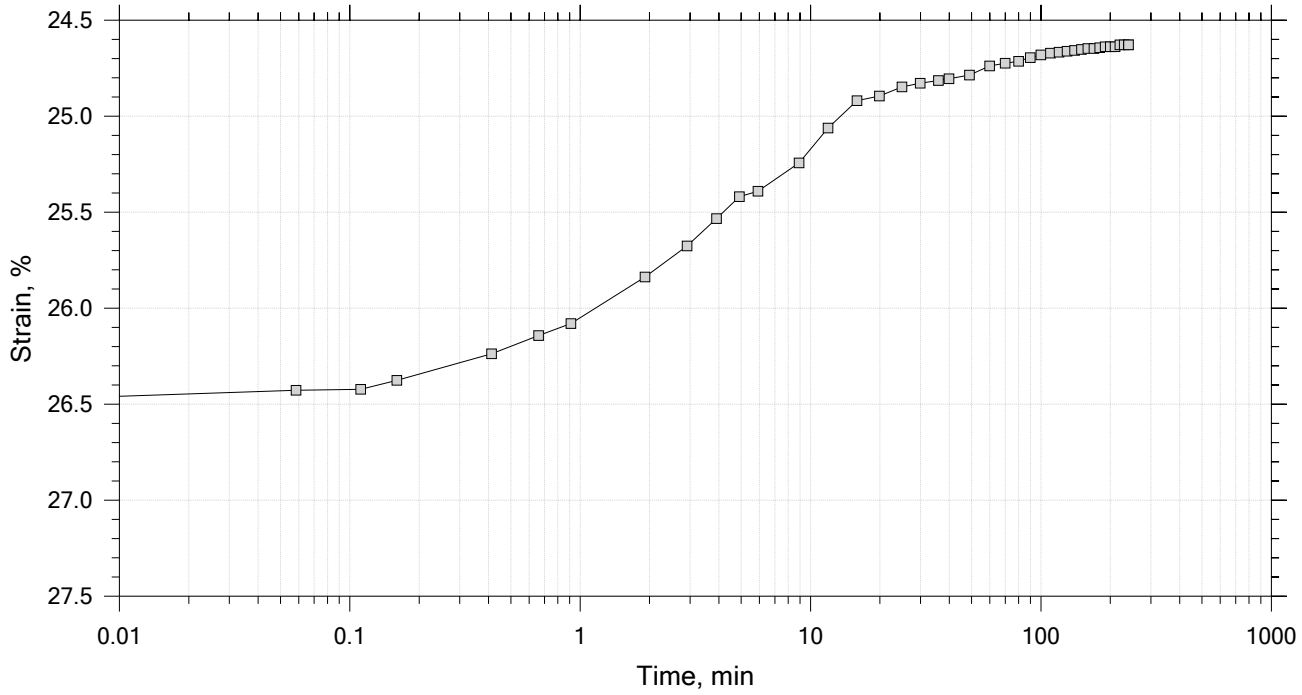


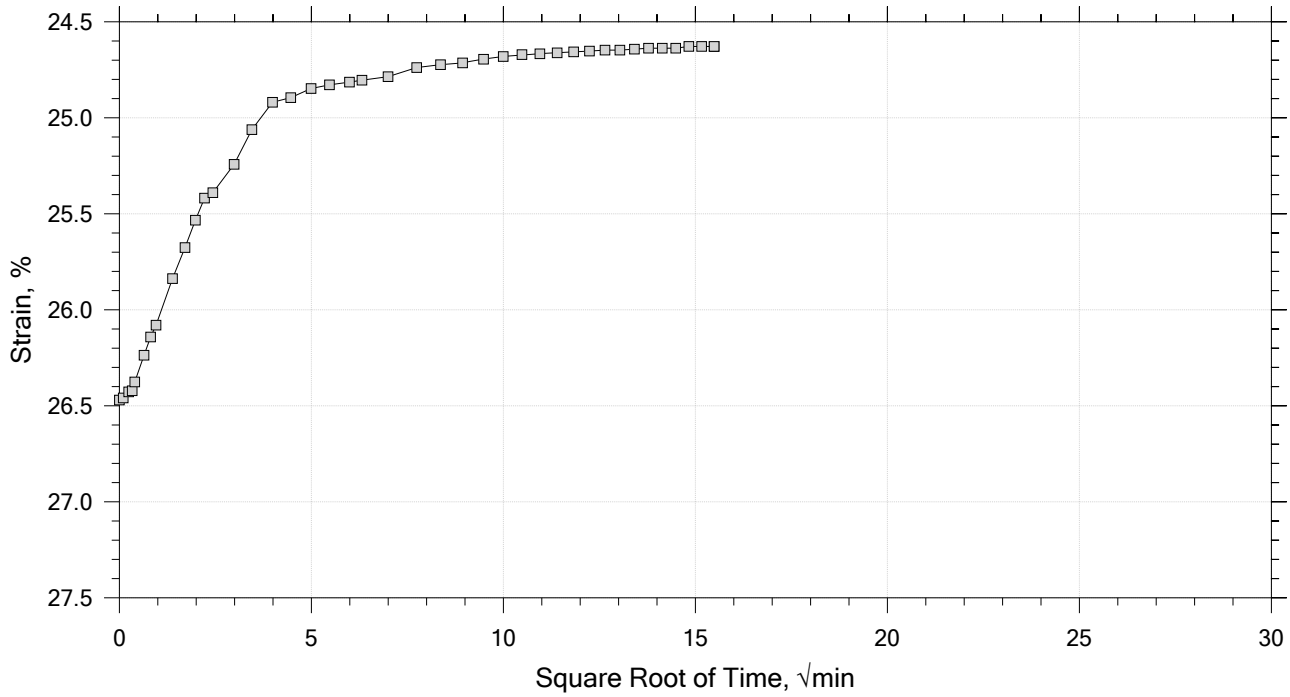


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

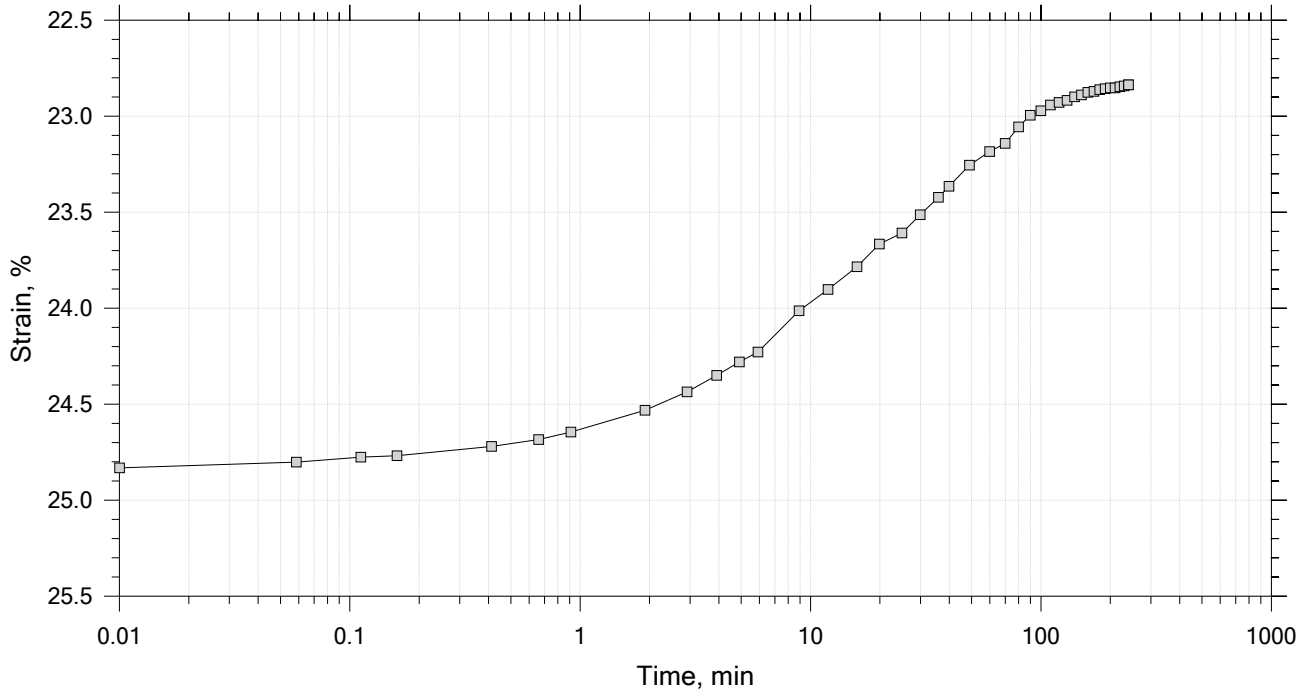


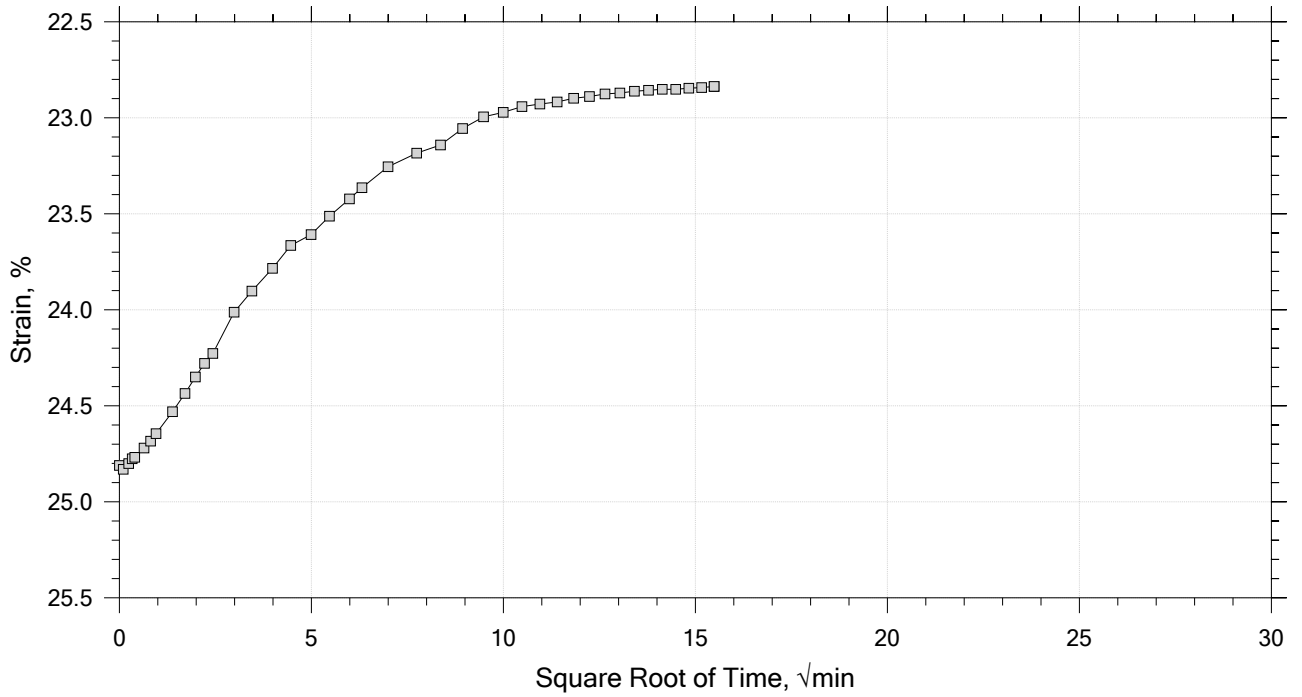


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

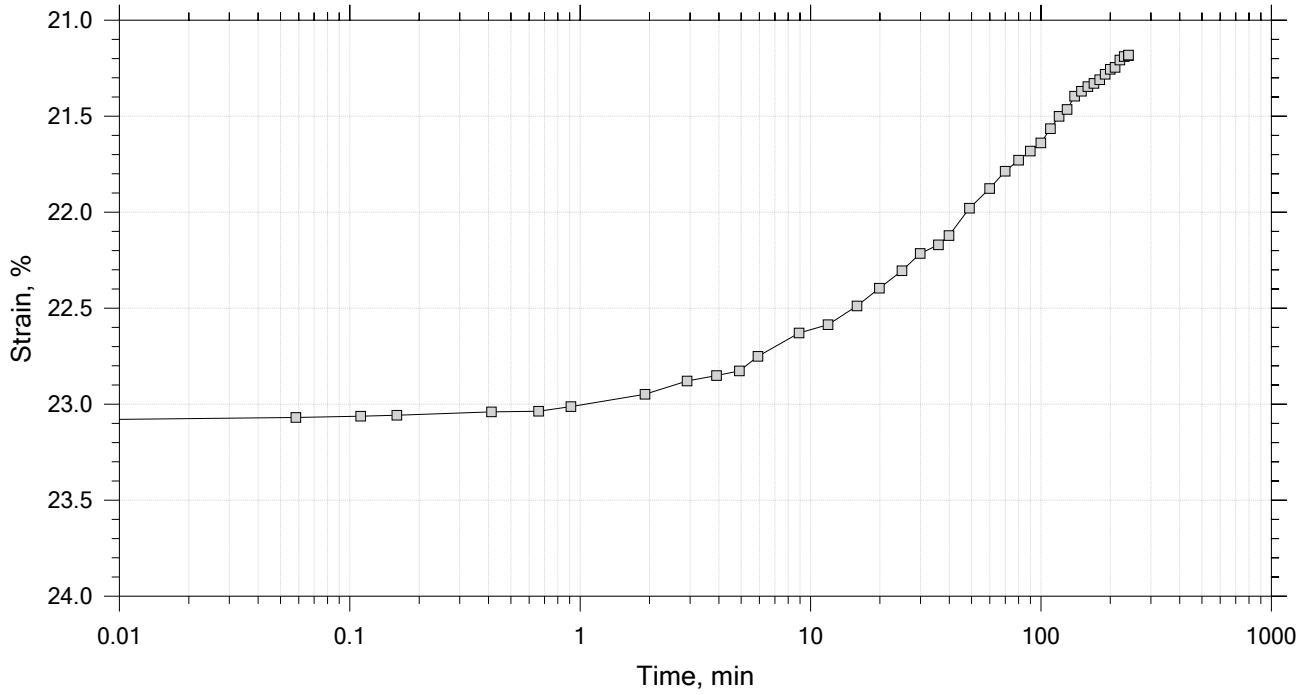


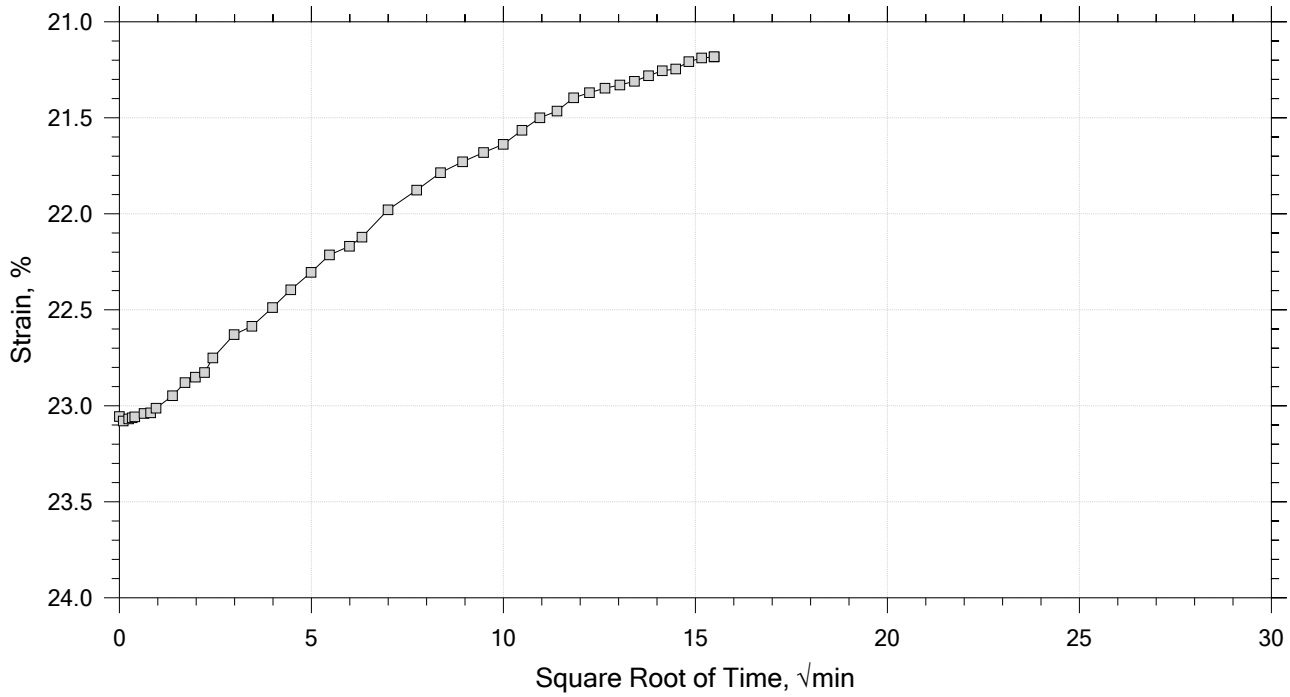


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

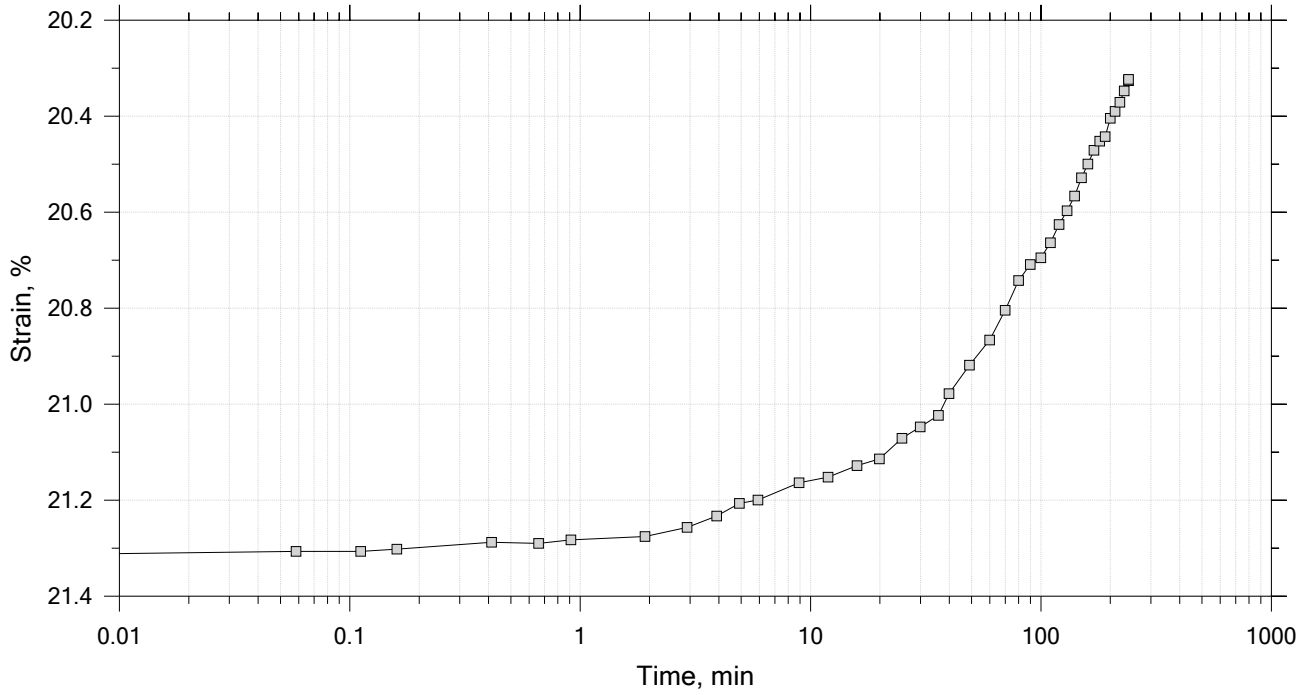


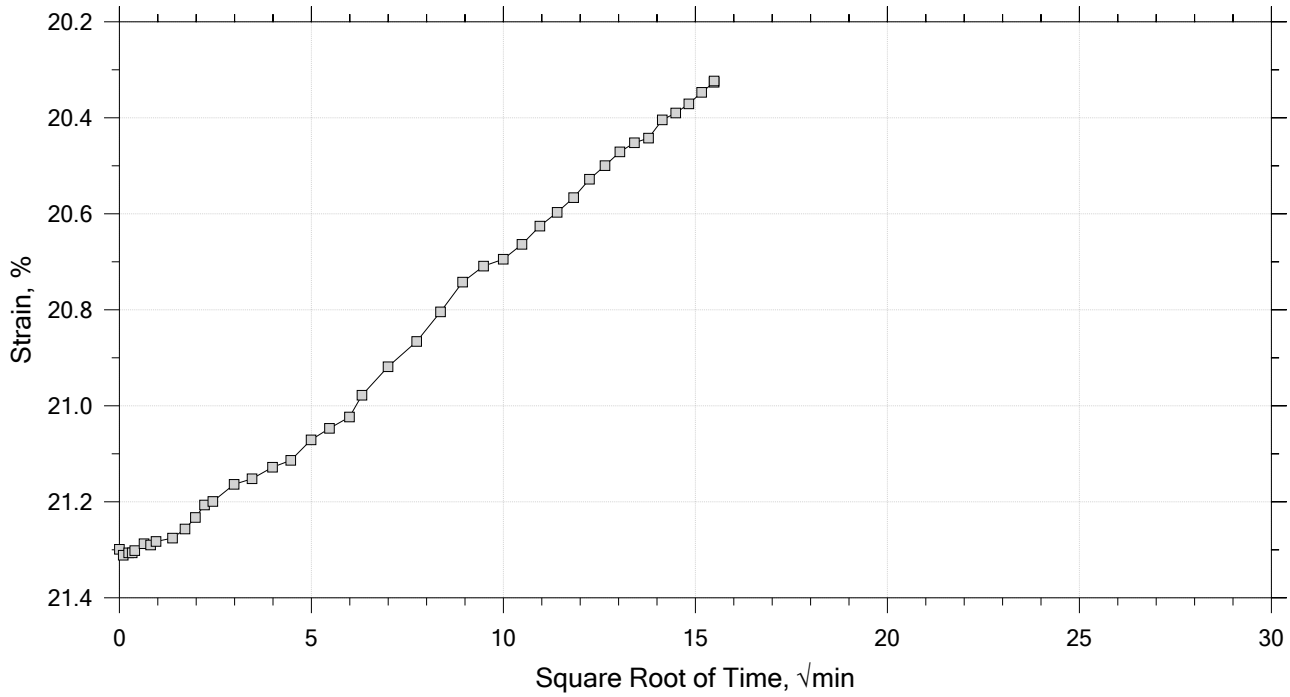


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 39
Initial Height: 1.00 in	Initial Void Ratio: 1.25	Plastic Limit: 20
Final Height: 0.80 in	Final Void Ratio: 0.798	Plasticity Index: 19

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	B2756	RING		D-2281
Mass Container, gm	8.25	111.07	111.07	8.5
Mass Container + Wet Soil, gm	145.57	253.78	238	136.88
Mass Container + Dry Soil, gm	104.48	209.45	209.45	108
Mass Dry Soil, gm	96.23	98.376	98.376	99.5
Water Content, %	42.70	45.07	29.03	29.03
Void Ratio	---	1.25	0.80	---
Degree of Saturation, %	---	99.31	100.00	---
Dry Unit Weight, pcf	---	76.348	95.435	---

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.

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0651	0.005708	1.23	0.571	12.980	4.37e-07	8.77e-02	1.03e-04	0.00e+00
2	0.125	0.01203	1.22	1.20	0.000	0.00e+00	1.06e-01	0.00e+00	0.00e+00
3	0.250	0.01981	1.20	1.98	0.000	0.00e+00	6.22e-02	0.00e+00	0.00e+00
4	0.500	0.03077	1.18	3.08	0.000	0.00e+00	4.39e-02	0.00e+00	0.00e+00
5	1.00	0.04560	1.14	4.56	4.462	1.18e-06	2.97e-02	9.45e-05	0.00e+00
6	2.00	0.07142	1.09	7.14	3.777	1.34e-06	2.58e-02	9.31e-05	0.00e+00
7	4.00	0.1282	0.959	12.8	8.876	5.20e-07	2.84e-02	3.99e-05	0.00e+00
8	8.00	0.1905	0.819	19.0	4.659	8.65e-07	1.56e-02	3.63e-05	0.00e+00
9	16.0	0.2351	0.719	23.5	2.813	1.26e-06	5.57e-03	1.89e-05	0.00e+00
10	32.0	0.2802	0.617	28.0	2.371	1.33e-06	2.82e-03	1.01e-05	0.00e+00
11	8.00	0.2658	0.650	26.6	0.000	0.00e+00	6.00e-04	0.00e+00	0.00e+00
12	2.00	0.2463	0.694	24.6	2.762	1.14e-06	3.25e-03	1.00e-05	0.00e+00
13	0.500	0.2284	0.734	22.8	0.000	0.00e+00	1.19e-02	0.00e+00	0.00e+00
14	0.125	0.2118	0.771	21.2	0.000	0.00e+00	4.41e-02	0.00e+00	0.00e+00
15	0.0625	0.2032	0.790	20.3	0.000	0.00e+00	1.37e-01	0.00e+00	0.00e+00

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

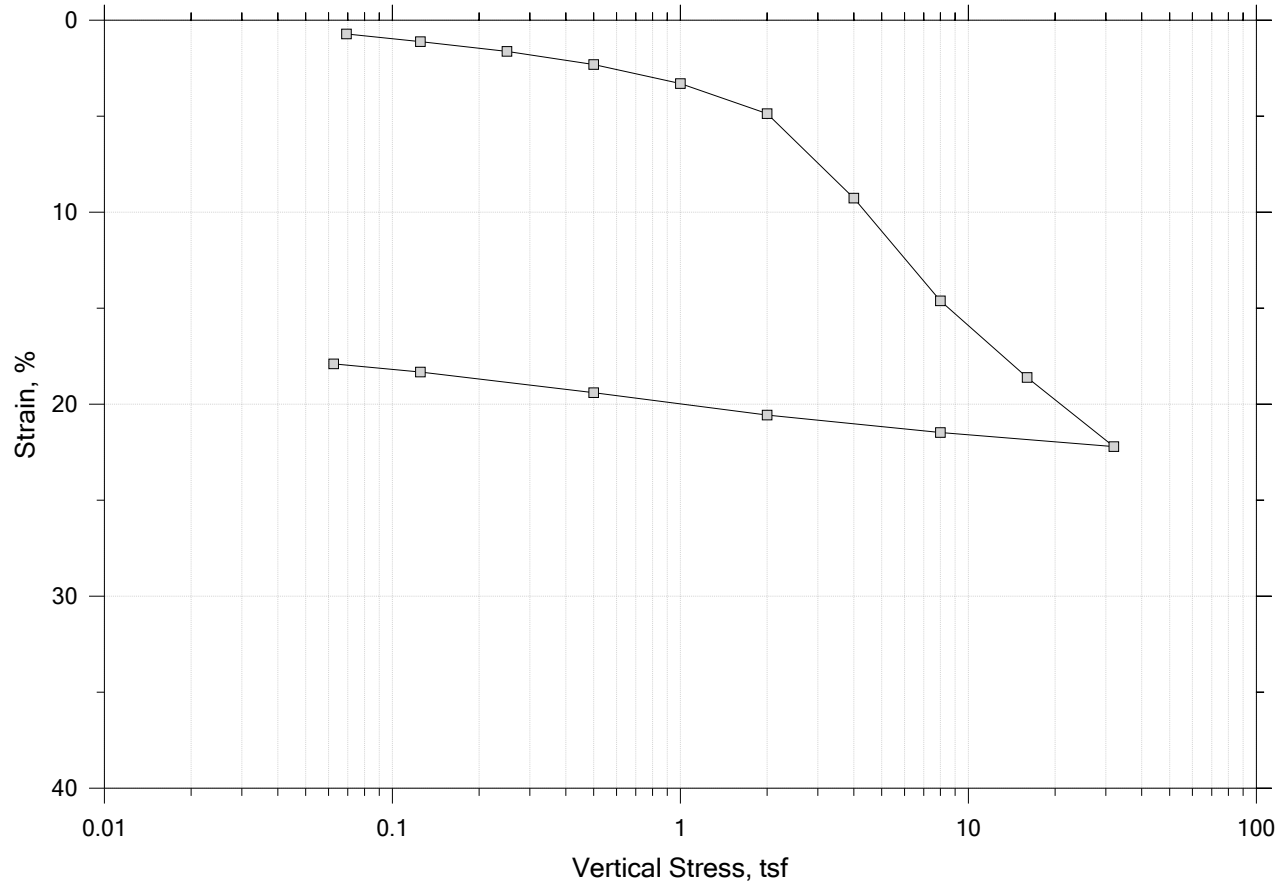
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0651	0.005708	1.23	0.571	65.067	3.75e-07	8.77e-02	8.87e-05
2	0.125	0.01203	1.22	1.20	23.429	1.03e-06	1.06e-01	2.93e-04
3	0.250	0.01981	1.20	1.98	37.566	6.33e-07	6.22e-02	1.06e-04
4	0.500	0.03077	1.18	3.08	28.514	8.18e-07	4.39e-02	9.67e-05
5	1.00	0.04560	1.14	4.56	16.883	1.34e-06	2.97e-02	1.08e-04
6	2.00	0.07142	1.09	7.14	27.220	7.99e-07	2.58e-02	5.56e-05
7	4.00	0.1282	0.959	12.8	42.809	4.64e-07	2.84e-02	3.56e-05
8	8.00	0.1905	0.819	19.0	27.979	6.20e-07	1.56e-02	2.60e-05
9	16.0	0.2351	0.719	23.5	12.652	1.20e-06	5.57e-03	1.81e-05
10	32.0	0.2802	0.617	28.0	10.921	1.24e-06	2.82e-03	9.41e-06
11	8.00	0.2658	0.650	26.6	6.144	2.11e-06	6.00e-04	3.42e-06
12	2.00	0.2463	0.694	24.6	16.416	8.27e-07	3.25e-03	7.25e-06
13	0.500	0.2284	0.734	22.8	50.237	2.84e-07	1.19e-02	9.15e-06
14	0.125	0.2118	0.771	21.2	176.816	8.44e-08	4.41e-02	1.00e-05
15	0.0625	0.2032	0.790	20.3	182.047	8.46e-08	1.37e-01	3.13e-05

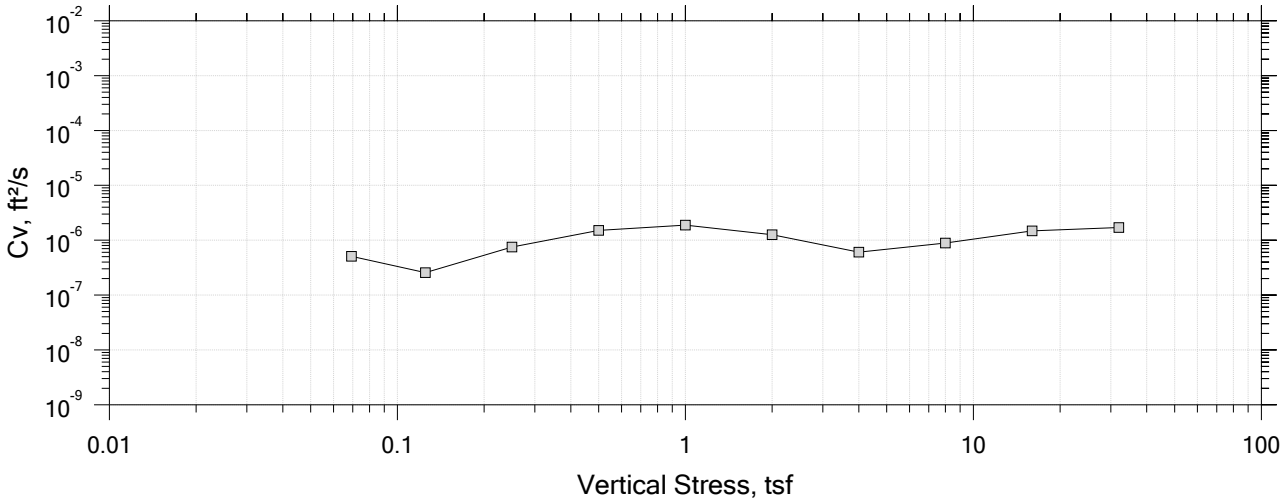
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

B-109 U-2

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





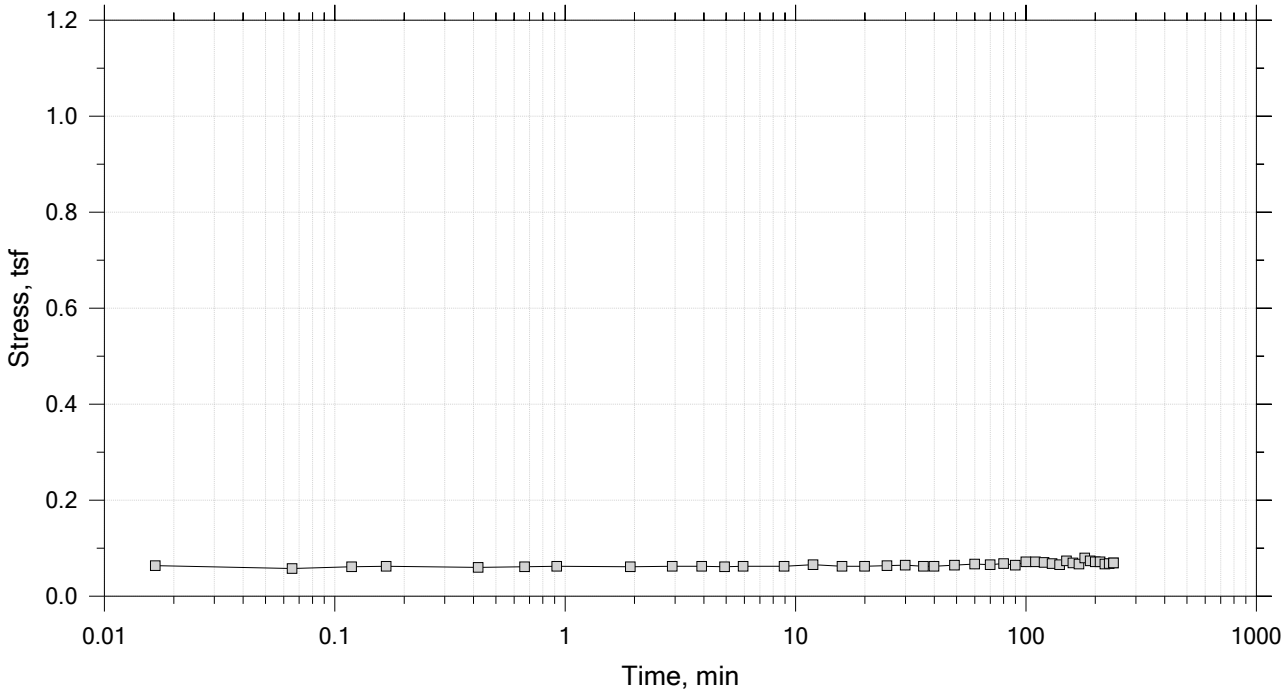
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		
	Displacement at End of Increment		

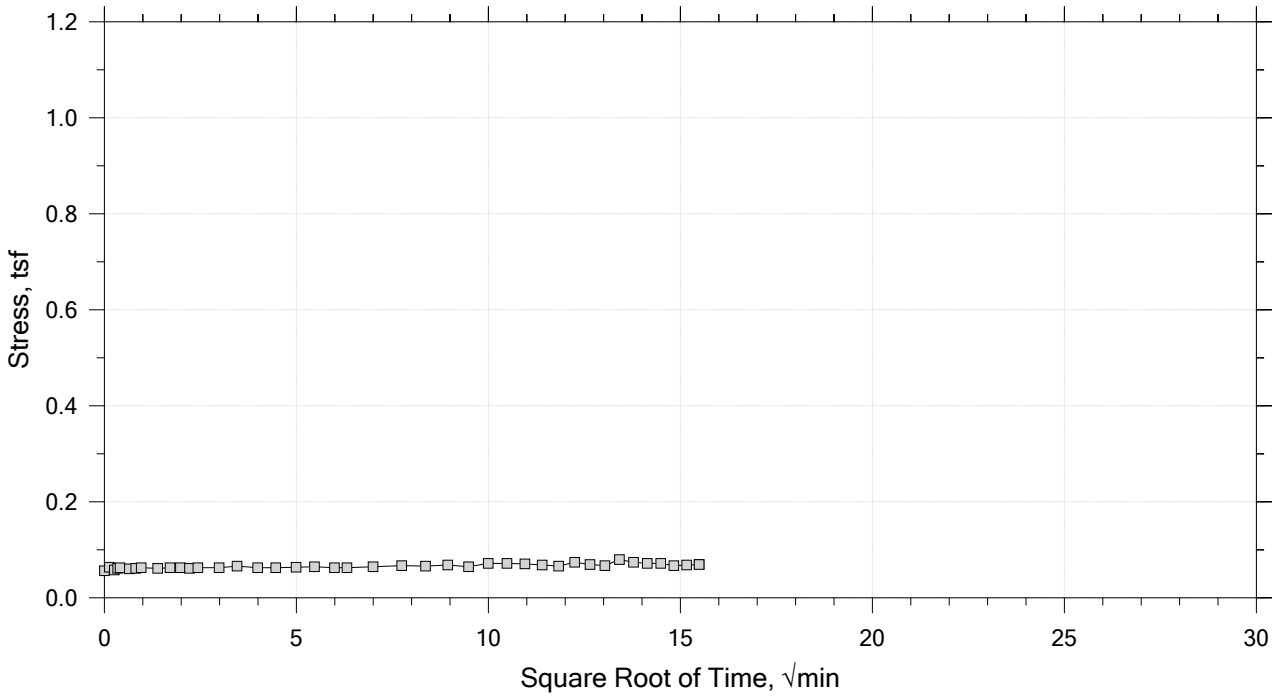
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0693 tsf

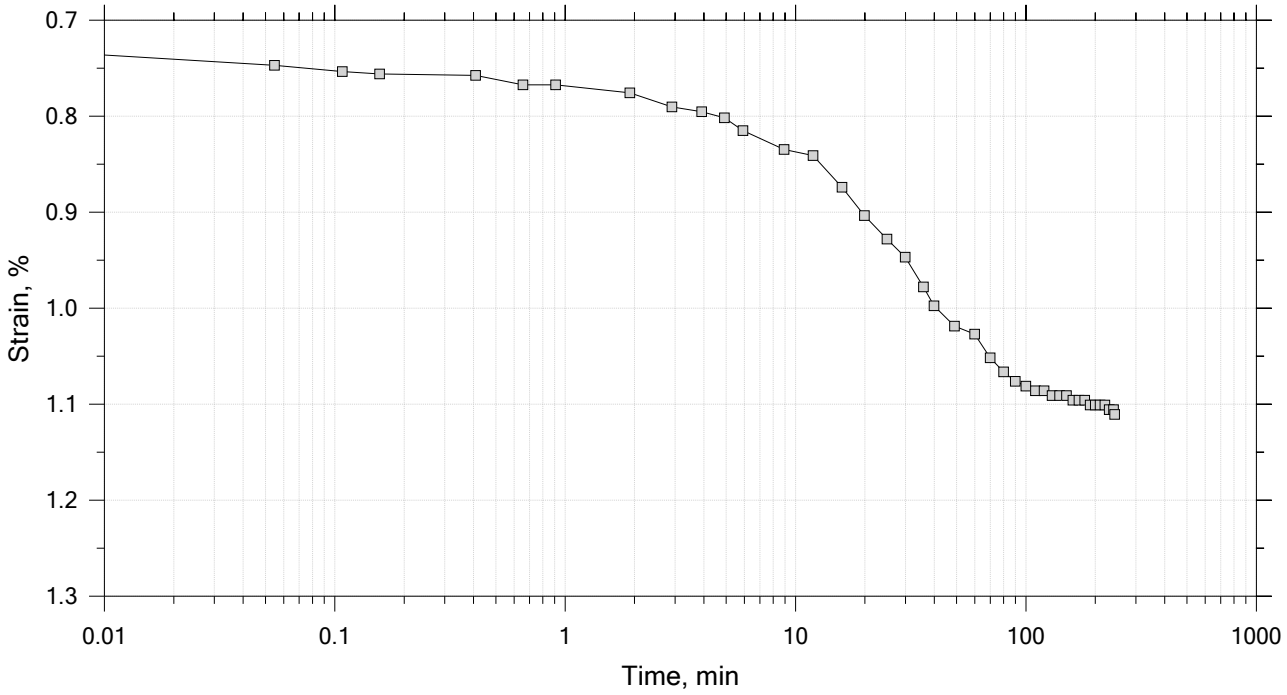


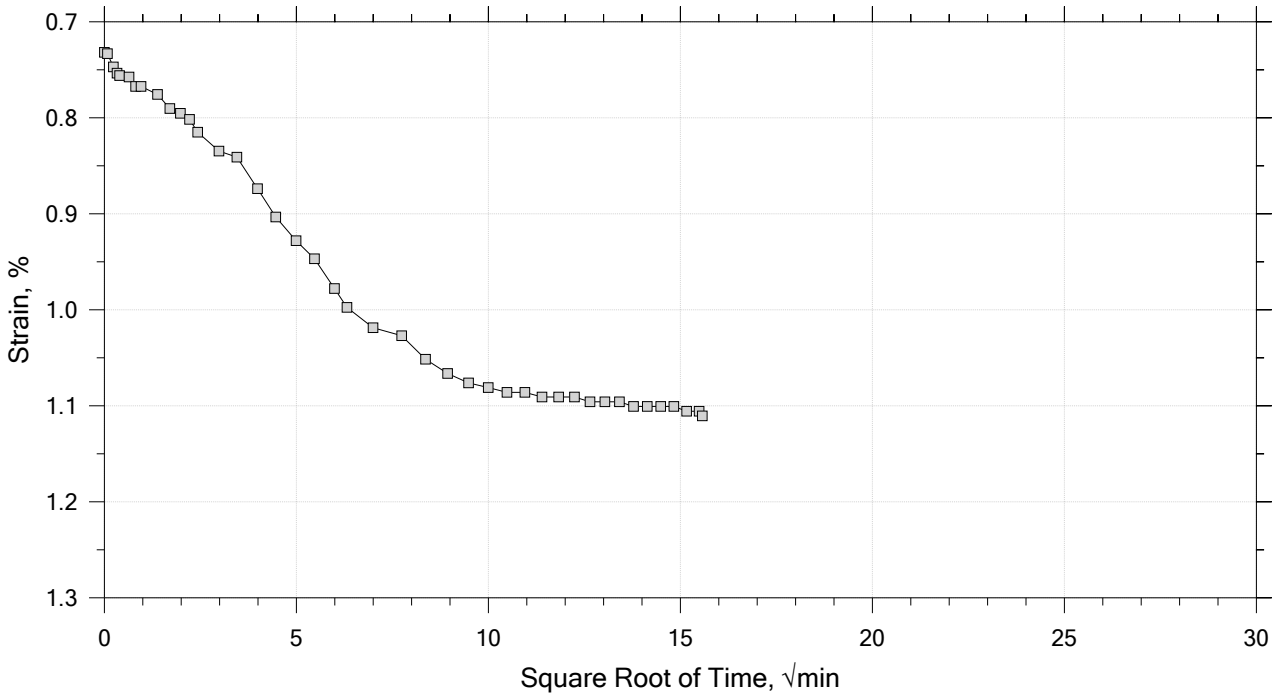


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf





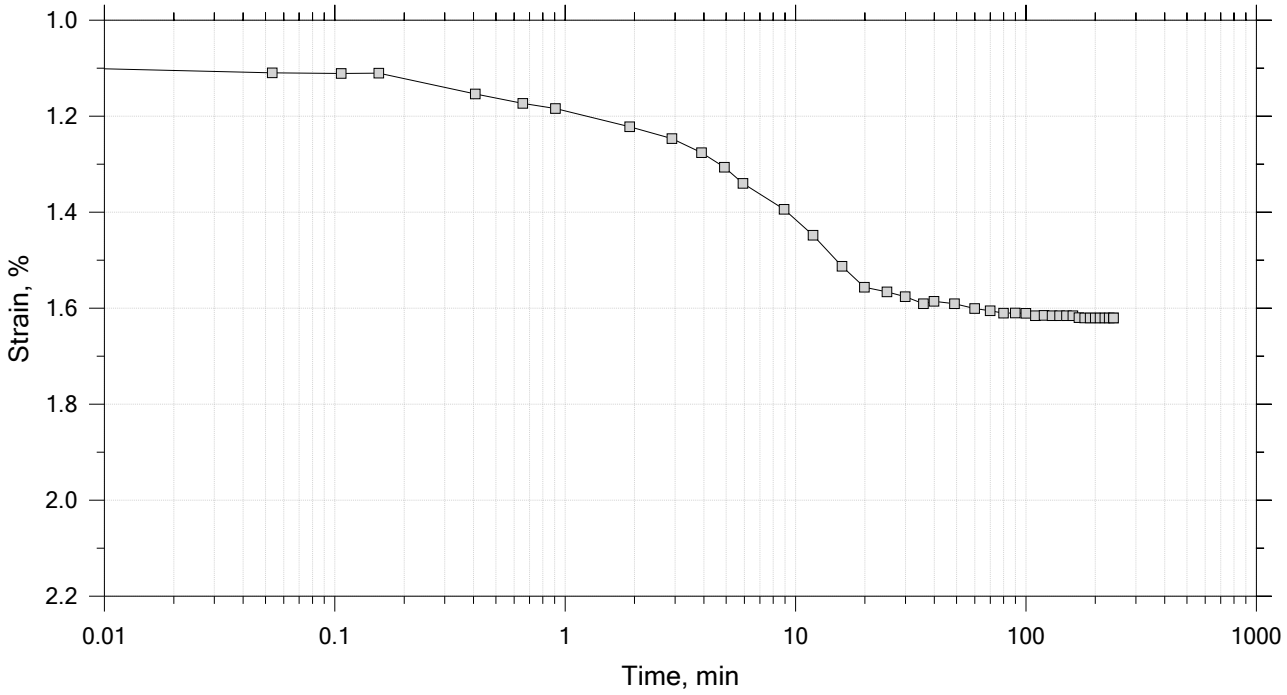
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

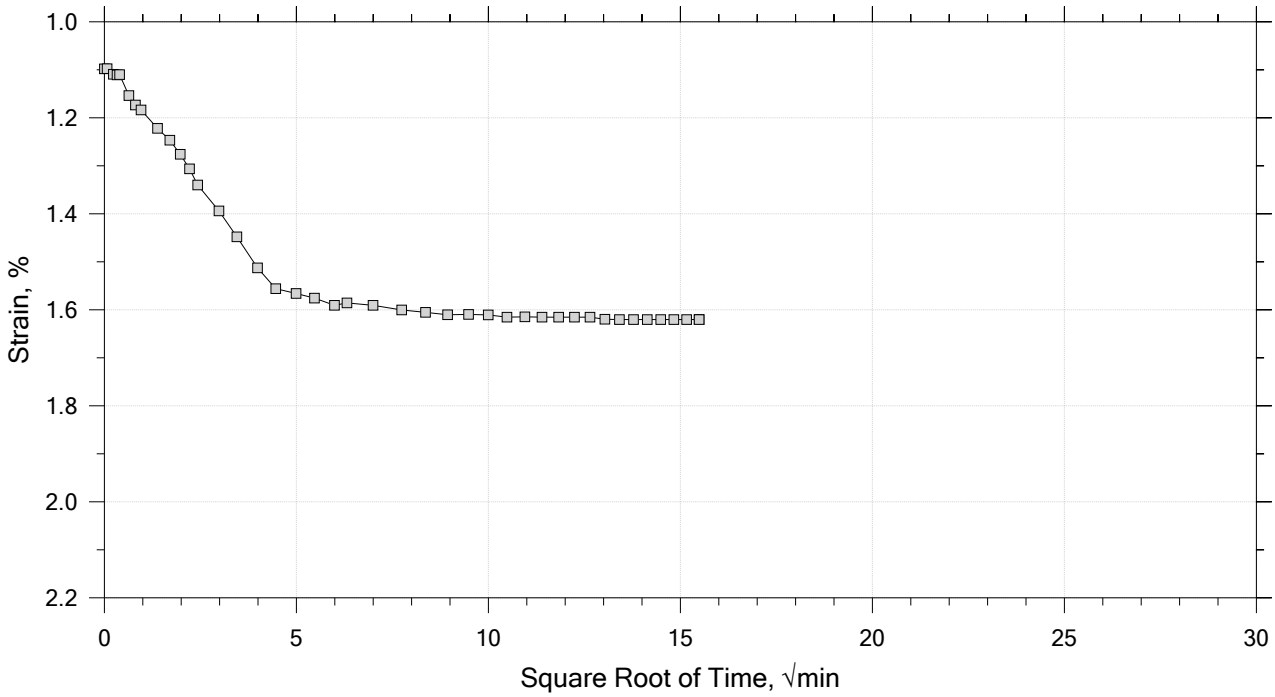
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf





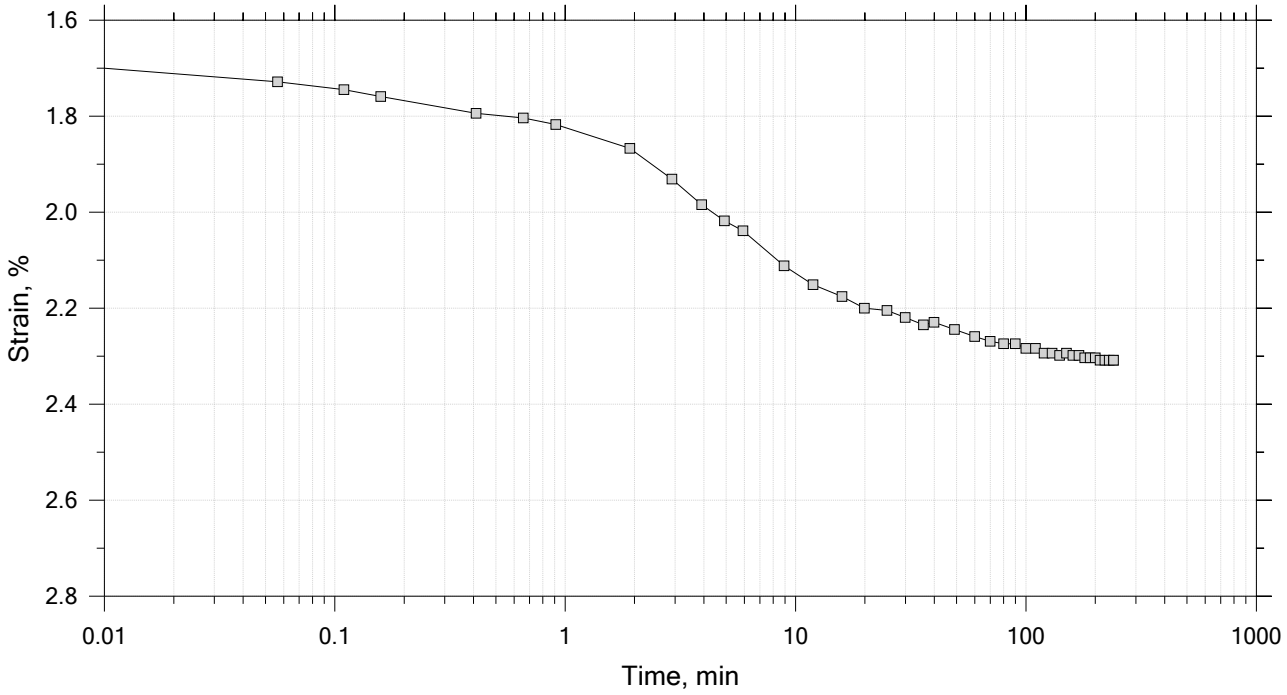
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

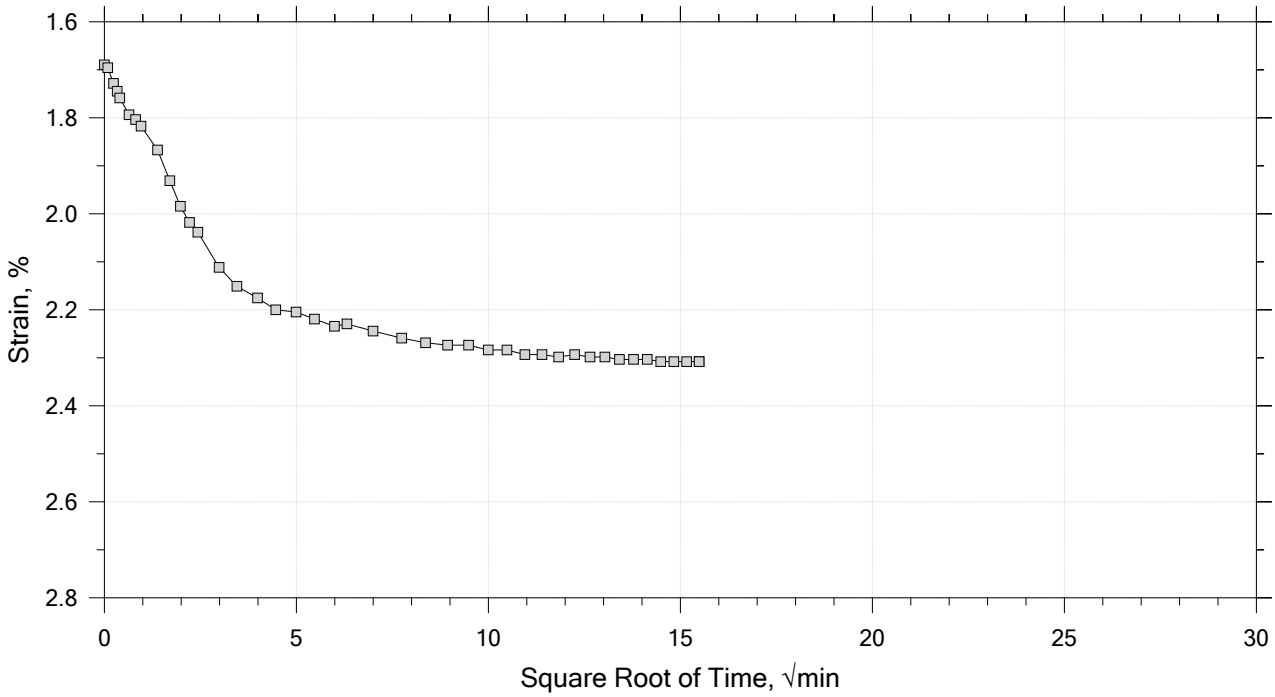
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





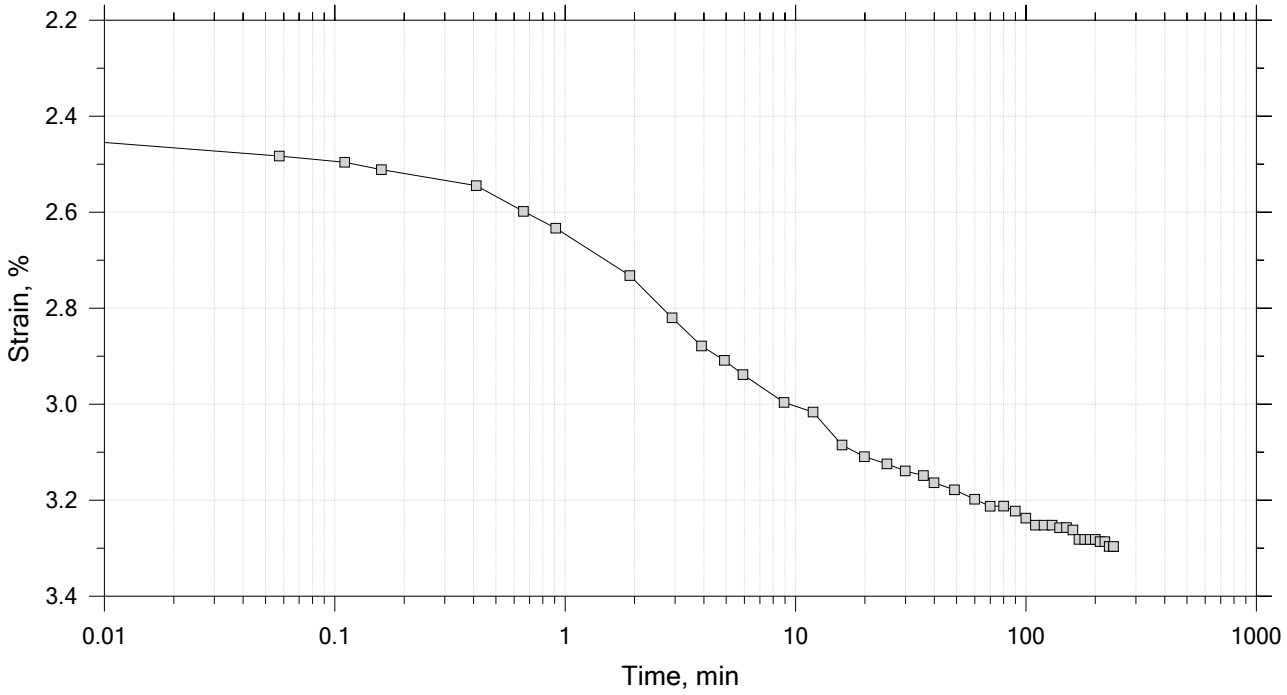
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
Test No.: IP-2B	Sample Type: intact	Elevation: ---
Description: Moist, gray silty clayey sand		
Remarks: System X, Swell Pressure = 0.0693 tsf		

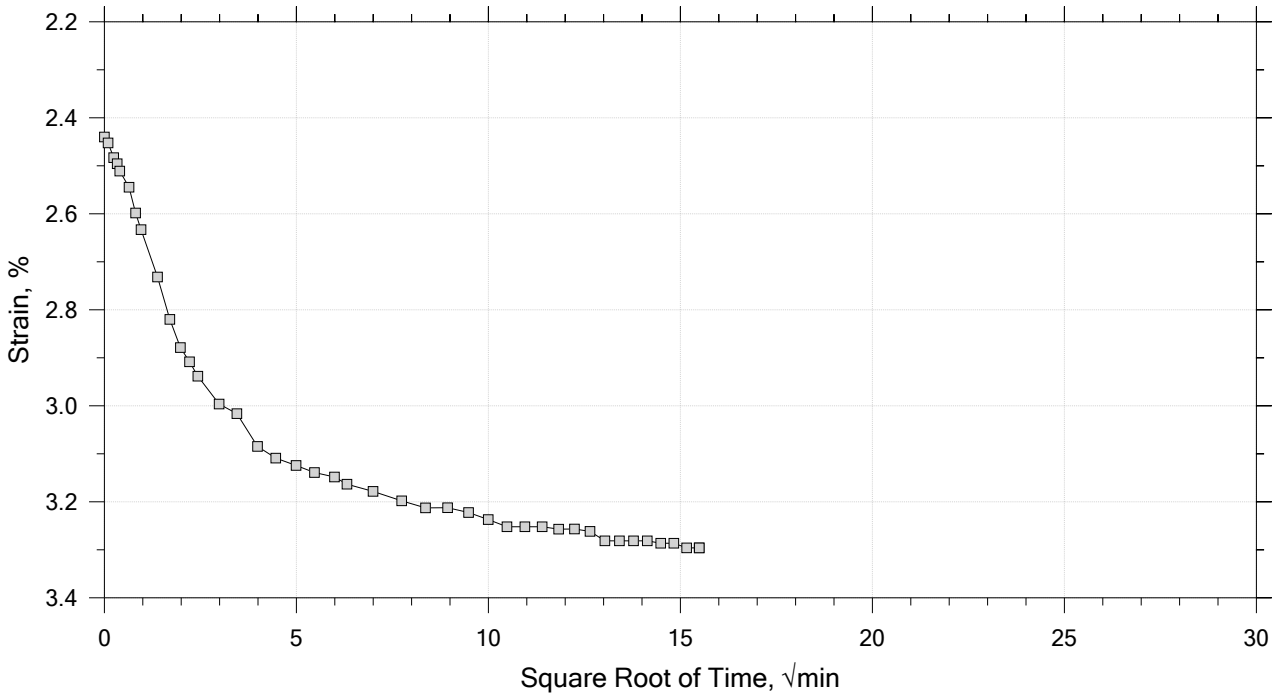
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





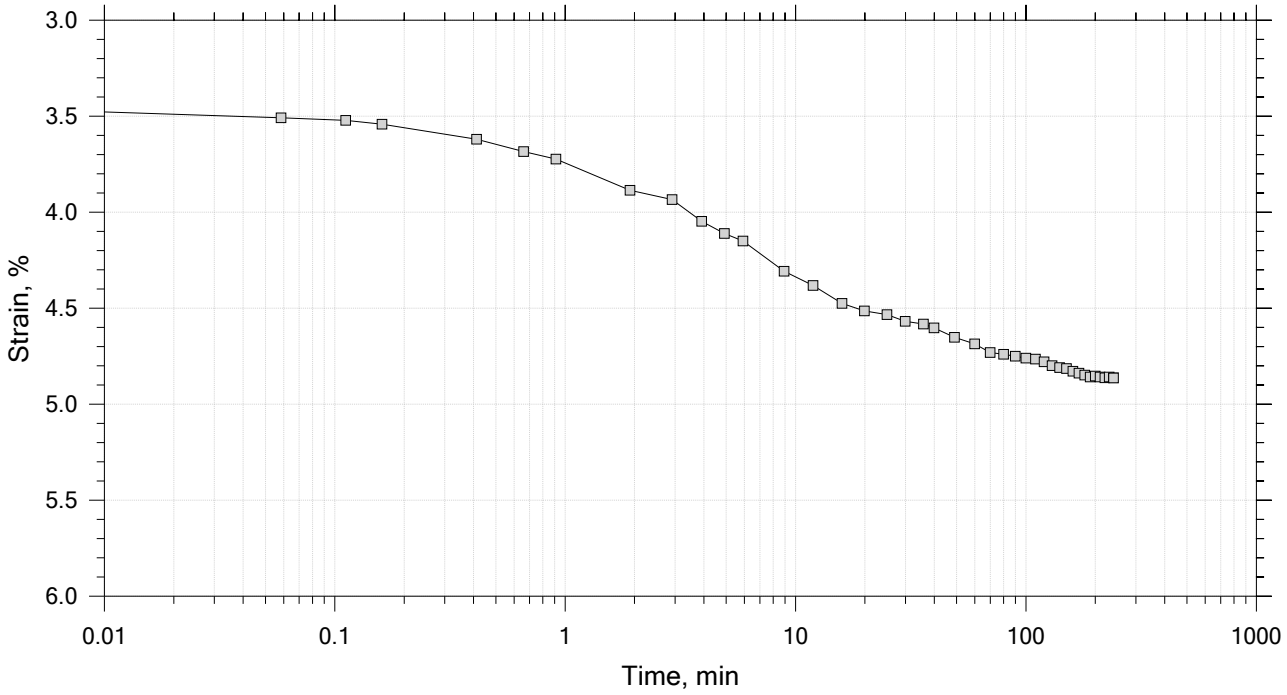
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
Test No.: IP-2B	Sample Type: intact	Elevation: ---
Description: Moist, gray silty clayey sand		
Remarks: System X, Swell Pressure = 0.0693 tsf		

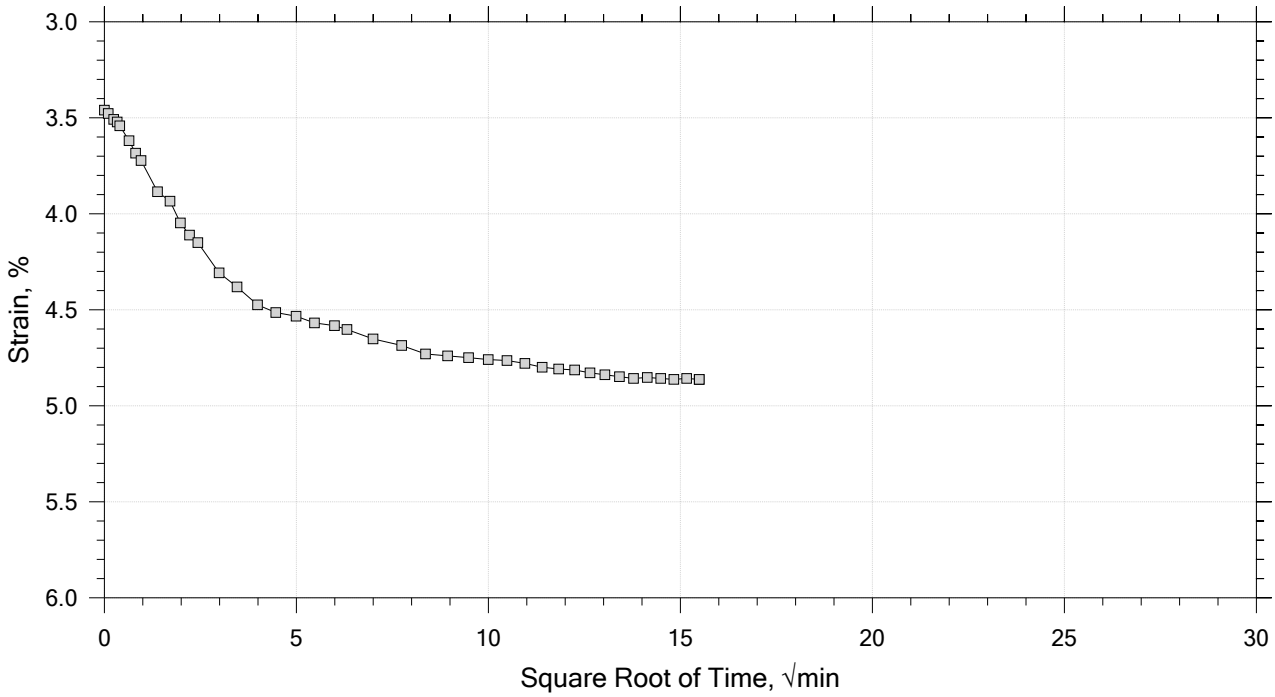
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





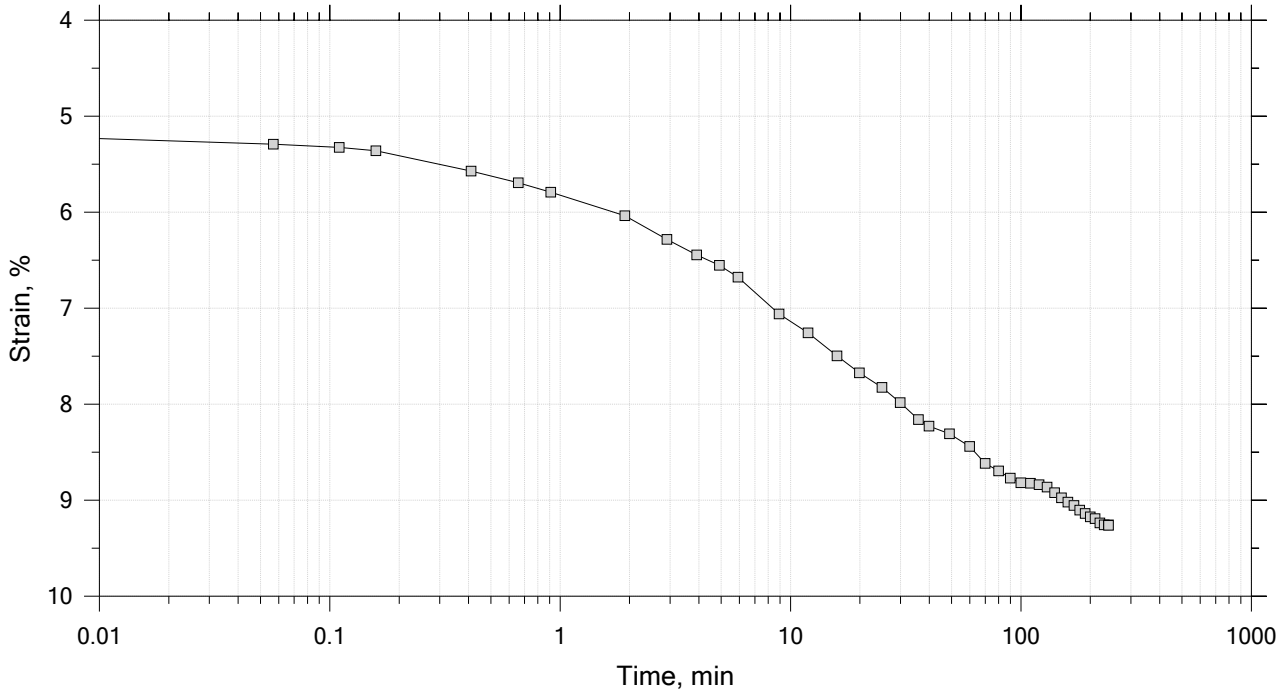
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

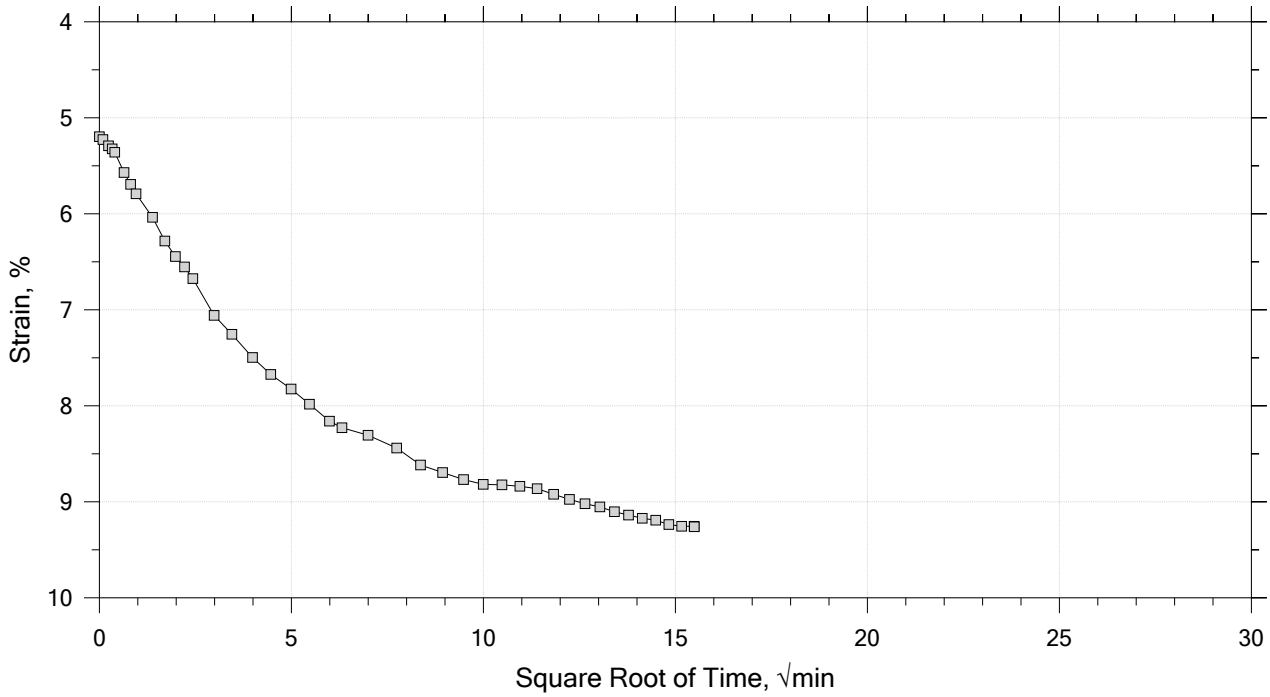
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





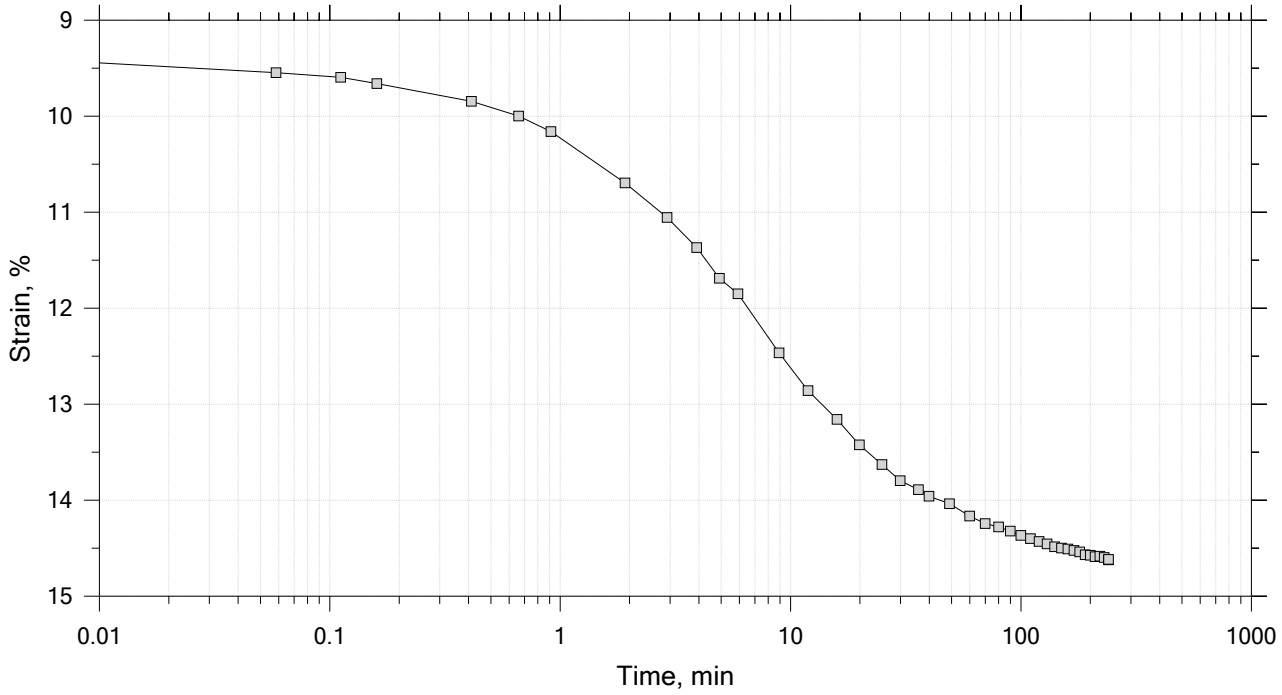
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

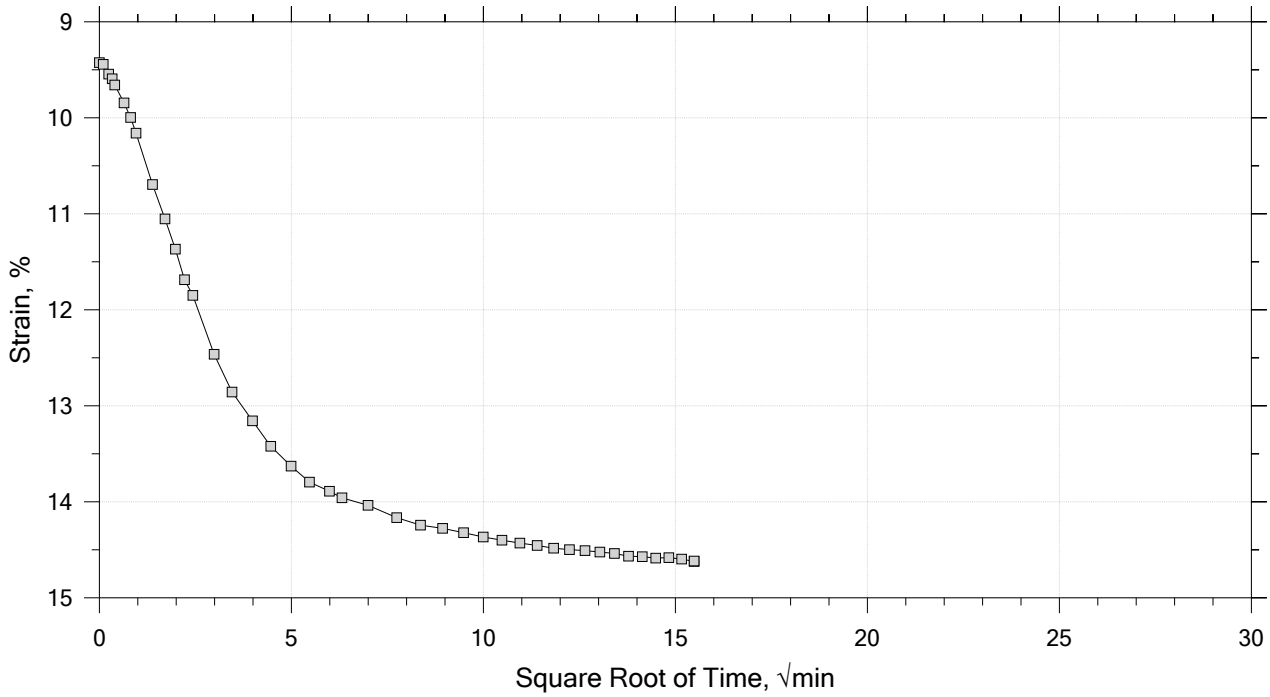
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





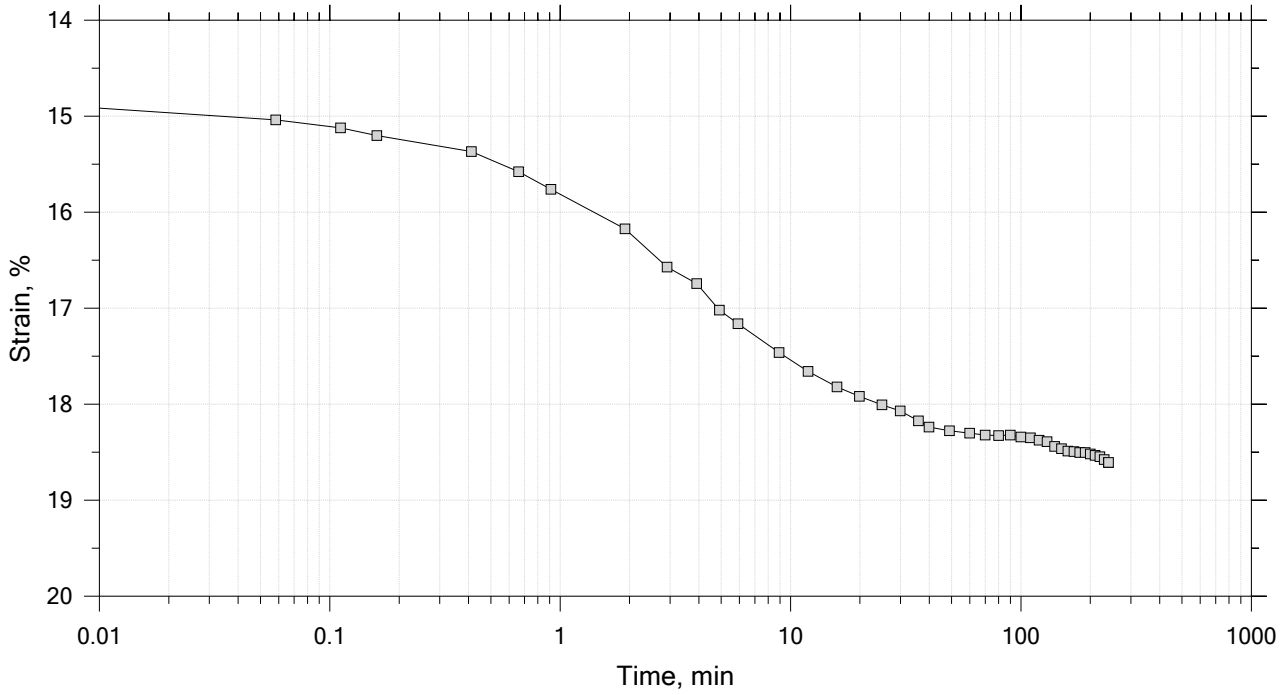
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

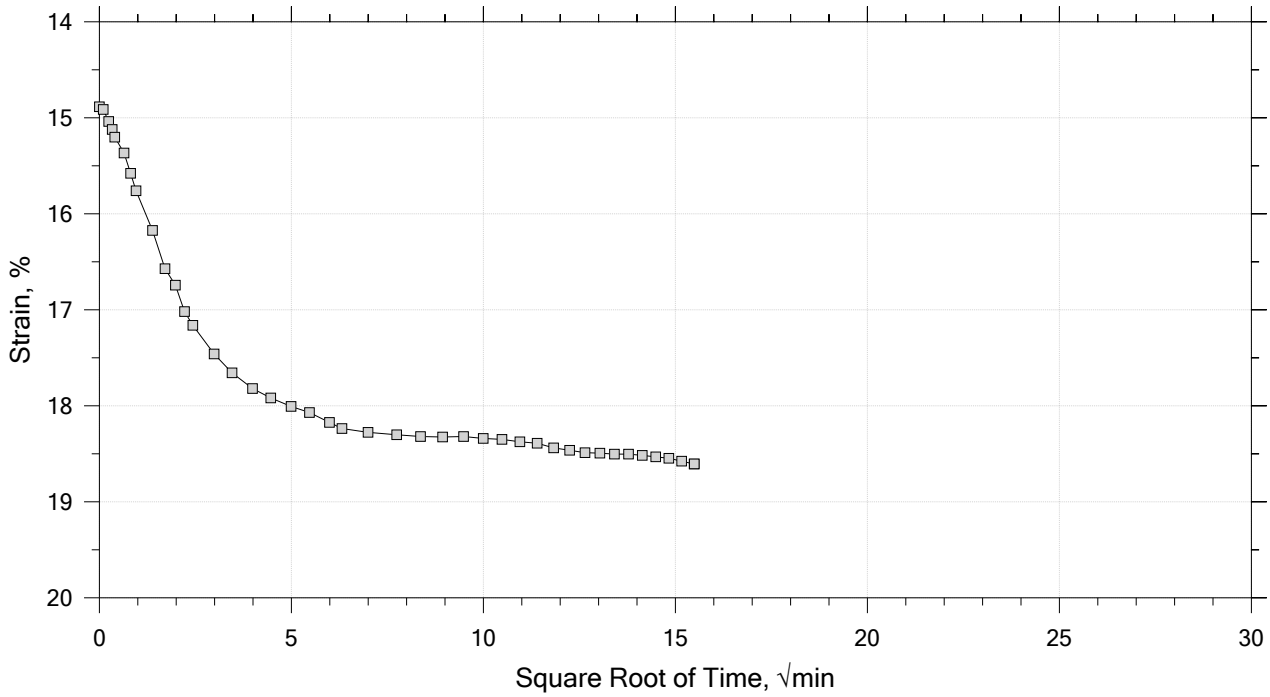
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf





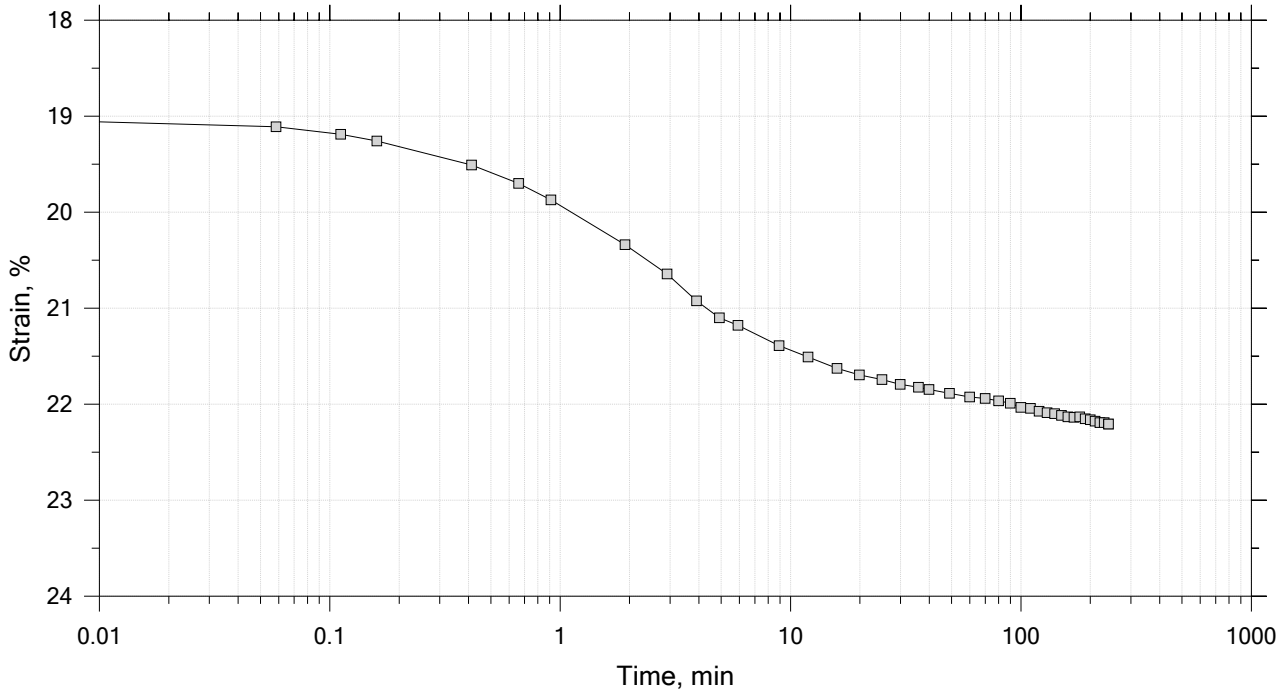
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

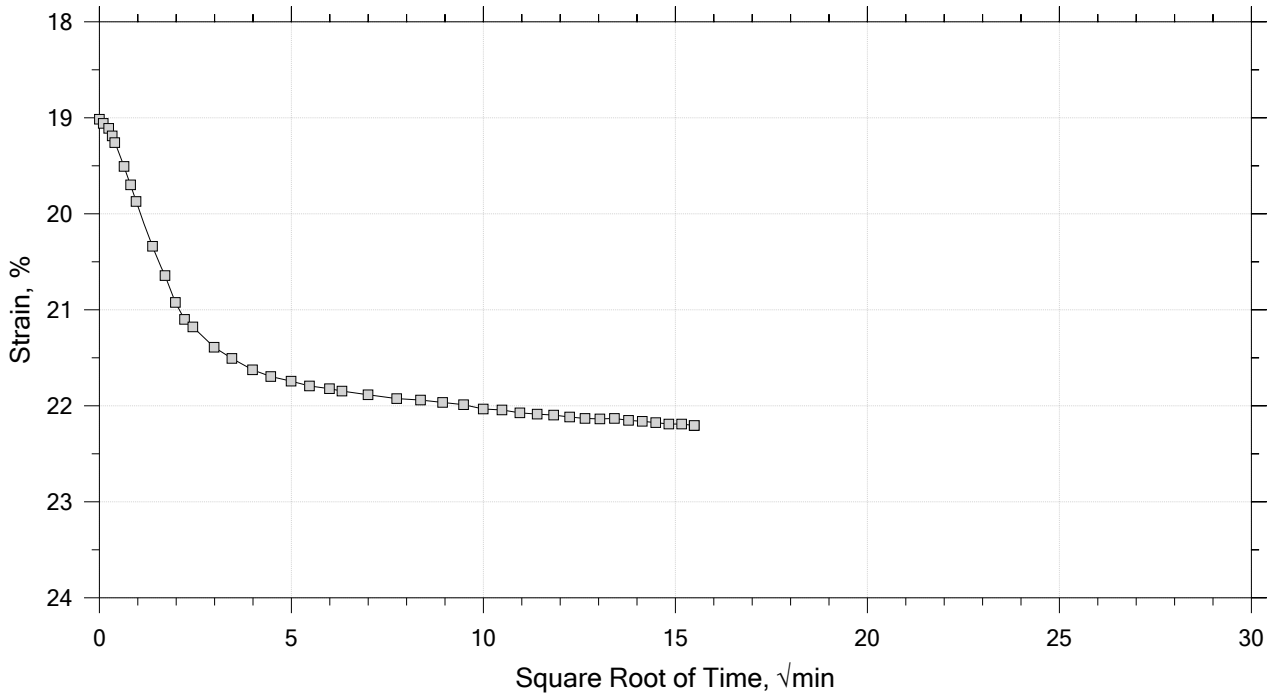
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf

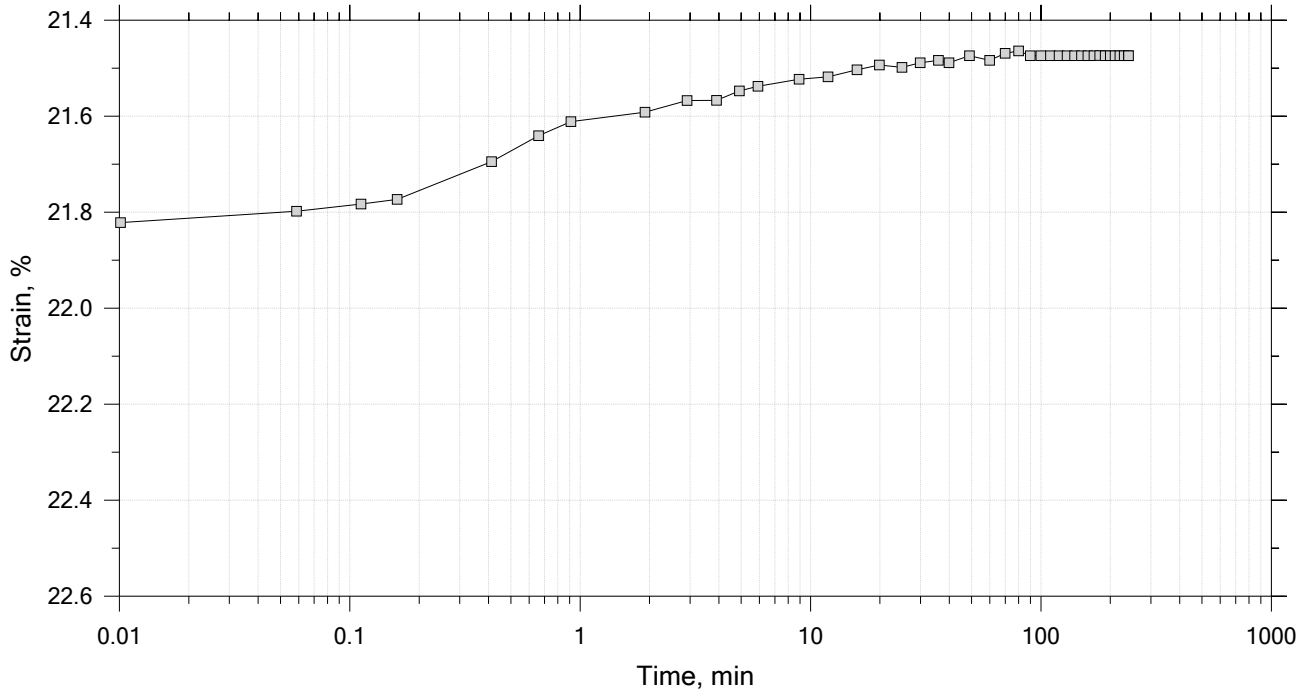


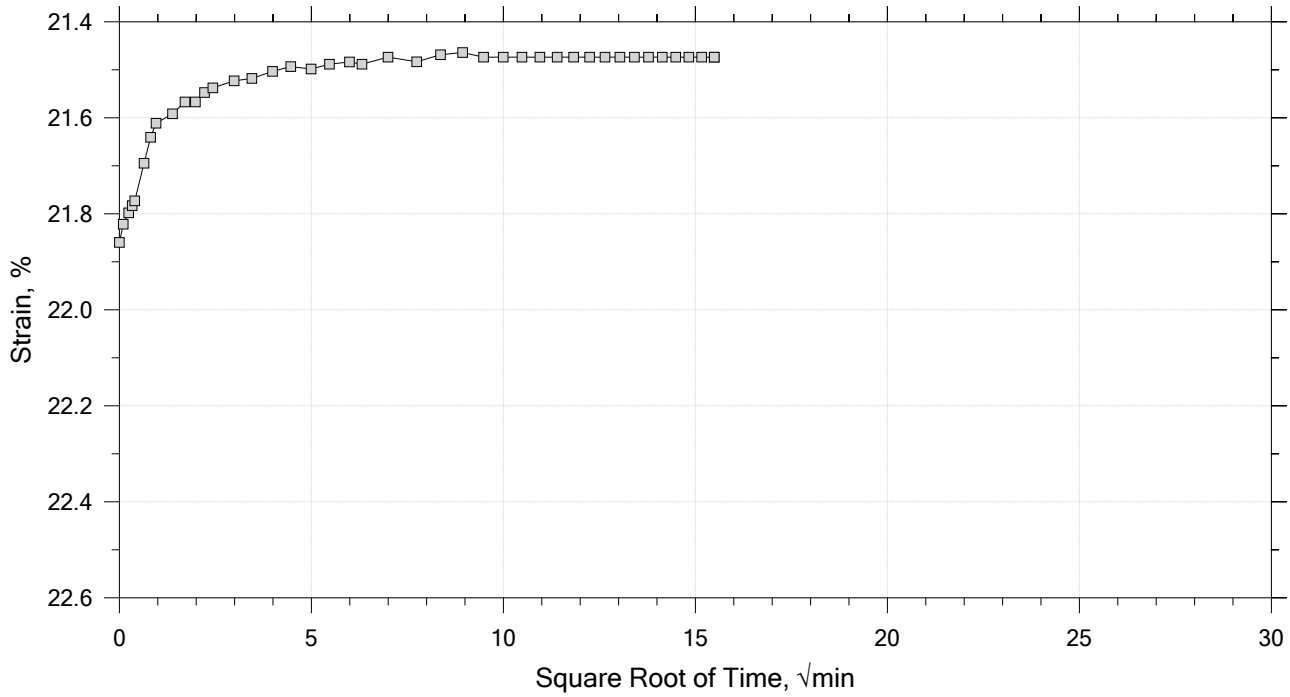


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





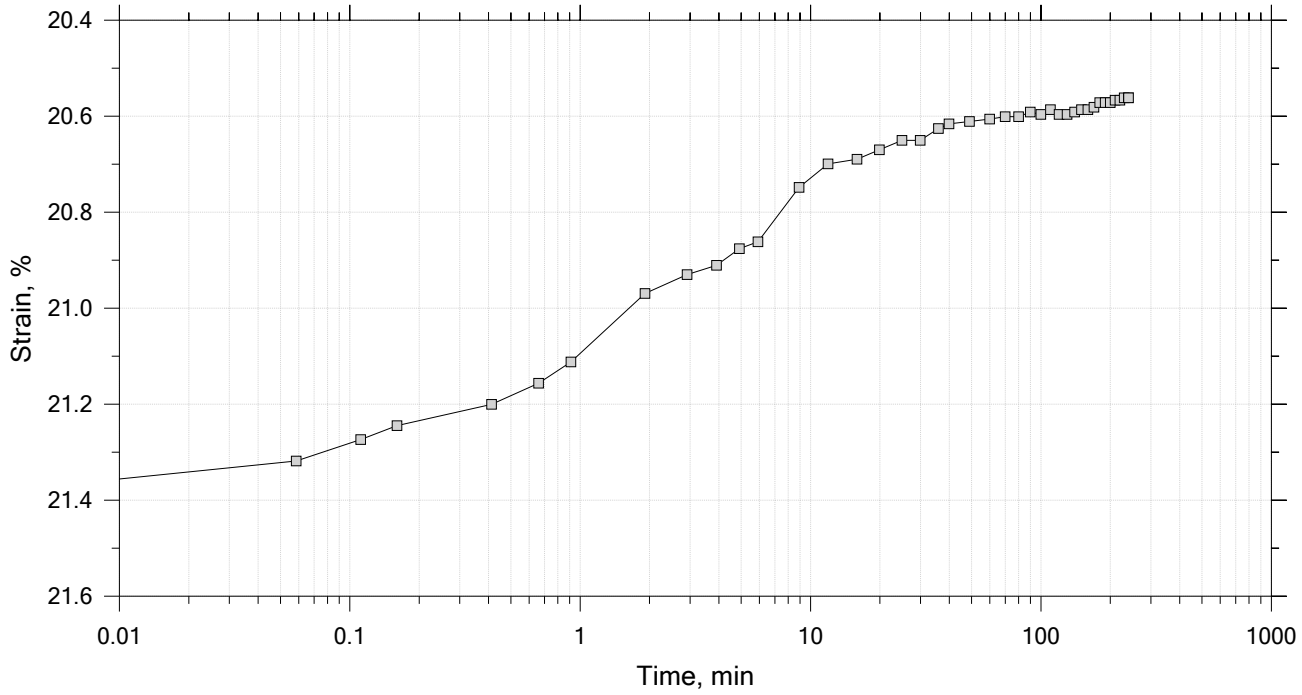
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
Test No.: IP-2B	Sample Type: intact	Elevation: ---
Description: Moist, gray silty clayey sand		
Remarks: System X, Swell Pressure = 0.0693 tsf		

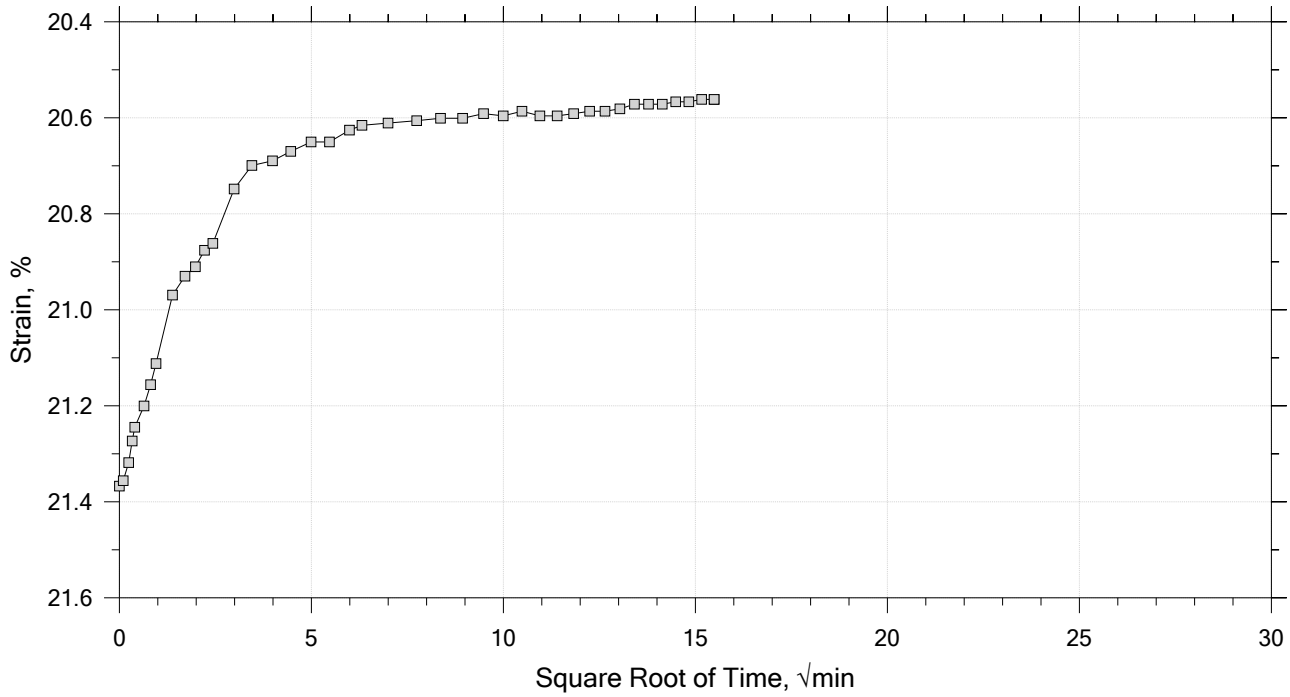
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

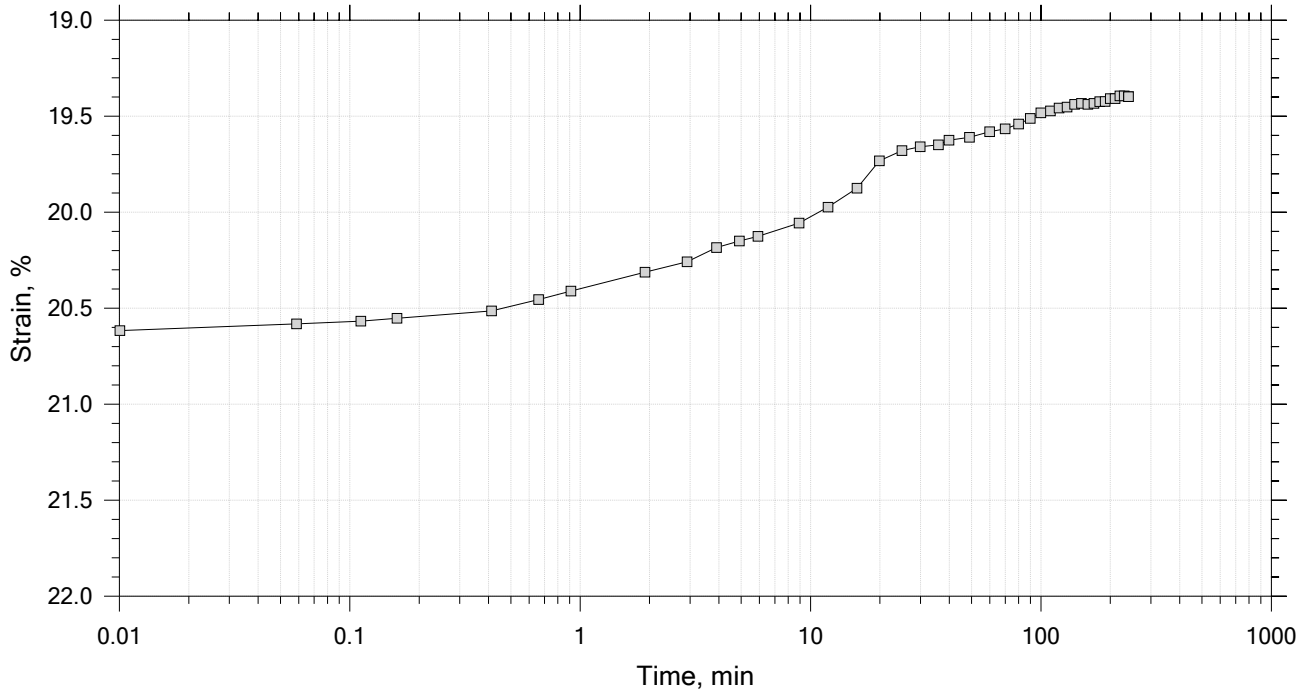


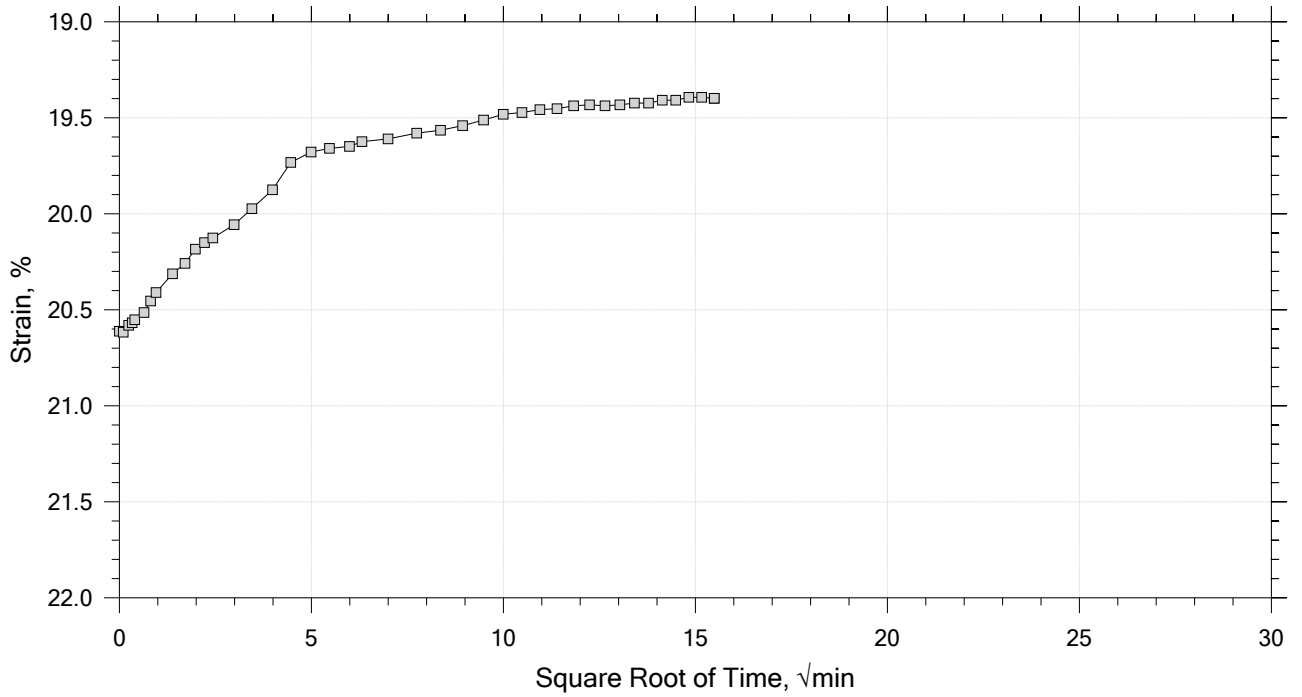


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

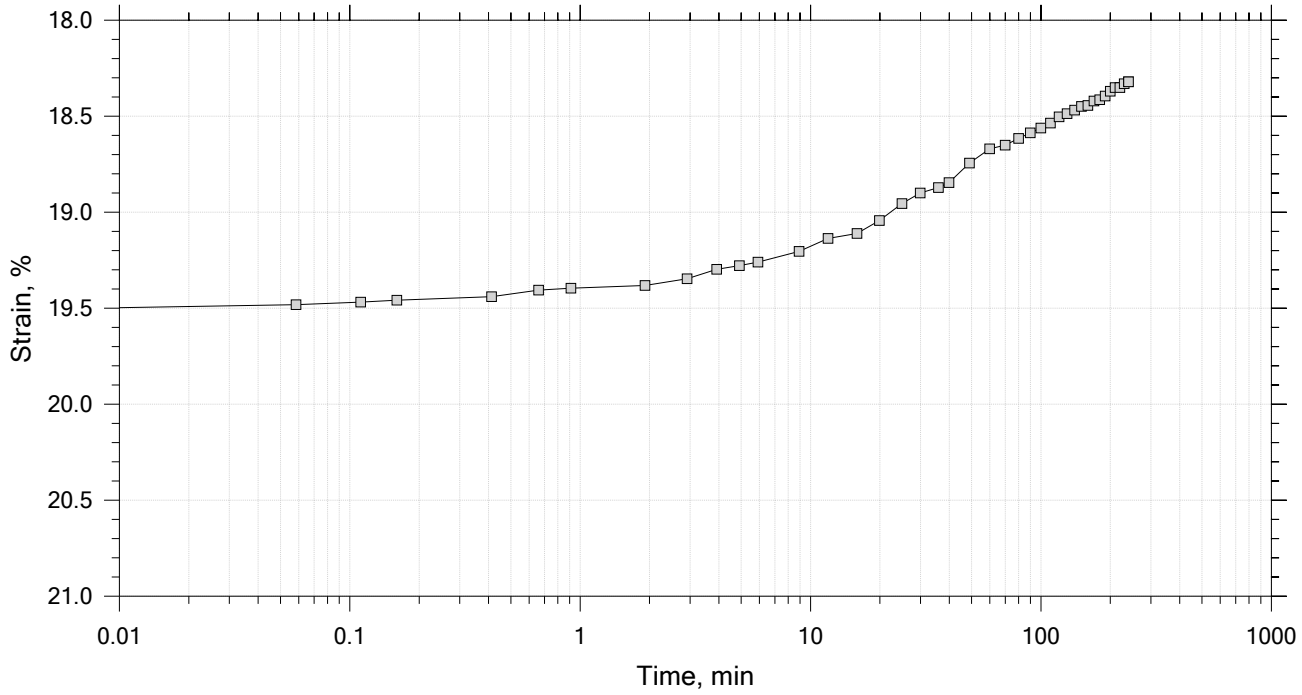


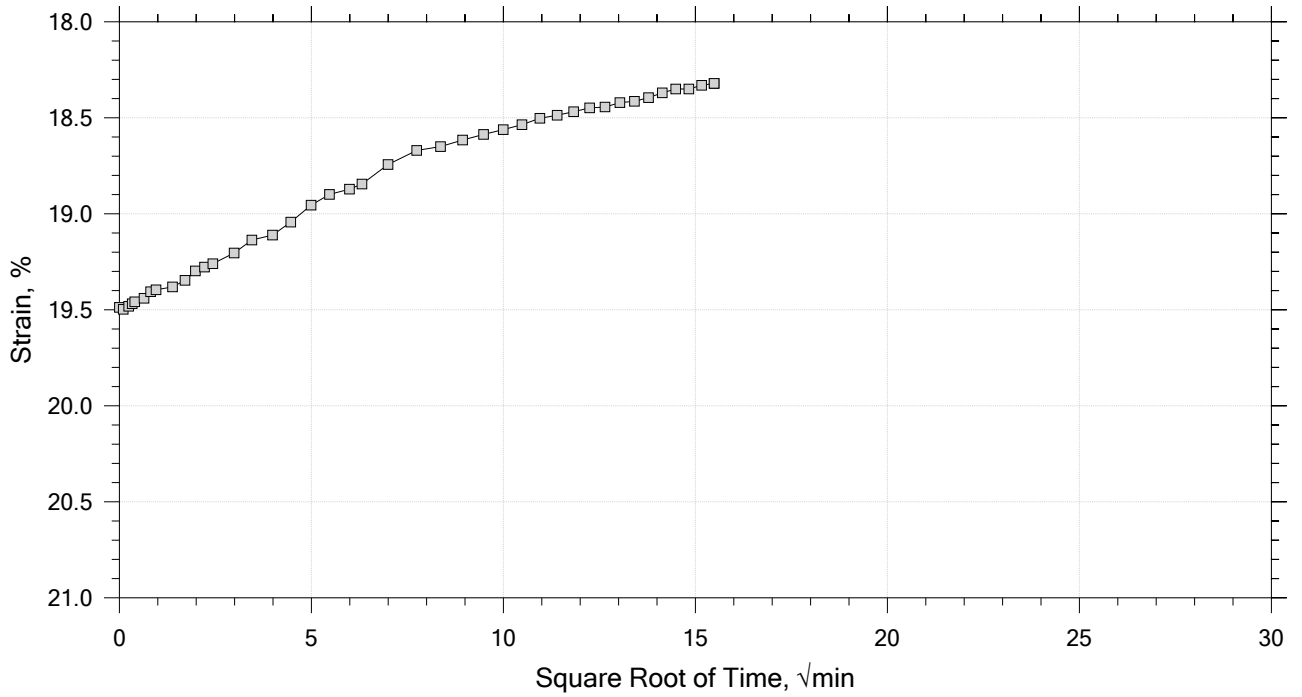


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
Test No.: IP-2B	Sample Type: intact	Elevation: ---
Description: Moist, gray silty clayey sand		
Remarks: System X, Swell Pressure = 0.0693 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

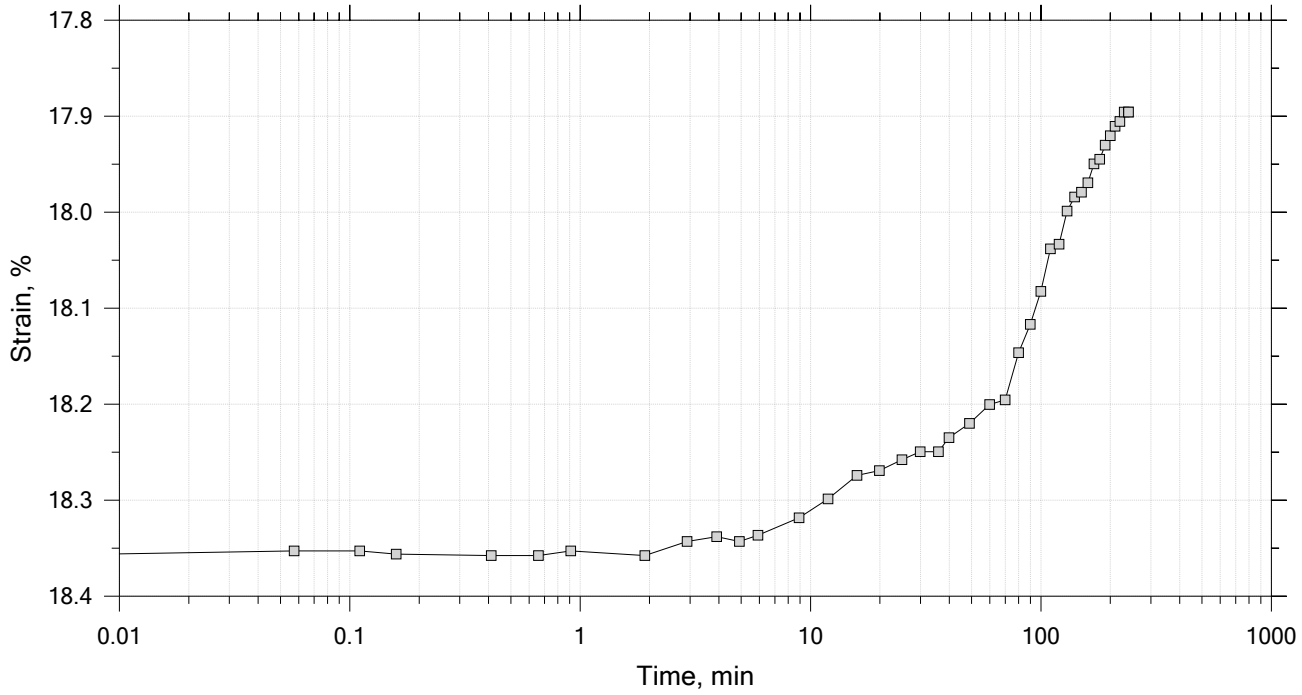


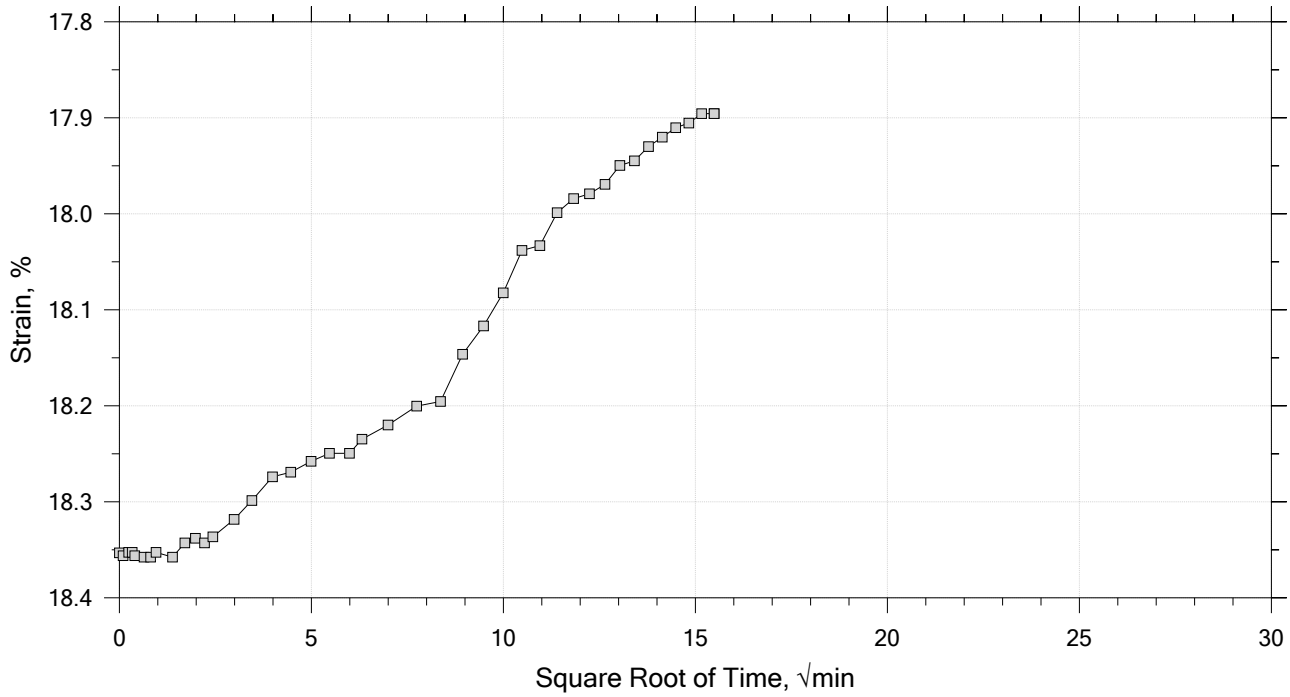


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
Test No.: IP-2B	Sample Type: intact	Elevation: ---
Description: Moist, gray silty clayey sand		
Remarks: System X, Swell Pressure = 0.0693 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-109	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
Test No.: IP-2B	Sample Type: intact	Elevation: ---
Description: Moist, gray silty clayey sand		
Remarks: System X, Swell Pressure = 0.0693 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.72	Liquid Limit: 19
Initial Height: 1.00 in	Initial Void Ratio: 0.925	Plastic Limit: 13
Final Height: 0.81 in	Final Void Ratio: 0.559	Plasticity Index: 6

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D610	RING		A-2895
Mass Container, gm	9.54	108.91	108.91	8.91
Mass Container + Wet Soil, gm	160.04	260.5	246	144.58
Mass Container + Dry Soil, gm	121.18	222.63	222.63	121.45
Mass Dry Soil, gm	111.64	113.72	113.72	112.54
Water Content, %	34.81	33.30	20.55	20.55
Void Ratio	---	0.93	0.56	---
Degree of Saturation, %	---	97.97	100.00	---
Dry Unit Weight, pcf	---	88.255	108.96	---

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.

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0693	0.007111	0.911	0.711	0.000	0.00e+00	1.03e-01	0.00e+00	0.00e+00
2	0.125	0.01111	0.904	1.11	17.410	3.21e-07	7.17e-02	6.22e-05	0.00e+00
3	0.250	0.01620	0.894	1.62	6.276	8.84e-07	4.08e-02	9.72e-05	0.00e+00
4	0.500	0.02308	0.881	2.31	3.067	1.79e-06	2.75e-02	1.33e-04	0.00e+00
5	1.00	0.03296	0.862	3.30	2.382	2.26e-06	1.98e-02	1.20e-04	0.00e+00
6	2.00	0.04863	0.832	4.86	4.249	1.23e-06	1.57e-02	5.22e-05	0.00e+00
7	4.00	0.09261	0.747	9.26	8.134	6.05e-07	2.20e-02	3.59e-05	0.00e+00
8	8.00	0.1462	0.644	14.6	4.618	9.57e-07	1.34e-02	3.46e-05	0.00e+00
9	16.0	0.1861	0.567	18.6	2.751	1.44e-06	4.99e-03	1.94e-05	0.00e+00
10	32.0	0.2221	0.498	22.2	2.053	1.76e-06	2.25e-03	1.07e-05	0.00e+00
11	8.00	0.2147	0.512	21.5	0.000	0.00e+00	3.05e-04	0.00e+00	0.00e+00
12	2.00	0.2056	0.529	20.6	0.000	0.00e+00	1.52e-03	0.00e+00	0.00e+00
13	0.500	0.1940	0.552	19.4	0.000	0.00e+00	7.76e-03	0.00e+00	0.00e+00
14	0.125	0.1832	0.572	18.3	20.511	1.83e-07	2.87e-02	1.42e-05	0.00e+00
15	0.0625	0.1790	0.581	17.9	85.626	4.46e-08	6.80e-02	8.19e-06	0.00e+00

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

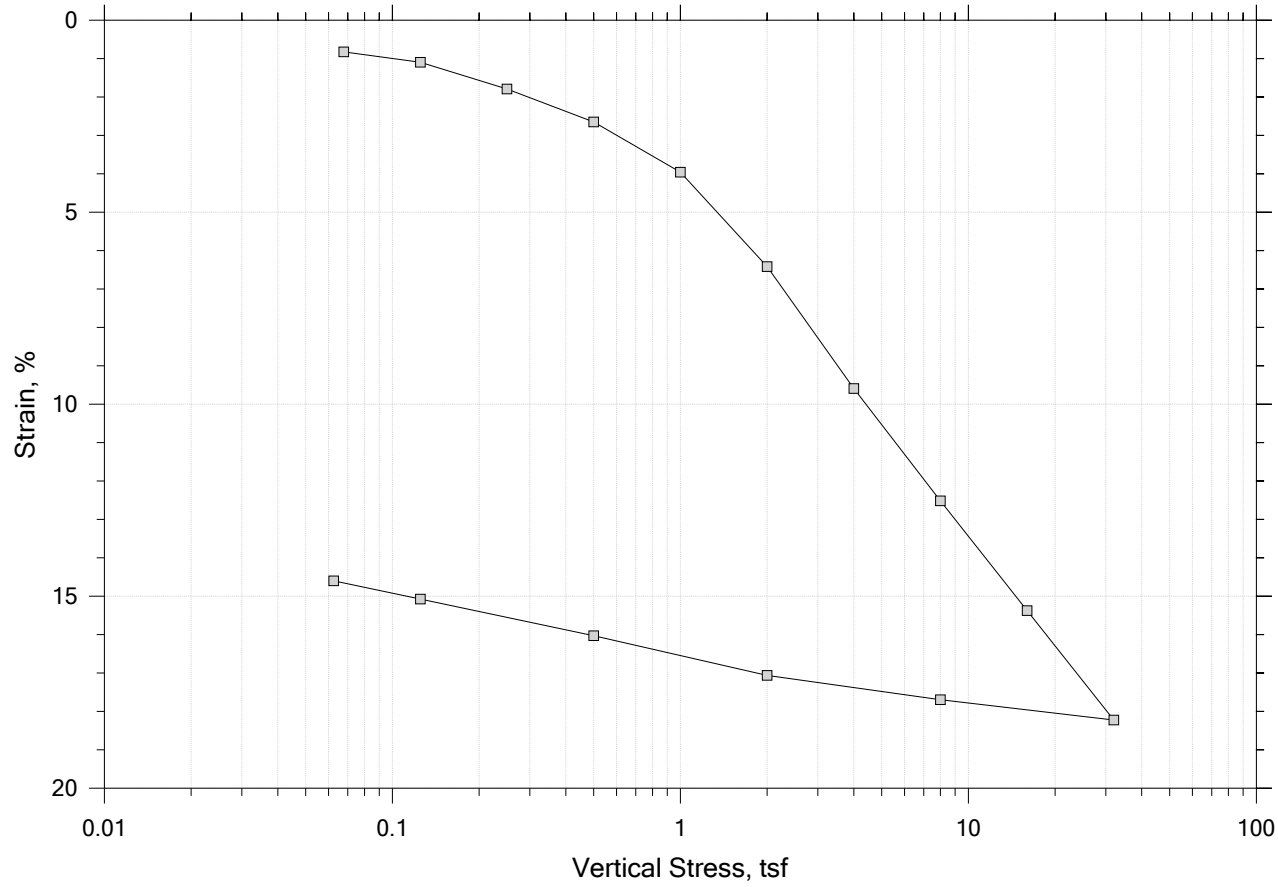
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0693	0.007111	0.911	0.711	43.917	5.55e-07	1.03e-01	1.54e-04
2	0.125	0.01111	0.904	1.11	107.875	2.23e-07	7.17e-02	4.32e-05
3	0.250	0.01620	0.894	1.62	35.883	6.65e-07	4.08e-02	7.32e-05
4	0.500	0.02308	0.881	2.31	20.395	1.16e-06	2.75e-02	8.58e-05
5	1.00	0.03296	0.862	3.30	17.335	1.34e-06	1.98e-02	7.13e-05
6	2.00	0.04863	0.832	4.86	19.046	1.19e-06	1.57e-02	5.01e-05
7	4.00	0.09261	0.747	9.26	37.804	5.61e-07	2.20e-02	3.32e-05
8	8.00	0.1462	0.644	14.6	24.279	7.84e-07	1.34e-02	2.83e-05
9	16.0	0.1861	0.567	18.6	12.351	1.38e-06	4.99e-03	1.86e-05
10	32.0	0.2221	0.498	22.2	10.297	1.51e-06	2.25e-03	9.16e-06
11	8.00	0.2147	0.512	21.5	2.959	5.07e-06	3.05e-04	4.17e-06
12	2.00	0.2056	0.529	20.6	10.039	1.52e-06	1.52e-03	6.25e-06
13	0.500	0.1940	0.552	19.4	32.600	4.82e-07	7.76e-03	1.01e-05
14	0.125	0.1832	0.572	18.3	121.658	1.33e-07	2.87e-02	1.03e-05
15	0.0625	0.1790	0.581	17.9	181.993	9.04e-08	6.80e-02	1.66e-05

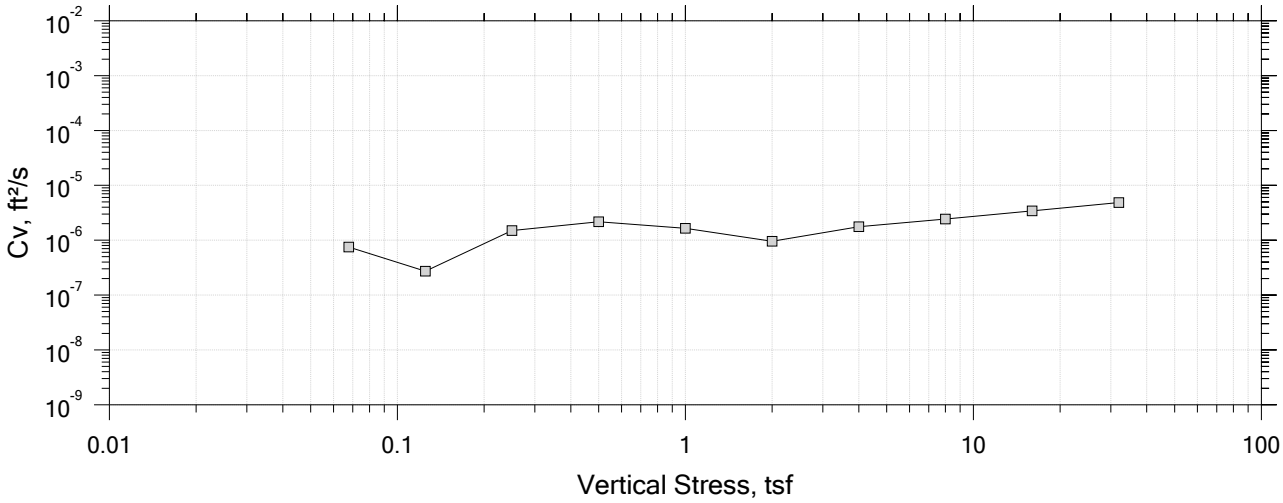
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		
	Displacement at End of Increment		

B-111 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

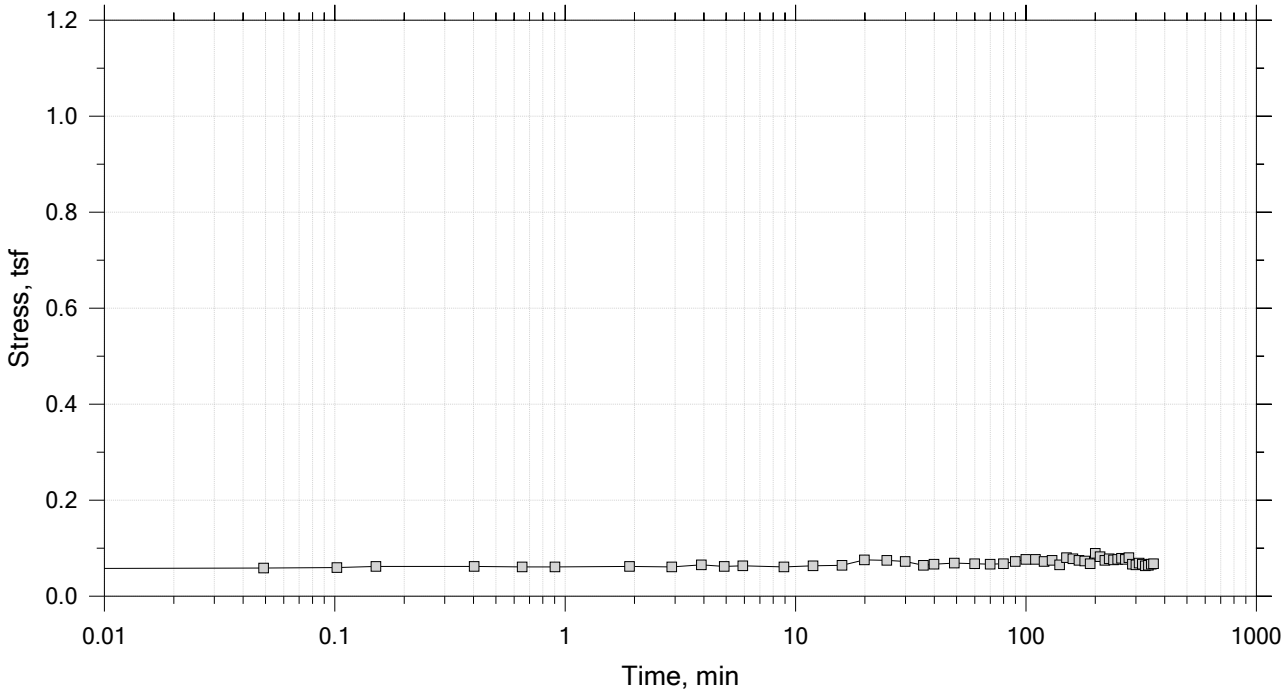


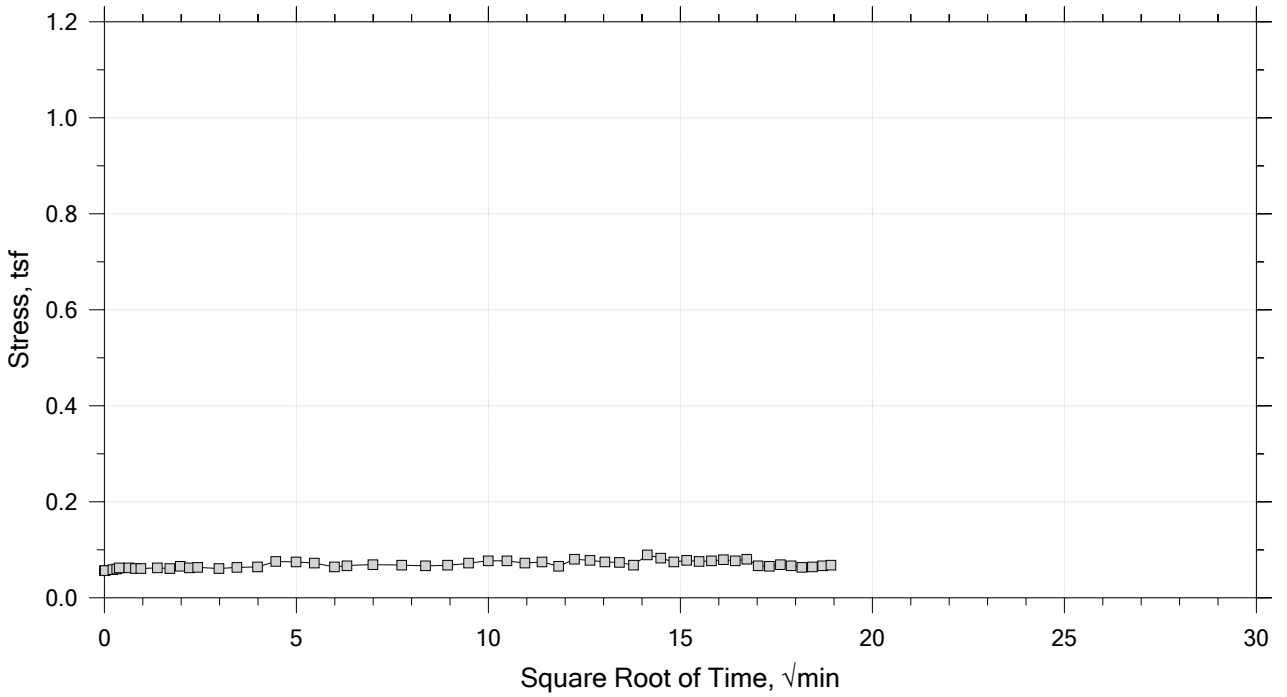


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0678 tsf

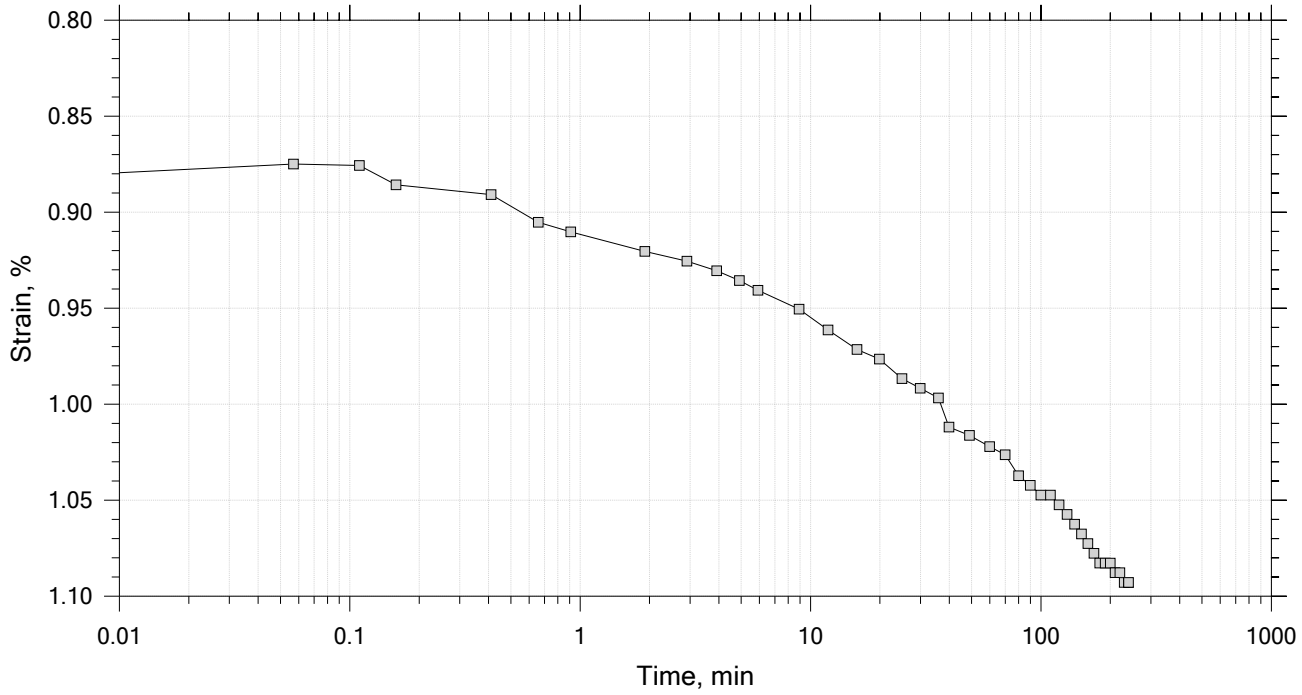


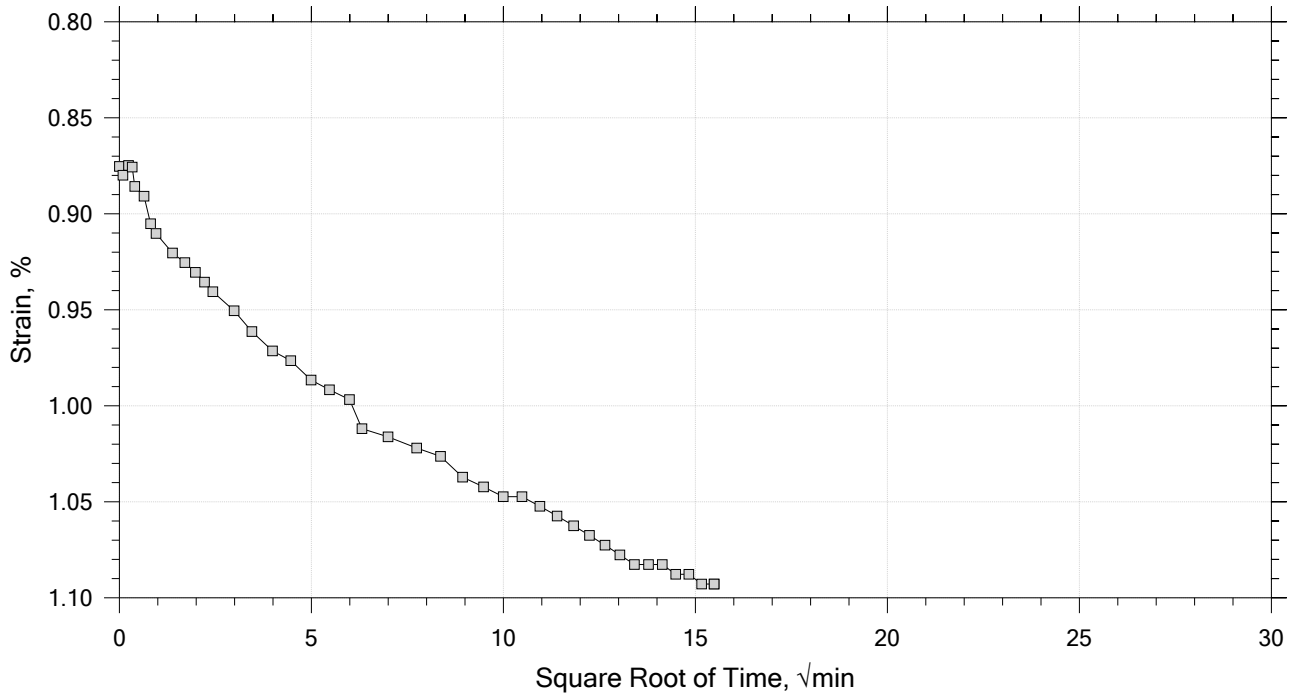


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

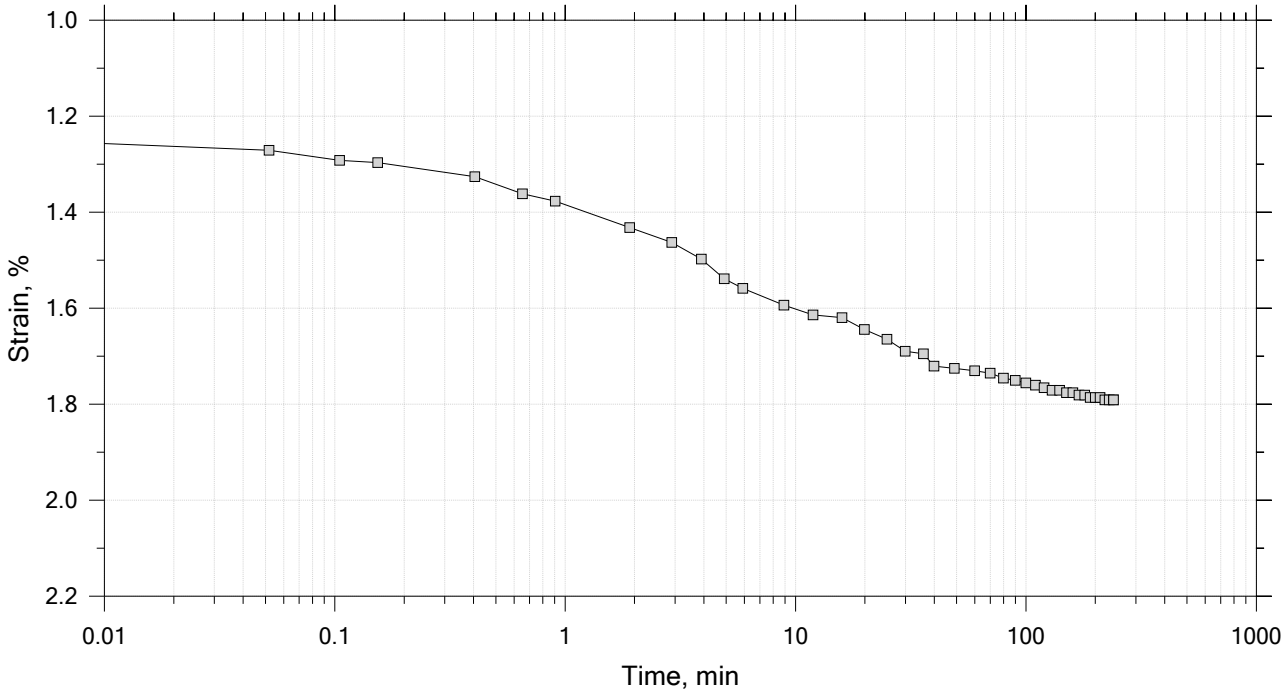


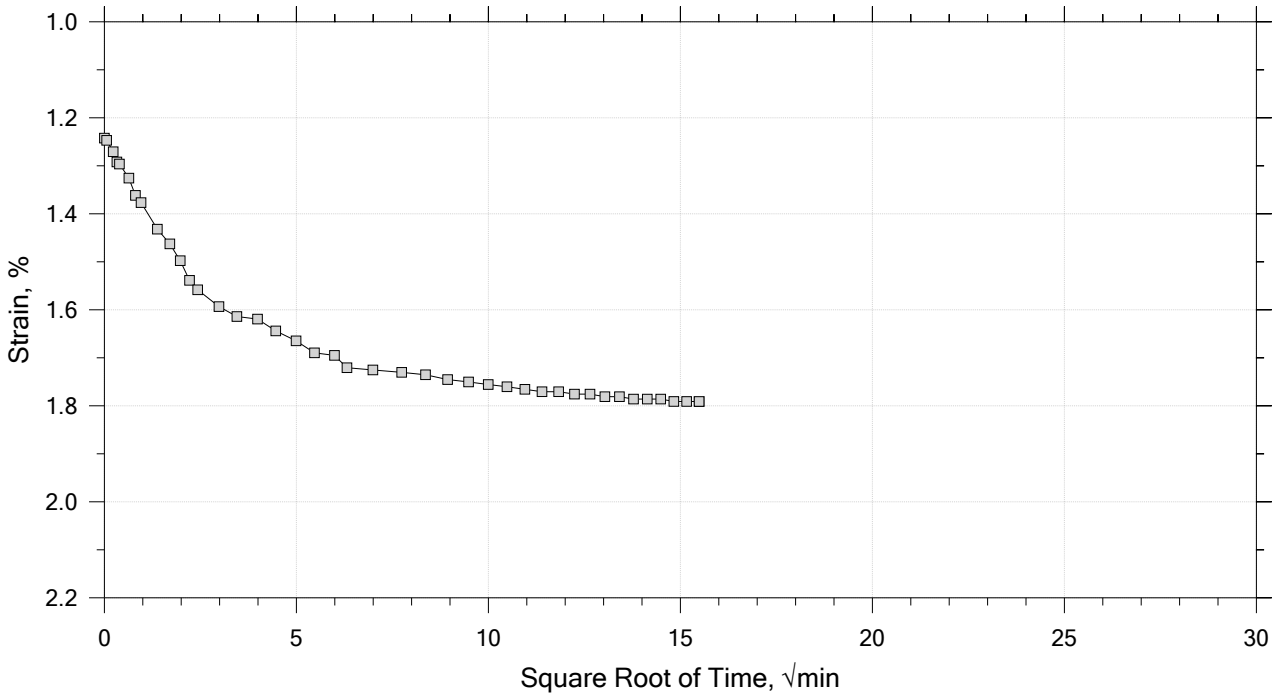


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

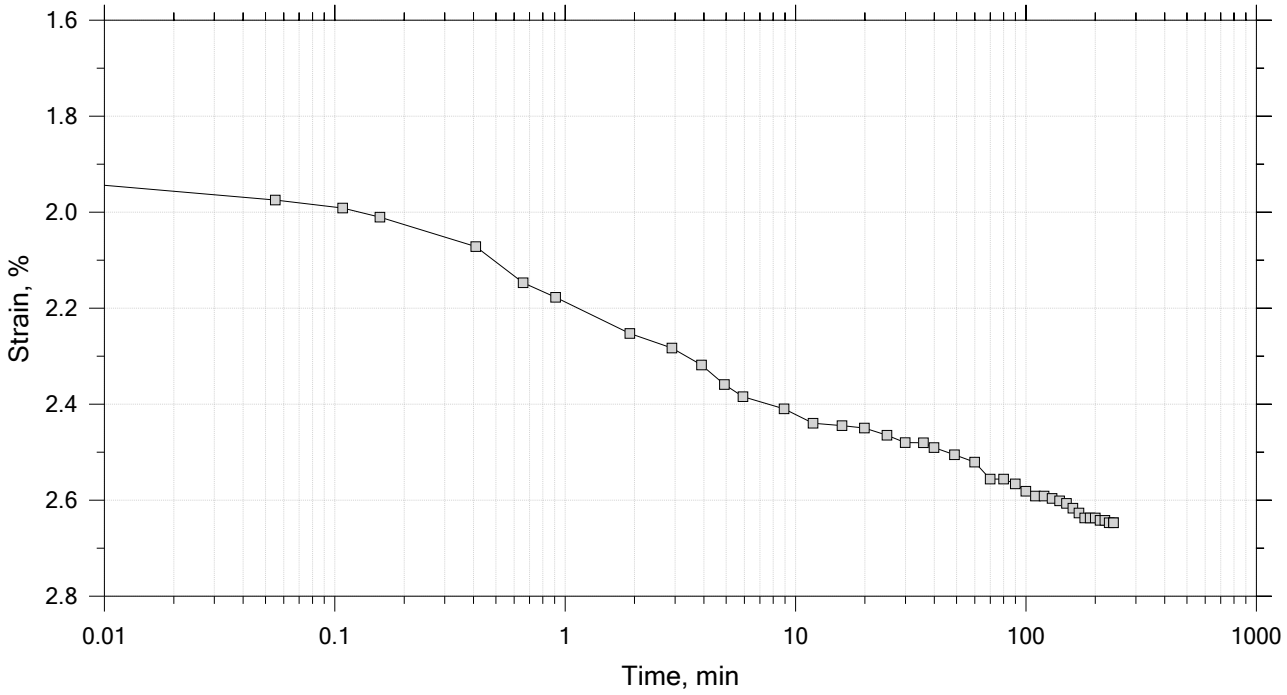


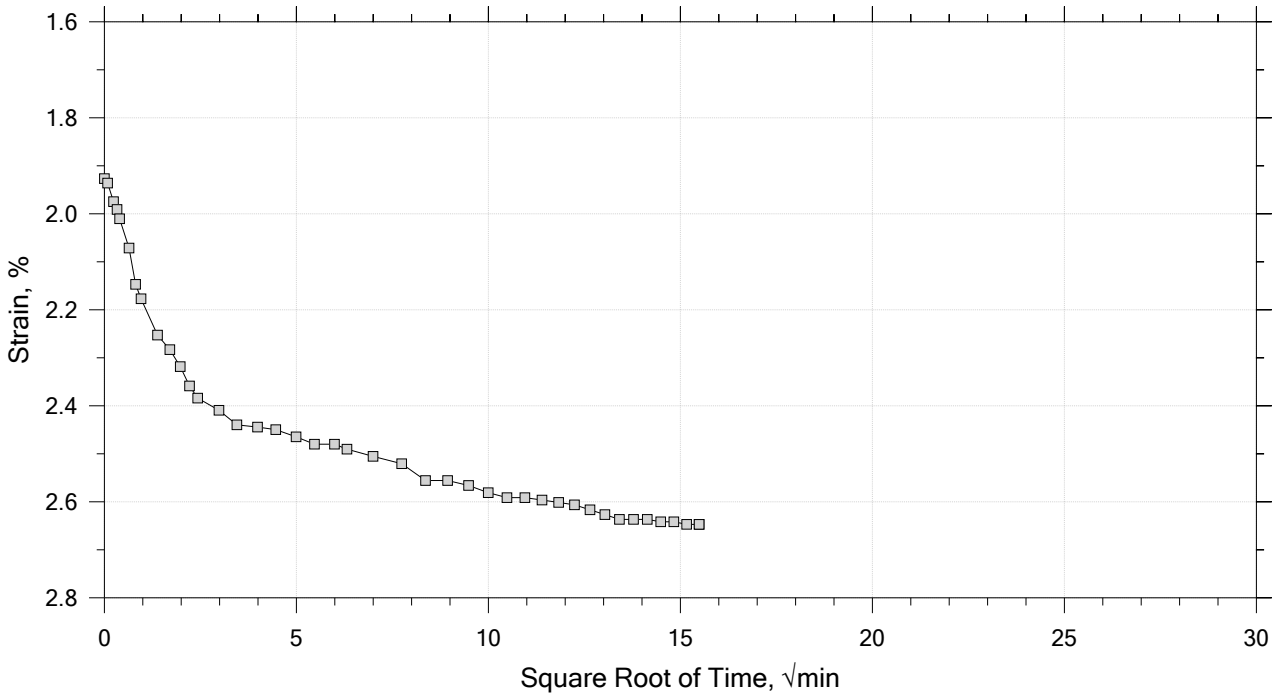


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





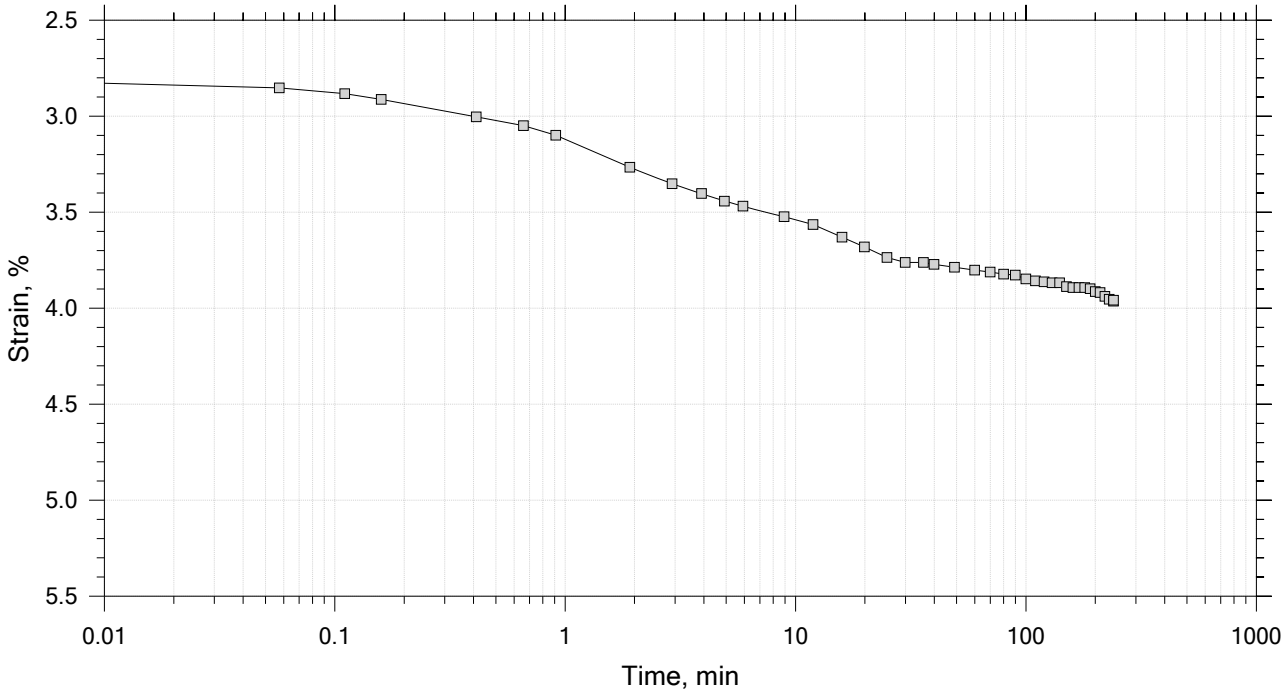
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

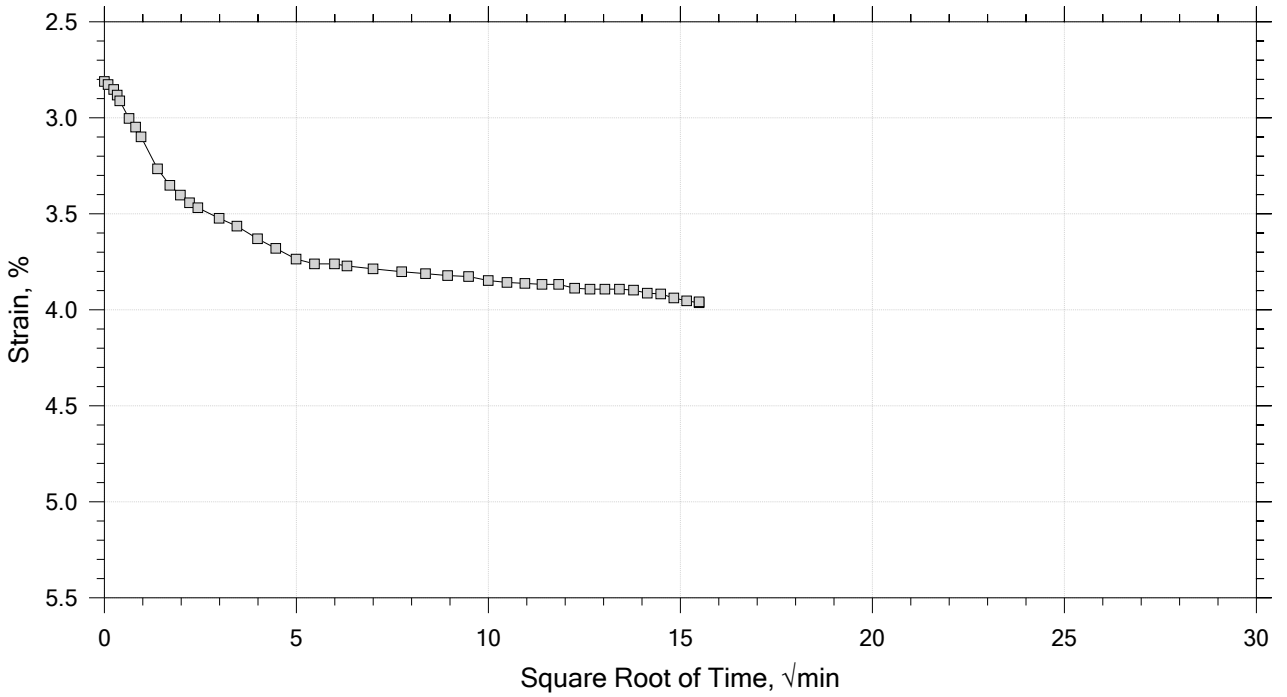
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





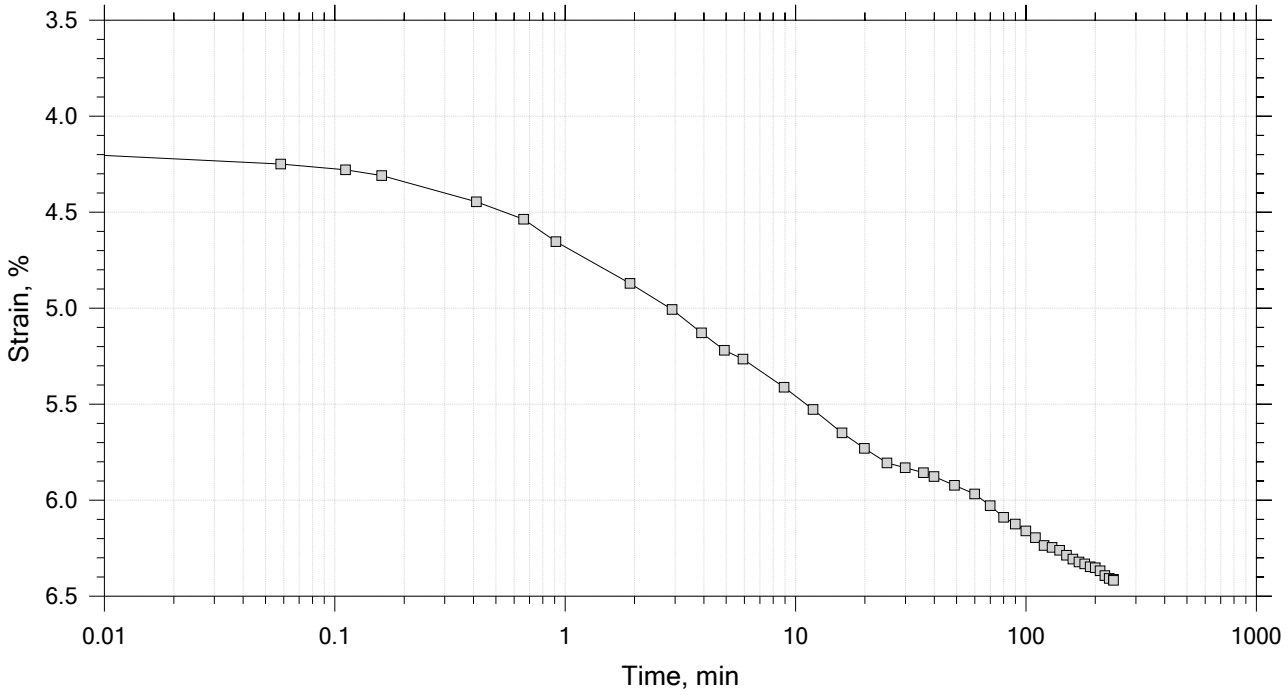
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

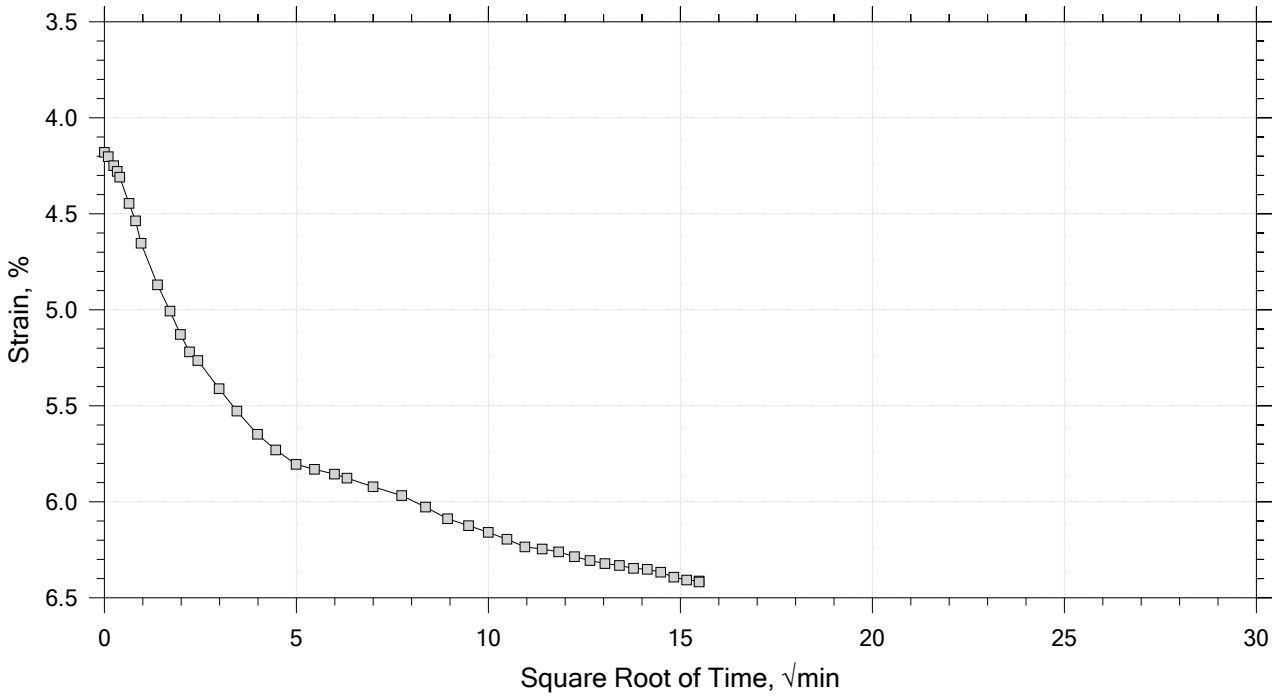
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





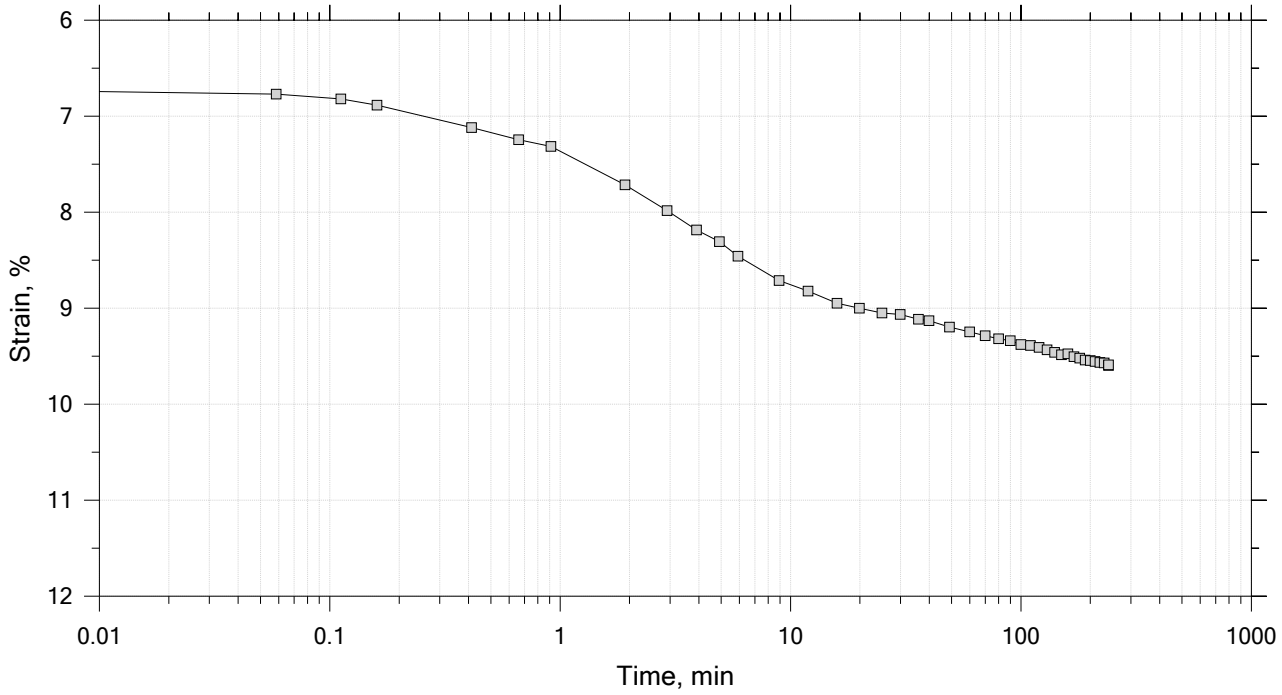
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System O, Swell Pressure = 0.0678 tsf		

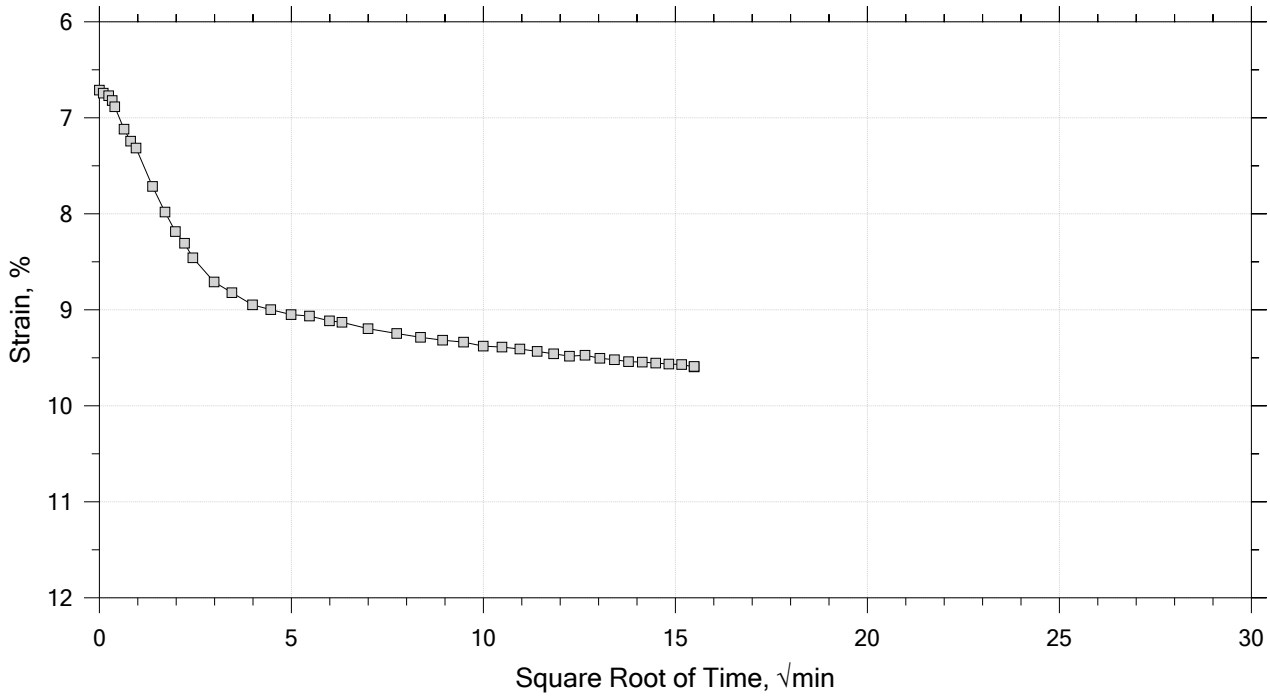
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





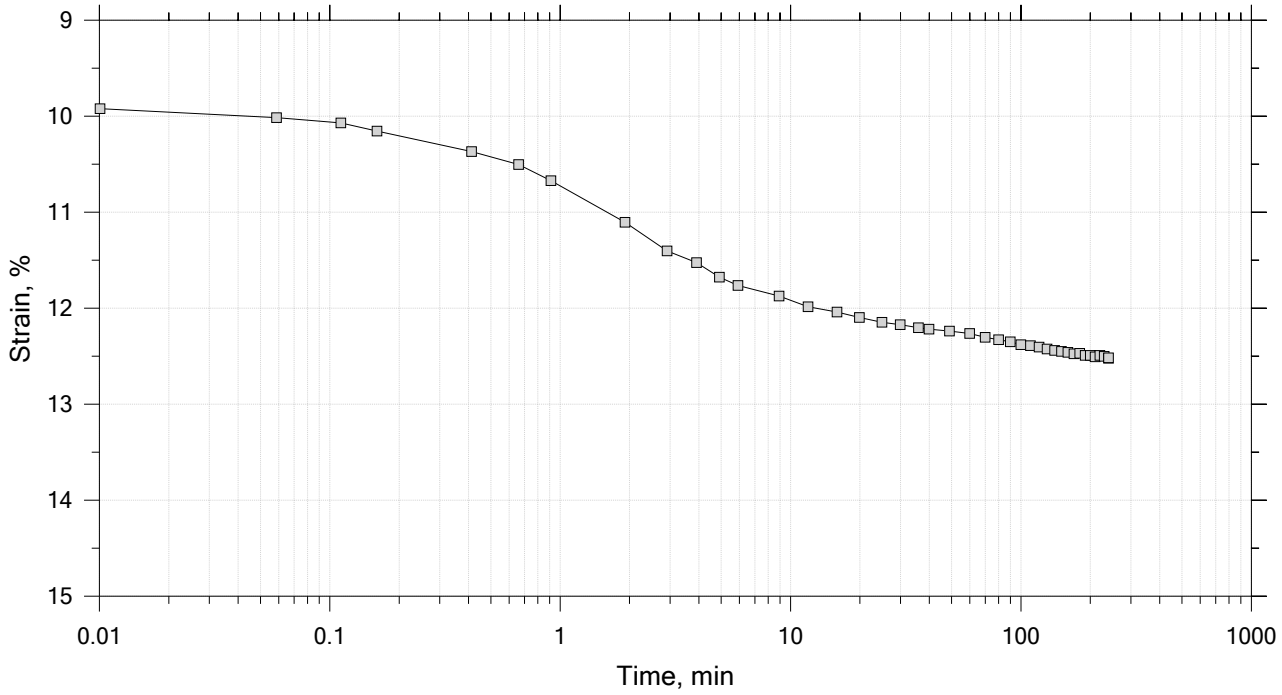
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

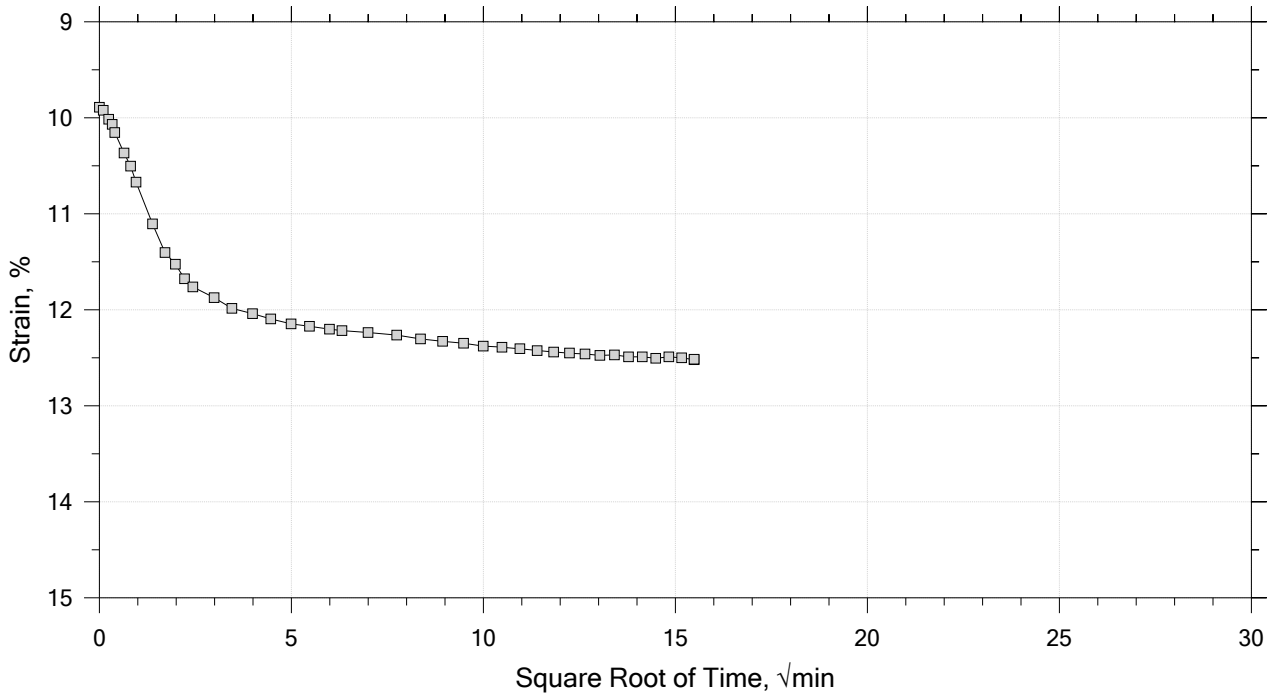
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





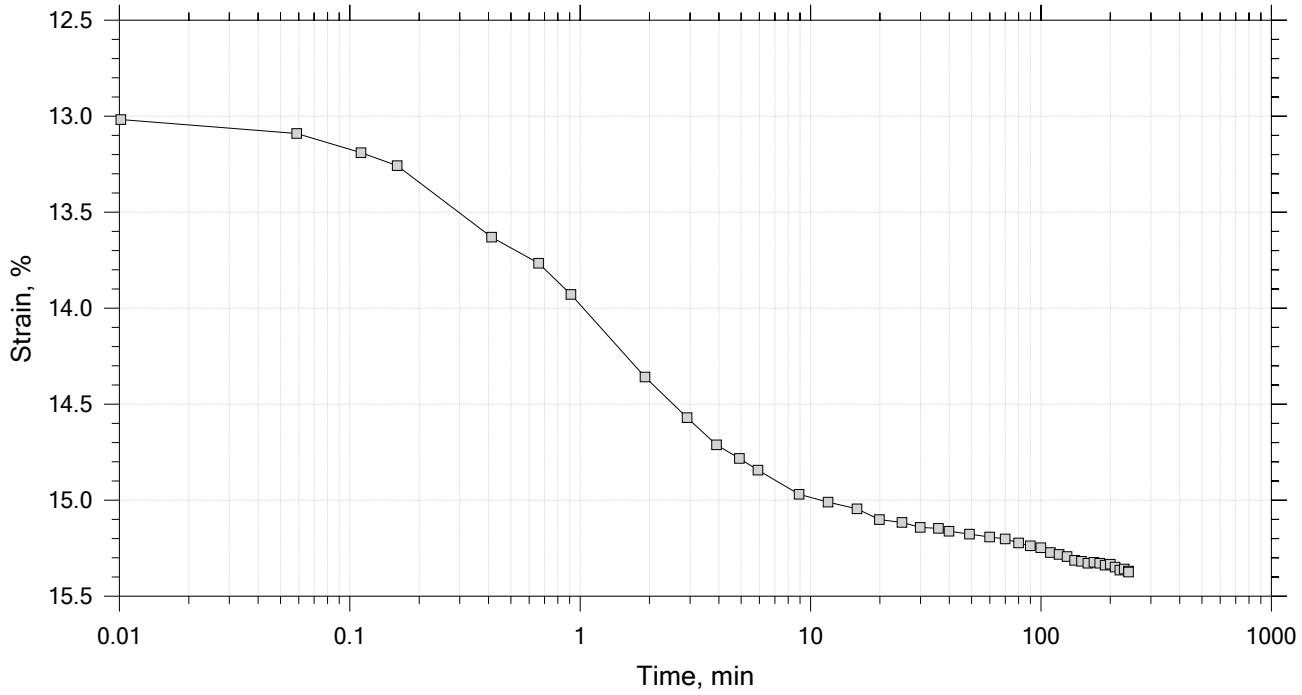
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

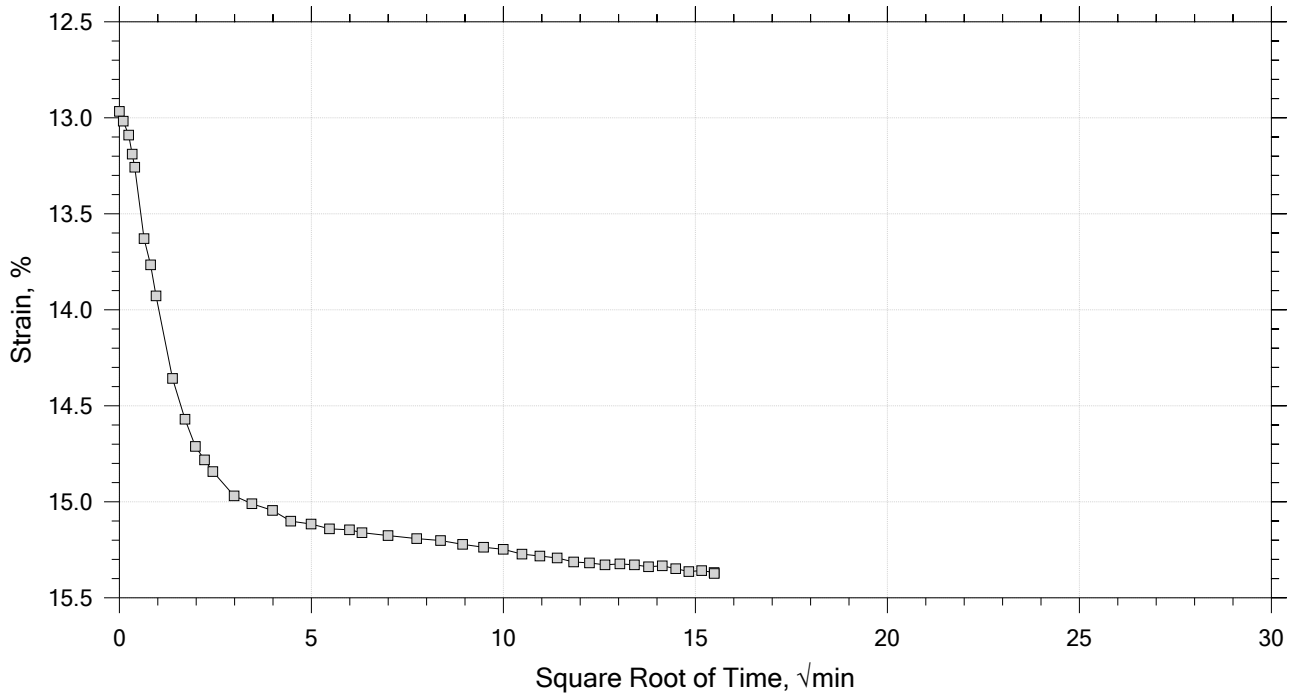
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf





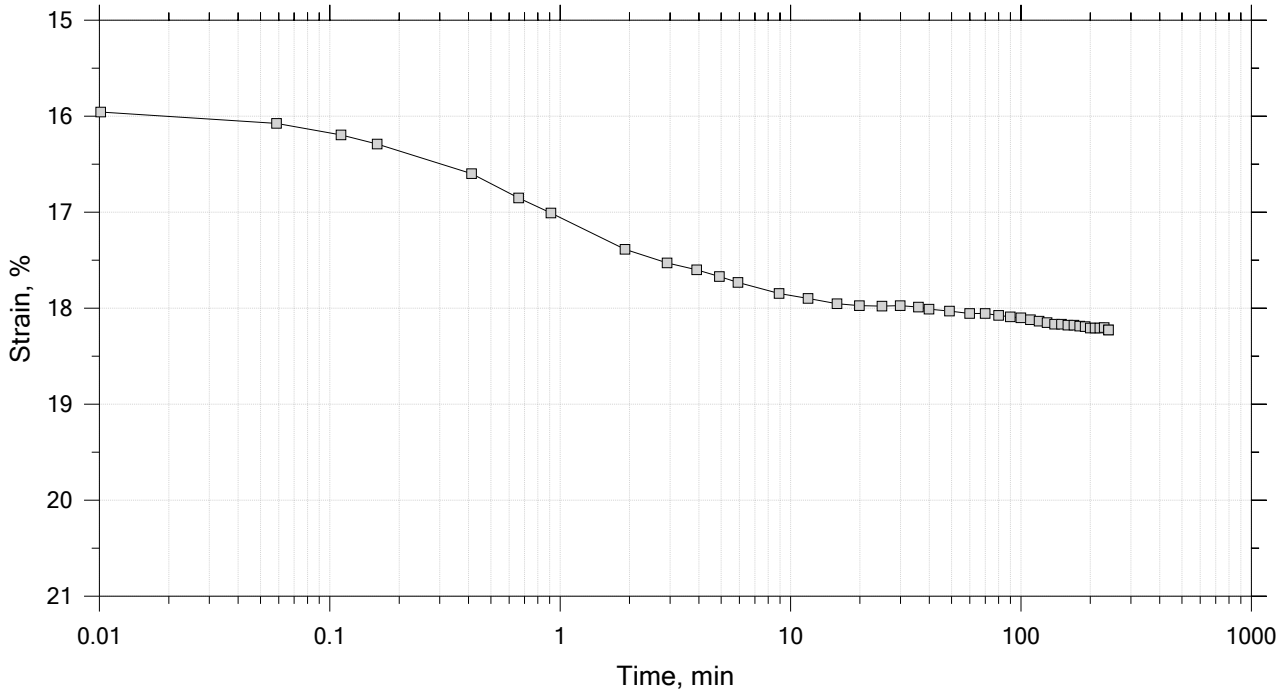
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System O, Swell Pressure = 0.0678 tsf		

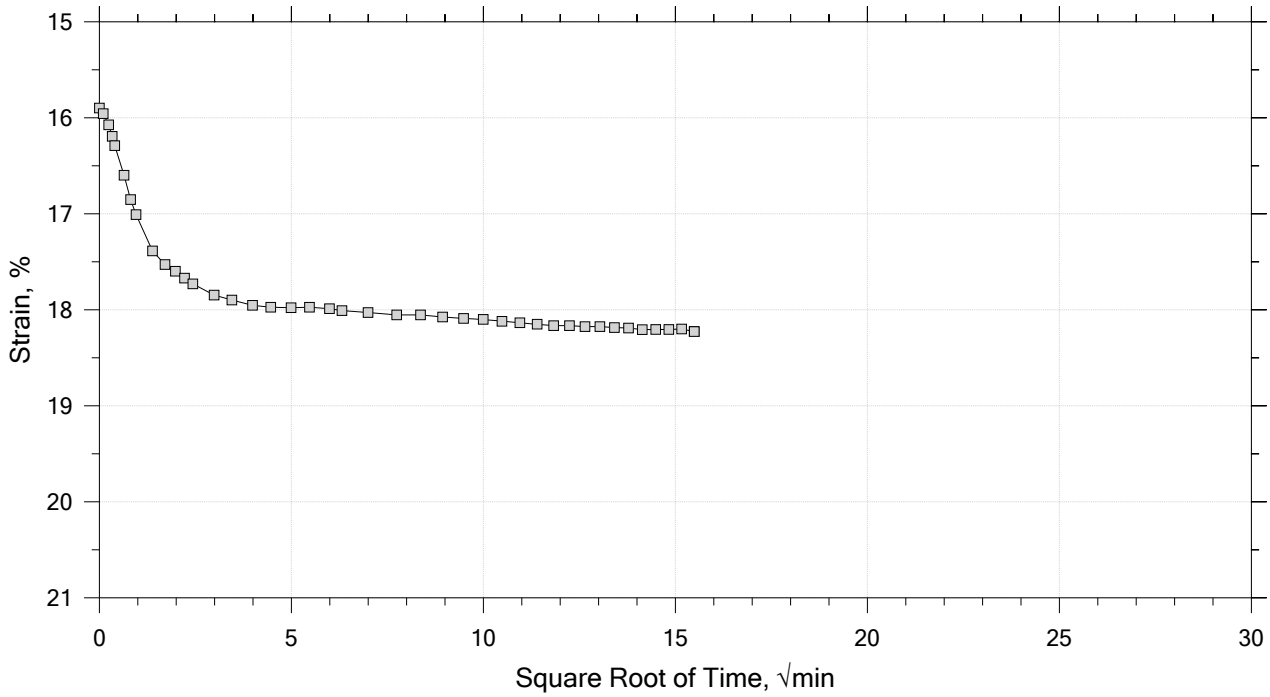
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf

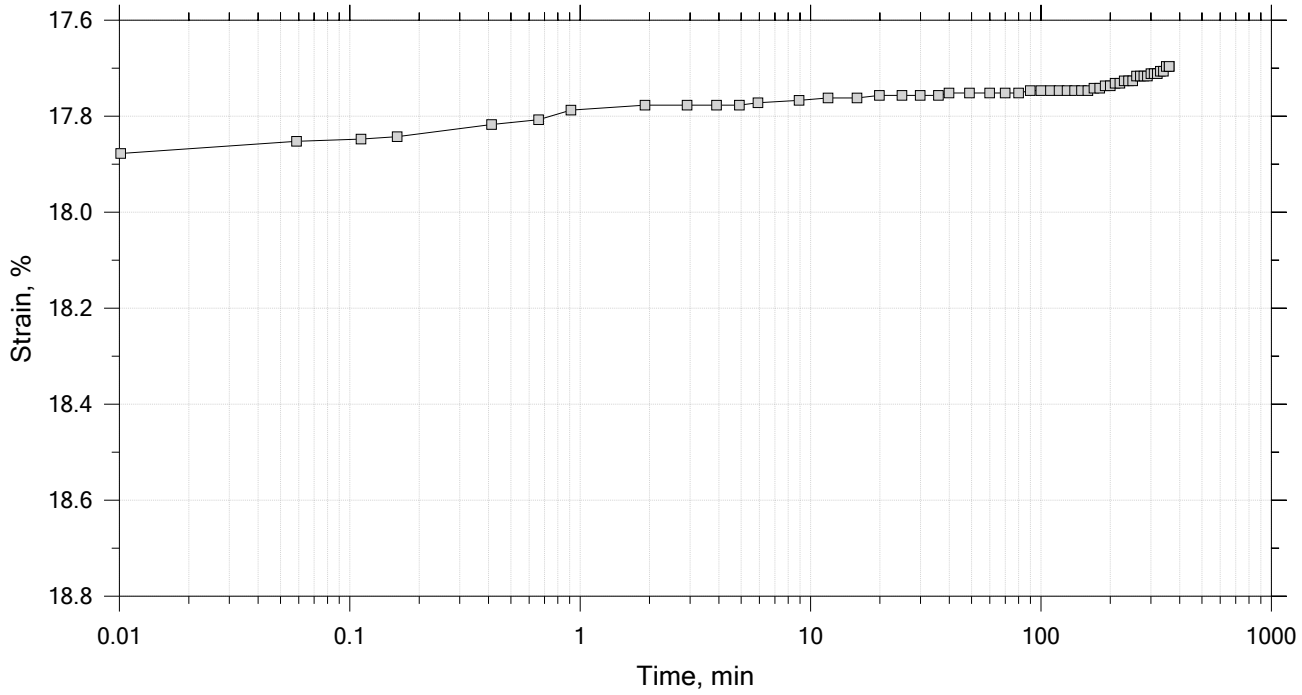


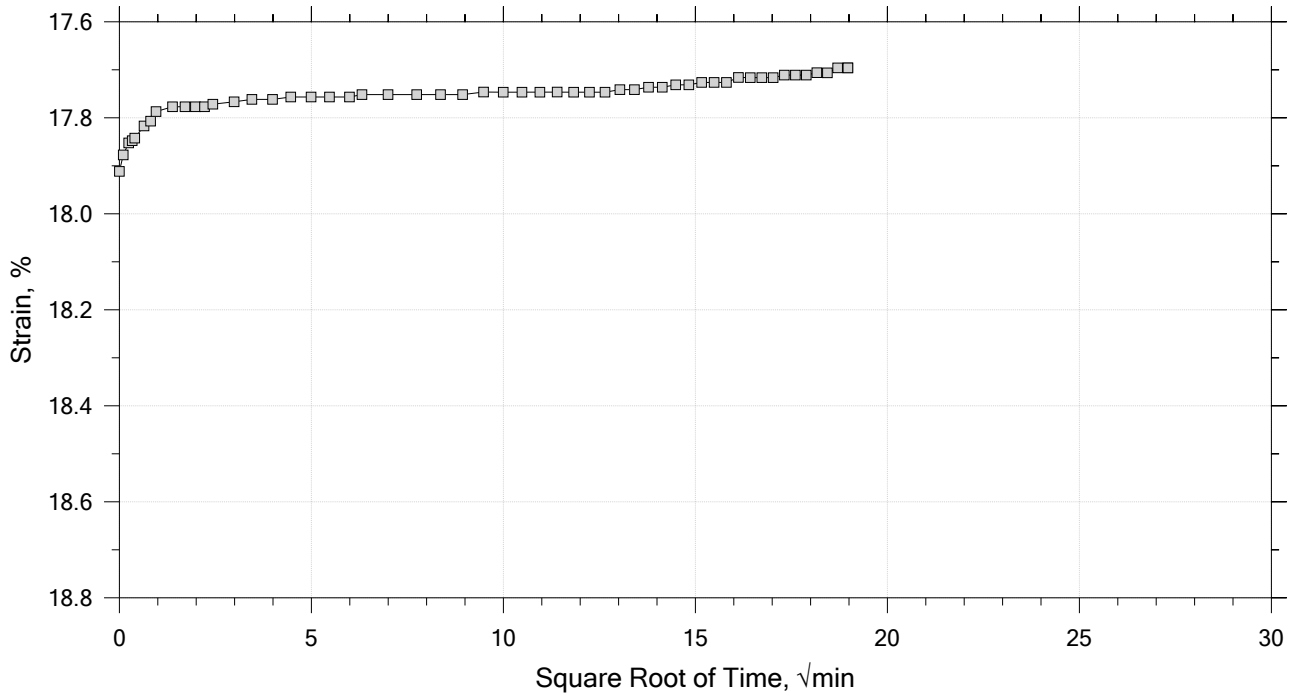


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





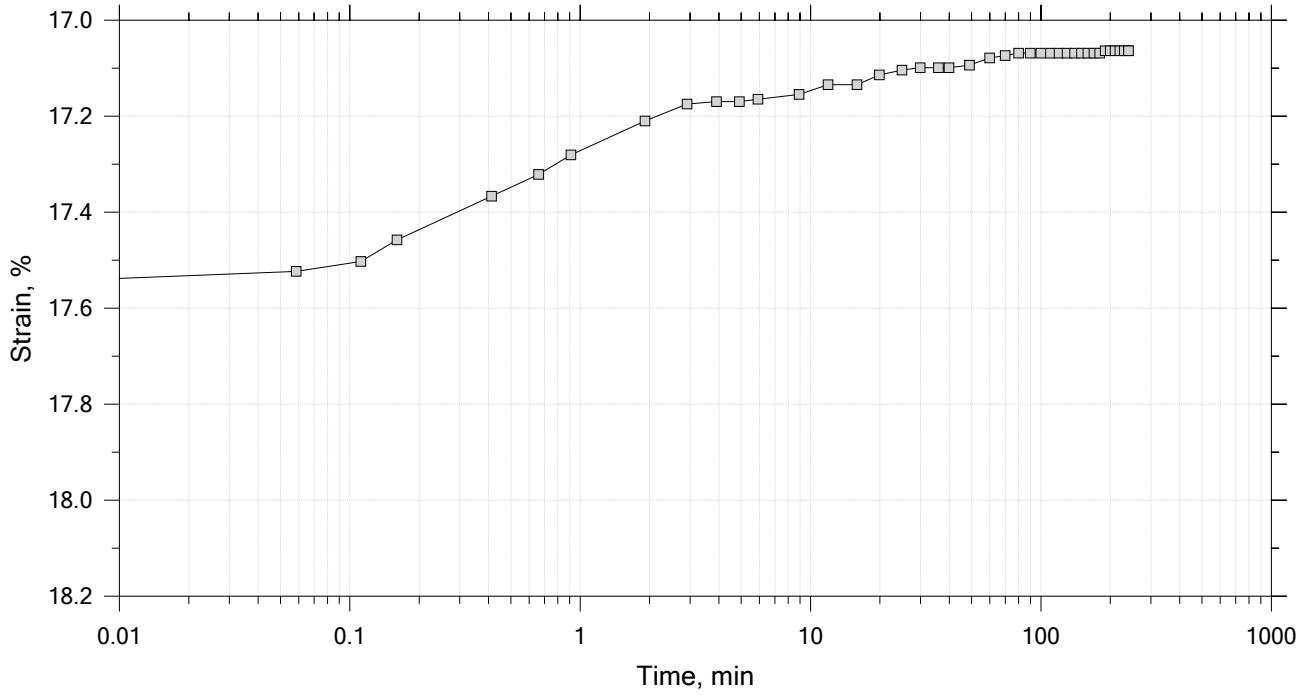
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System O, Swell Pressure = 0.0678 tsf		

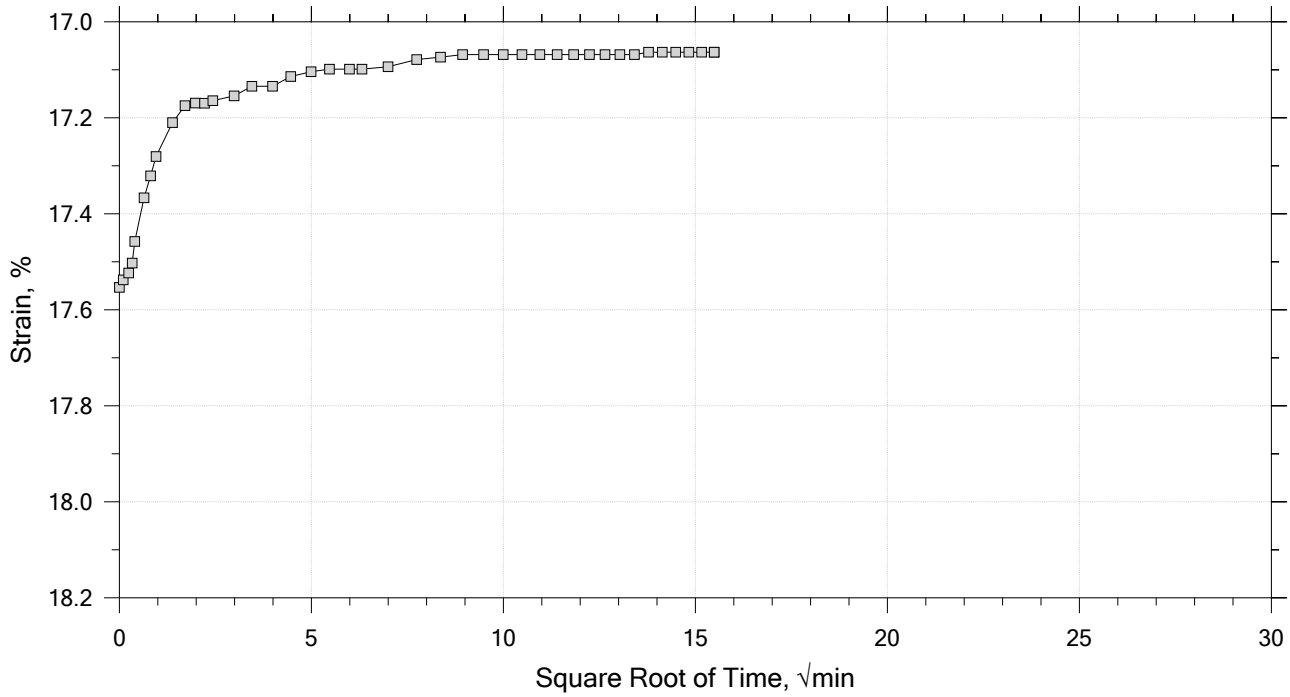
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

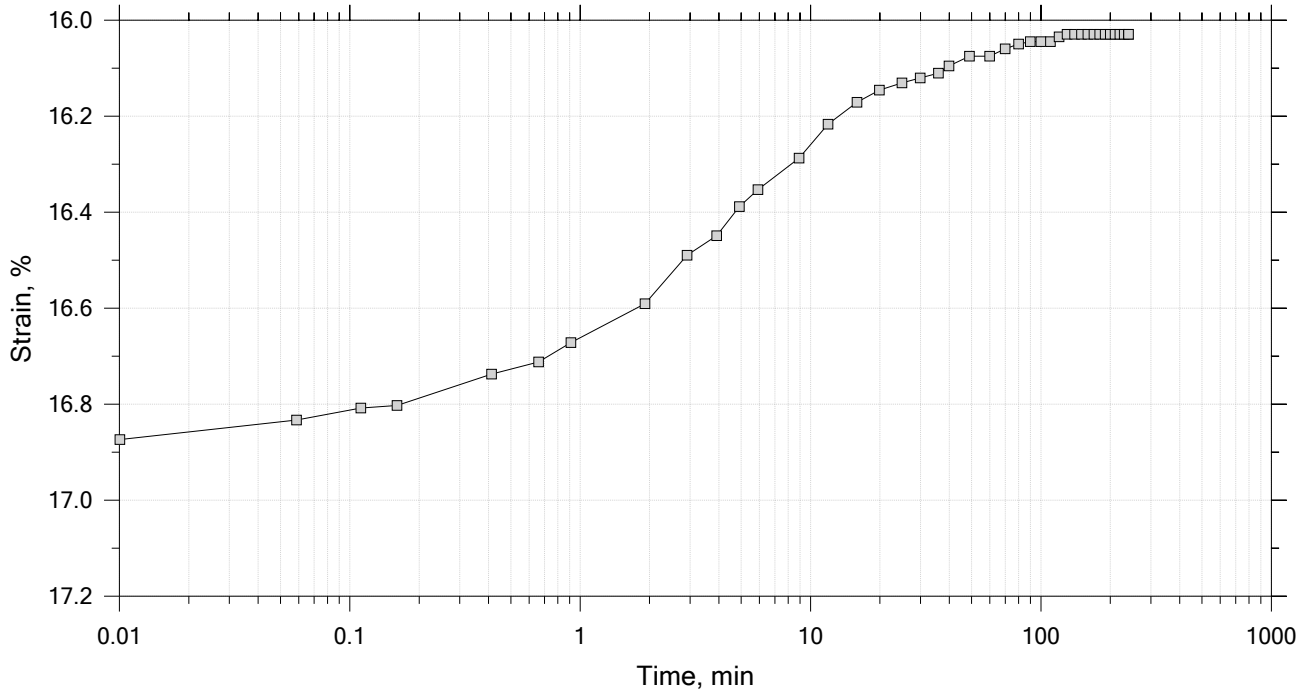


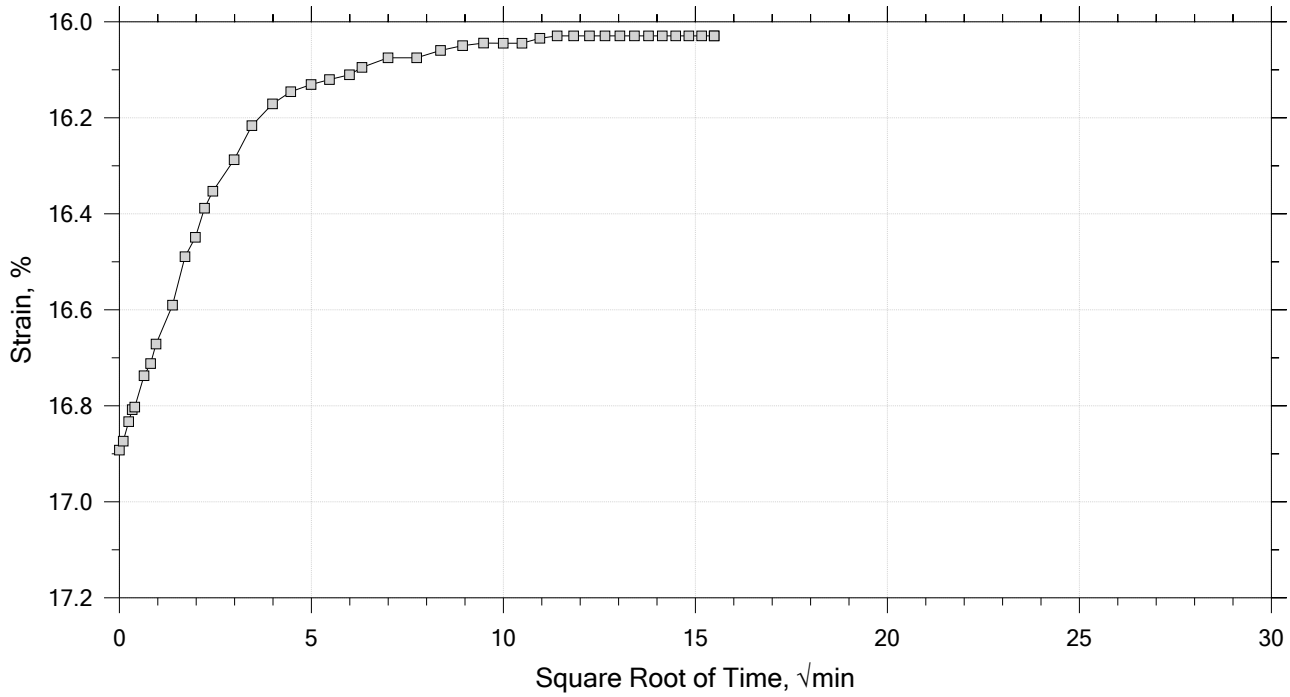


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

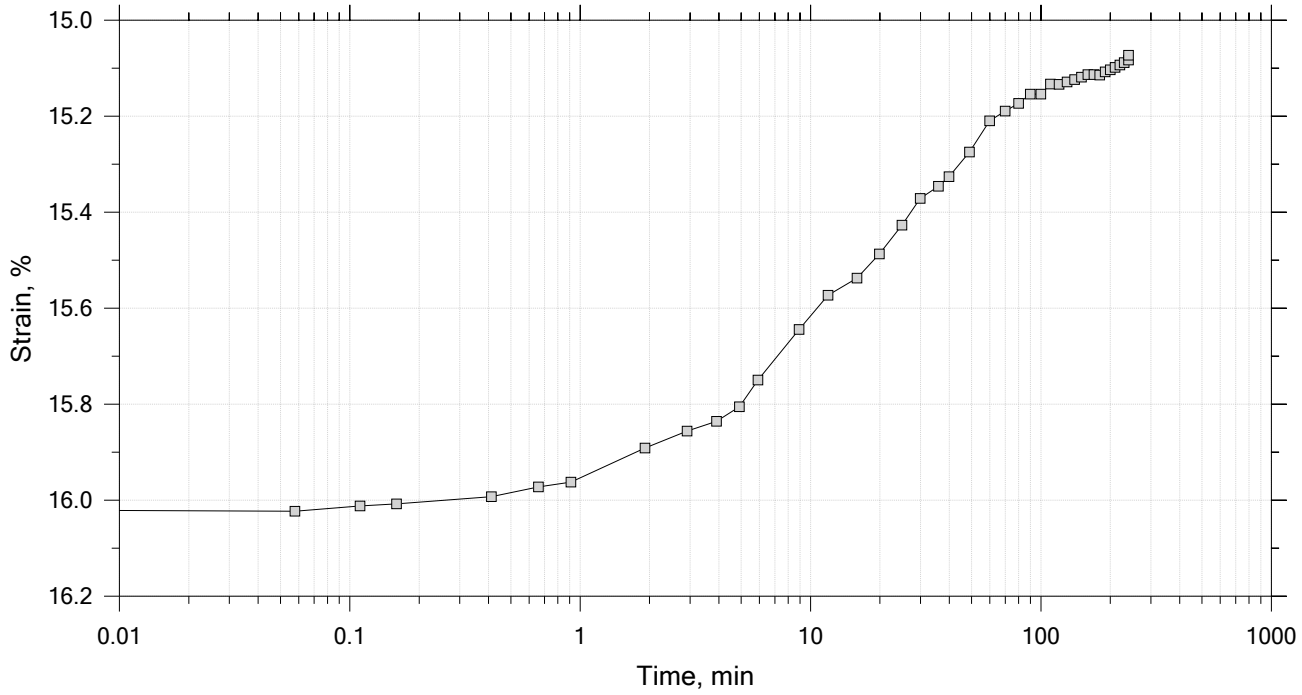


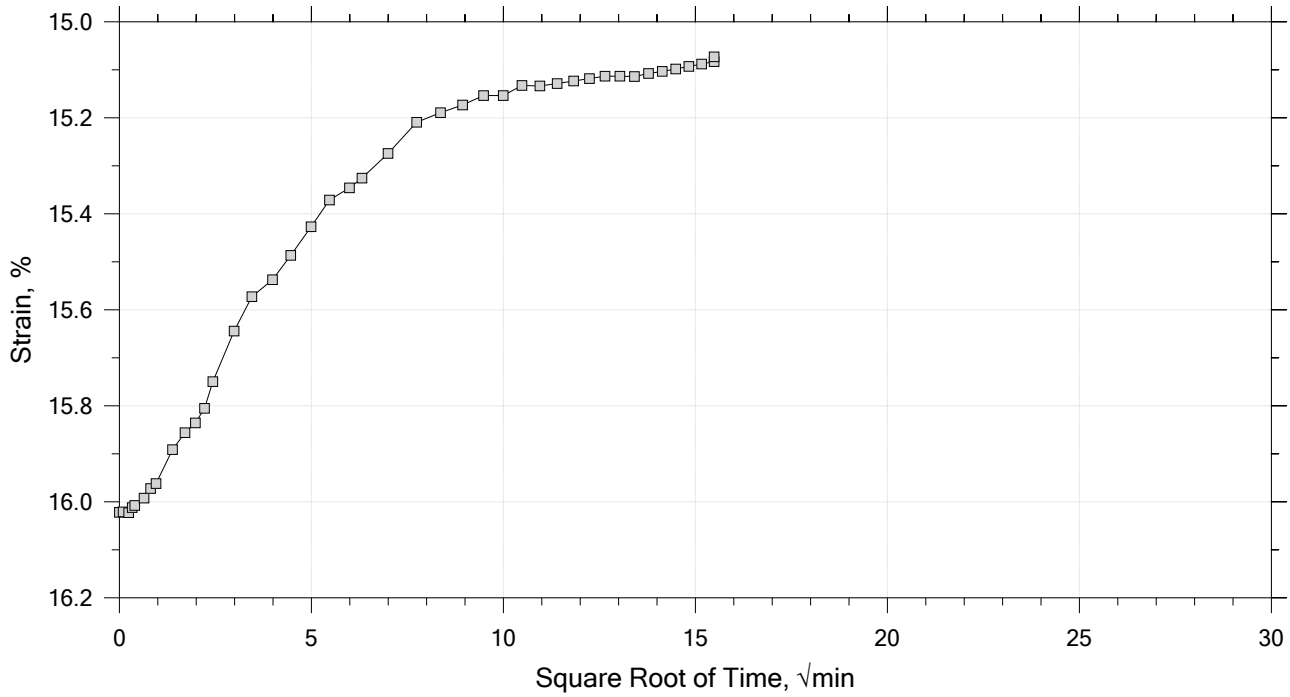


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

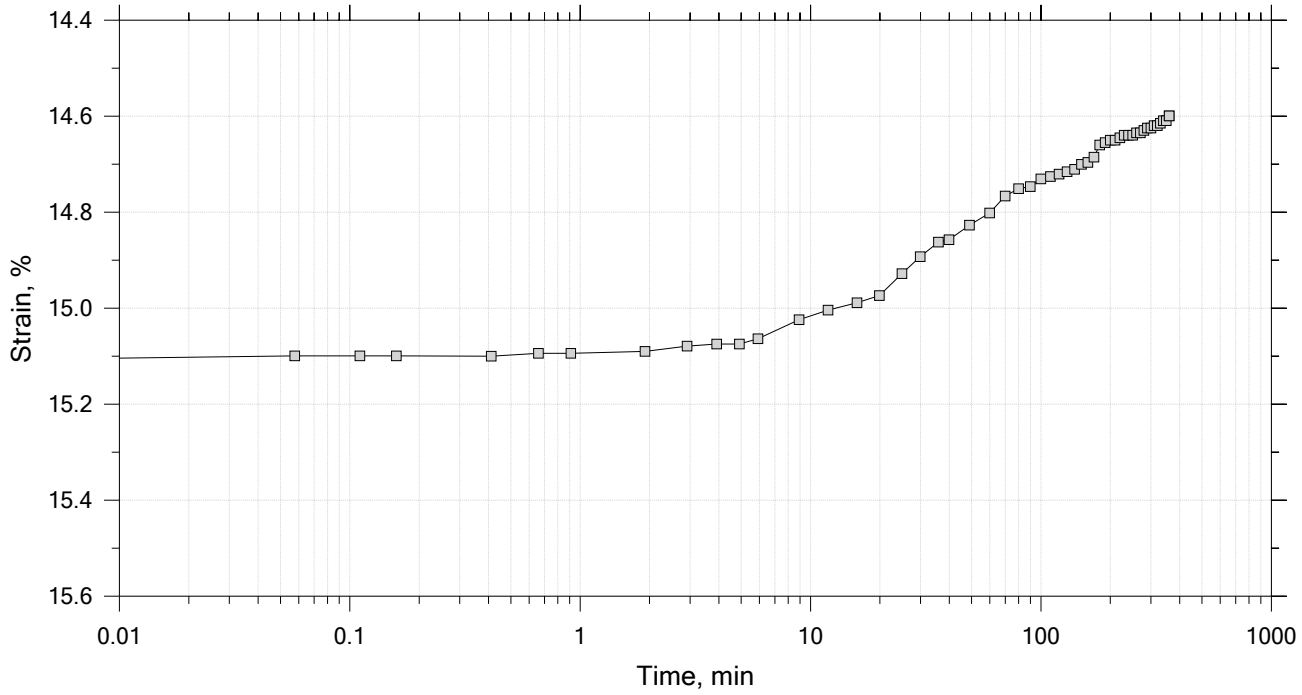


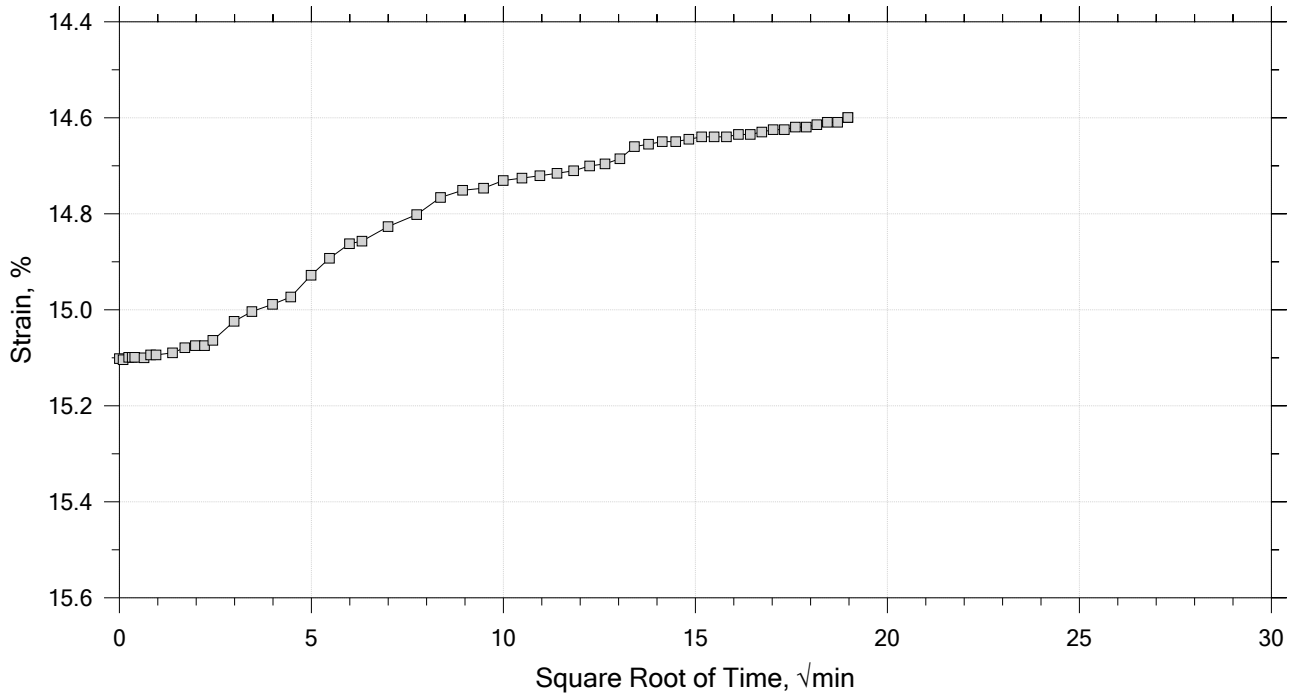


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 31
Initial Height: 1.00 in	Initial Void Ratio: 0.716	Plastic Limit: 19
Final Height: 0.87 in	Final Void Ratio: 0.492	Plasticity Index: 12

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	B2905	RING		C-2200
Mass Container, gm	8.39	109.14	109.14	9.15
Mass Container + Wet Soil, gm	139.53	270.7	261	159.28
Mass Container + Dry Soil, gm	111.77	237.91	237.91	136.45
Mass Dry Soil, gm	103.38	128.77	128.77	127.3
Water Content, %	26.85	25.47	17.93	17.93
Void Ratio	---	0.72	0.49	---
Degree of Saturation, %	---	97.74	100.00	---
Dry Unit Weight, pcf	---	99.934	114.87	---

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.

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0678	0.008237	0.701	0.824	0.000	0.00e+00	1.22e-01	0.00e+00	0.00e+00
2	0.125	0.01093	0.697	1.09	0.000	0.00e+00	4.70e-02	0.00e+00	0.00e+00
3	0.250	0.01791	0.685	1.79	3.072	1.80e-06	5.59e-02	2.71e-04	0.00e+00
4	0.500	0.02647	0.670	2.65	0.000	0.00e+00	3.42e-02	0.00e+00	0.00e+00
5	1.00	0.03958	0.648	3.96	0.000	0.00e+00	2.62e-02	0.00e+00	0.00e+00
6	2.00	0.06418	0.605	6.42	0.000	0.00e+00	2.46e-02	0.00e+00	0.00e+00
7	4.00	0.09590	0.551	9.59	2.400	2.01e-06	1.59e-02	8.60e-05	0.00e+00
8	8.00	0.1252	0.501	12.5	1.790	2.52e-06	7.31e-03	4.97e-05	0.00e+00
9	16.0	0.1537	0.452	15.4	1.283	3.29e-06	3.57e-03	3.17e-05	0.00e+00
10	32.0	0.1823	0.403	18.2	0.857	4.60e-06	1.78e-03	2.21e-05	0.00e+00
11	8.00	0.1770	0.412	17.7	0.000	0.00e+00	2.21e-04	0.00e+00	0.00e+00
12	2.00	0.1706	0.423	17.1	0.000	0.00e+00	1.05e-03	0.00e+00	0.00e+00
13	0.500	0.1603	0.441	16.0	0.000	0.00e+00	6.89e-03	0.00e+00	0.00e+00
14	0.125	0.1507	0.457	15.1	15.711	2.59e-07	2.55e-02	1.78e-05	0.00e+00
15	0.0625	0.1460	0.465	14.6	0.000	0.00e+00	7.58e-02	0.00e+00	0.00e+00

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

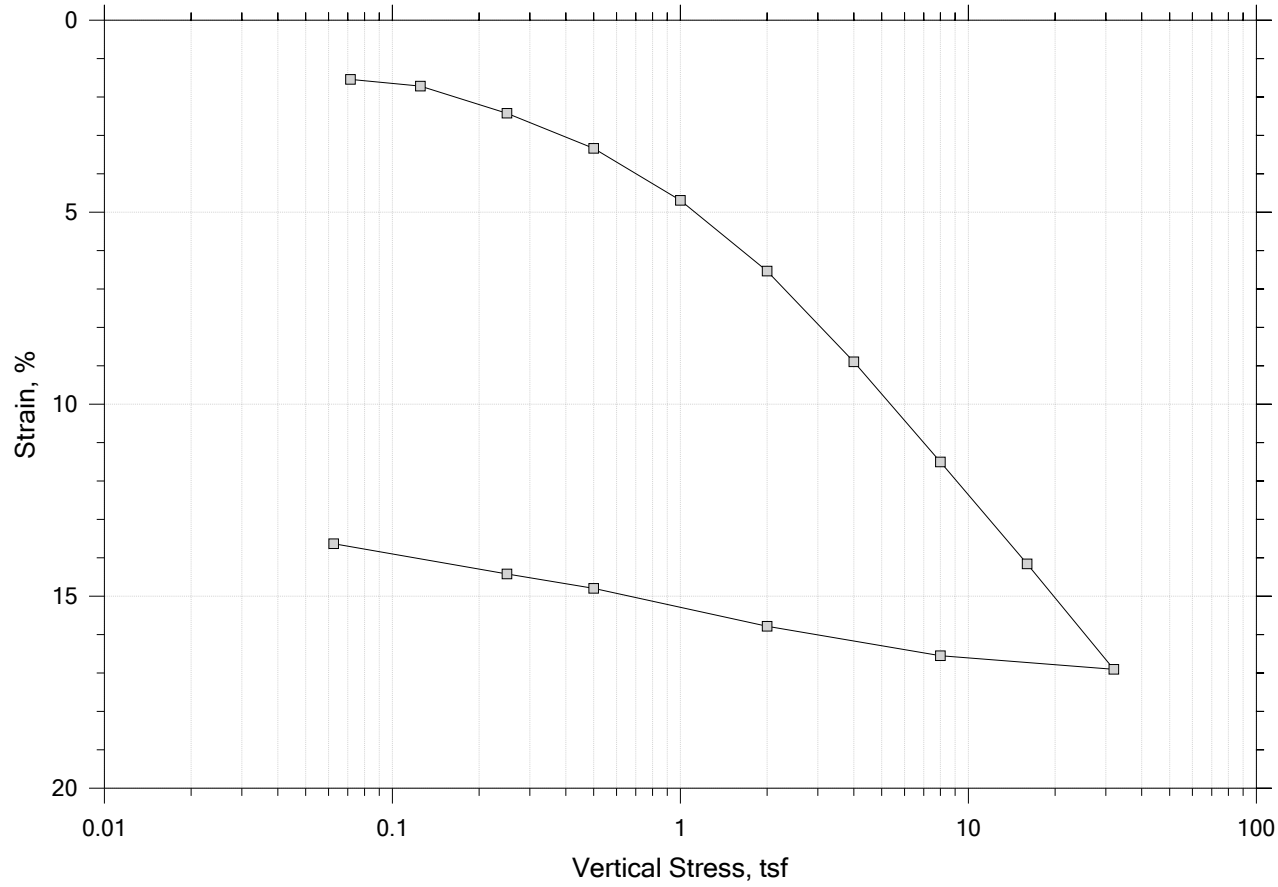
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0678	0.008237	0.701	0.824	27.468	8.86e-07	1.22e-01	2.90e-04
2	0.125	0.01093	0.697	1.09	87.575	2.75e-07	4.70e-02	3.48e-05
3	0.250	0.01791	0.685	1.79	20.803	1.15e-06	5.59e-02	1.73e-04
4	0.500	0.02647	0.670	2.65	11.681	2.01e-06	3.42e-02	1.85e-04
5	1.00	0.03958	0.648	3.96	17.482	1.31e-06	2.62e-02	9.28e-05
6	2.00	0.06418	0.605	6.42	25.750	8.57e-07	2.46e-02	5.68e-05
7	4.00	0.09590	0.551	9.59	14.813	1.40e-06	1.59e-02	6.00e-05
8	8.00	0.1252	0.501	12.5	9.628	2.02e-06	7.31e-03	3.98e-05
9	16.0	0.1537	0.452	15.4	5.975	3.04e-06	3.57e-03	2.93e-05
10	32.0	0.1823	0.403	18.2	4.409	3.85e-06	1.78e-03	1.85e-05
11	8.00	0.1770	0.412	17.7	257.244	6.42e-08	2.21e-04	3.83e-08
12	2.00	0.1706	0.423	17.1	3.906	4.29e-06	1.05e-03	1.22e-05
13	0.500	0.1603	0.441	16.0	14.496	1.18e-06	6.89e-03	2.19e-05
14	0.125	0.1507	0.457	15.1	67.624	2.59e-07	2.55e-02	1.78e-05
15	0.0625	0.1460	0.465	14.6	135.510	1.31e-07	7.58e-02	2.68e-05

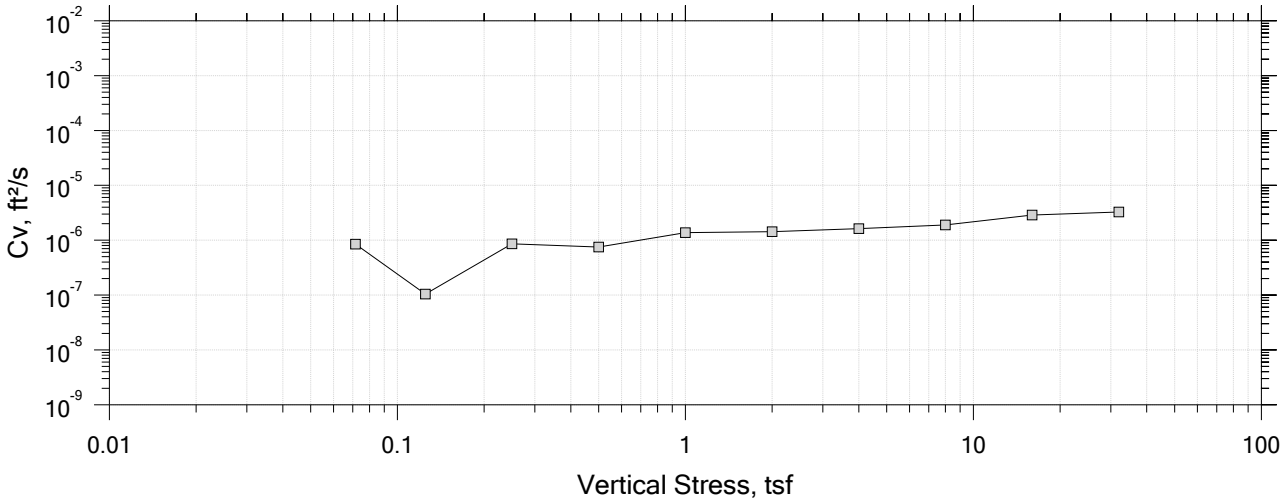
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		
	Displacement at End of Increment		

B-111 U-2

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

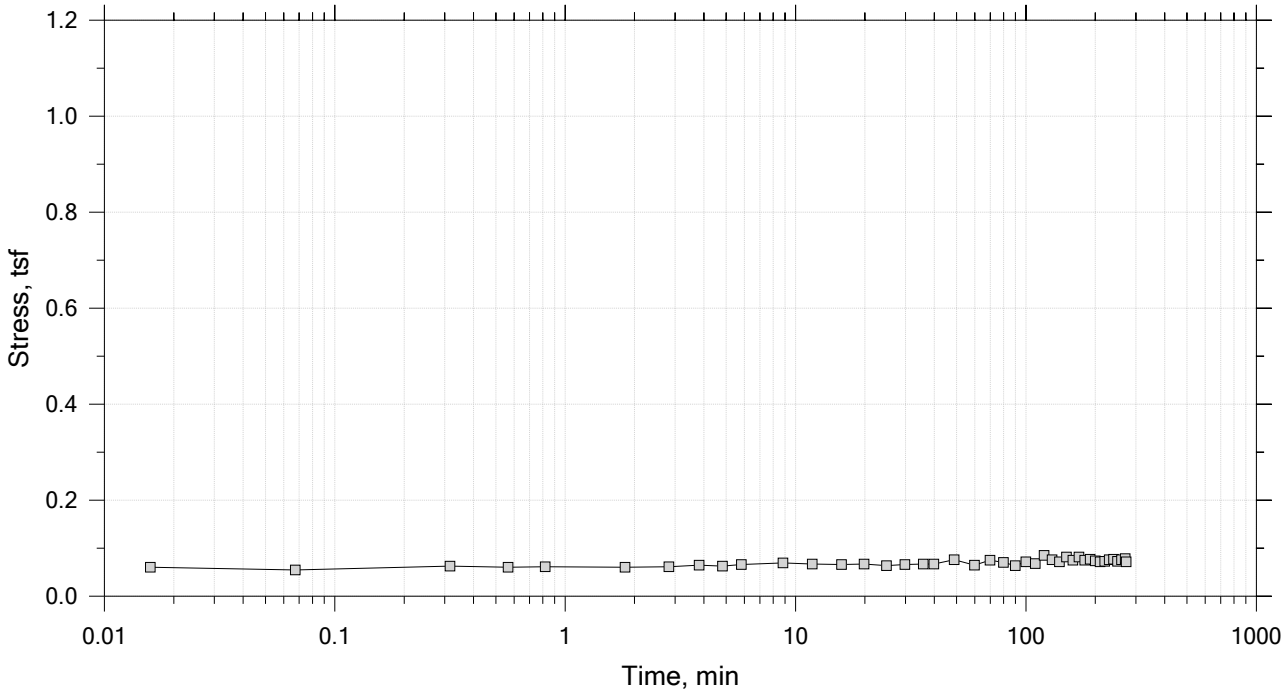


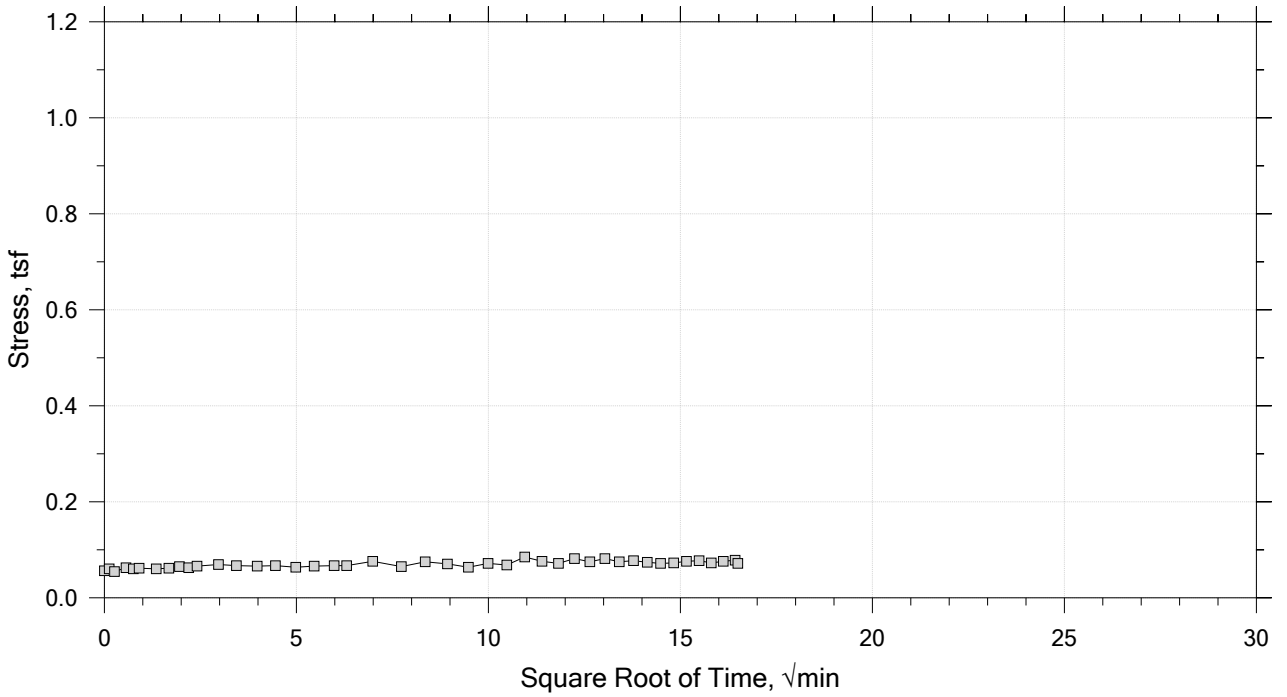


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0715 tsf

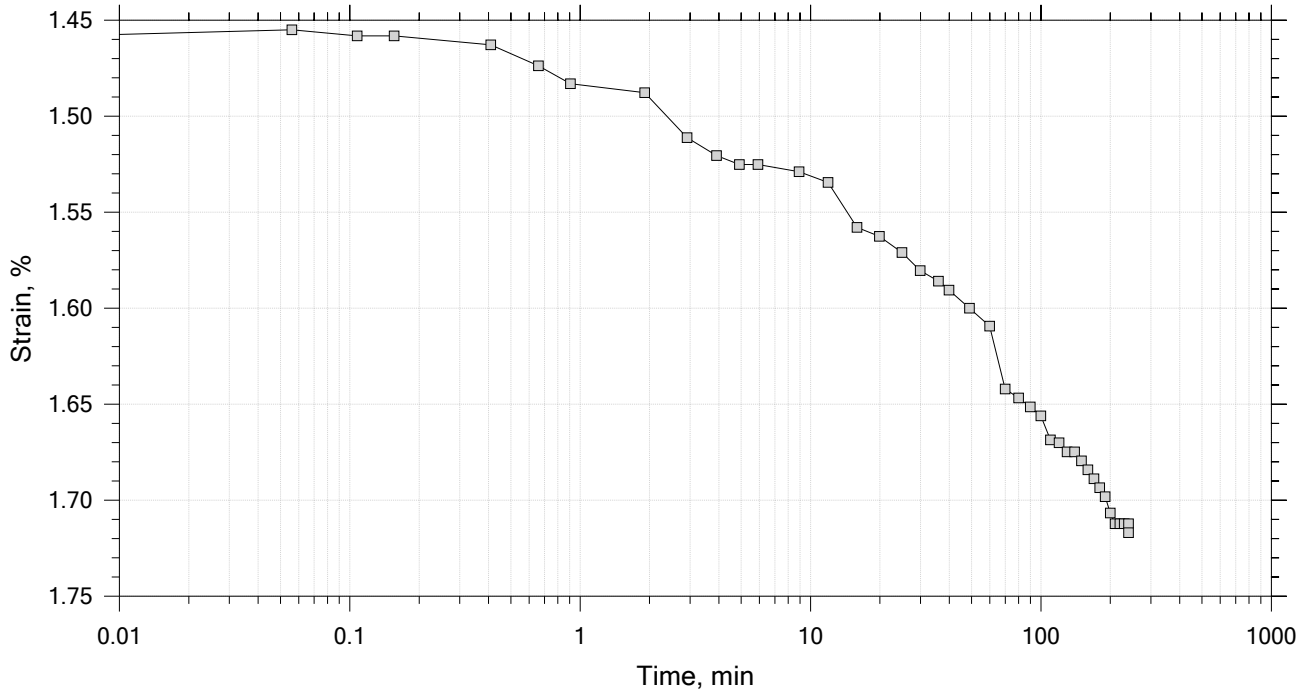


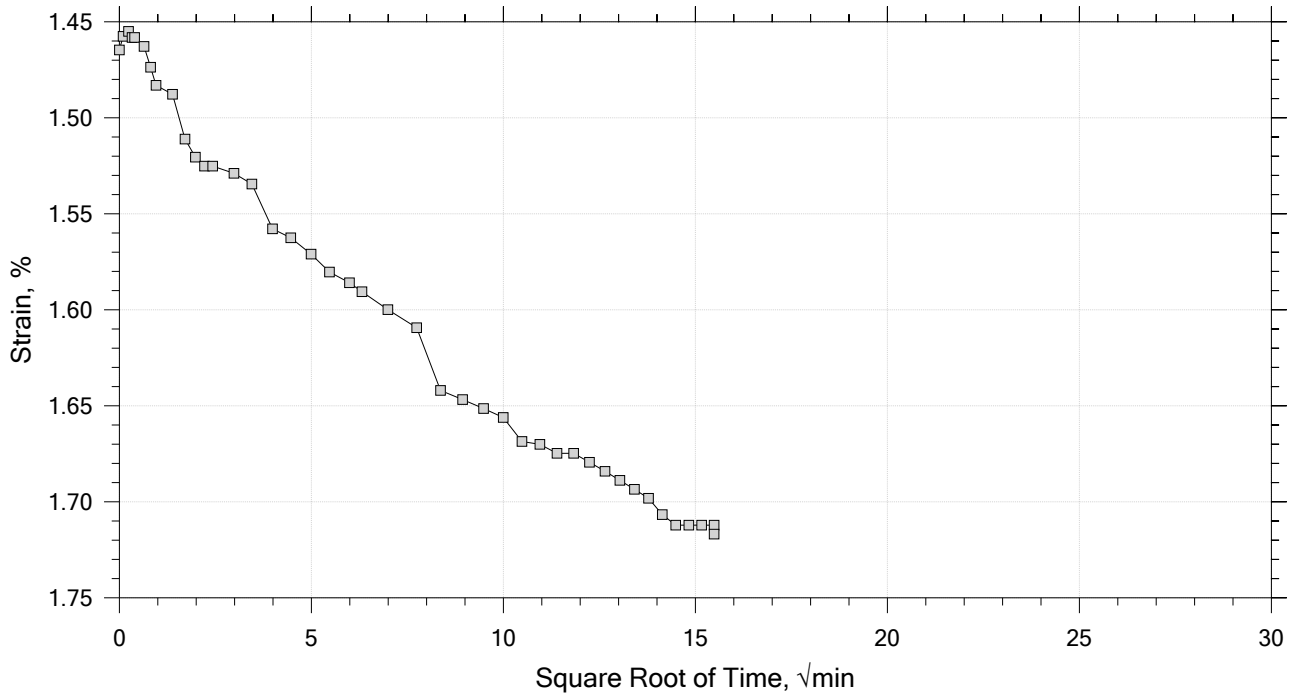


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

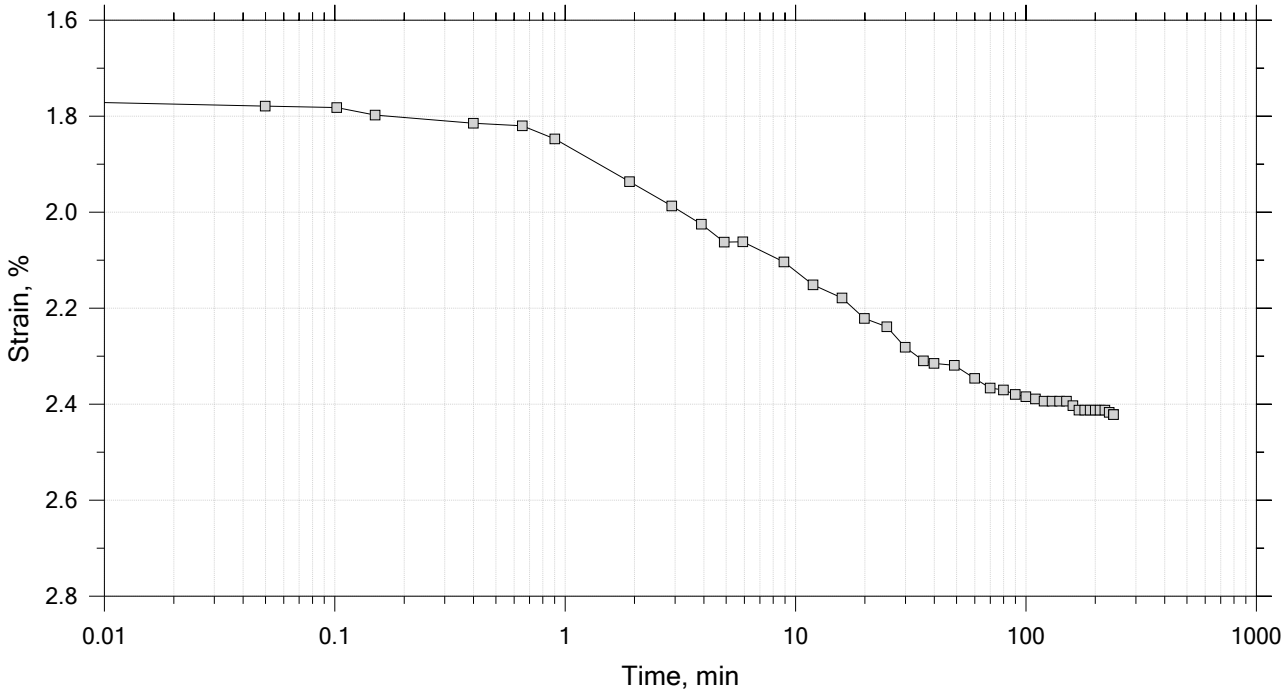


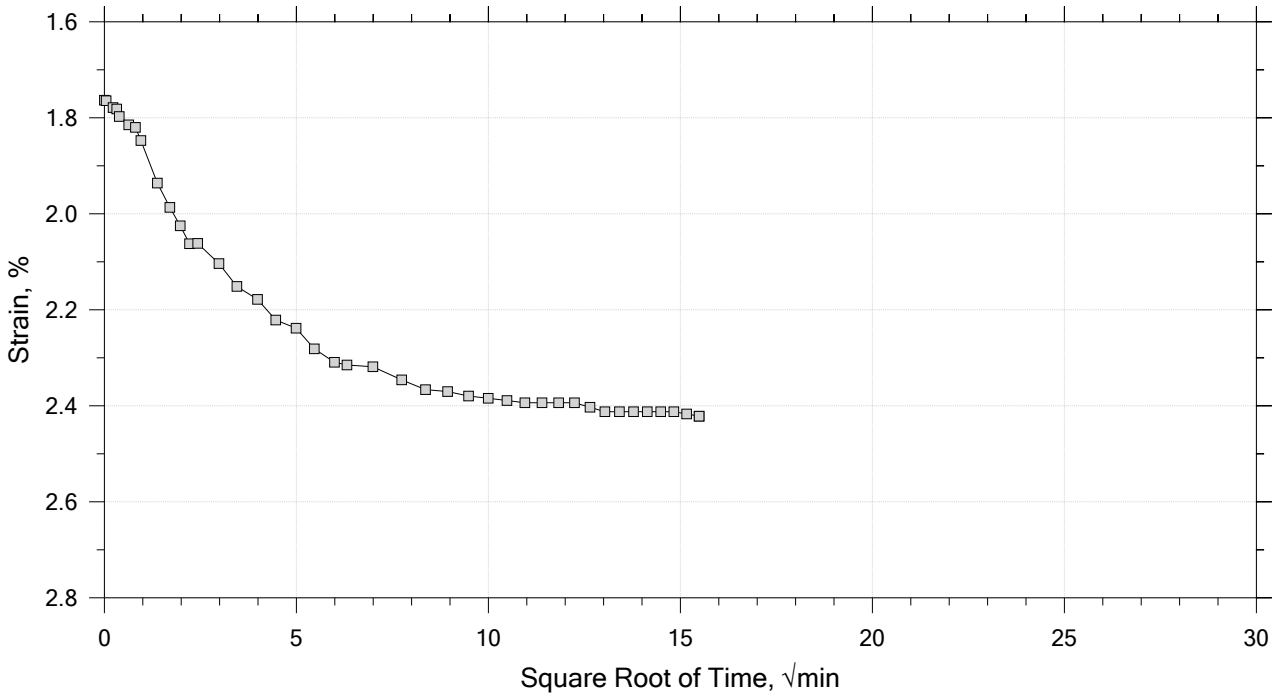


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

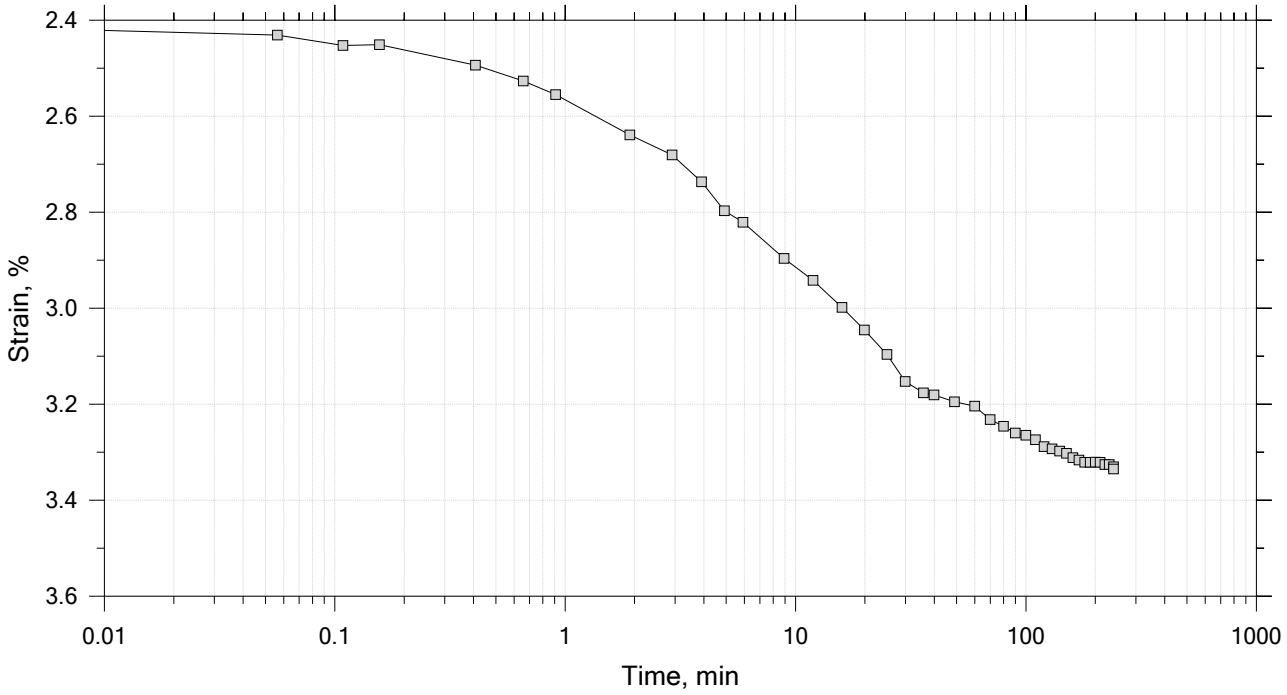


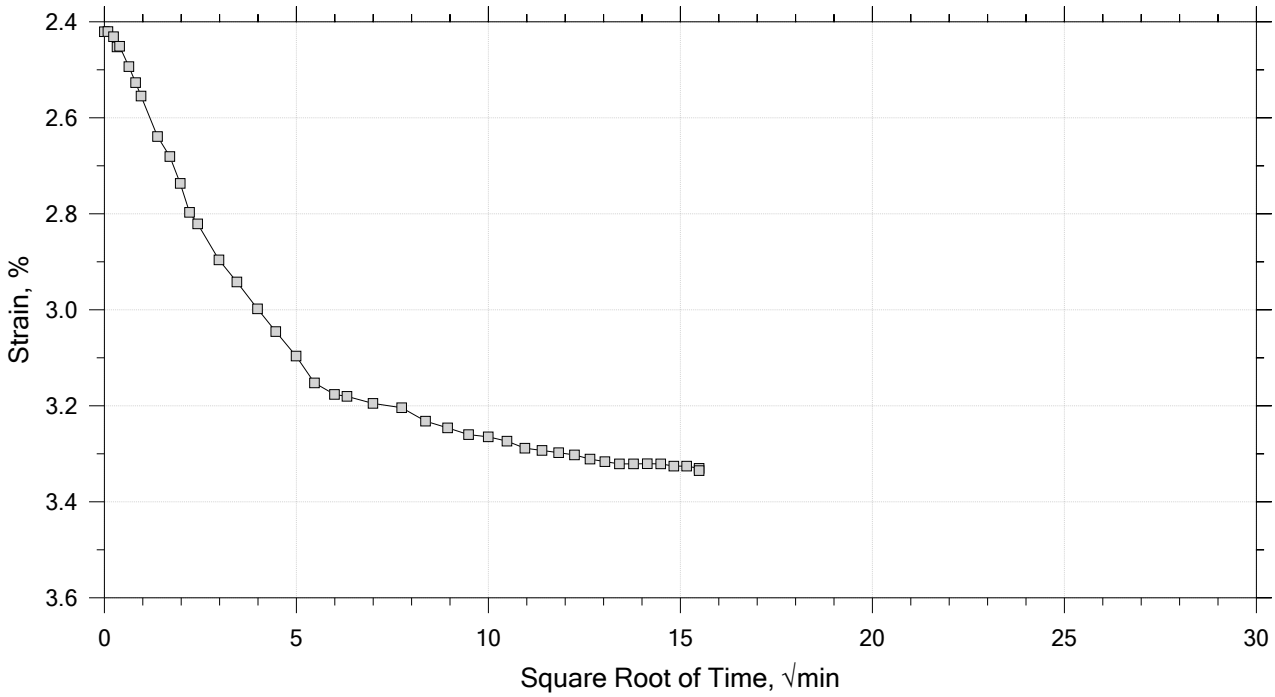


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





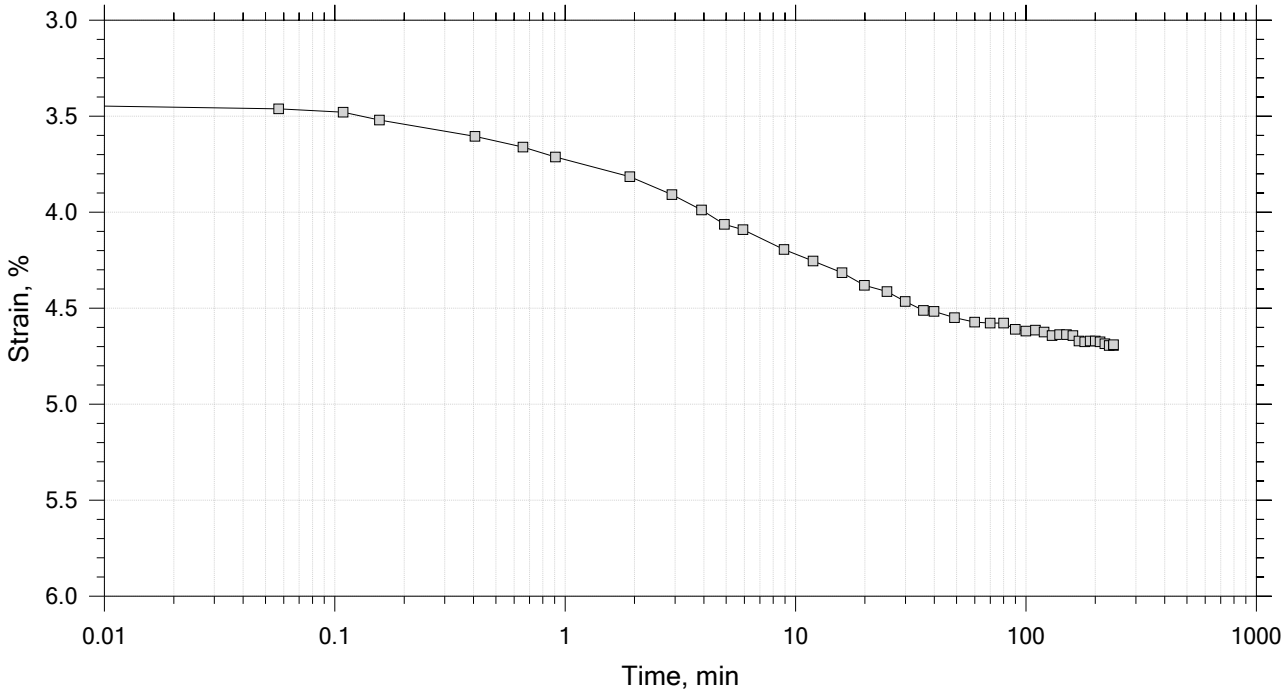
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

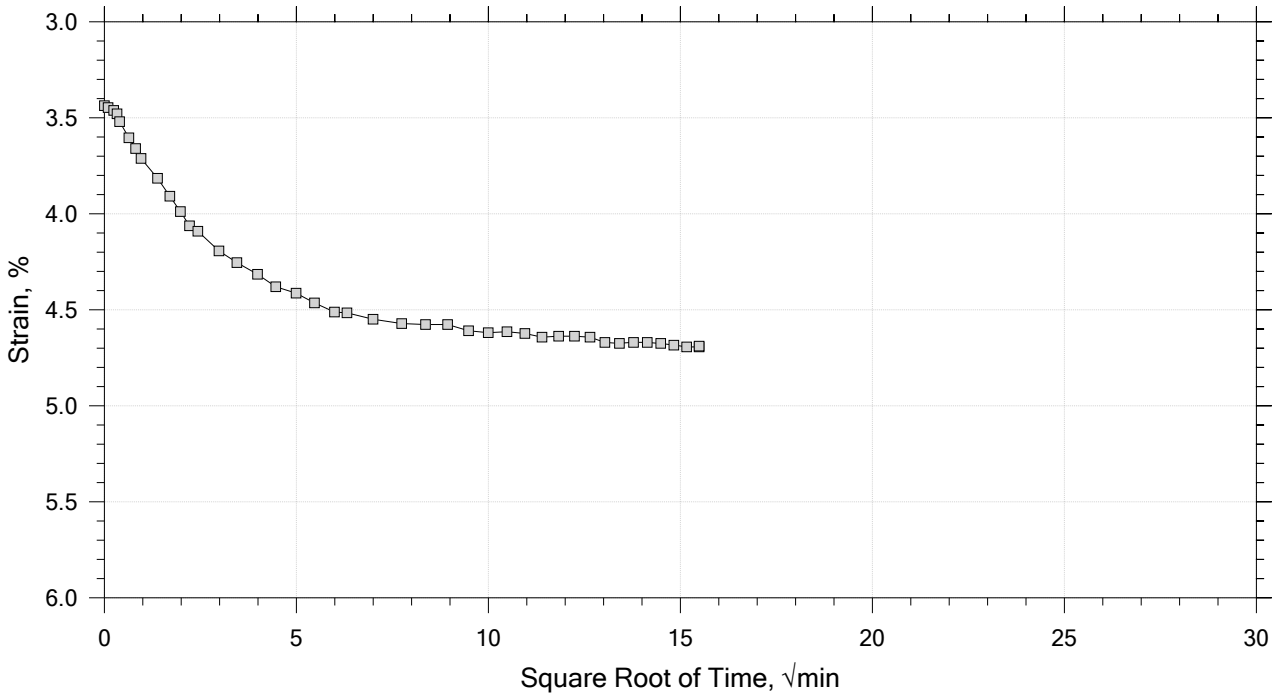
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





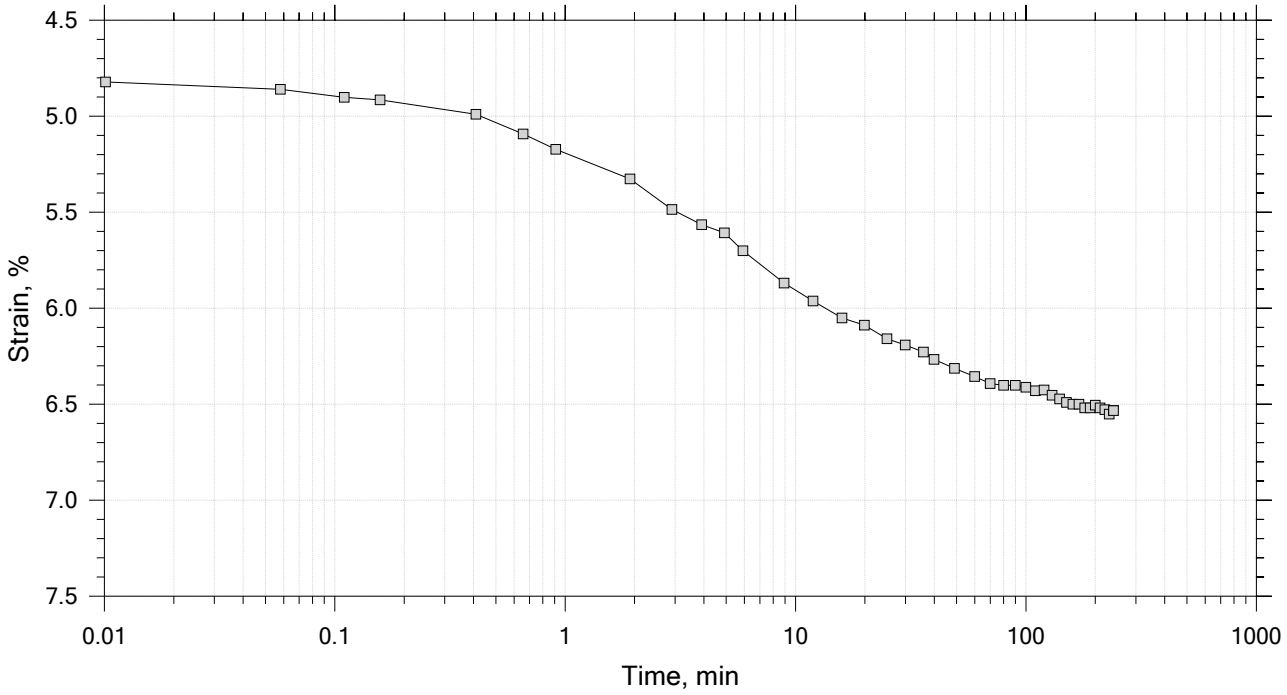
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

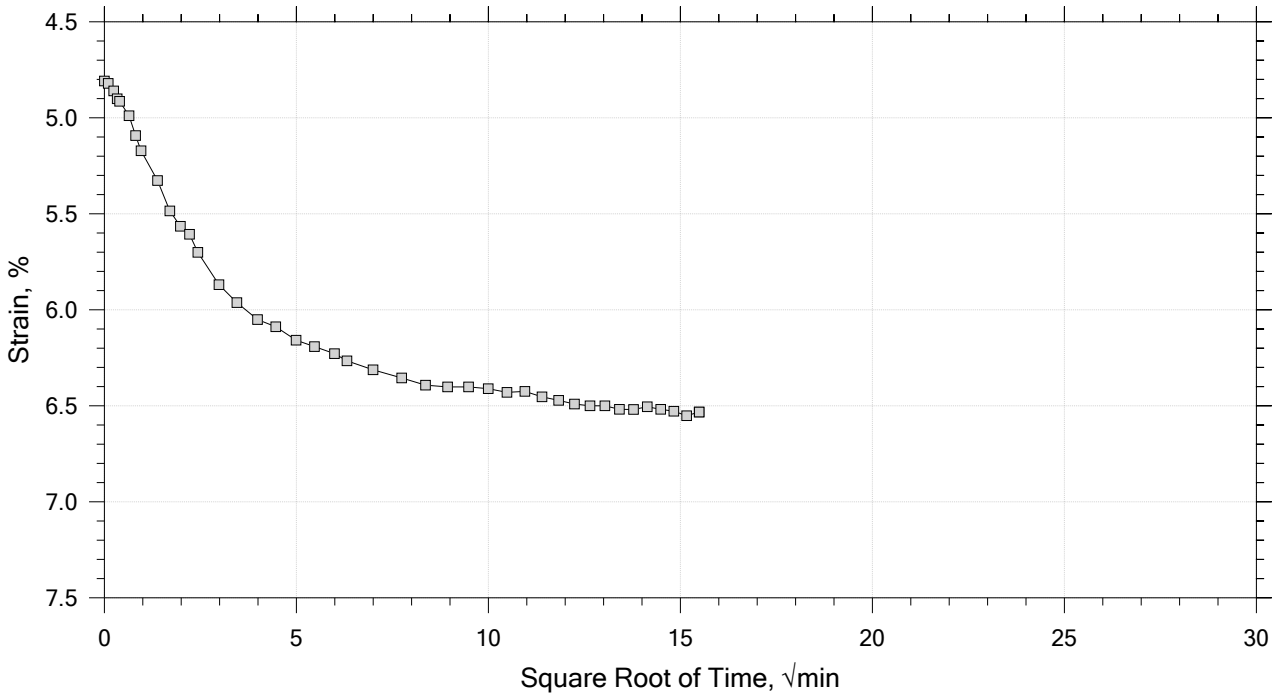
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





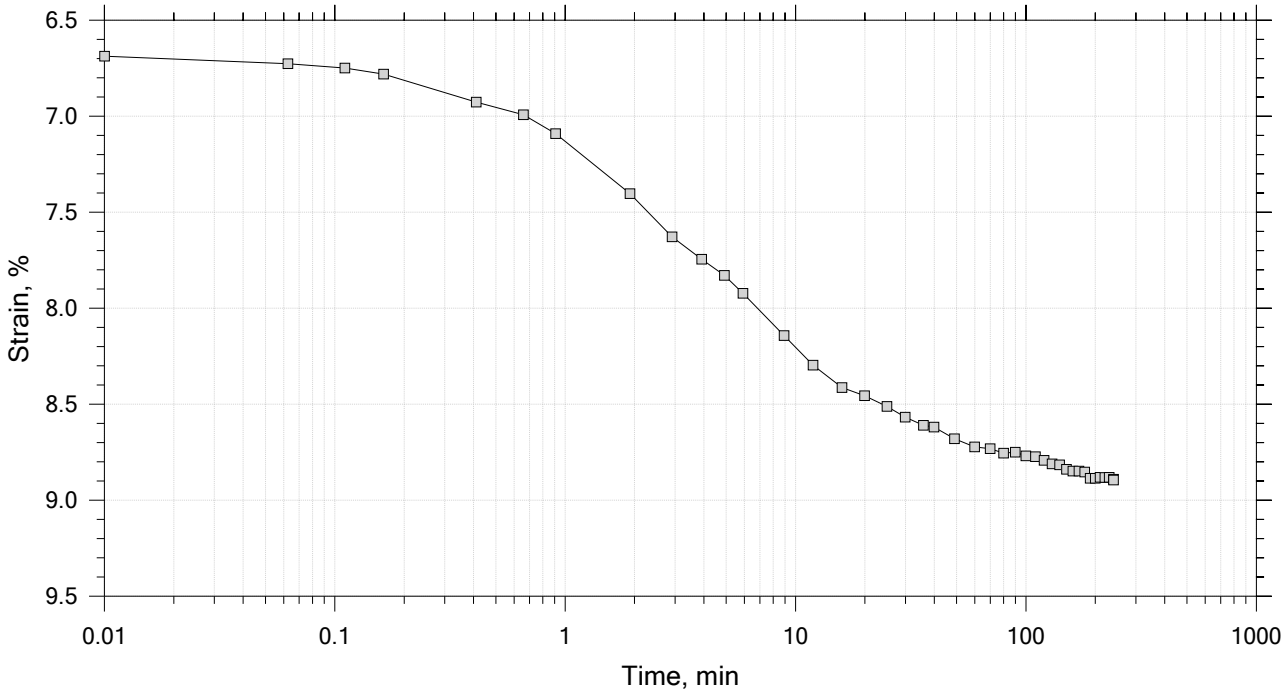
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

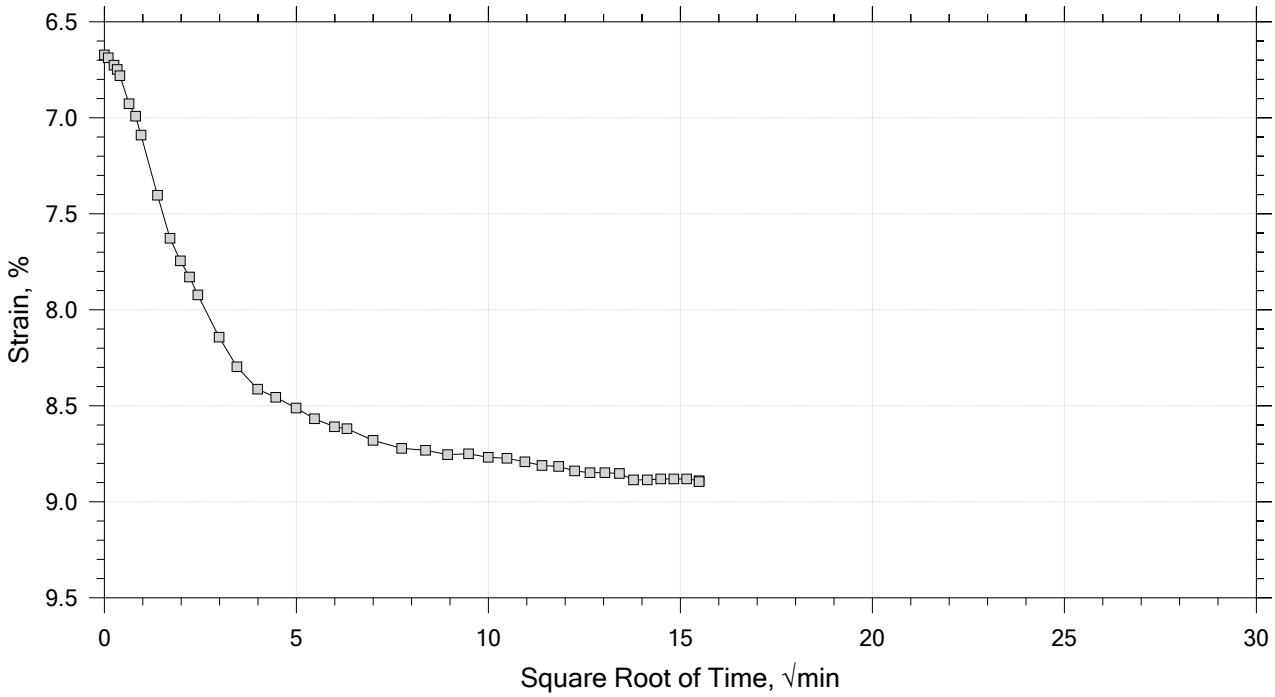
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





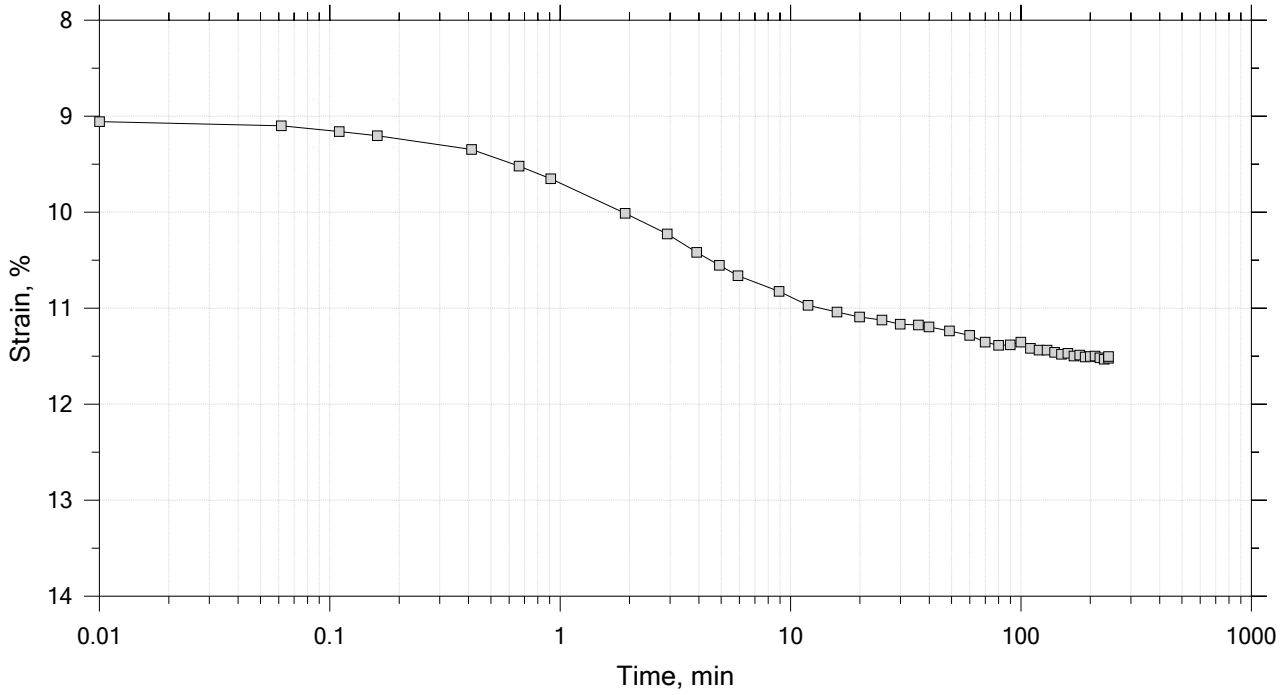
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

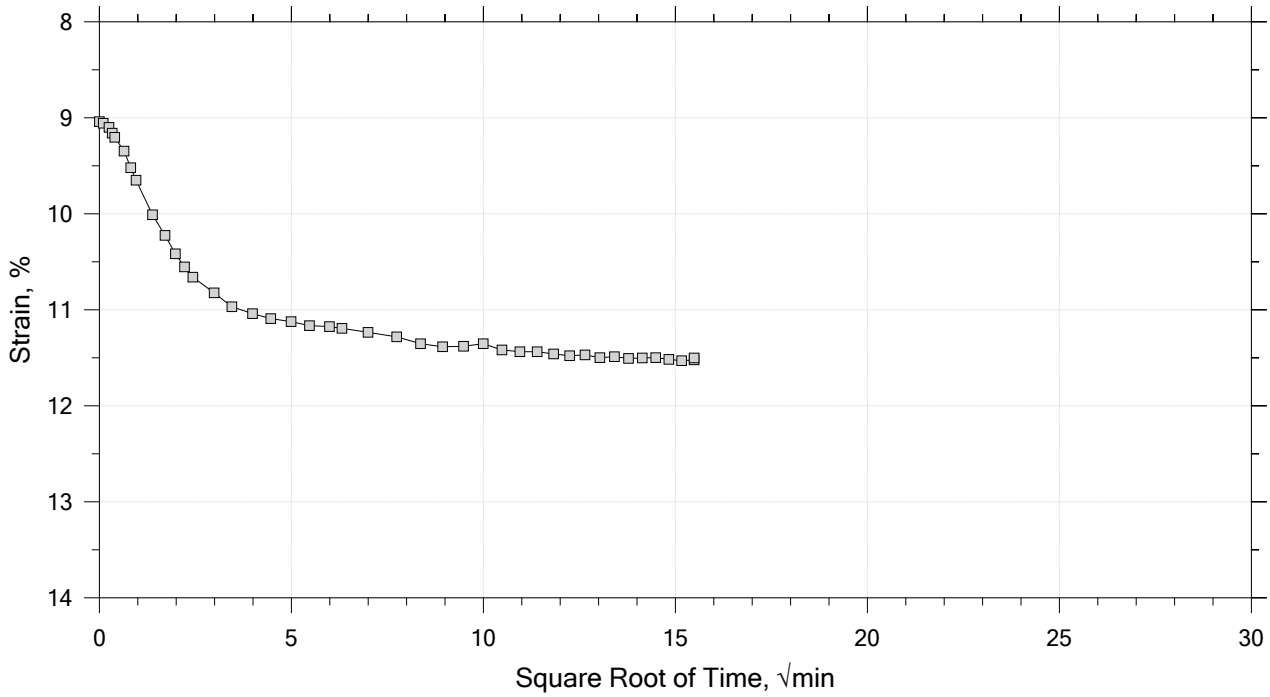
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





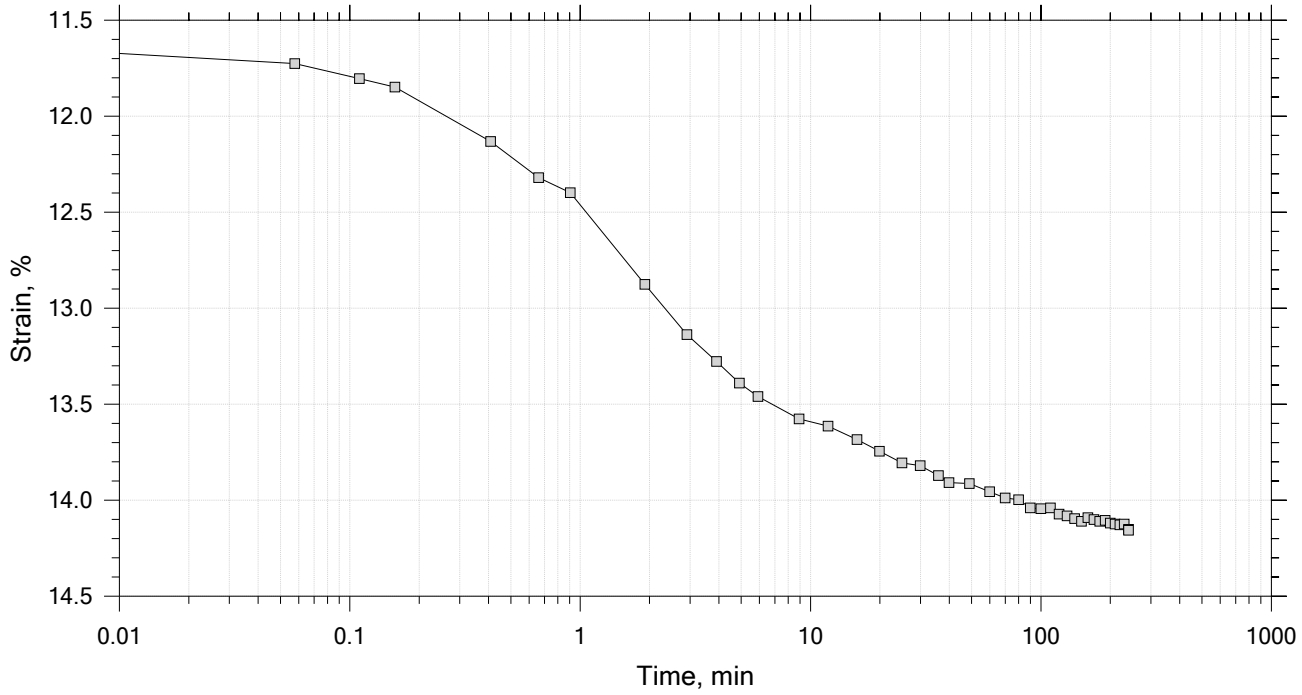
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

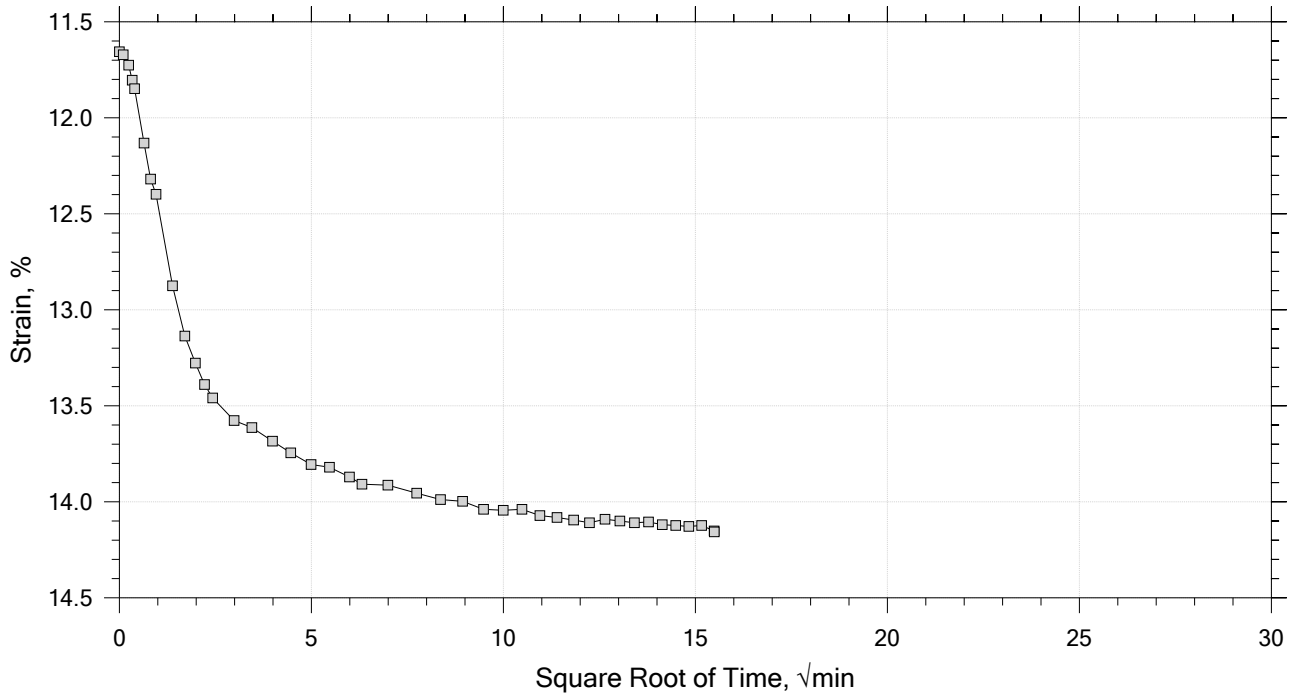
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

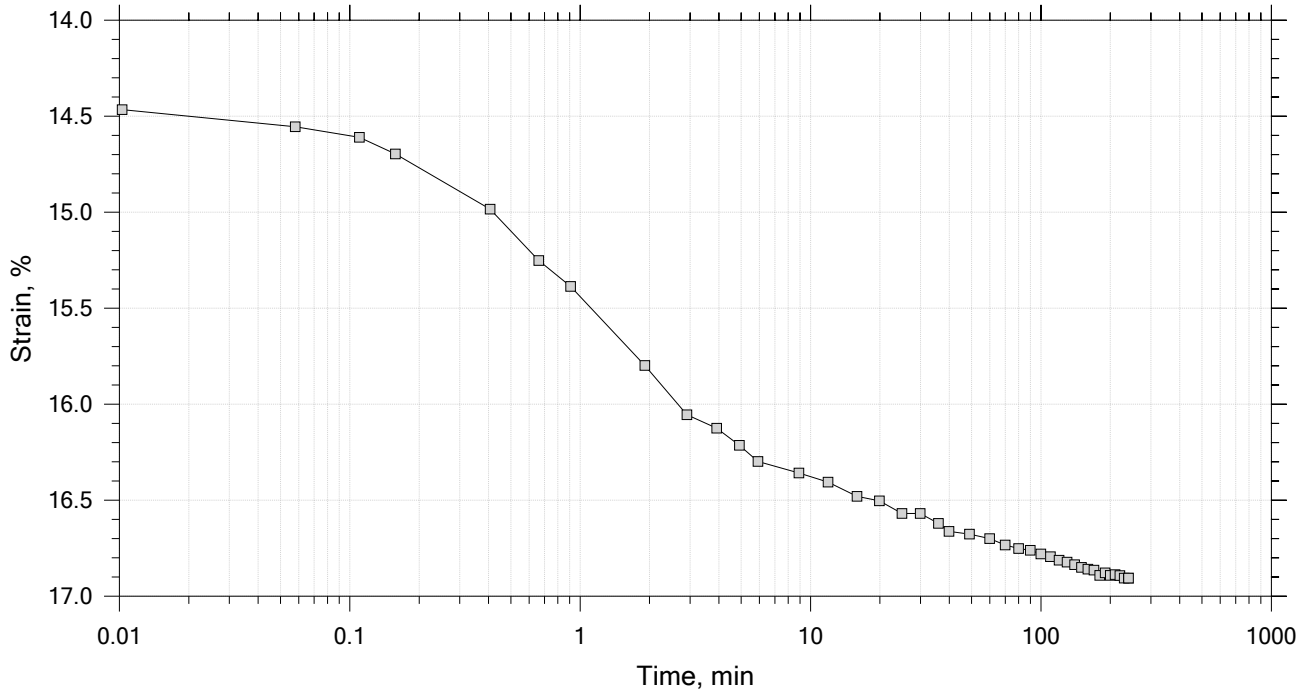


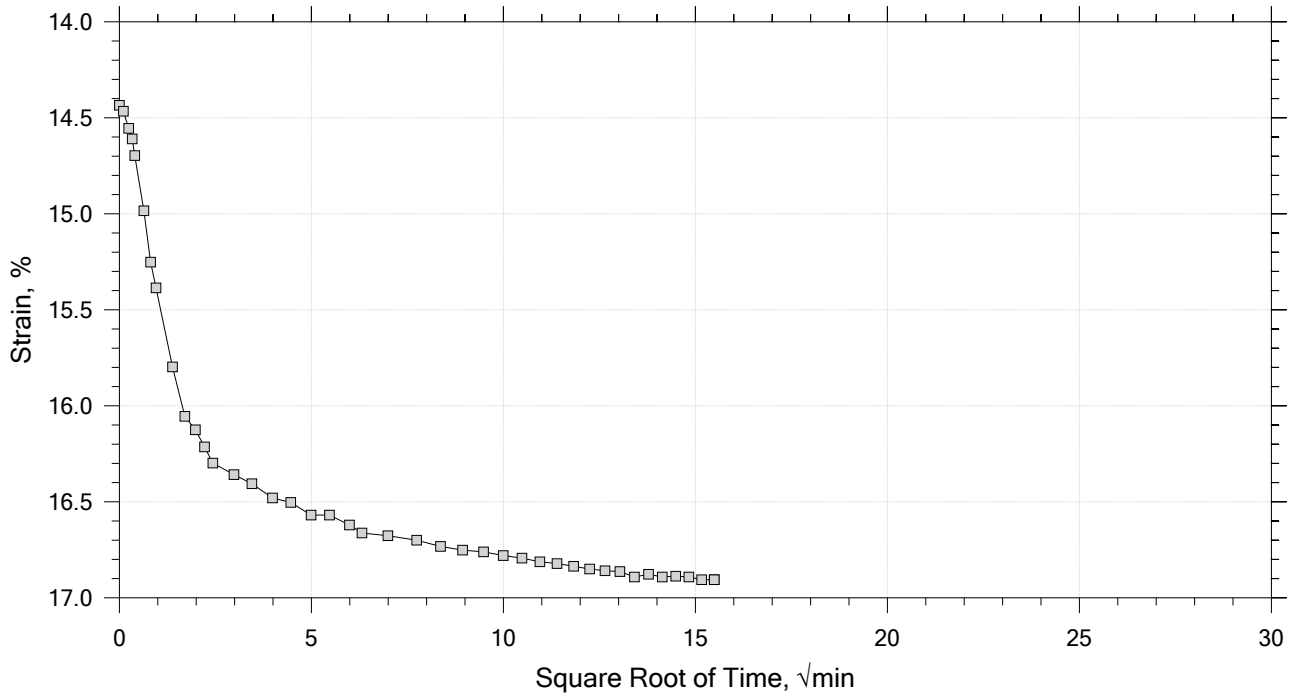


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

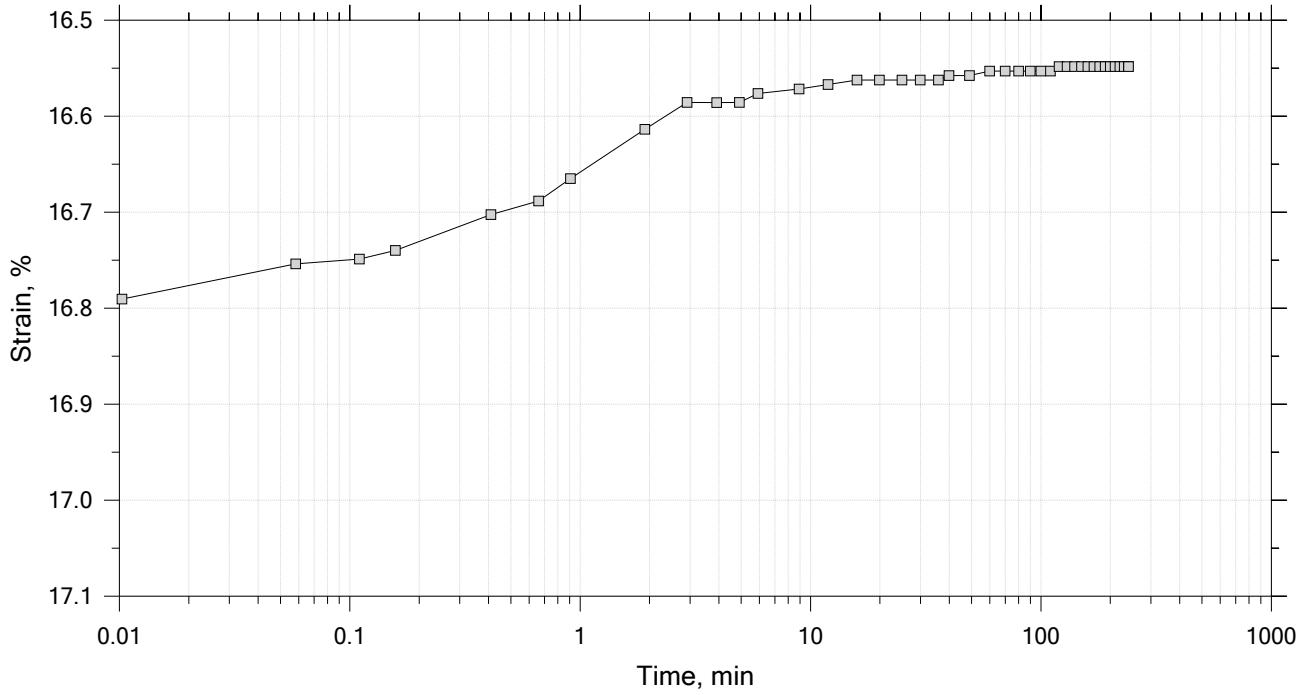


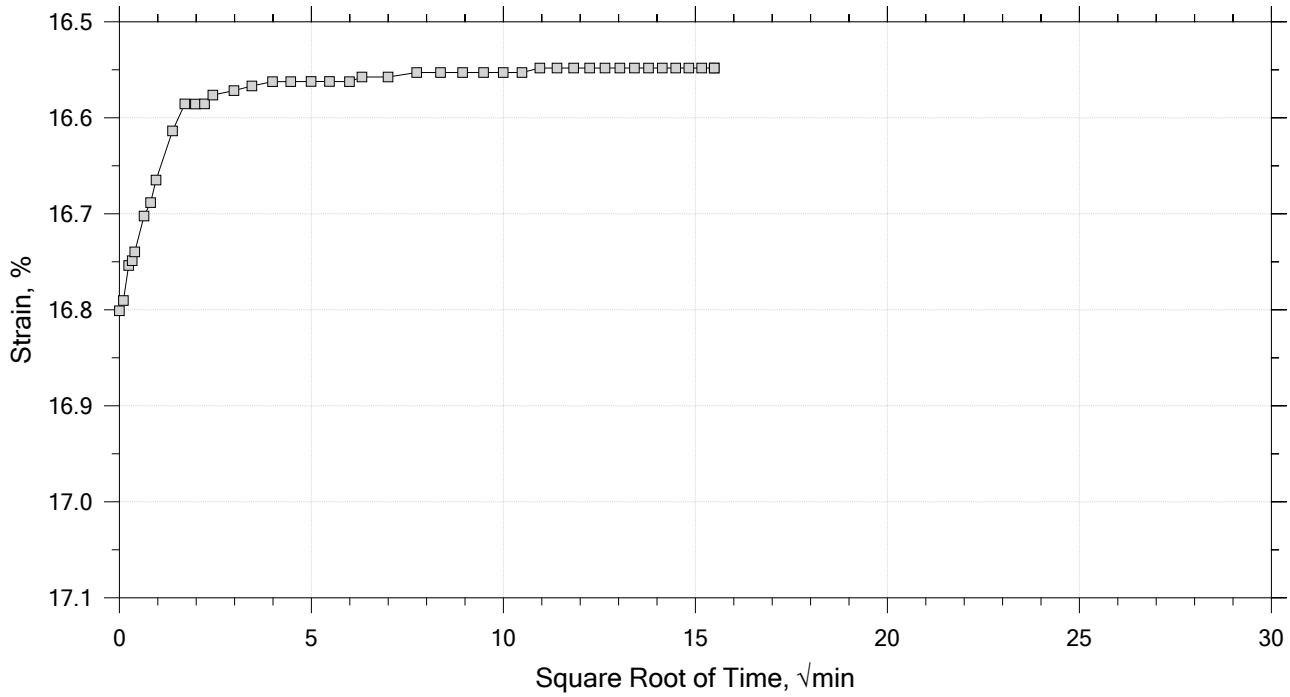


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf

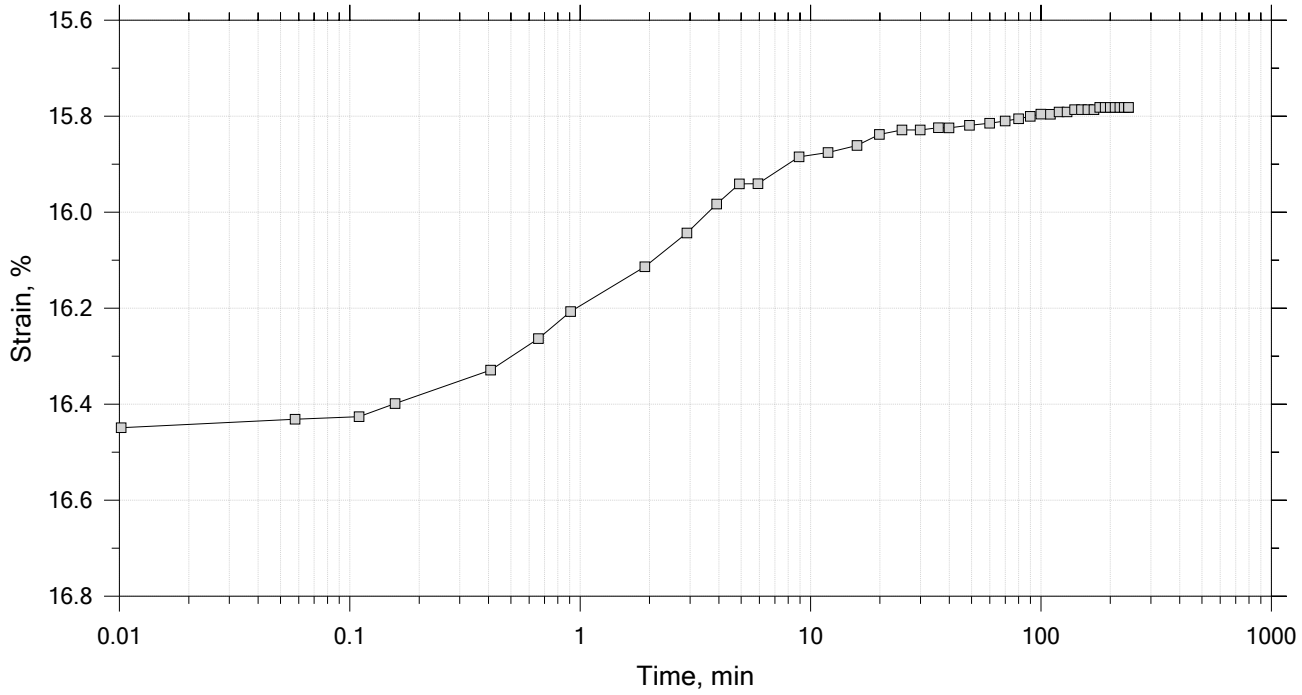


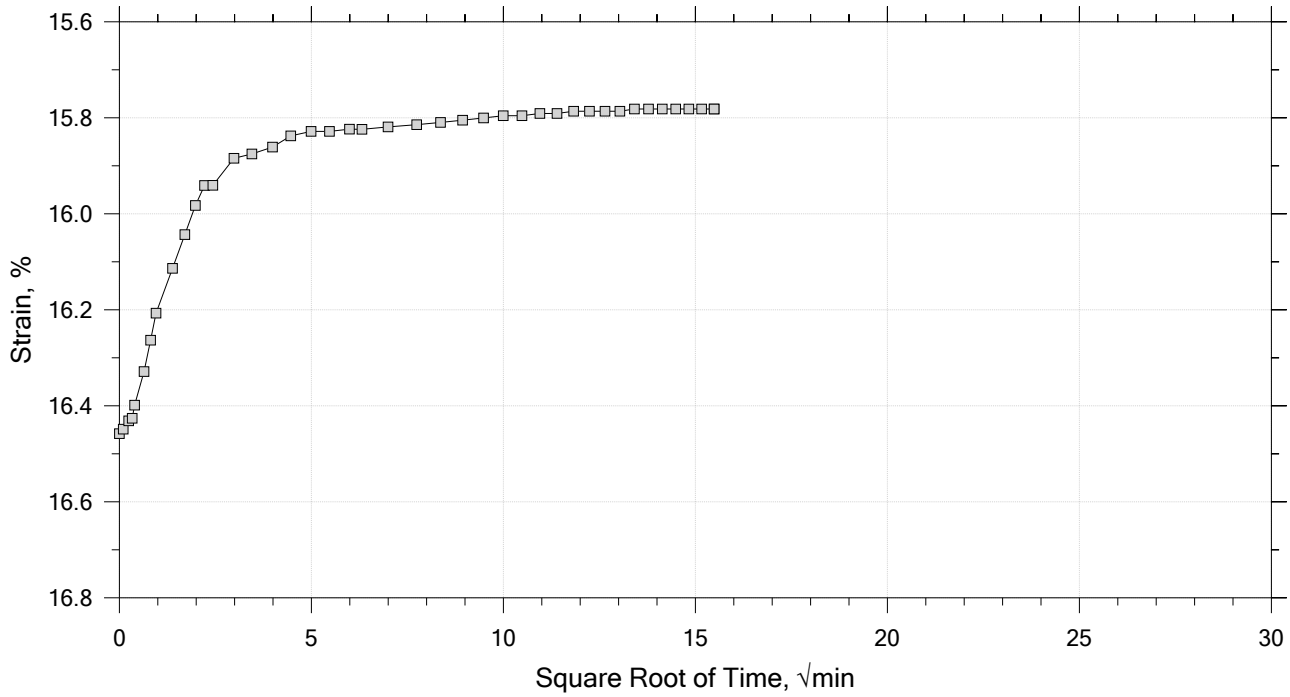


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

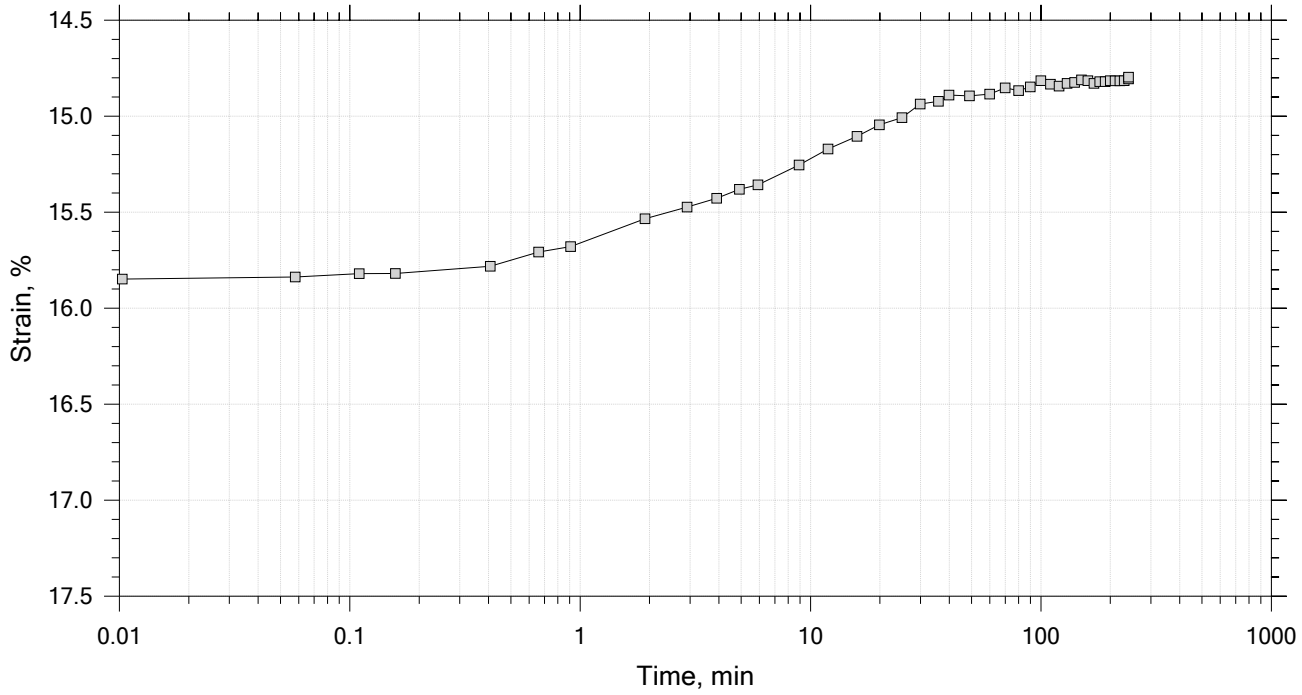


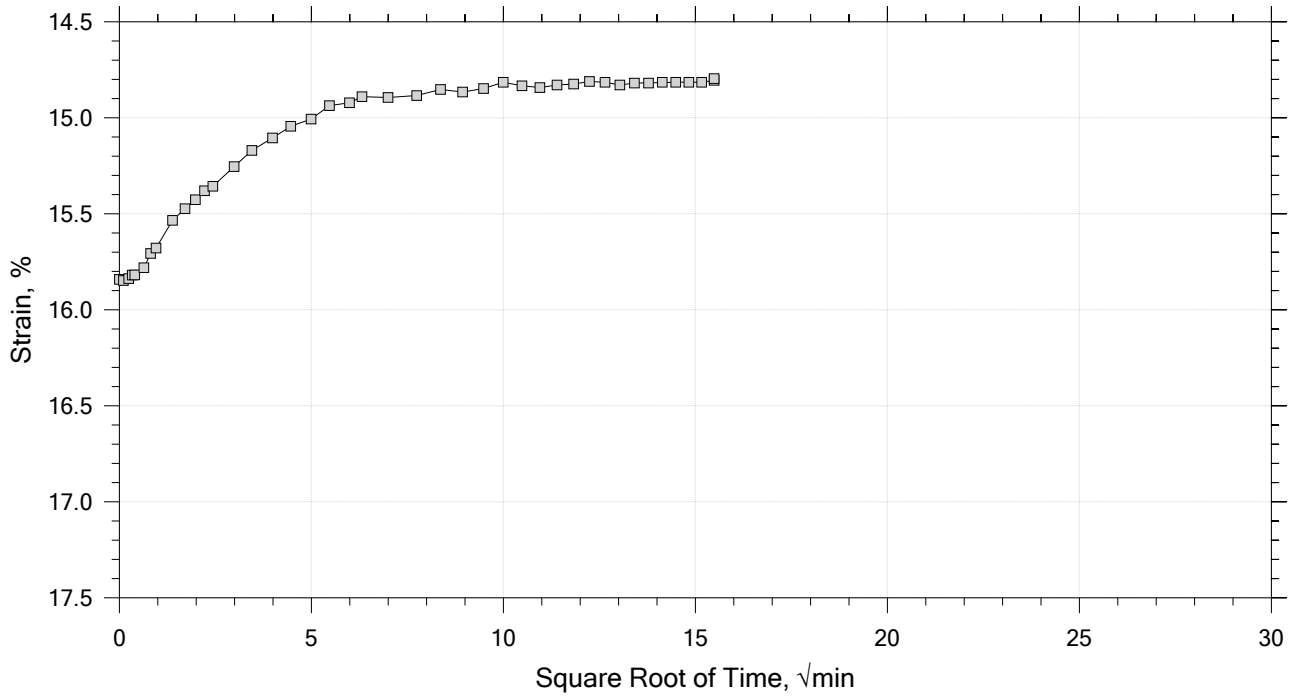


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf





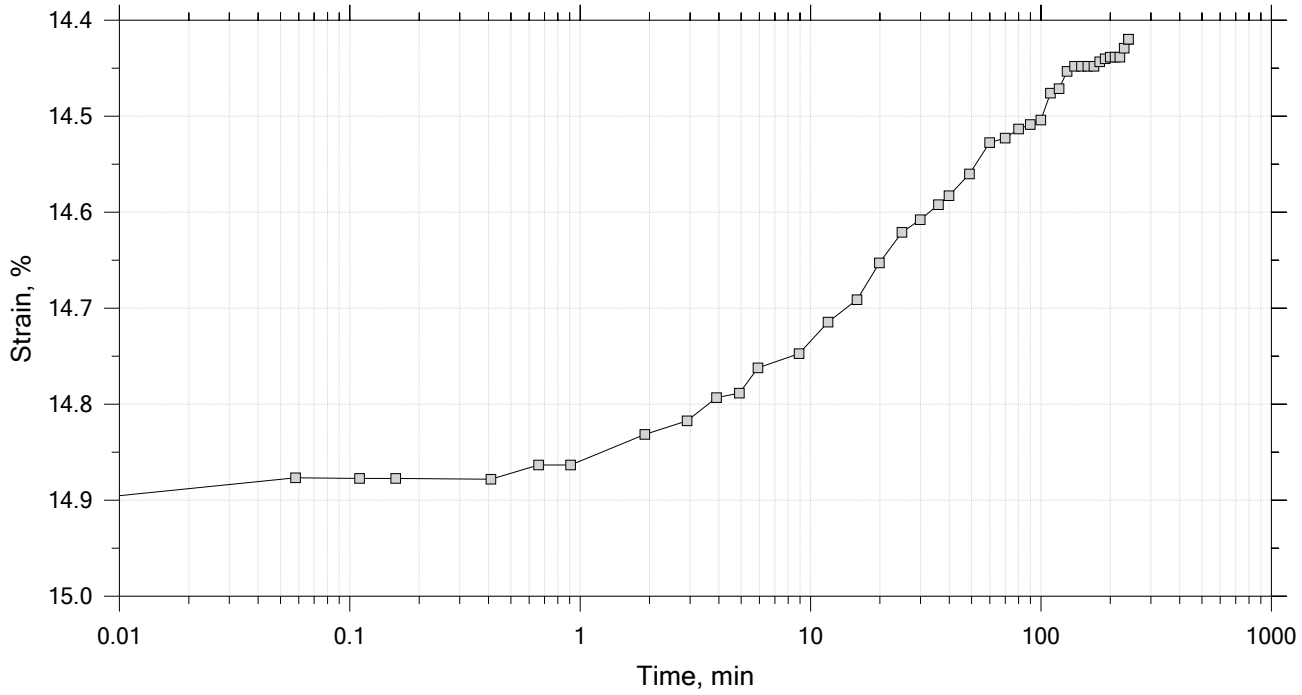
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System E, Swell Pressure = 0.0715 tsf		

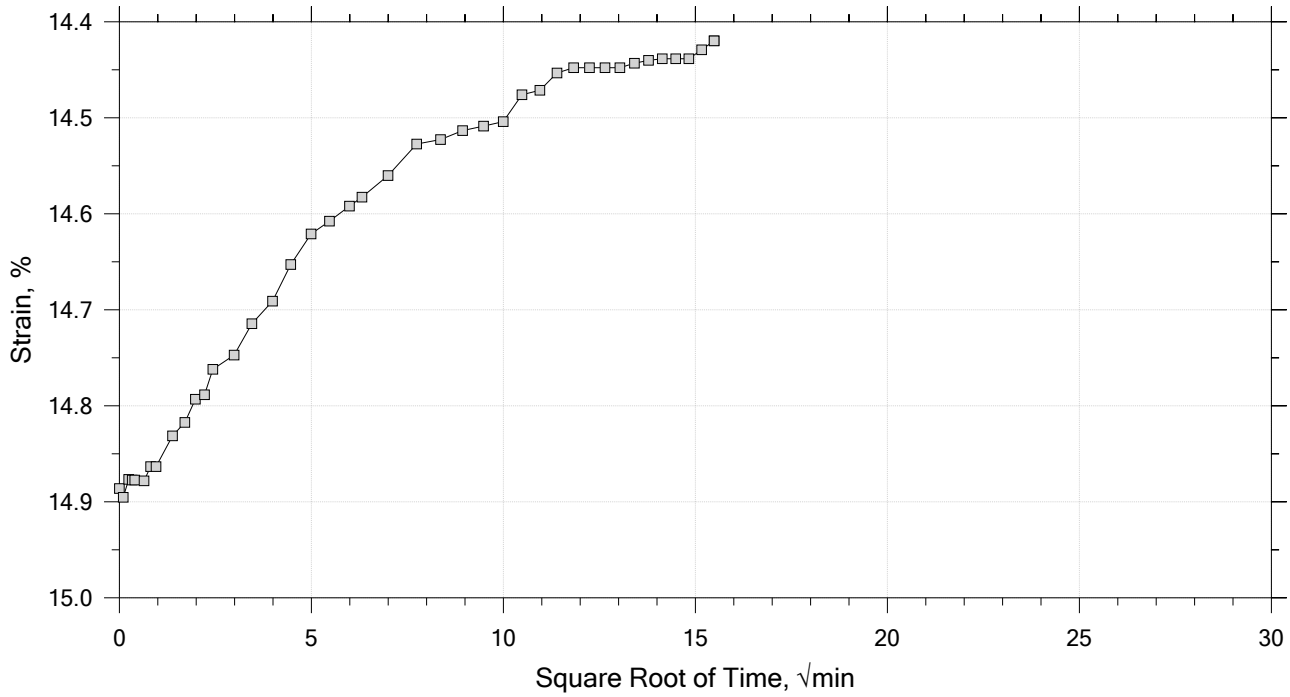
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.25 tsf

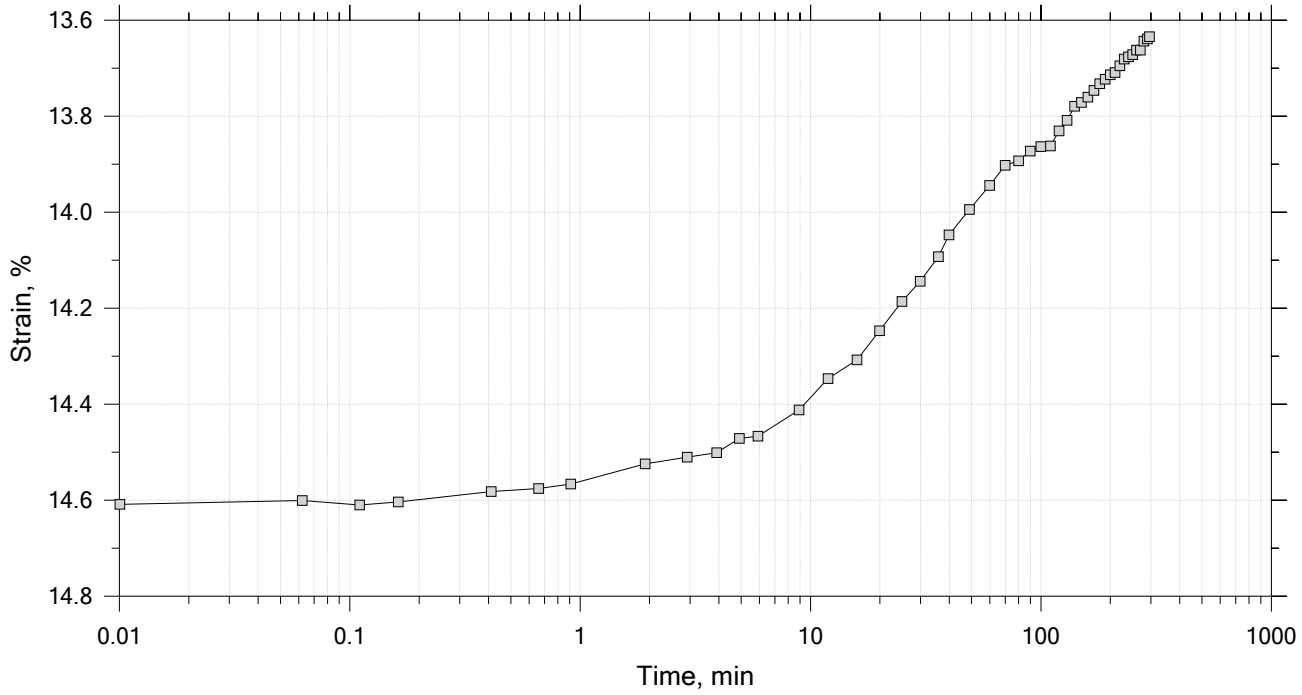


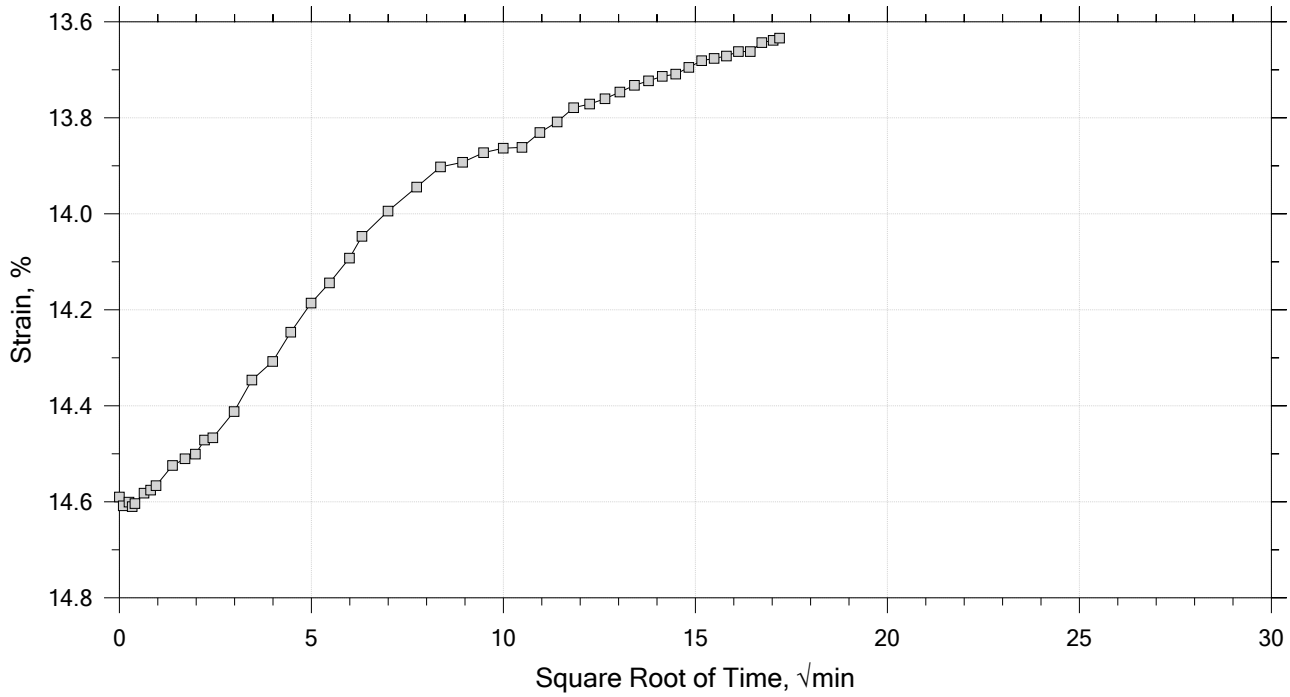


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 36
Initial Height: 1.00 in	Initial Void Ratio: 0.754	Plastic Limit: 20
Final Height: 0.87 in	Final Void Ratio: 0.526	Plasticity Index: 16

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	B2208	RING		B-2191
Mass Container, gm	8.56	109.17	109.17	8.41
Mass Container + Wet Soil, gm	137.14	267.13	259	150
Mass Container + Dry Soil, gm	109.17	234.88	234.88	127.21
Mass Dry Soil, gm	100.61	125.71	125.71	118.8
Water Content, %	27.80	25.65	19.18	19.18
Void Ratio	---	0.75	0.53	---
Degree of Saturation, %	---	93.27	100.00	---
Dry Unit Weight, pcf	---	97.564	112.14	---

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.

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0715	0.01541	0.727	1.54	8.531	6.58e-07	2.15e-01	3.82e-04	0.00e+00
2	0.125	0.01717	0.724	1.72	0.000	0.00e+00	3.30e-02	0.00e+00	0.00e+00
3	0.250	0.02422	0.711	2.42	8.845	6.18e-07	5.64e-02	9.40e-05	0.00e+00
4	0.500	0.03335	0.695	3.34	0.000	0.00e+00	3.65e-02	0.00e+00	0.00e+00
5	1.00	0.04689	0.672	4.69	3.791	1.39e-06	2.71e-02	1.01e-04	0.00e+00
6	2.00	0.06533	0.639	6.53	4.006	1.27e-06	1.84e-02	6.30e-05	0.00e+00
7	4.00	0.08895	0.598	8.90	2.610	1.86e-06	1.18e-02	5.93e-05	0.00e+00
8	8.00	0.1150	0.552	11.5	2.394	1.92e-06	6.52e-03	3.37e-05	0.00e+00
9	16.0	0.1416	0.506	14.2	1.493	2.90e-06	3.32e-03	2.60e-05	0.00e+00
10	32.0	0.1691	0.457	16.9	1.338	3.04e-06	1.72e-03	1.41e-05	0.00e+00
11	8.00	0.1655	0.464	16.5	0.000	0.00e+00	1.49e-04	0.00e+00	0.00e+00
12	2.00	0.1578	0.477	15.8	1.327	3.02e-06	1.28e-03	1.04e-05	0.00e+00
13	0.500	0.1480	0.494	14.8	0.000	0.00e+00	6.57e-03	0.00e+00	0.00e+00
14	0.250	0.1442	0.501	14.4	0.000	0.00e+00	1.51e-02	0.00e+00	0.00e+00
15	0.0625	0.1363	0.515	13.6	23.011	1.83e-07	4.19e-02	2.07e-05	0.00e+00

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

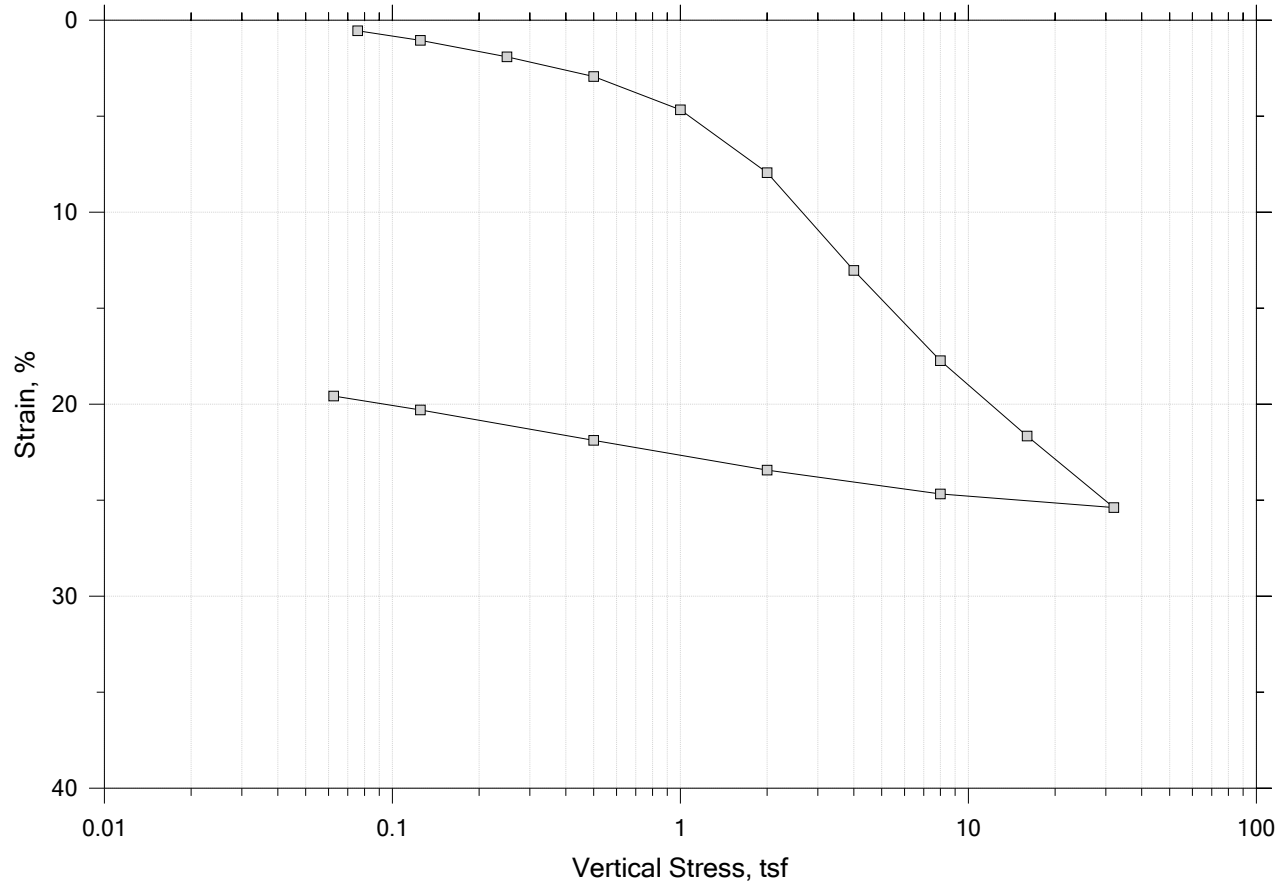
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0715	0.01541	0.727	1.54	22.398	1.08e-06	2.15e-01	6.27e-04
2	0.125	0.01717	0.724	1.72	209.337	1.13e-07	3.30e-02	1.01e-05
3	0.250	0.02422	0.711	2.42	19.935	1.18e-06	5.64e-02	1.80e-04
4	0.500	0.03335	0.695	3.34	33.697	6.87e-07	3.65e-02	6.77e-05
5	1.00	0.04689	0.672	4.69	18.174	1.24e-06	2.71e-02	9.09e-05
6	2.00	0.06533	0.639	6.53	15.101	1.45e-06	1.84e-02	7.20e-05
7	4.00	0.08895	0.598	8.90	16.813	1.24e-06	1.18e-02	3.96e-05
8	8.00	0.1150	0.552	11.5	11.631	1.70e-06	6.52e-03	2.99e-05
9	16.0	0.1416	0.506	14.2	7.311	2.55e-06	3.32e-03	2.28e-05
10	32.0	0.1691	0.457	16.9	6.052	2.89e-06	1.72e-03	1.34e-05
11	8.00	0.1655	0.464	16.5	2.904	5.86e-06	1.49e-04	2.36e-06
12	2.00	0.1578	0.477	15.8	7.626	2.26e-06	1.28e-03	7.79e-06
13	0.500	0.1480	0.494	14.8	22.789	7.73e-07	6.57e-03	1.37e-05
14	0.250	0.1442	0.501	14.4	66.592	2.69e-07	1.51e-02	1.09e-05
15	0.0625	0.1363	0.515	13.6	106.131	1.71e-07	4.19e-02	1.93e-05

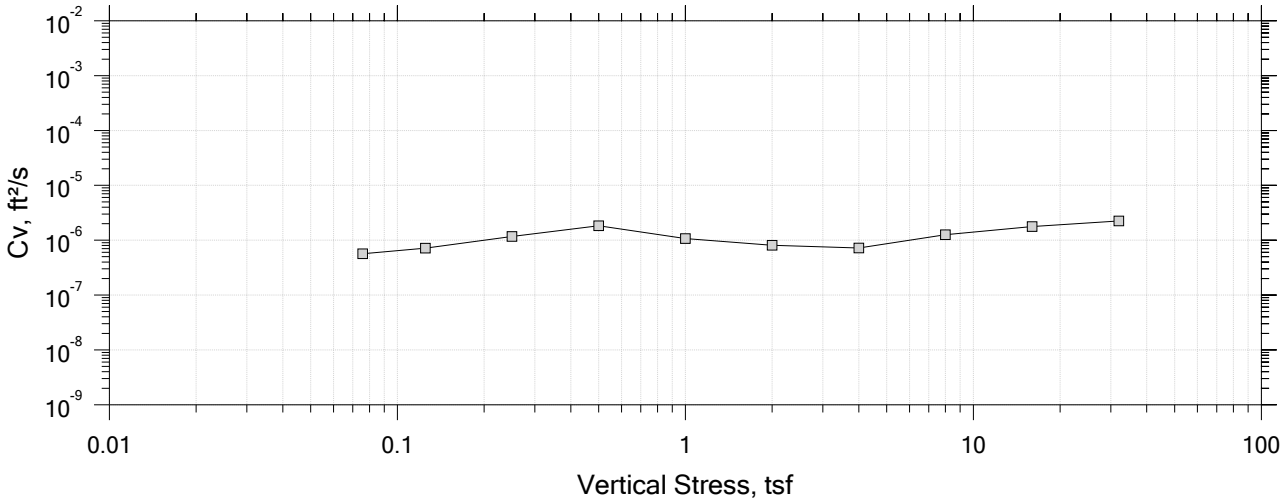
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		
	Displacement at End of Increment		

B-111 U-3

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





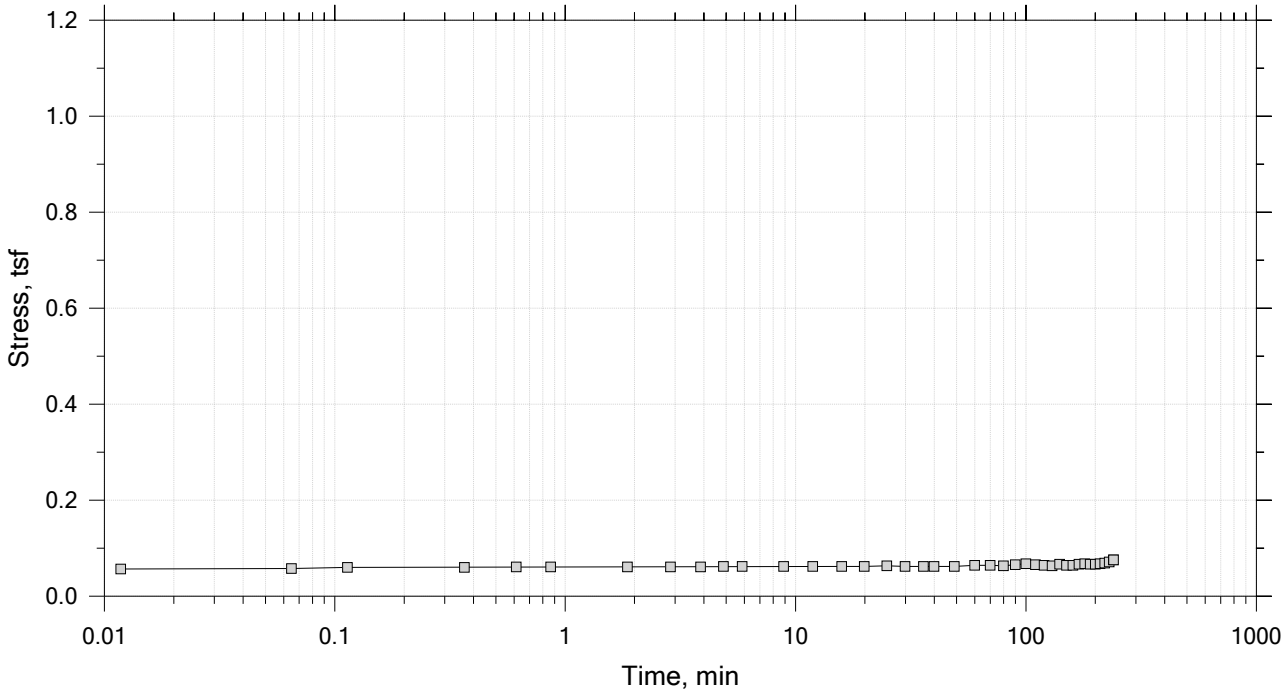
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		
	Displacement at End of Increment		

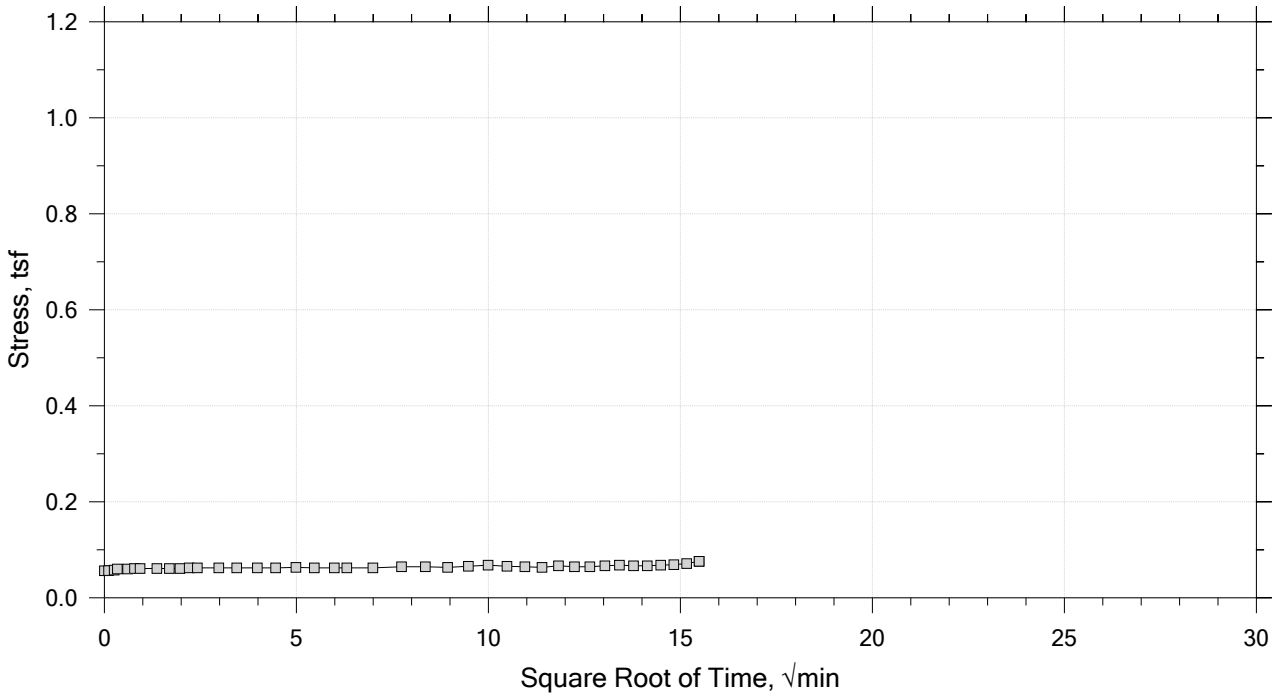
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0758 tsf





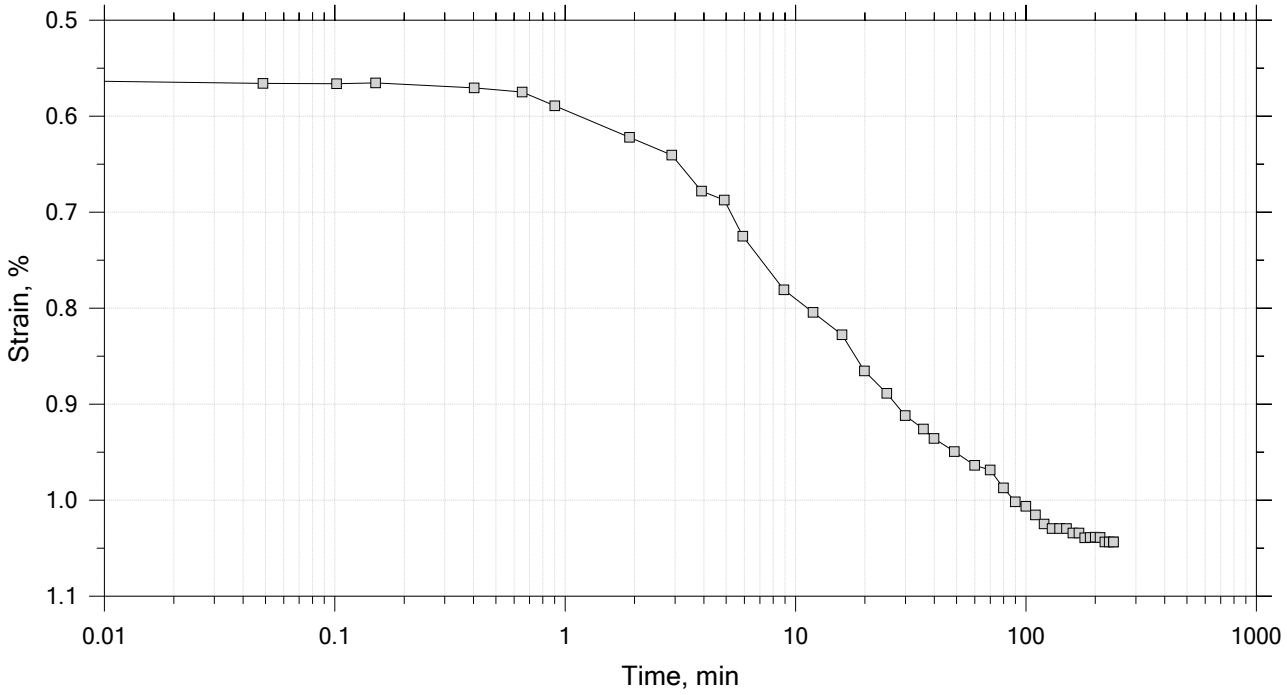
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

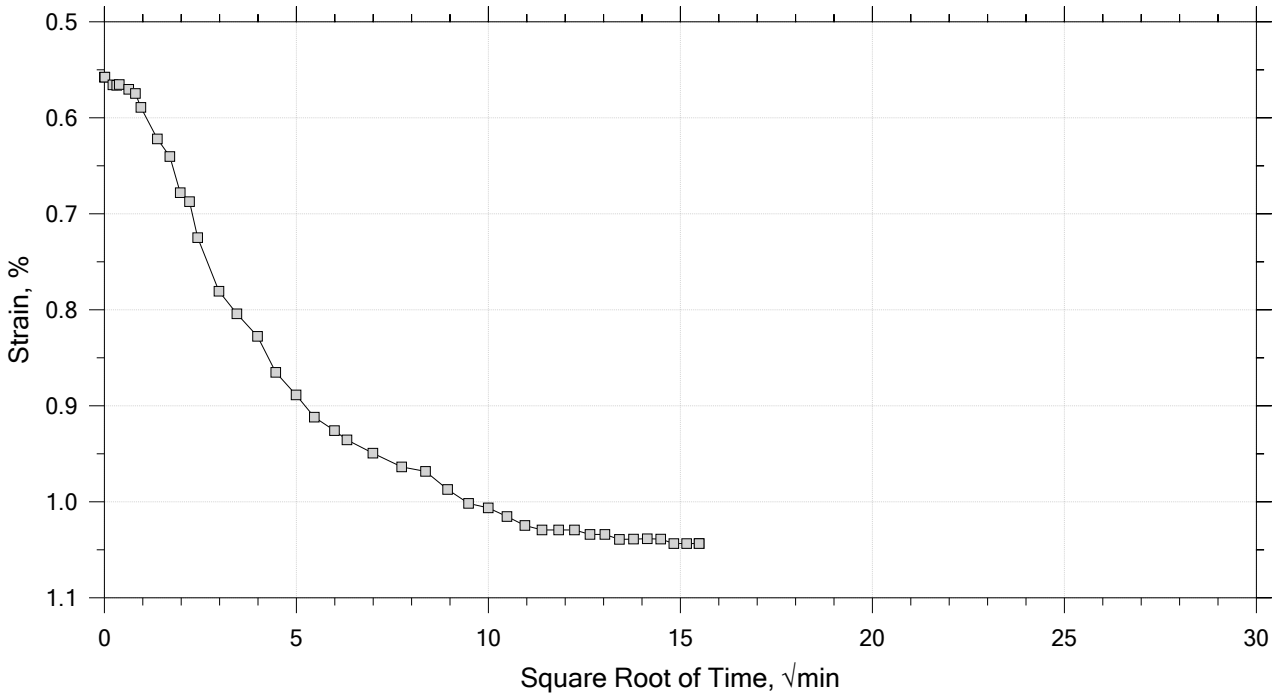
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

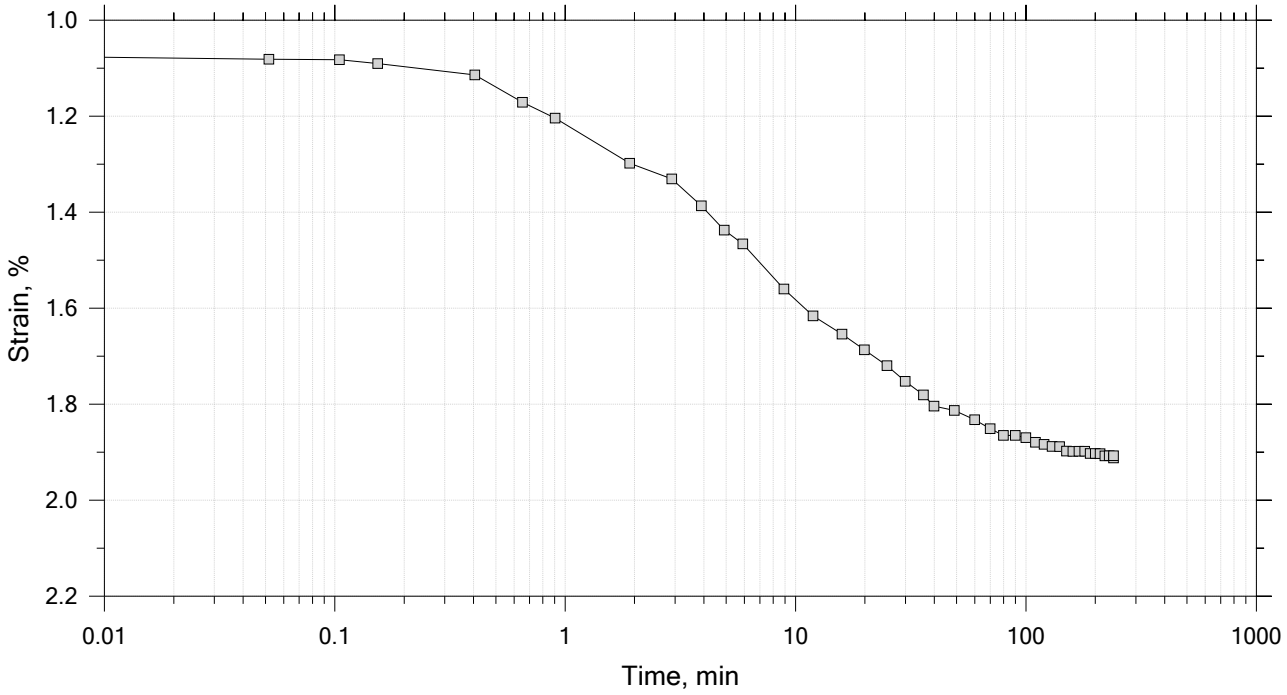


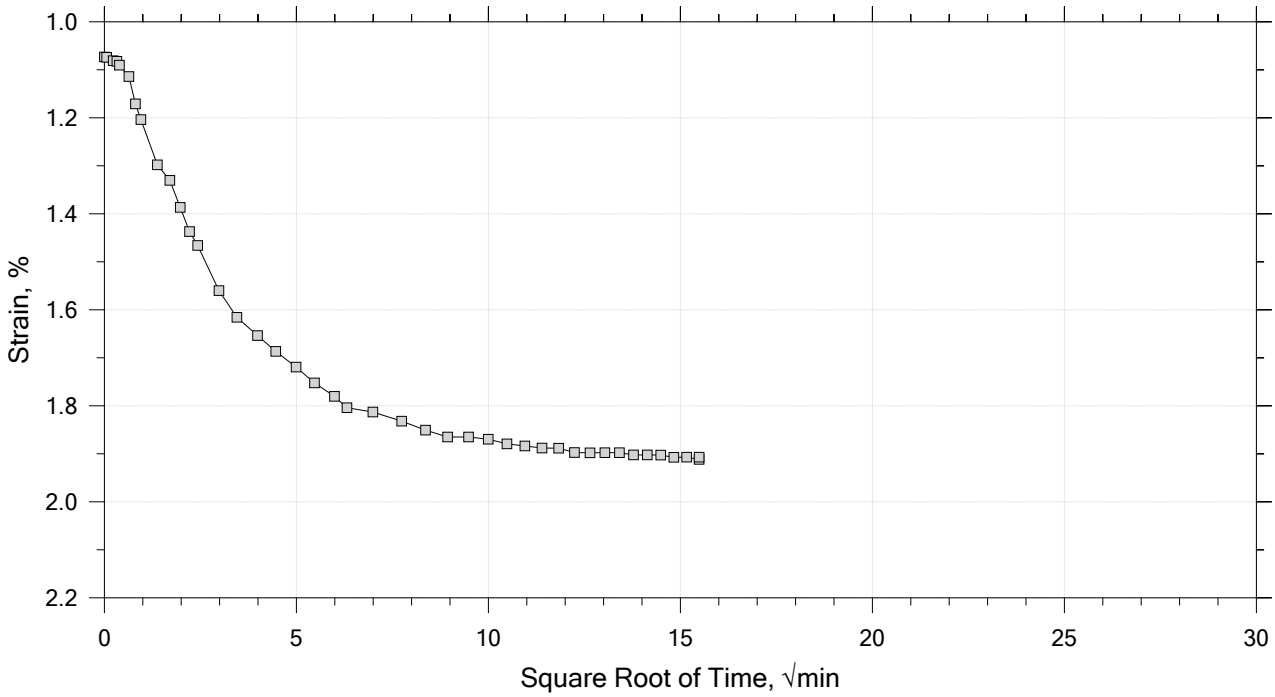


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, olive gray clay		
Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





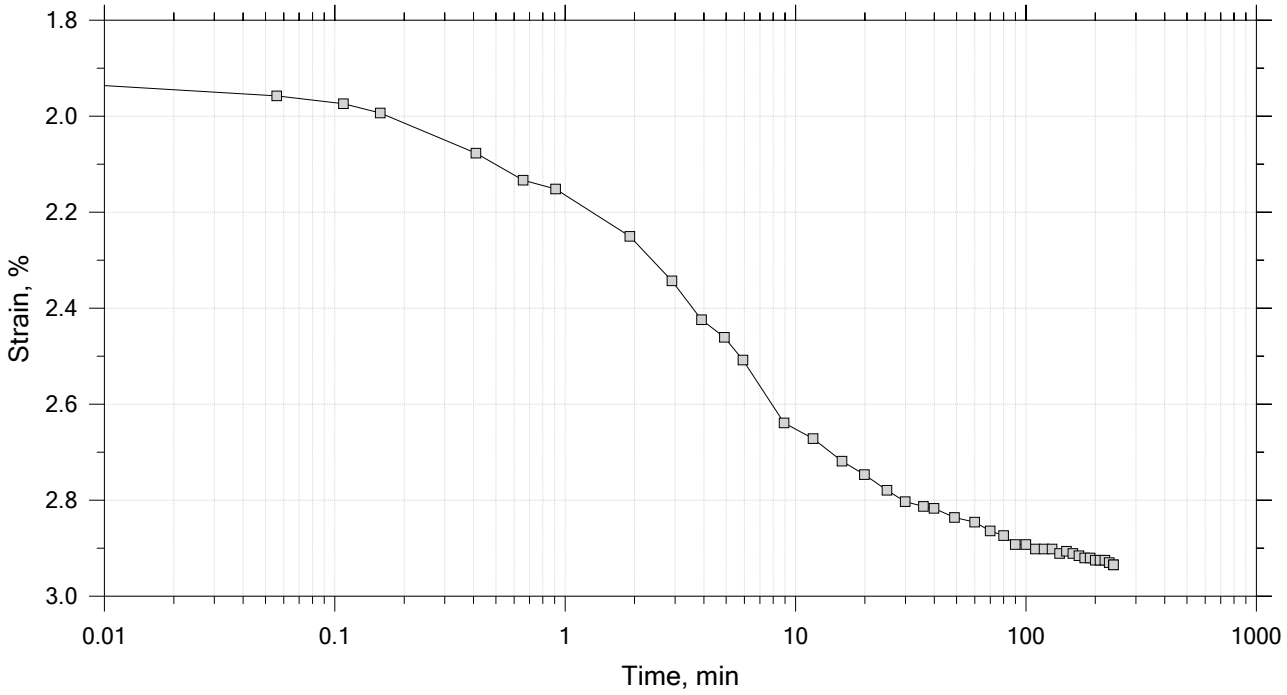
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

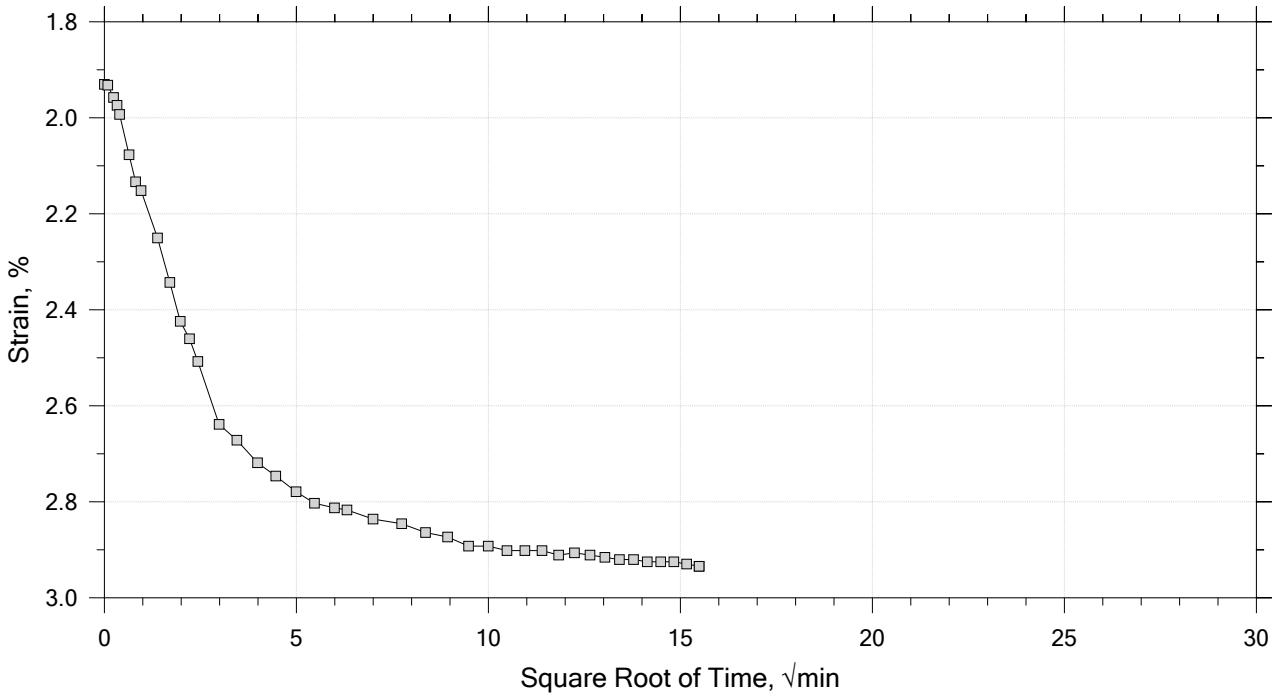
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





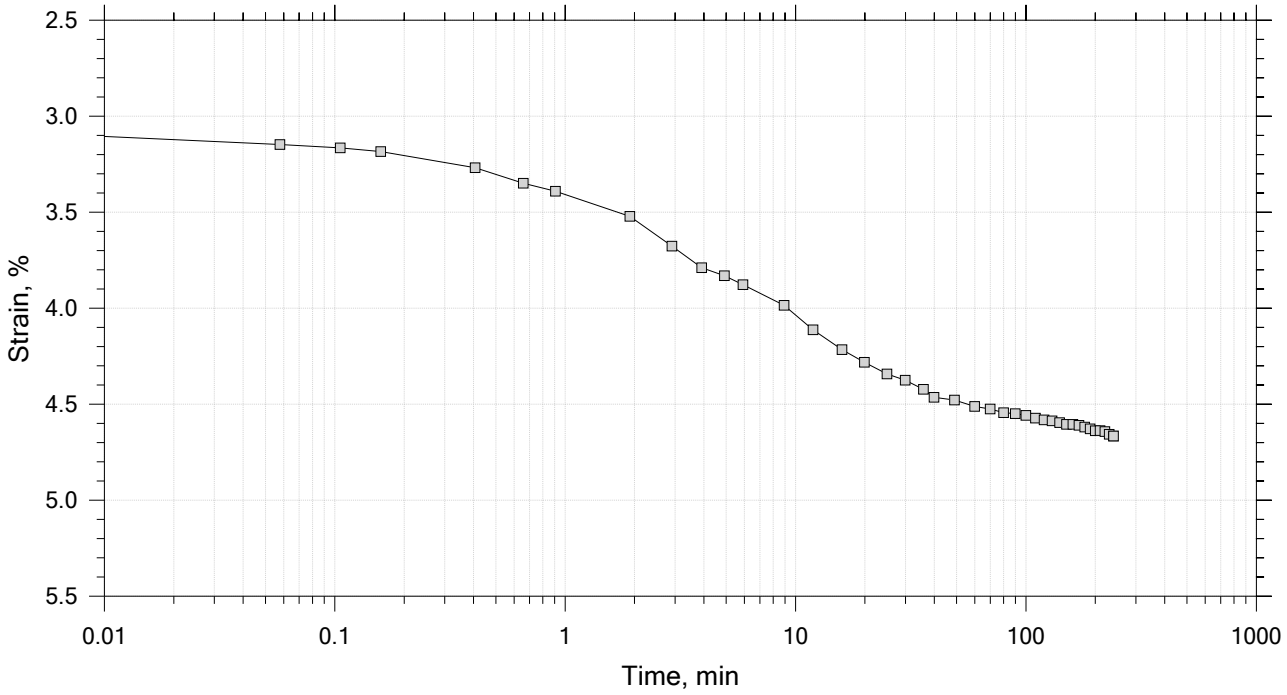
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

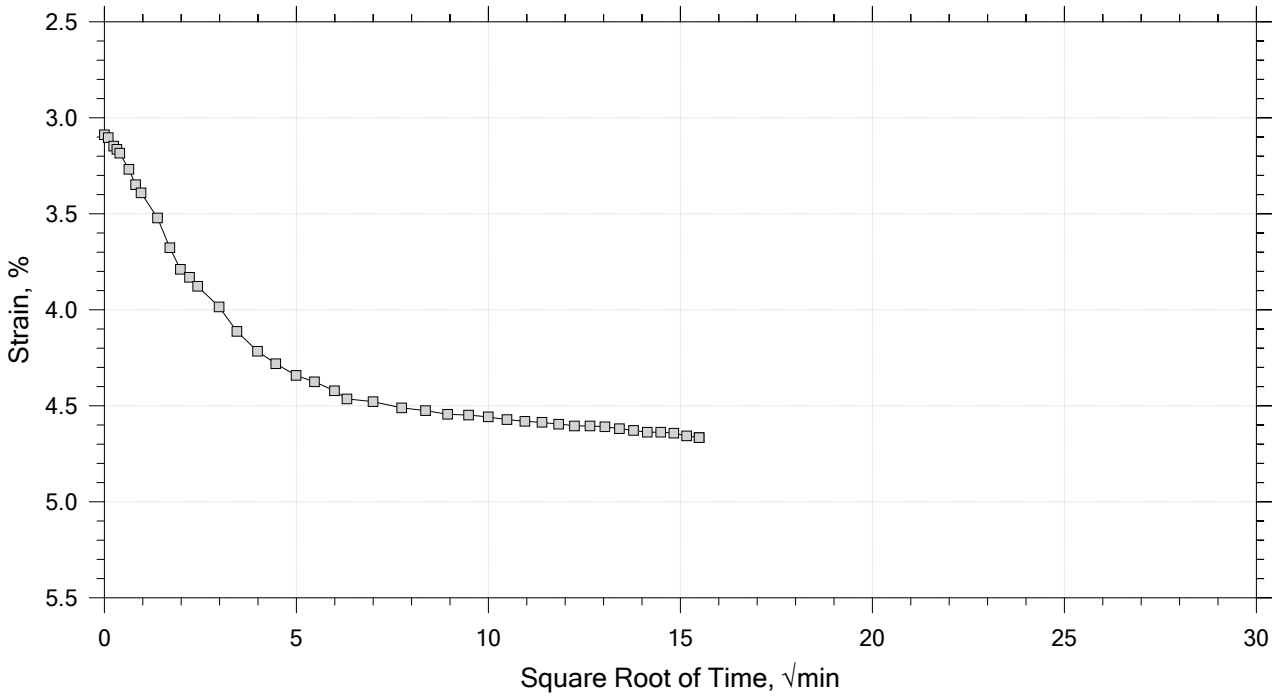
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





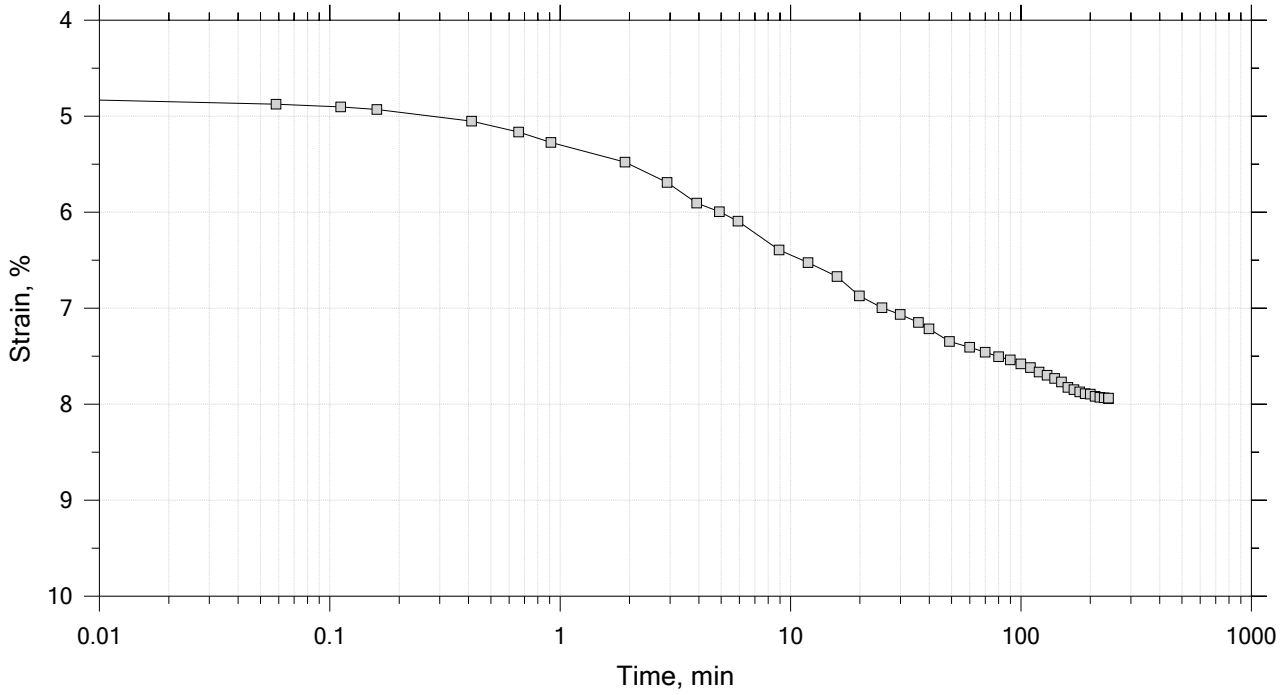
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

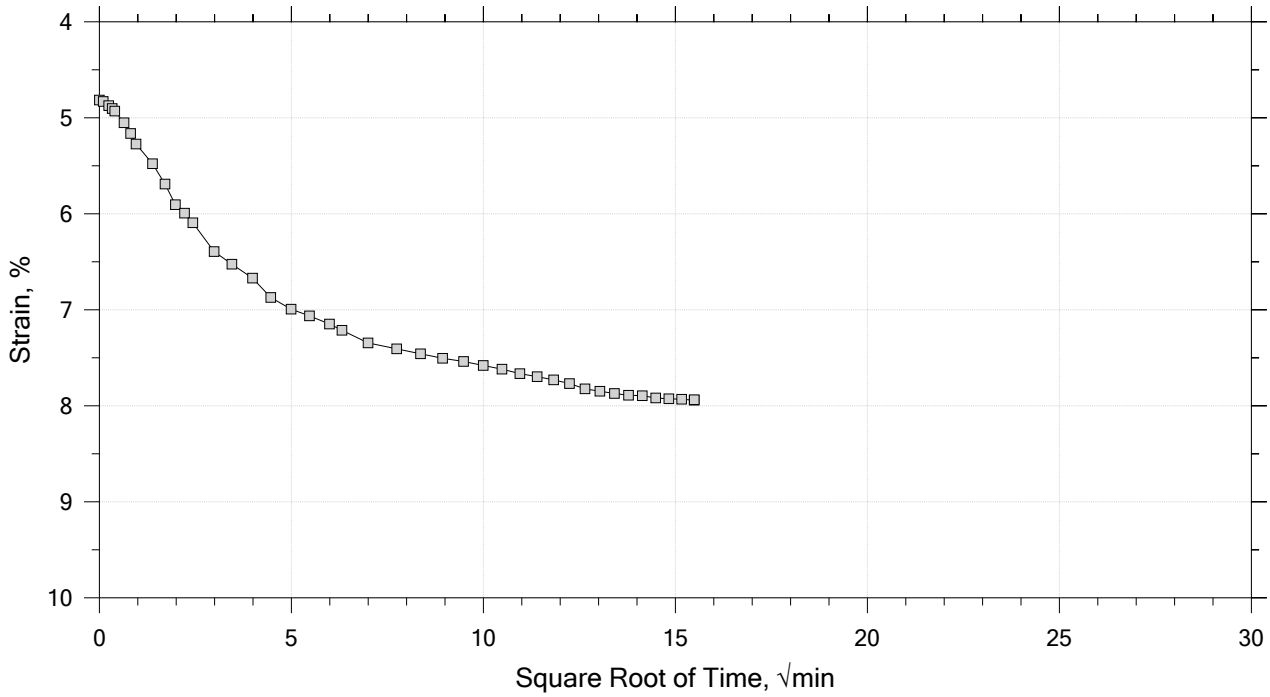
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





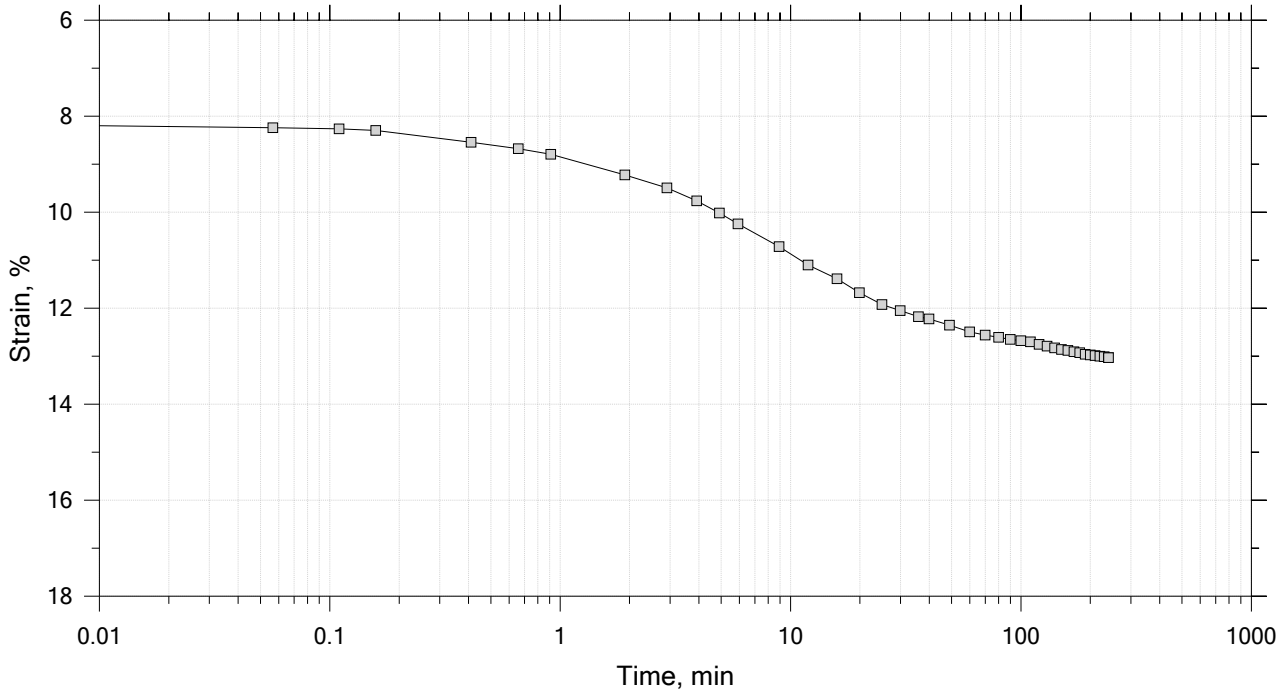
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

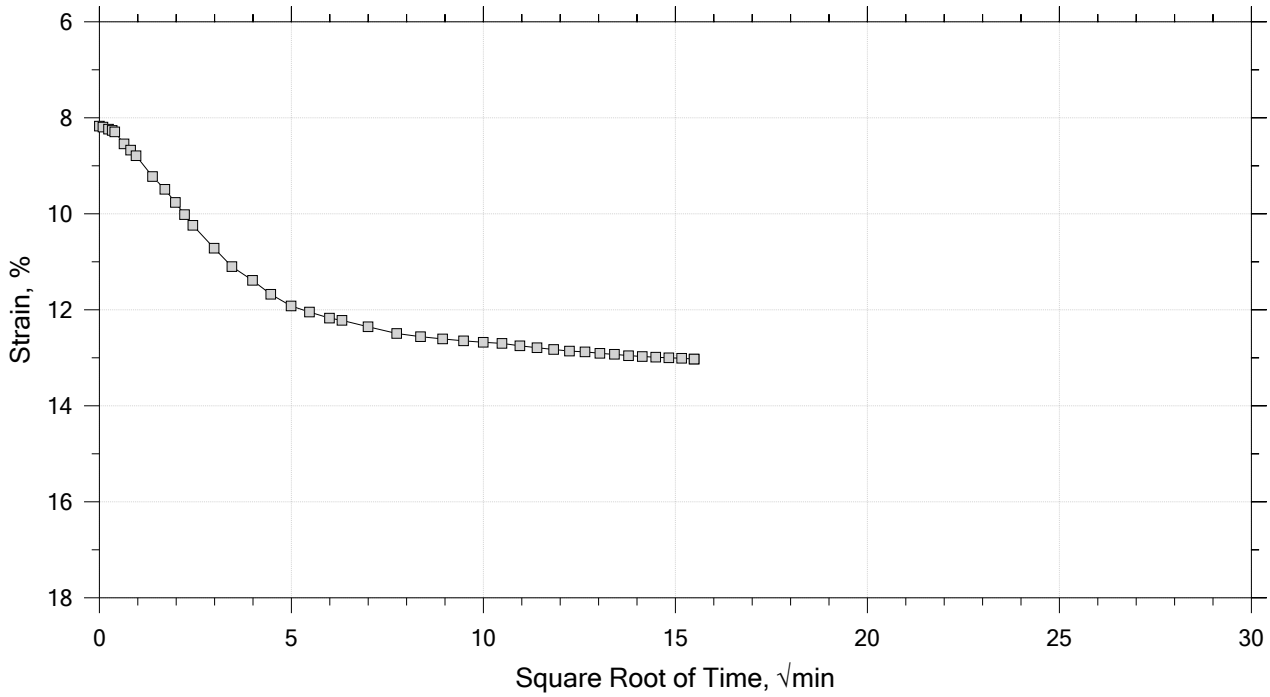
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





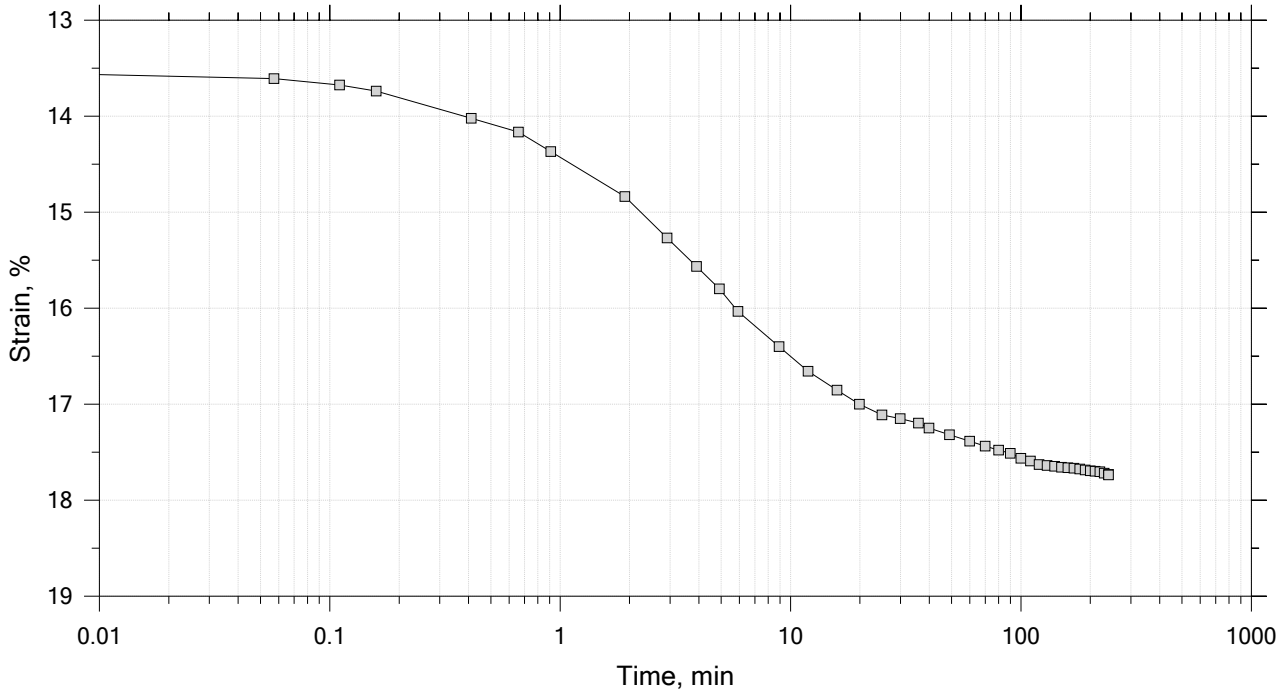
Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, olive gray clay		
Remarks: System W, Swell Pressure = 0.0758 tsf		

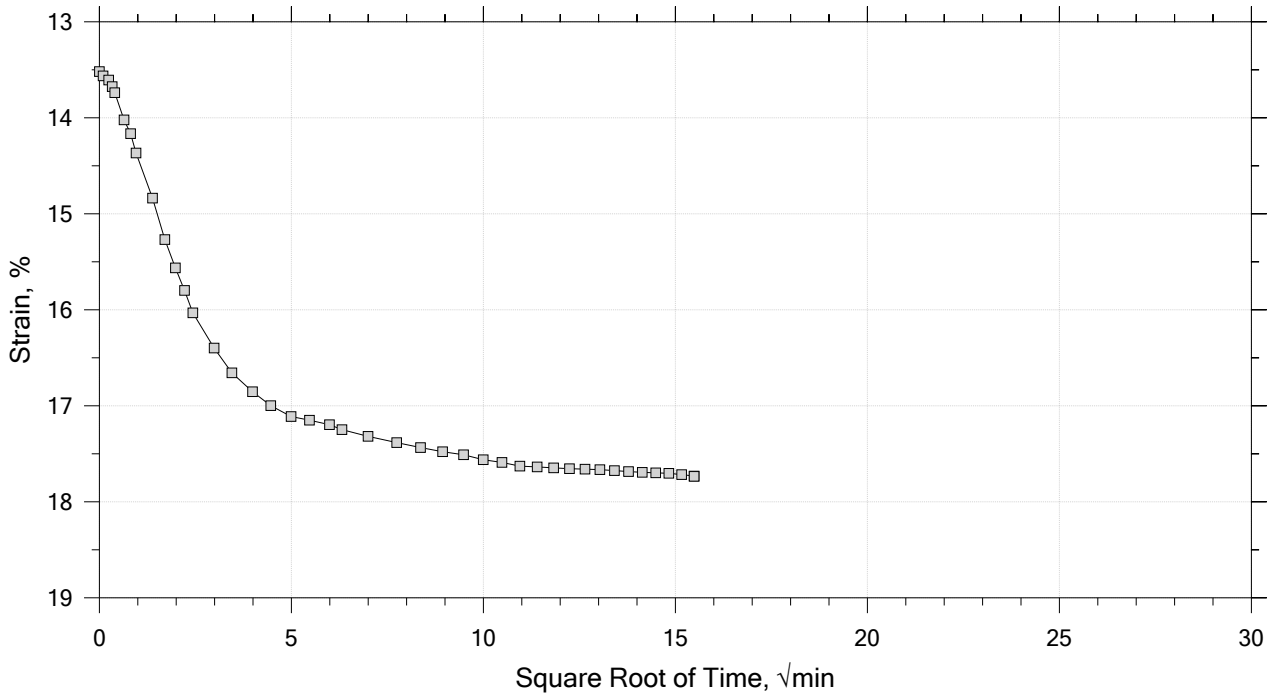
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





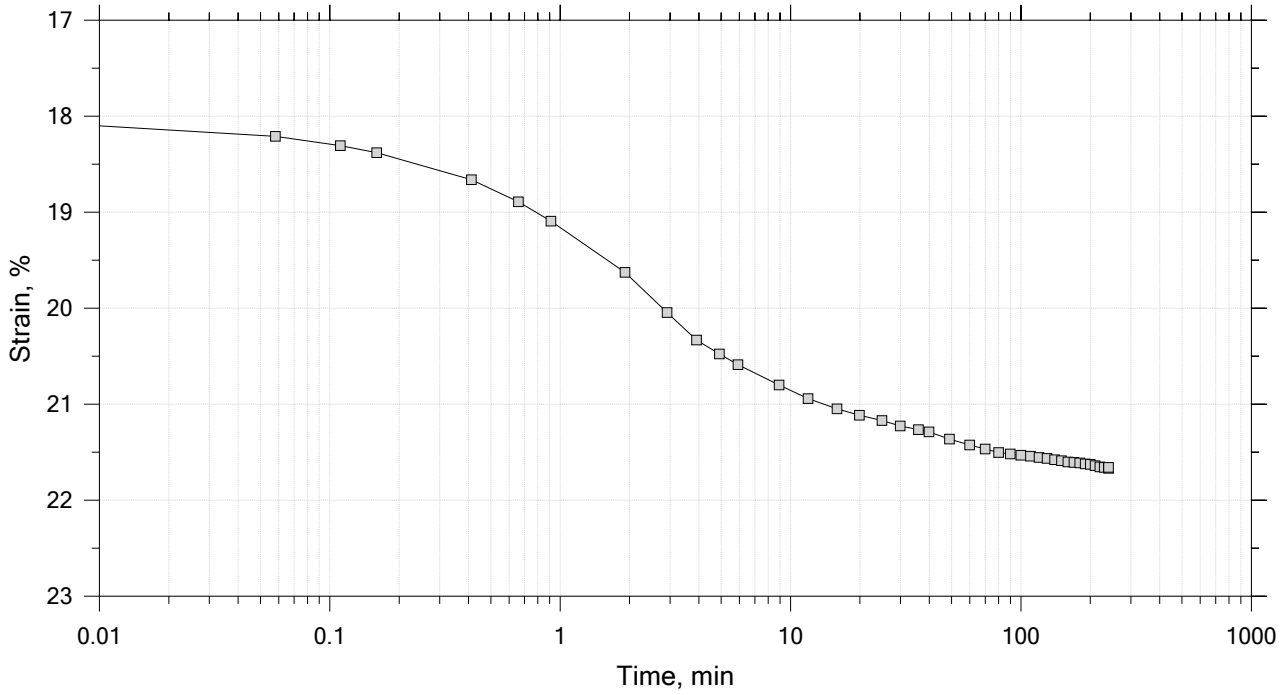
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

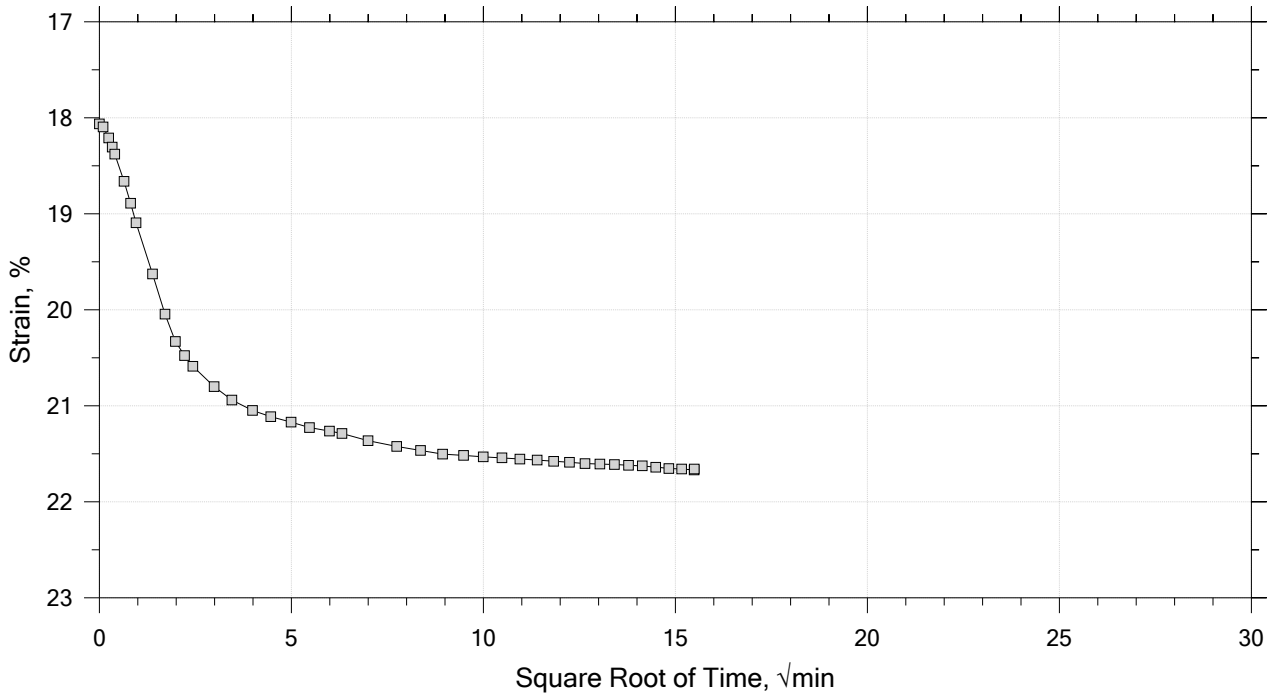
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

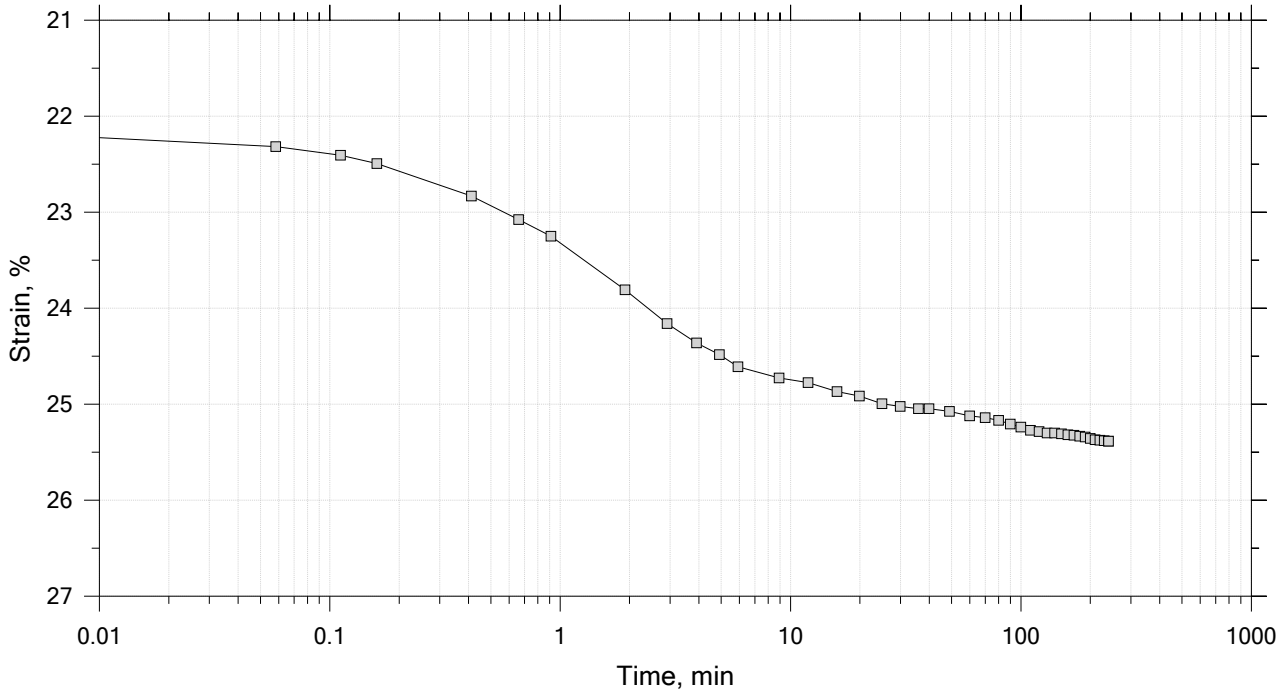


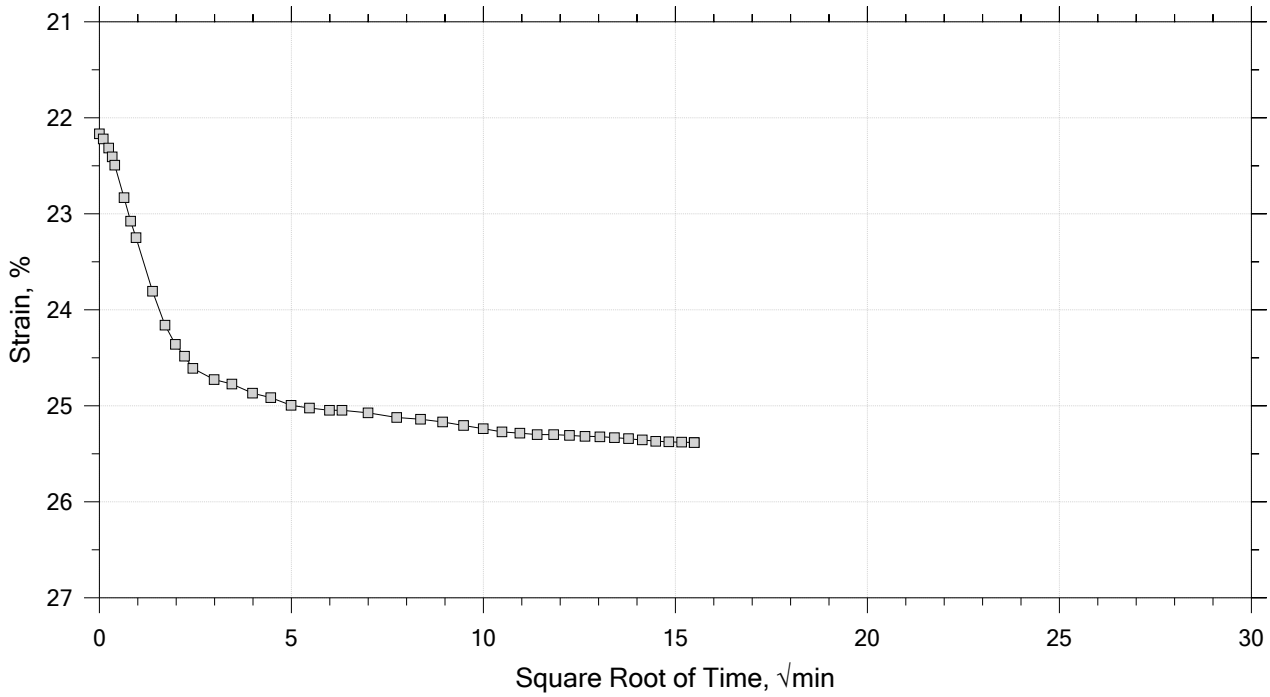


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

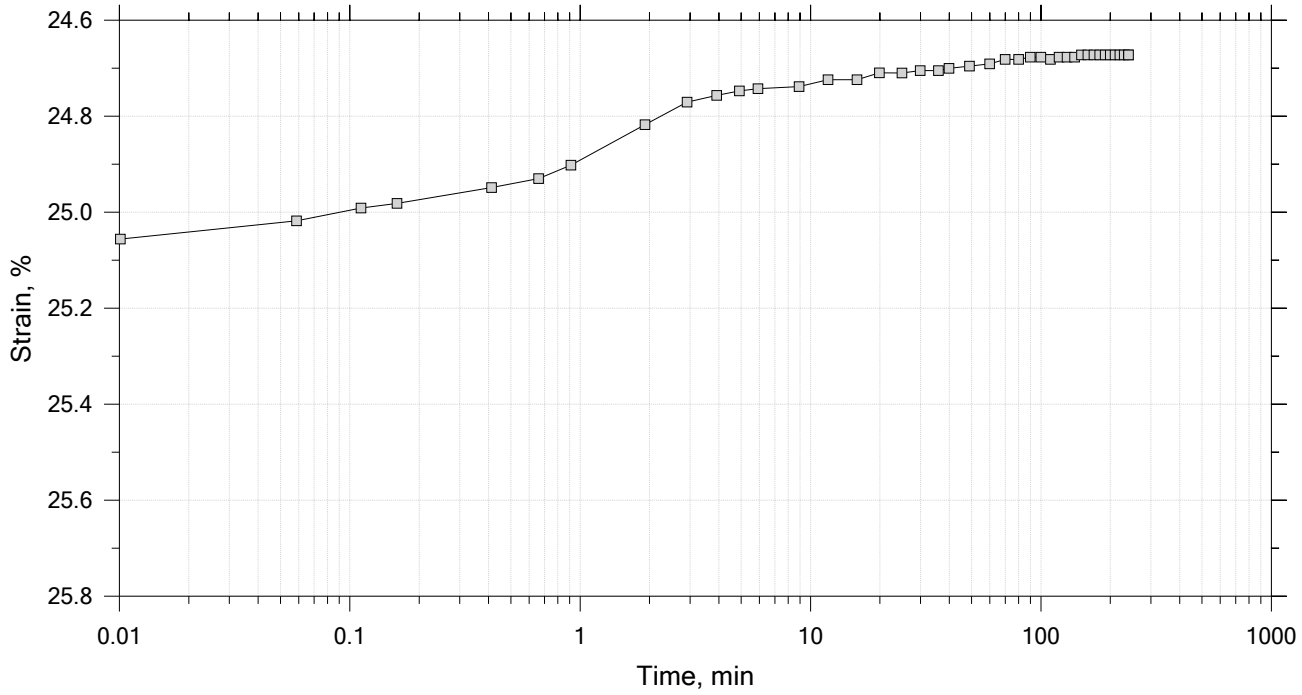


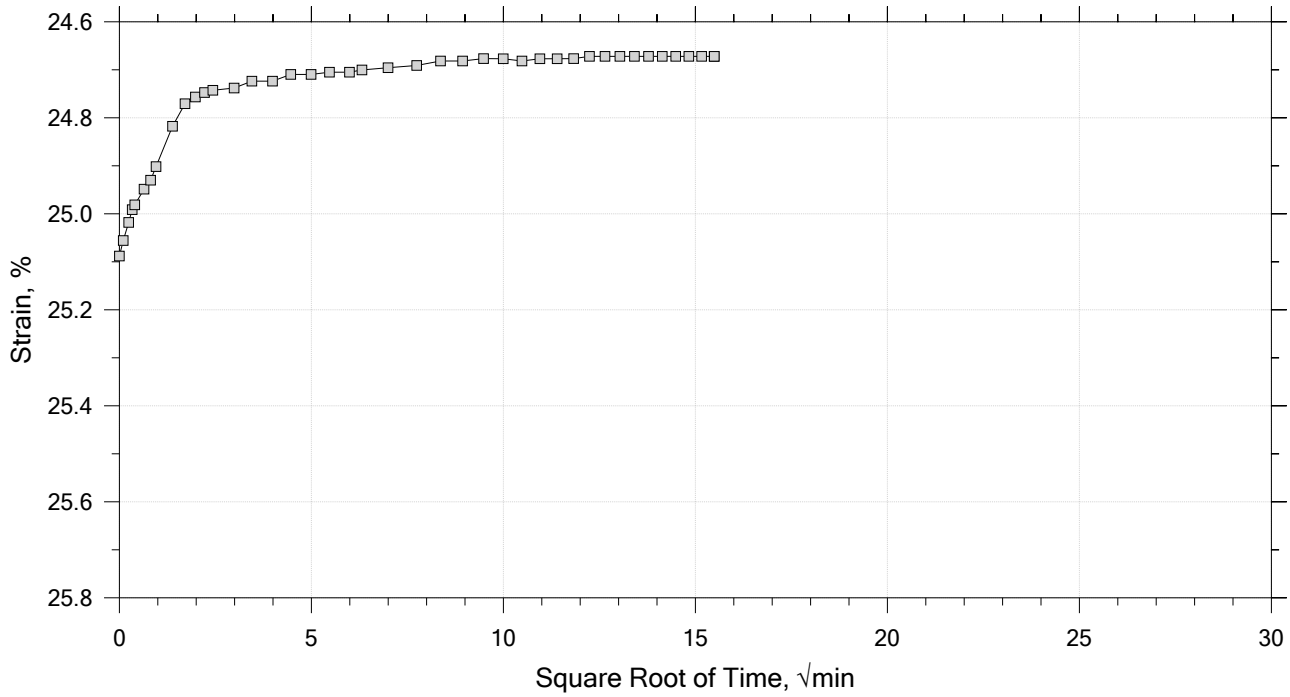


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, olive gray clay		
Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf

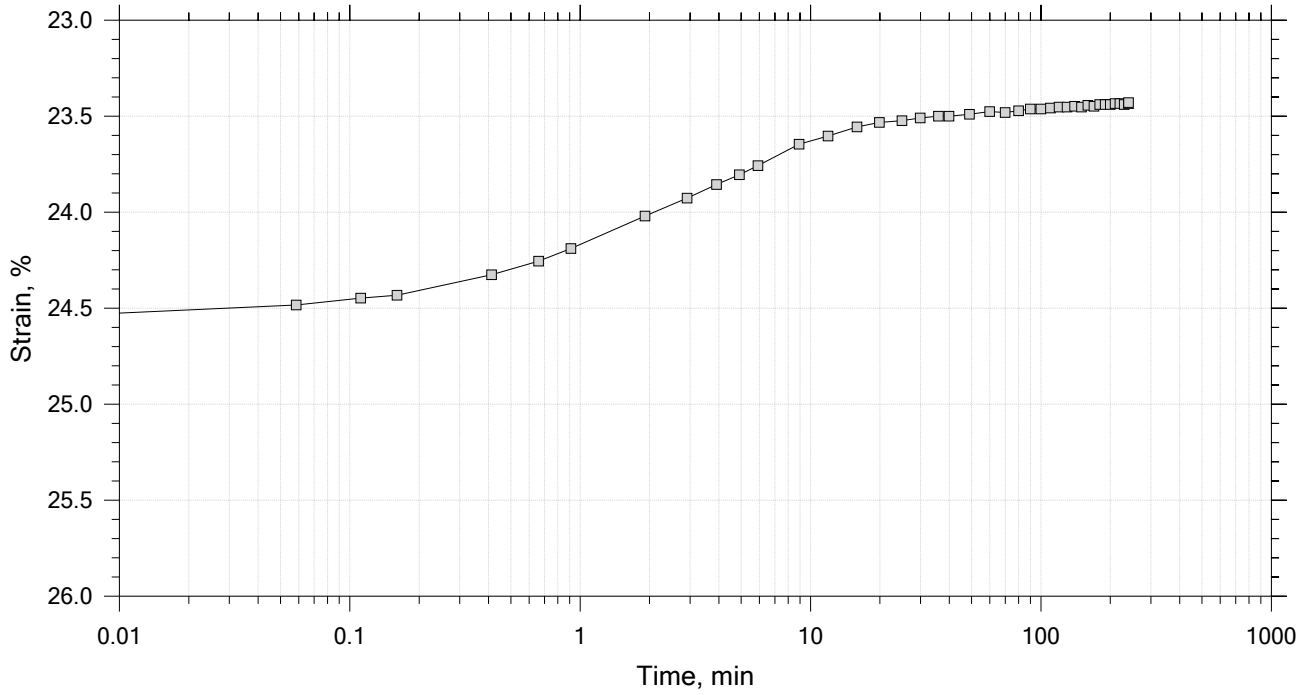


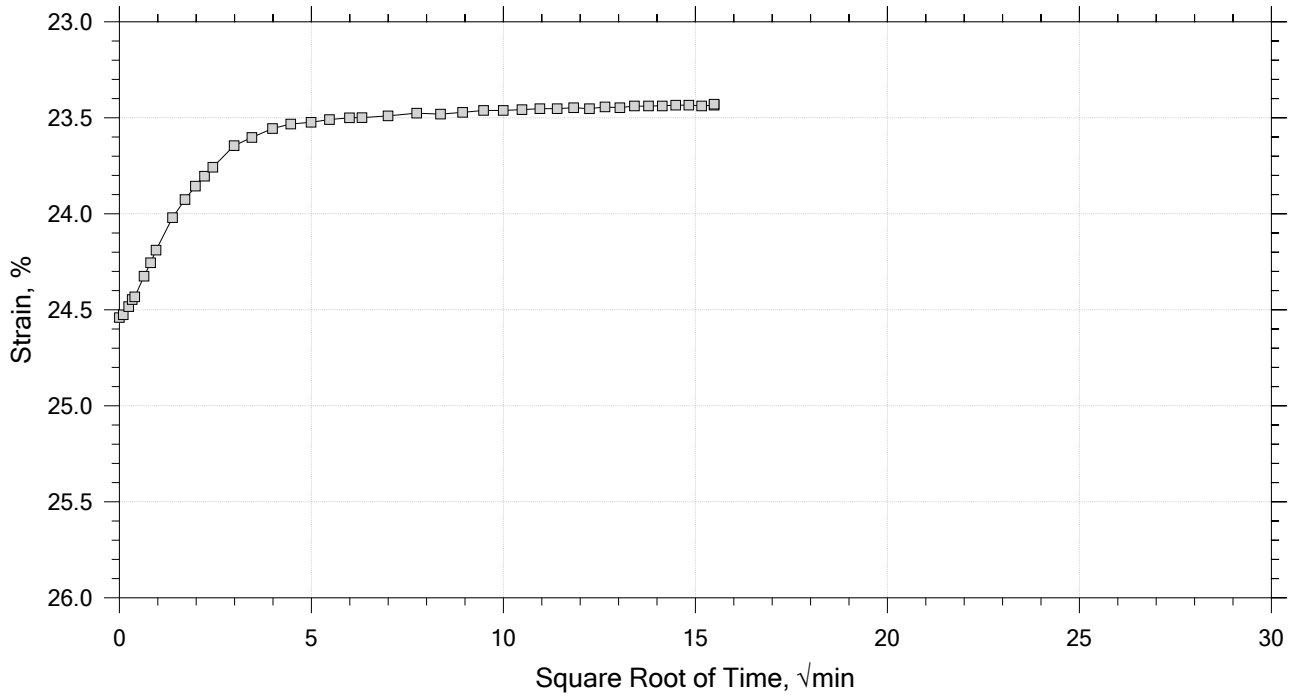


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, olive gray clay		
Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

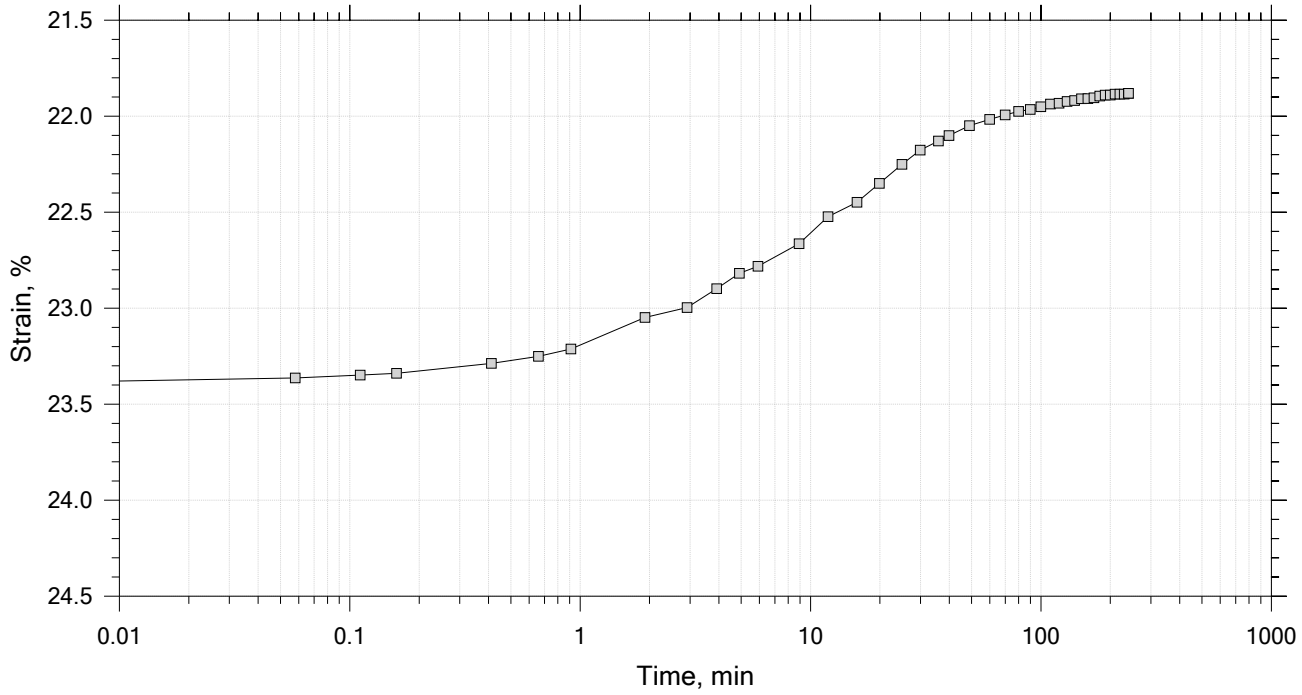


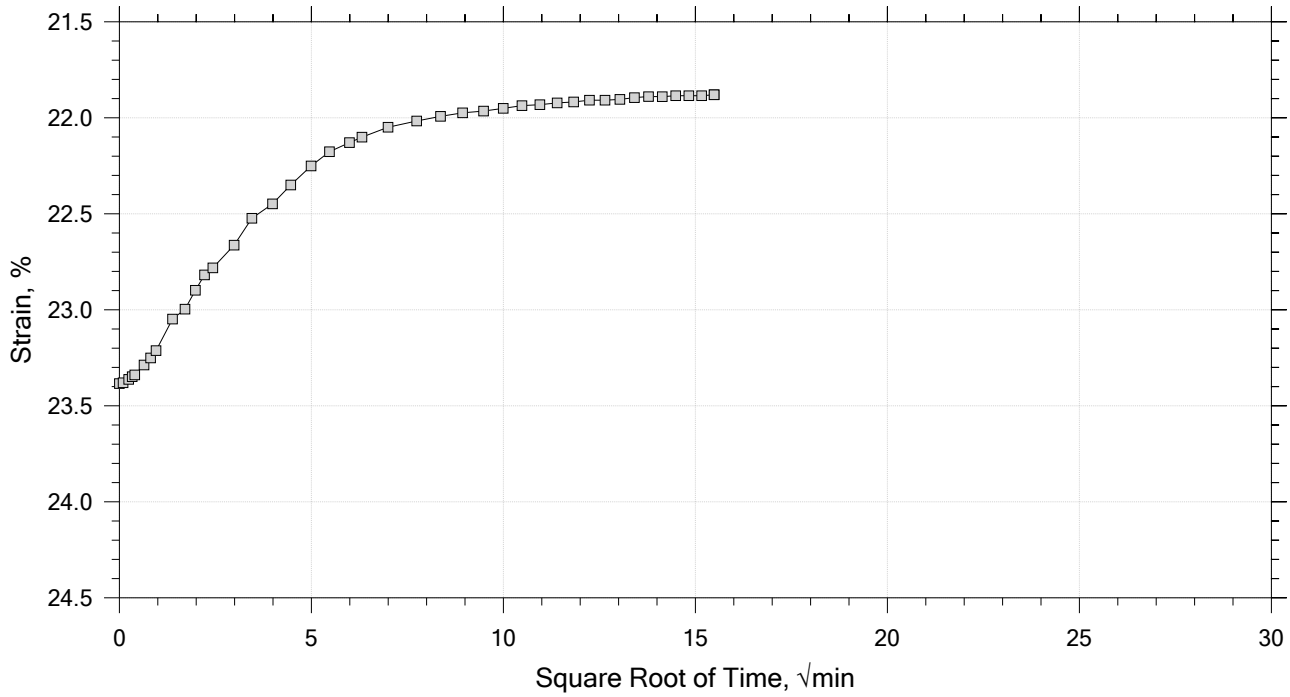


Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, olive gray clay		
Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

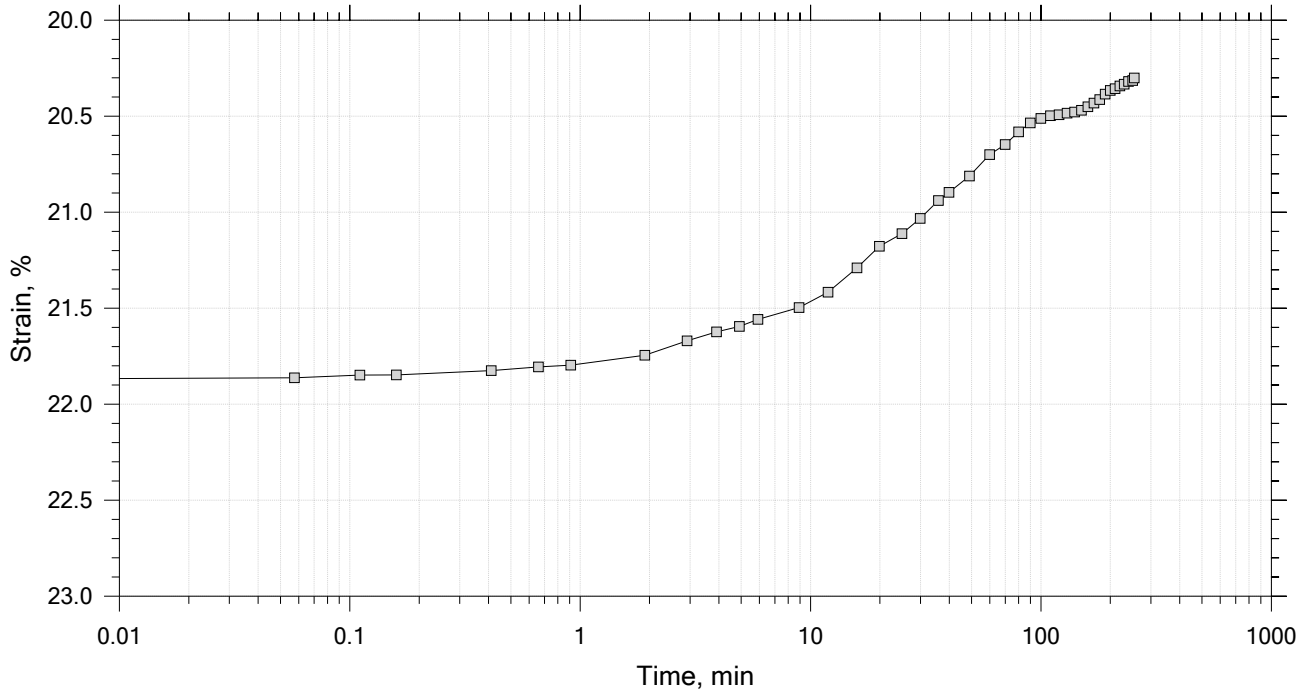


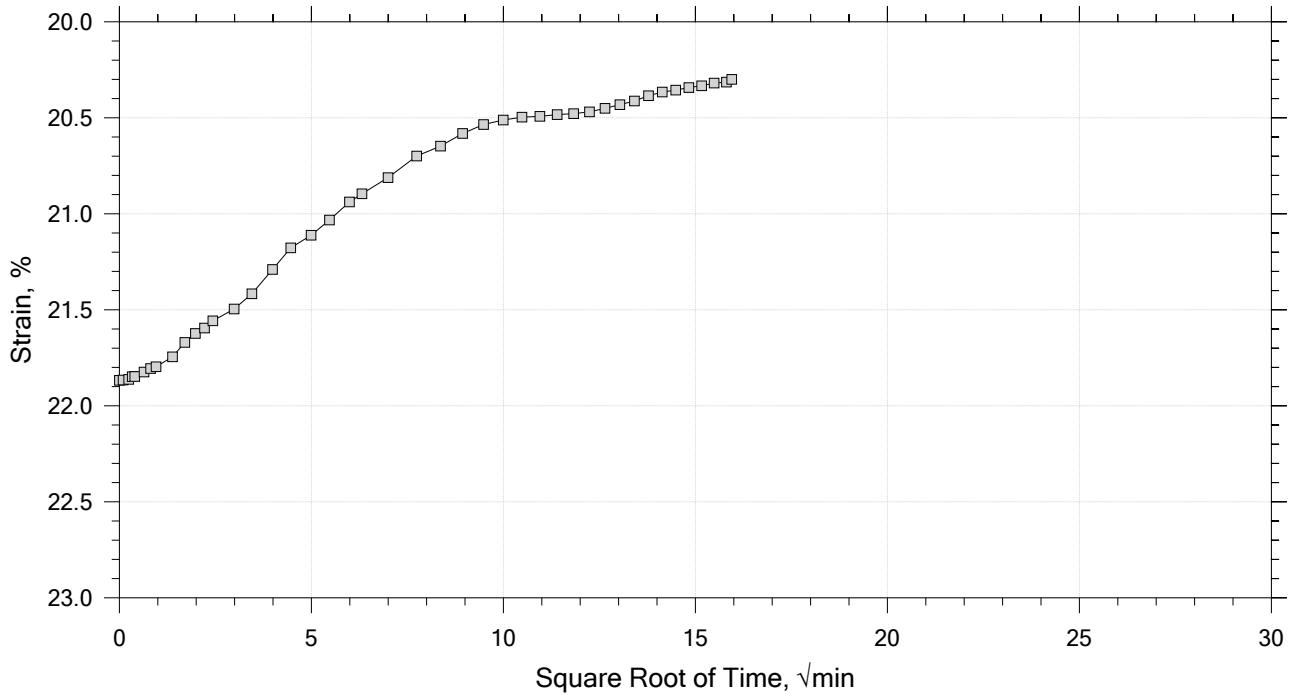


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

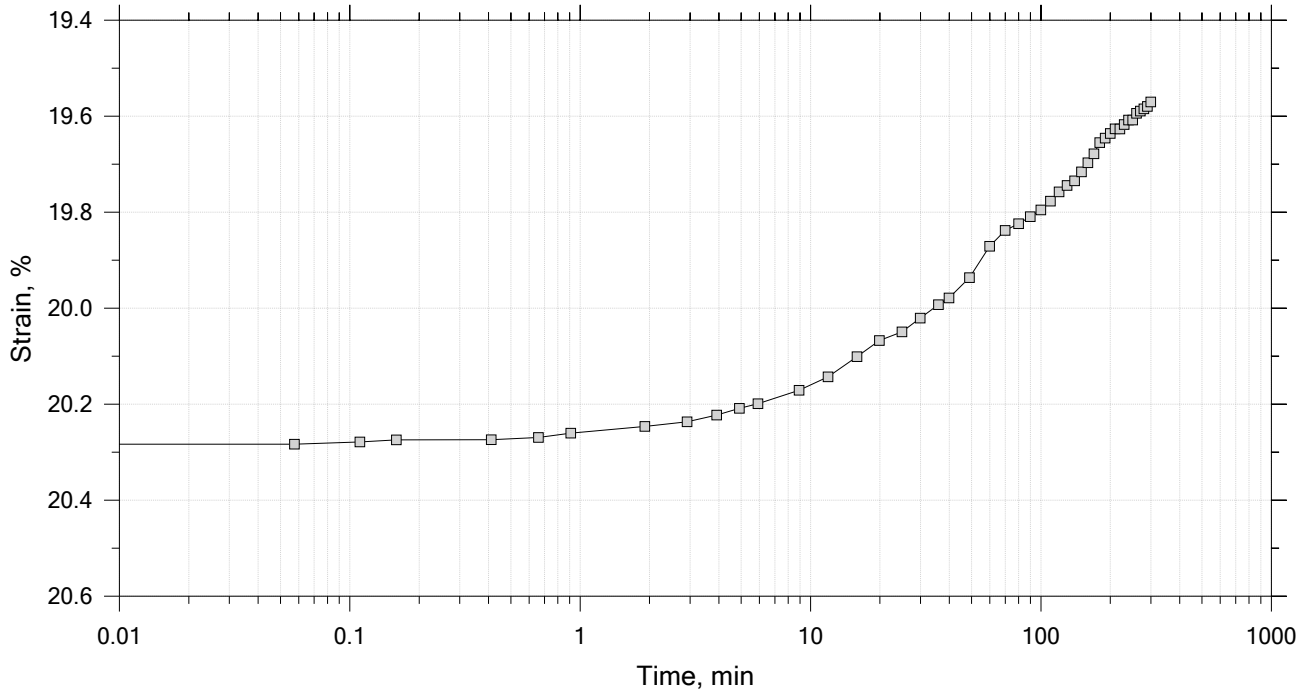


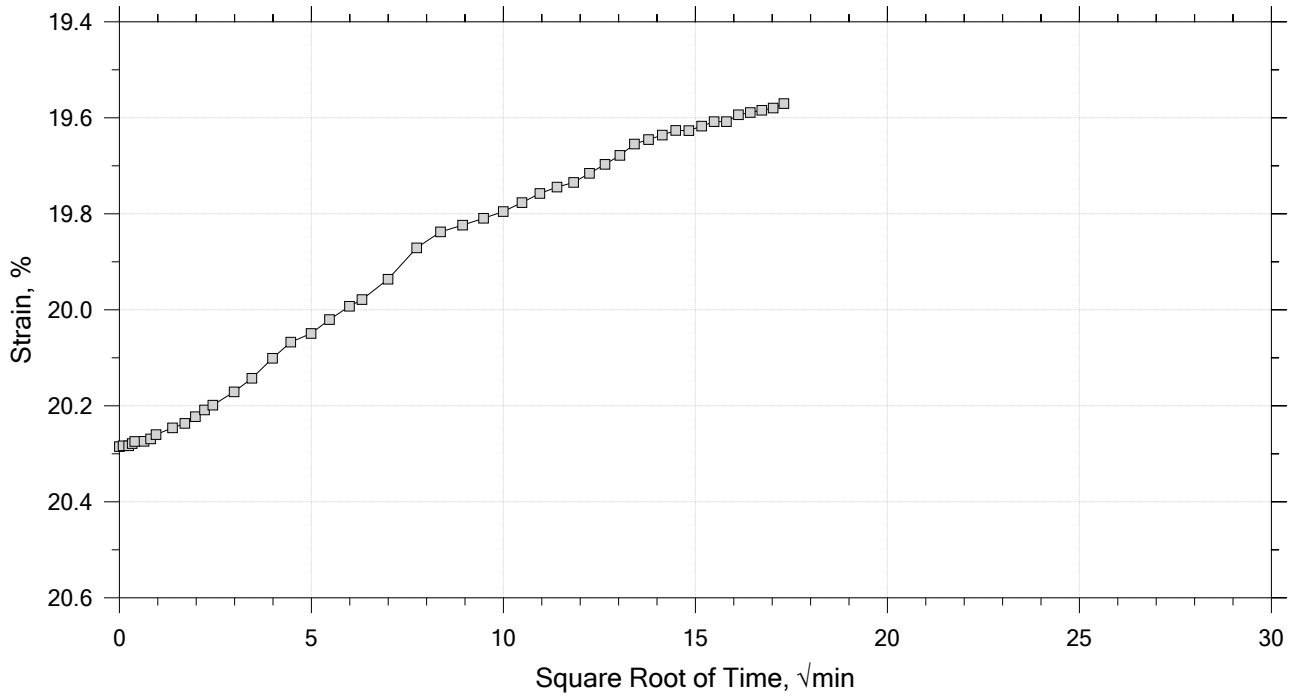


GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
Boring No.: B-111	Tested By: trm	Checked By: anm
Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, olive gray clay		
Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 43
Initial Height: 1.00 in	Initial Void Ratio: 1.04	Plastic Limit: 22
Final Height: 0.84 in	Final Void Ratio: 0.715	Plasticity Index: 21

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D2178	RING		B-2837
Mass Container, gm	8.46	109.51	109.51	9.61
Mass Container + Wet Soil, gm	159.62	257.99	245.45	141.3
Mass Container + Dry Soil, gm	117.38	217.27	217.27	114
Mass Dry Soil, gm	108.92	107.76	107.76	104.39
Water Content, %	38.78	37.79	26.15	26.15
Void Ratio	---	1.04	0.72	---
Degree of Saturation, %	---	99.20	100.00	---
Dry Unit Weight, pcf	---	83.63	99.559	---

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.

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.0758	0.005504	1.03	0.550	11.164	5.08e-07	7.26e-02	9.95e-05	0.00e+00
2	0.125	0.01044	1.02	1.04	7.127	7.87e-07	1.00e-01	2.13e-04	0.00e+00
3	0.250	0.01907	1.00	1.91	4.562	1.21e-06	6.91e-02	2.26e-04	0.00e+00
4	0.500	0.02935	0.982	2.93	2.911	1.86e-06	4.11e-02	2.07e-04	0.00e+00
5	1.00	0.04666	0.947	4.67	6.393	8.25e-07	3.46e-02	7.71e-05	0.00e+00
6	2.00	0.07937	0.880	7.94	6.344	7.89e-07	3.27e-02	6.96e-05	0.00e+00
7	4.00	0.1303	0.776	13.0	6.055	7.54e-07	2.55e-02	5.18e-05	0.00e+00
8	8.00	0.1774	0.680	17.7	3.084	1.32e-06	1.18e-02	4.20e-05	0.00e+00
9	16.0	0.2166	0.600	21.7	2.040	1.80e-06	4.90e-03	2.38e-05	0.00e+00
10	32.0	0.2538	0.524	25.4	1.462	2.28e-06	2.33e-03	1.43e-05	0.00e+00
11	8.00	0.2467	0.538	24.7	0.000	0.00e+00	2.97e-04	0.00e+00	0.00e+00
12	2.00	0.2343	0.564	23.4	1.992	1.65e-06	2.07e-03	9.22e-06	0.00e+00
13	0.500	0.2188	0.595	21.9	0.000	0.00e+00	1.03e-02	0.00e+00	0.00e+00
14	0.125	0.2030	0.628	20.3	24.822	1.43e-07	4.21e-02	1.63e-05	0.00e+00
15	0.0625	0.1957	0.643	19.6	0.000	0.00e+00	1.17e-01	0.00e+00	0.00e+00

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

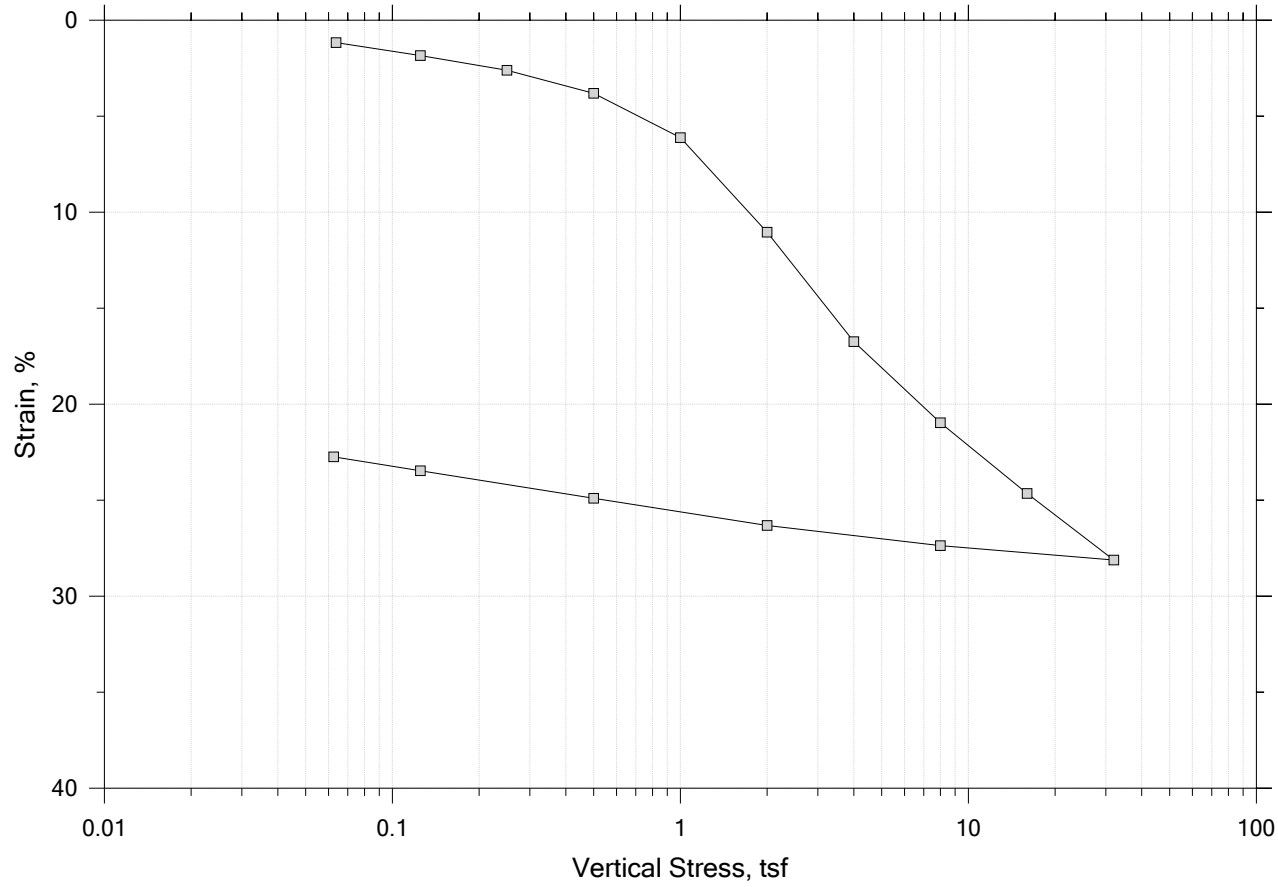
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0758	0.005504	1.03	0.550	35.165	6.94e-07	7.26e-02	1.36e-04
2	0.125	0.01044	1.02	1.04	43.633	5.53e-07	1.00e-01	1.50e-04
3	0.250	0.01907	1.00	1.91	22.798	1.04e-06	6.91e-02	1.95e-04
4	0.500	0.02935	0.982	2.93	13.332	1.75e-06	4.11e-02	1.94e-04
5	1.00	0.04666	0.947	4.67	17.260	1.32e-06	3.46e-02	1.23e-04
6	2.00	0.07937	0.880	7.94	27.764	7.76e-07	3.27e-02	6.84e-05
7	4.00	0.1303	0.776	13.0	30.518	6.44e-07	2.55e-02	4.42e-05
8	8.00	0.1774	0.680	17.7	15.904	1.10e-06	1.18e-02	3.51e-05
9	16.0	0.2166	0.600	21.7	10.006	1.58e-06	4.90e-03	2.09e-05
10	32.0	0.2538	0.524	25.4	7.296	1.97e-06	2.33e-03	1.24e-05
11	8.00	0.2467	0.538	24.7	4.388	3.14e-06	2.97e-04	2.51e-06
12	2.00	0.2343	0.564	23.4	9.777	1.45e-06	2.07e-03	8.09e-06
13	0.500	0.2188	0.595	21.9	35.746	4.11e-07	1.03e-02	1.14e-05
14	0.125	0.2030	0.628	20.3	113.877	1.34e-07	4.21e-02	1.52e-05
15	0.0625	0.1957	0.643	19.6	261.660	6.01e-08	1.17e-01	1.89e-05

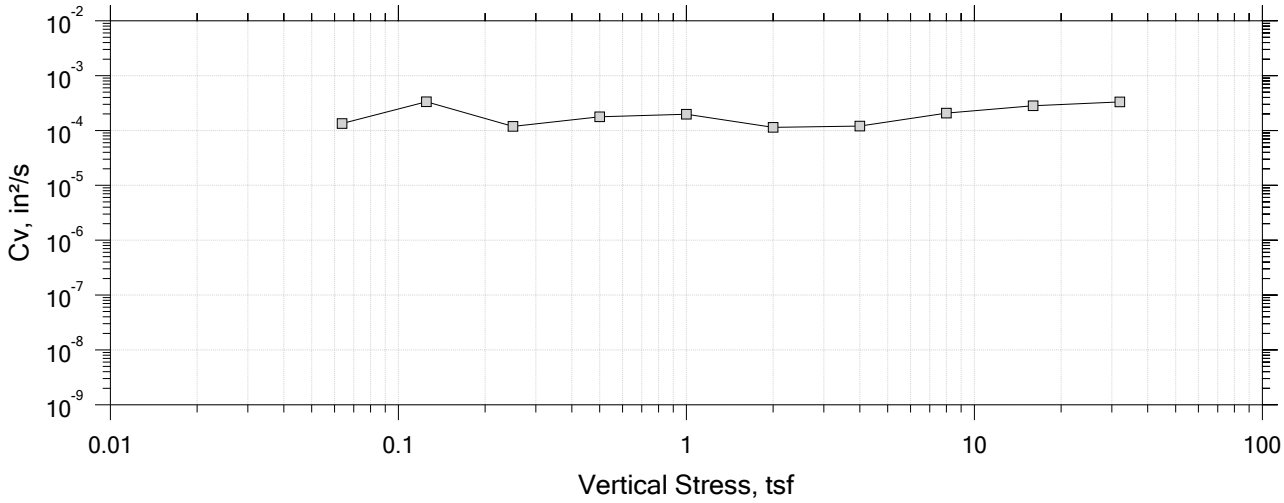
GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		
	Displacement at End of Increment		

B-203 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

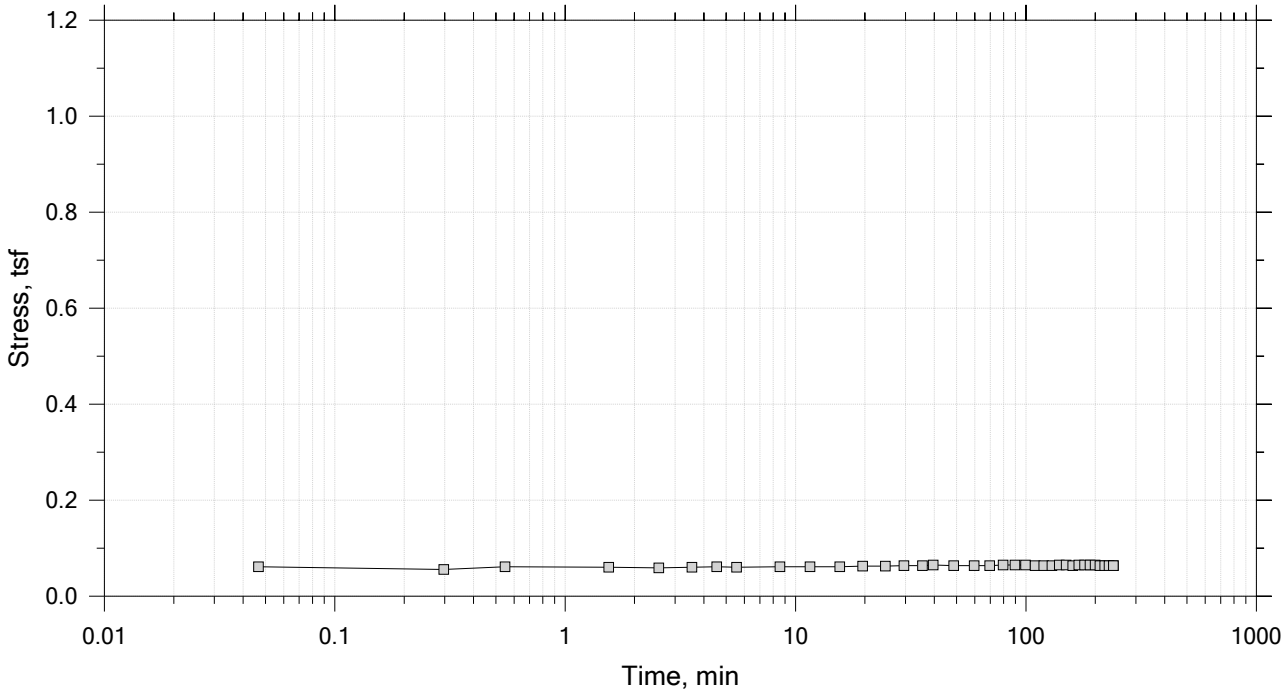


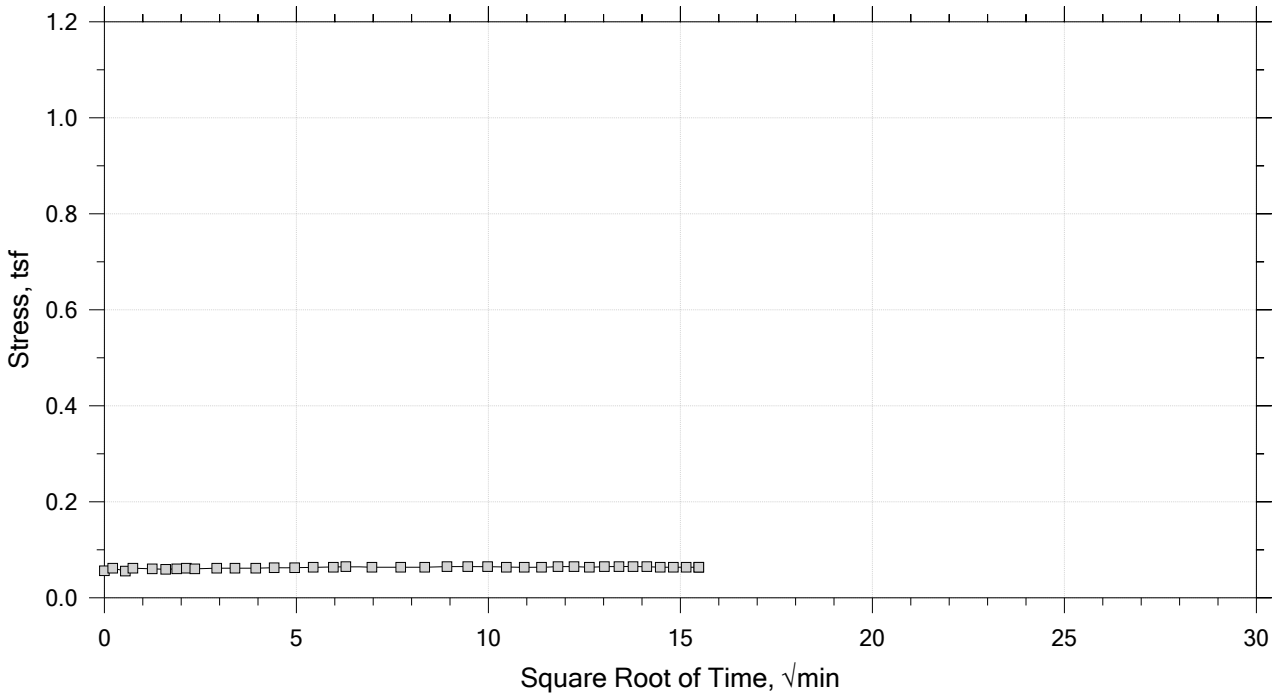


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0637 tsf





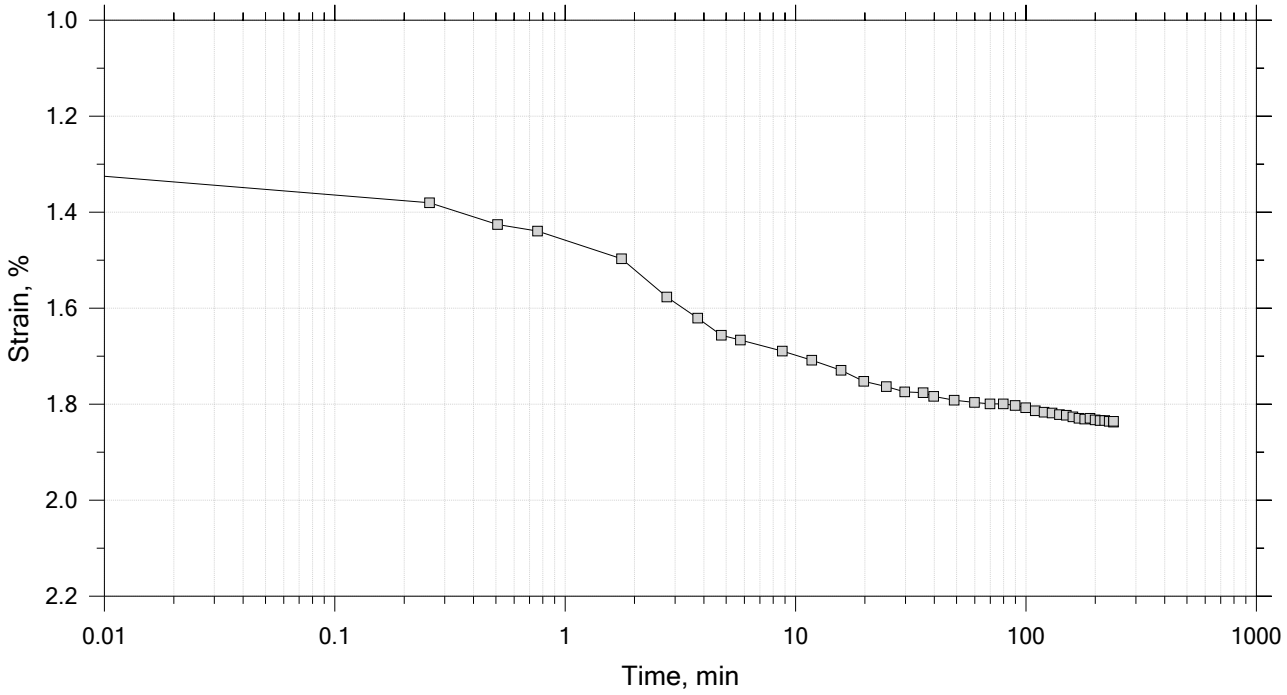
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

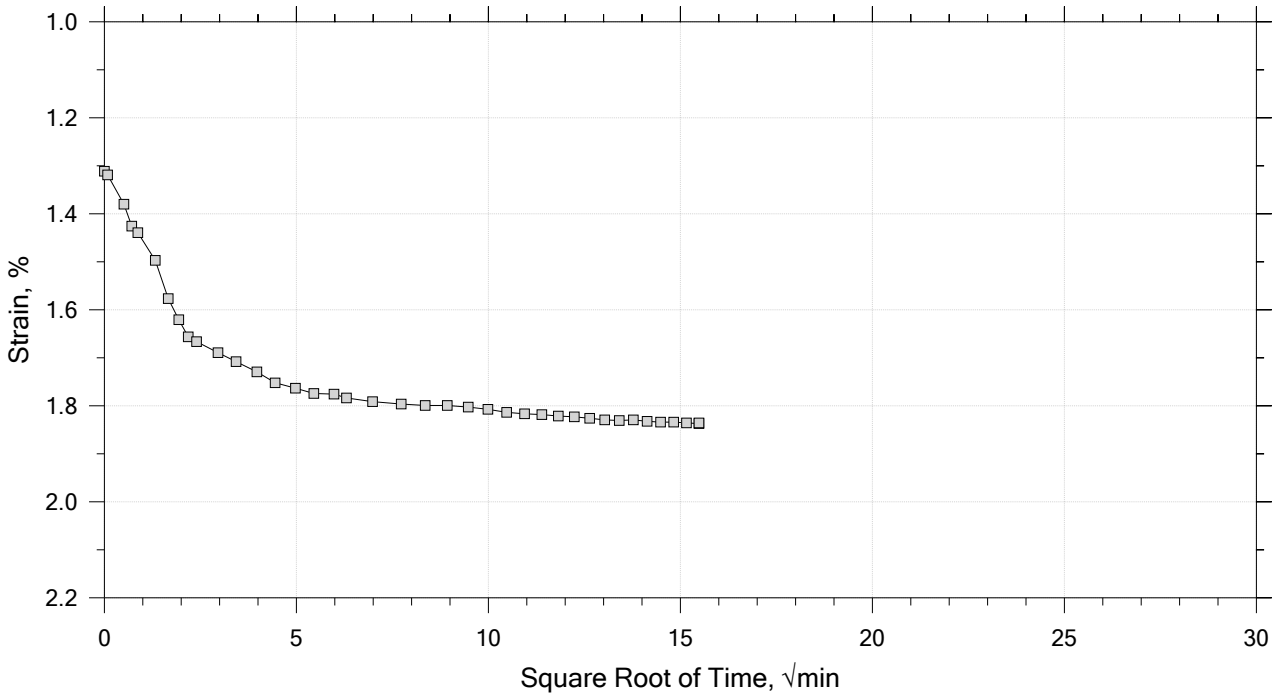
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

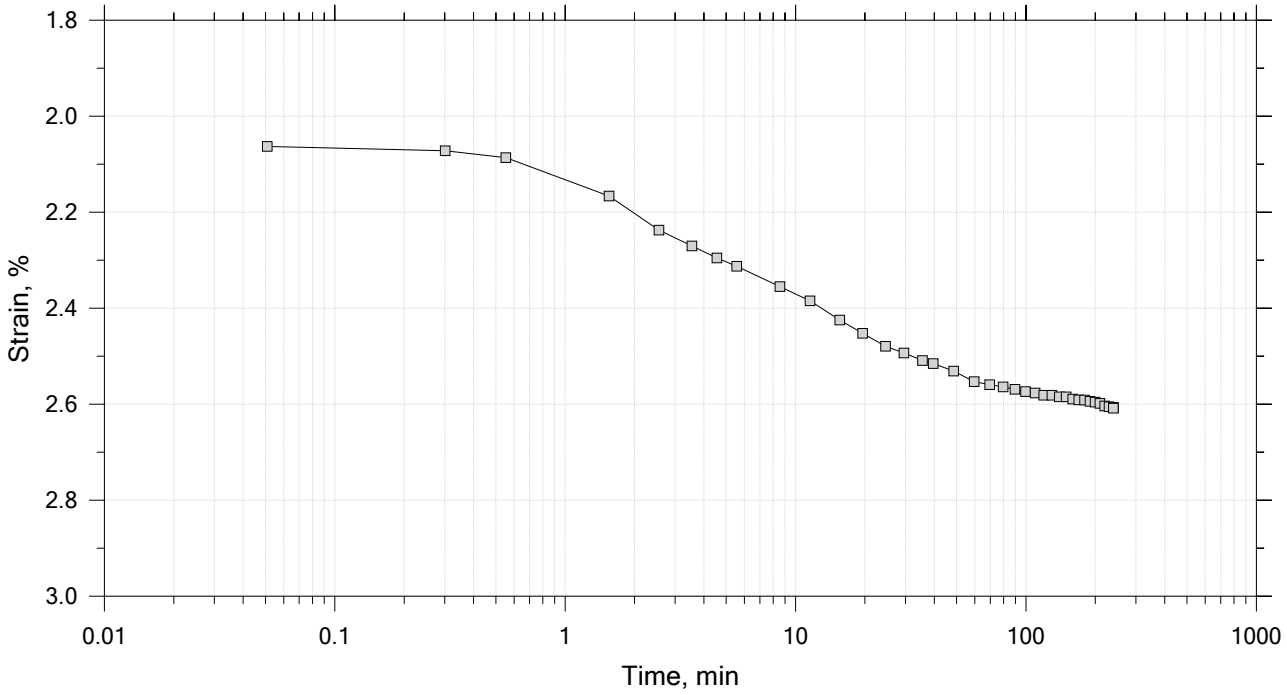


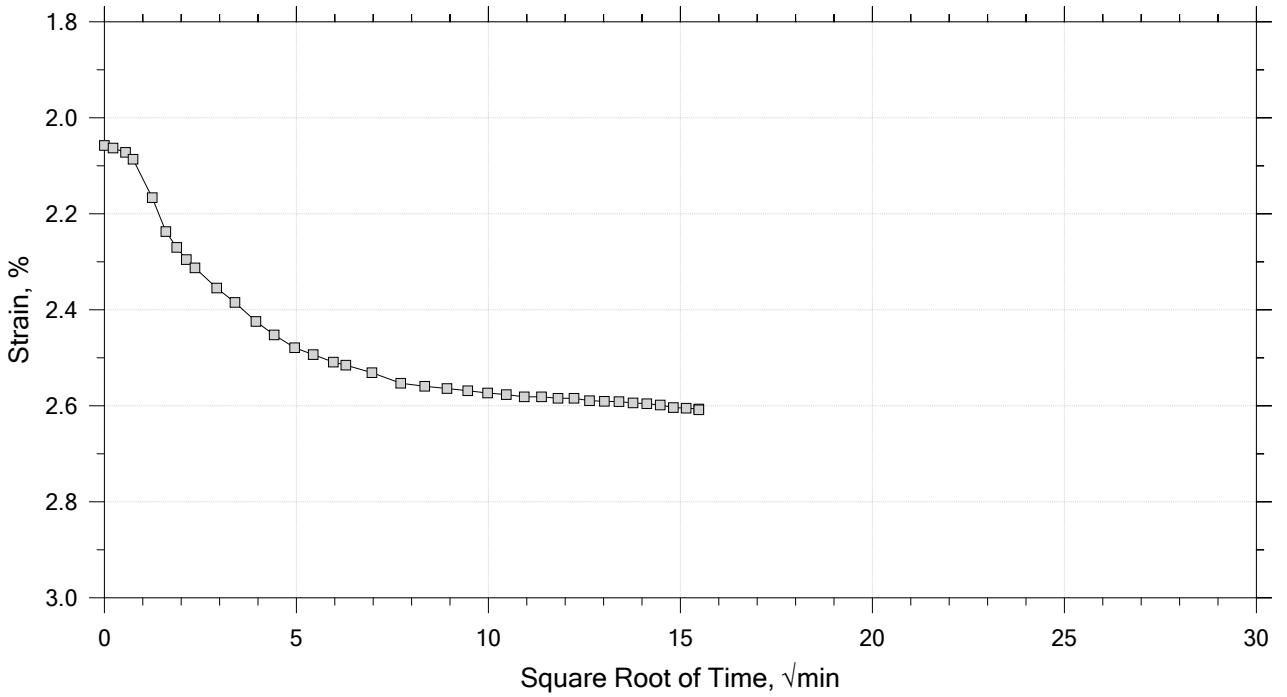


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

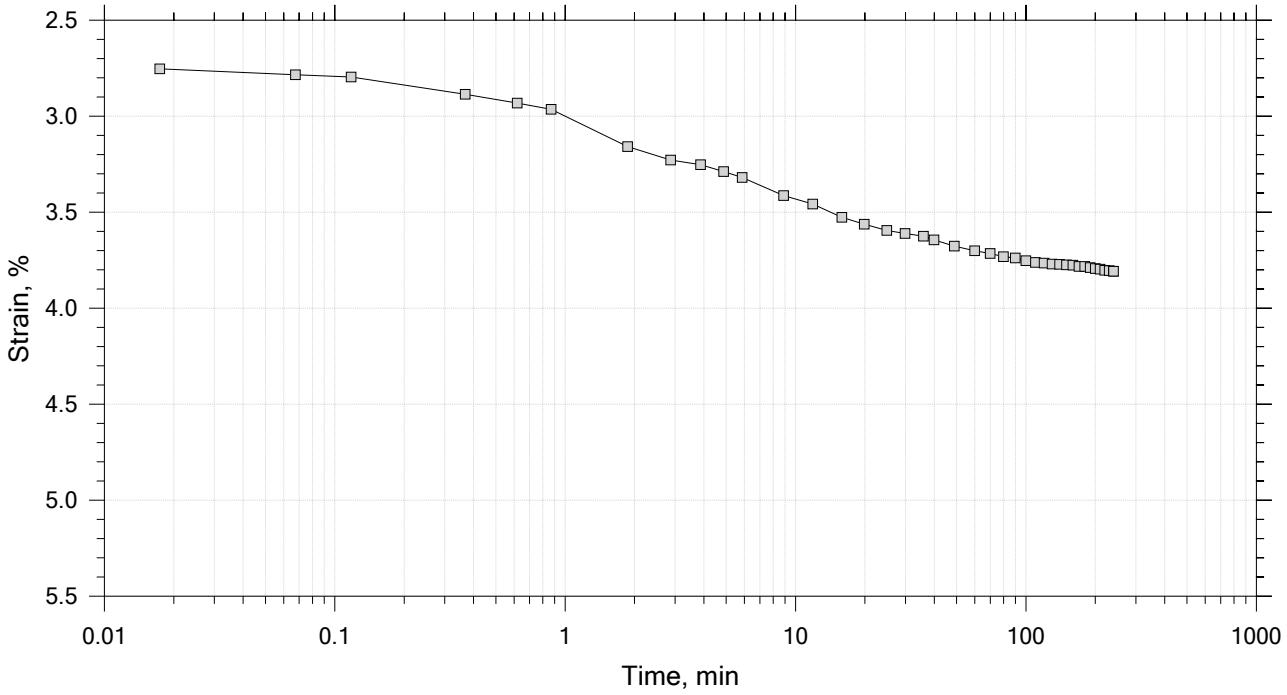


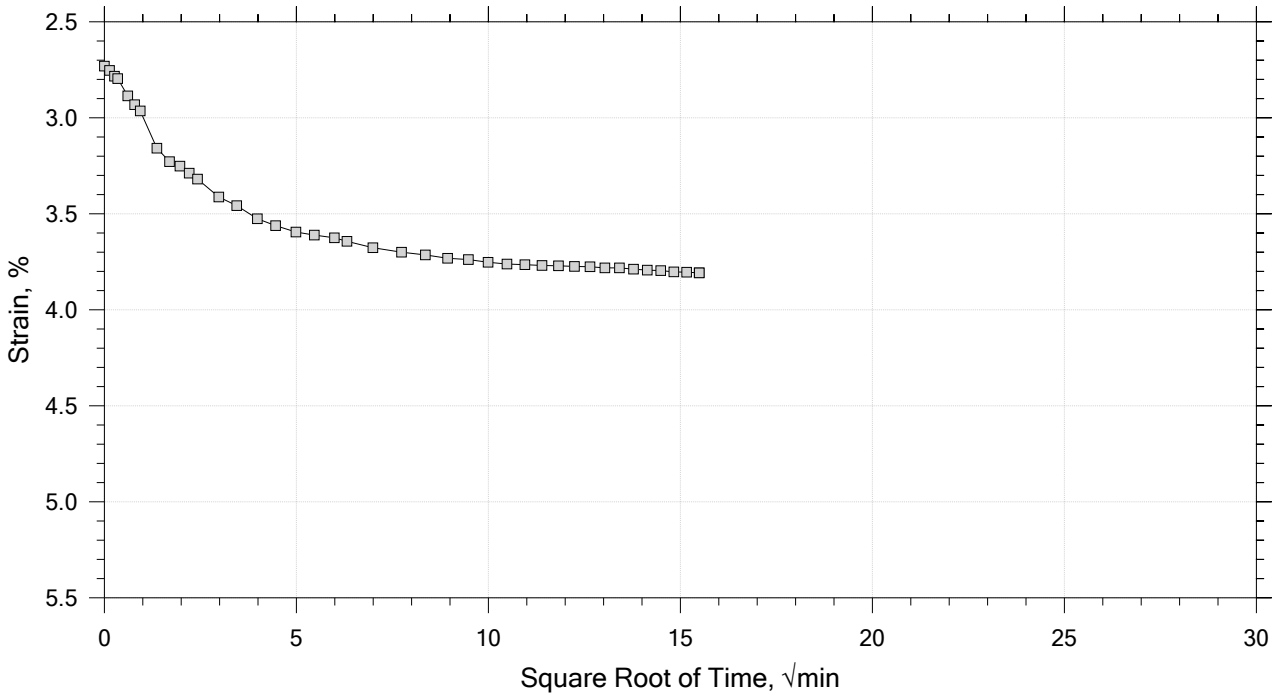


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





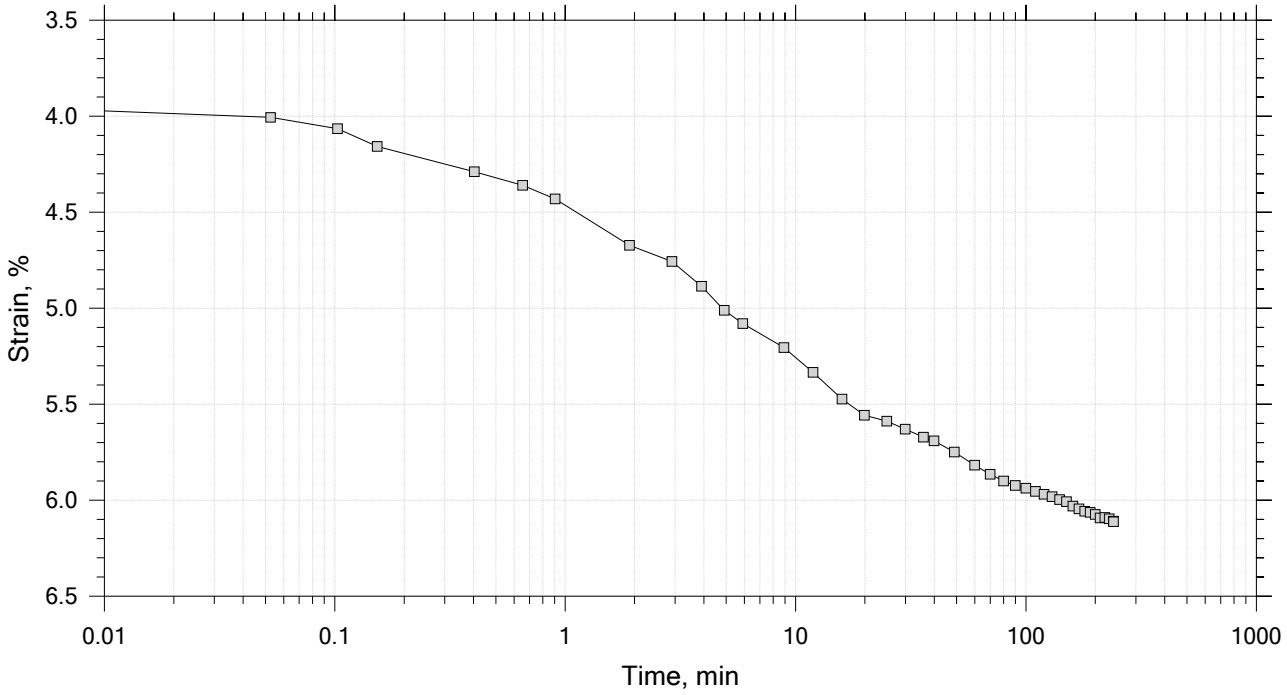
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

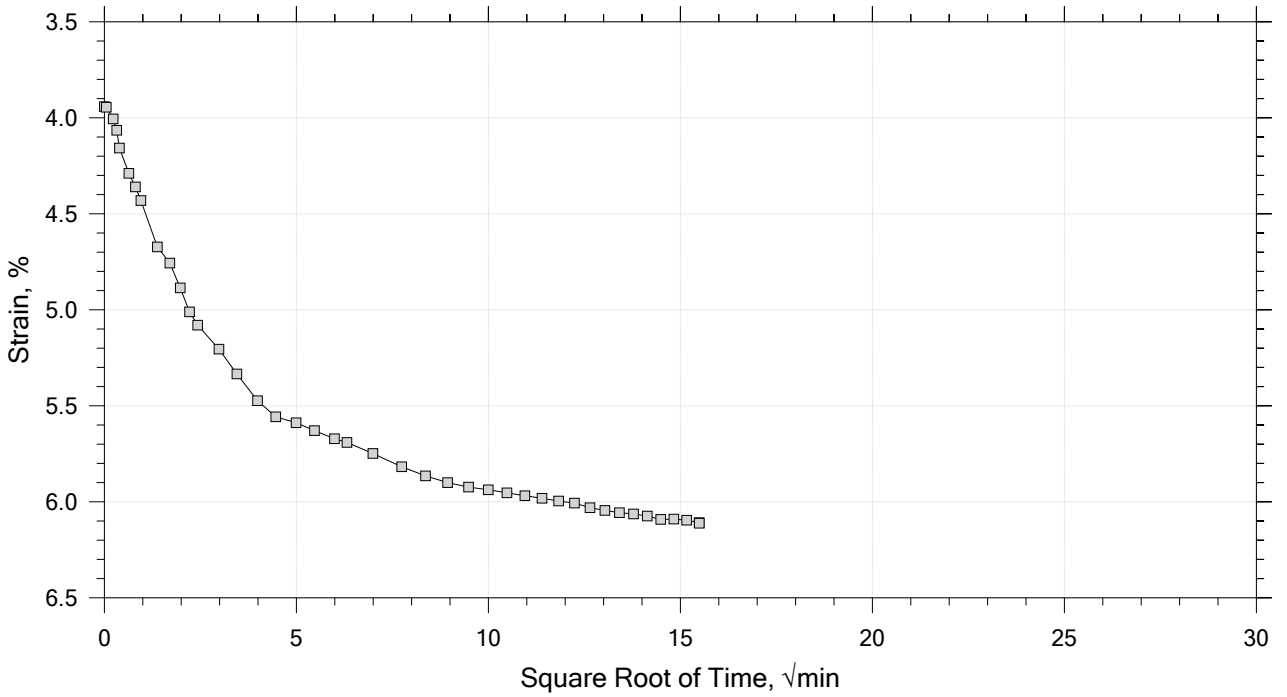
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





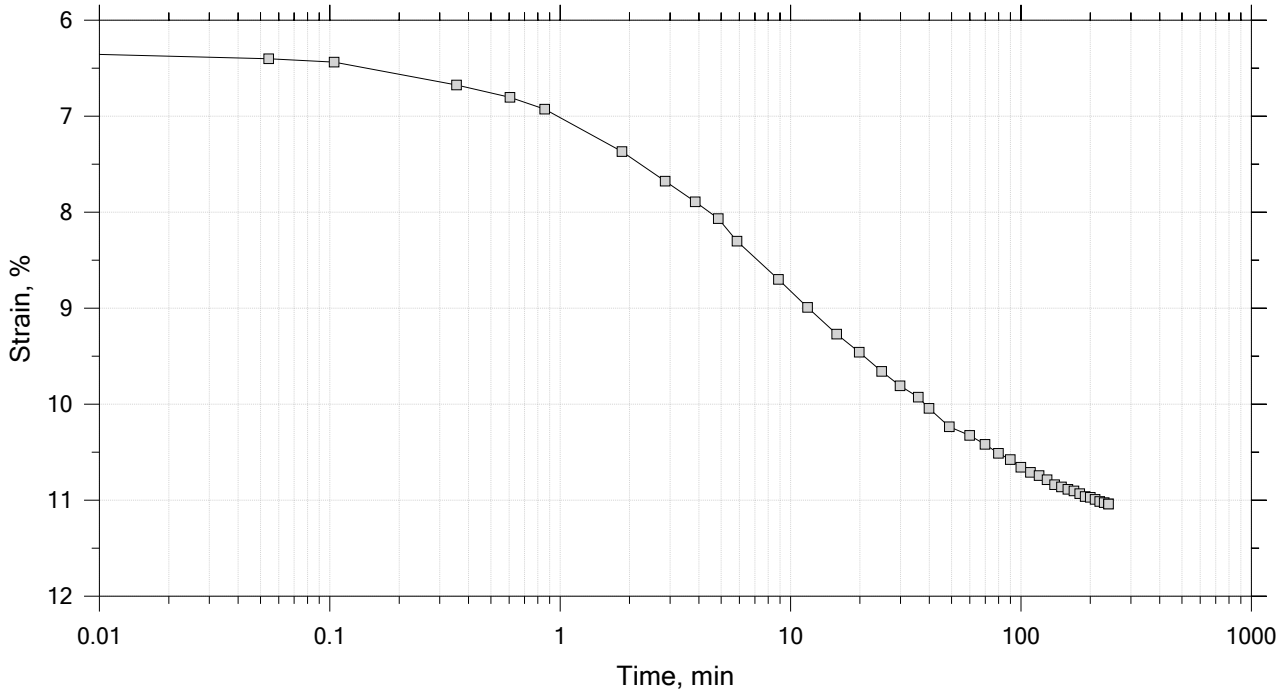
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

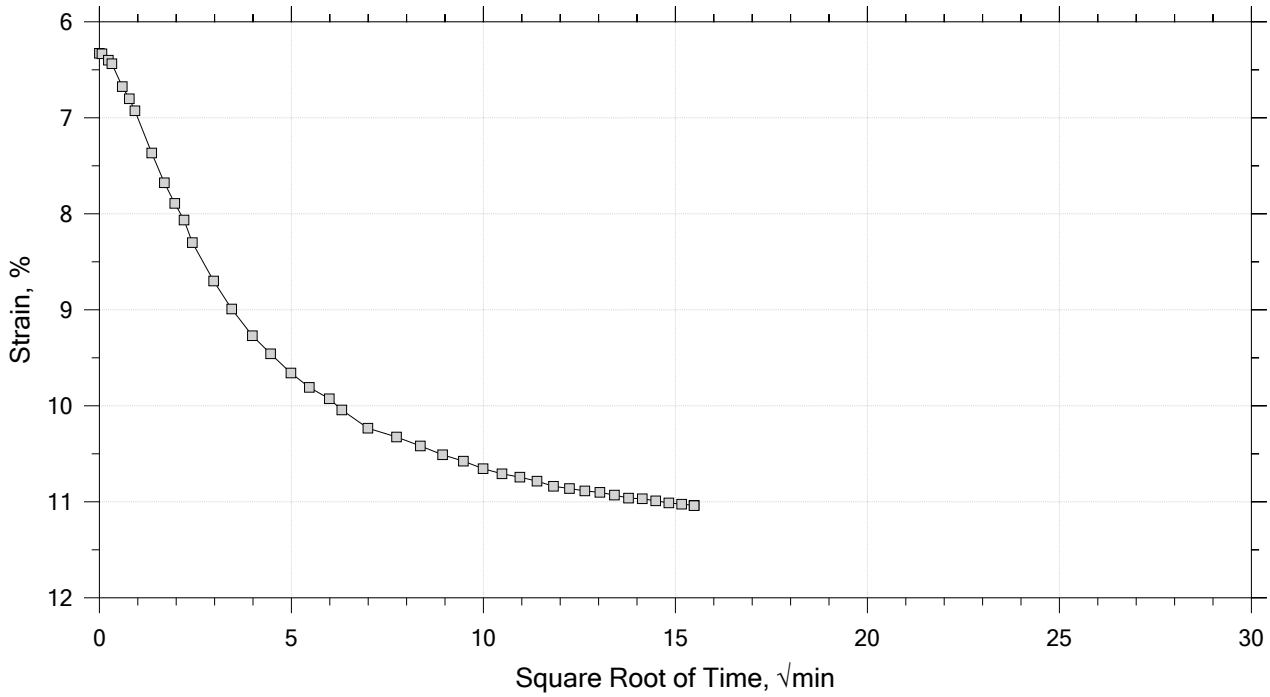
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





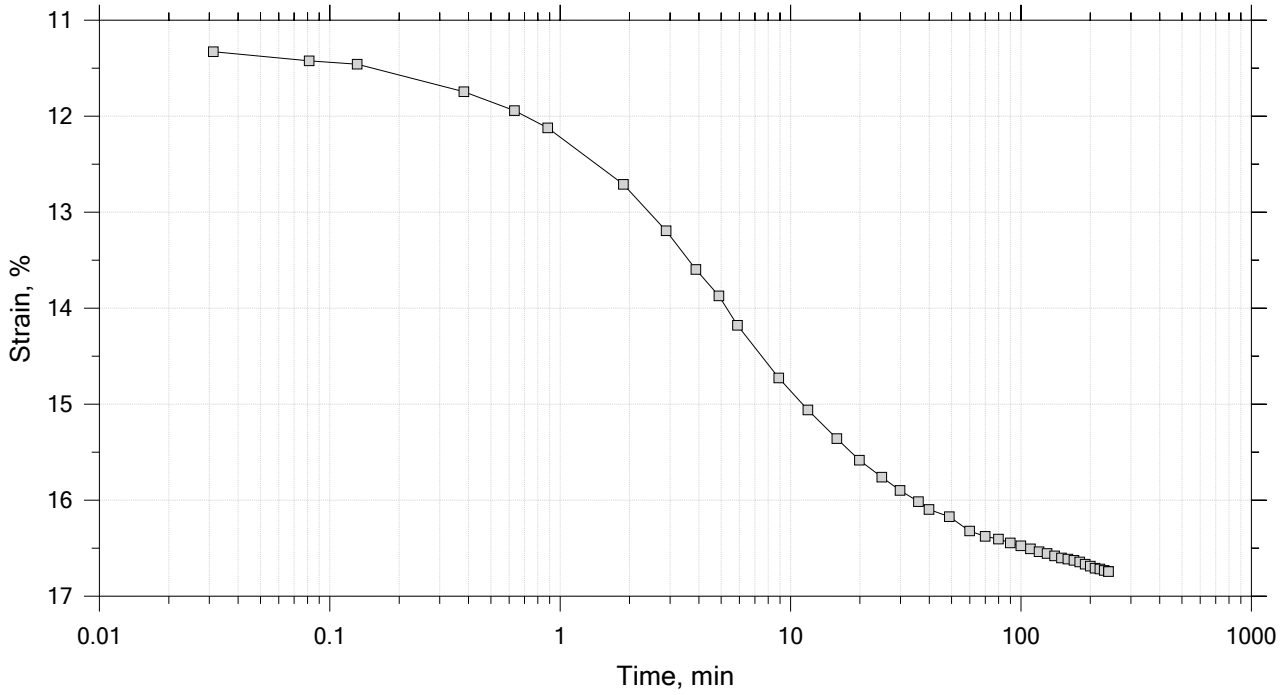
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

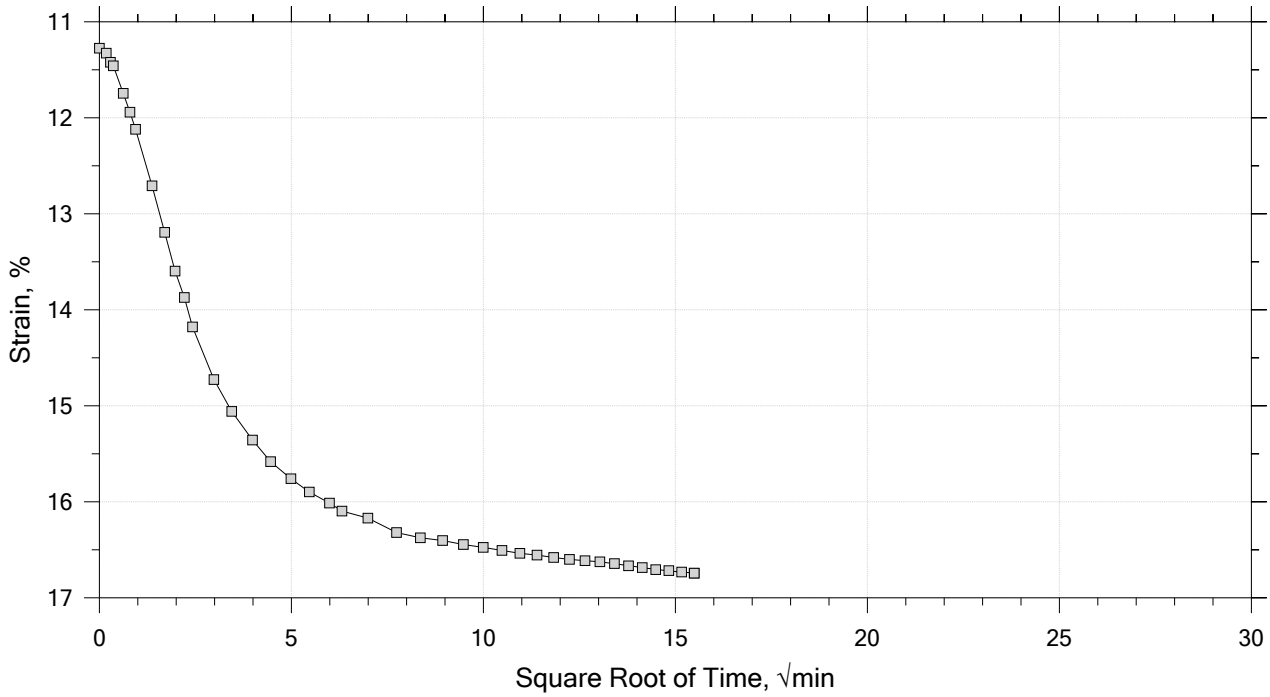
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





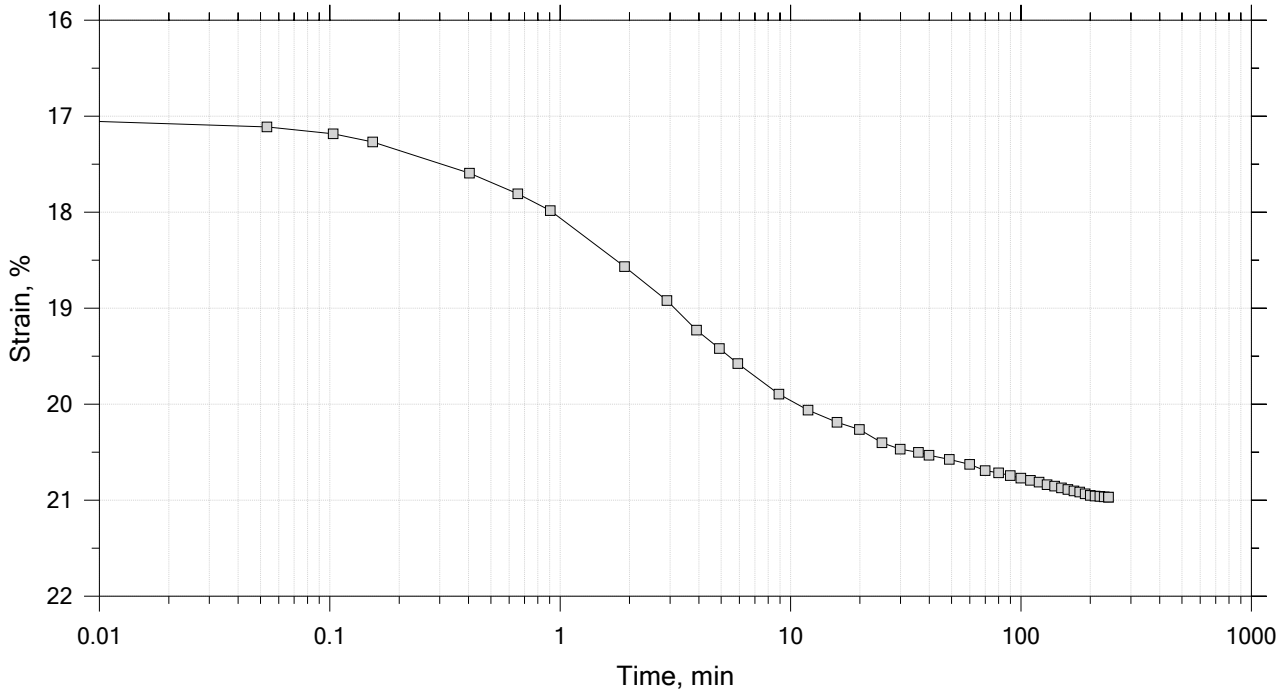
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

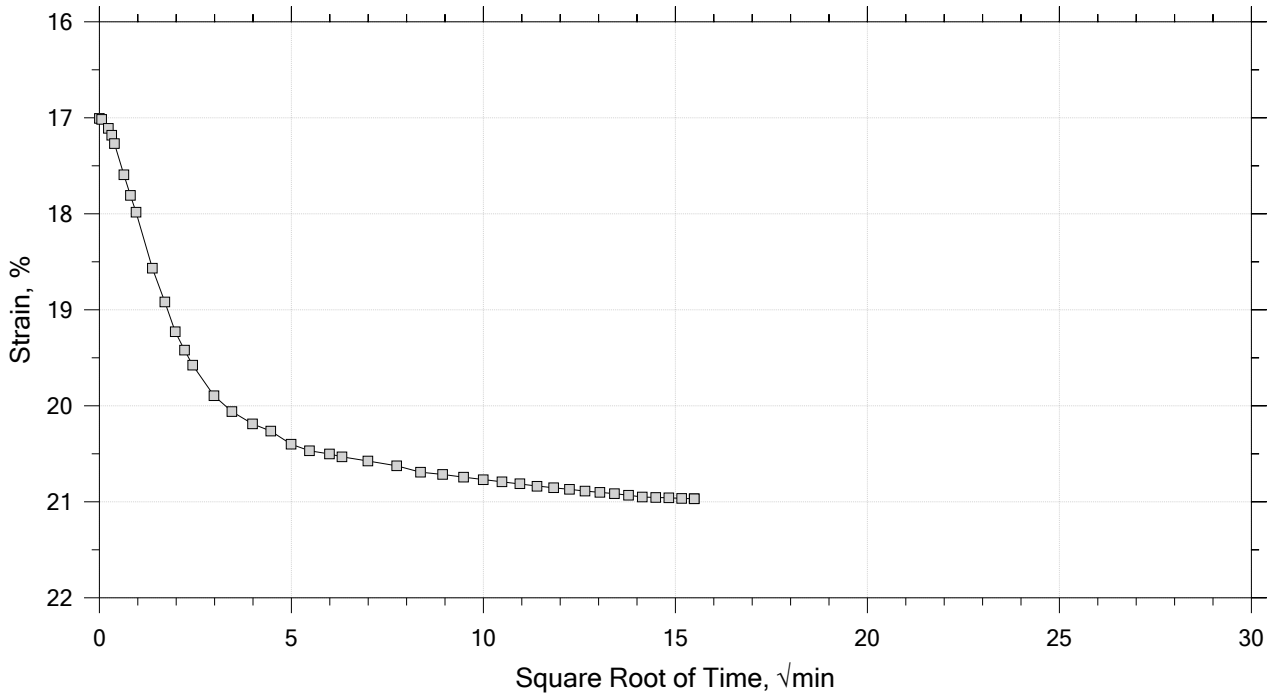
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





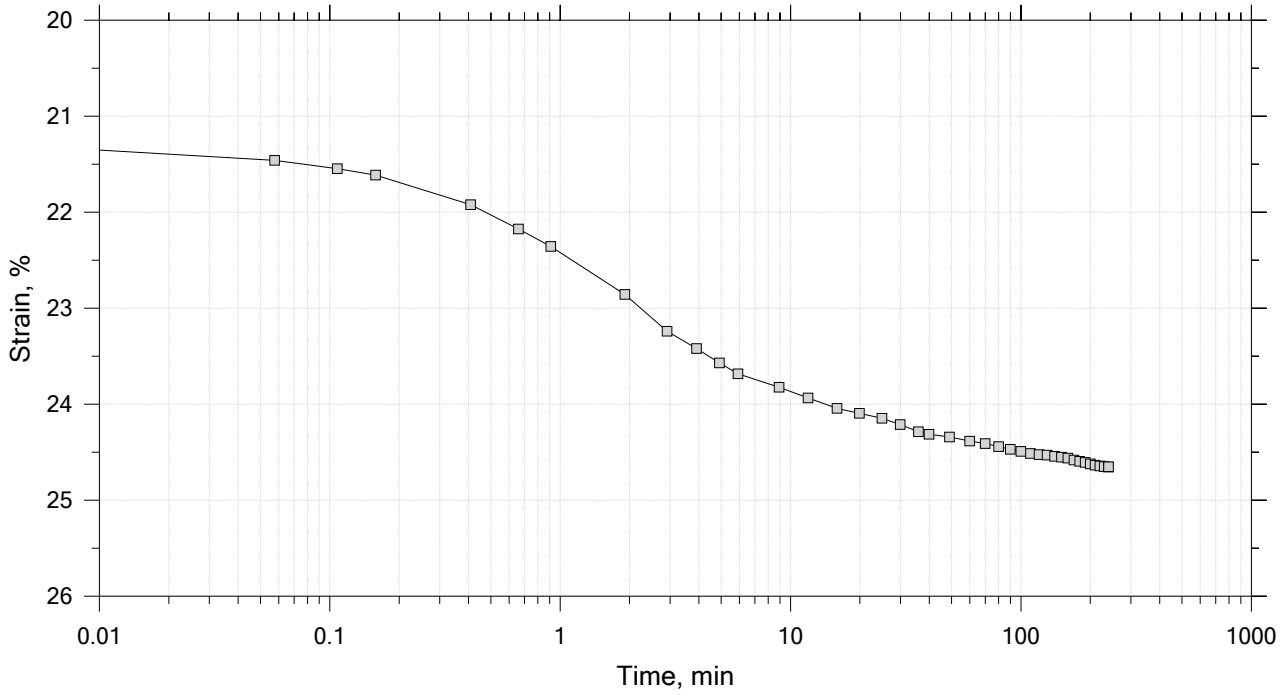
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

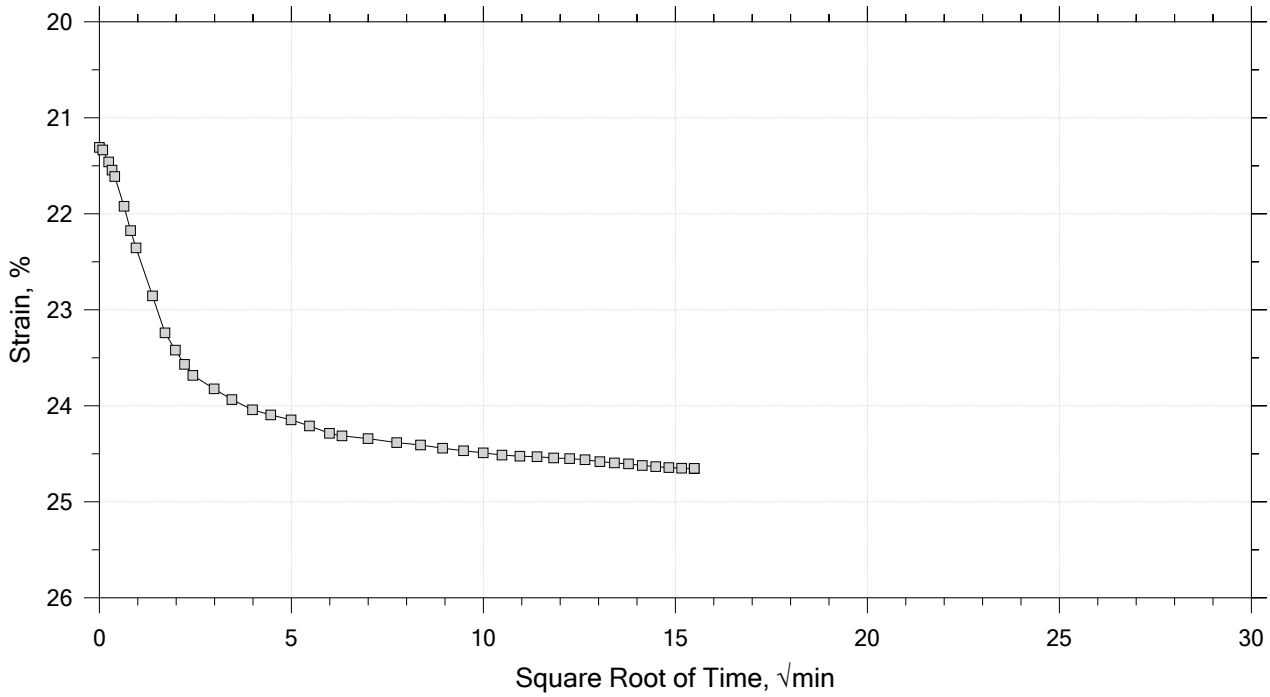
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

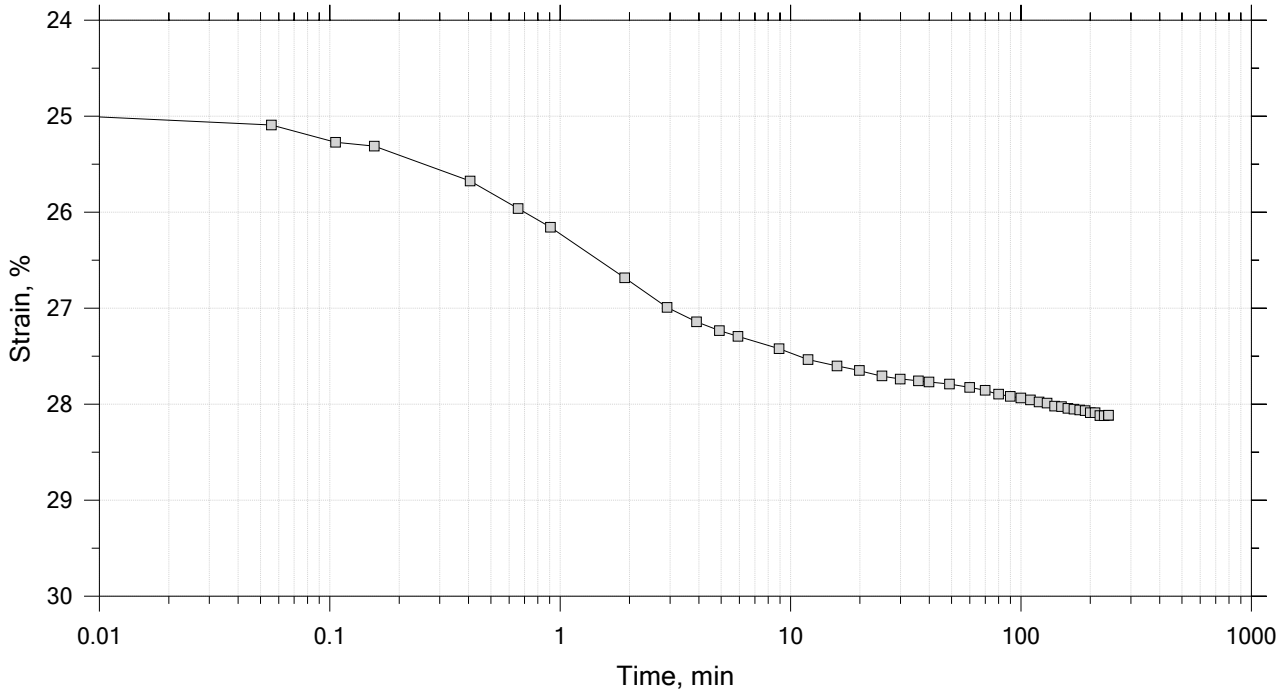


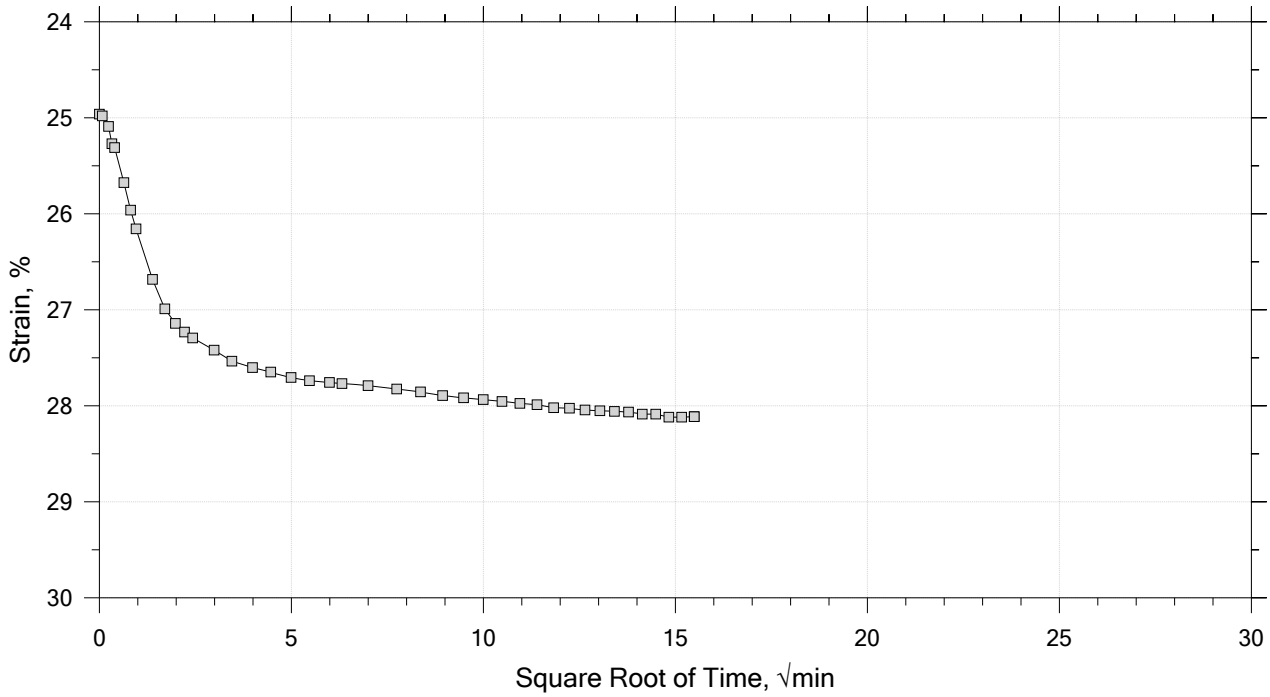


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf





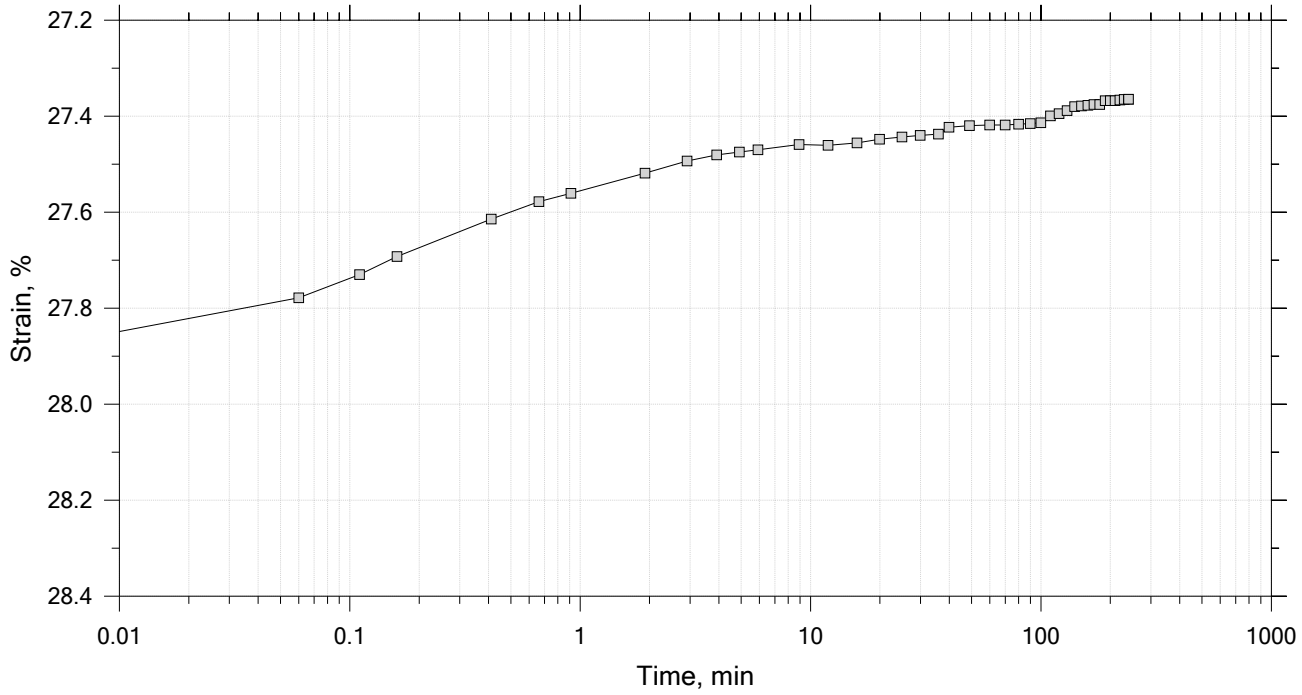
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

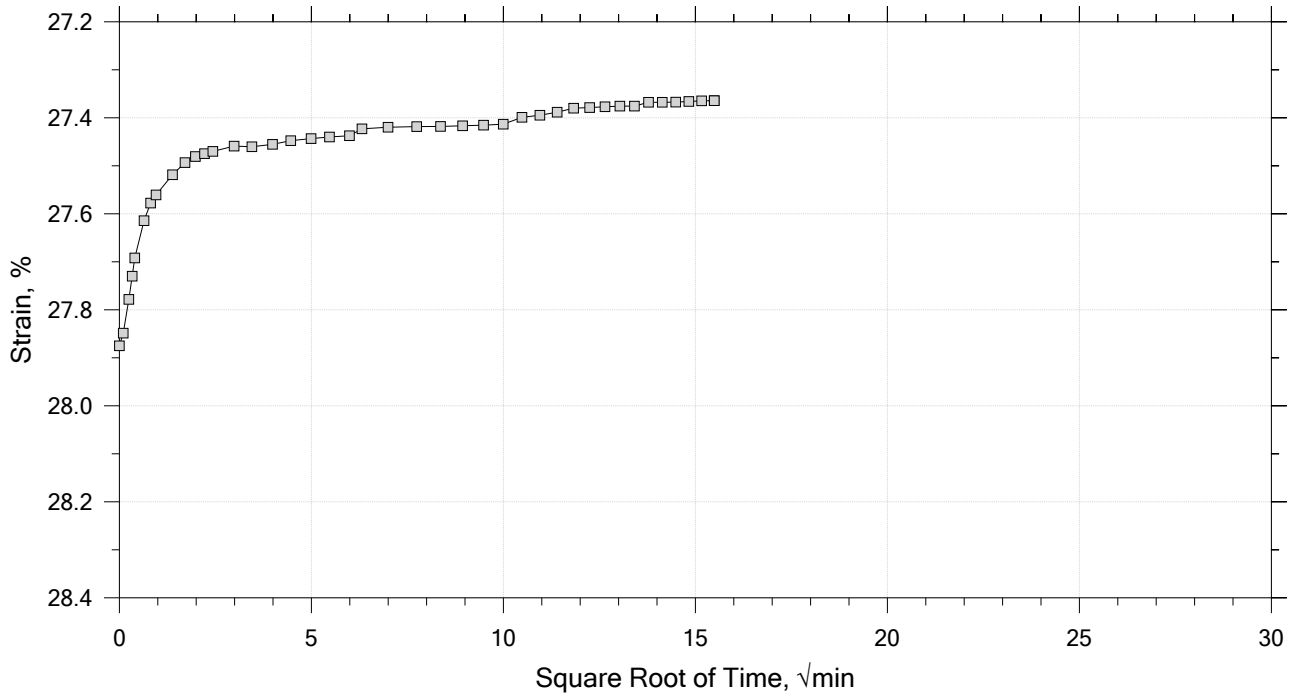
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf

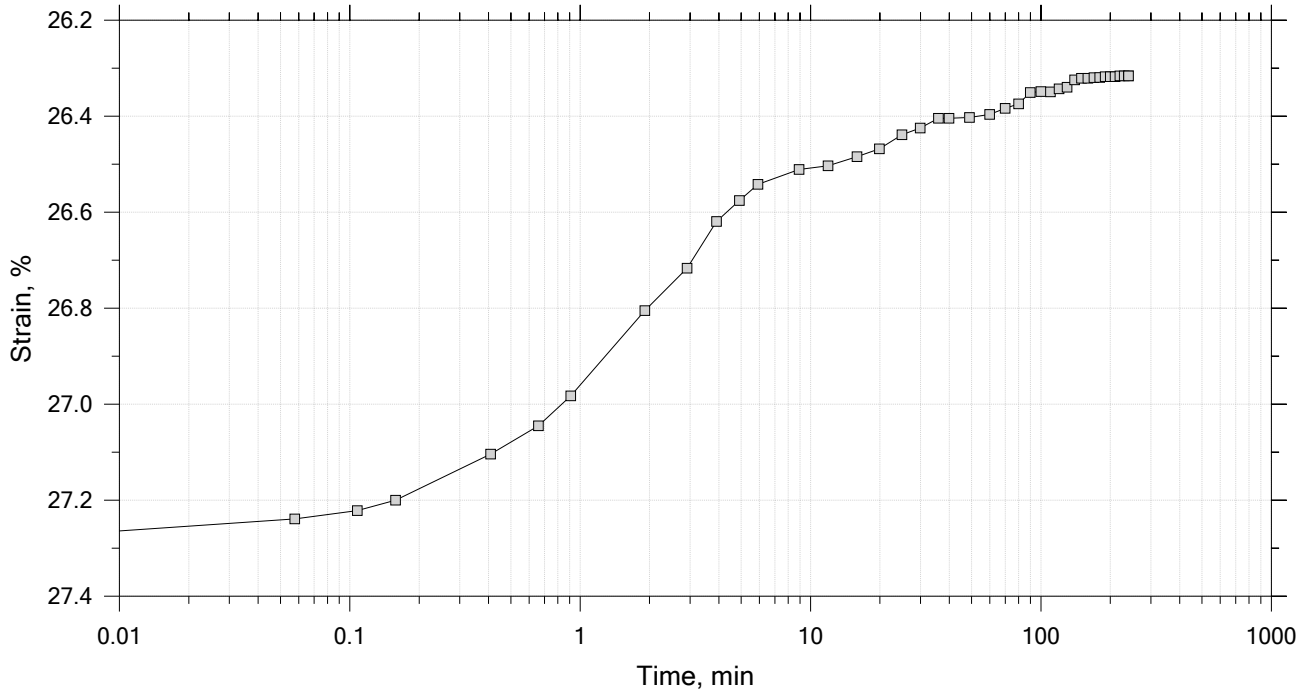


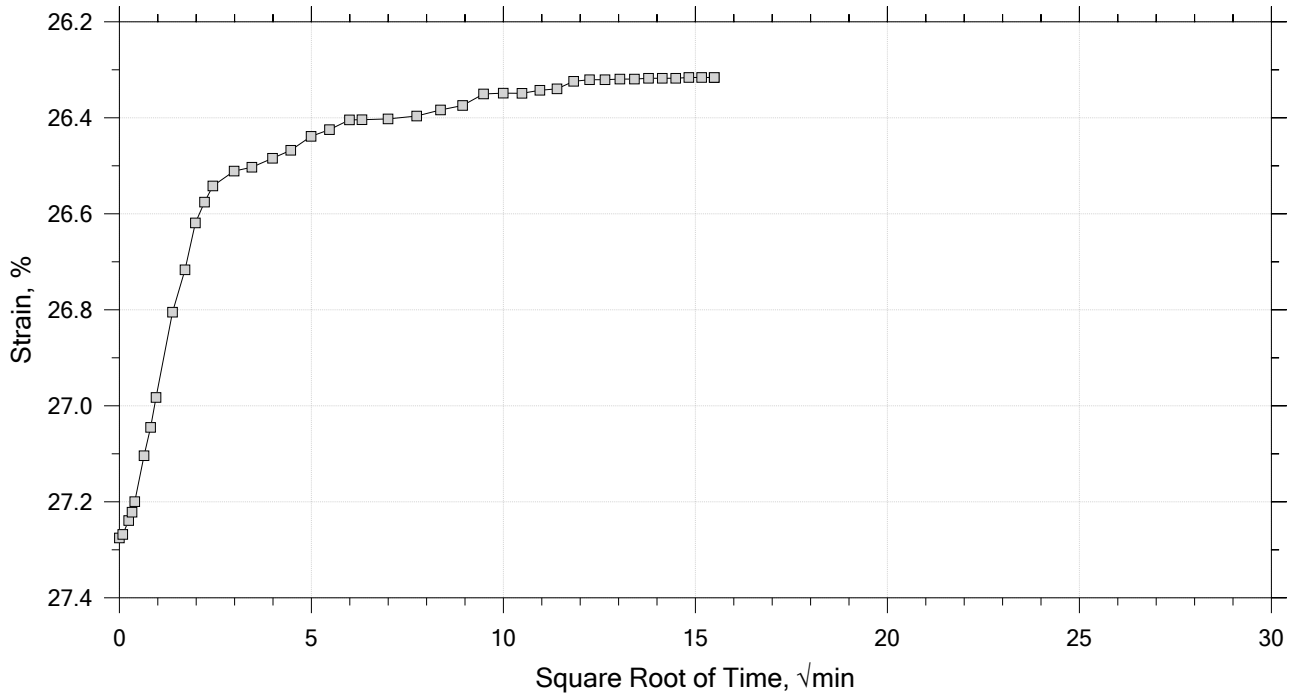


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

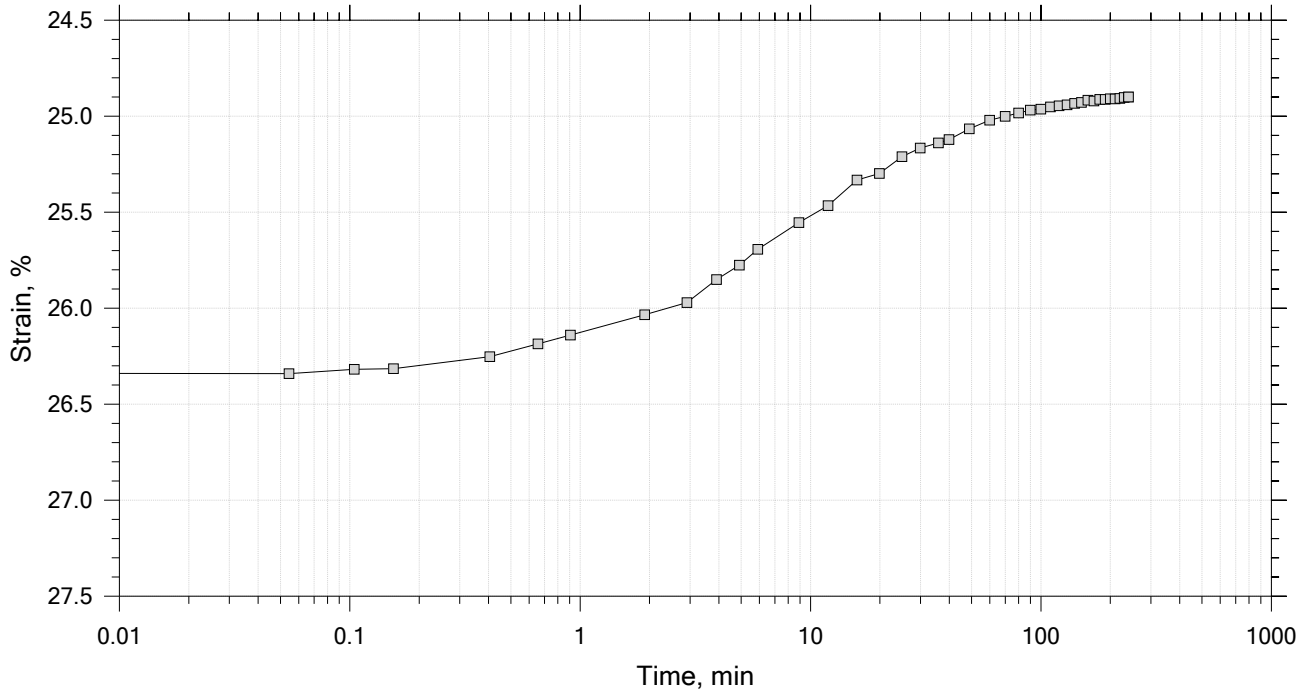


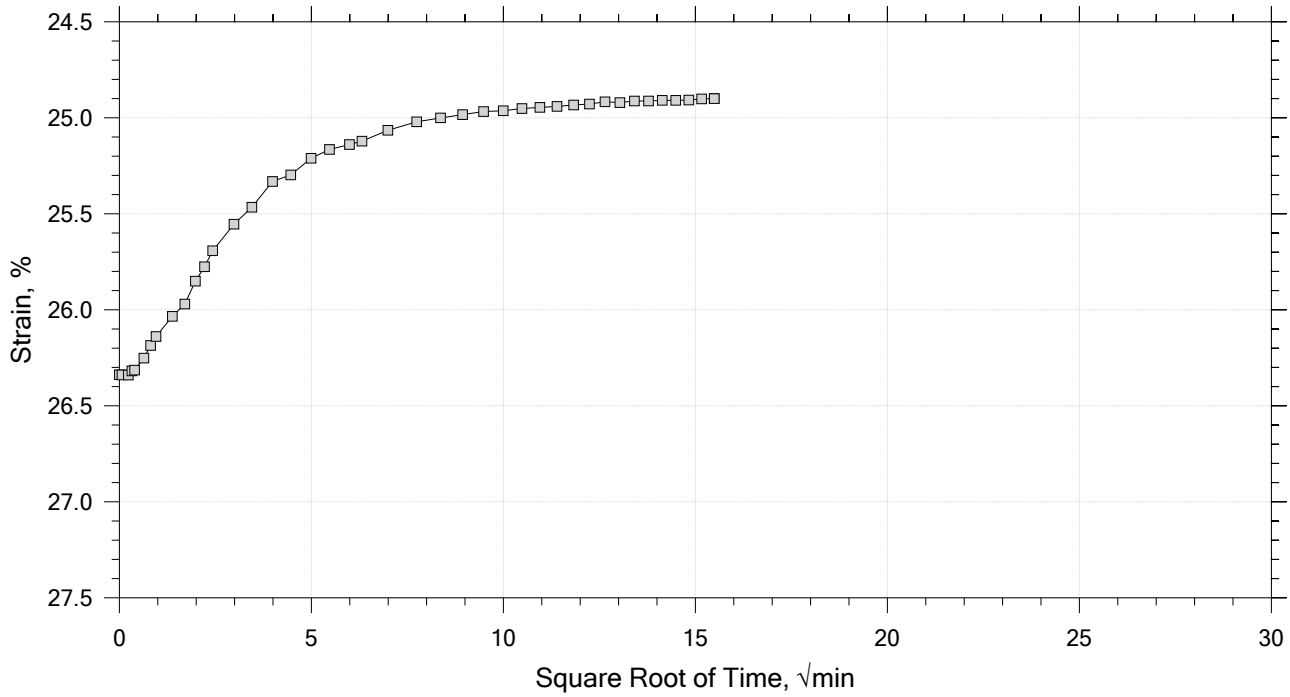


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

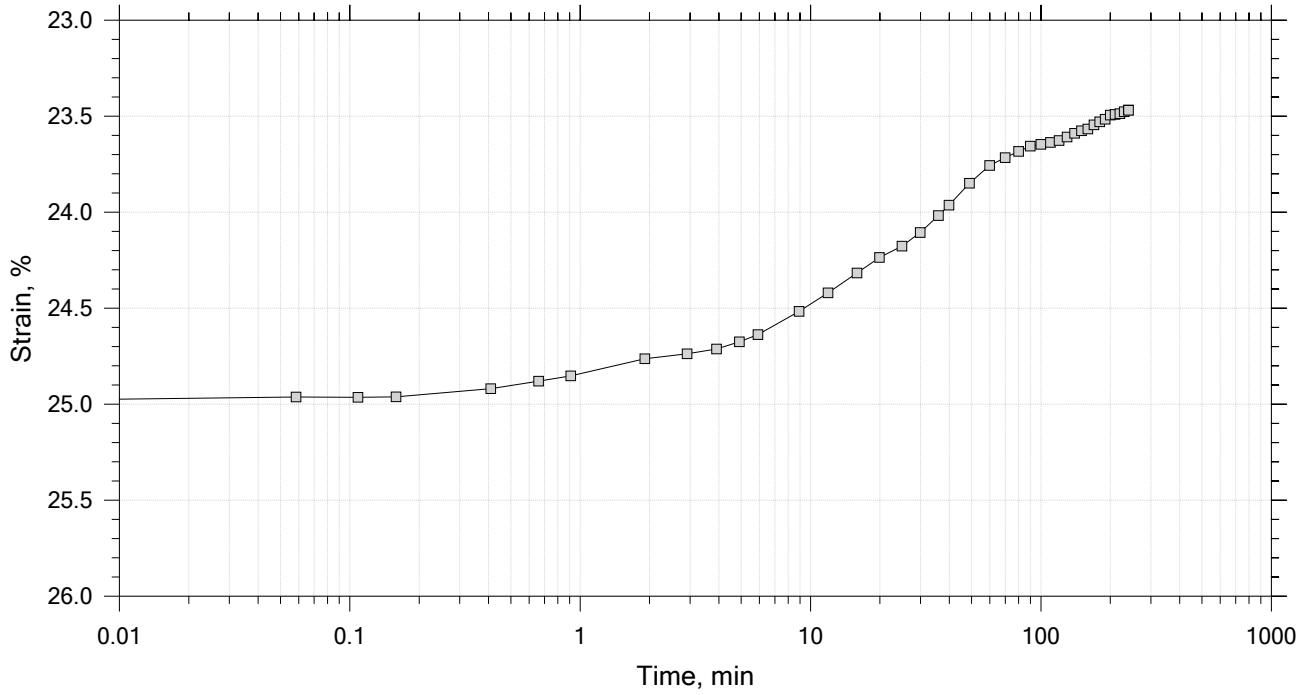


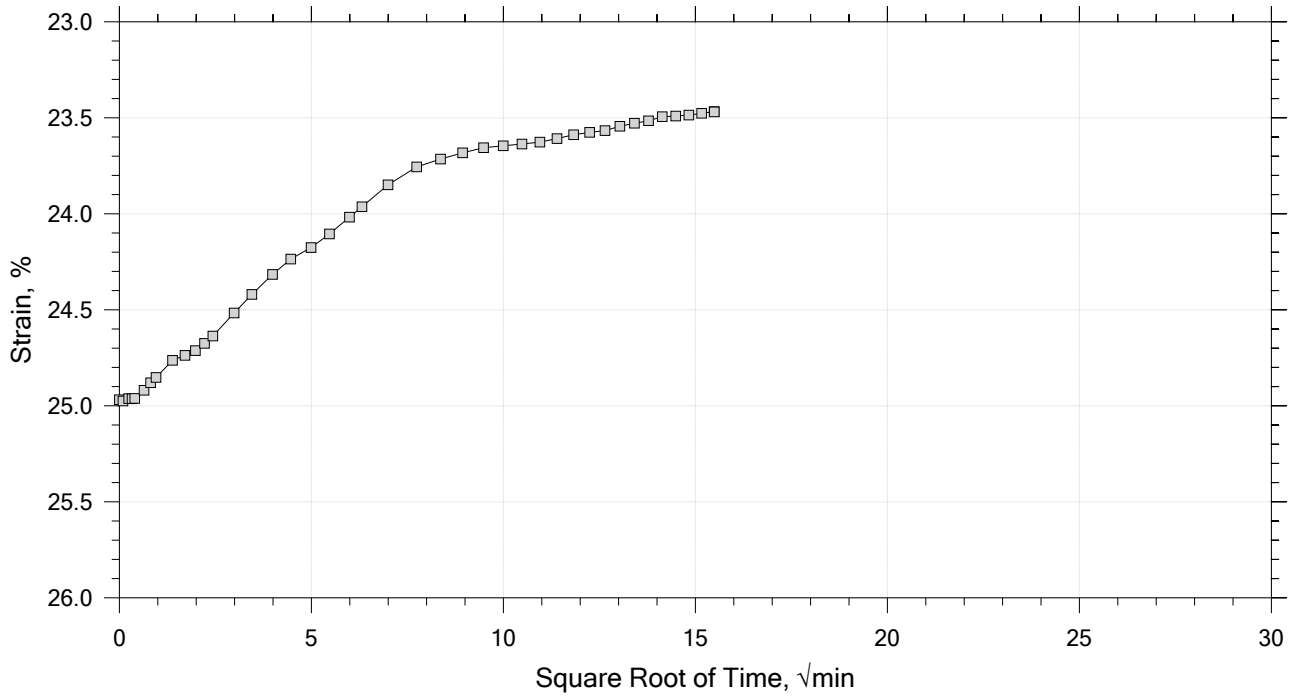


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

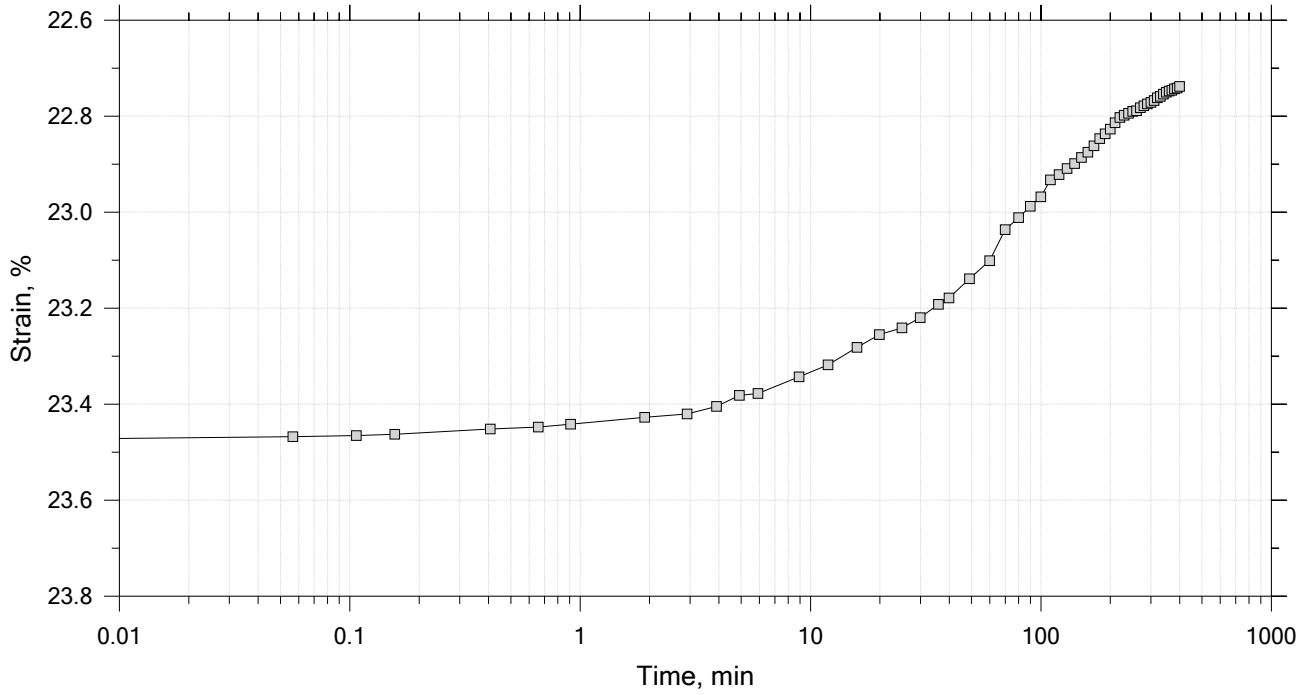


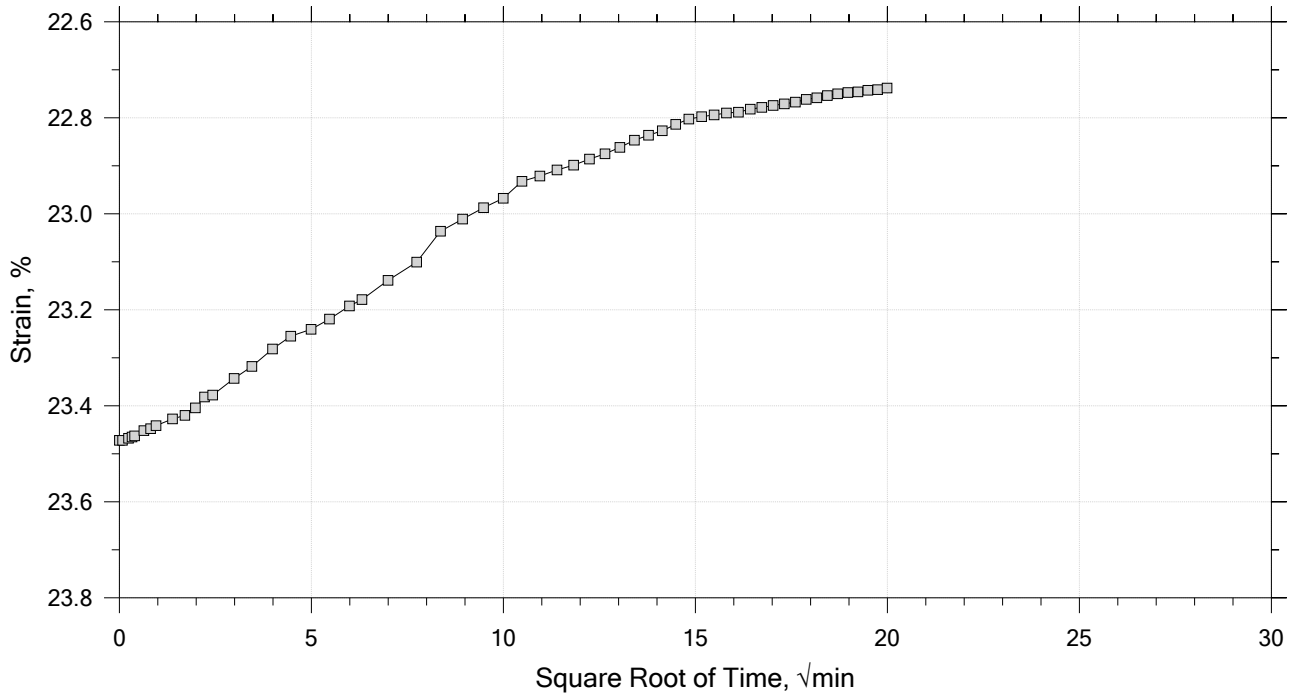


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
Test No.: IP-5	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 28
Initial Height: 1.00 in	Initial Void Ratio: 1.09	Plastic Limit: 16
Final Height: 0.76 in	Final Void Ratio: 0.587	Plasticity Index: 12

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E1066	RING		C2298
Mass Container, gm	8.16	110.4	110.4	9.31
Mass Container + Wet Soil, gm	41.65	257.36	239	138.77
Mass Container + Dry Soil, gm	32.71	216.38	216.38	116
Mass Dry Soil, gm	24.55	105.98	105.98	106.69
Water Content, %	36.42	38.67	21.34	21.34
Void Ratio	---	1.09	0.59	---
Degree of Saturation, %	---	97.74	100.00	---
Dry Unit Weight, pcf	---	82.25	108.22	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

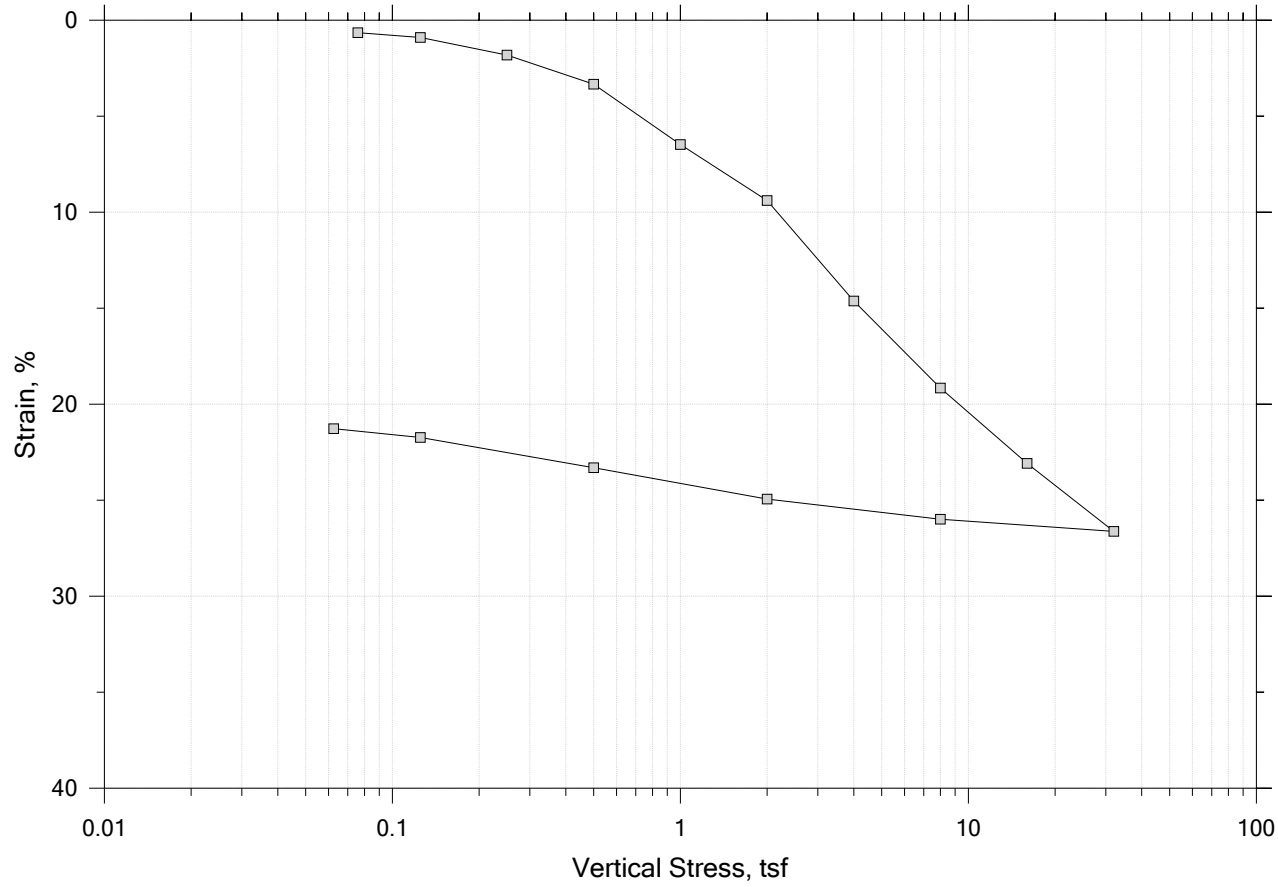
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0637	0.01163	1.06	1.16	26.019	1.34e-04	1.82e-01	4.59e-04
2	0.125	0.01836	1.05	1.84	10.238	3.35e-04	1.10e-01	6.89e-04
3	0.250	0.02608	1.03	2.61	28.471	1.19e-04	6.18e-02	1.37e-04
4	0.500	0.03807	1.01	3.81	18.596	1.78e-04	4.80e-02	1.60e-04
5	1.00	0.06112	0.961	6.11	16.116	1.98e-04	4.61e-02	1.71e-04
6	2.00	0.1104	0.858	11.0	25.930	1.14e-04	4.93e-02	1.05e-04
7	4.00	0.1674	0.739	16.7	21.709	1.21e-04	2.85e-02	6.45e-05
8	8.00	0.2097	0.651	21.0	11.194	2.08e-04	1.06e-02	4.11e-05
9	16.0	0.2465	0.574	24.7	7.437	2.83e-04	4.60e-03	2.44e-05
10	32.0	0.2811	0.501	28.1	5.789	3.31e-04	2.16e-03	1.34e-05
11	8.00	0.2736	0.517	27.4	2.986	6.18e-04	3.12e-04	3.62e-06
12	2.00	0.2632	0.539	26.3	9.116	2.07e-04	1.75e-03	6.79e-06
13	0.500	0.2490	0.568	24.9	29.979	6.52e-05	9.44e-03	1.15e-05
14	0.125	0.2347	0.598	23.5	88.996	2.28e-05	3.82e-02	1.63e-05
15	0.0625	0.2274	0.614	22.7	264.240	7.91e-06	1.17e-01	1.73e-05

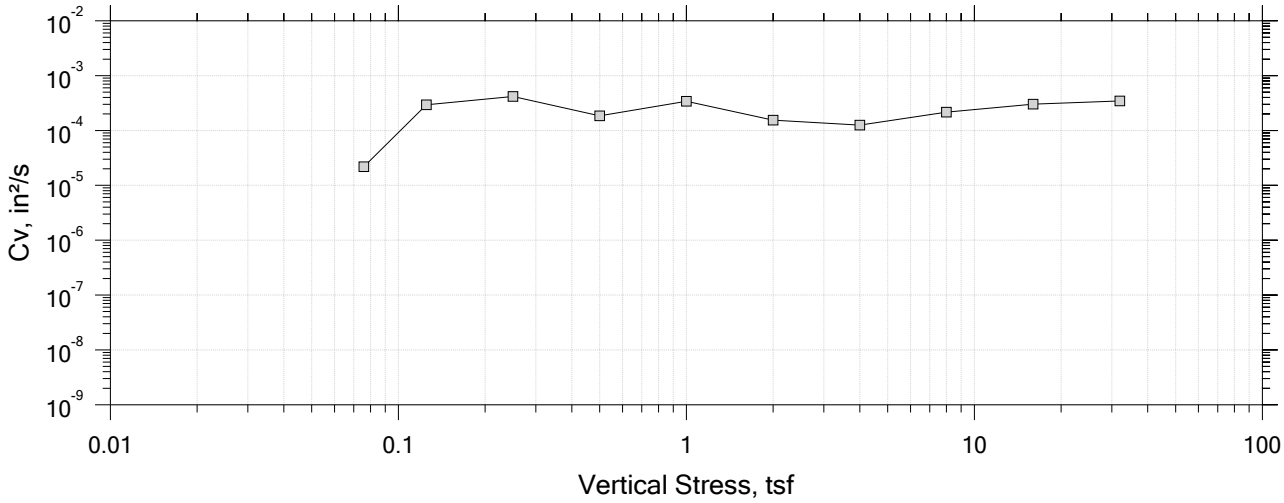
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		
	Displacement at End of Increment		

B-205 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

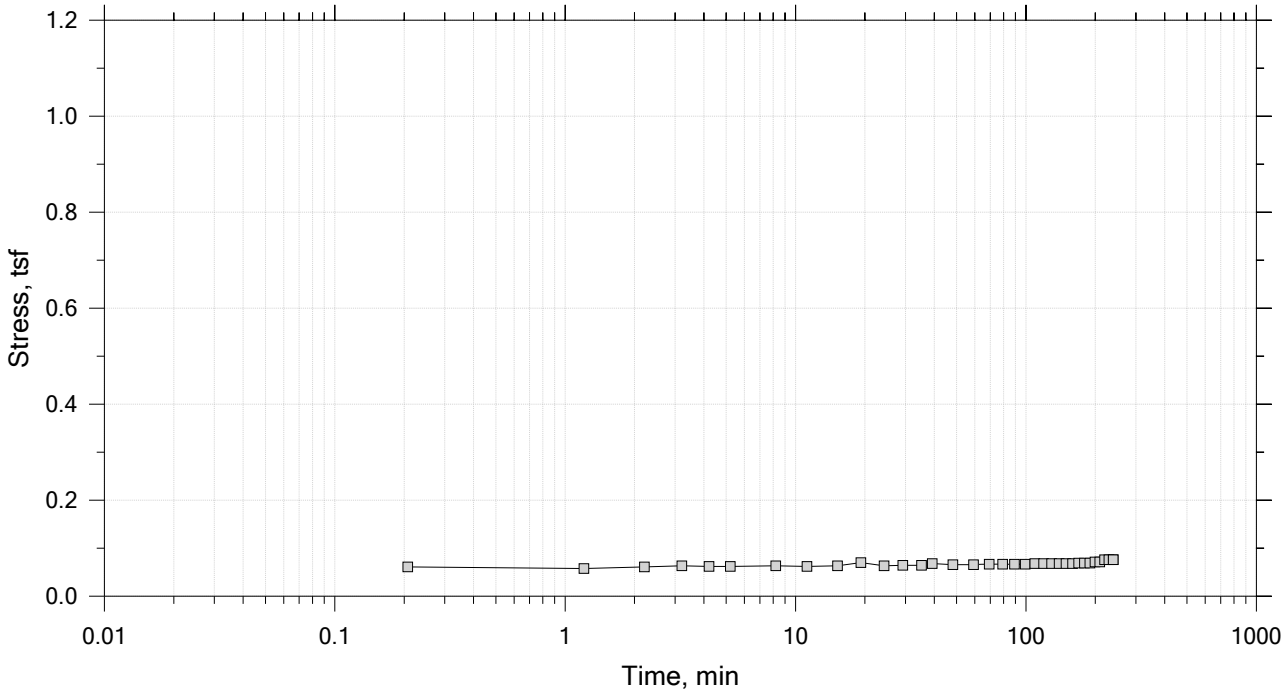


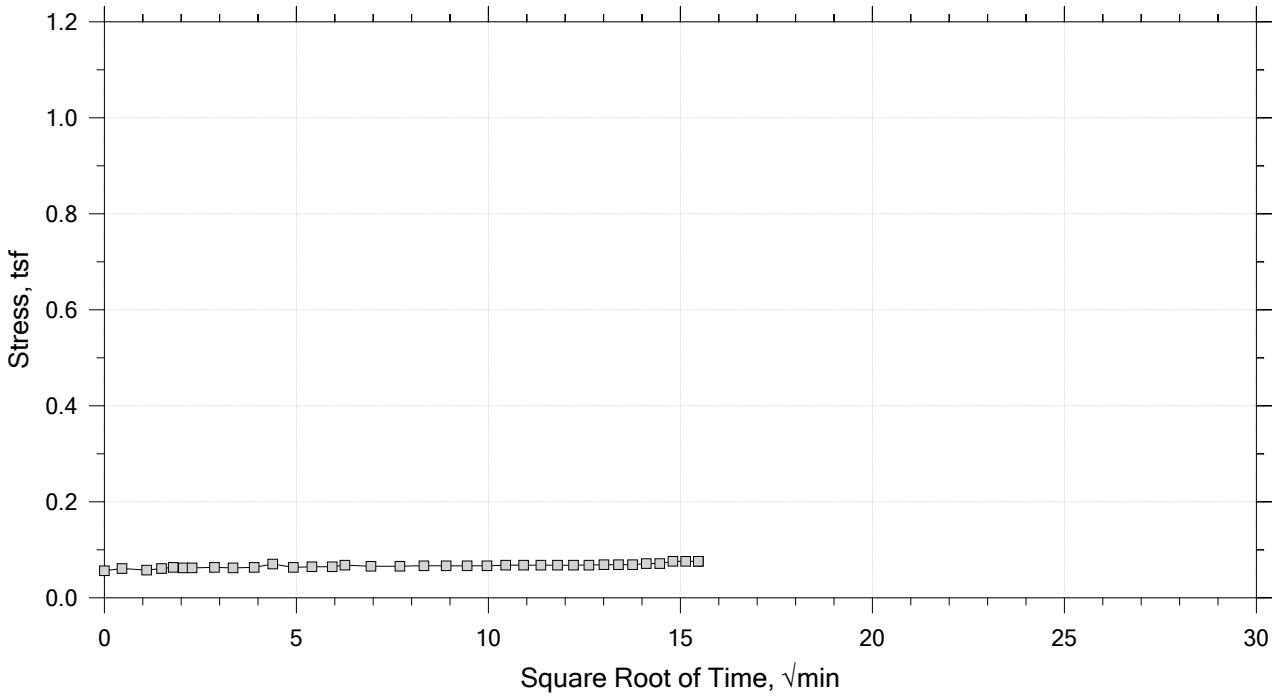


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0759 tsf





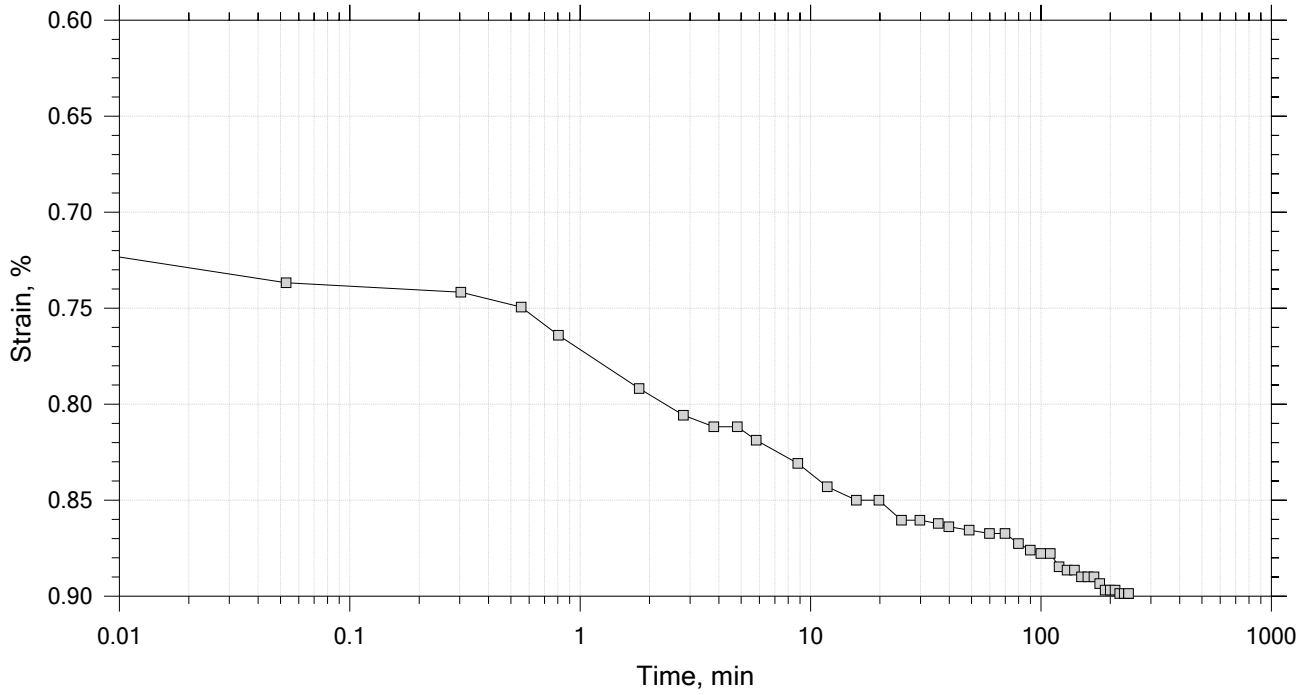
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

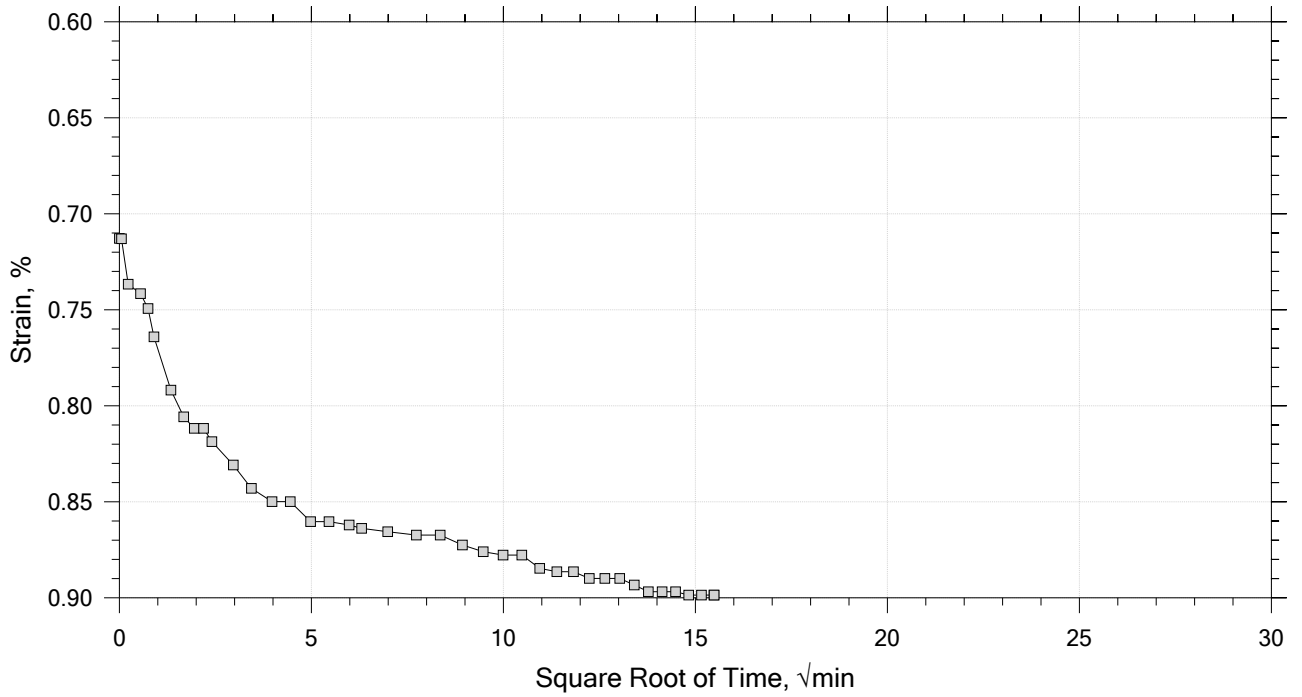
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

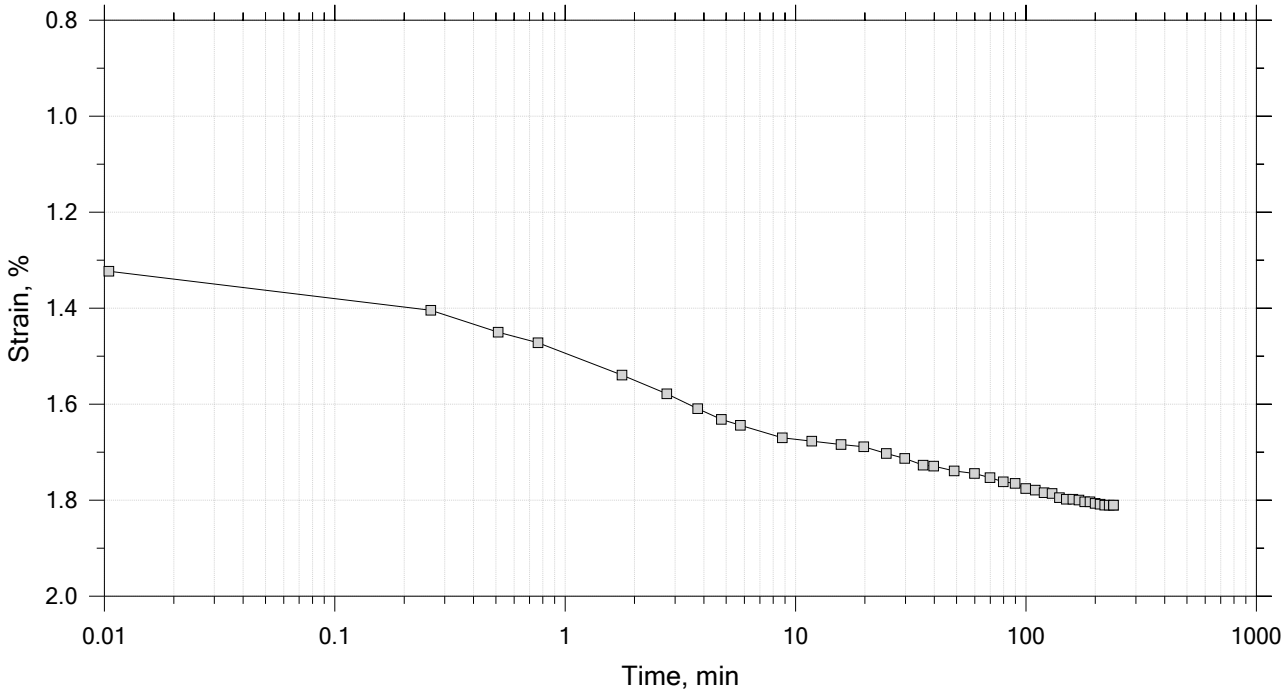


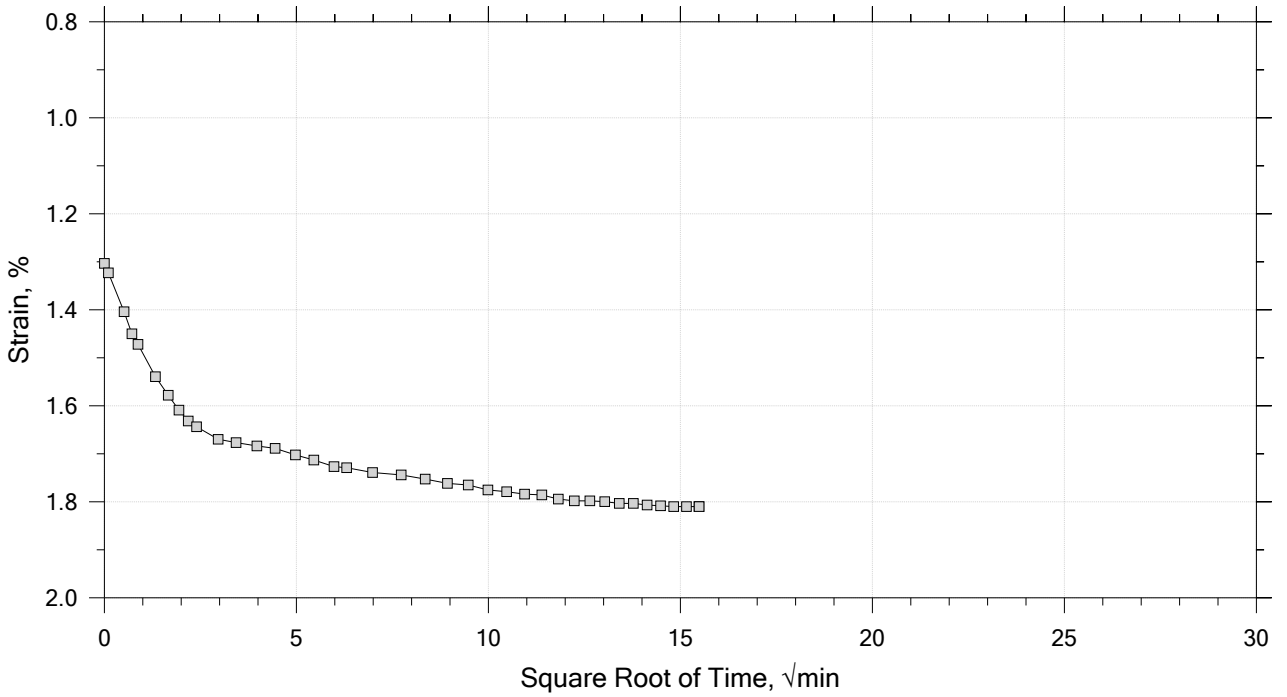


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

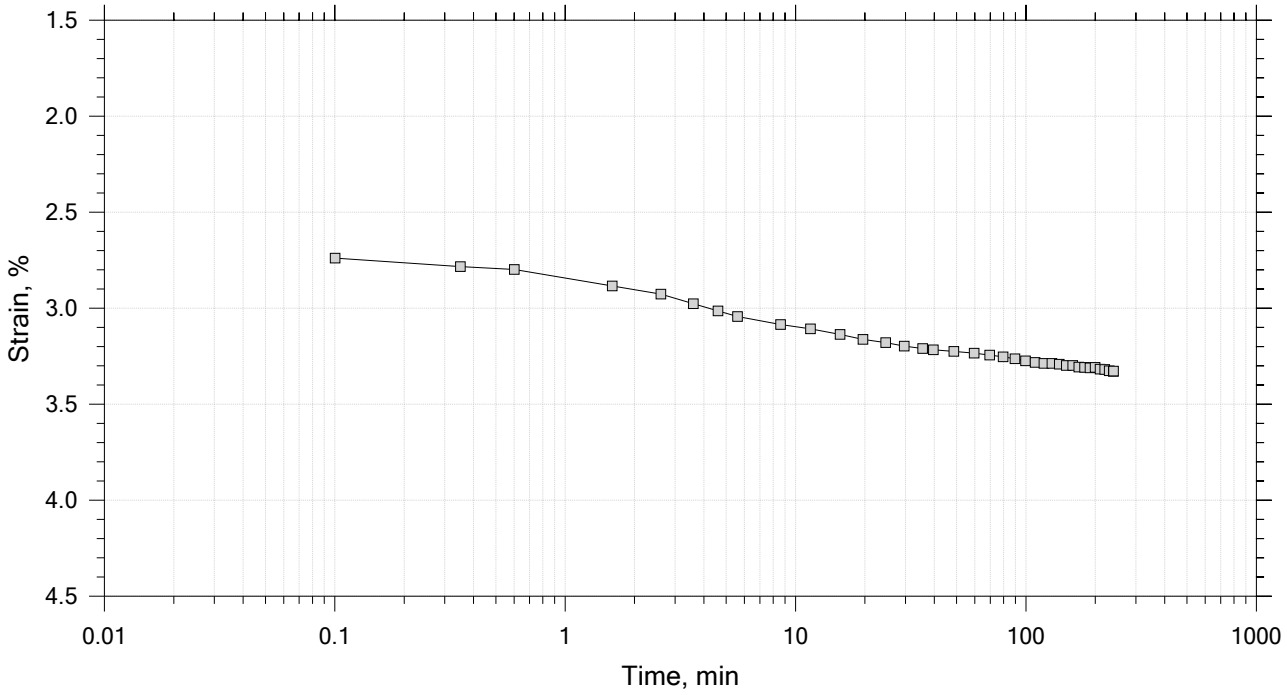


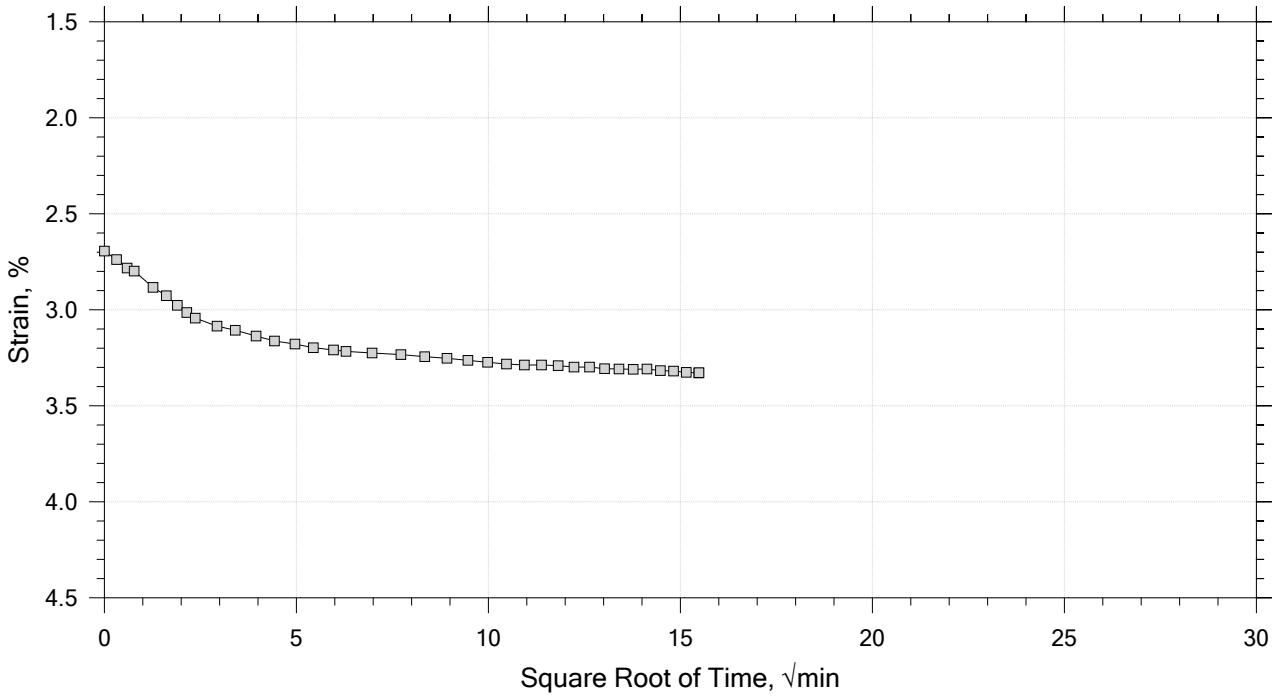


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-205	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





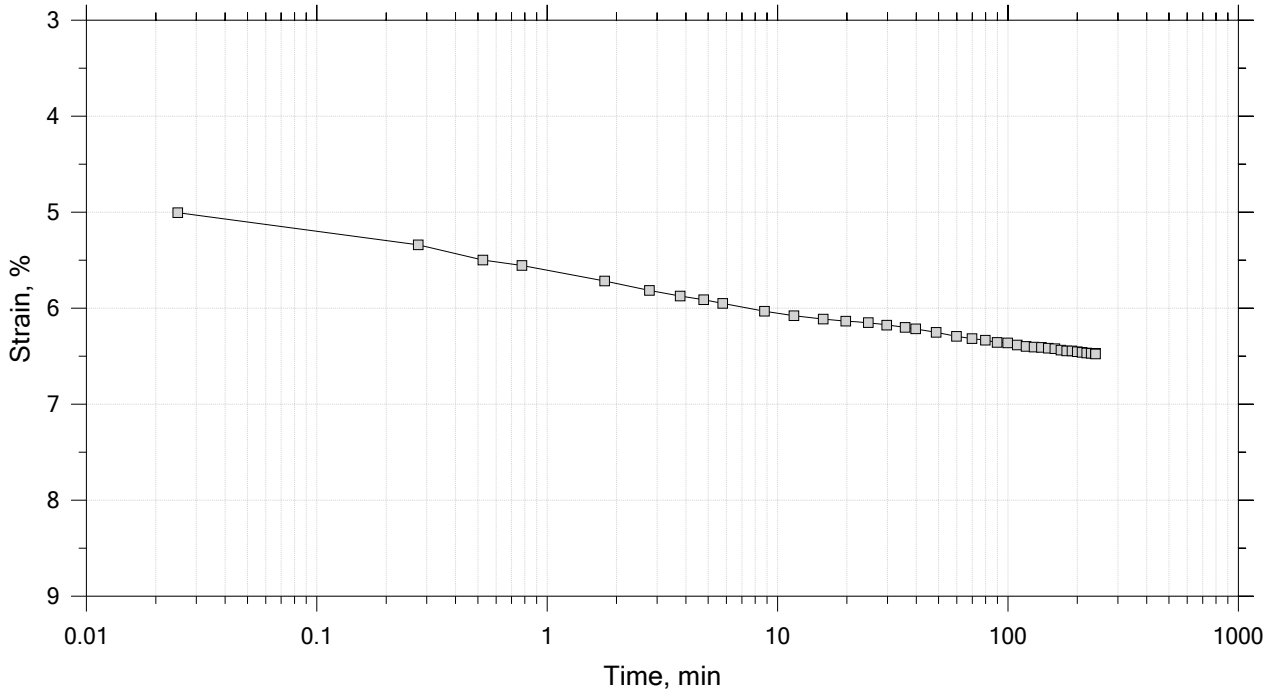
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-205	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

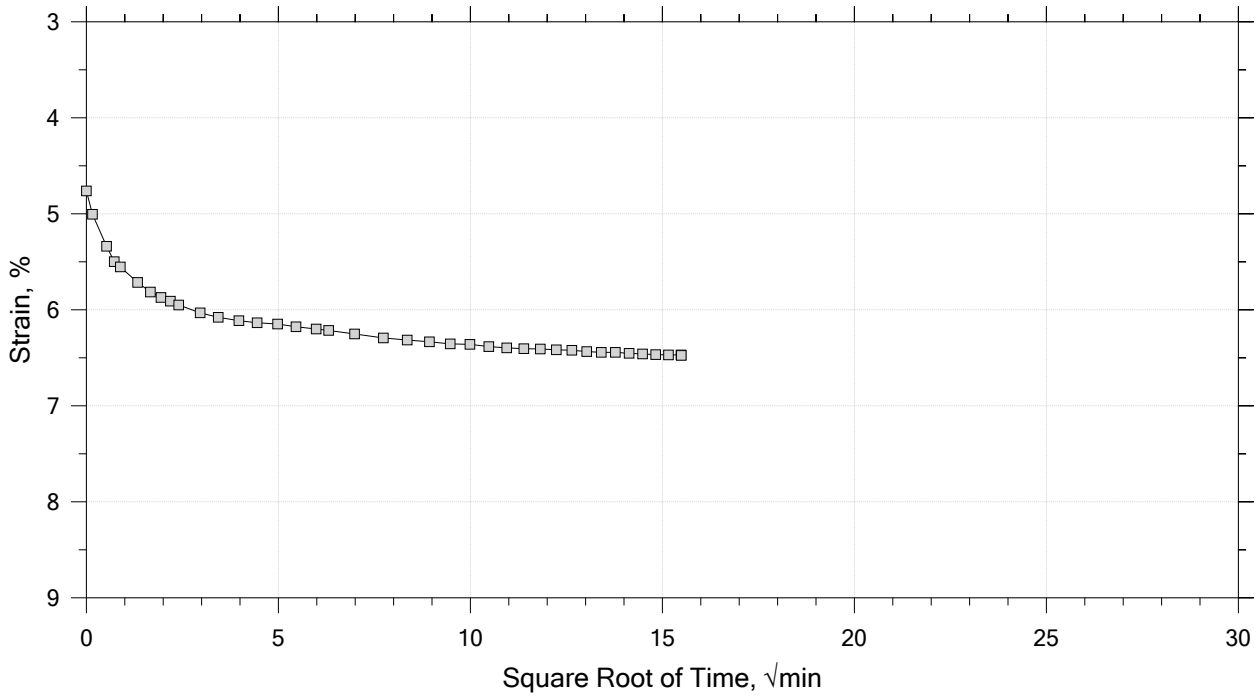
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





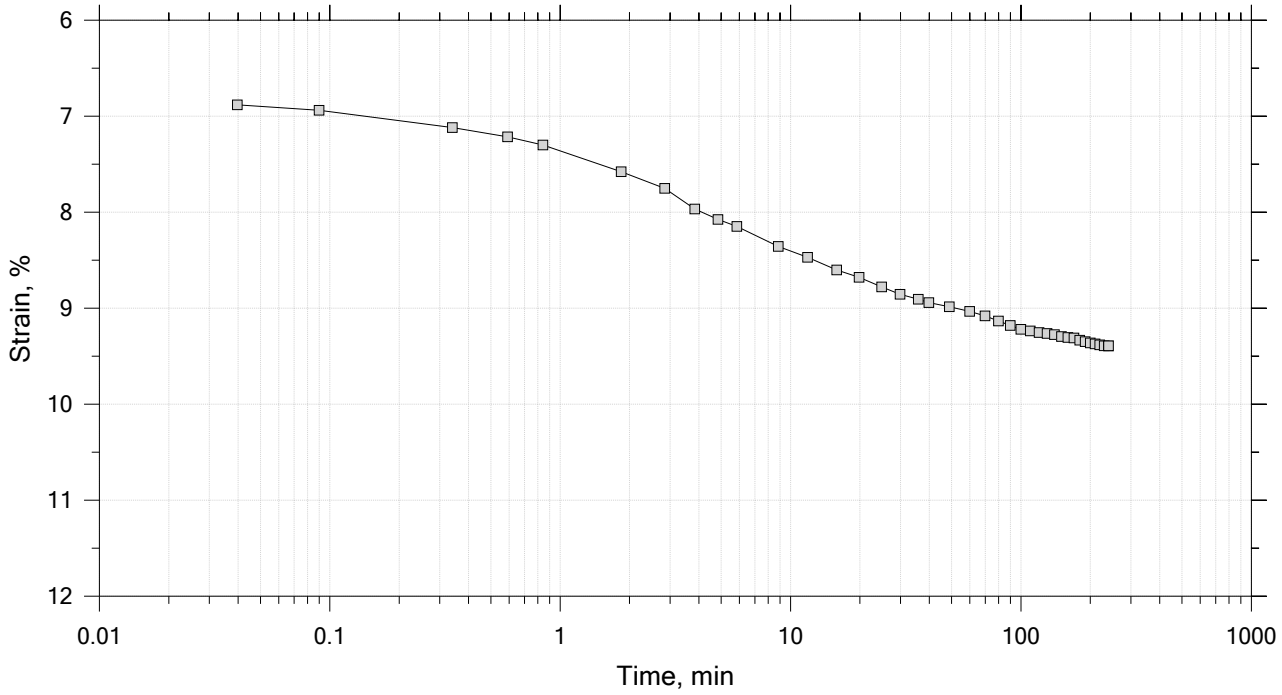
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

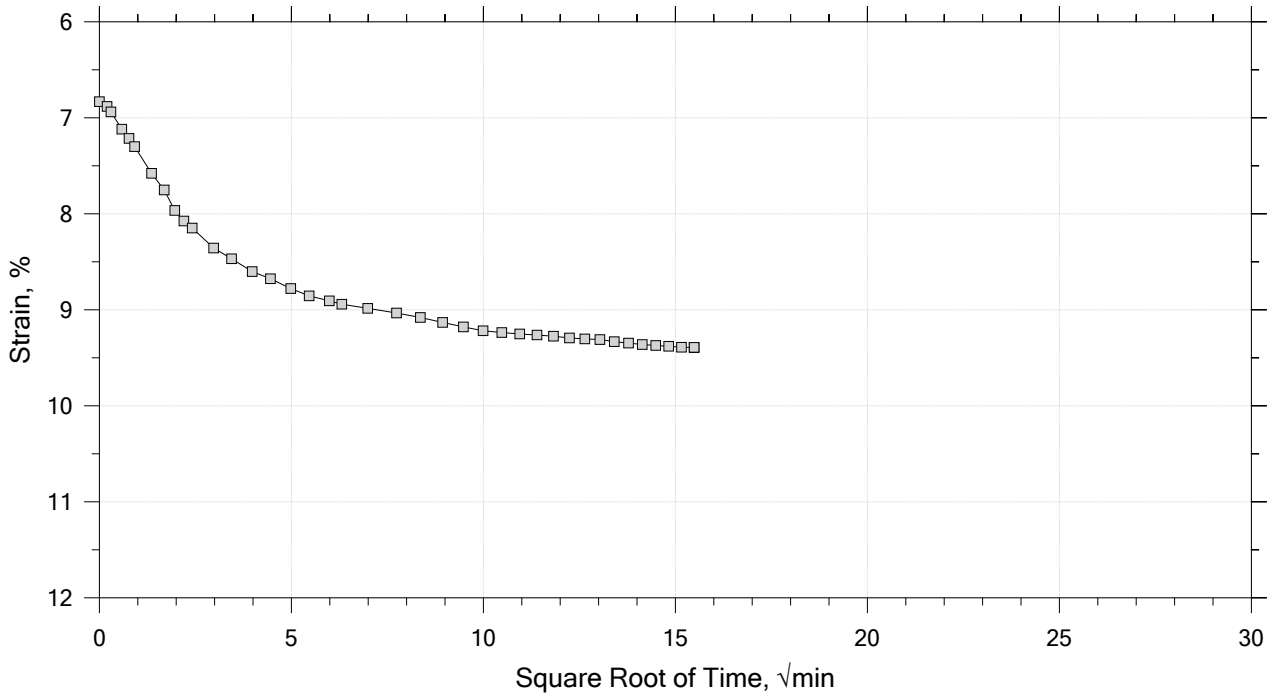
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





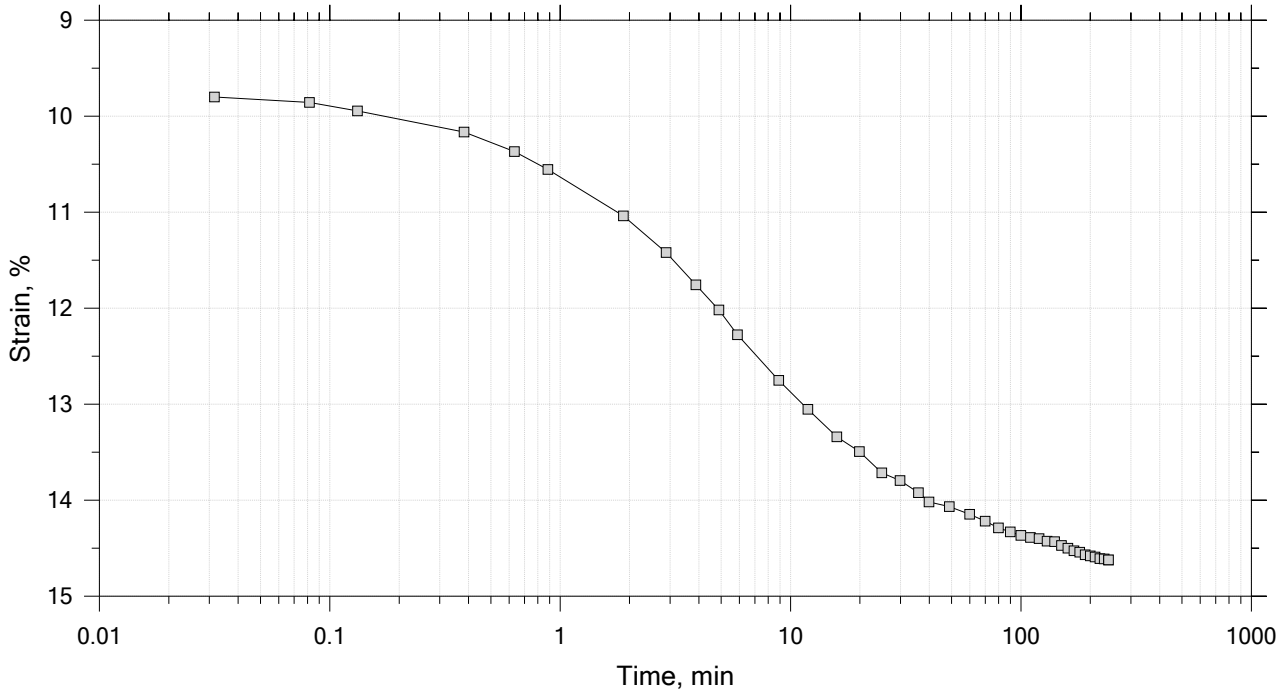
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

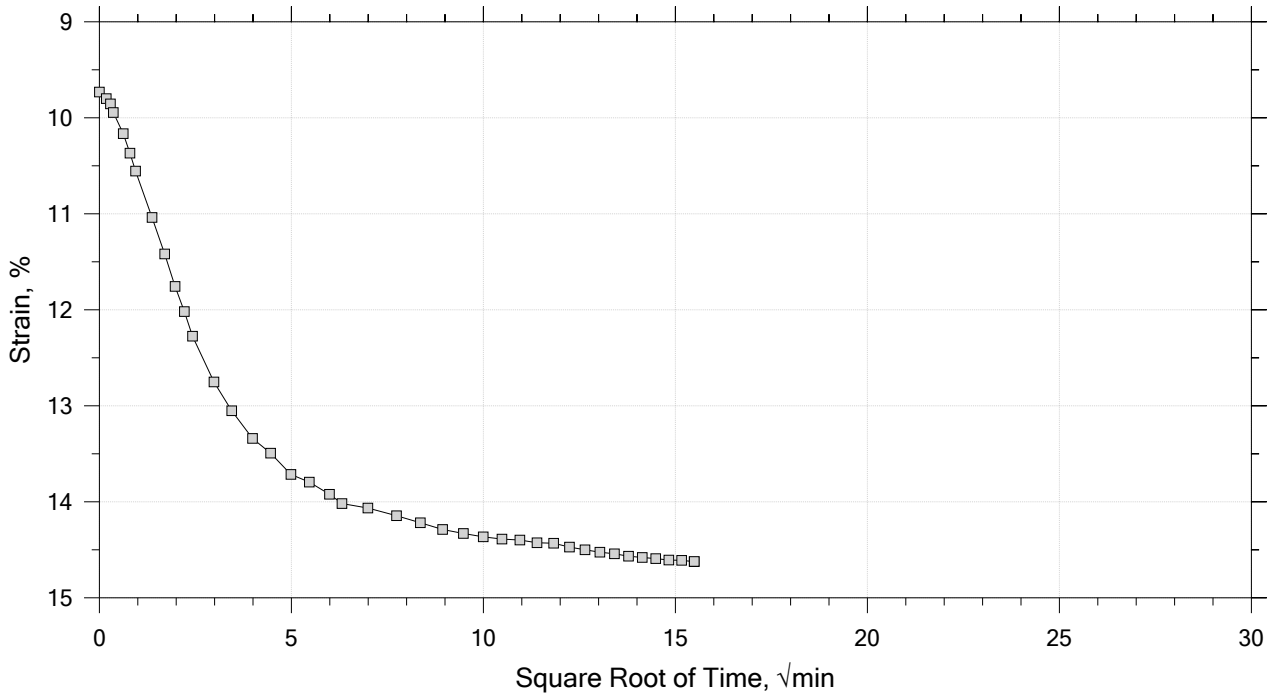
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





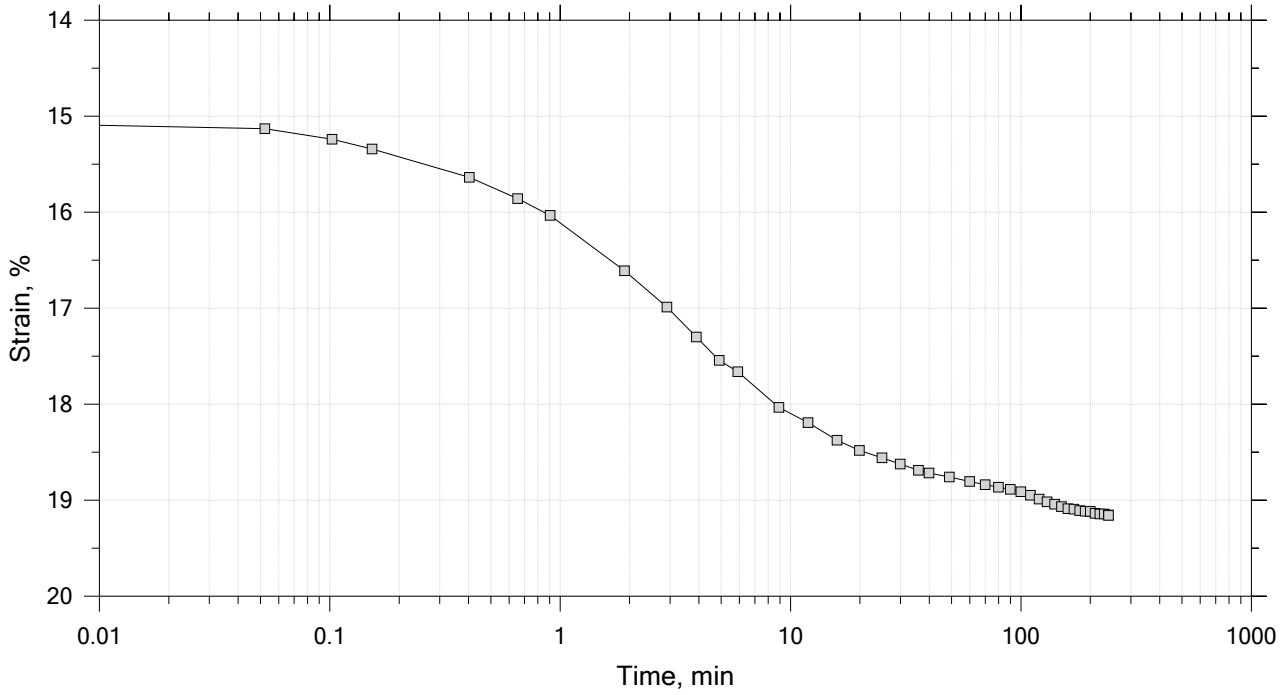
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

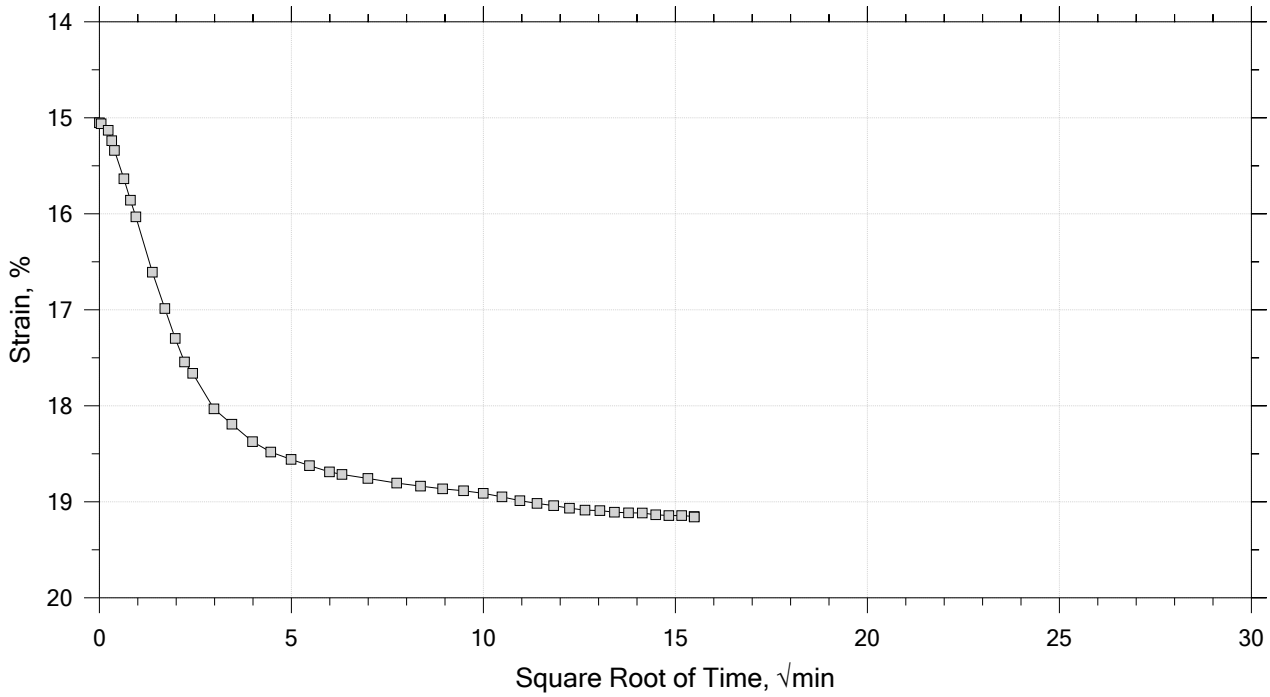
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





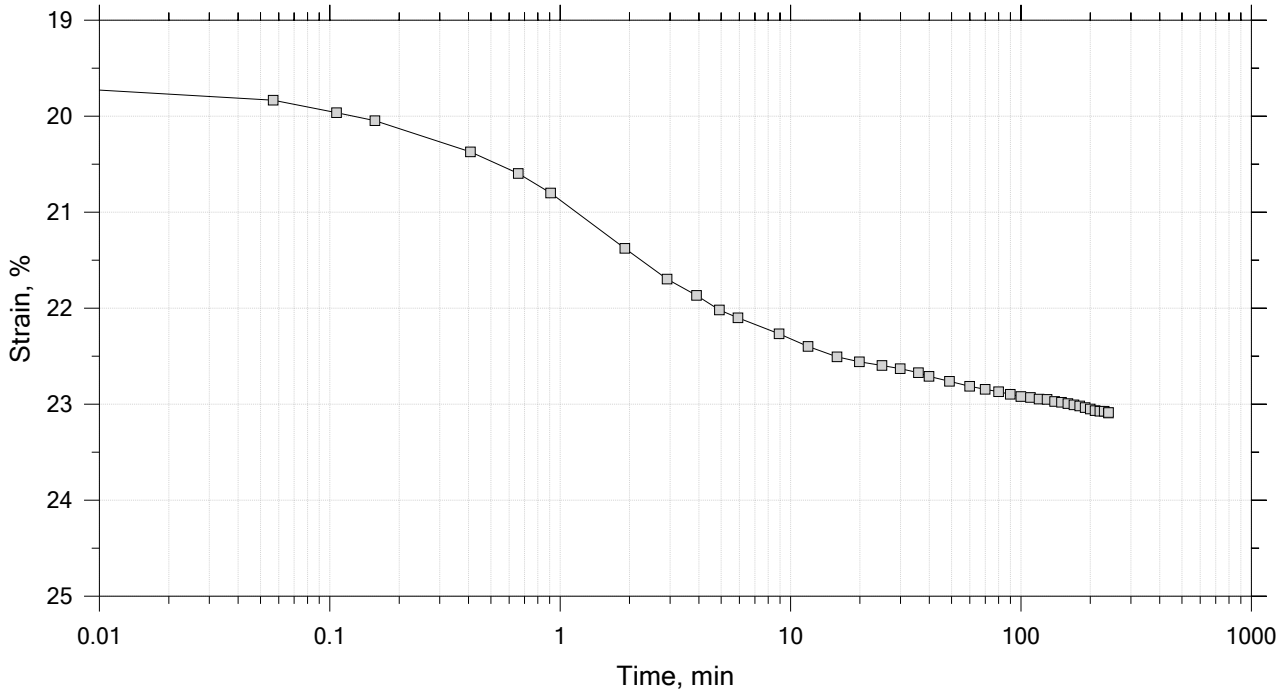
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

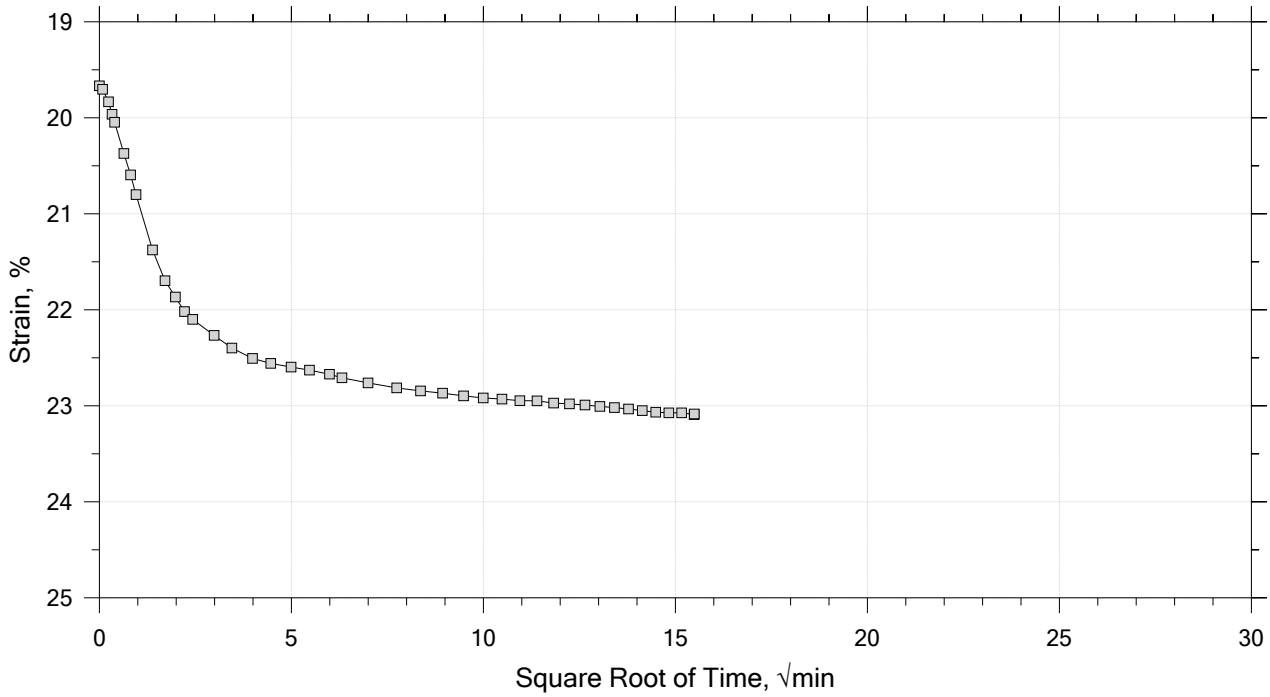
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

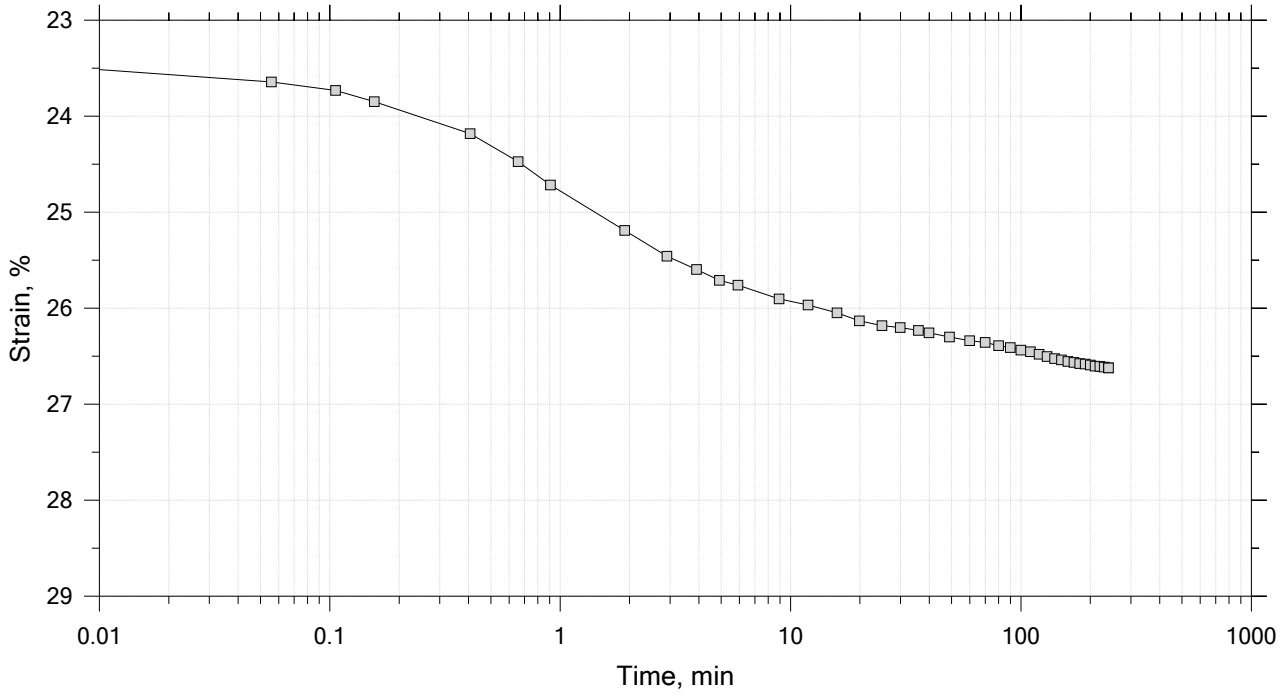


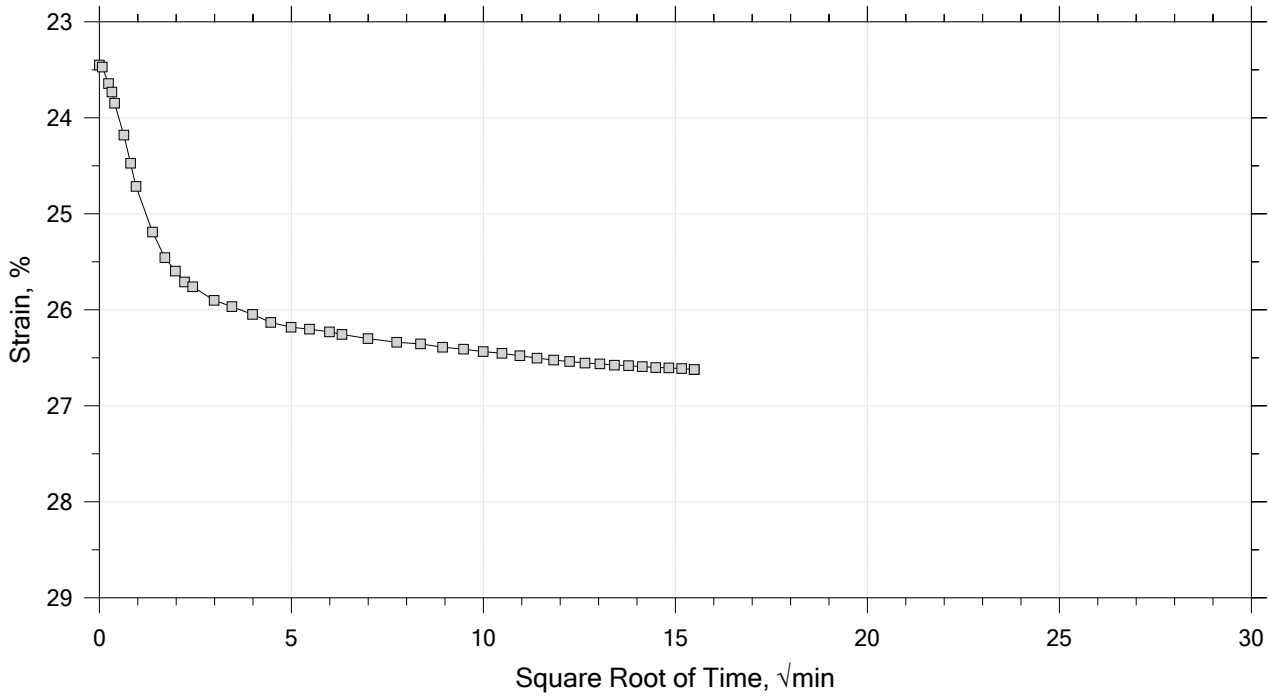


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

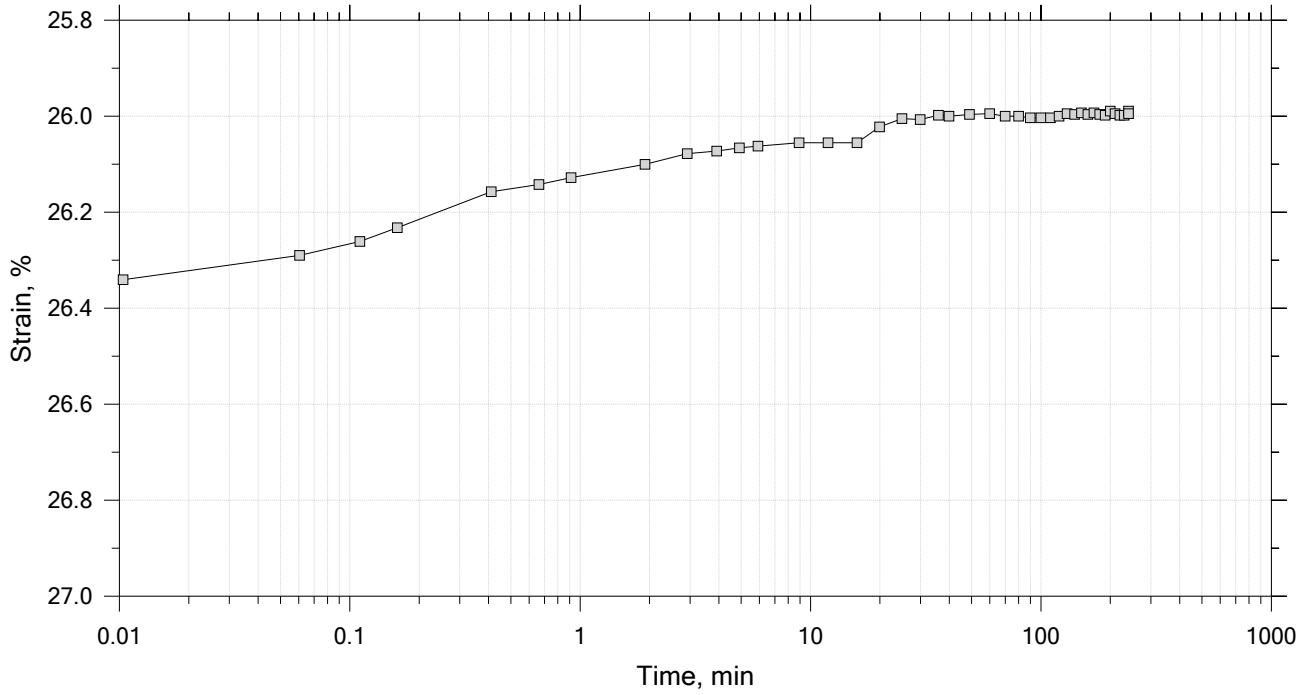


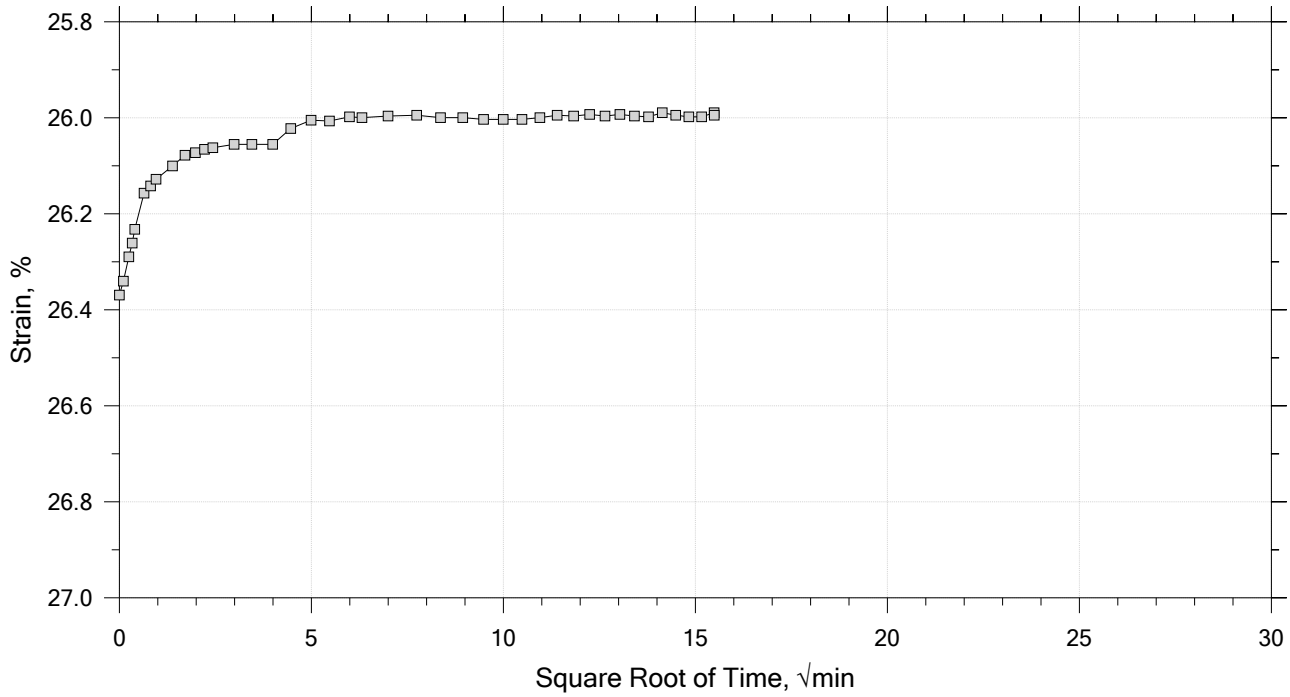


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf

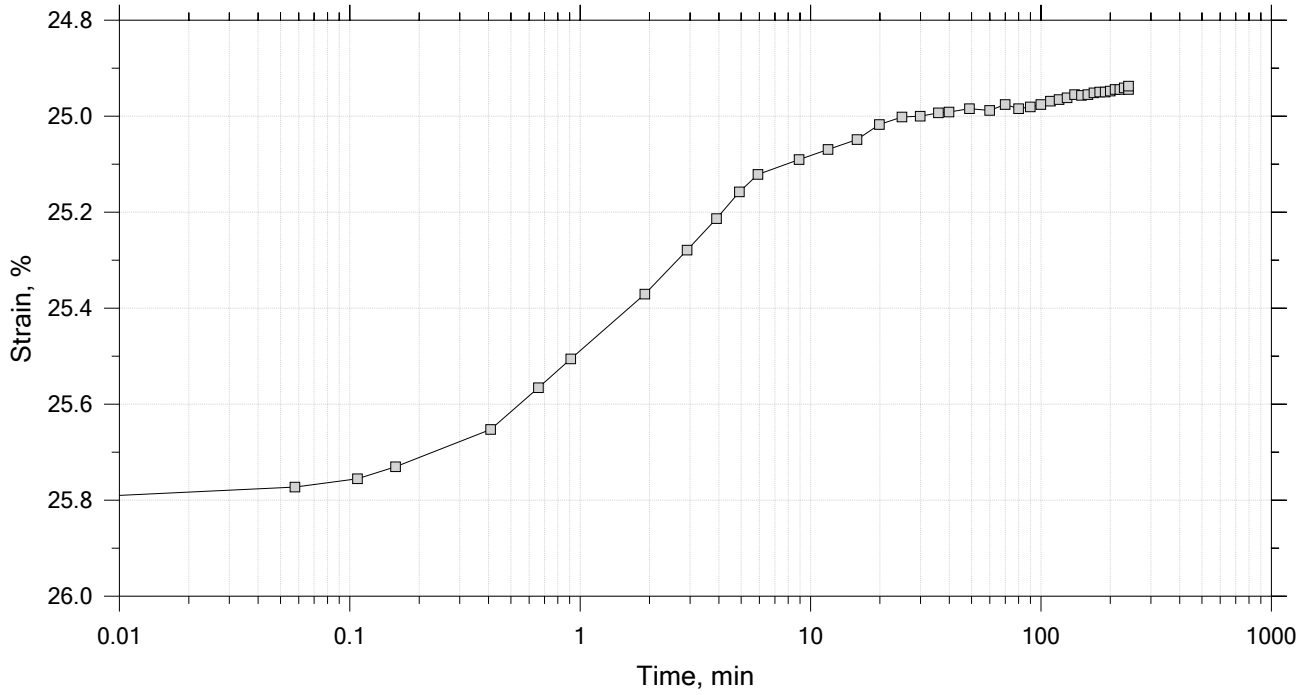


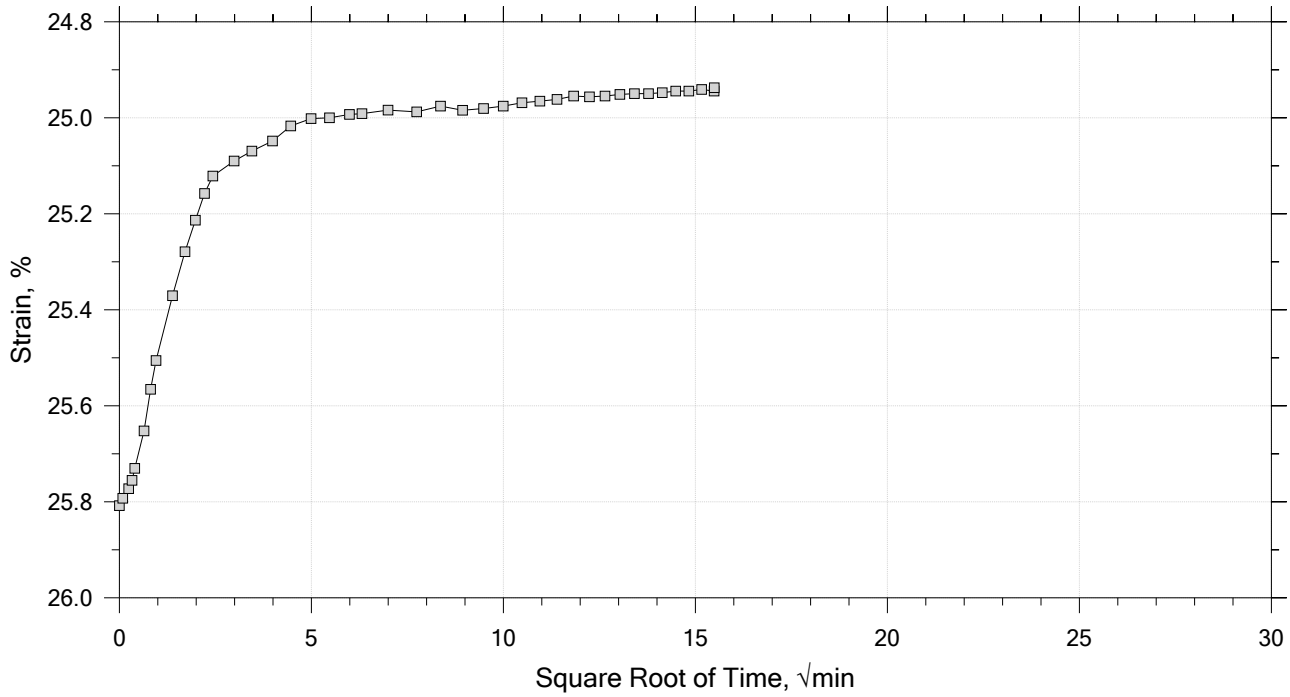


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

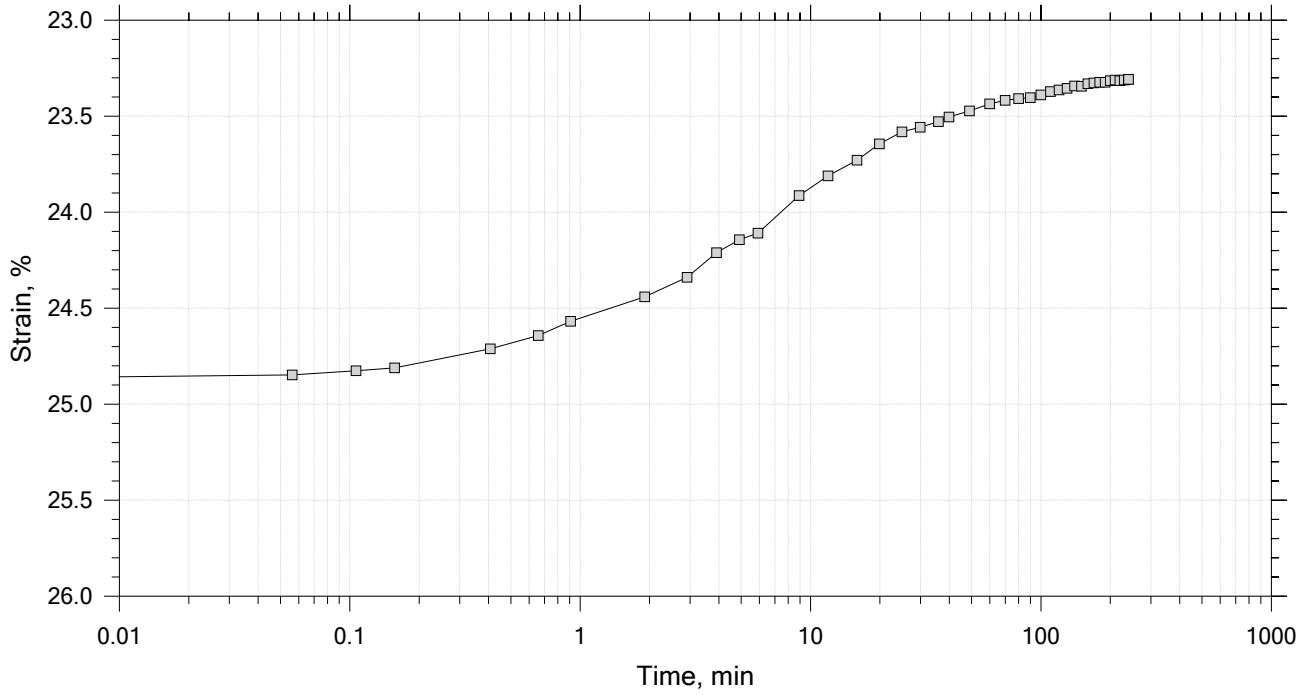


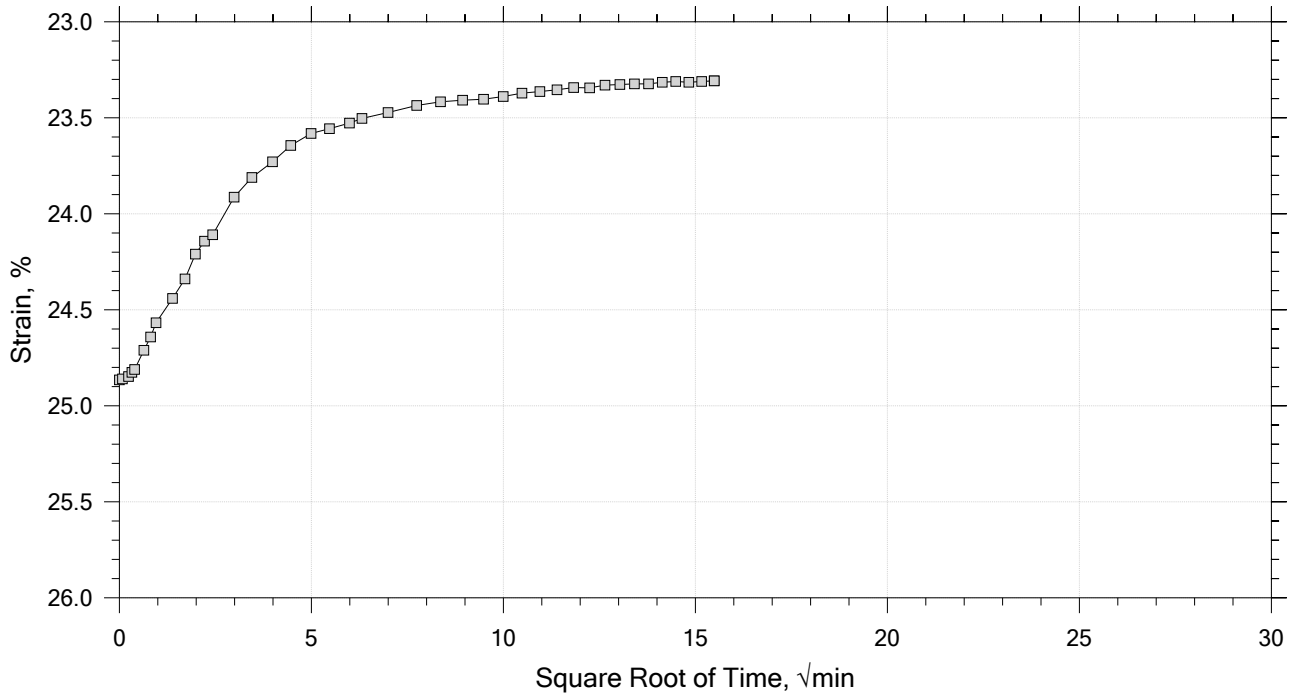


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-205	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

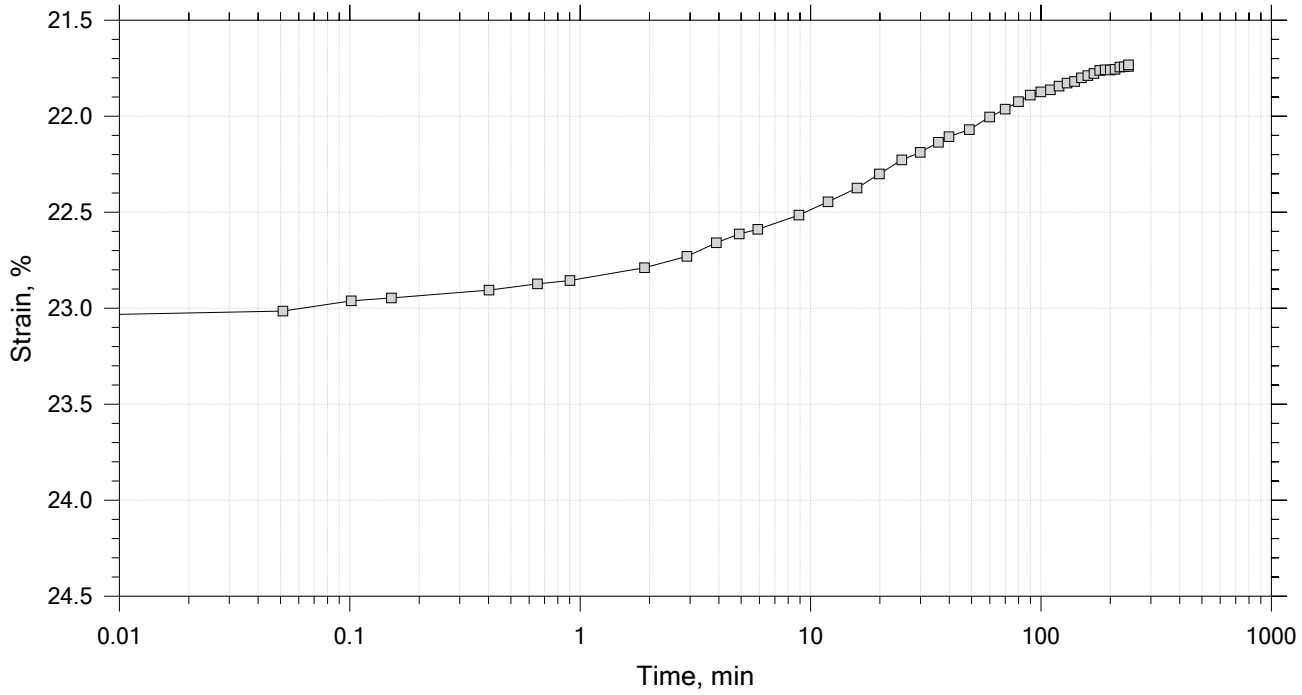


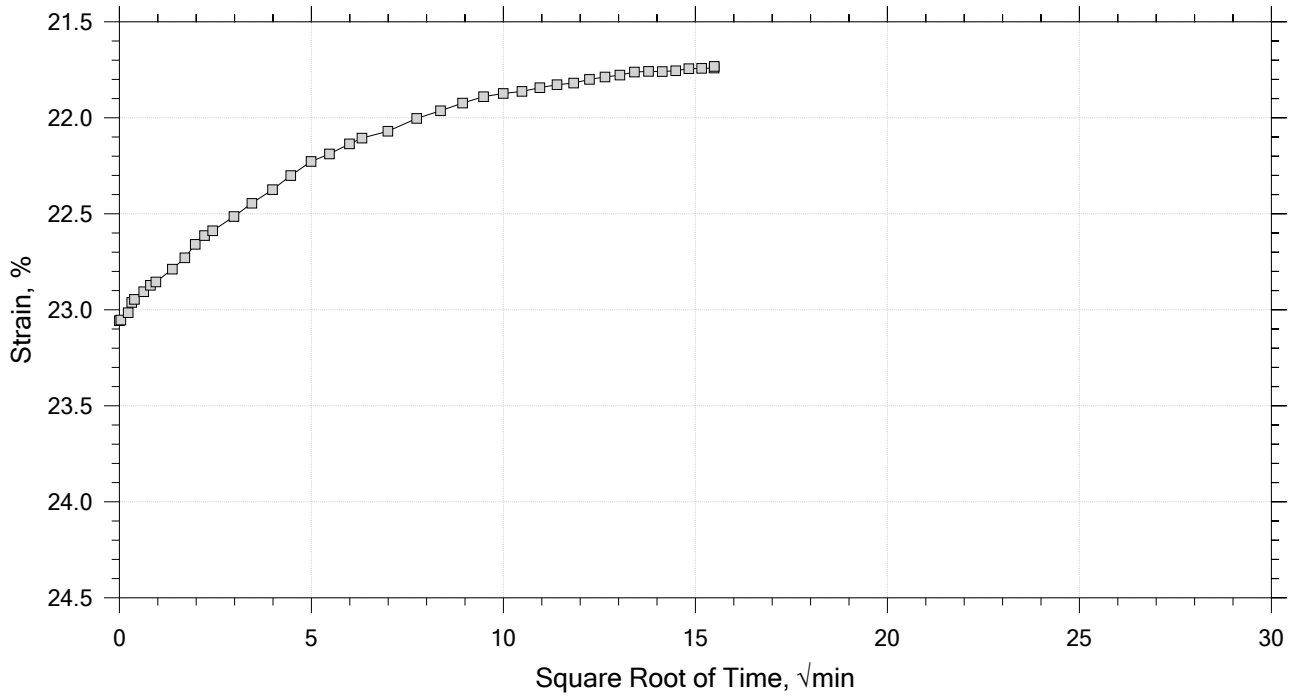


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-205	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

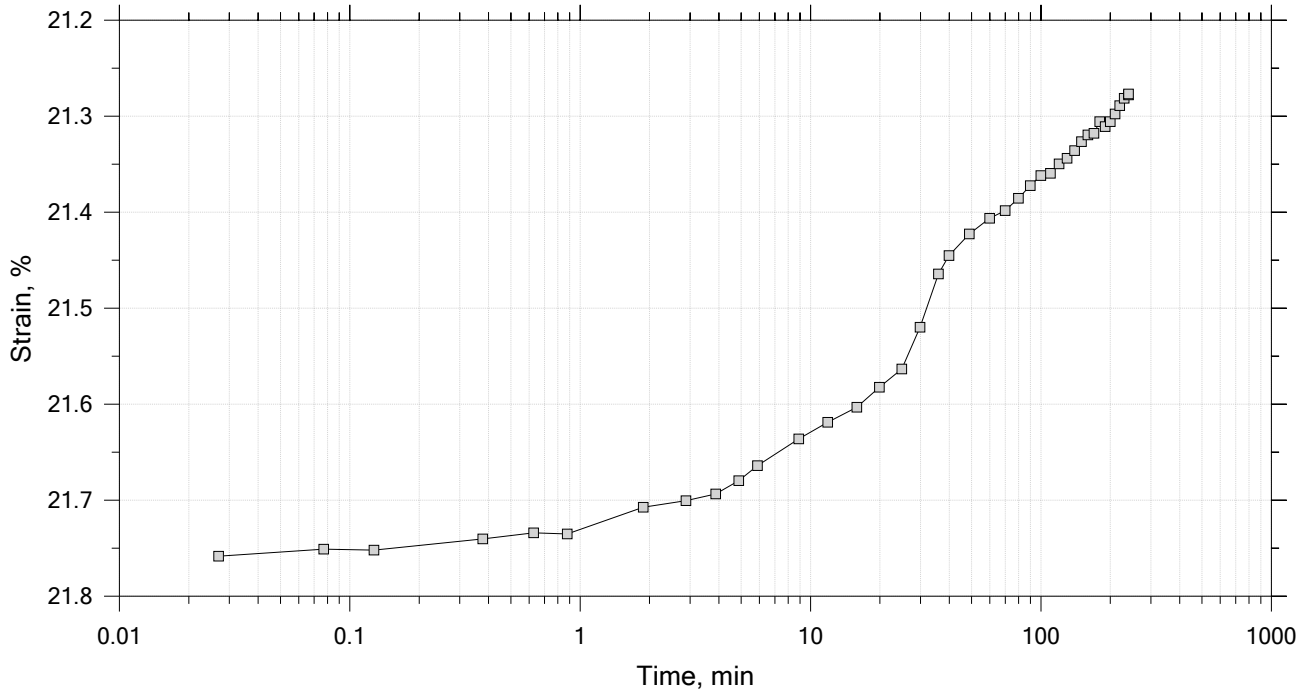


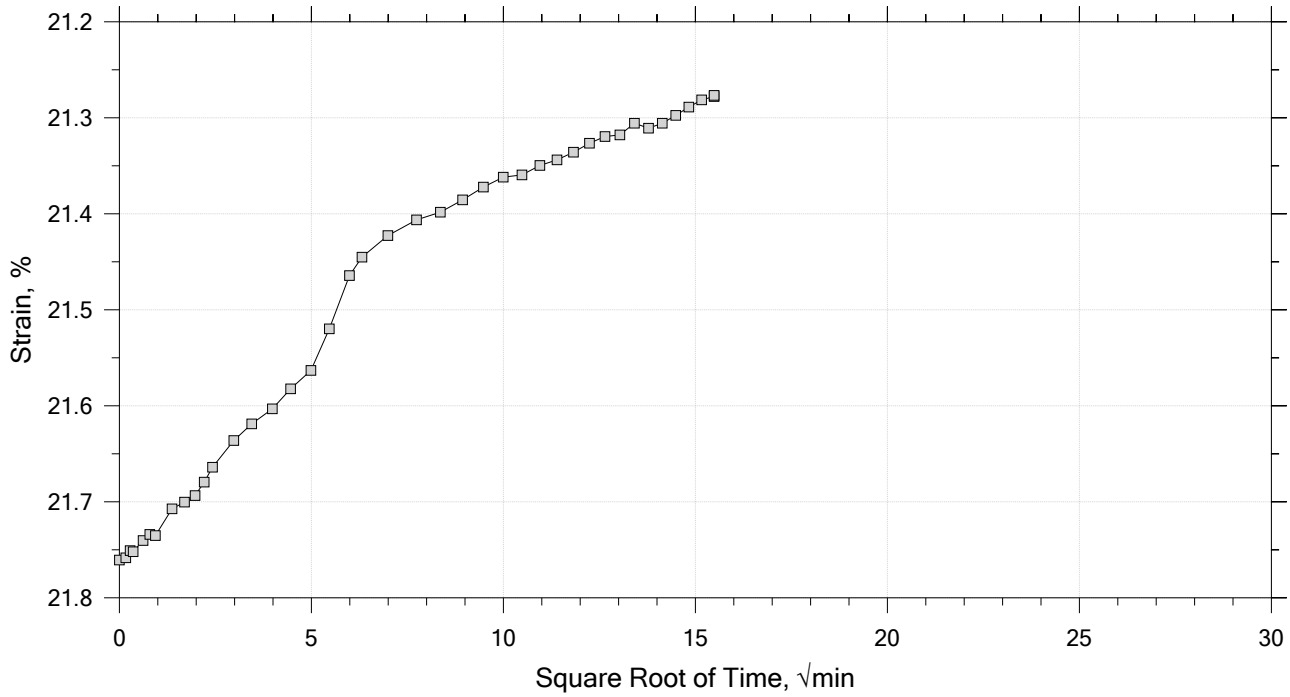


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-205	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
Test No.: IP-6	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.75	Liquid Limit: 30
Initial Height: 1.00 in	Initial Void Ratio: 0.843	Plastic Limit: 17
Final Height: 0.79 in	Final Void Ratio: 0.456	Plasticity Index: 13

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E0506	RING		D570
Mass Container, gm	8.18	112.3	112.3	8.77
Mass Container + Wet Soil, gm	69.06	268.3	252	150.63
Mass Container + Dry Soil, gm	54.65	232.09	232.09	130.41
Mass Dry Soil, gm	46.47	119.79	119.79	121.64
Water Content, %	31.01	30.23	16.62	16.62
Void Ratio	---	0.84	0.46	---
Degree of Saturation, %	---	98.39	100.00	---
Dry Unit Weight, pcf	---	92.965	117.68	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

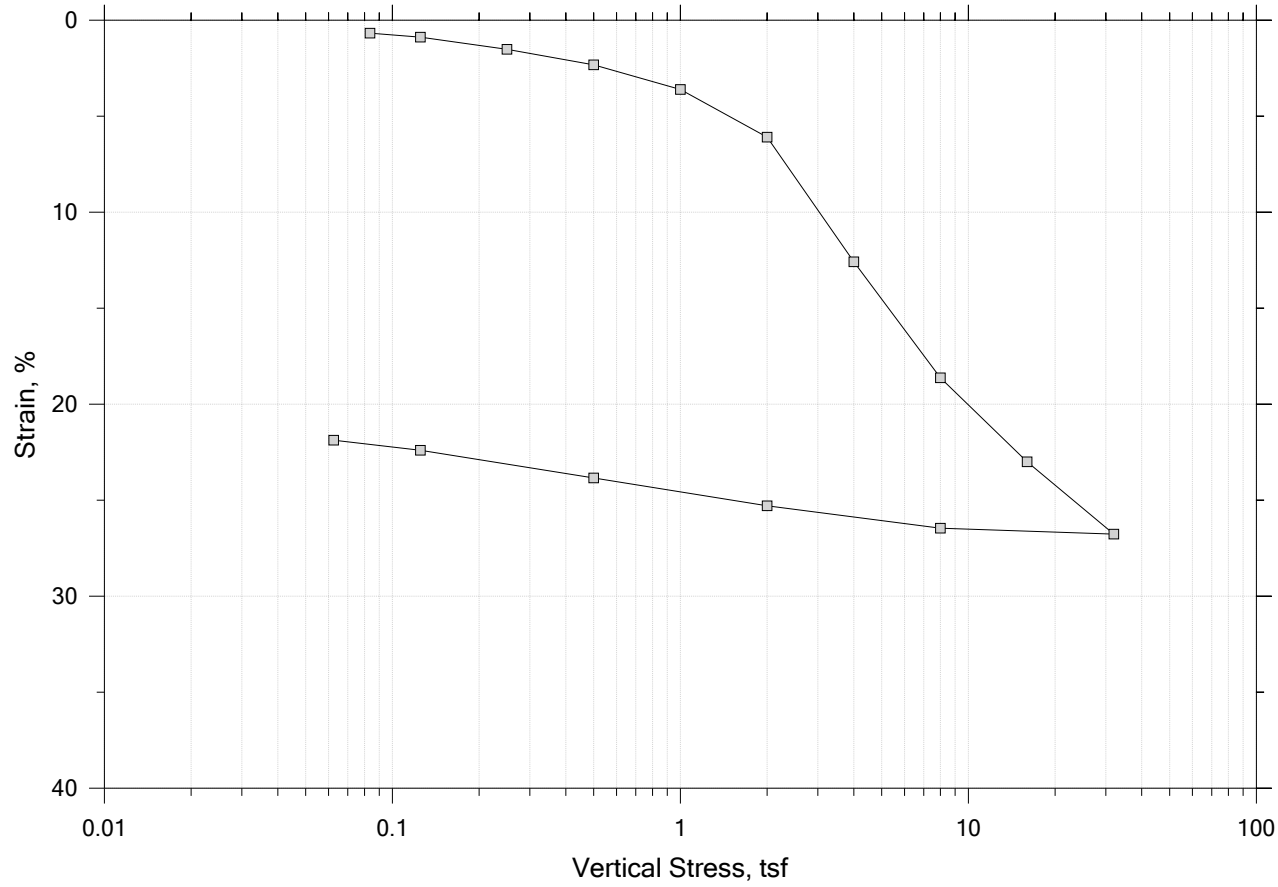
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0759	0.006477	0.832	0.648	160.690	2.18e-05	8.53e-02	3.49e-05
2	0.125	0.008986	0.827	0.899	11.811	2.95e-04	5.11e-02	2.82e-04
3	0.250	0.01810	0.810	1.81	8.225	4.18e-04	7.29e-02	5.71e-04
4	0.500	0.03328	0.782	3.33	18.123	1.85e-04	6.07e-02	2.10e-04
5	1.00	0.06476	0.724	6.48	9.401	3.40e-04	6.30e-02	4.01e-04
6	2.00	0.09391	0.670	9.39	19.464	1.54e-04	2.92e-02	8.40e-05
7	4.00	0.1462	0.574	14.6	21.821	1.25e-04	2.62e-02	6.14e-05
8	8.00	0.1916	0.490	19.2	11.296	2.16e-04	1.13e-02	4.59e-05
9	16.0	0.2309	0.418	23.1	7.289	3.02e-04	4.91e-03	2.77e-05
10	32.0	0.2662	0.353	26.6	5.791	3.45e-04	2.21e-03	1.43e-05
11	8.00	0.2599	0.364	26.0	2.983	6.43e-04	2.61e-04	3.15e-06
12	2.00	0.2494	0.384	24.9	9.500	2.07e-04	1.76e-03	6.82e-06
13	0.500	0.2331	0.414	23.3	20.309	1.00e-04	1.09e-02	2.04e-05
14	0.125	0.2173	0.443	21.7	36.140	5.87e-05	4.20e-02	4.62e-05
15	0.0625	0.2128	0.451	21.3	108.205	2.01e-05	7.29e-02	2.75e-05

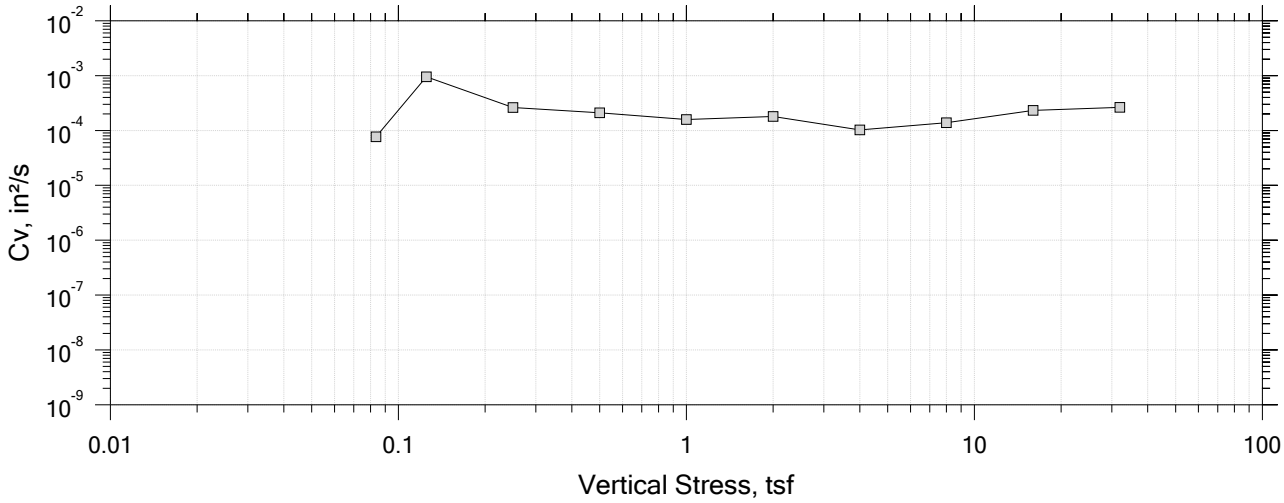
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		
	Displacement at End of Increment		

B-206 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





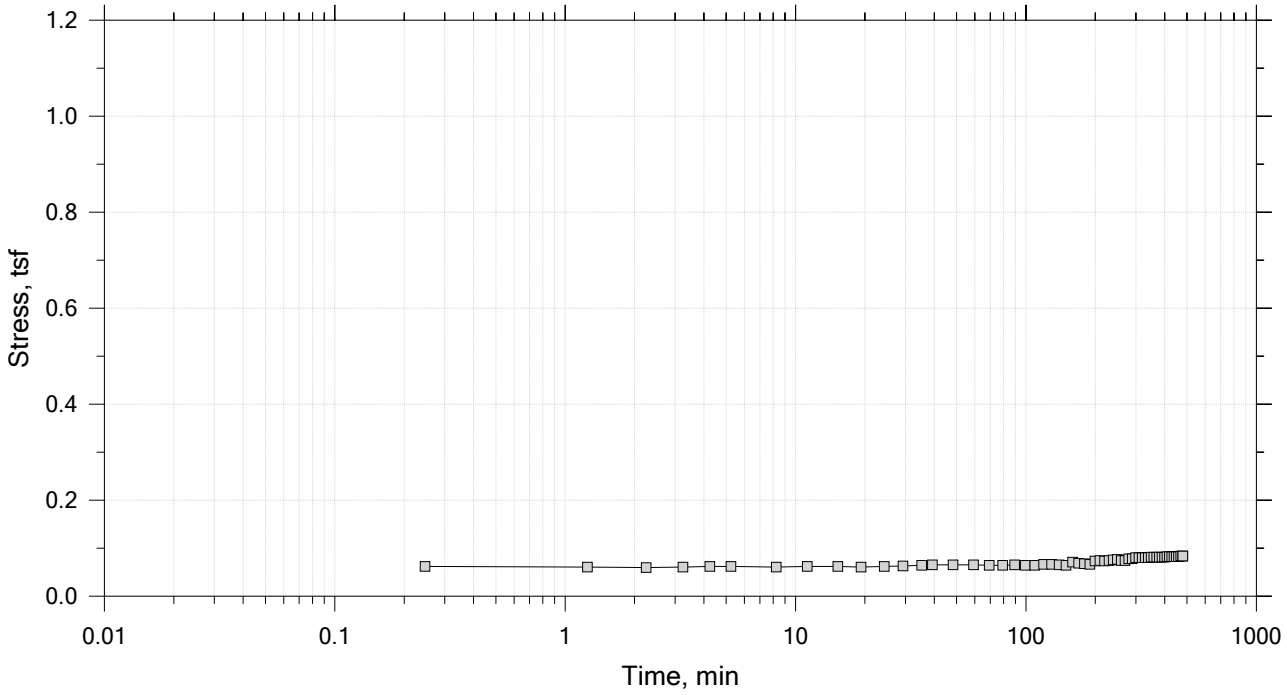
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		
	Displacement at End of Increment		

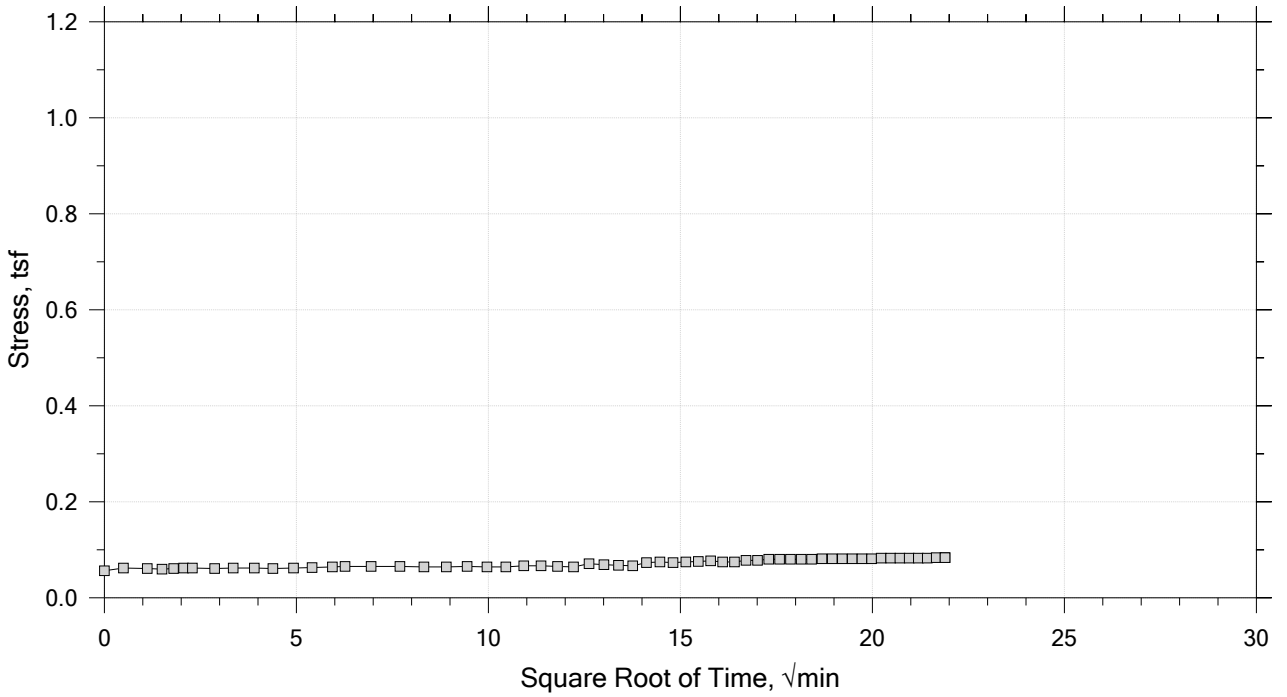
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0836 tsf

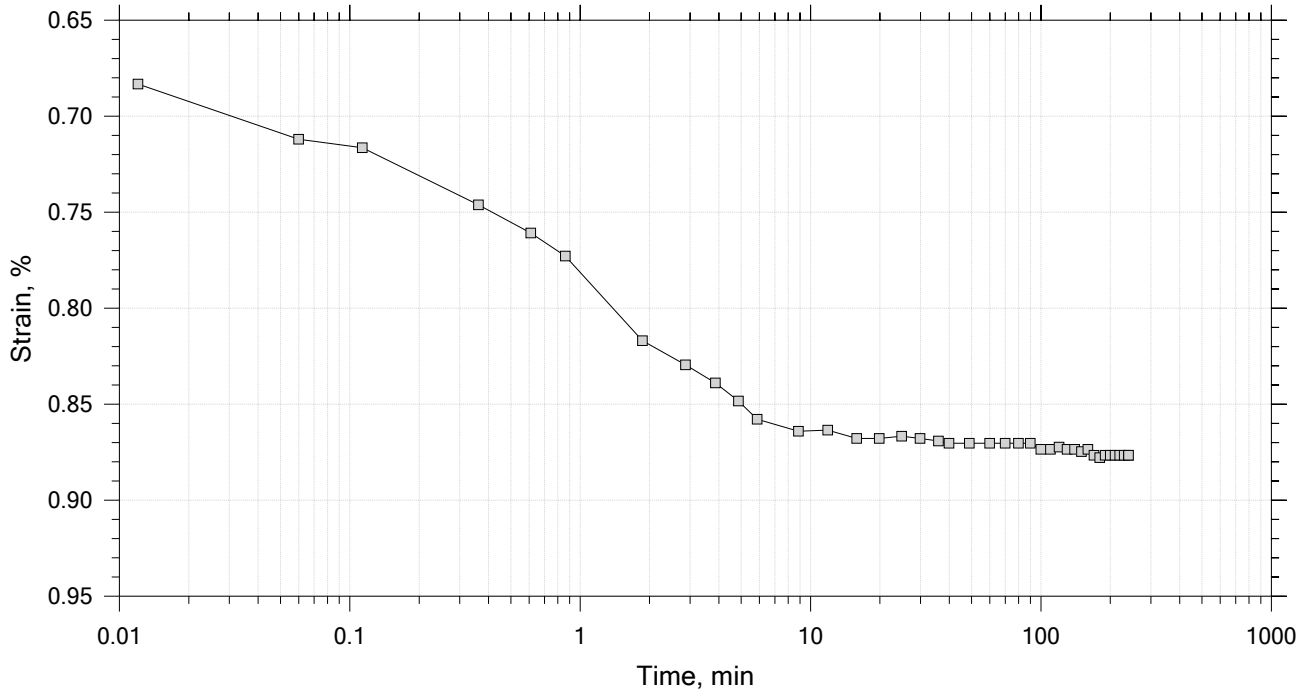


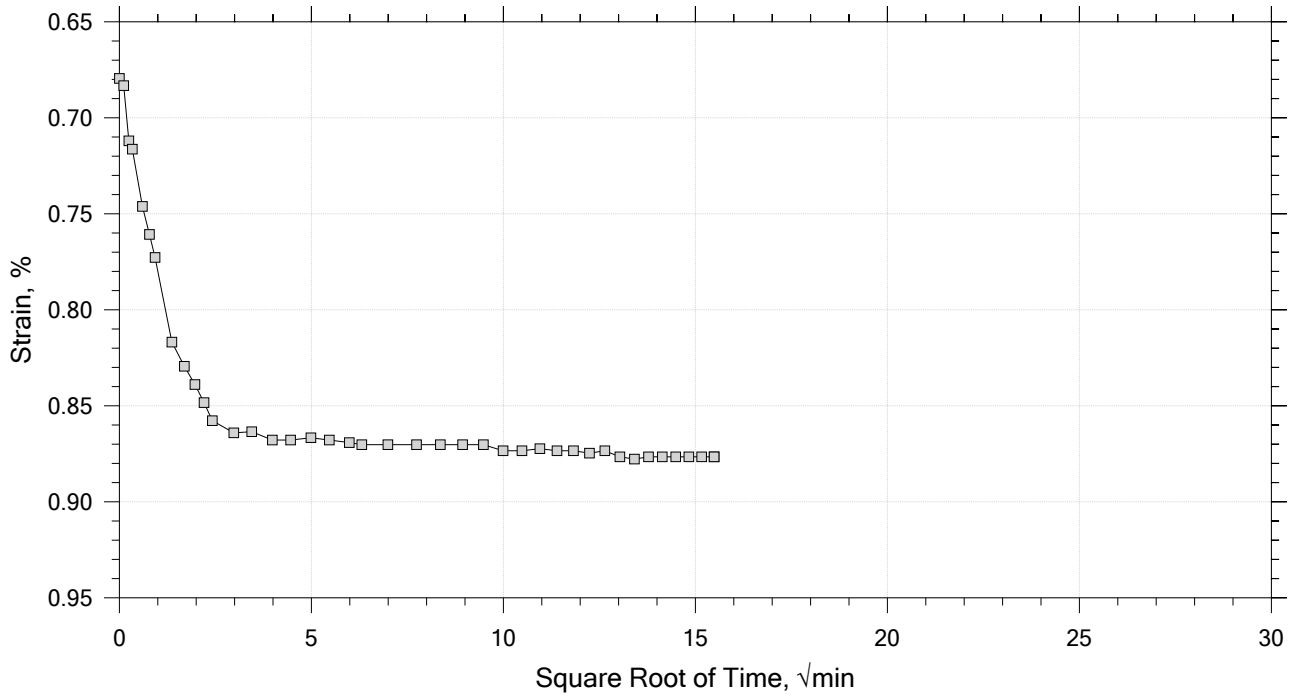


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

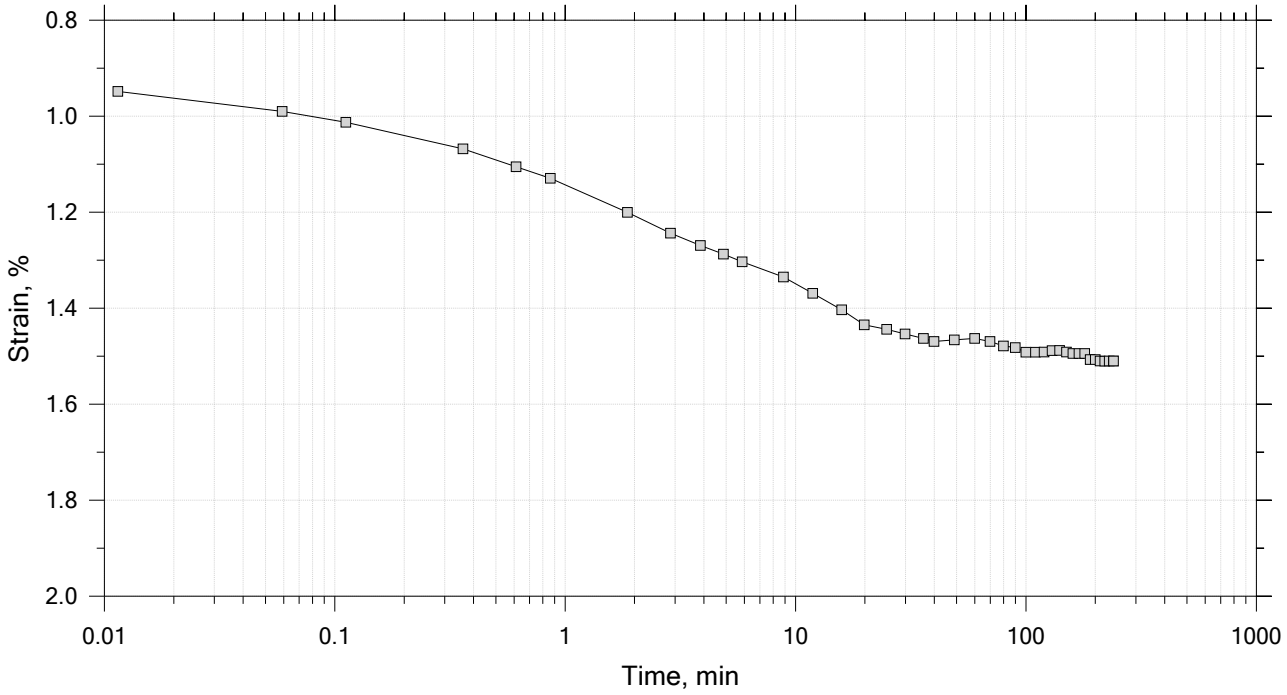


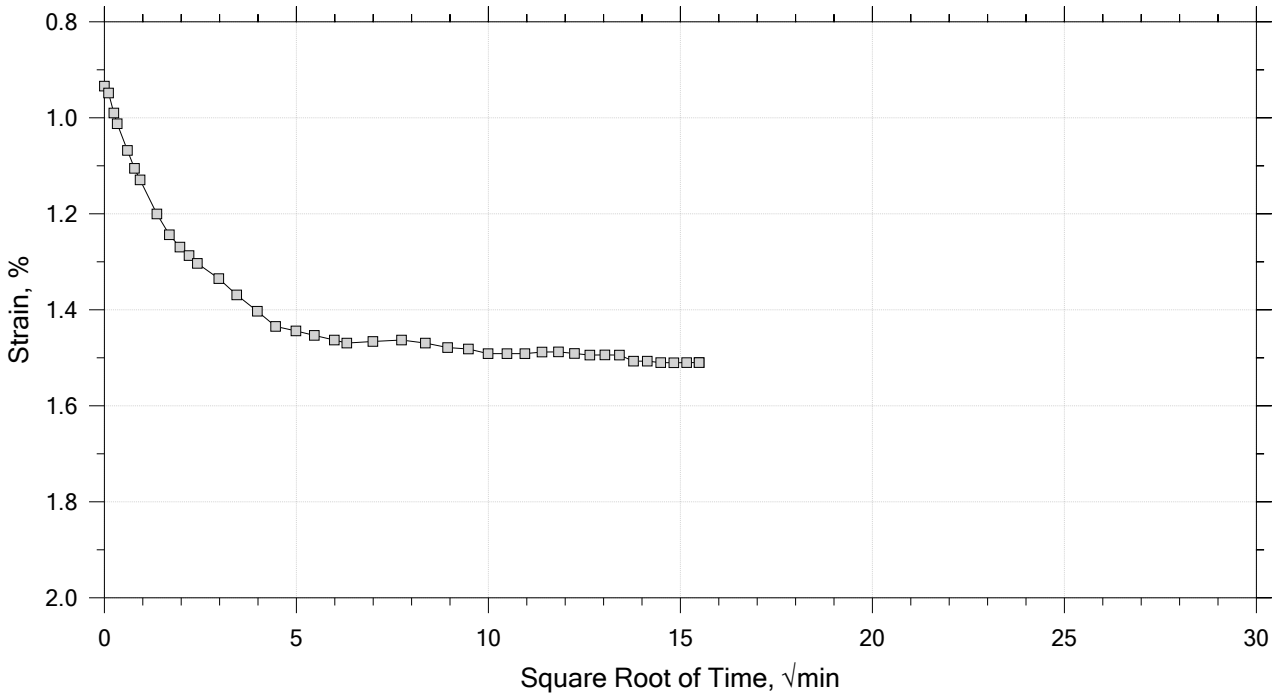


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





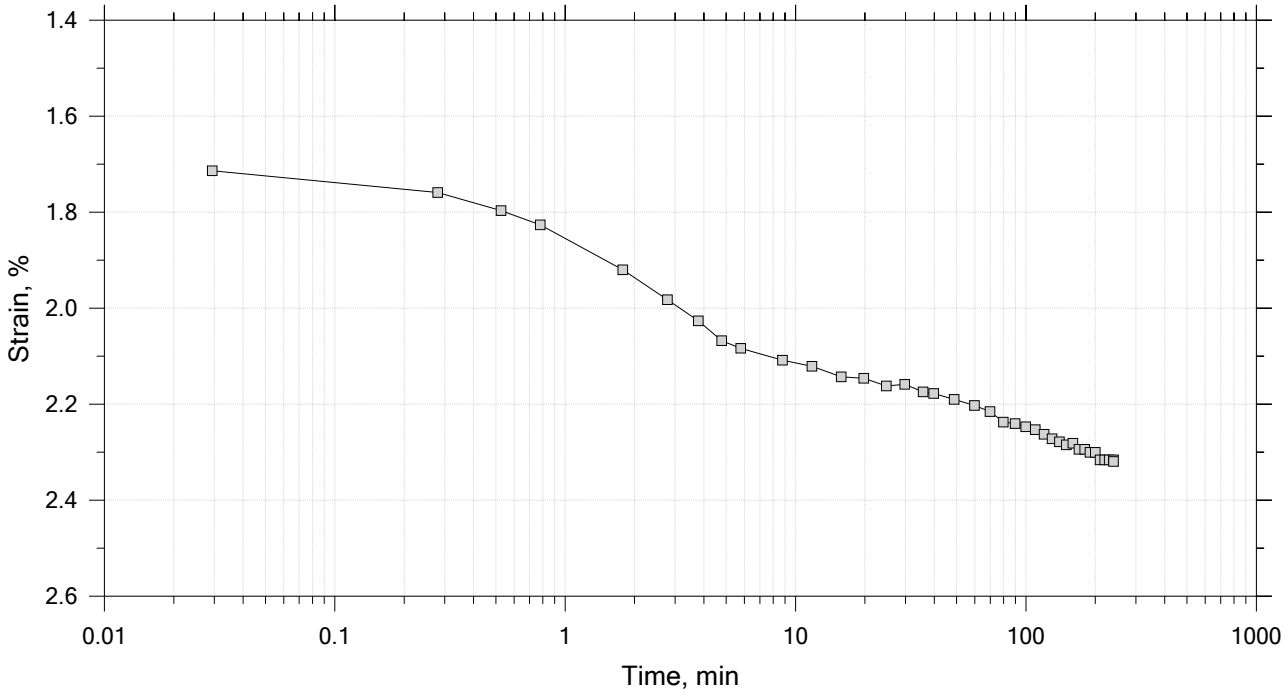
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

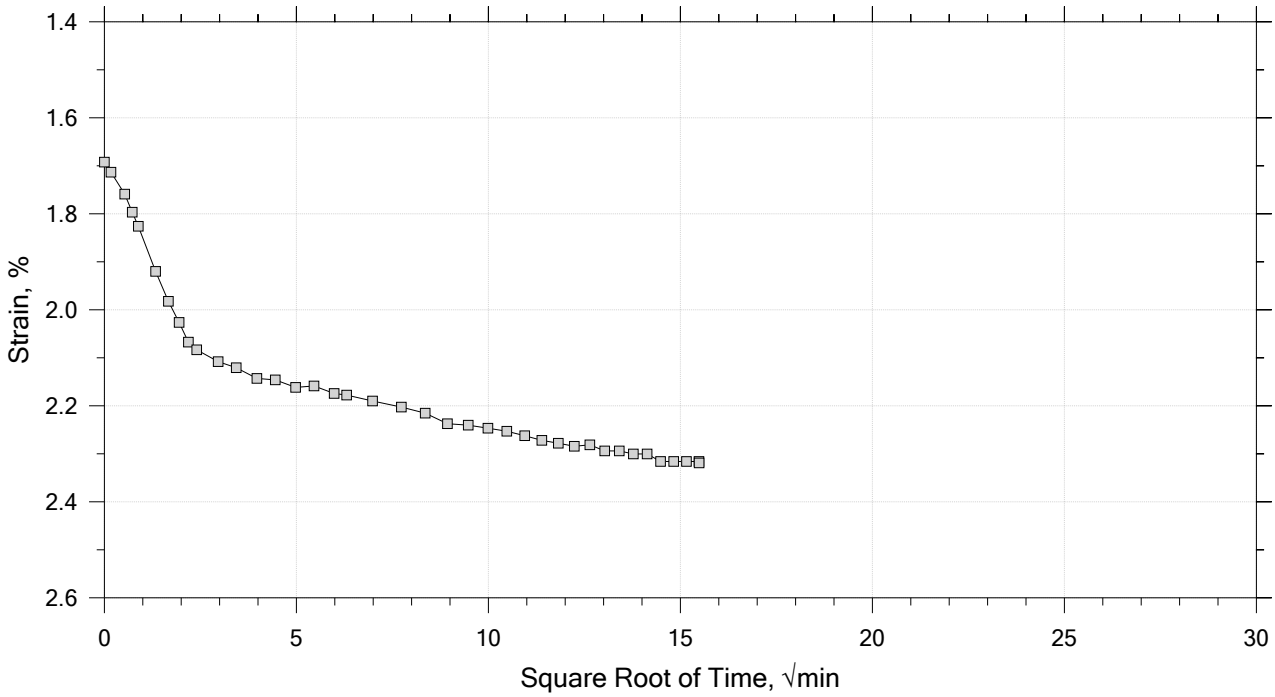
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





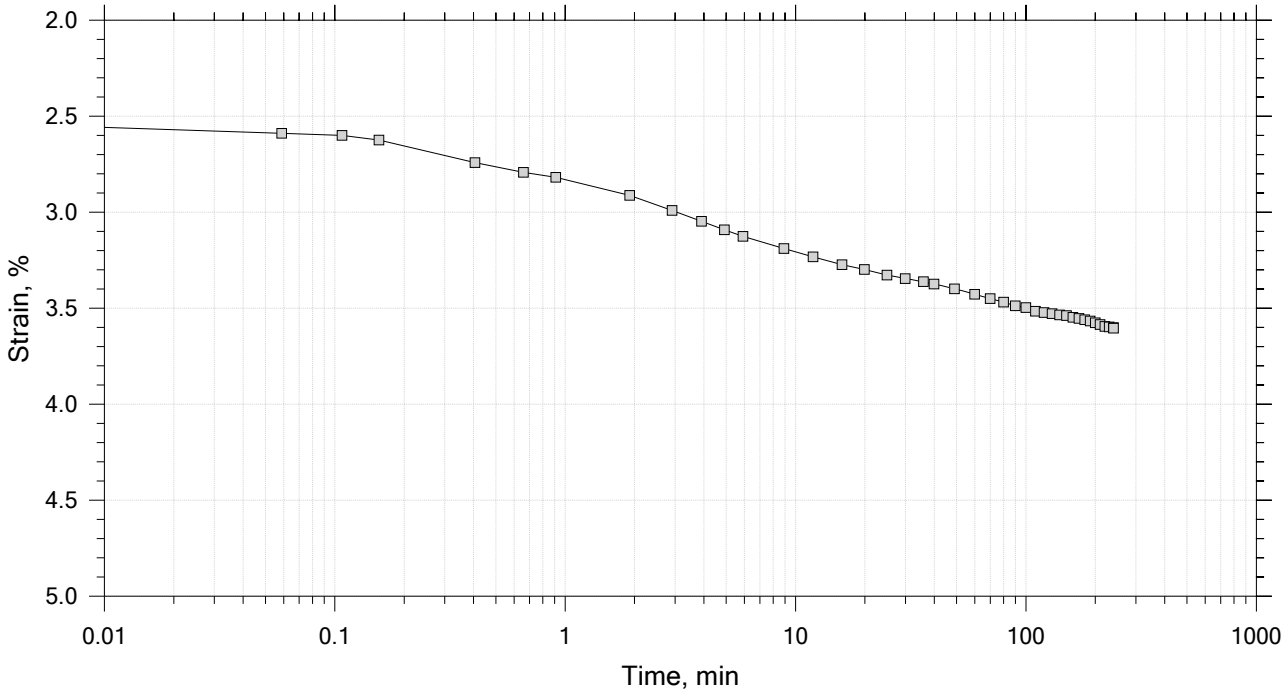
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

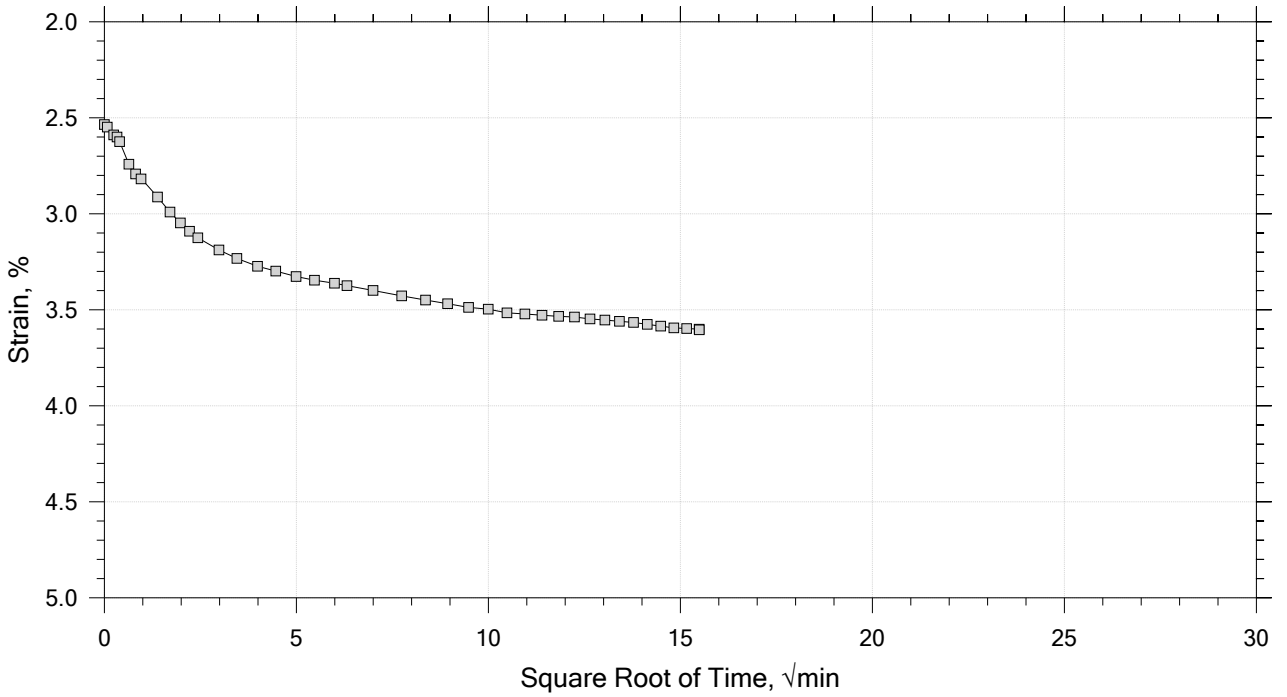
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





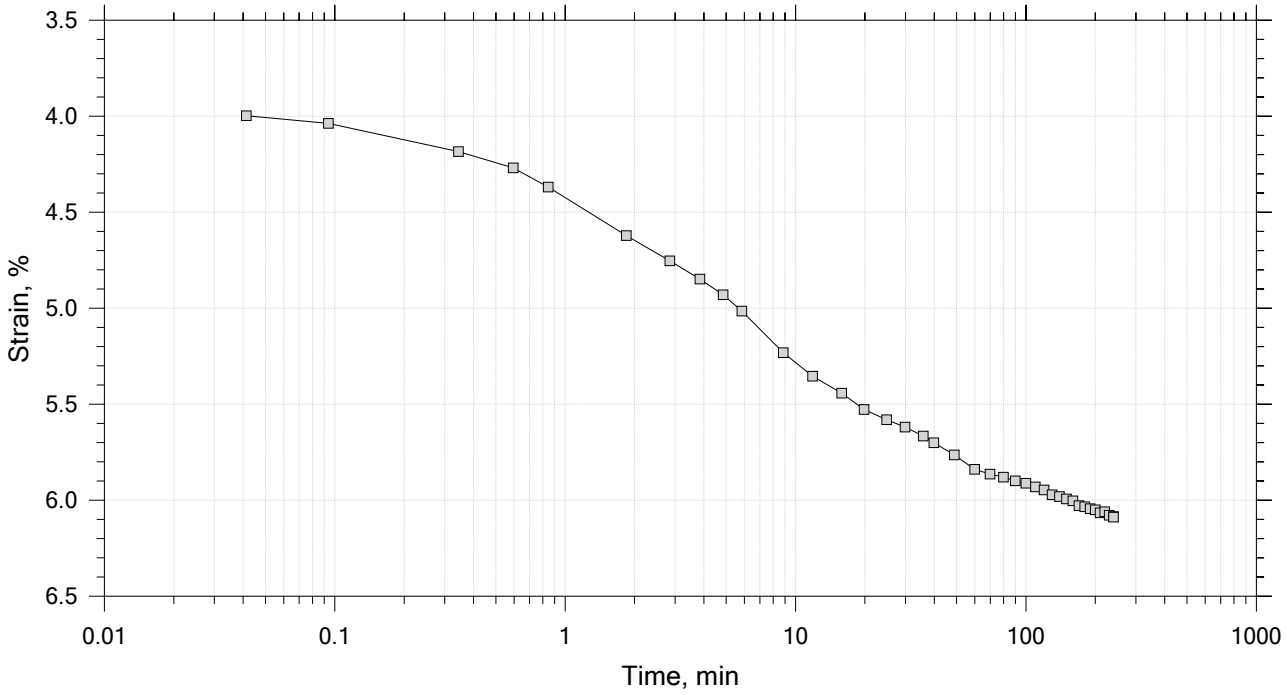
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

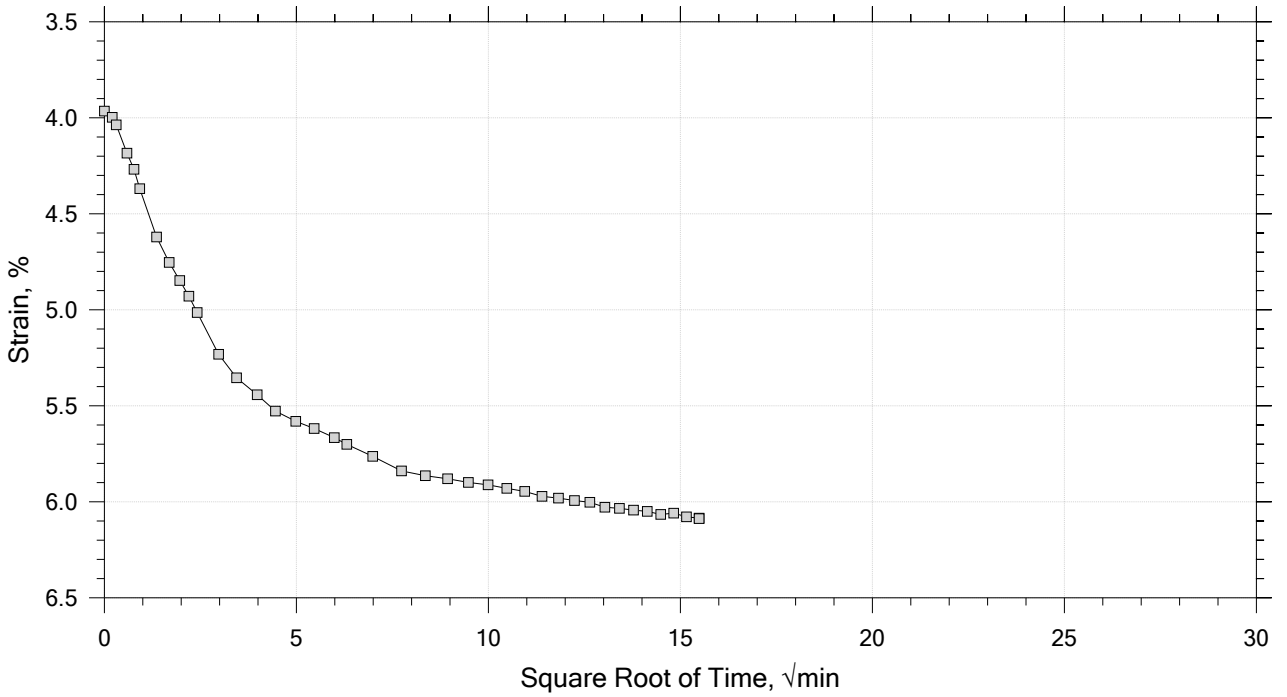
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





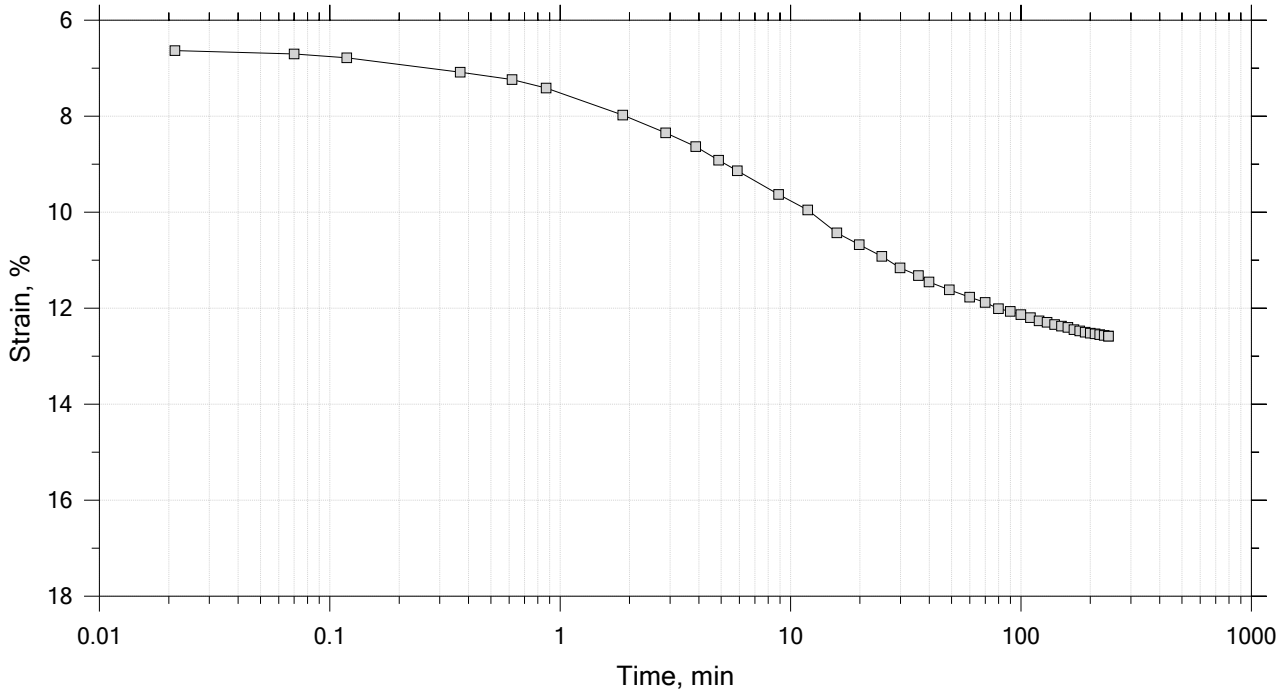
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

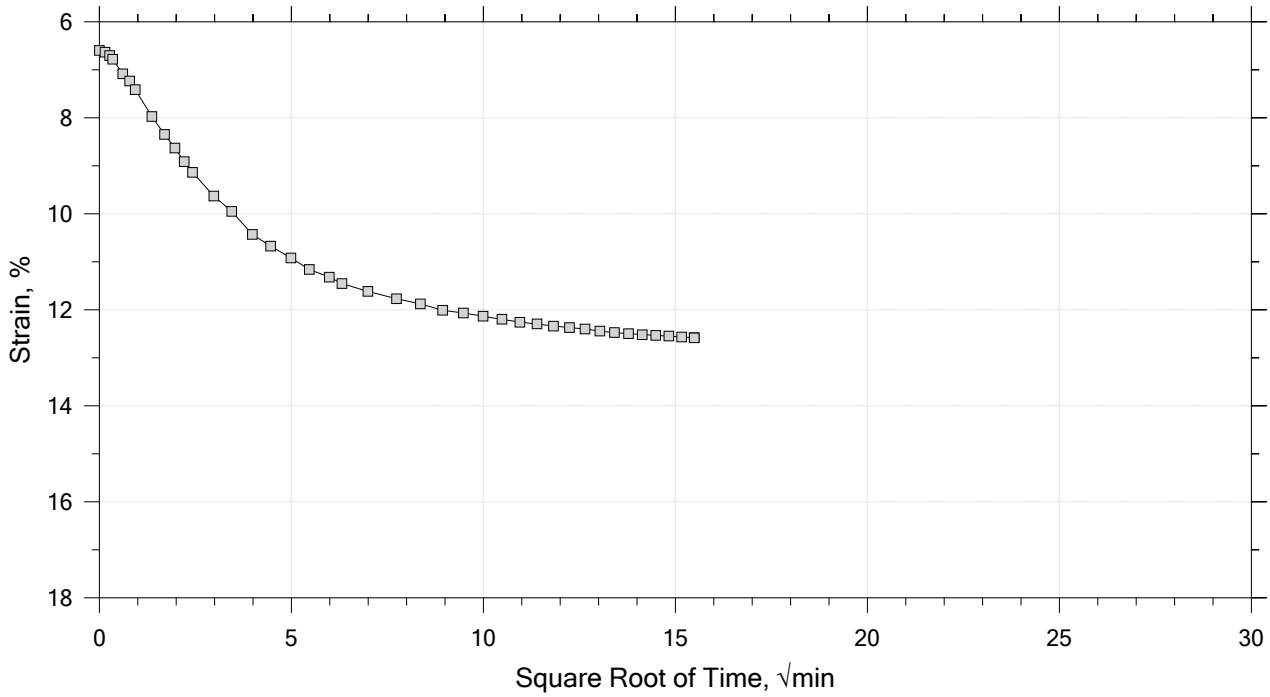
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





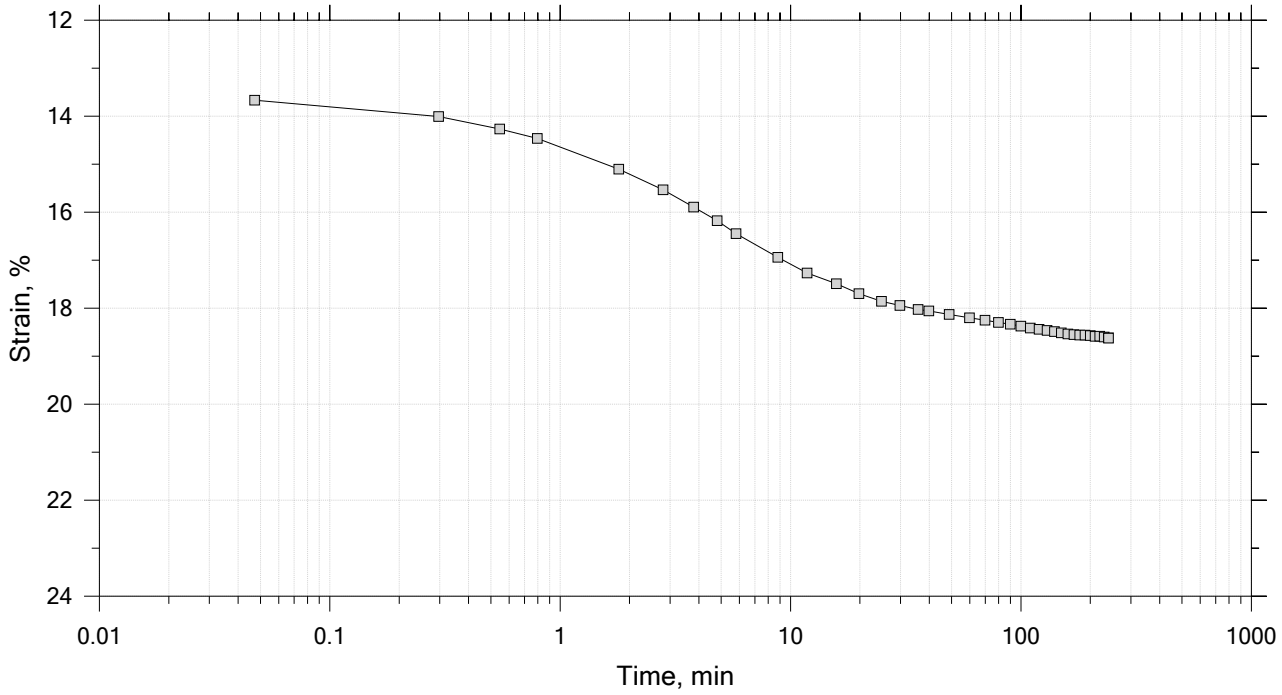
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

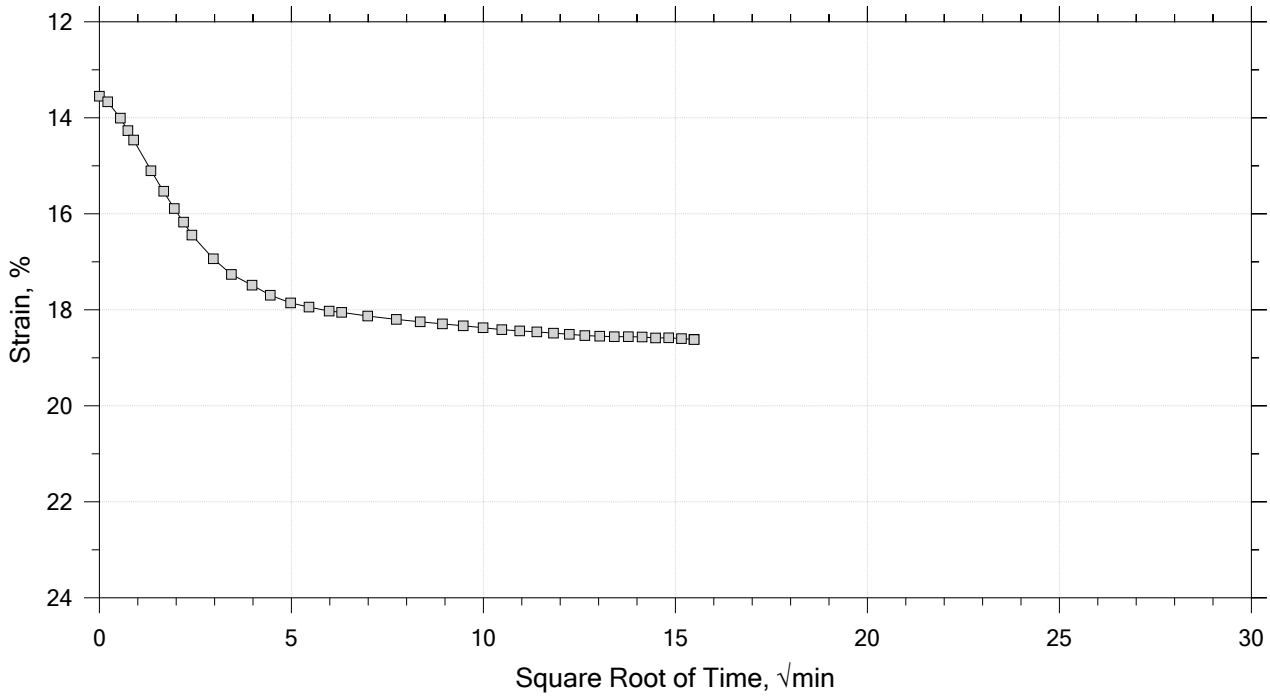
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





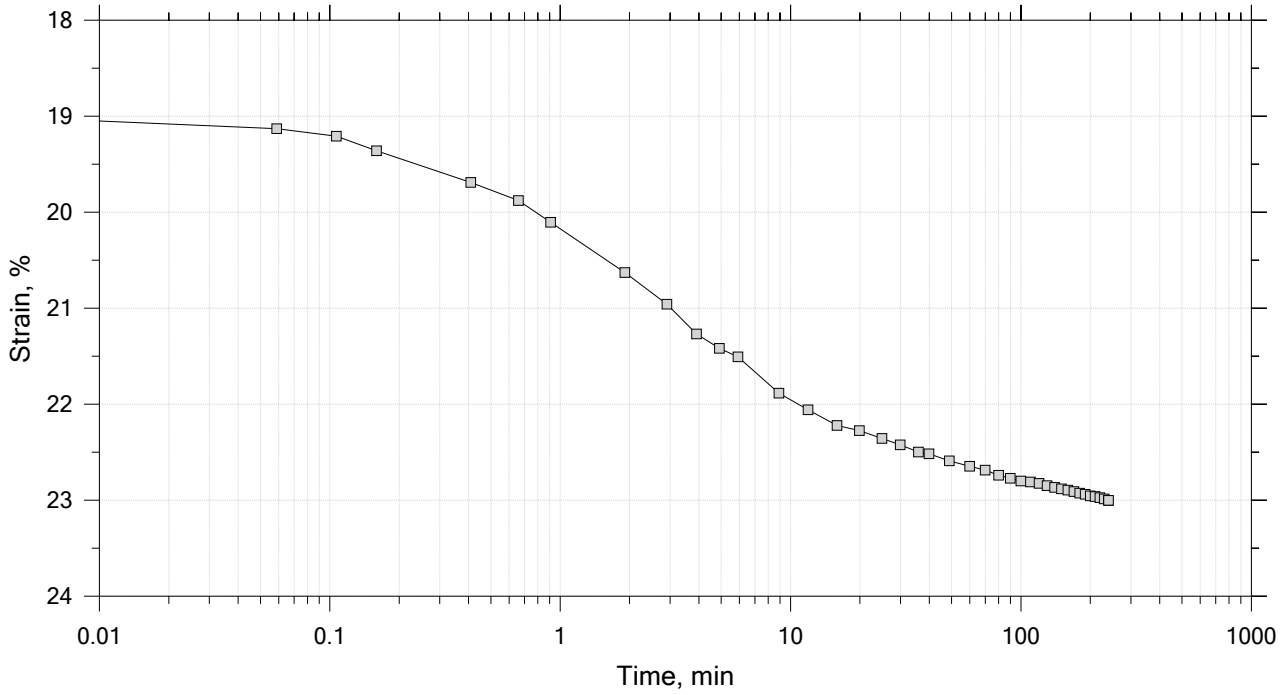
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

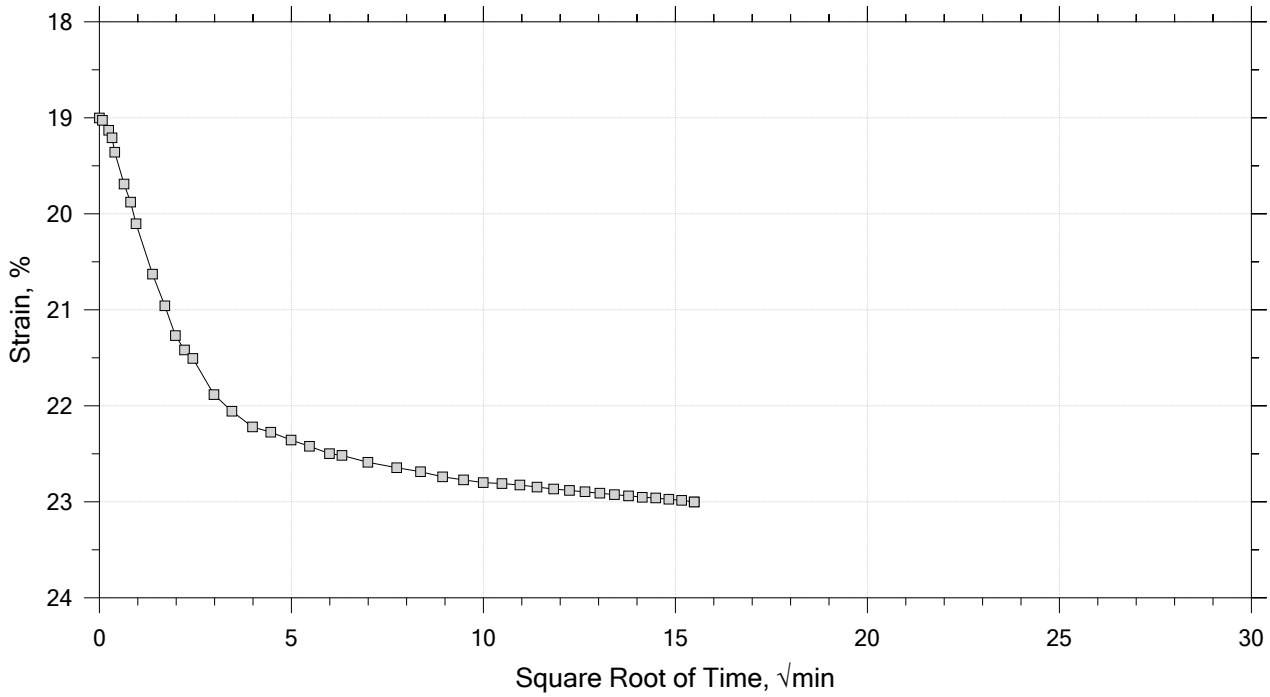
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

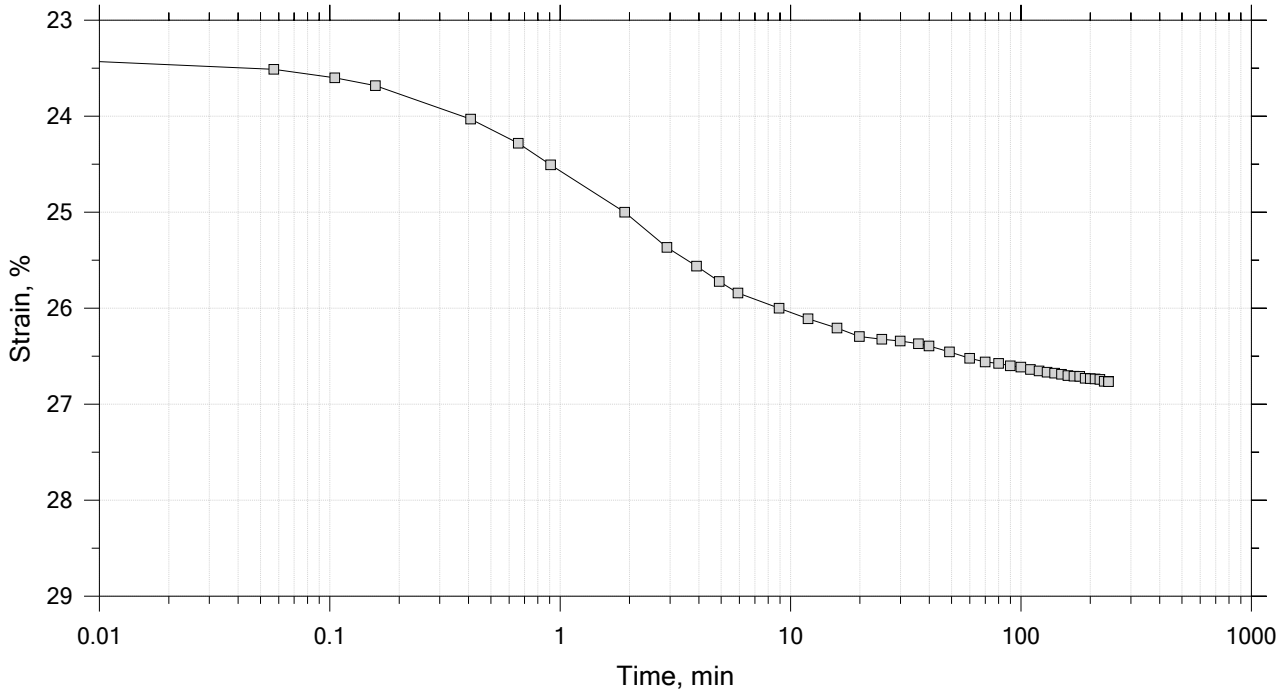


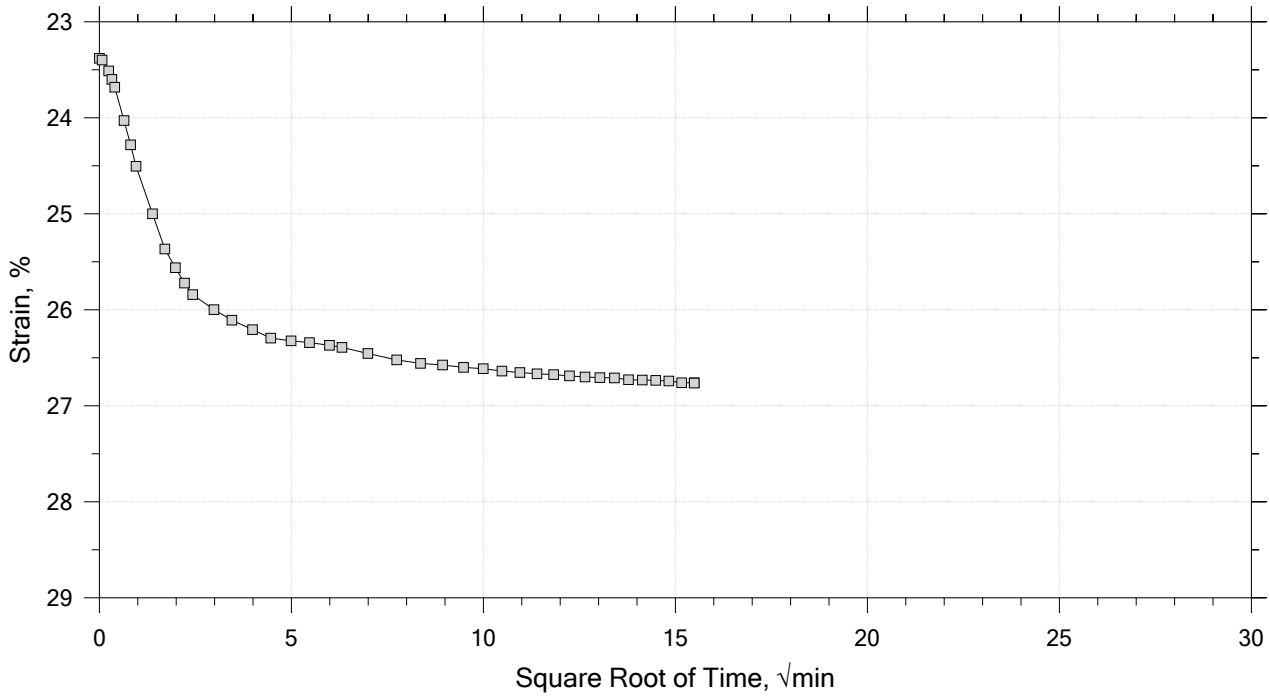


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

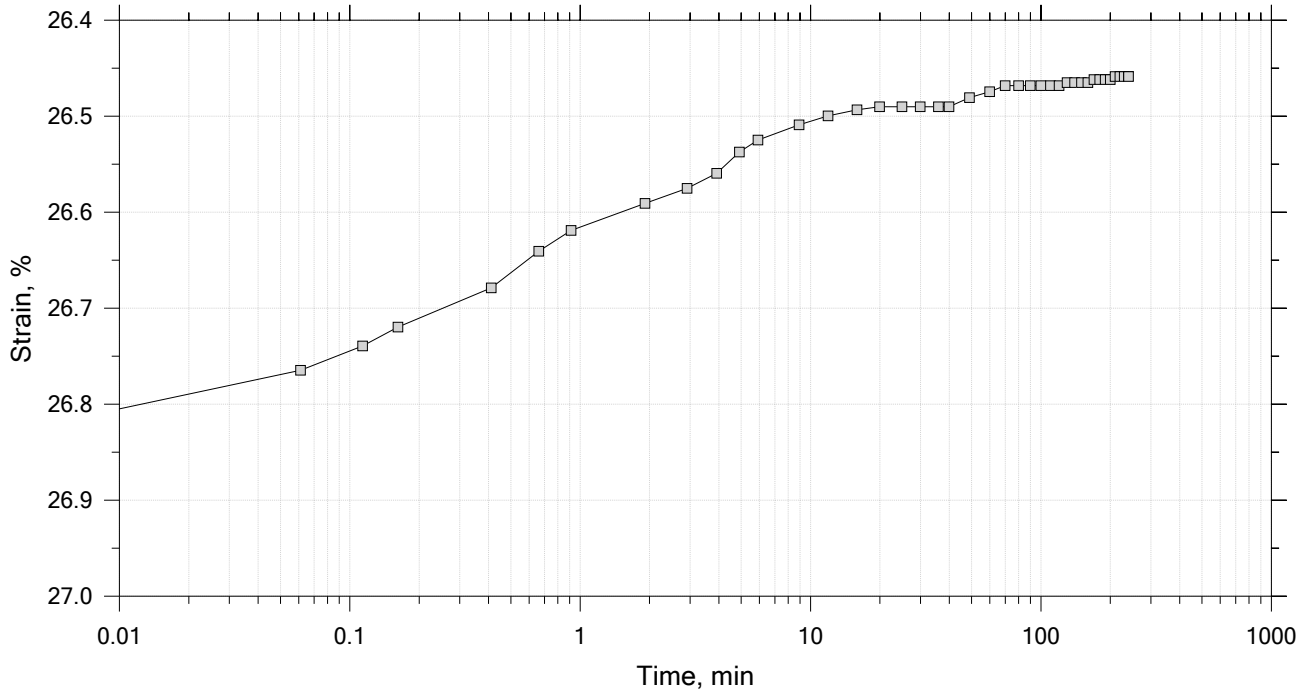


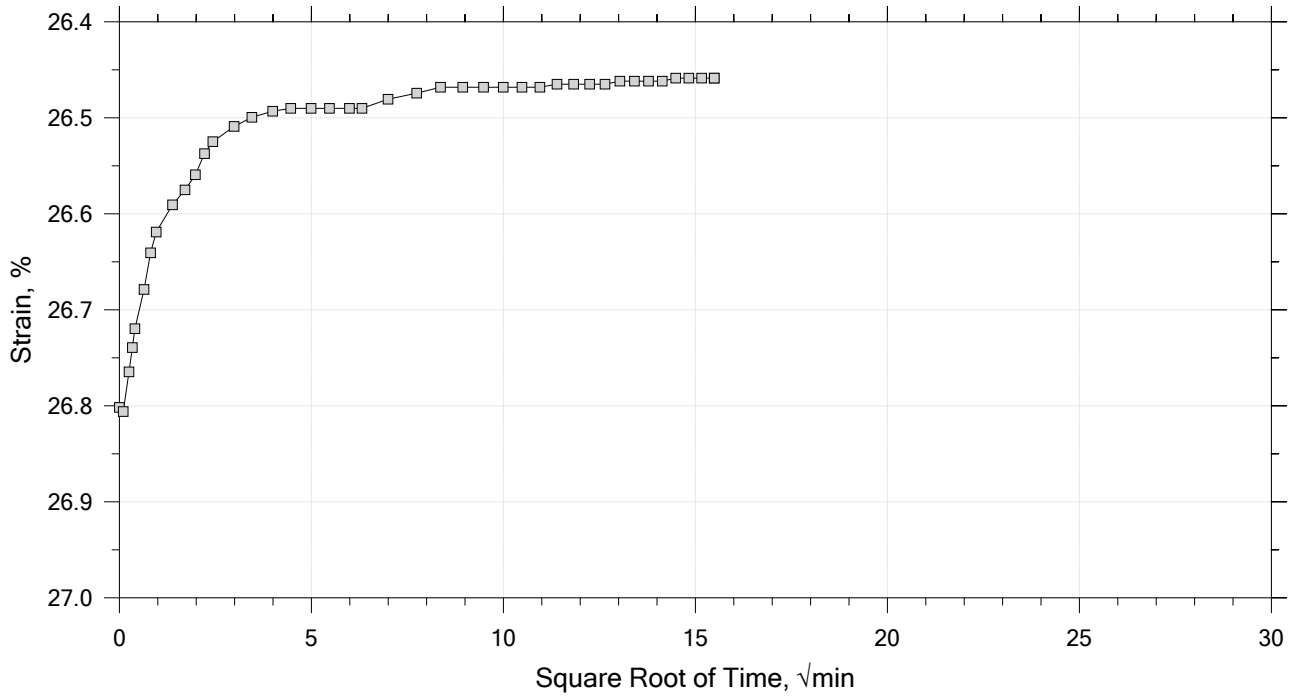


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





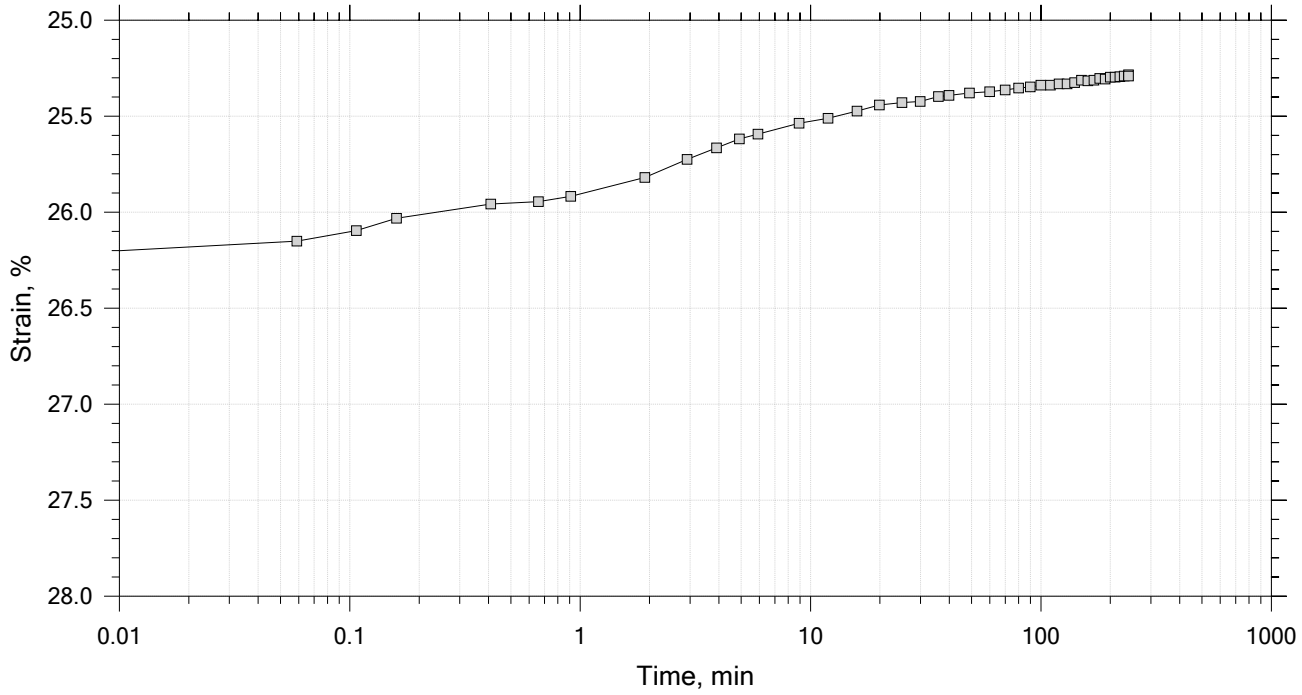
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

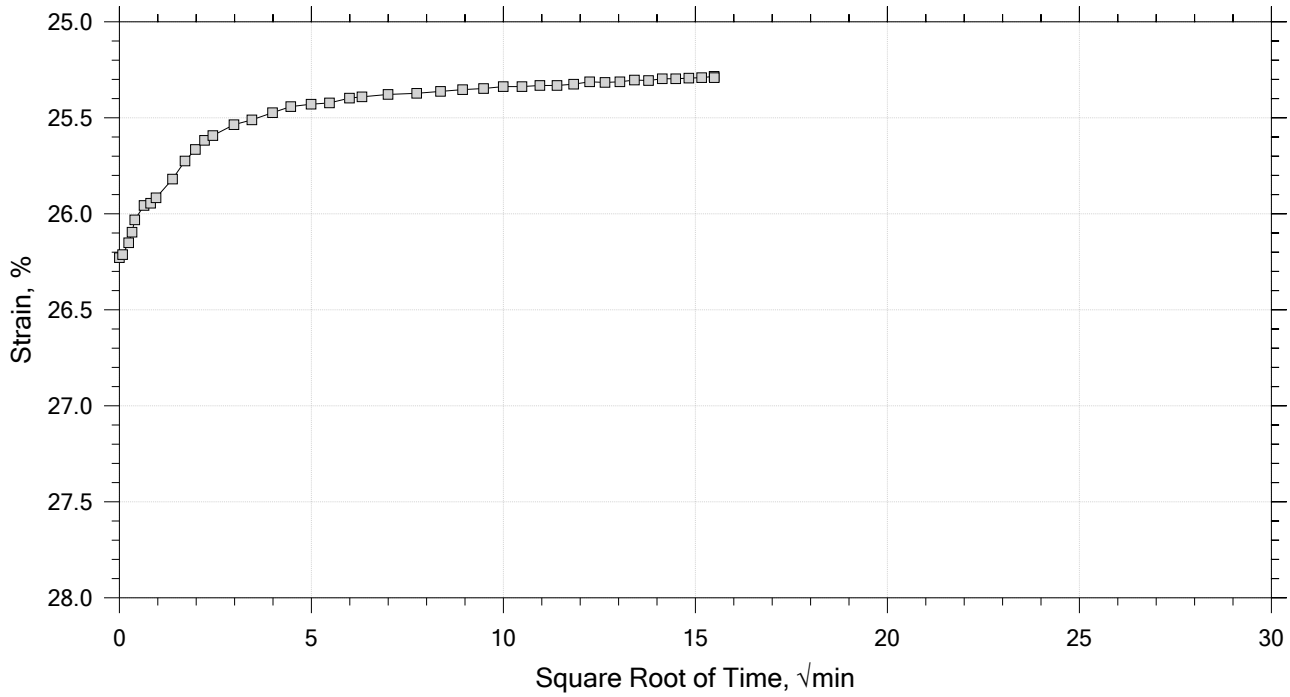
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

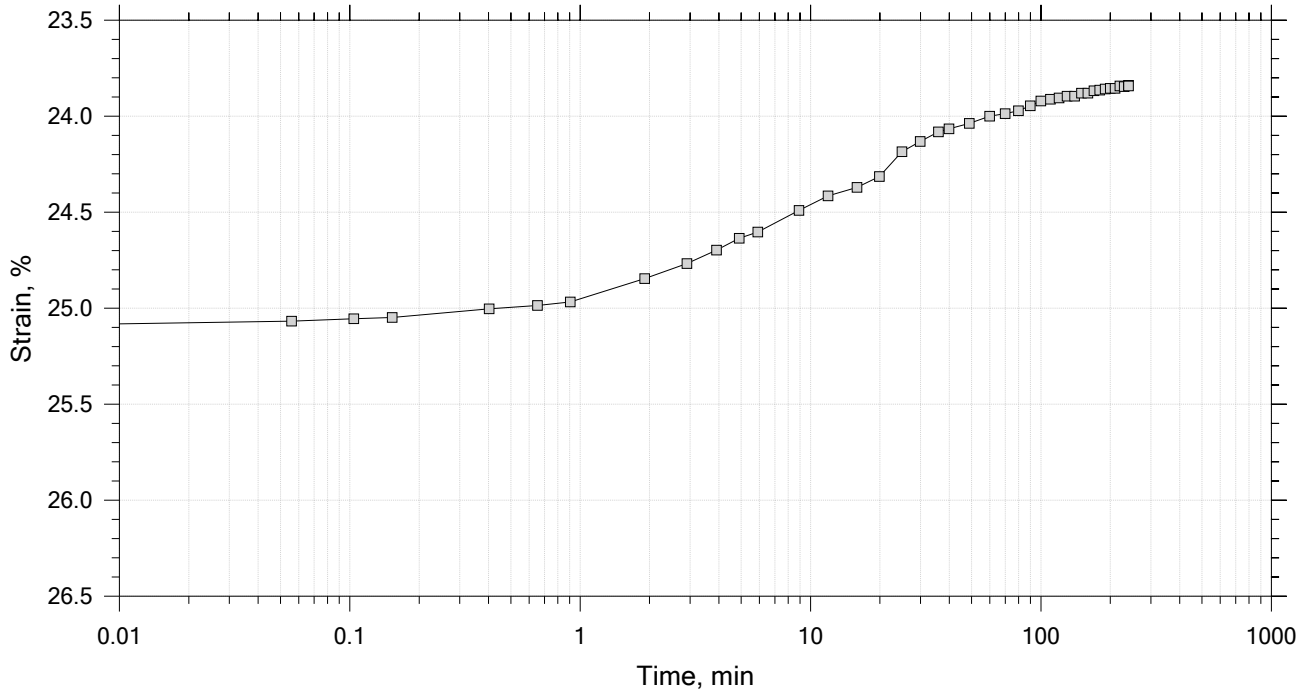


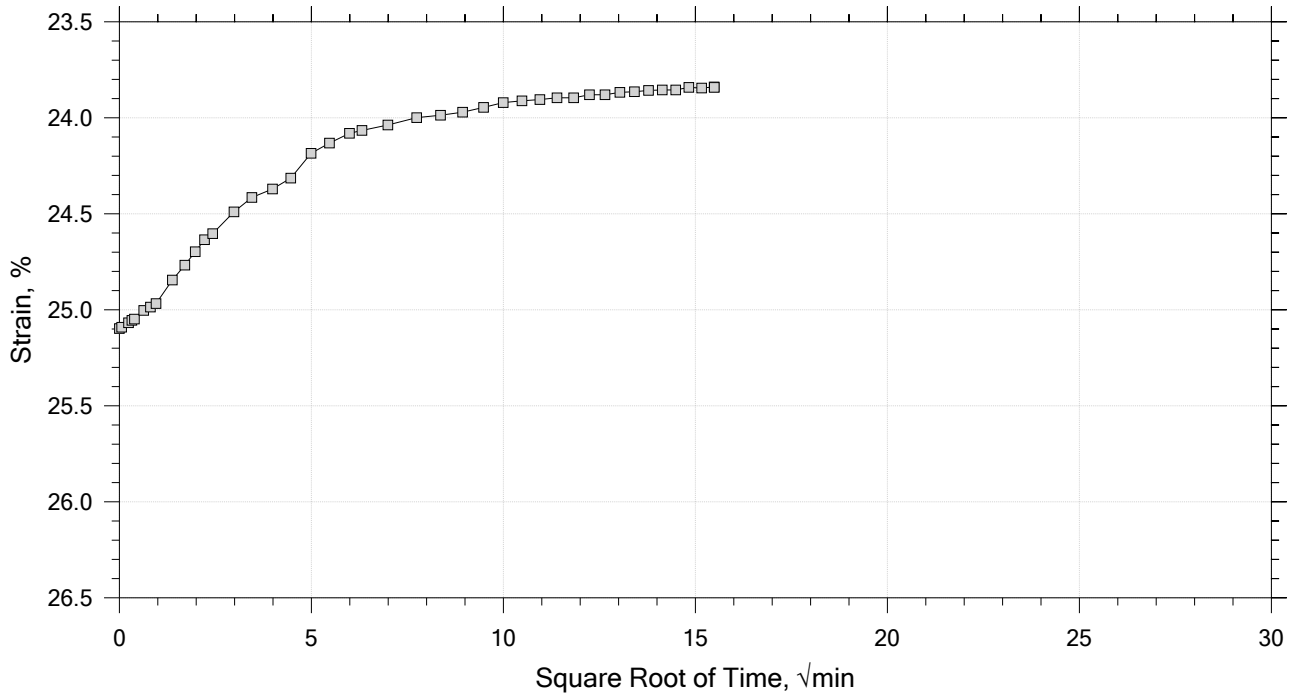


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

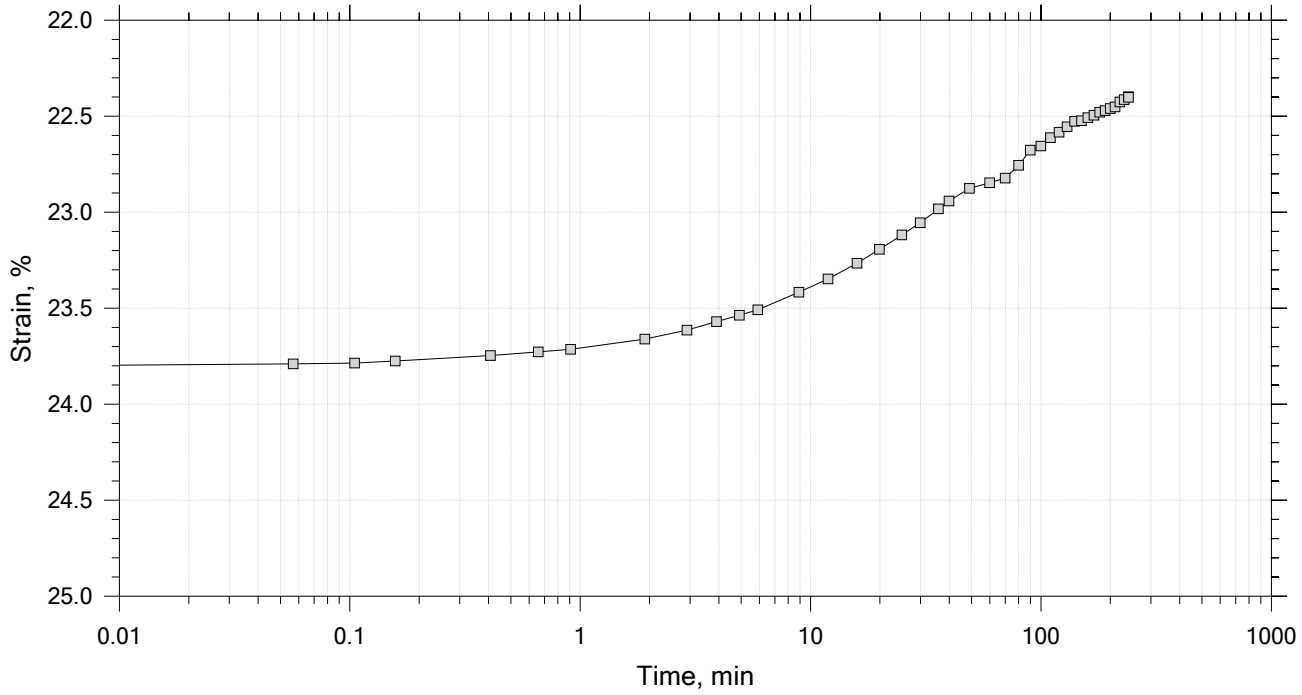


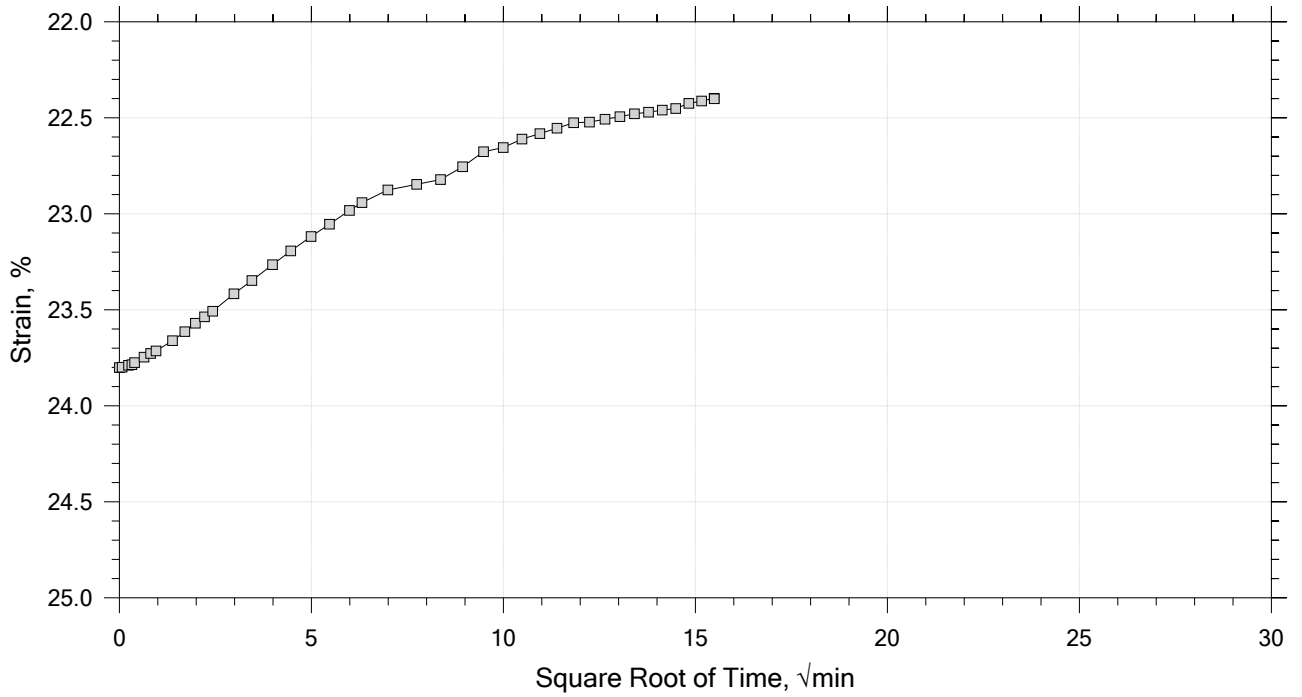


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

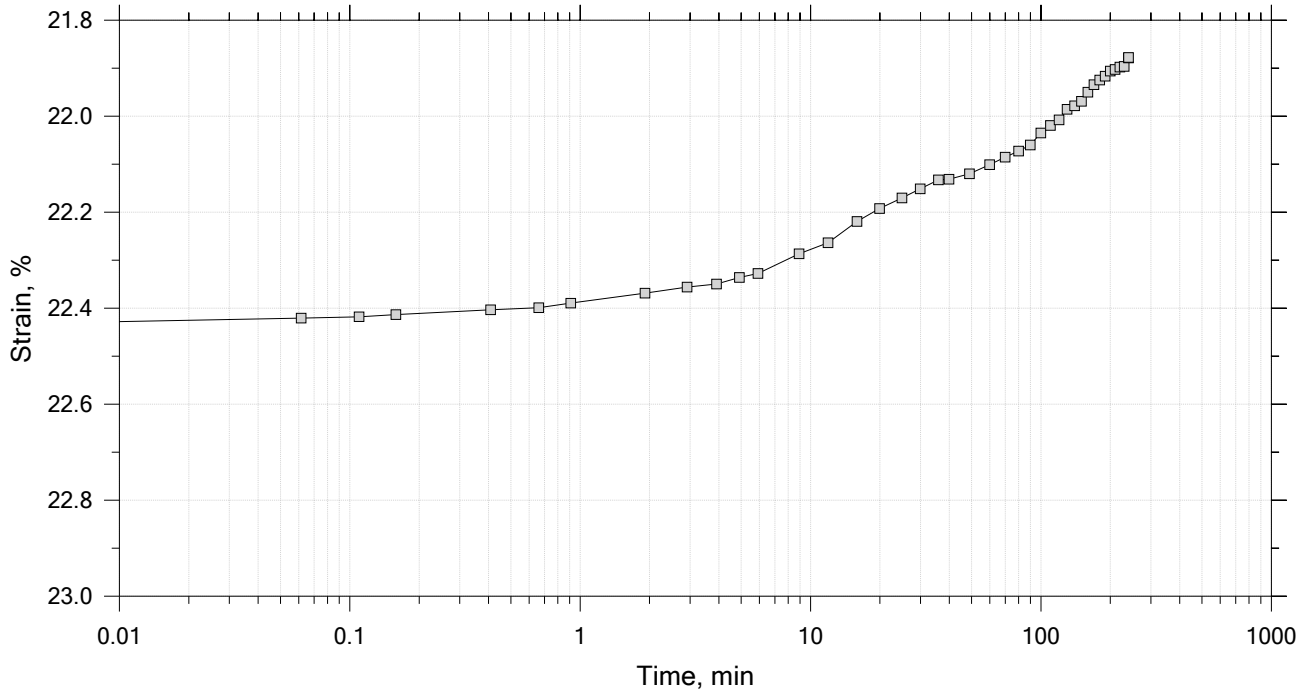


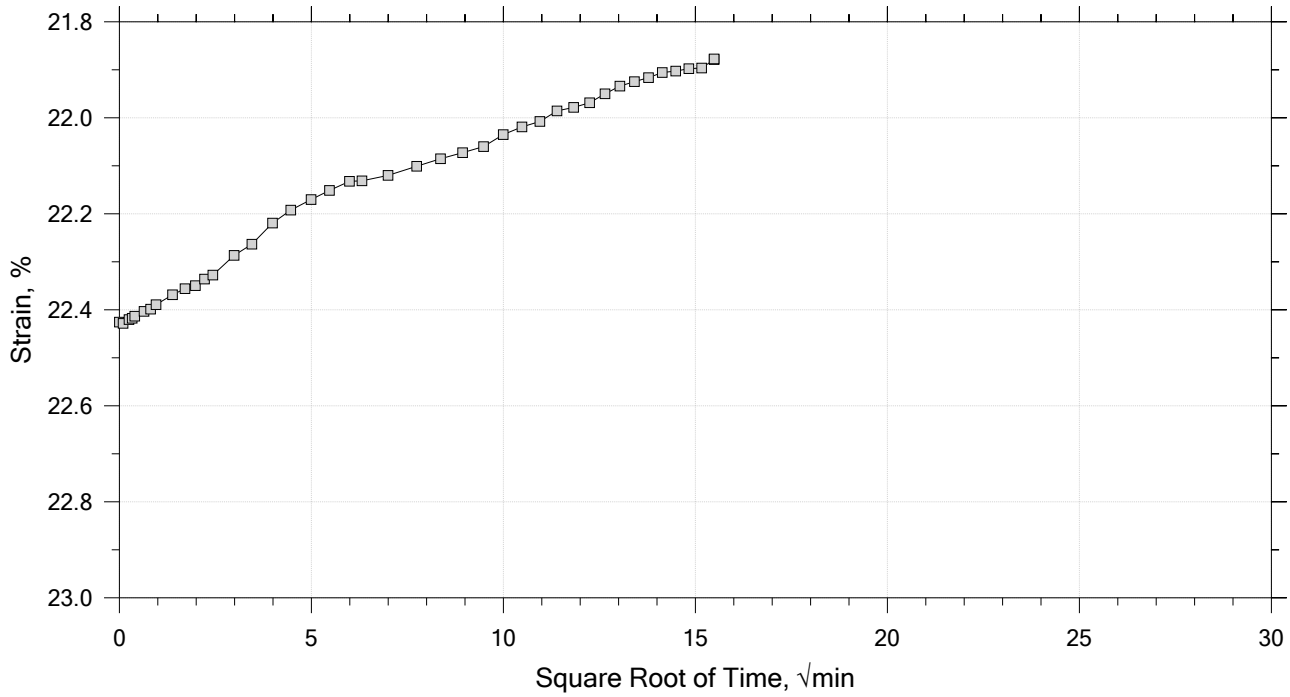


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-206	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
Test No.: IP-9	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 30
Initial Height: 1.00 in	Initial Void Ratio: 1.08	Plastic Limit: 16
Final Height: 0.78 in	Final Void Ratio: 0.62	Plasticity Index: 14

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E0934	RING		D1952
Mass Container, gm	8.17	110.8	110.8	8.87
Mass Container + Wet Soil, gm	154.79	258.18	241	140.22
Mass Container + Dry Soil, gm	118.22	216.99	216.99	116
Mass Dry Soil, gm	110.05	106.19	106.19	107.13
Water Content, %	33.23	38.79	22.61	22.61
Void Ratio	---	1.08	0.62	---
Degree of Saturation, %	---	98.76	100.00	---
Dry Unit Weight, pcf	---	82.414	105.66	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

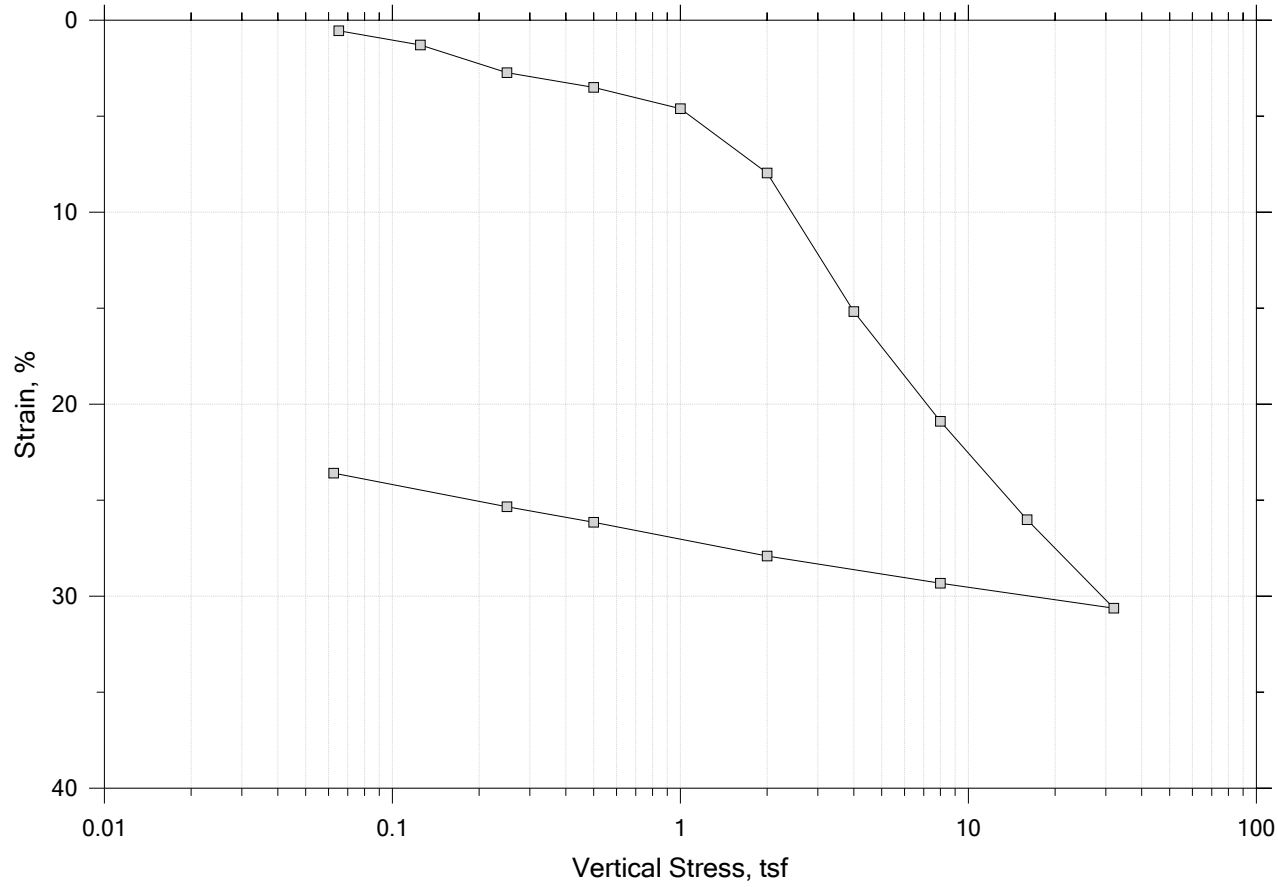
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0836	0.006732	1.06	0.673	45.677	7.68e-05	8.05e-02	1.16e-04
2	0.125	0.008766	1.06	0.877	3.643	9.55e-04	4.92e-02	8.79e-04
3	0.250	0.01510	1.05	1.51	13.192	2.61e-04	5.07e-02	2.48e-04
4	0.500	0.02319	1.03	2.32	16.182	2.10e-04	3.24e-02	1.27e-04
5	1.00	0.03604	1.00	3.60	21.025	1.58e-04	2.57e-02	7.62e-05
6	2.00	0.06088	0.950	6.09	17.753	1.80e-04	2.48e-02	8.38e-05
7	4.00	0.1258	0.815	12.6	28.306	1.03e-04	3.25e-02	6.24e-05
8	8.00	0.1862	0.690	18.6	18.116	1.39e-04	1.51e-02	3.93e-05
9	16.0	0.2300	0.599	23.0	9.546	2.32e-04	5.47e-03	2.38e-05
10	32.0	0.2676	0.521	26.8	7.547	2.64e-04	2.35e-03	1.16e-05
11	8.00	0.2646	0.527	26.5	5.965	3.19e-04	1.27e-04	7.60e-07
12	2.00	0.2529	0.551	25.3	7.728	2.51e-04	1.95e-03	9.16e-06
13	0.500	0.2384	0.582	23.8	38.199	5.26e-05	9.66e-03	9.52e-06
14	0.125	0.2240	0.611	22.4	126.891	1.65e-05	3.84e-02	1.18e-05
15	0.0625	0.2188	0.622	21.9	130.170	1.65e-05	8.38e-02	2.58e-05

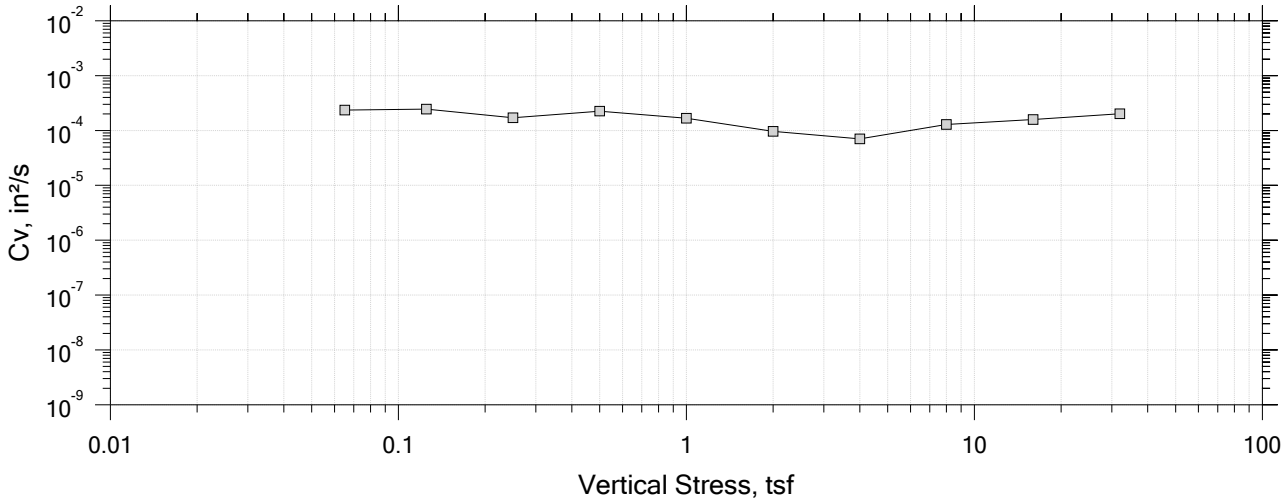
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		
	Displacement at End of Increment		

B-207 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

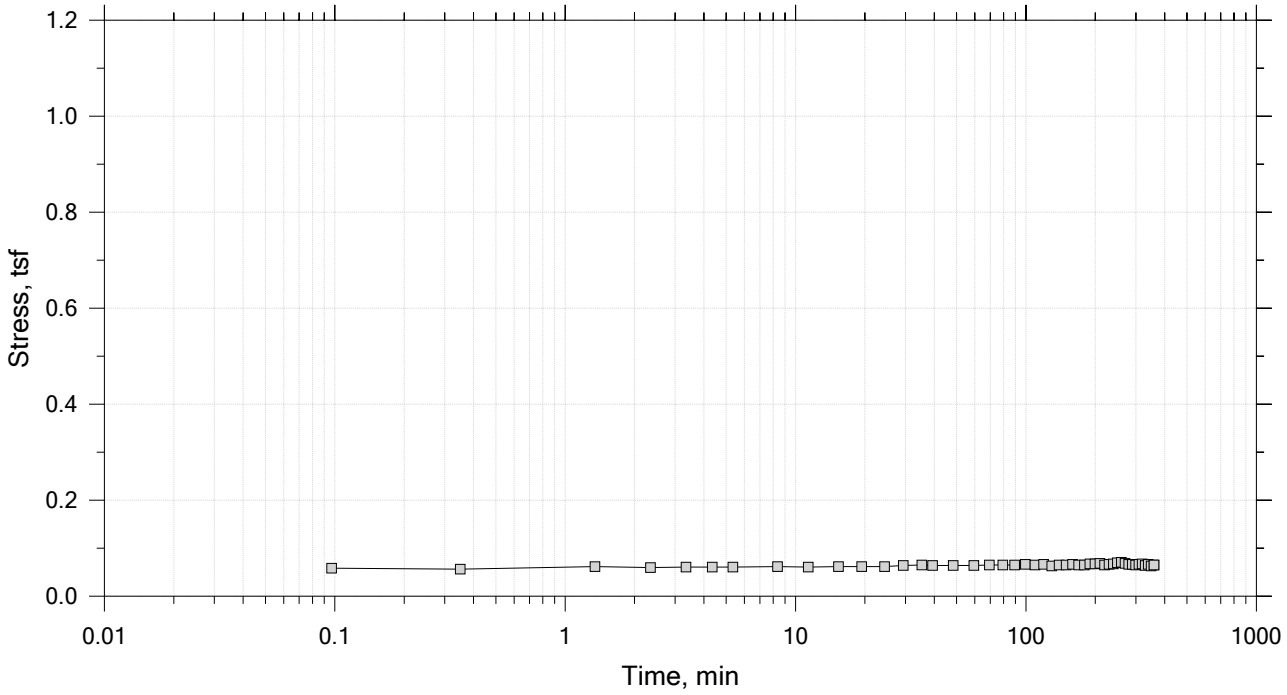


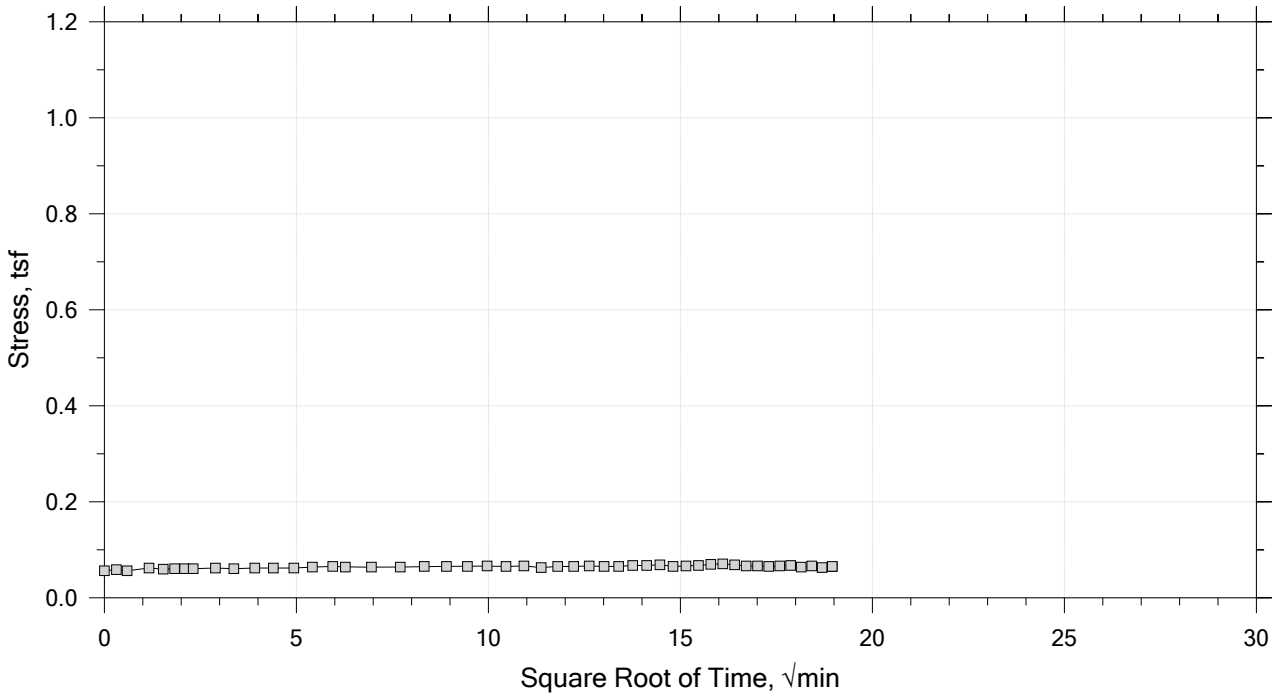


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0651 tsf





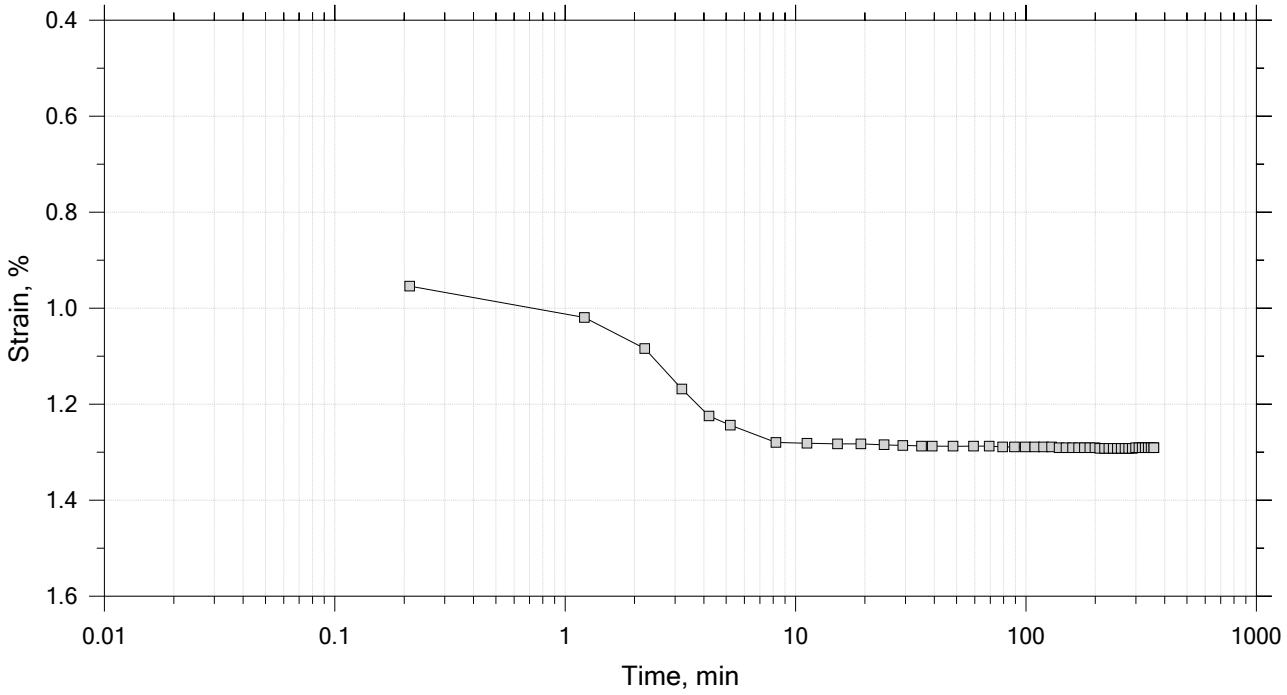
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

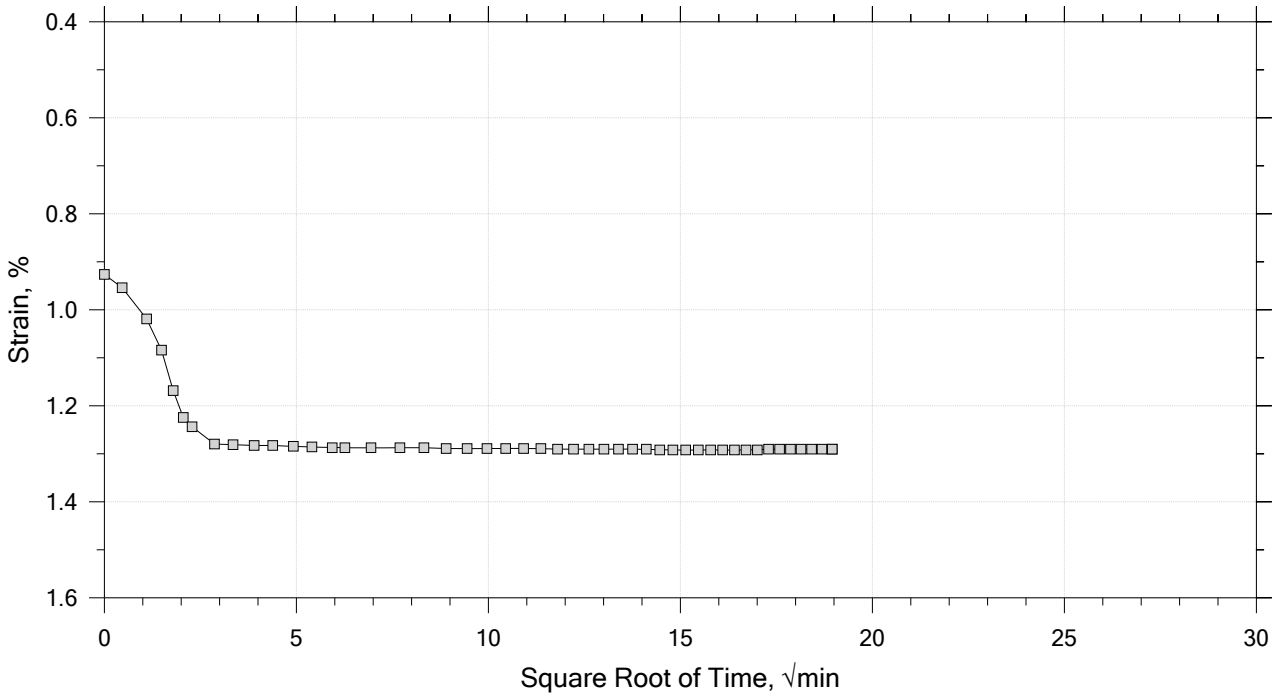
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

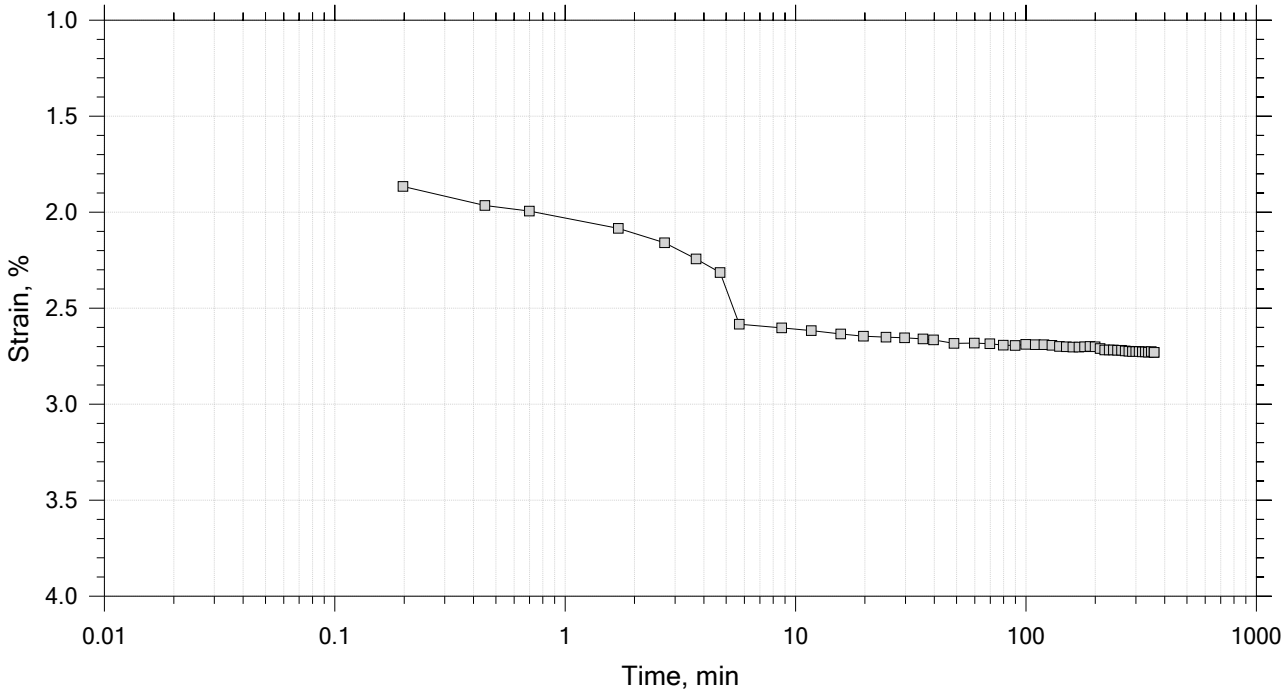


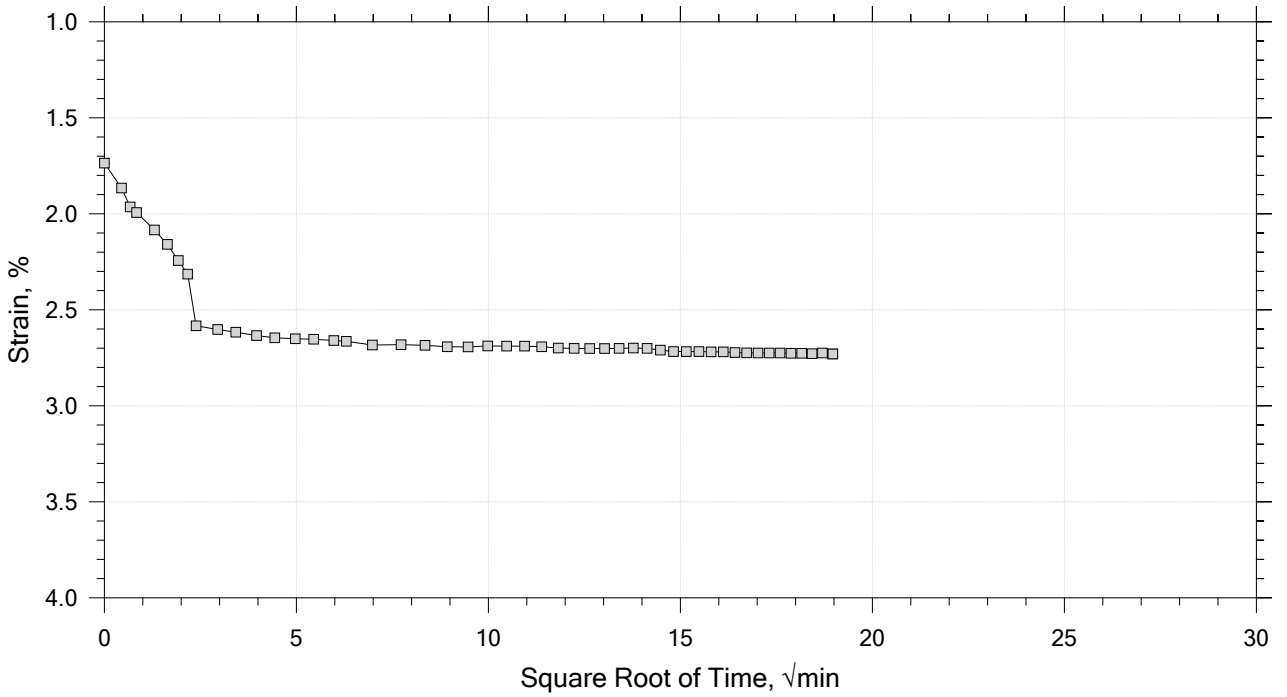


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





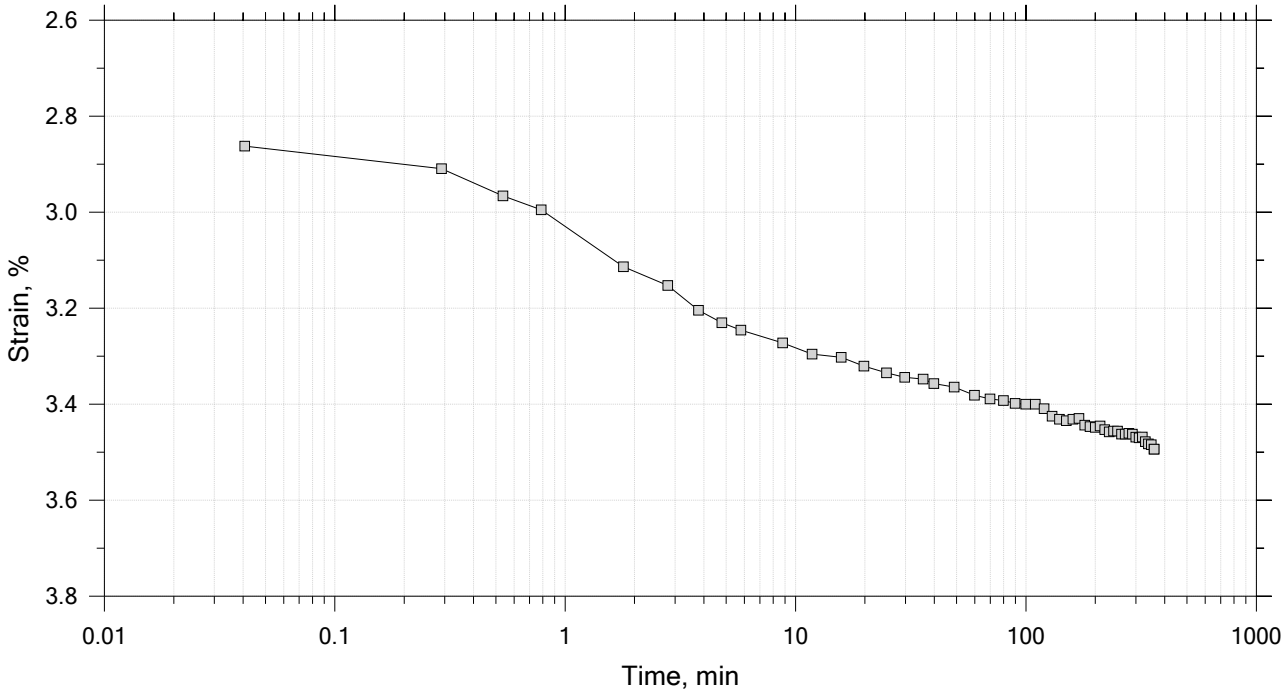
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-207	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

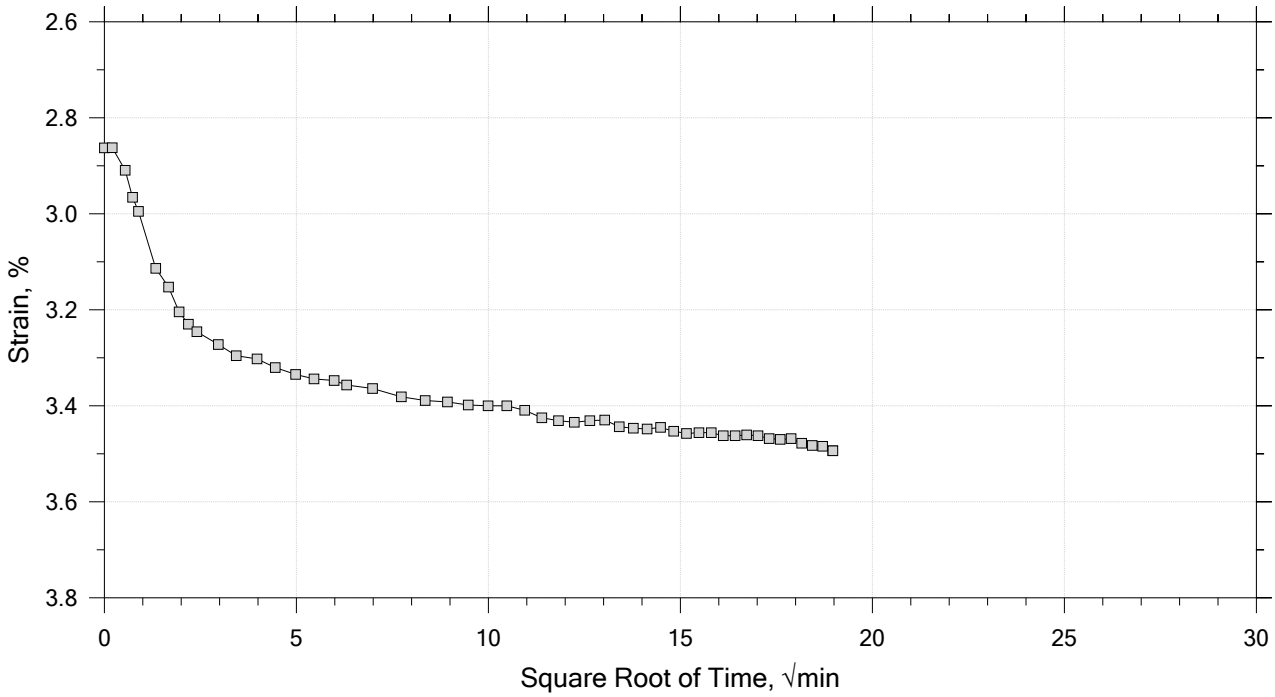
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





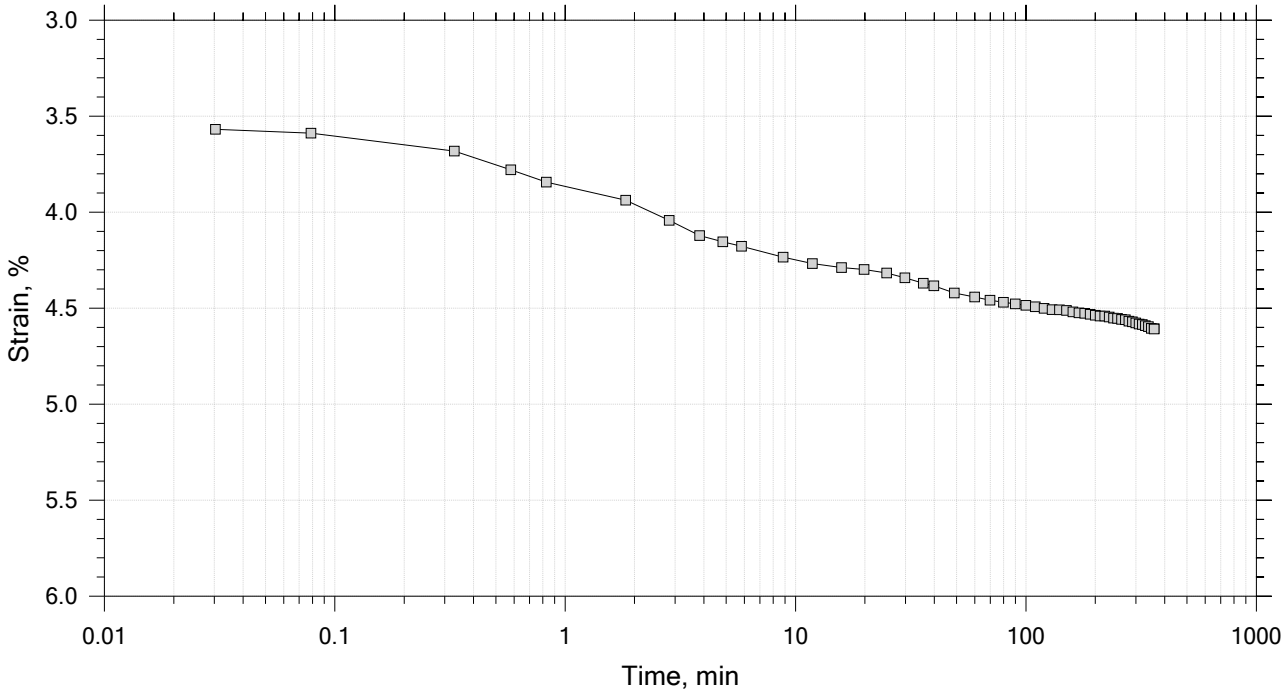
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

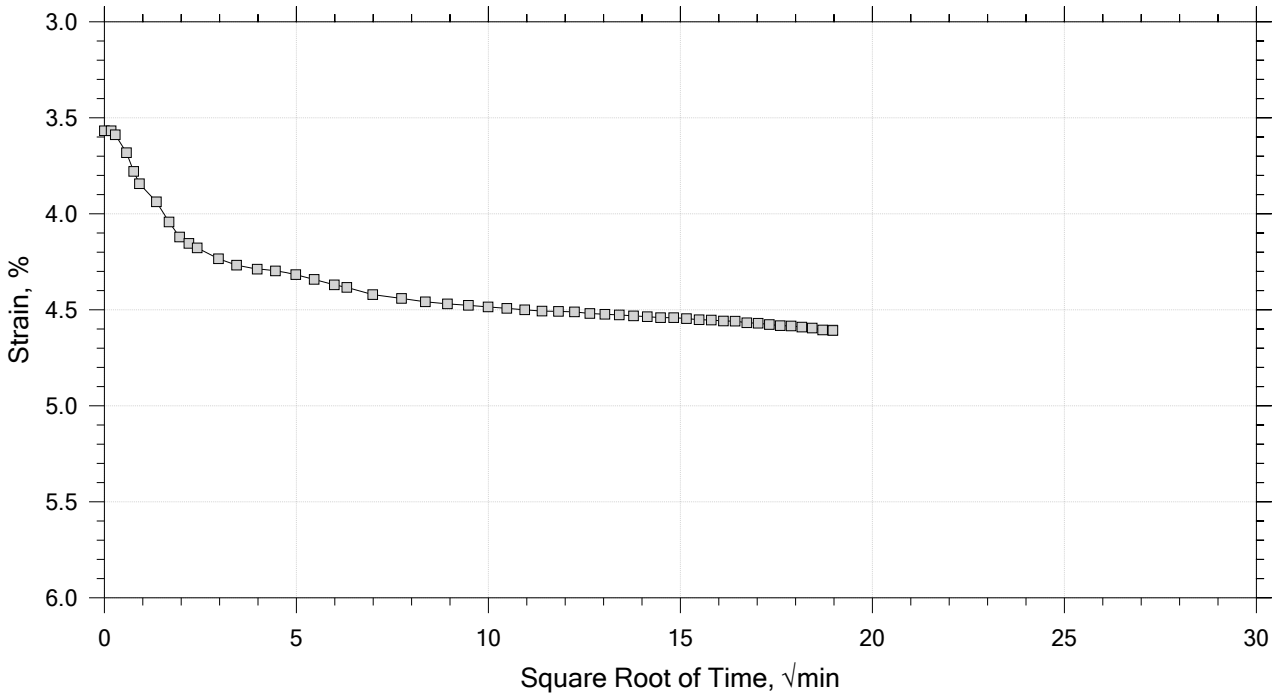
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





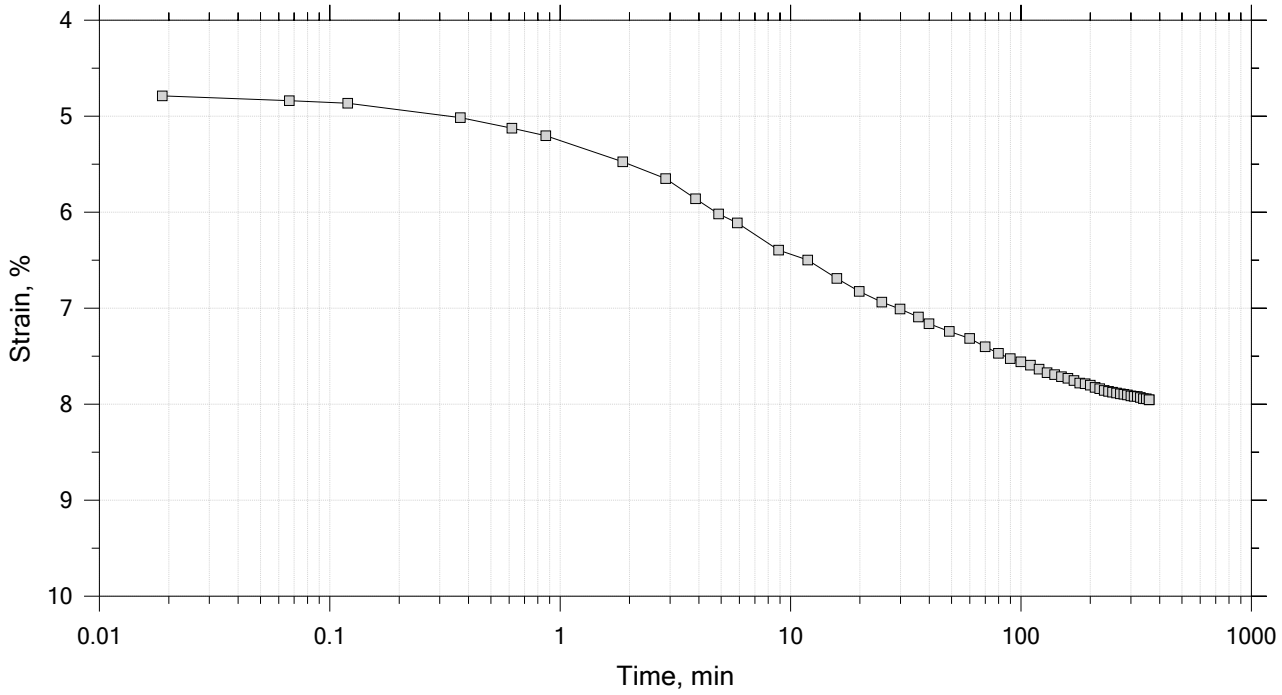
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-207	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

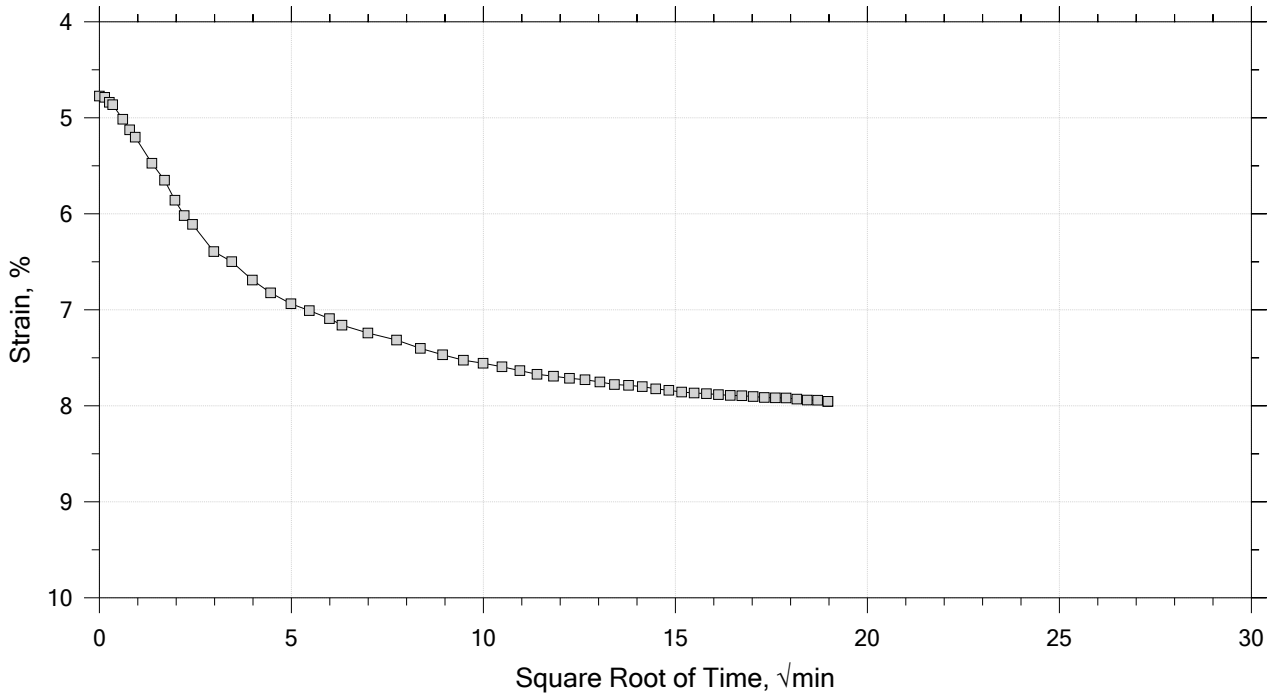
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





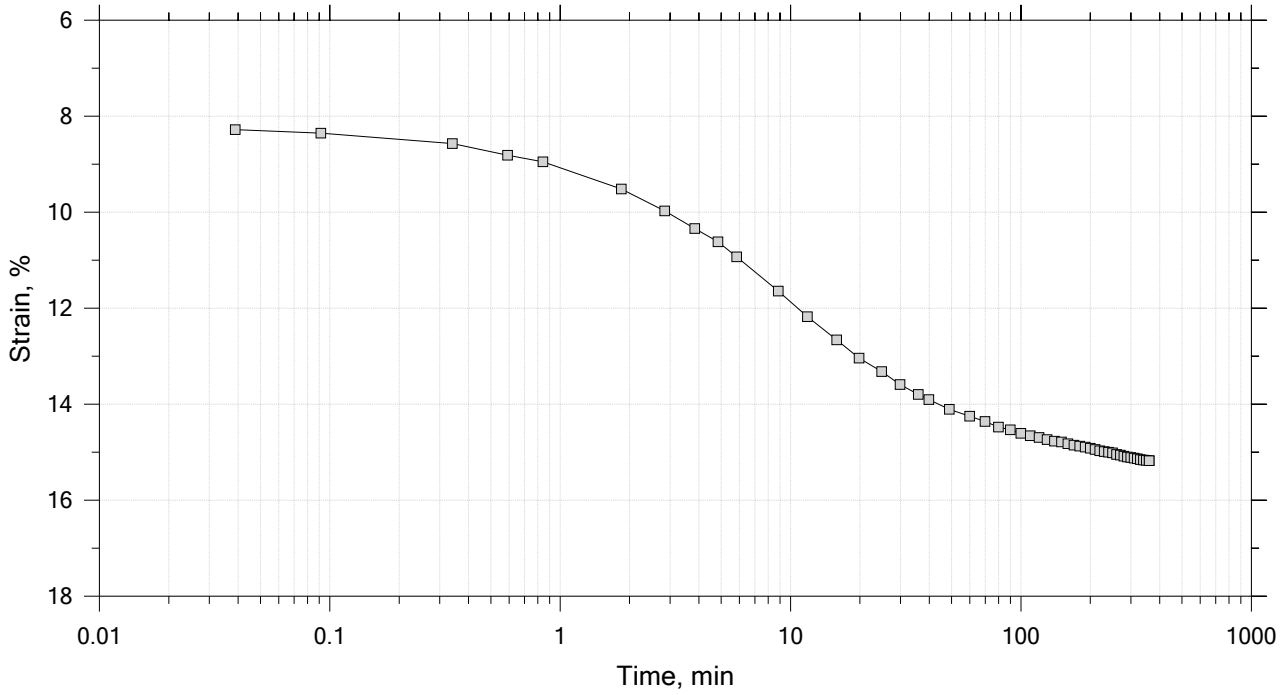
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

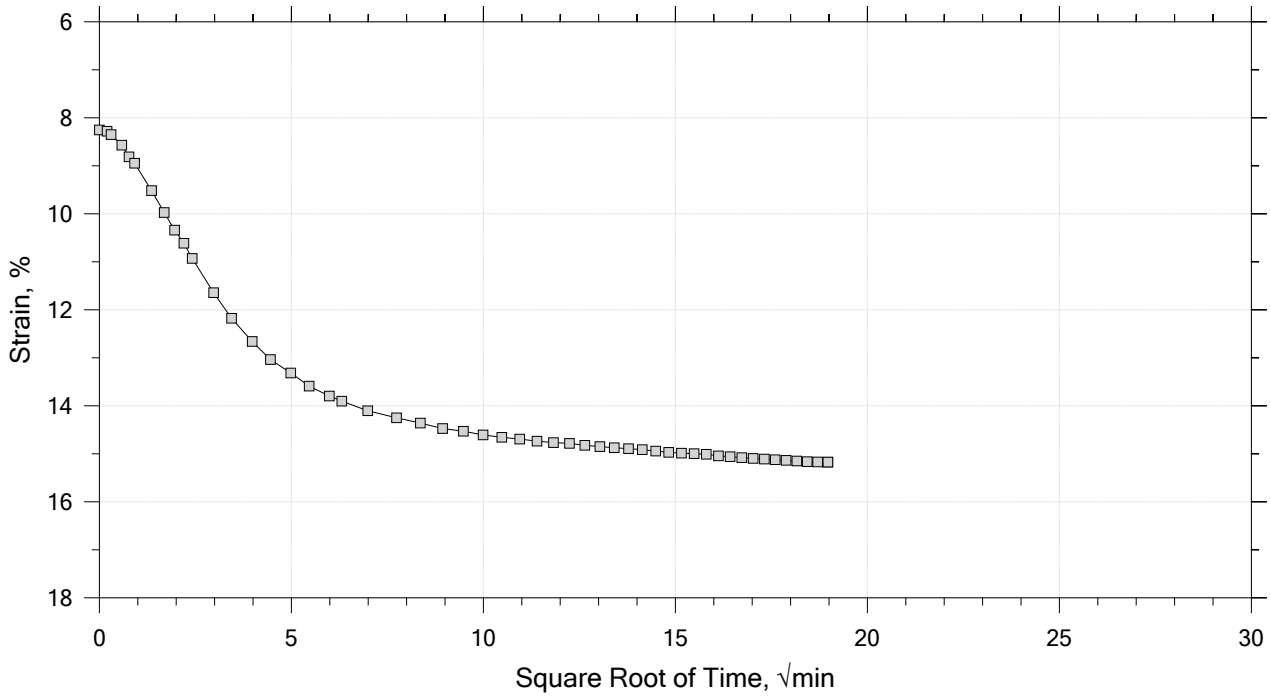
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





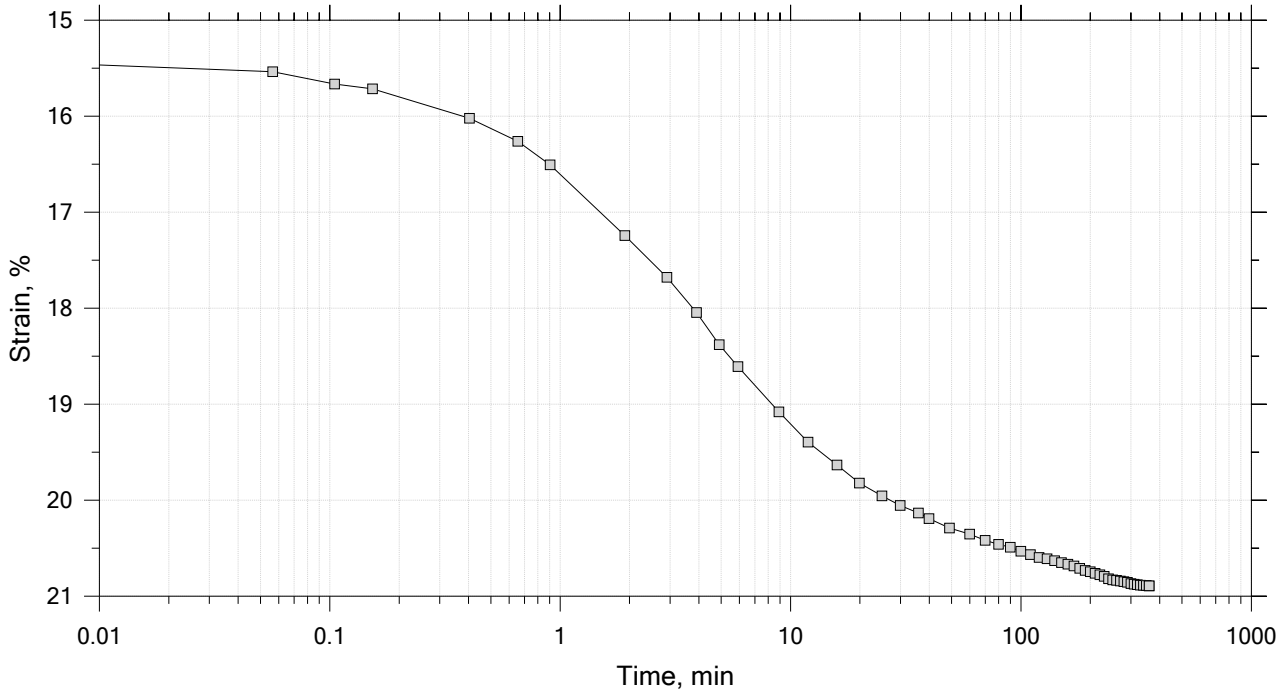
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-207	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

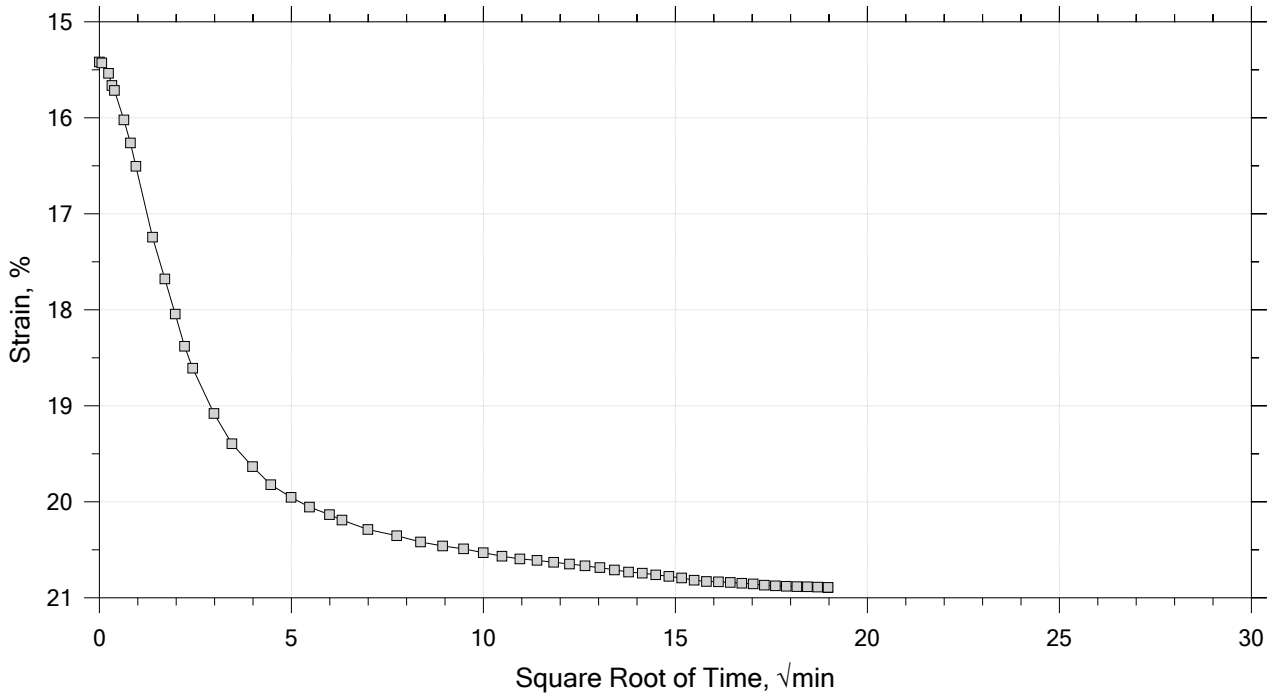
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





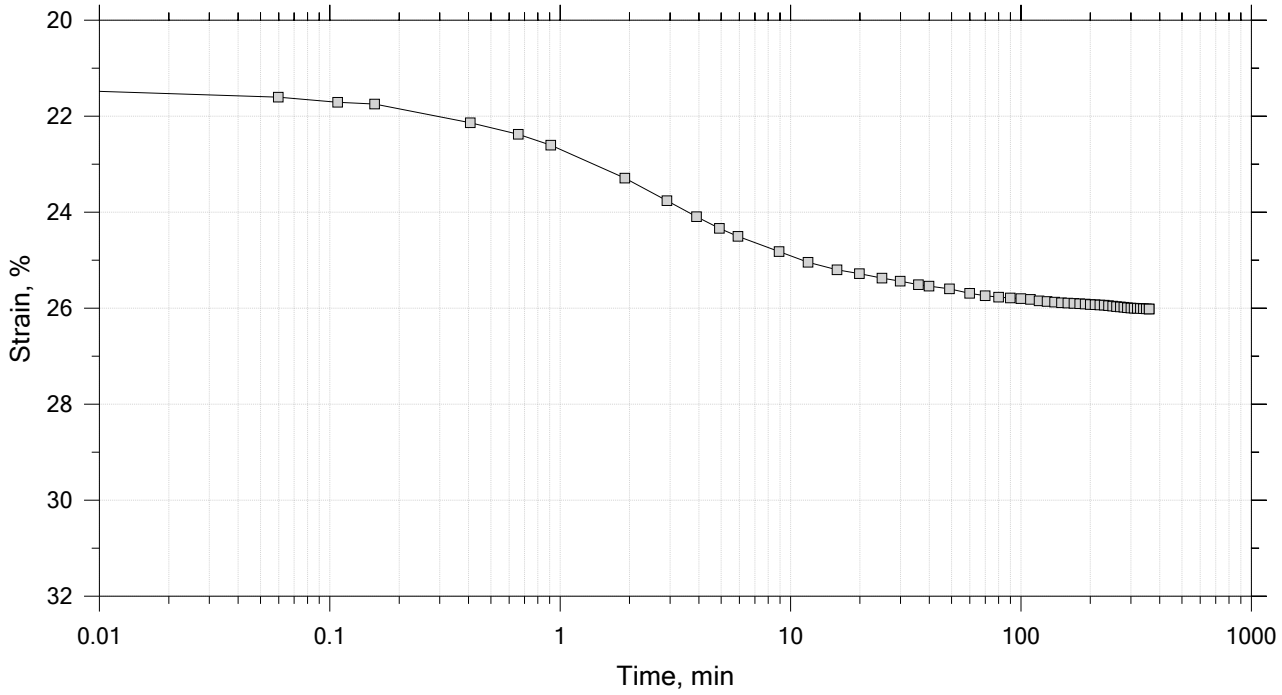
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

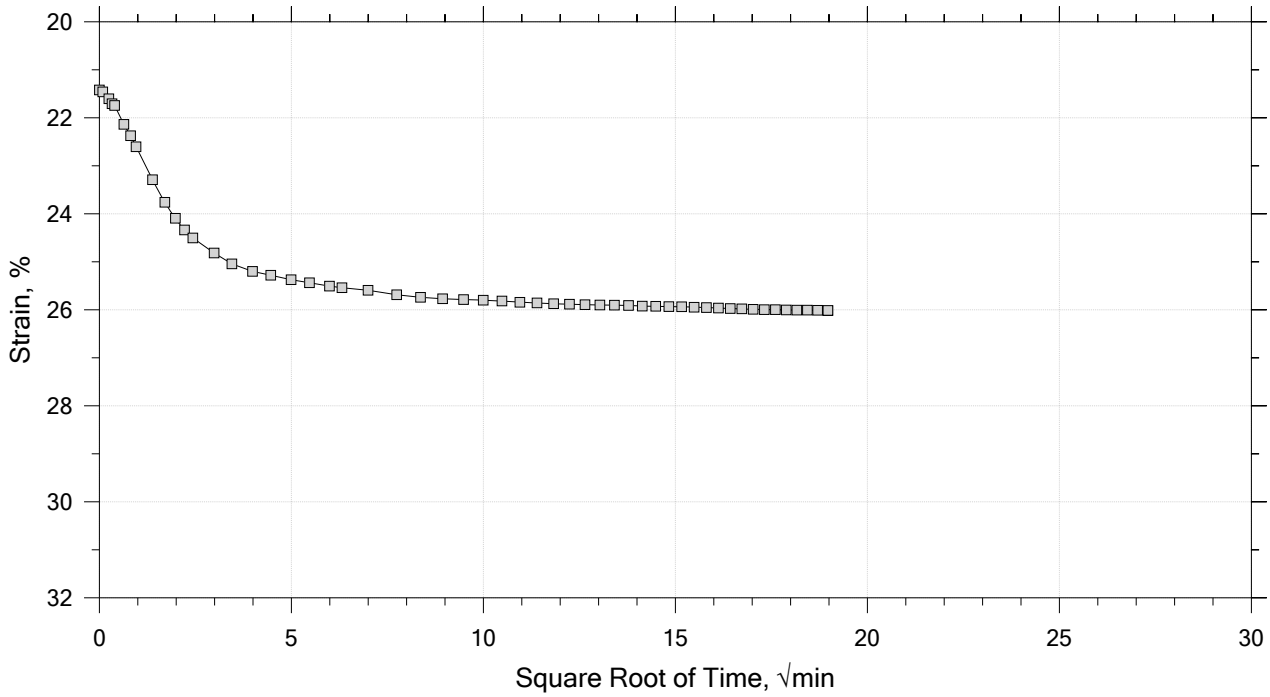
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

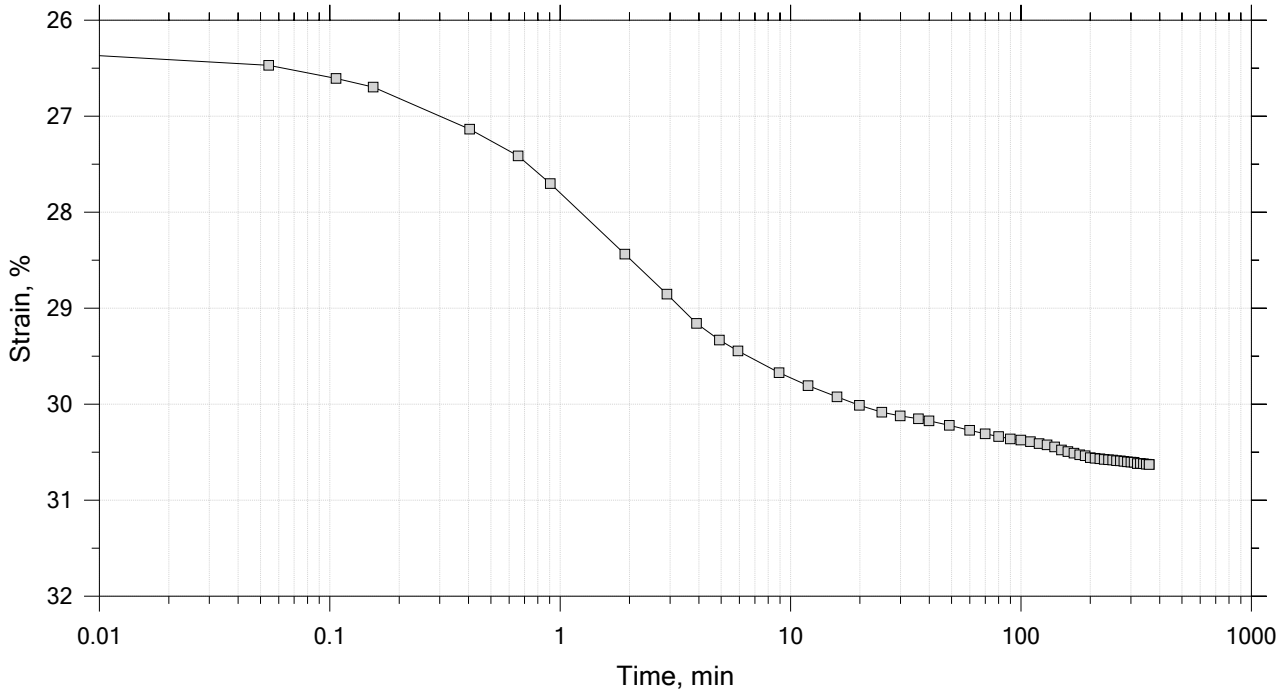


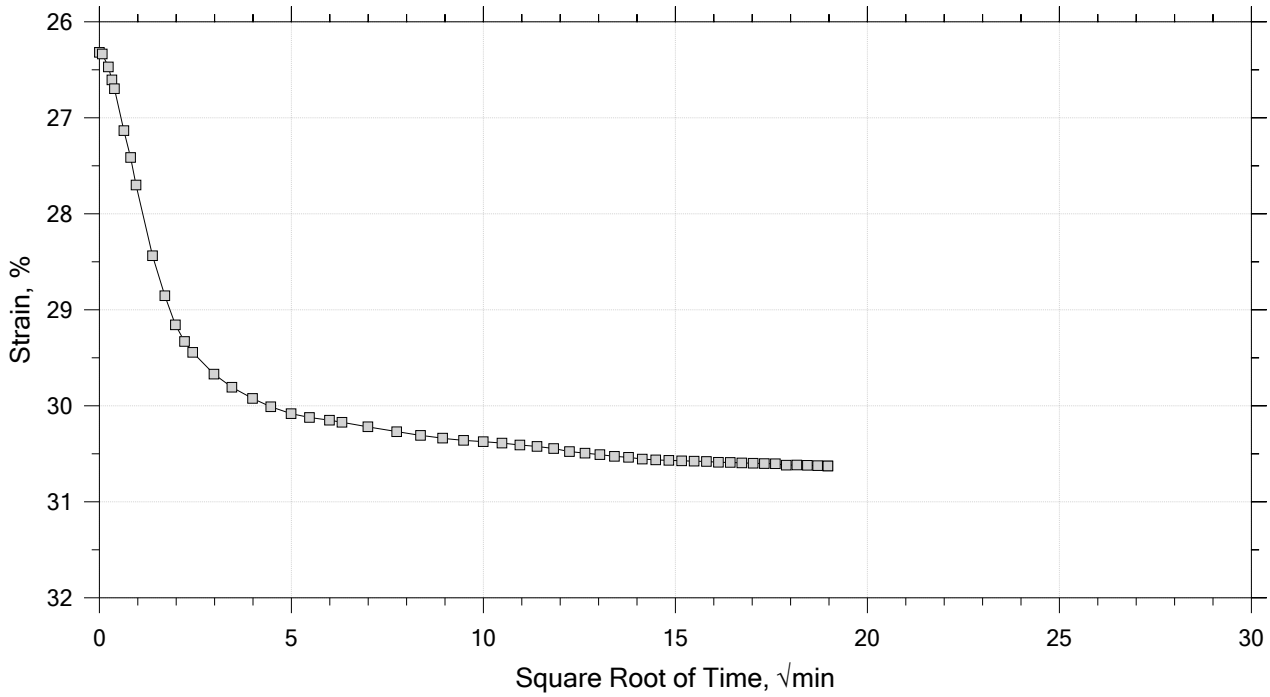


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

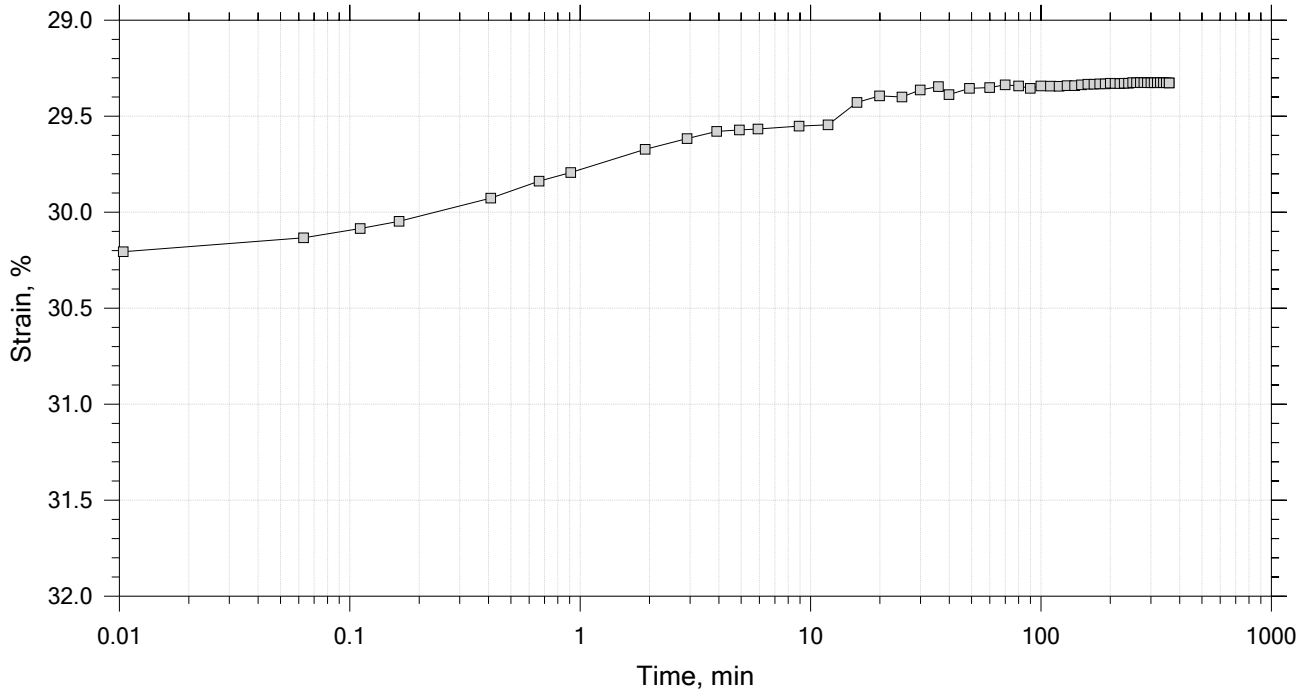


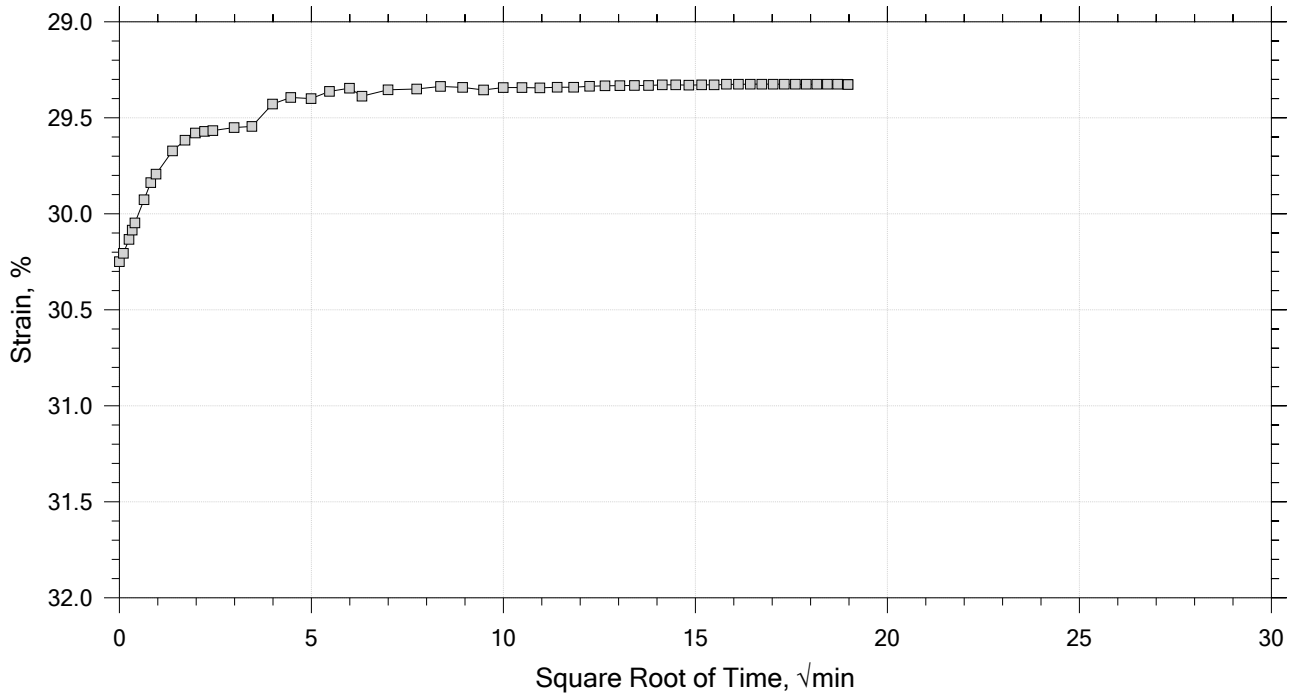


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf

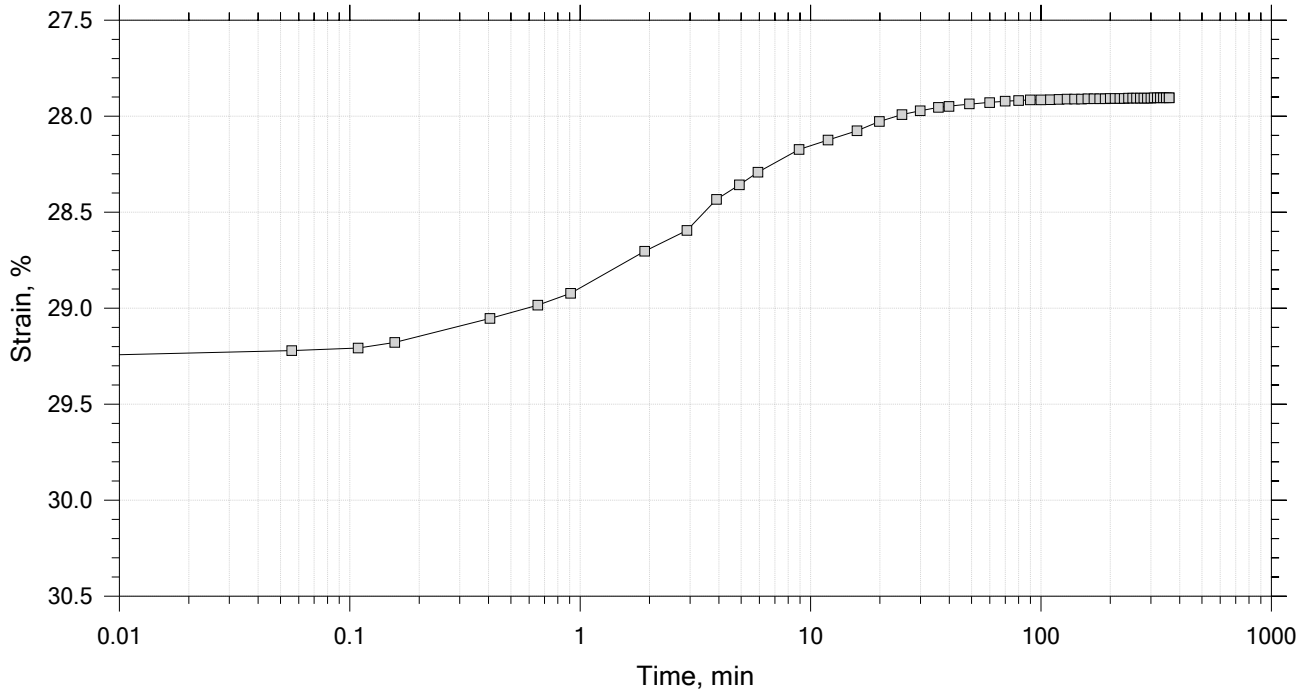


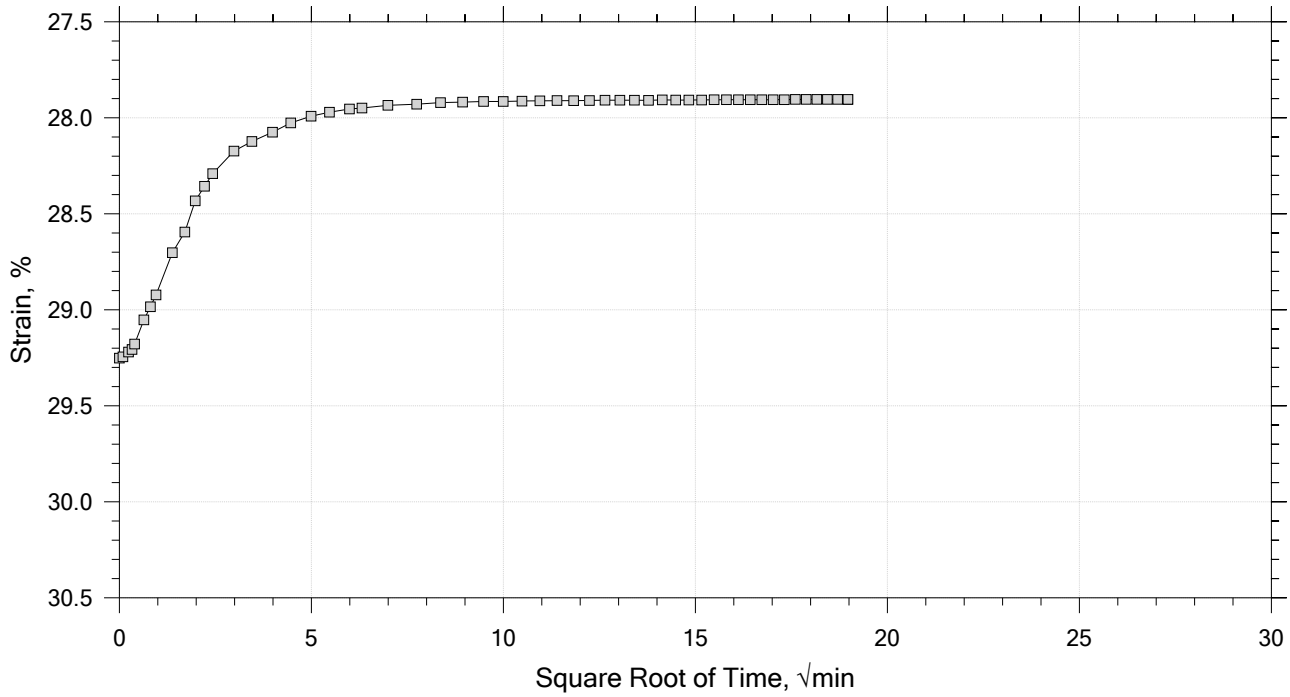


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-207	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

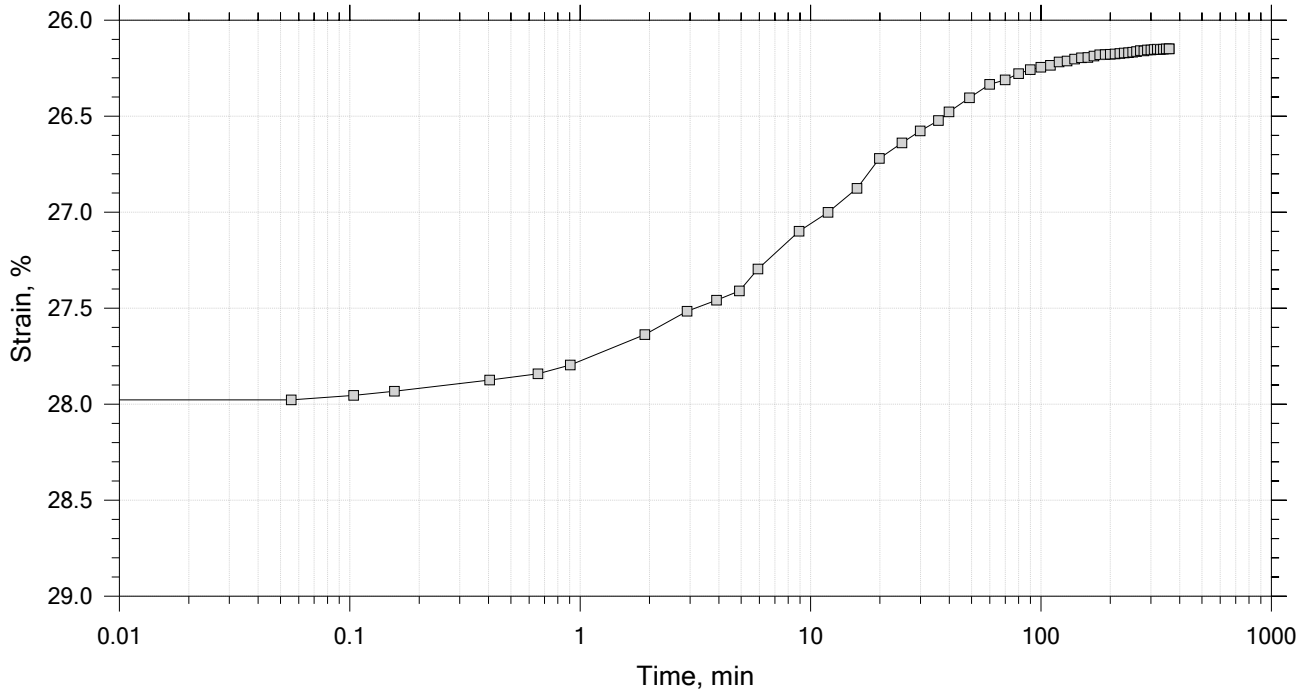


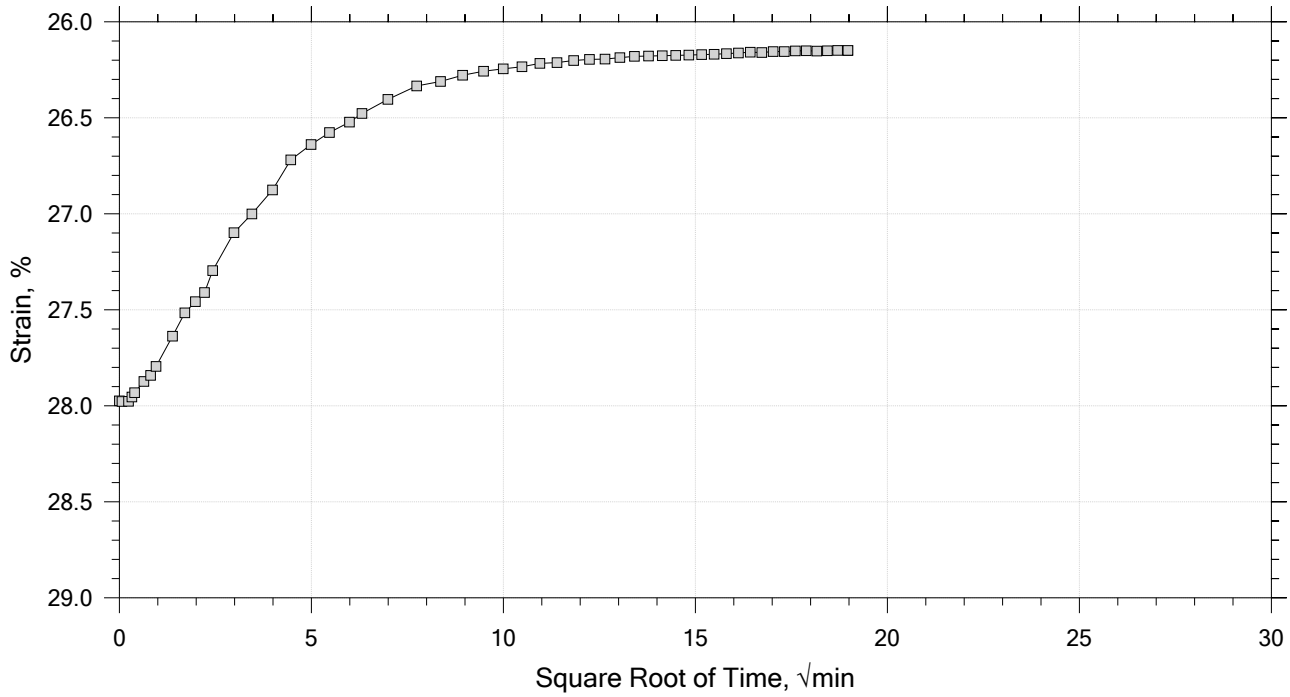


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

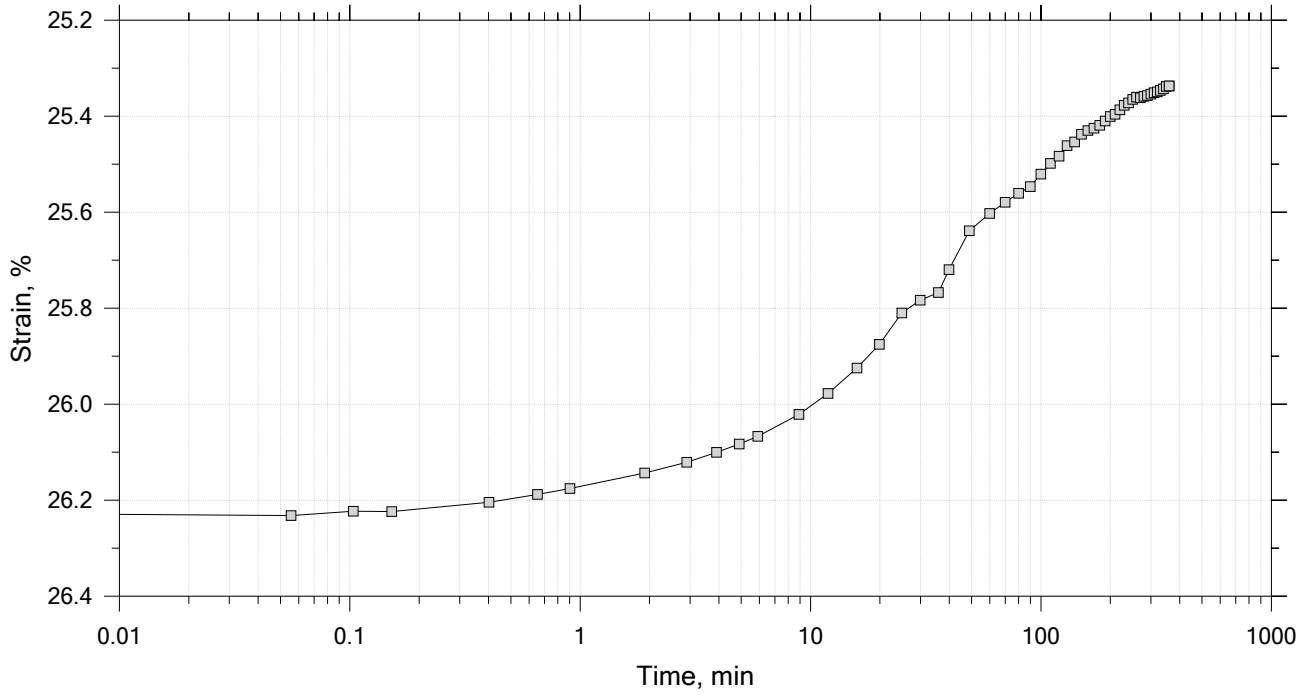


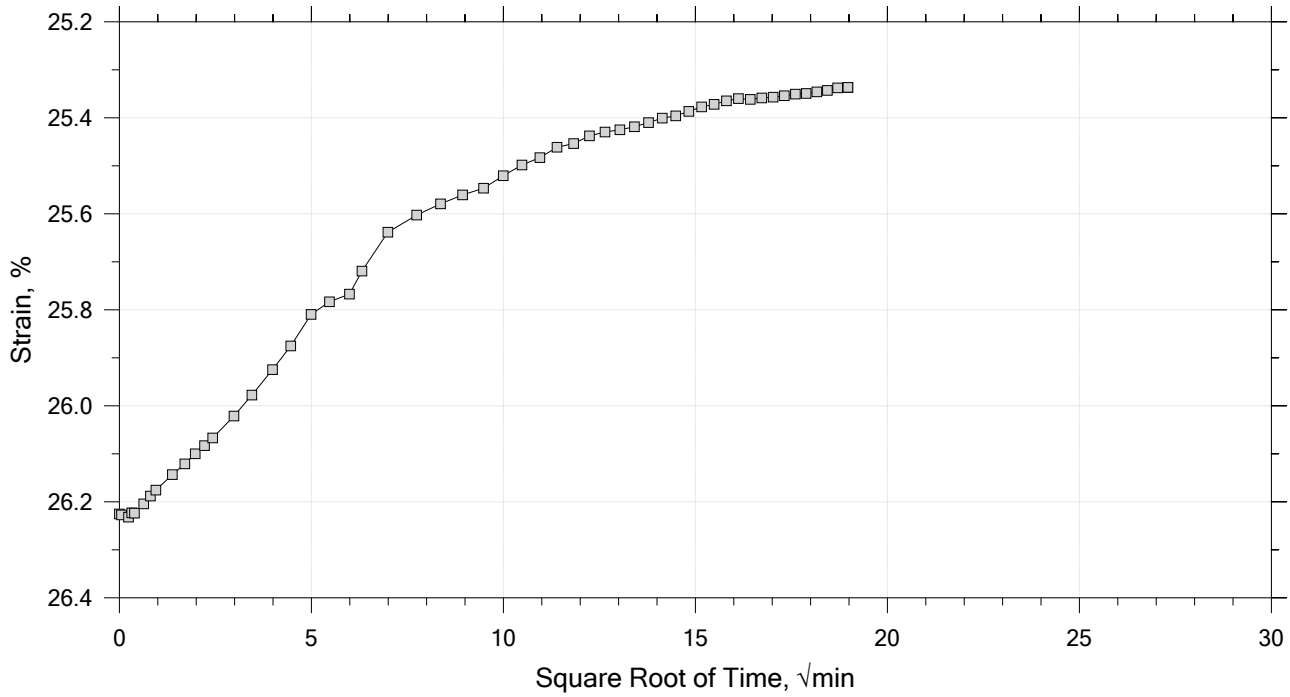


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-207	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.25 tsf

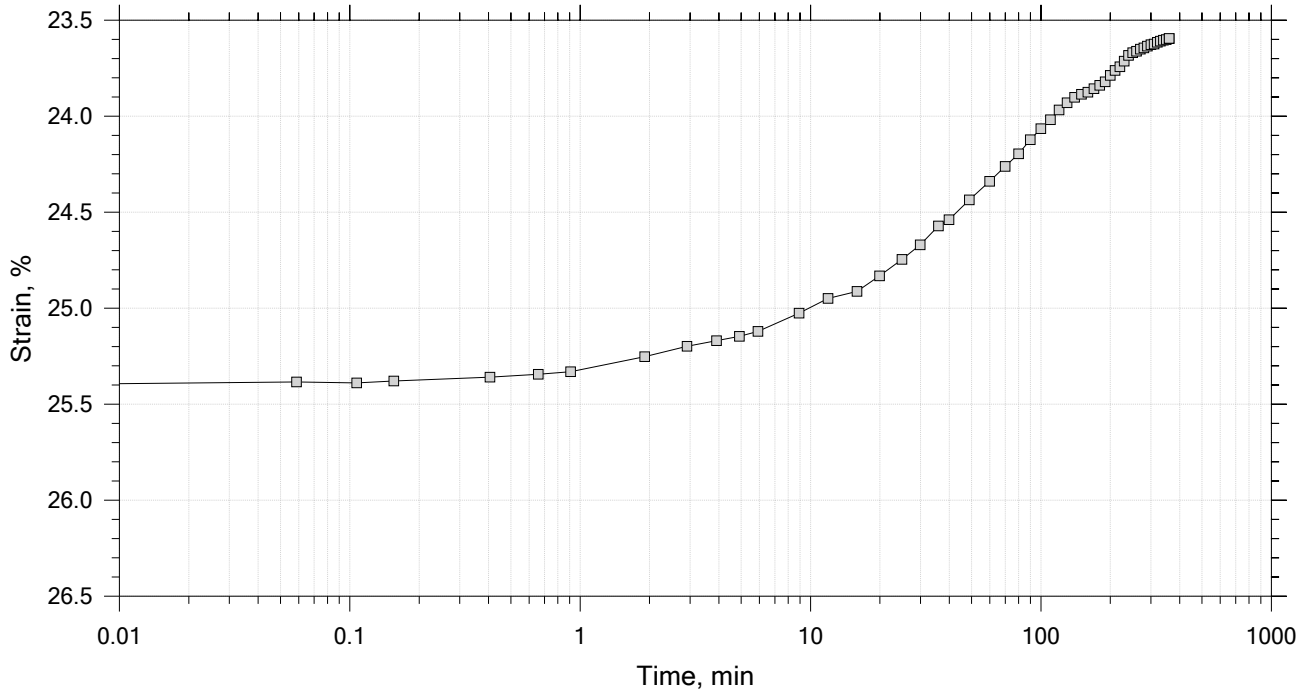


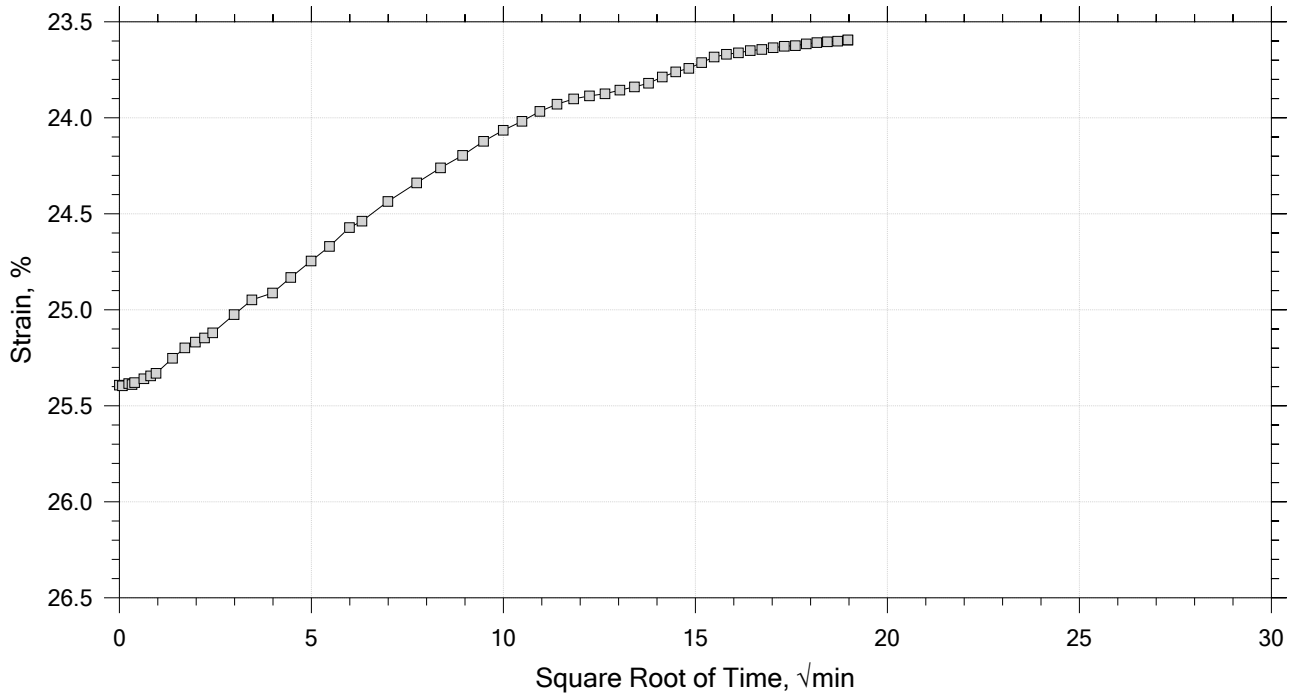


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-207	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 47
Initial Height: 1.00 in	Initial Void Ratio: 1.22	Plastic Limit: 21
Final Height: 0.79 in	Final Void Ratio: 0.756	Plasticity Index: 26

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	A1629	RING		E0947
Mass Container, gm	8.56	107.88	107.88	8.22
Mass Container + Wet Soil, gm	83.81	251.18	234.35	134.26
Mass Container + Dry Soil, gm	60.89	207	207	107
Mass Dry Soil, gm	52.33	99.117	99.117	98.78
Water Content, %	43.80	44.58	27.60	27.60
Void Ratio	---	1.22	0.76	---
Degree of Saturation, %	---	99.86	100.00	---
Dry Unit Weight, pcf	---	76.923	97.371	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

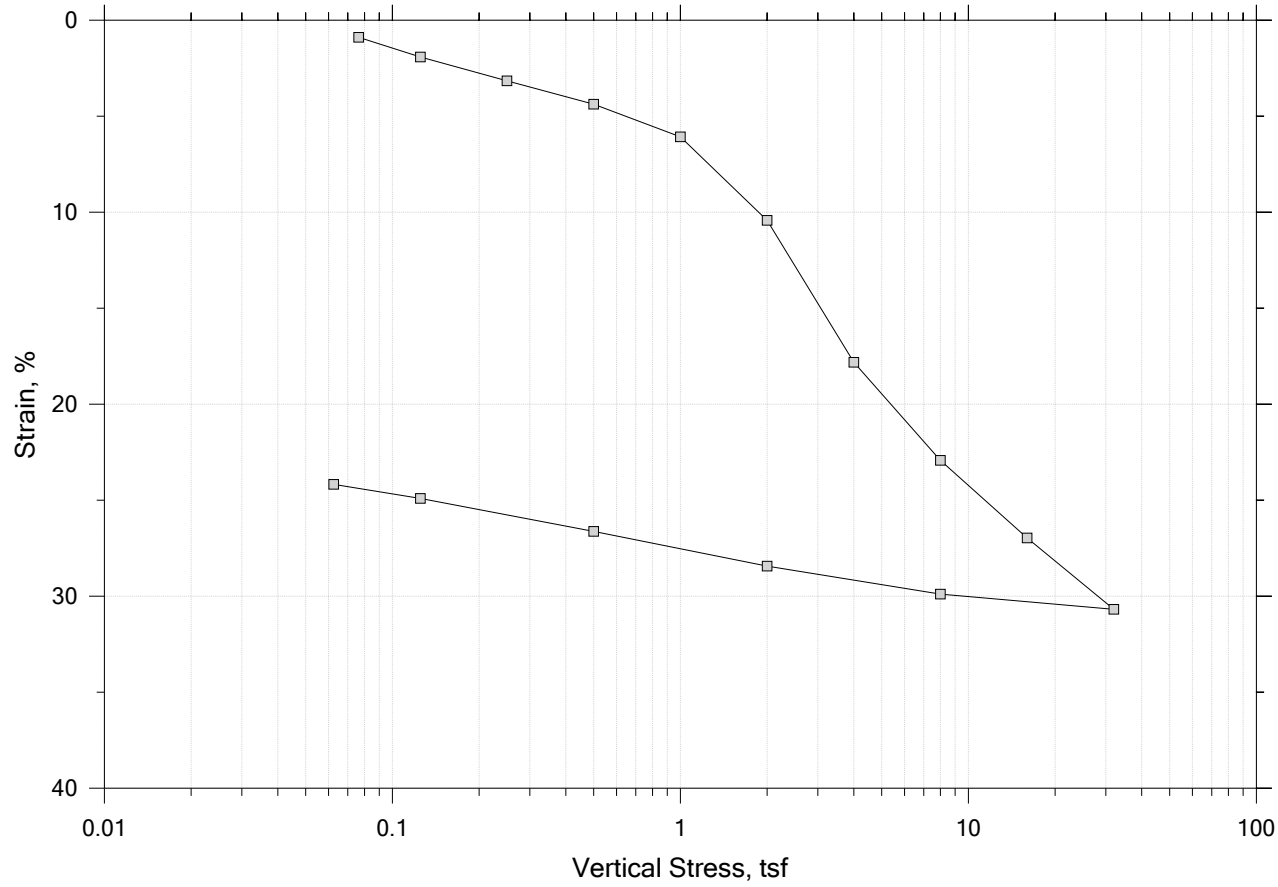
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0651	0.005433	1.21	0.543	14.872	2.36e-04	8.34e-02	3.69e-04
2	0.125	0.01291	1.19	1.29	14.190	2.44e-04	1.25e-01	5.72e-04
3	0.250	0.02730	1.16	2.73	19.857	1.71e-04	1.15e-01	3.69e-04
4	0.500	0.03494	1.14	3.49	14.711	2.25e-04	3.05e-02	1.29e-04
5	1.00	0.04608	1.12	4.61	19.494	1.67e-04	2.23e-02	6.96e-05
6	2.00	0.07954	1.05	7.95	32.257	9.62e-05	3.35e-02	6.03e-05
7	4.00	0.1517	0.885	15.2	39.363	7.02e-05	3.61e-02	4.75e-05
8	8.00	0.2089	0.758	20.9	18.391	1.29e-04	1.43e-02	3.46e-05
9	16.0	0.2601	0.644	26.0	13.024	1.59e-04	6.40e-03	1.91e-05
10	32.0	0.3063	0.542	30.6	9.003	2.02e-04	2.88e-03	1.09e-05
11	8.00	0.2933	0.571	29.3	4.168	4.16e-04	5.42e-04	4.22e-06
12	2.00	0.2790	0.602	27.9	12.954	1.39e-04	2.37e-03	6.17e-06
13	0.500	0.2615	0.641	26.1	42.094	4.47e-05	1.17e-02	9.80e-06
14	0.250	0.2534	0.659	25.3	122.849	1.59e-05	3.25e-02	9.65e-06
15	0.0625	0.2359	0.698	23.6	174.684	1.15e-05	9.29e-02	2.01e-05

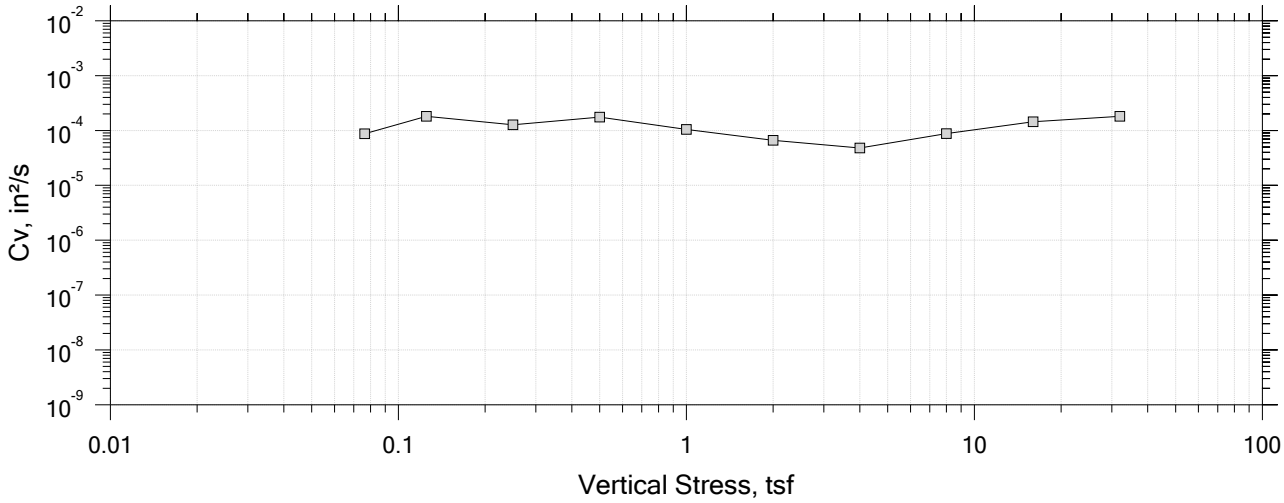
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

B-208 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





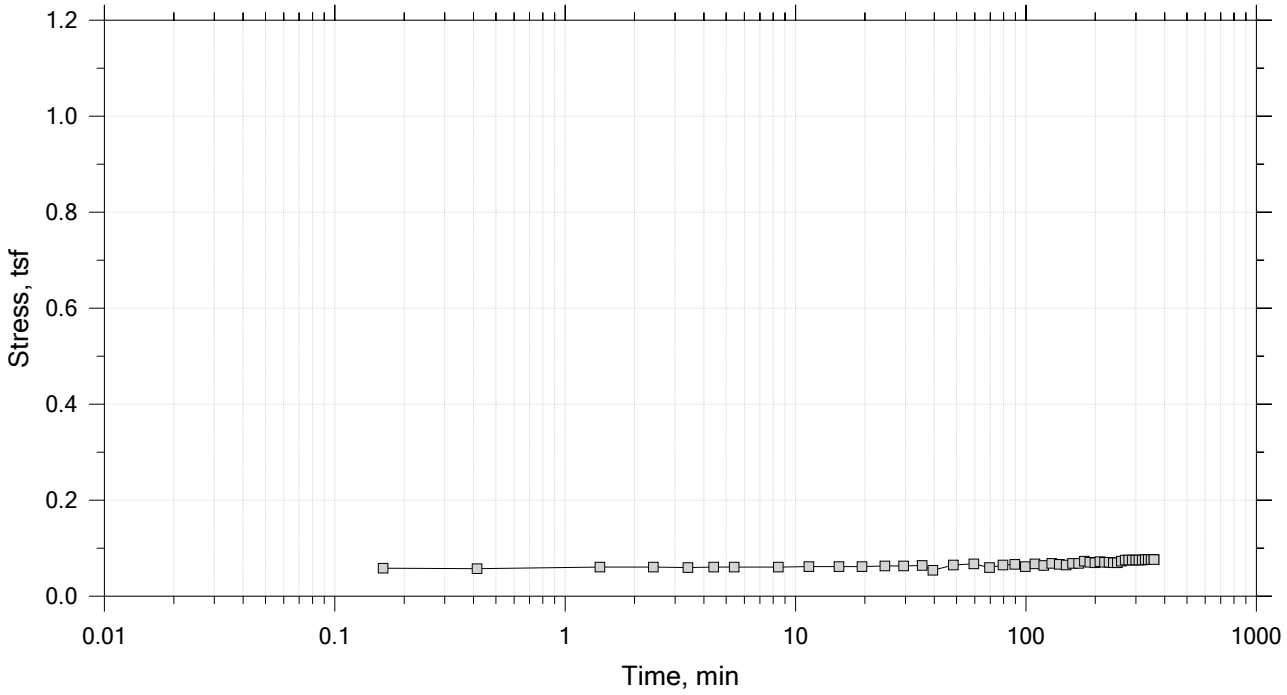
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

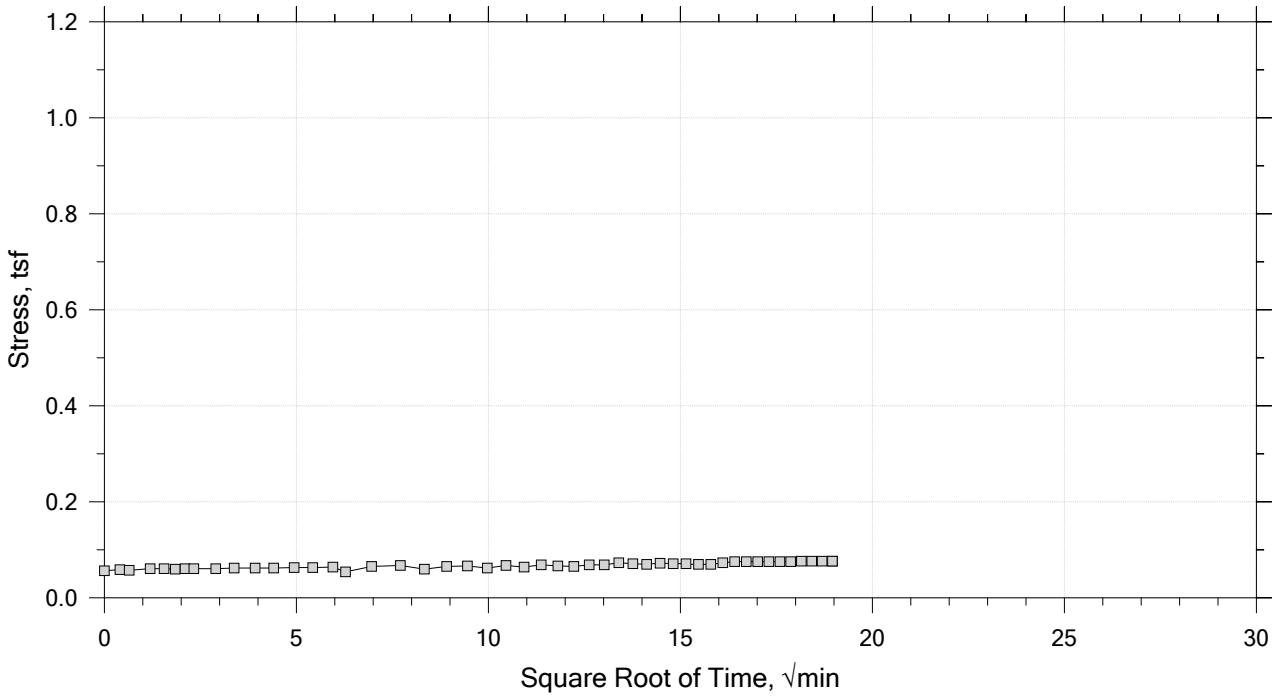
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0763 tsf

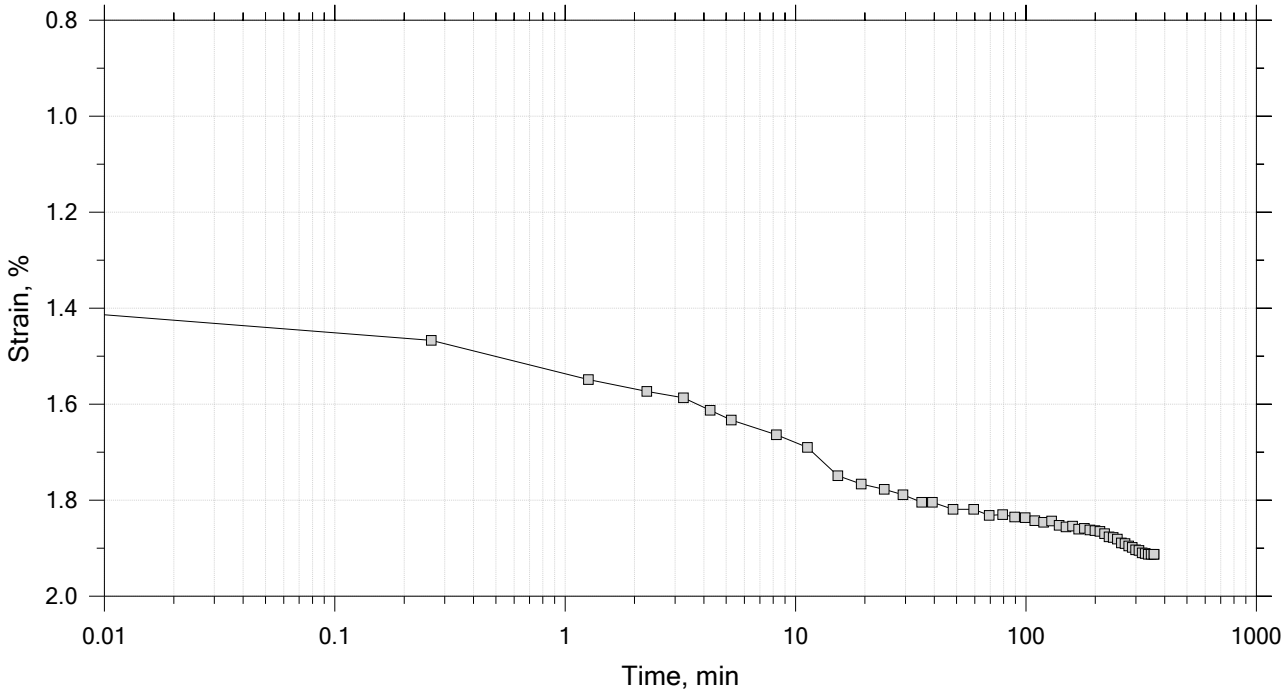


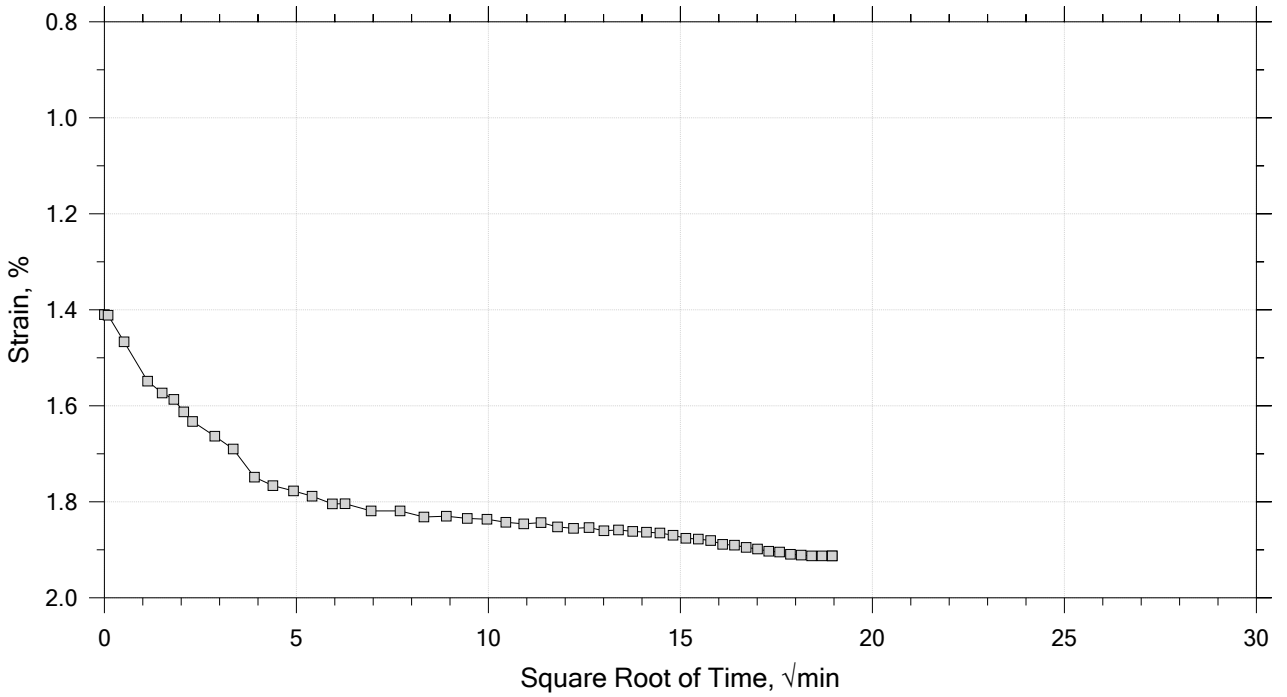


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

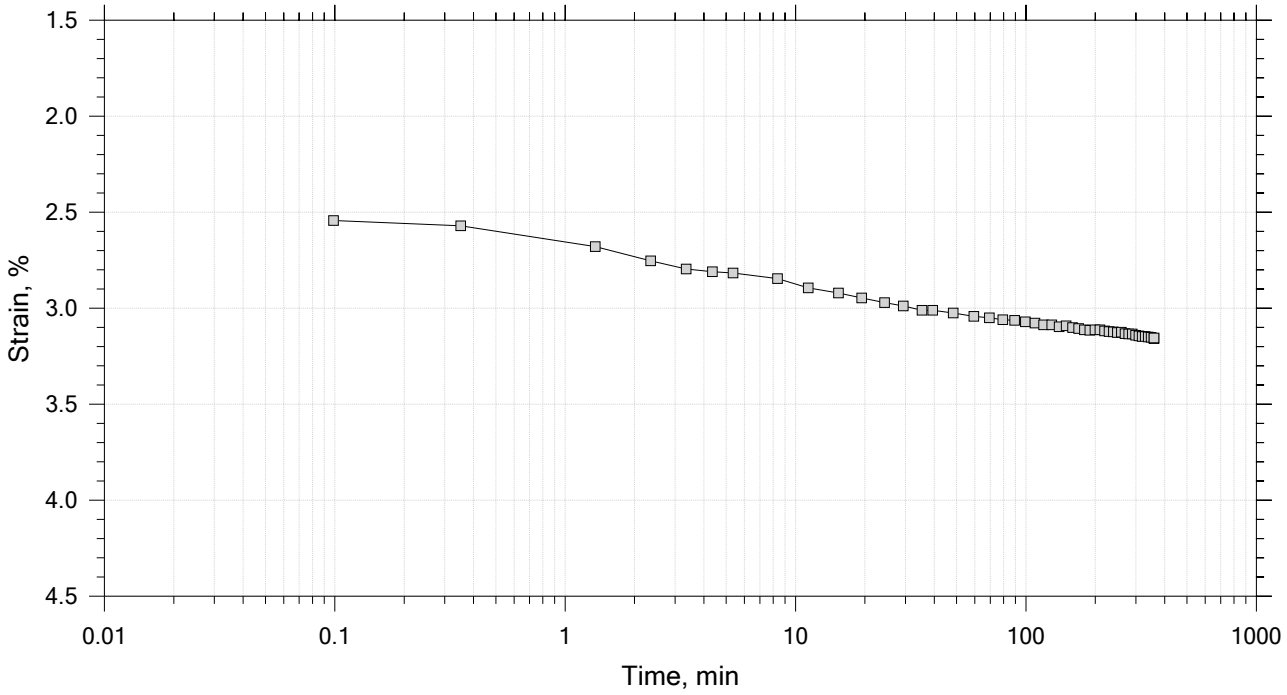


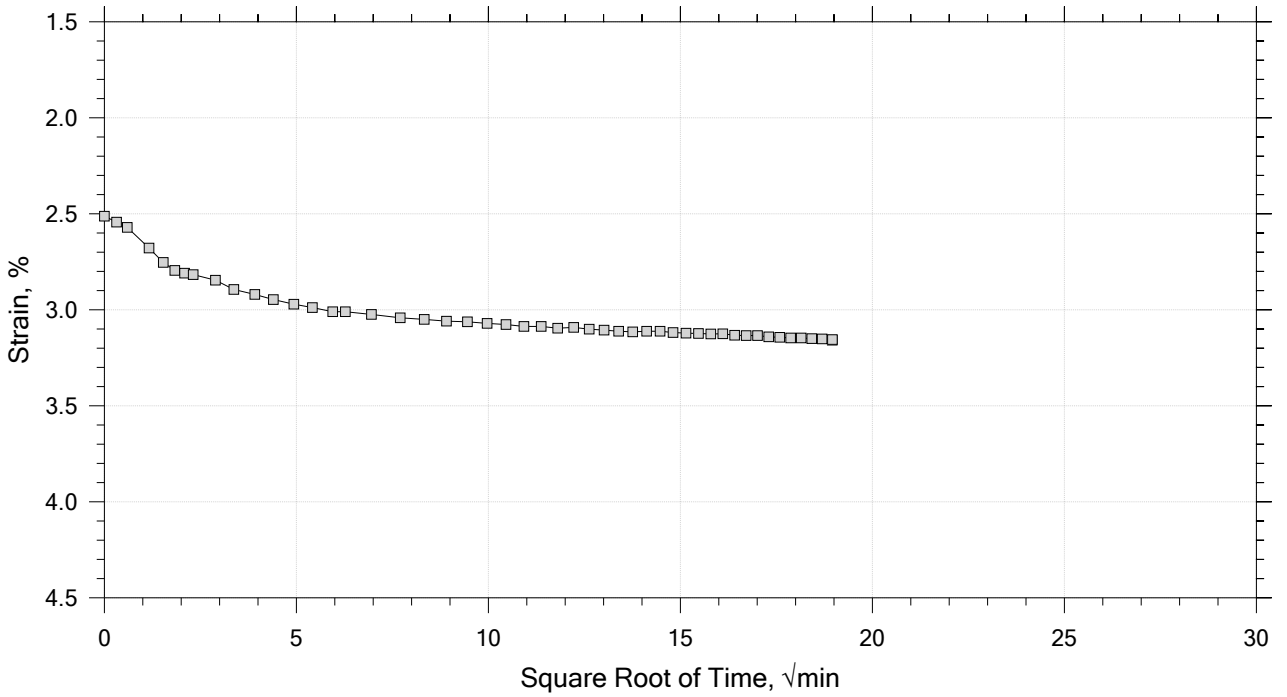


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf





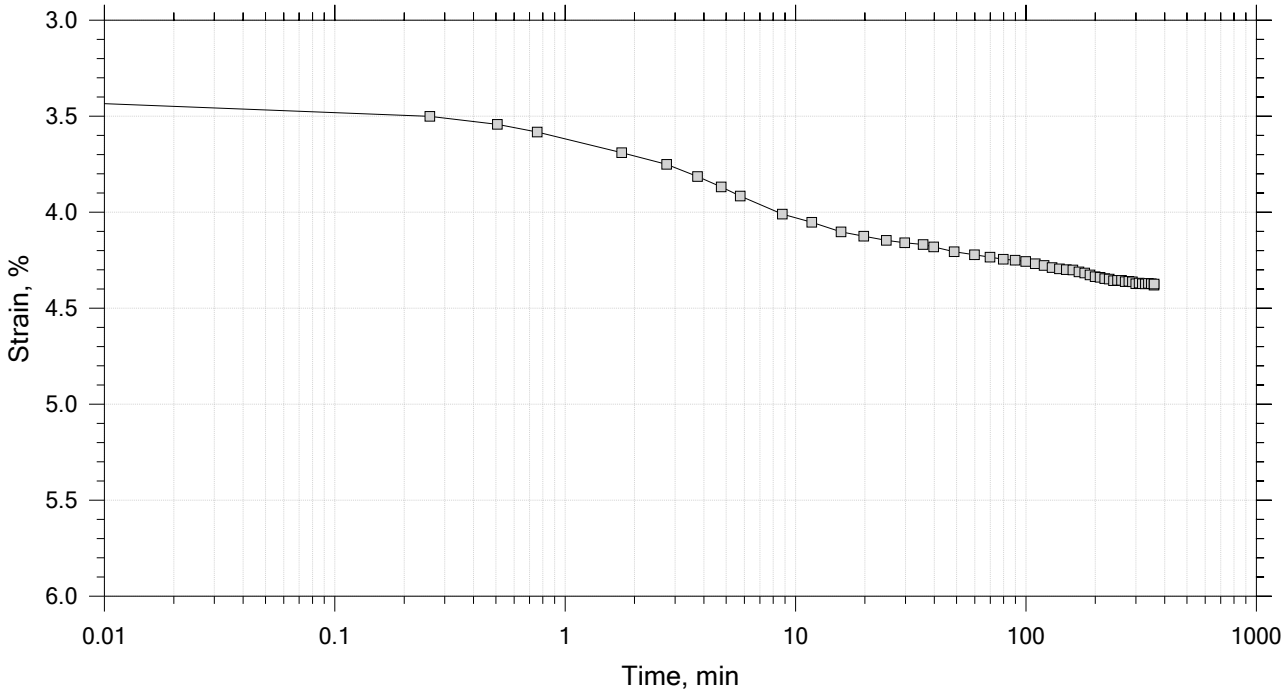
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

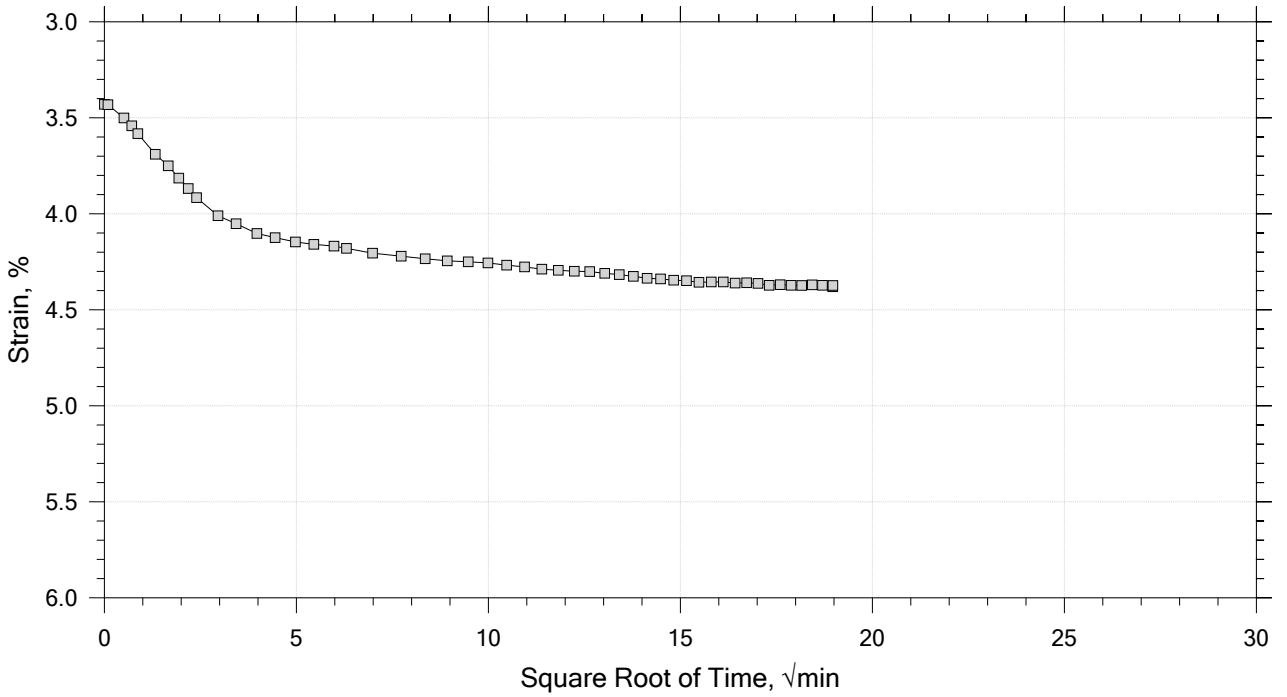
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf





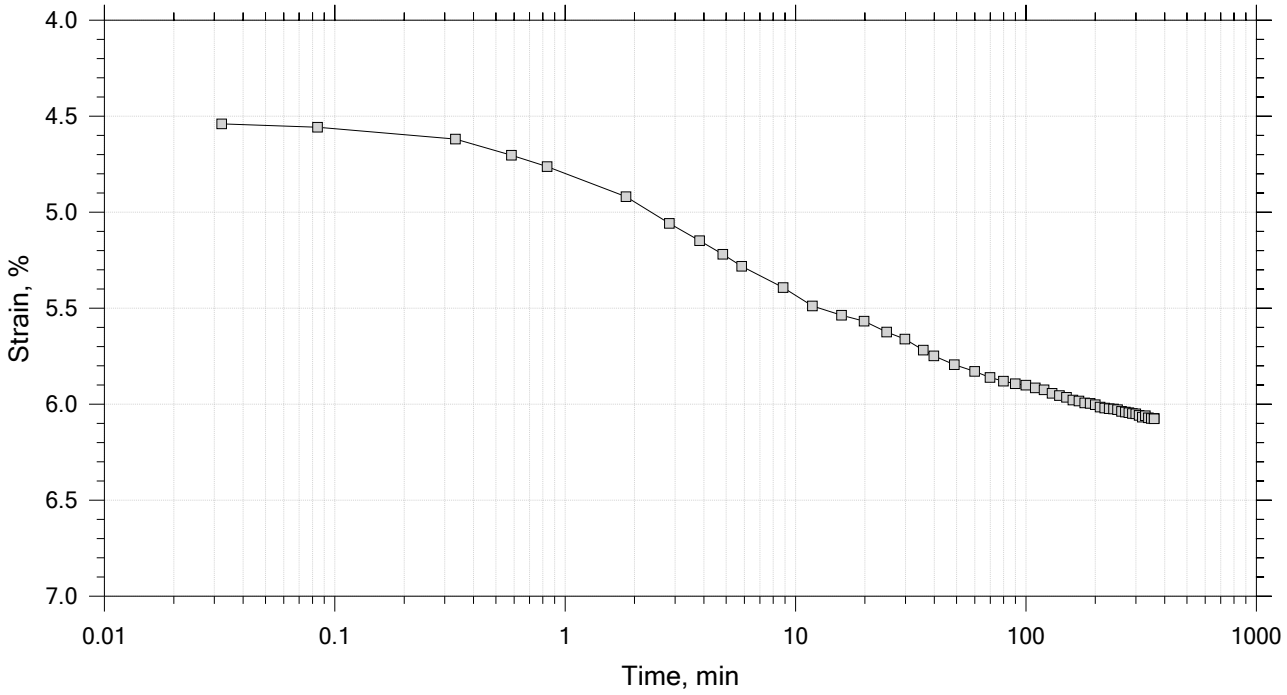
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

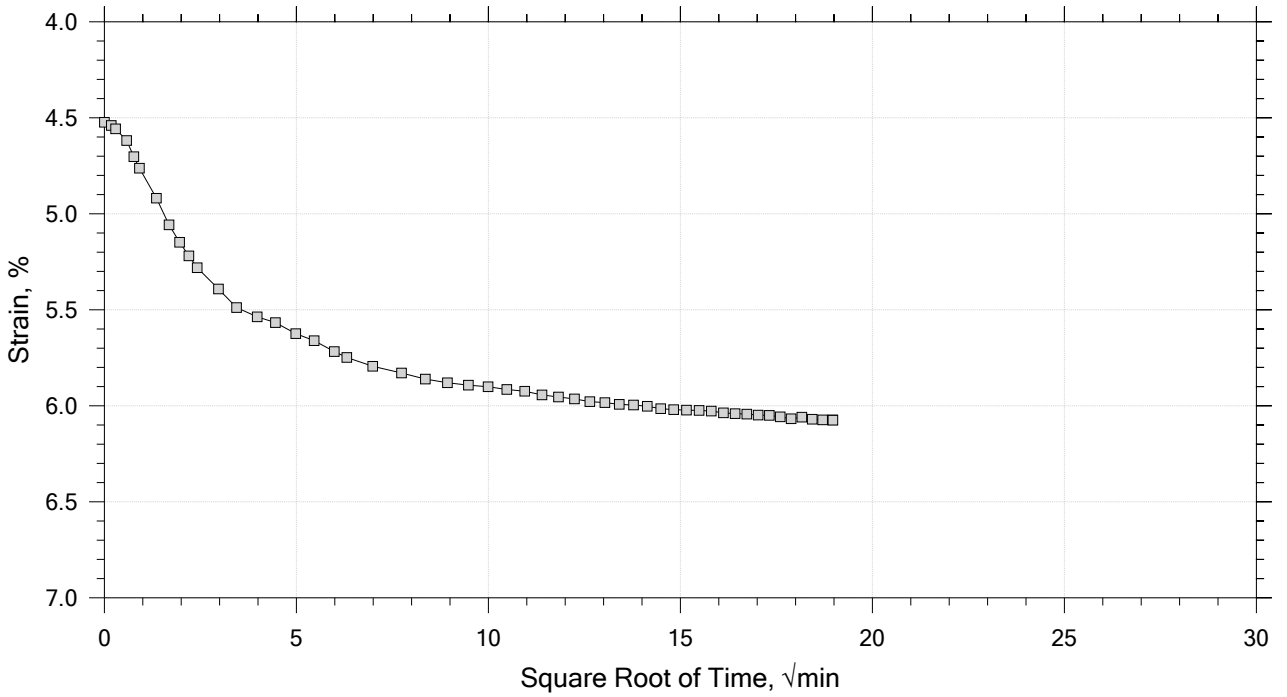
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





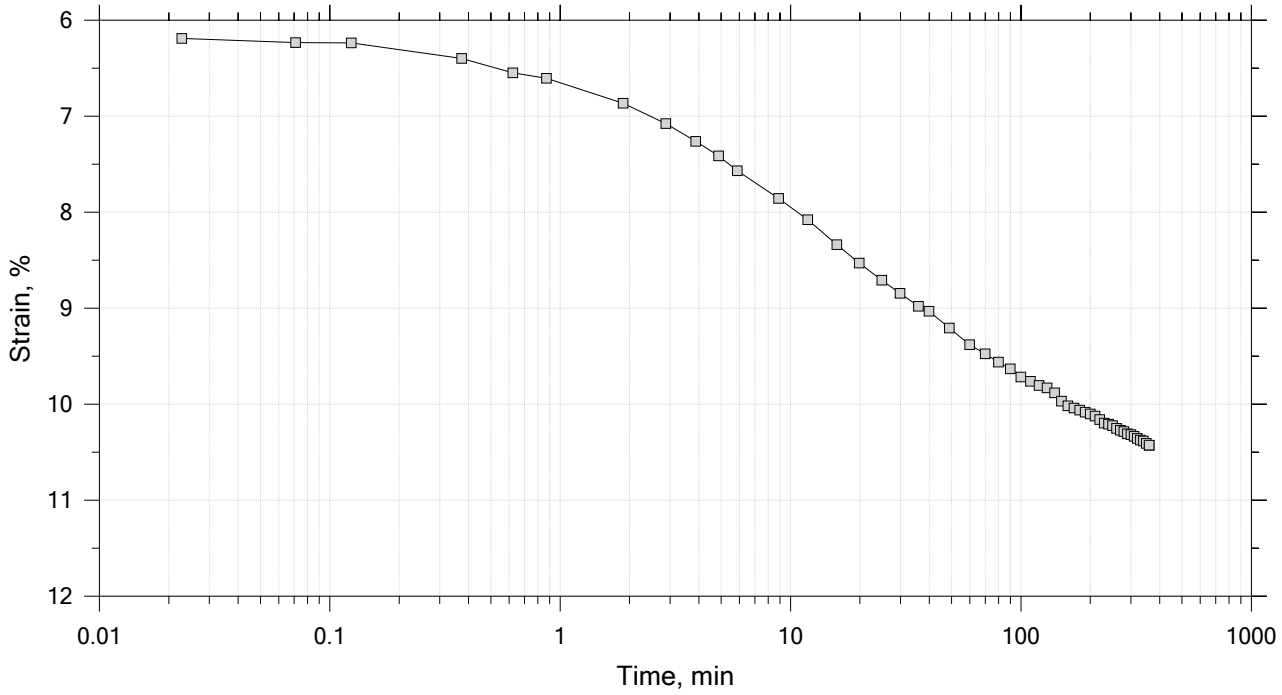
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

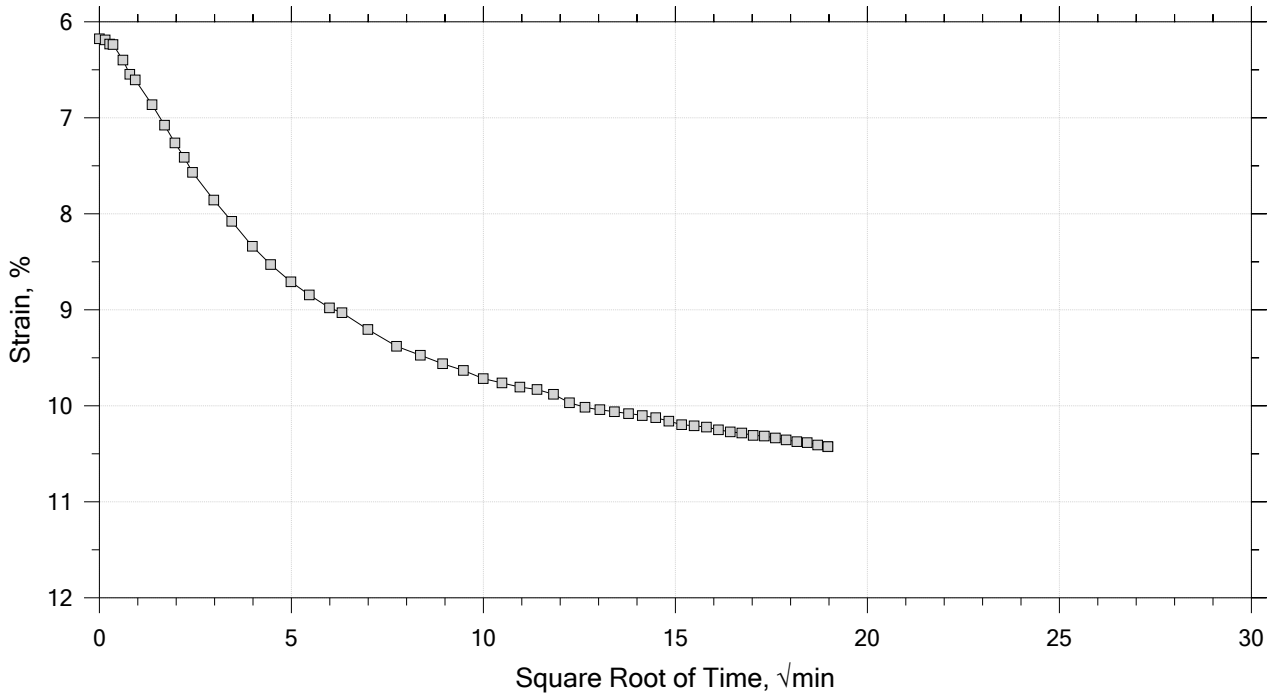
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





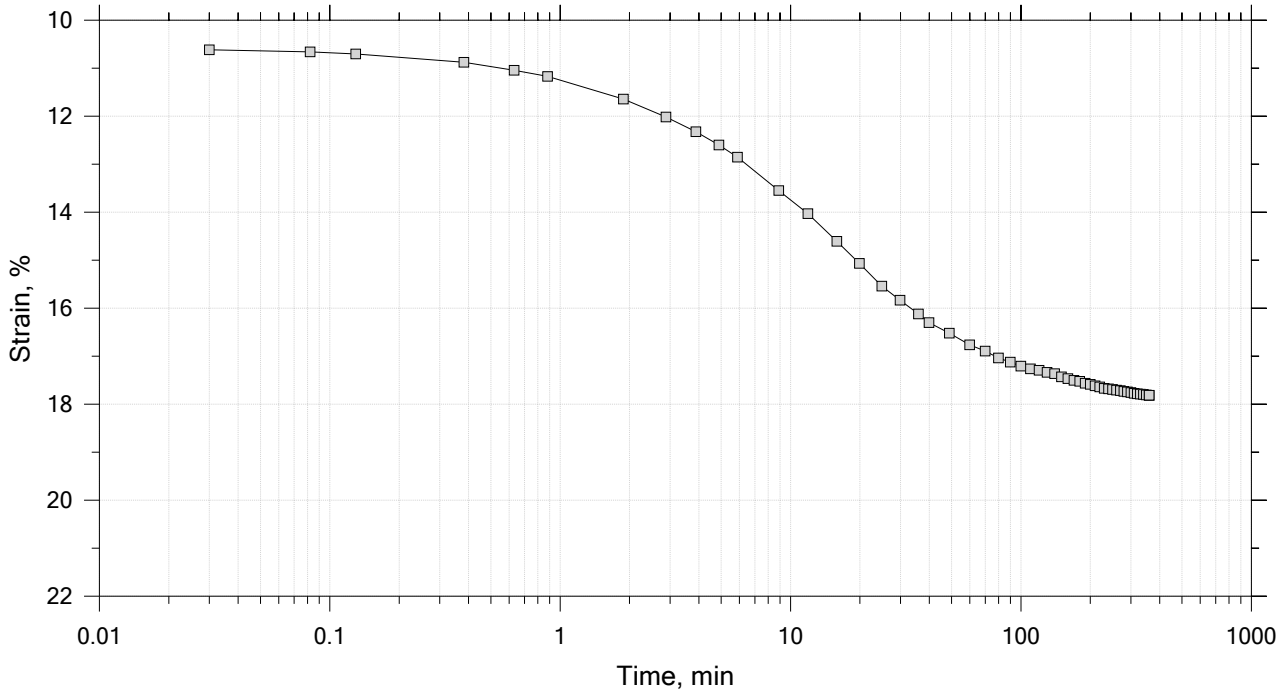
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

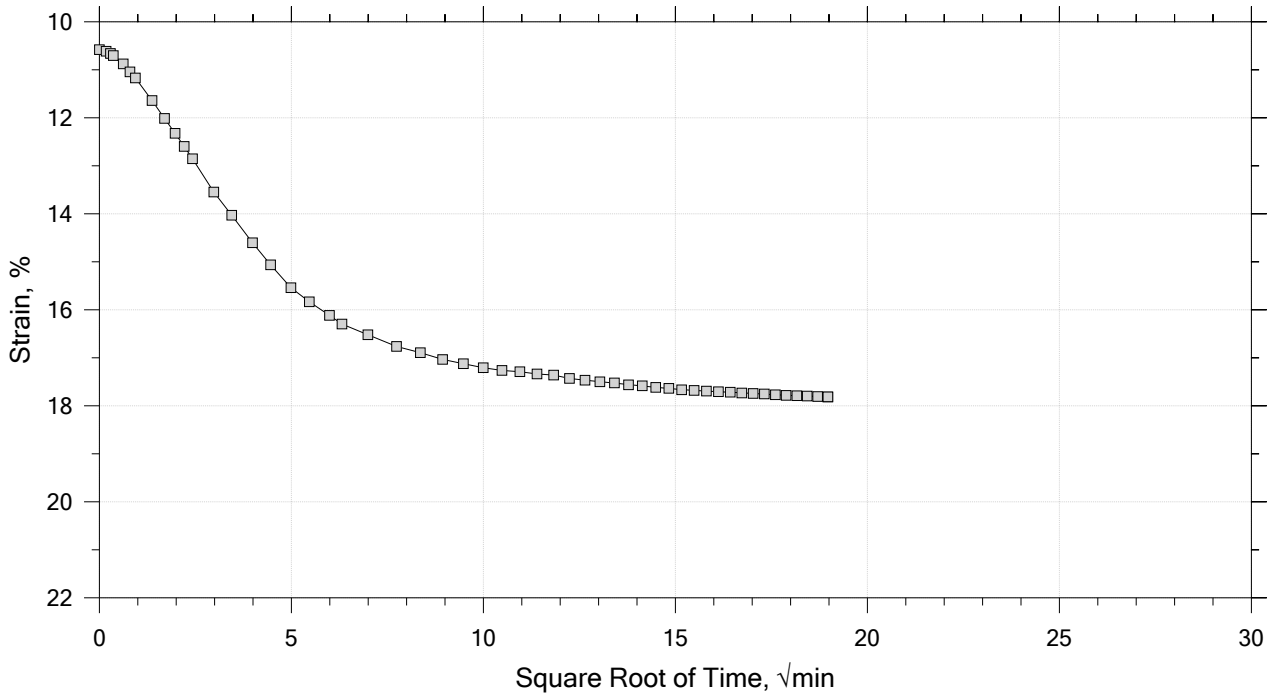
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





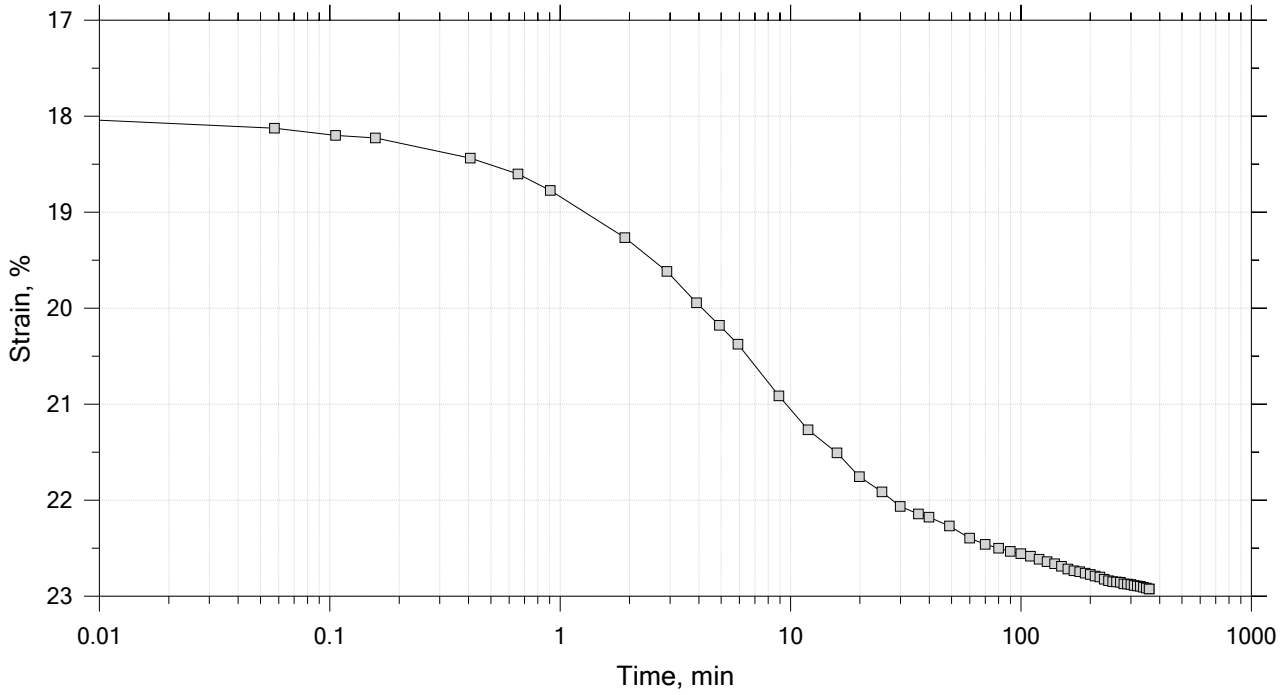
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

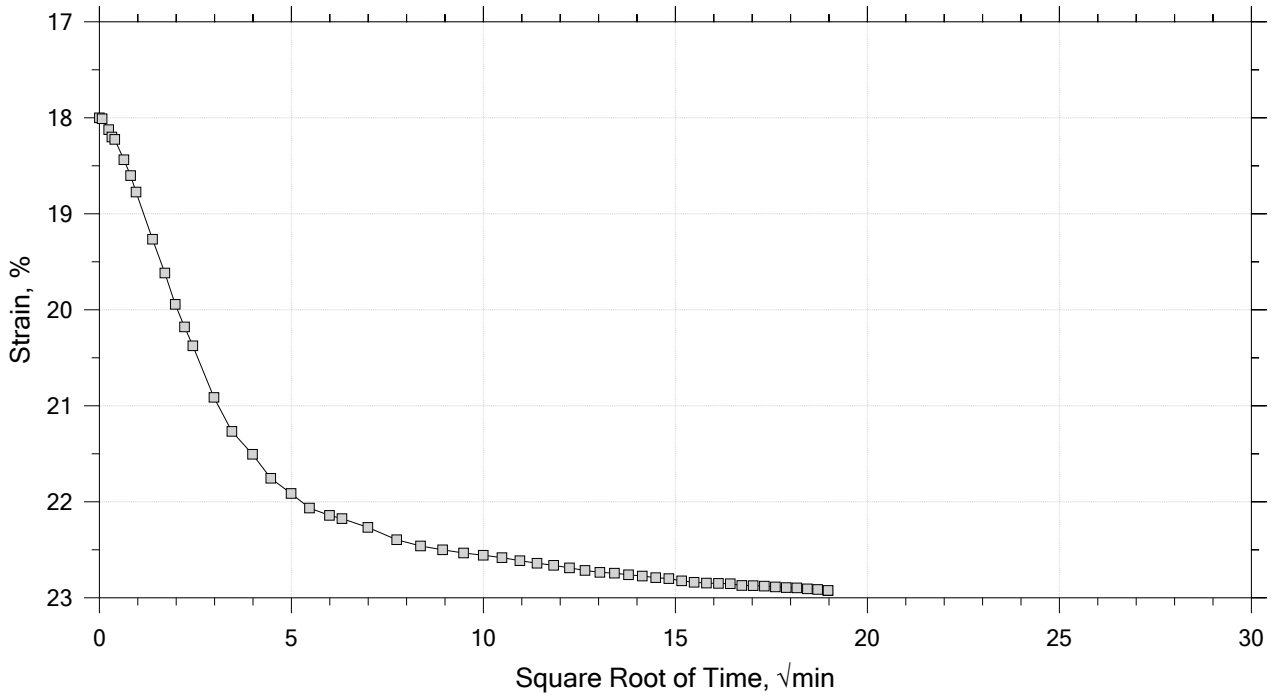
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





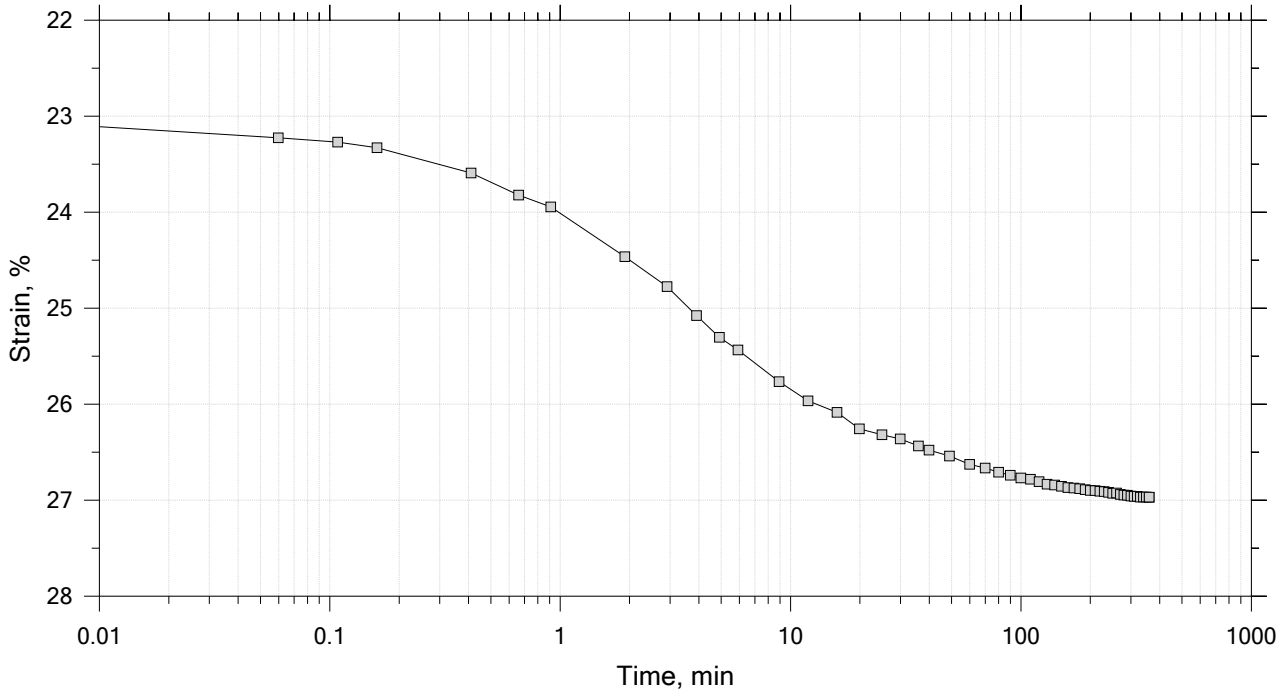
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

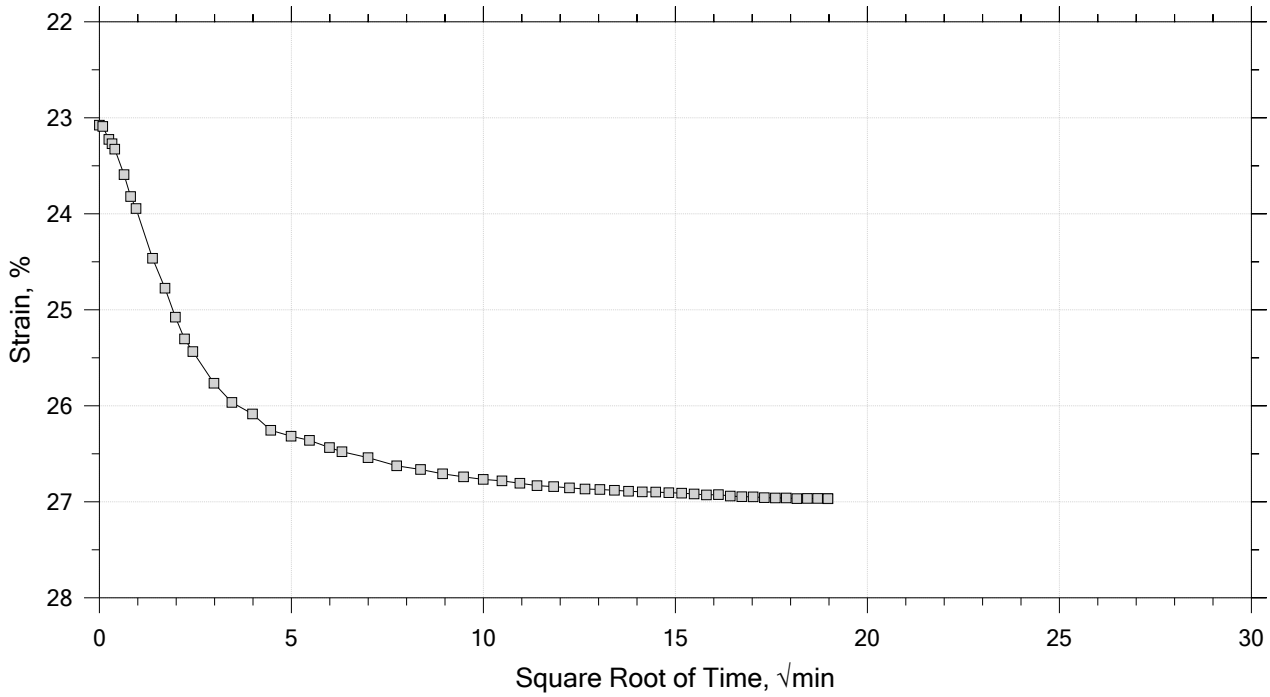
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

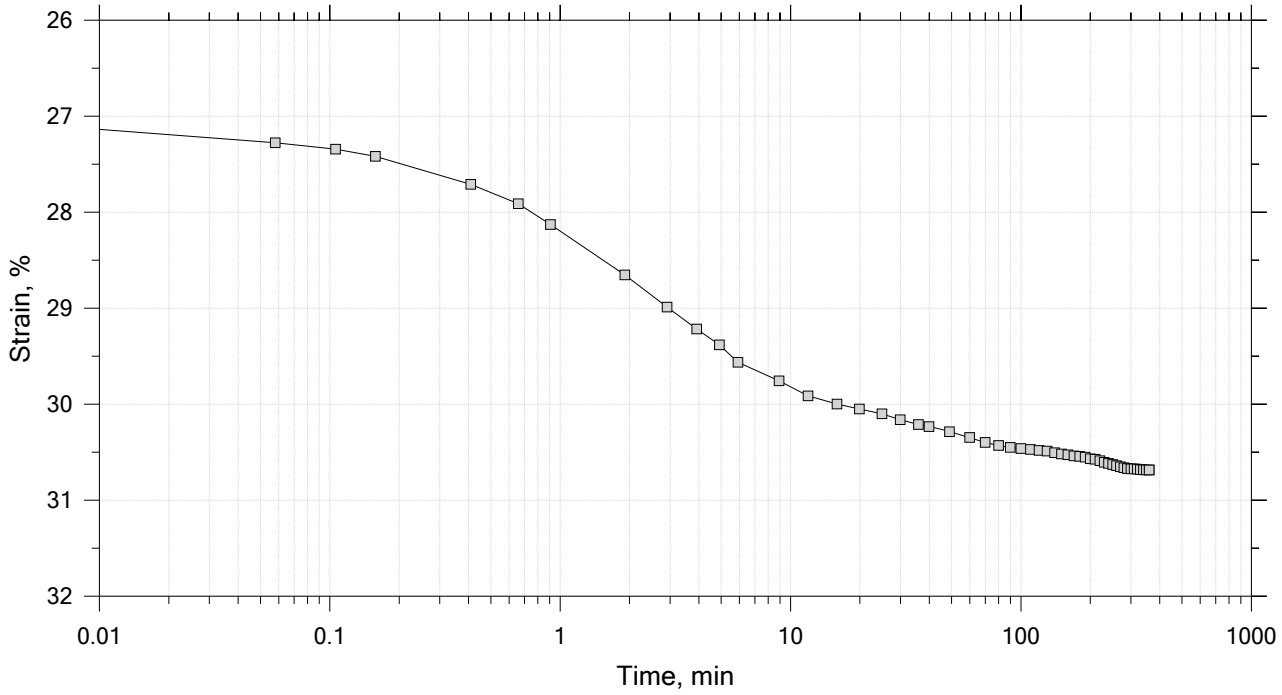


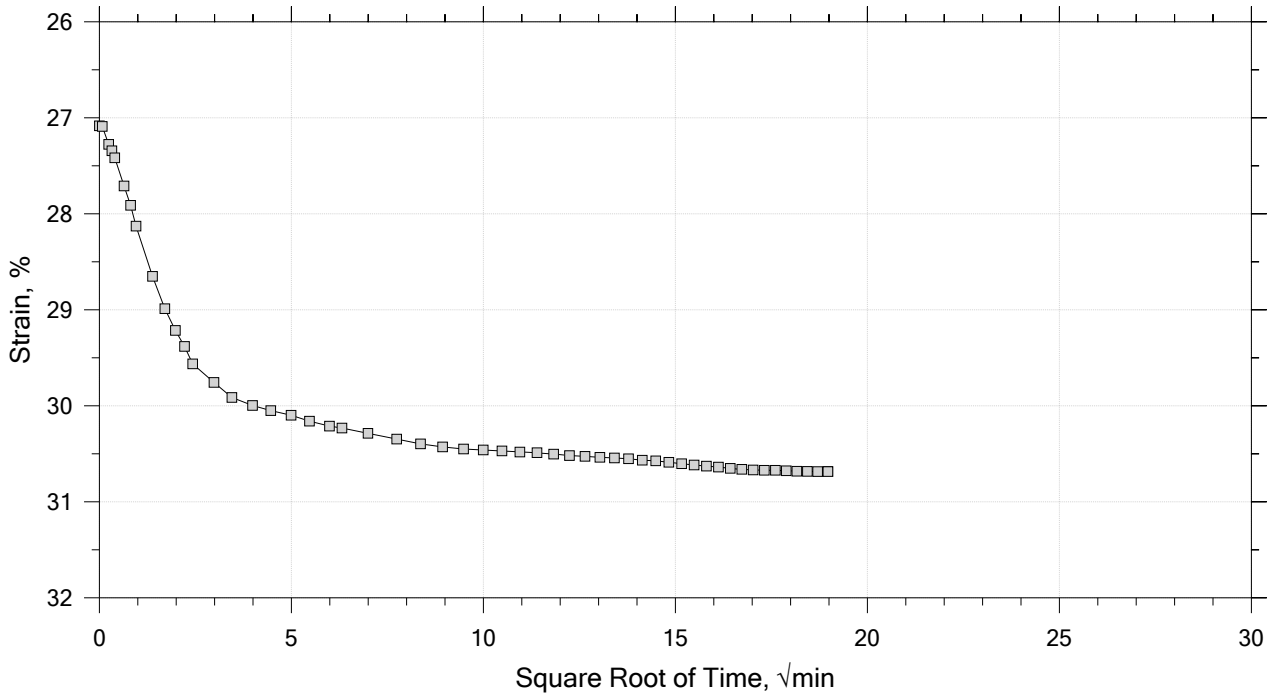


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

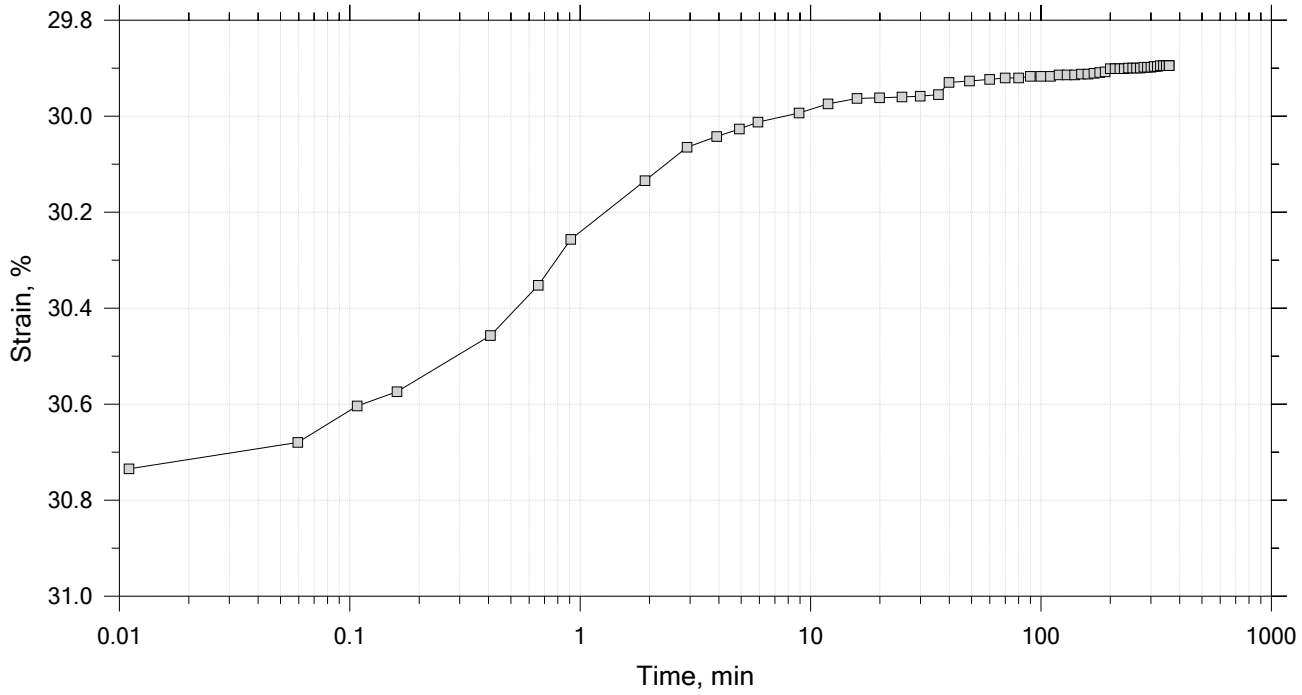


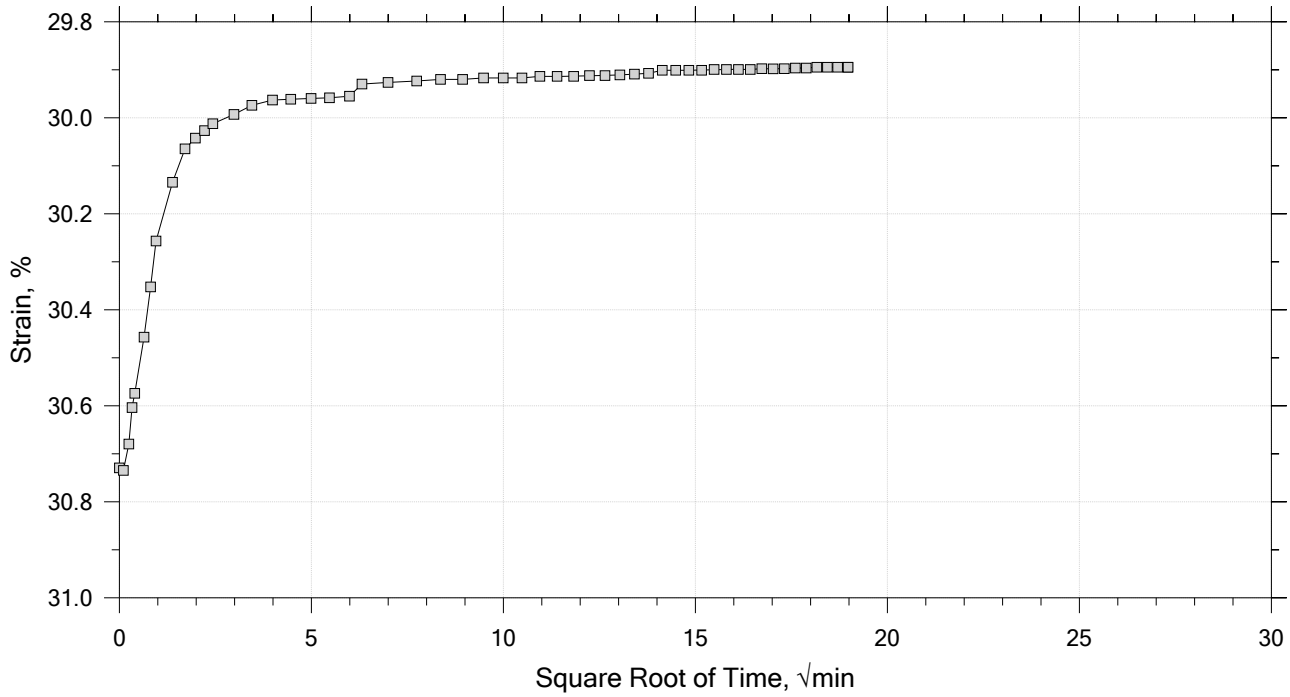


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





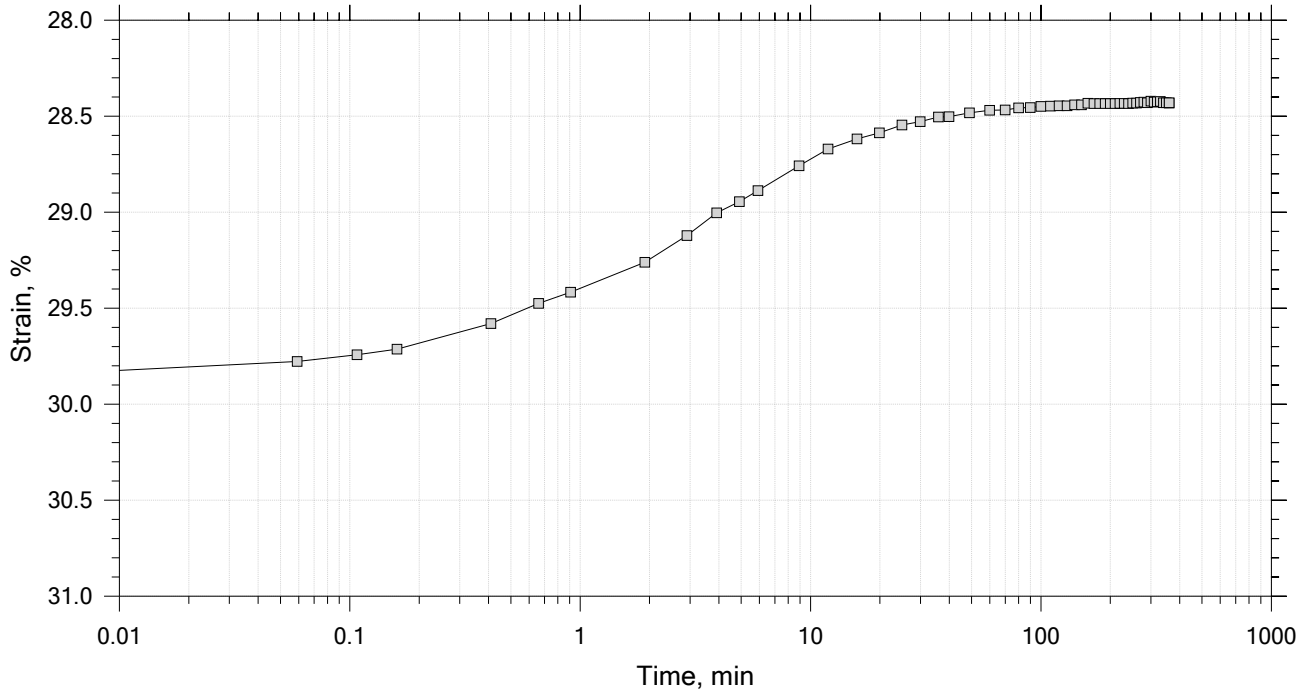
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

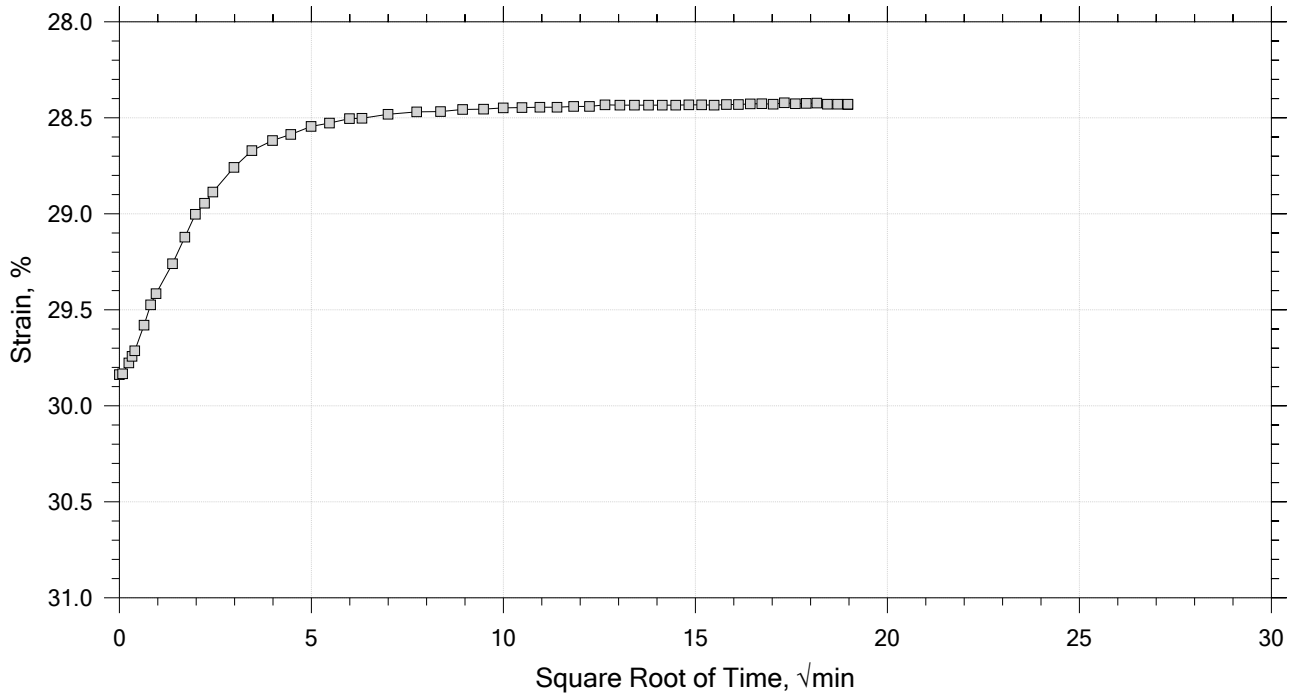
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

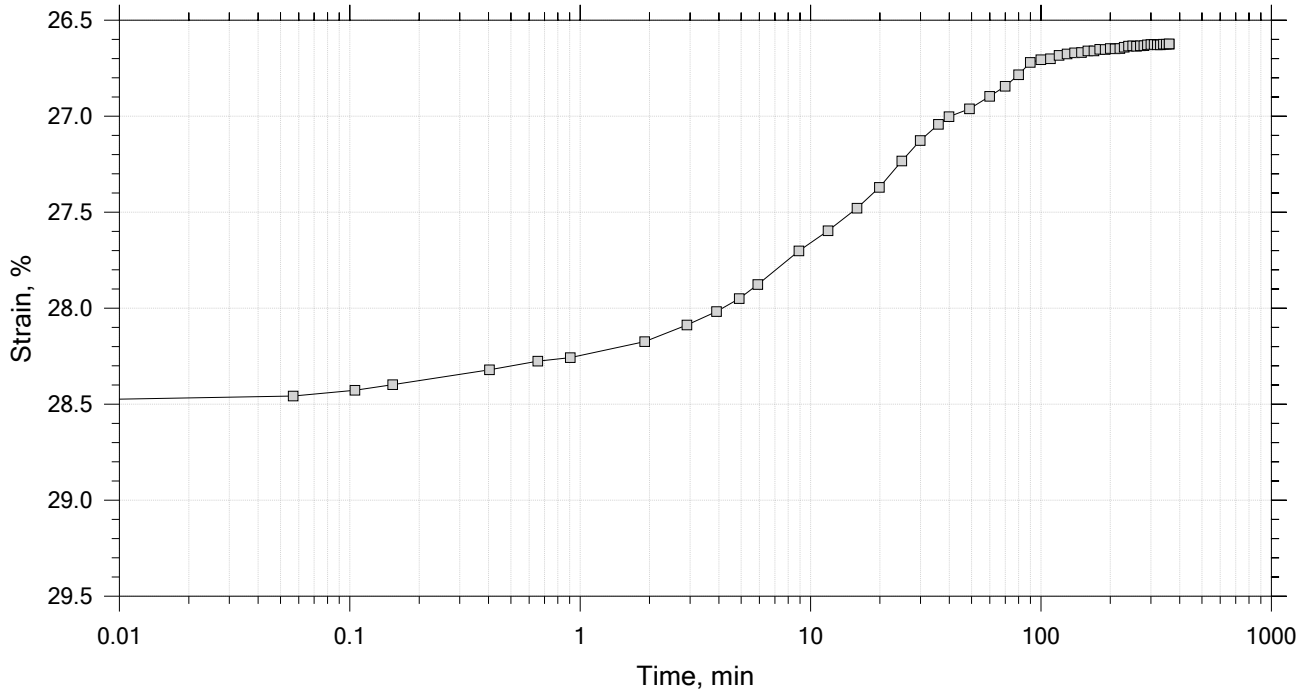


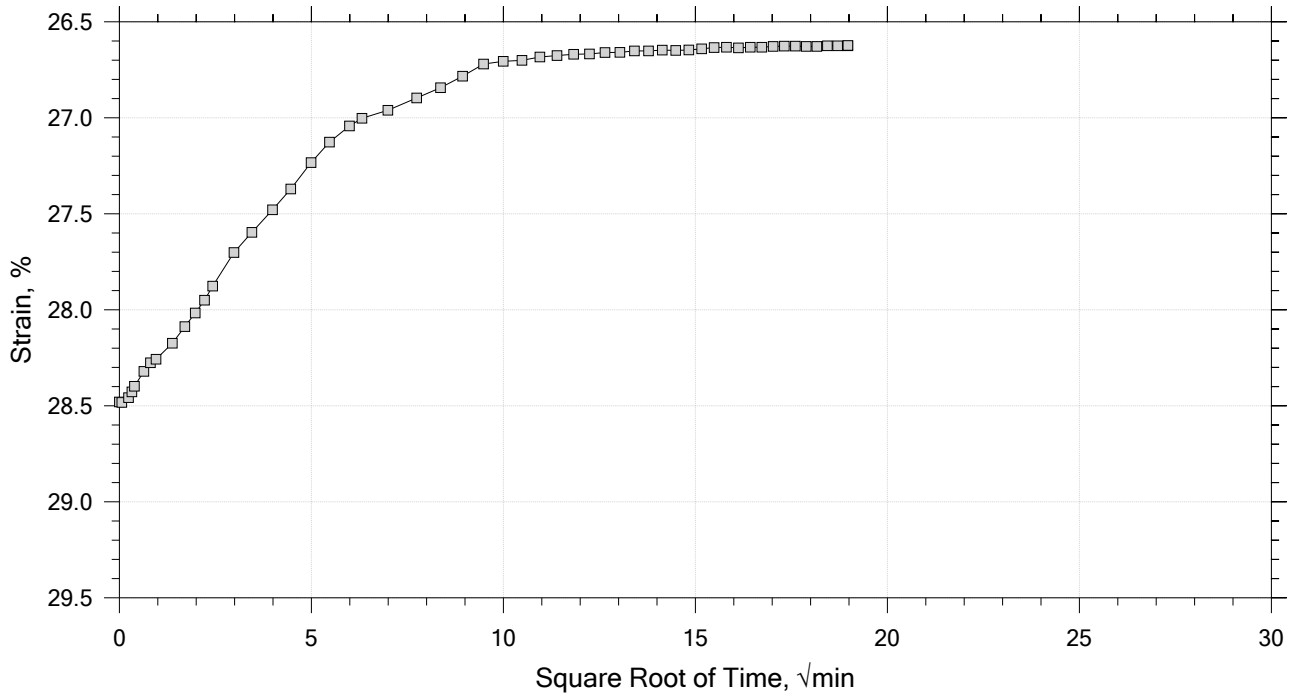


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

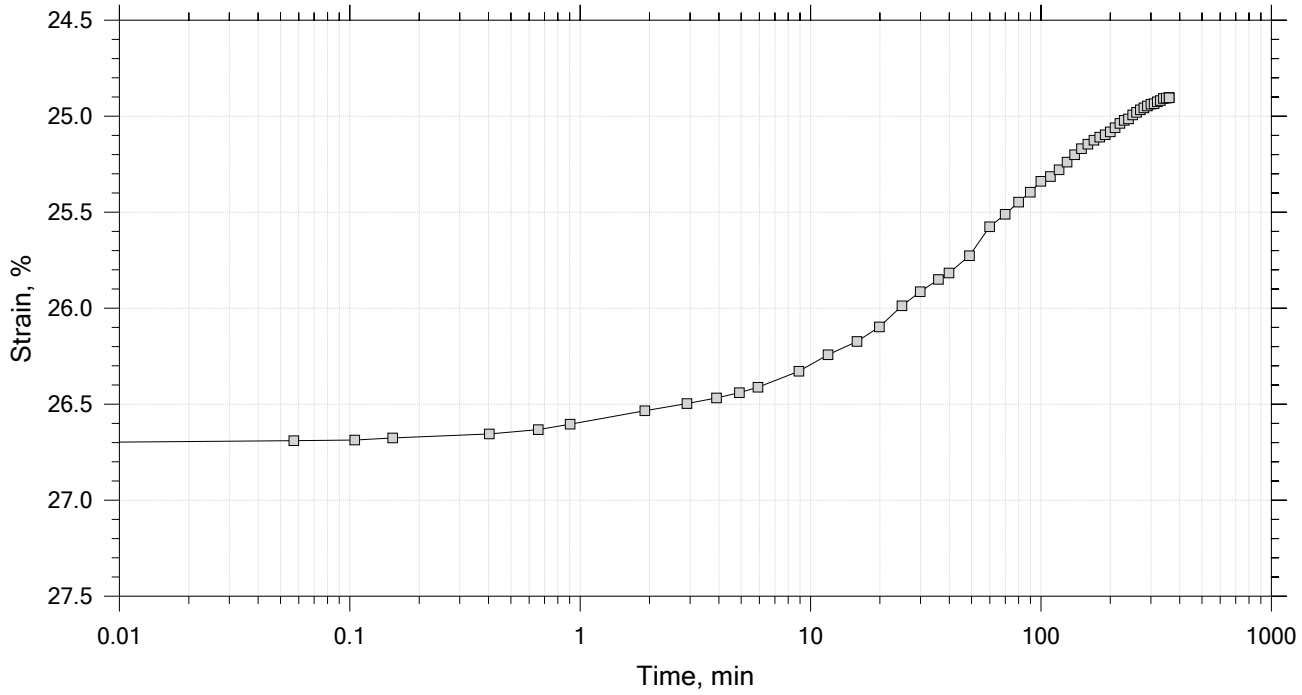


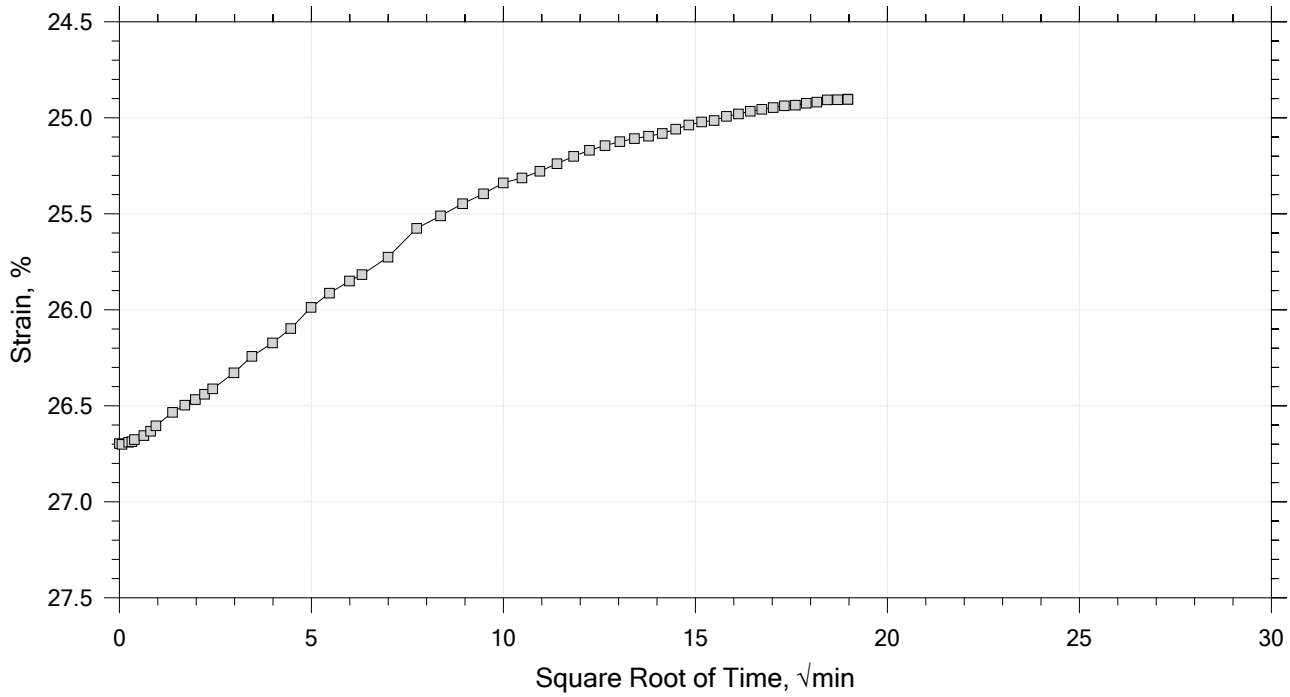


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

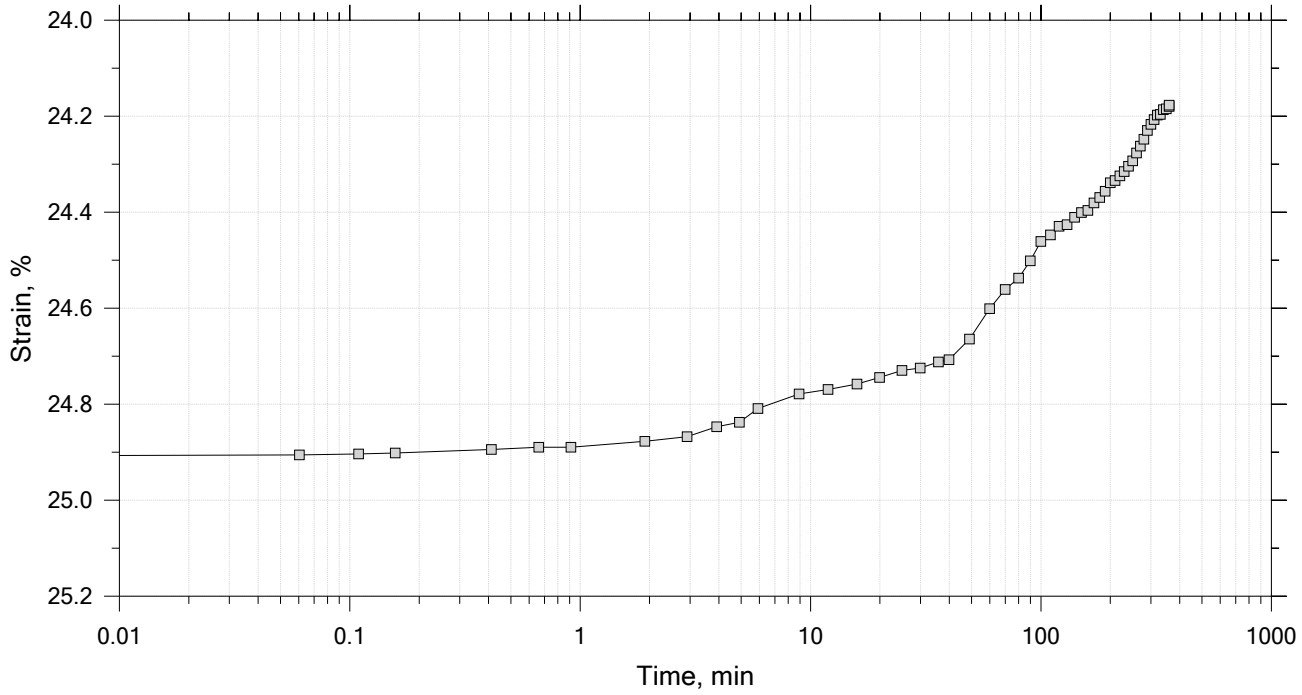


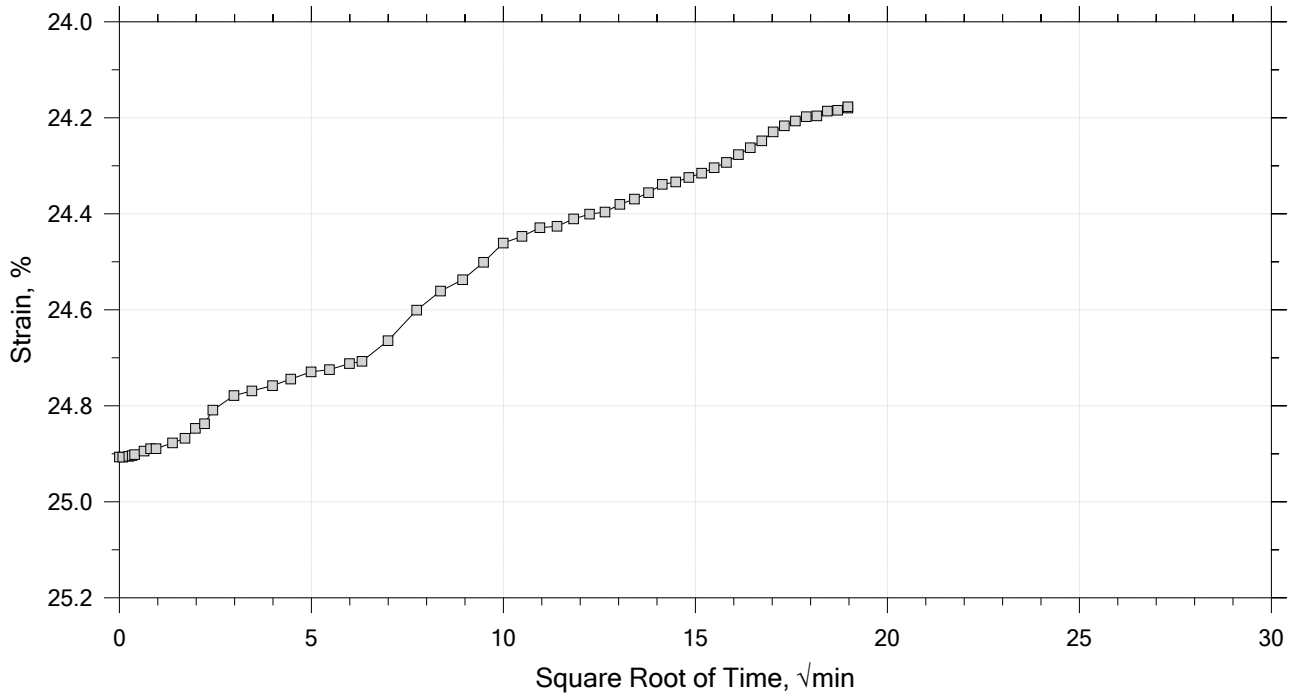


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
Test No.: IP-7	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 39
Initial Height: 1.00 in	Initial Void Ratio: 1.21	Plastic Limit: 20
Final Height: 0.75 in	Final Void Ratio: 0.656	Plasticity Index: 19

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E0174	RING		A1605
Mass Container, gm	8.24	112.27	112.27	8.43
Mass Container + Wet Soil, gm	174.47	255.35	236	132.78
Mass Container + Dry Soil, gm	124.88	212.1	212.1	108.76
Mass Dry Soil, gm	116.64	99.83	99.83	100.33
Water Content, %	42.52	43.32	23.94	23.94
Void Ratio	---	1.21	0.66	---
Degree of Saturation, %	---	98.27	100.00	---
Dry Unit Weight, pcf	---	77.476	103.3	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

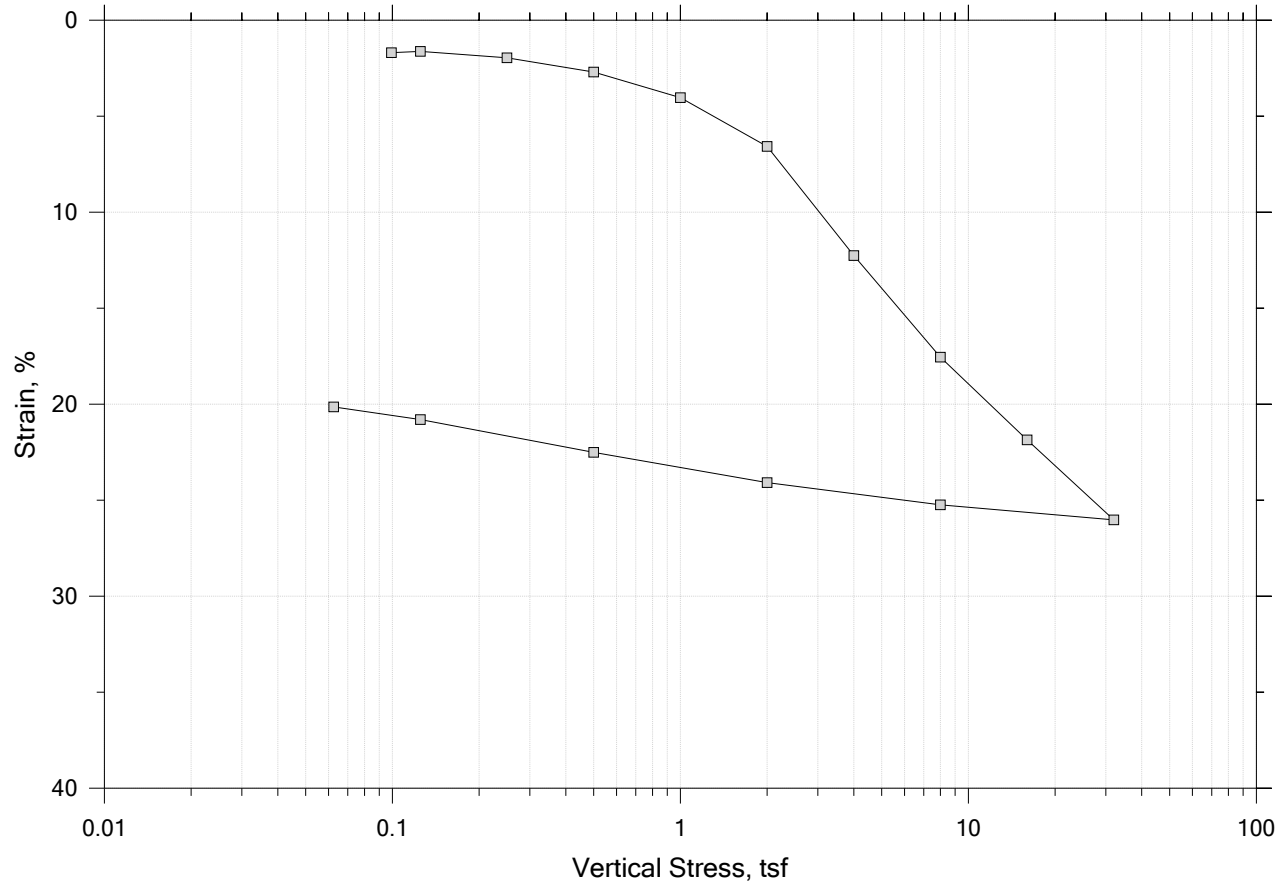
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0763	0.008853	1.19	0.885	40.284	8.69e-05	1.16e-01	1.89e-04
2	0.125	0.01913	1.17	1.91	18.926	1.82e-04	2.11e-01	7.18e-04
3	0.250	0.03155	1.14	3.15	26.514	1.27e-04	9.94e-02	2.36e-04
4	0.500	0.04374	1.11	4.37	18.623	1.76e-04	4.88e-02	1.60e-04
5	1.00	0.06075	1.07	6.08	30.332	1.05e-04	3.40e-02	6.67e-05
6	2.00	0.1043	0.978	10.4	44.823	6.64e-05	4.35e-02	5.41e-05
7	4.00	0.1781	0.815	17.8	54.381	4.79e-05	3.69e-02	3.32e-05
8	8.00	0.2292	0.702	22.9	25.522	8.78e-05	1.28e-02	2.10e-05
9	16.0	0.2697	0.613	27.0	13.832	1.44e-04	5.05e-03	1.36e-05
10	32.0	0.3069	0.531	30.7	9.895	1.81e-04	2.32e-03	7.87e-06
11	8.00	0.2989	0.548	29.9	4.059	4.23e-04	3.29e-04	2.61e-06
12	2.00	0.2843	0.580	28.4	11.994	1.48e-04	2.44e-03	6.76e-06
13	0.500	0.2662	0.620	26.6	50.998	3.64e-05	1.20e-02	8.21e-06
14	0.125	0.2490	0.658	24.9	163.926	1.19e-05	4.58e-02	1.02e-05
15	0.0625	0.2418	0.674	24.2	274.959	7.32e-06	1.16e-01	1.59e-05

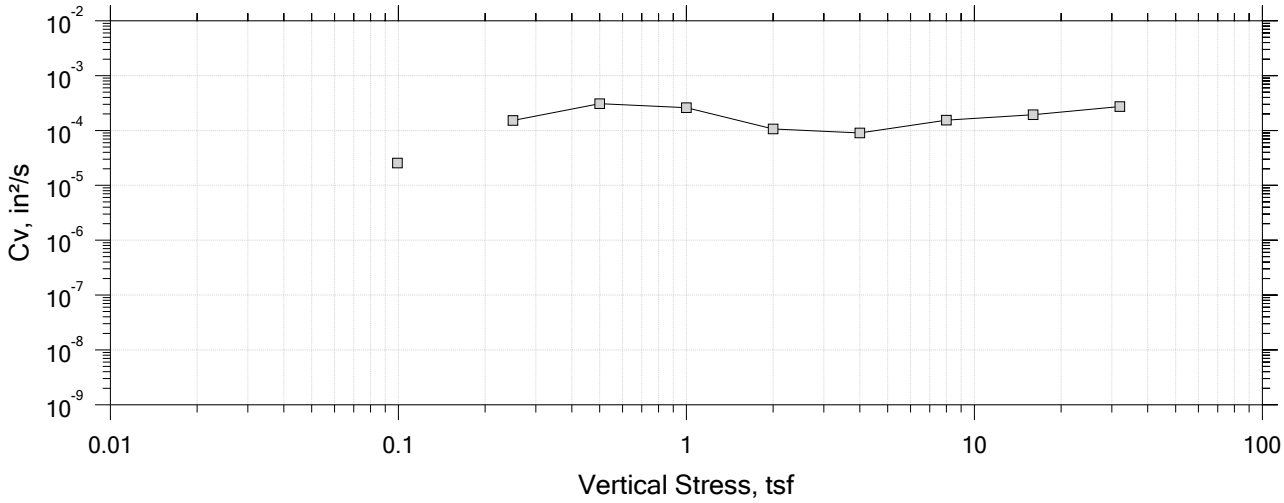
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

B-208 U-2

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

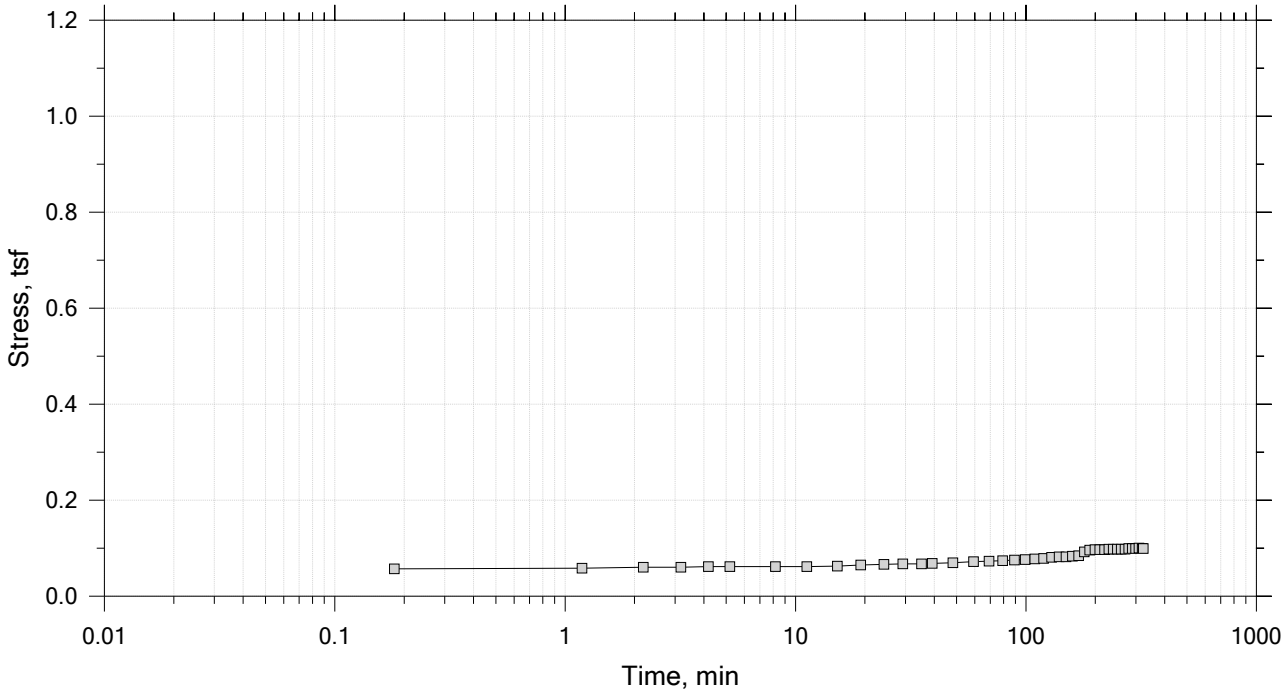


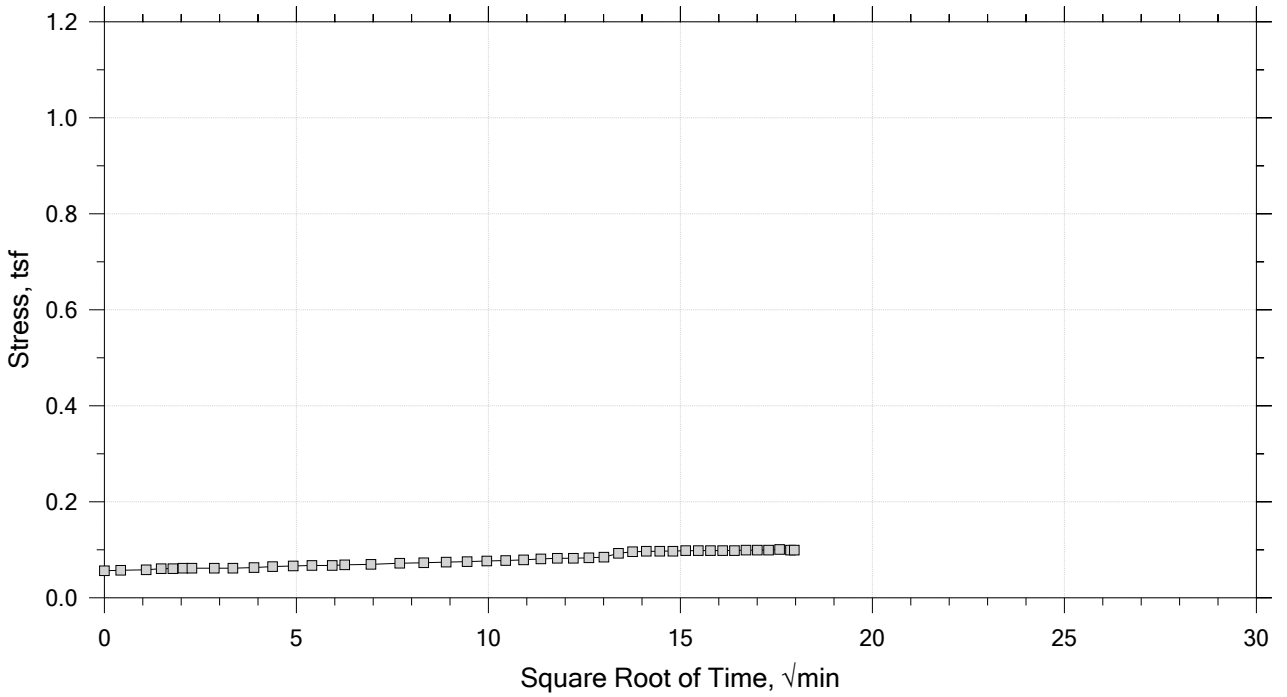


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0993 tsf





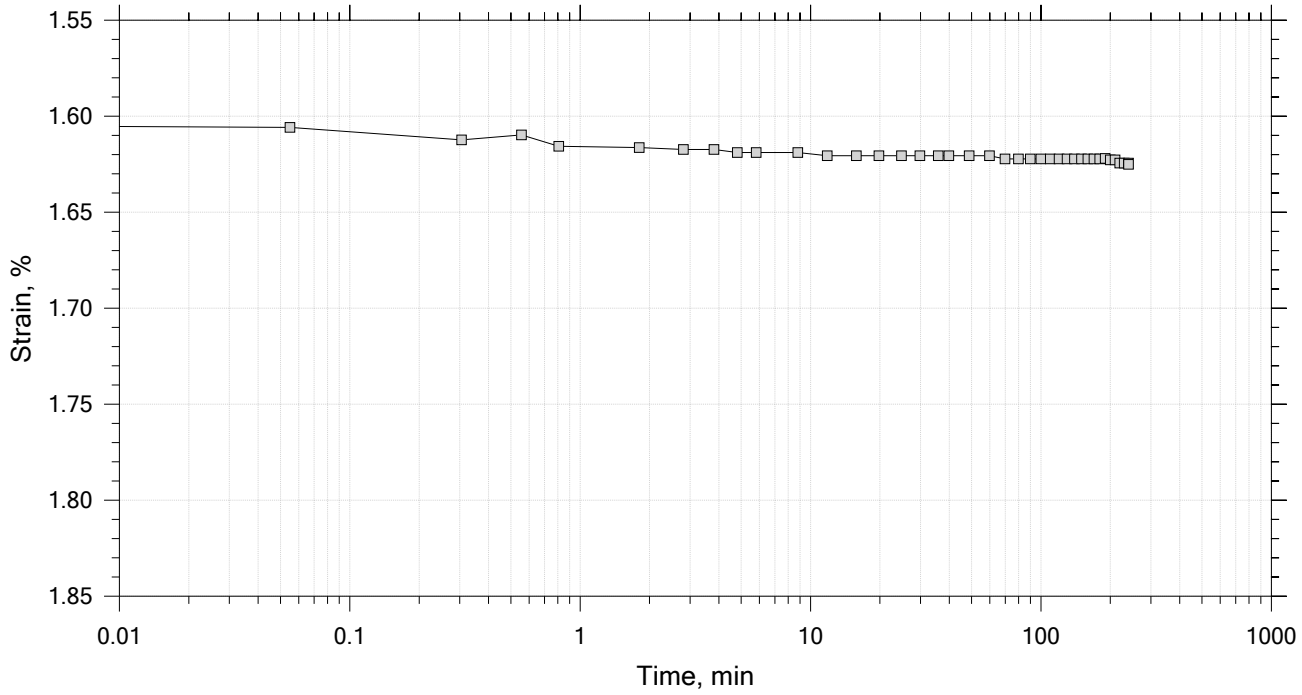
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

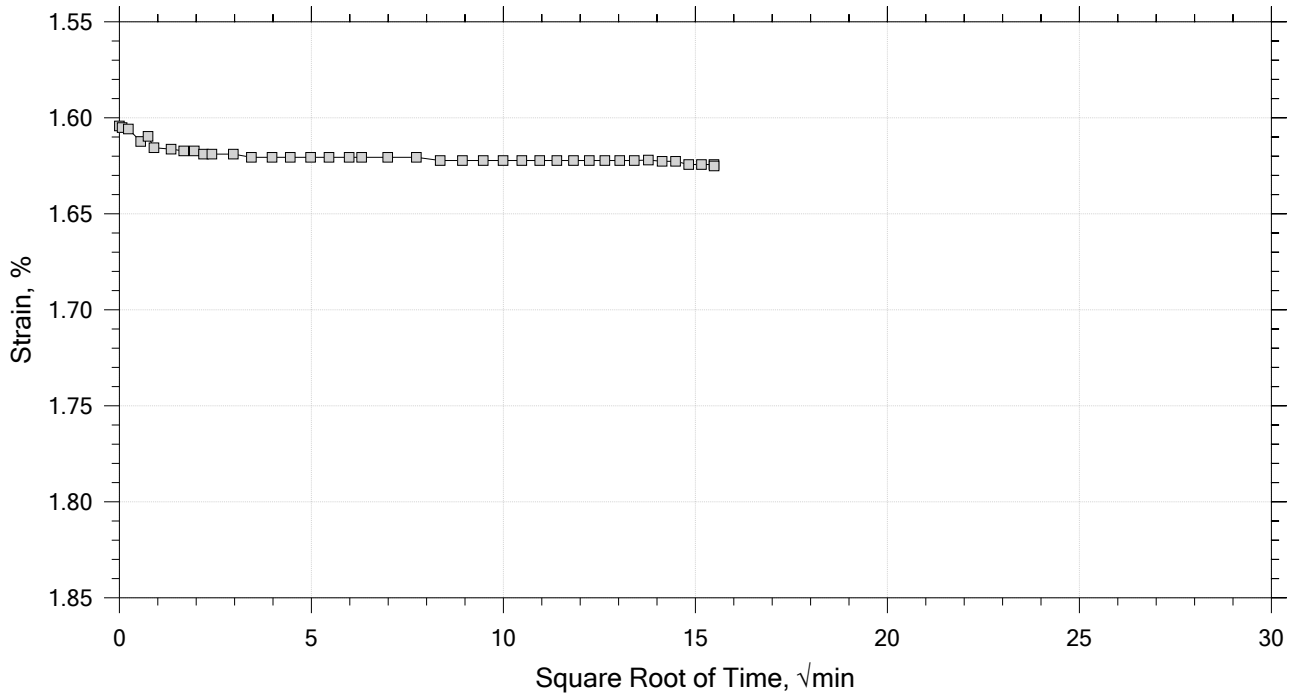
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

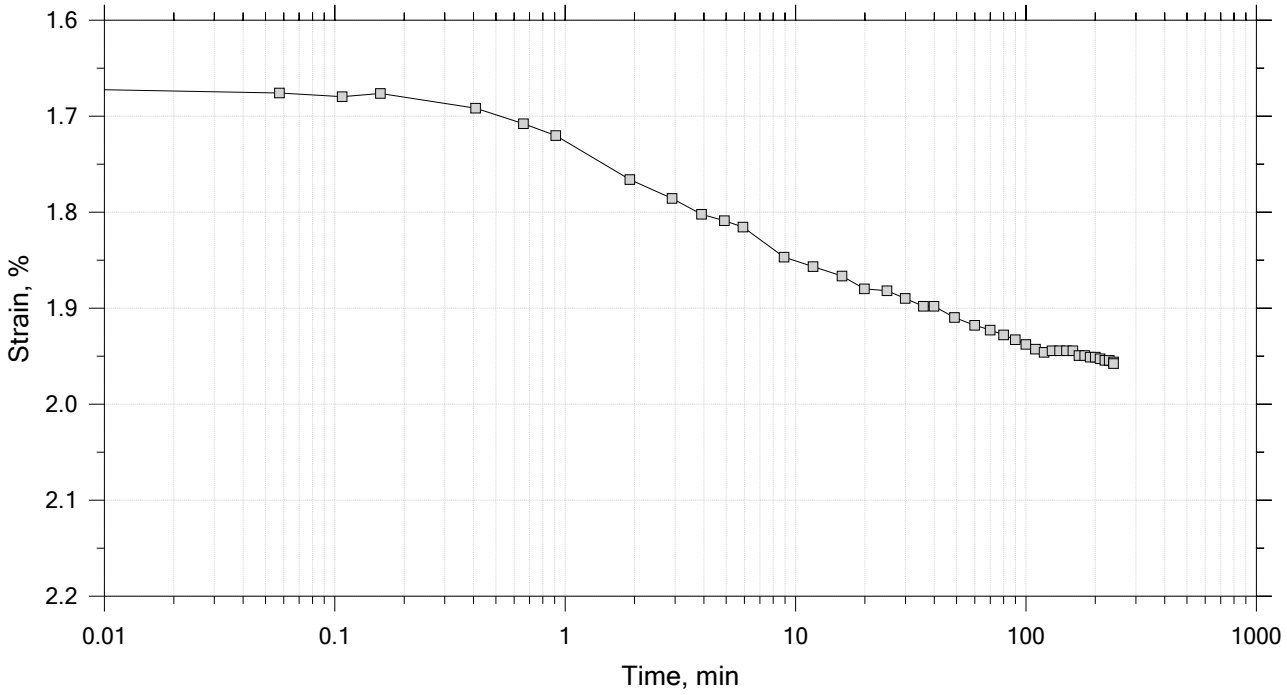


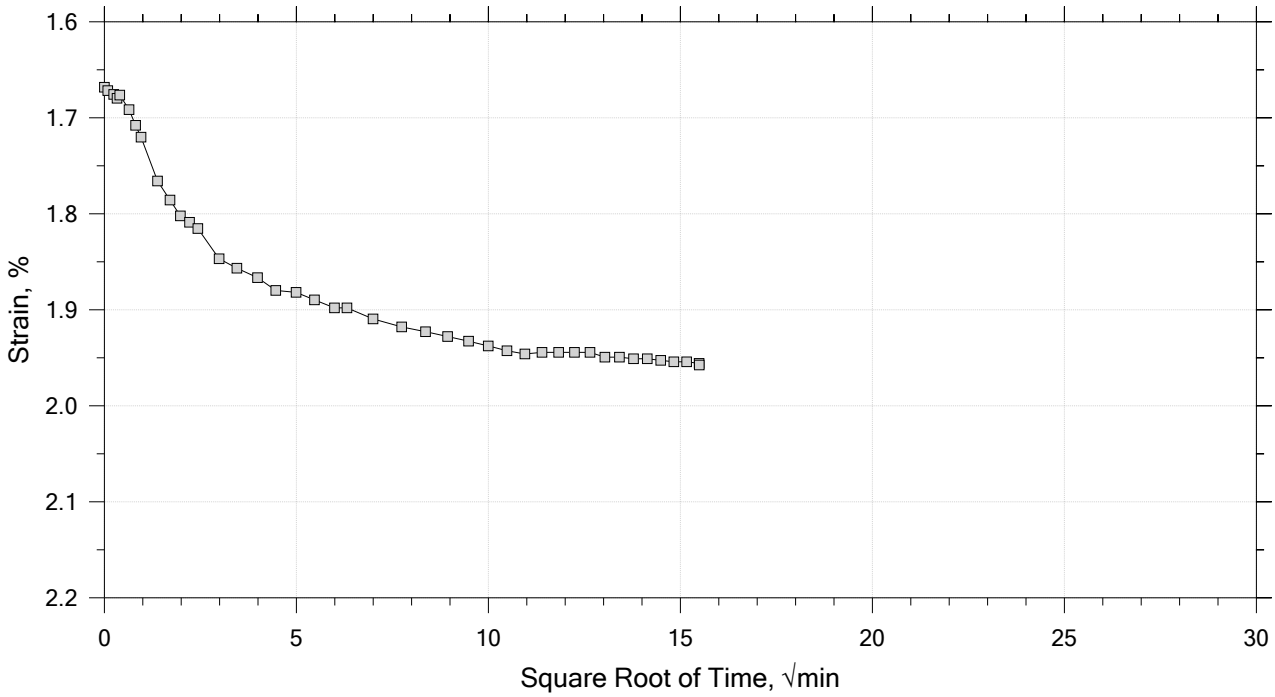


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

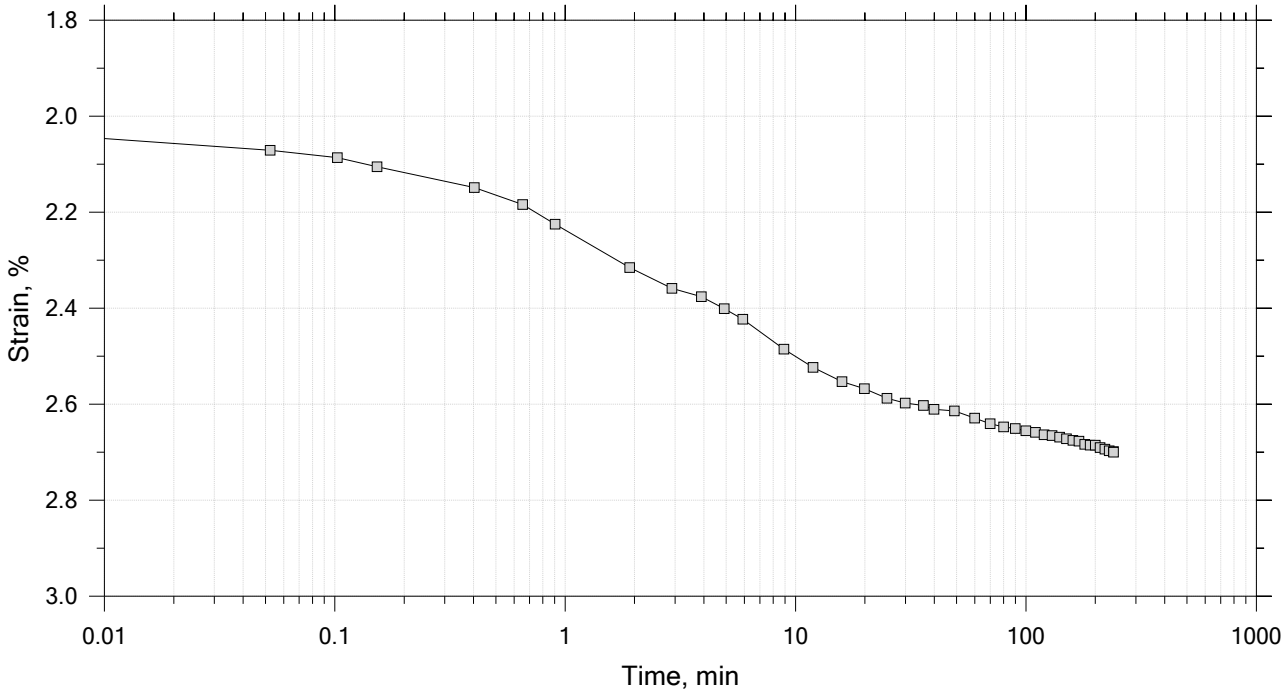


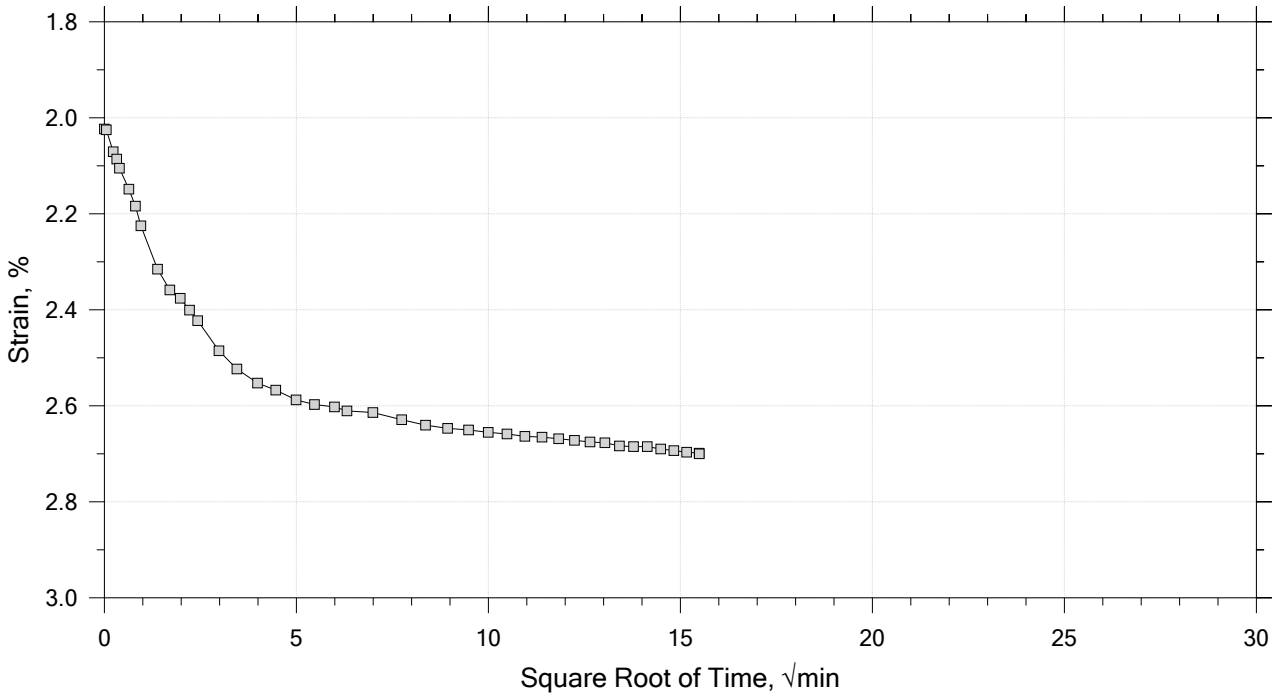


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





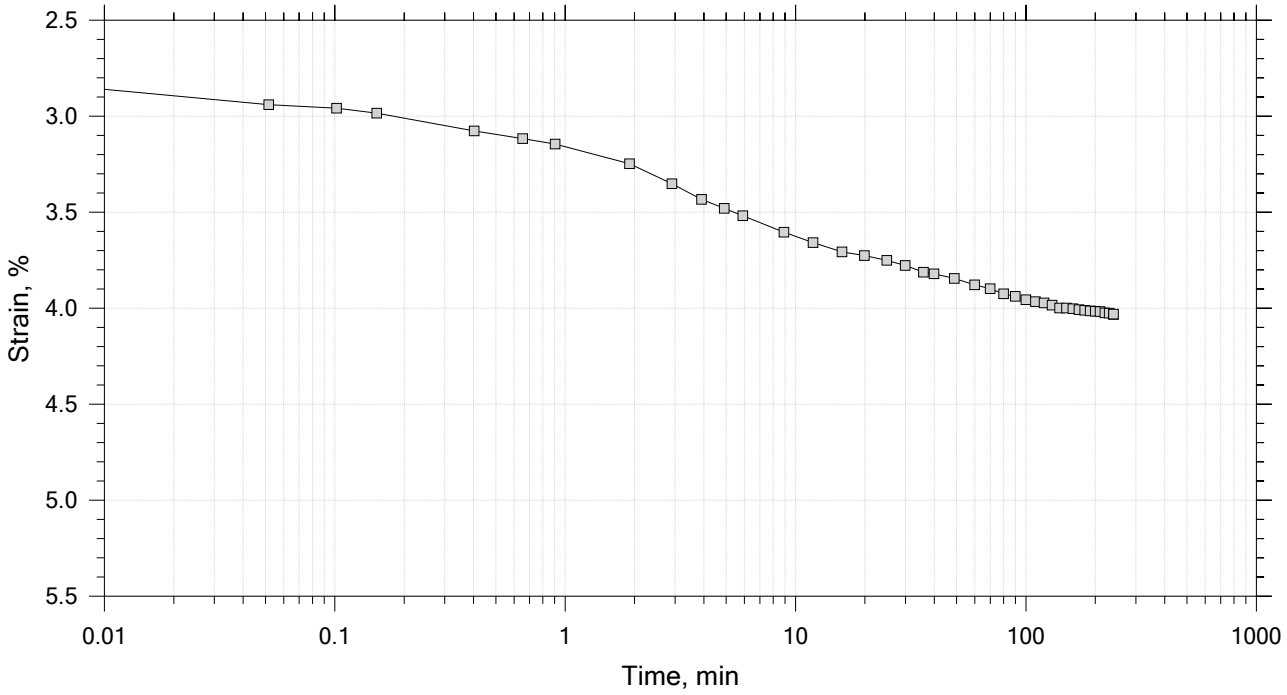
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

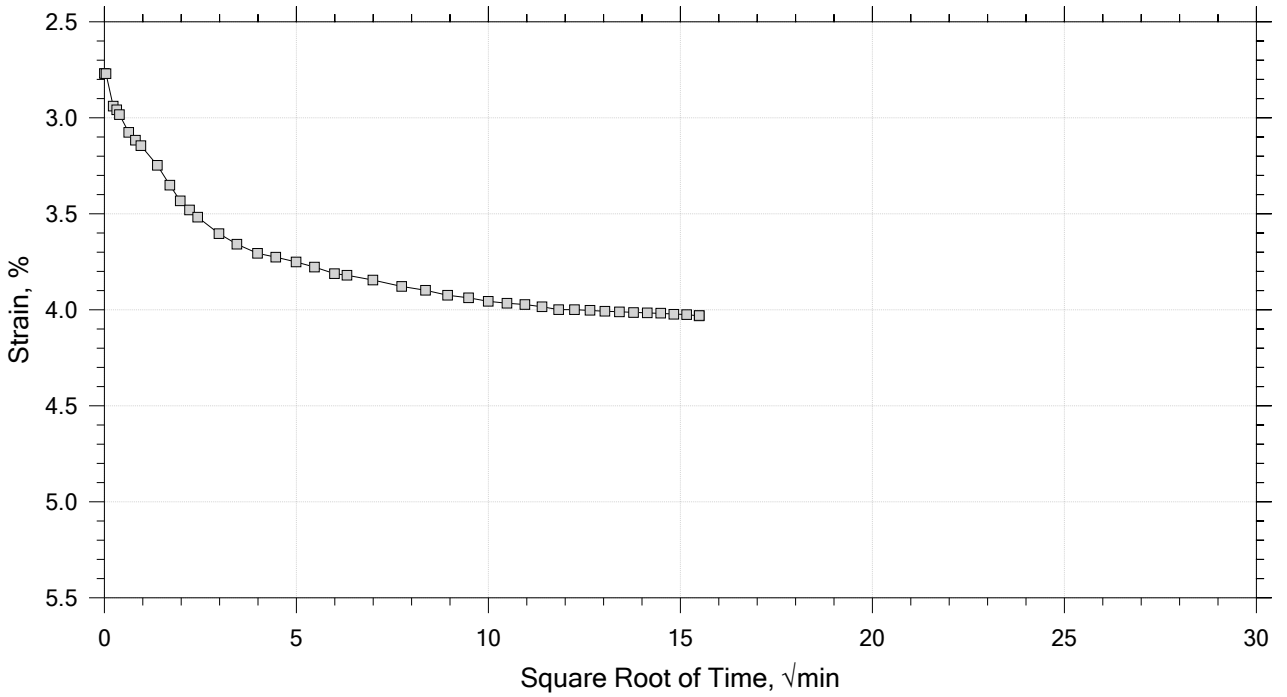
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





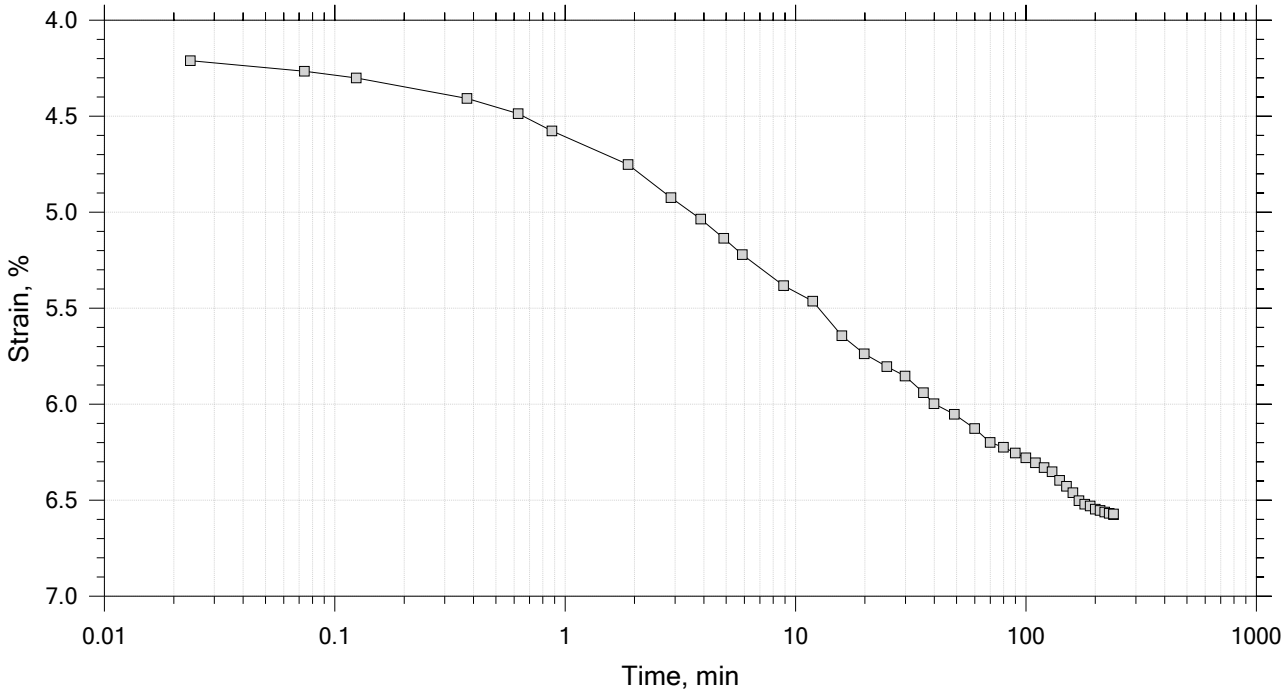
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

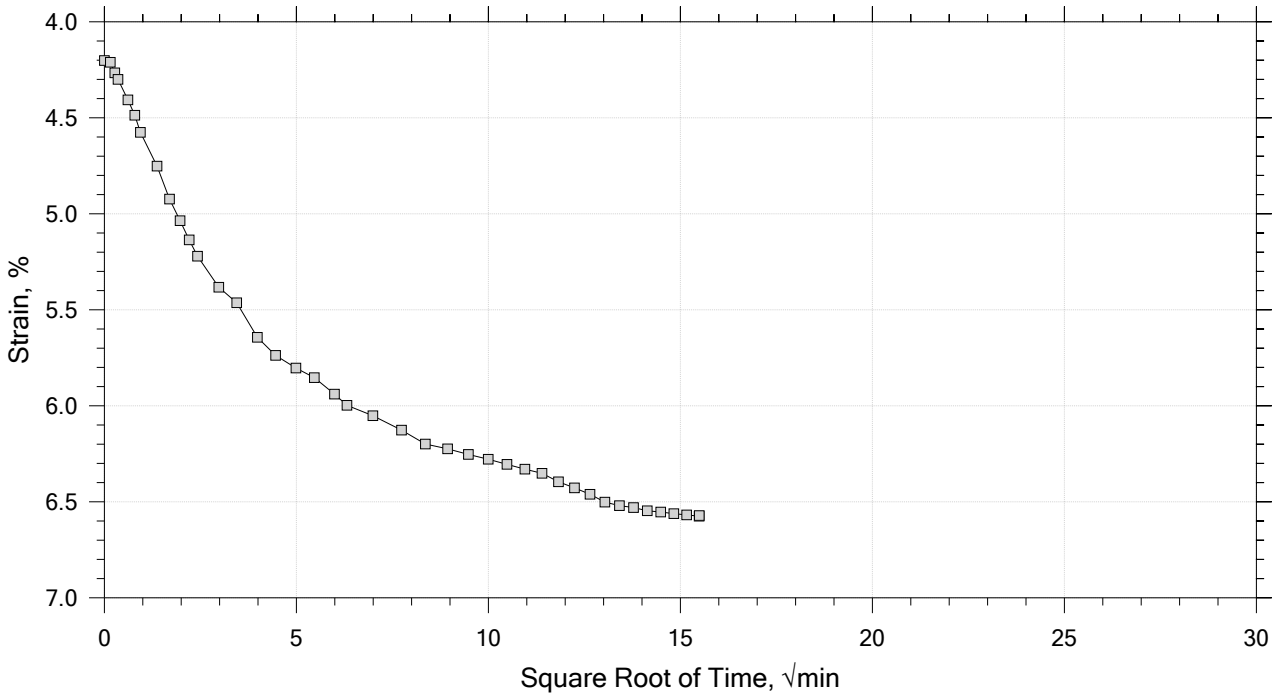
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





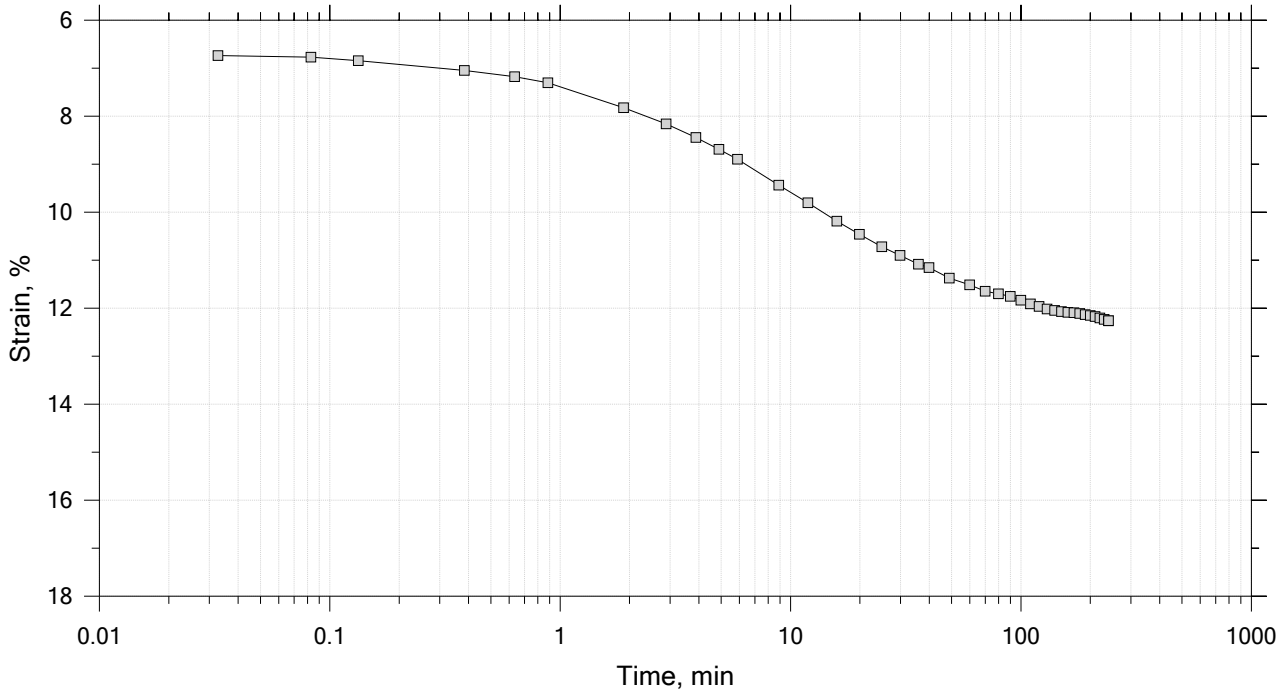
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

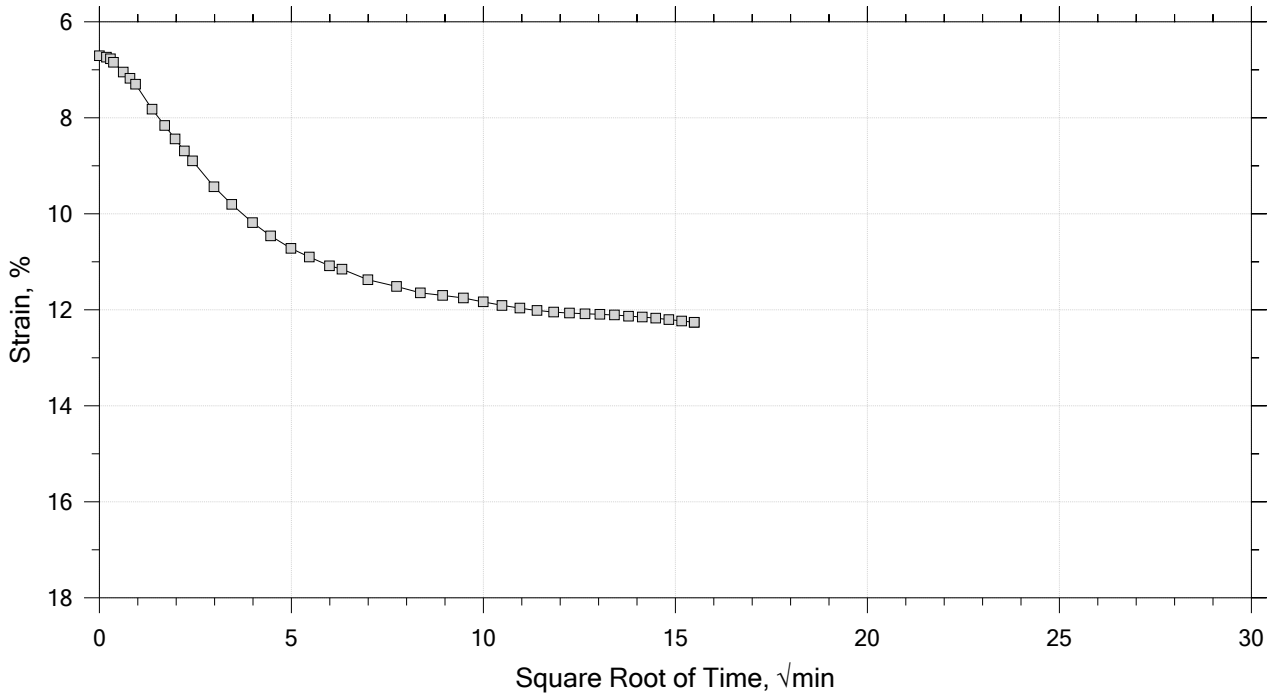
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





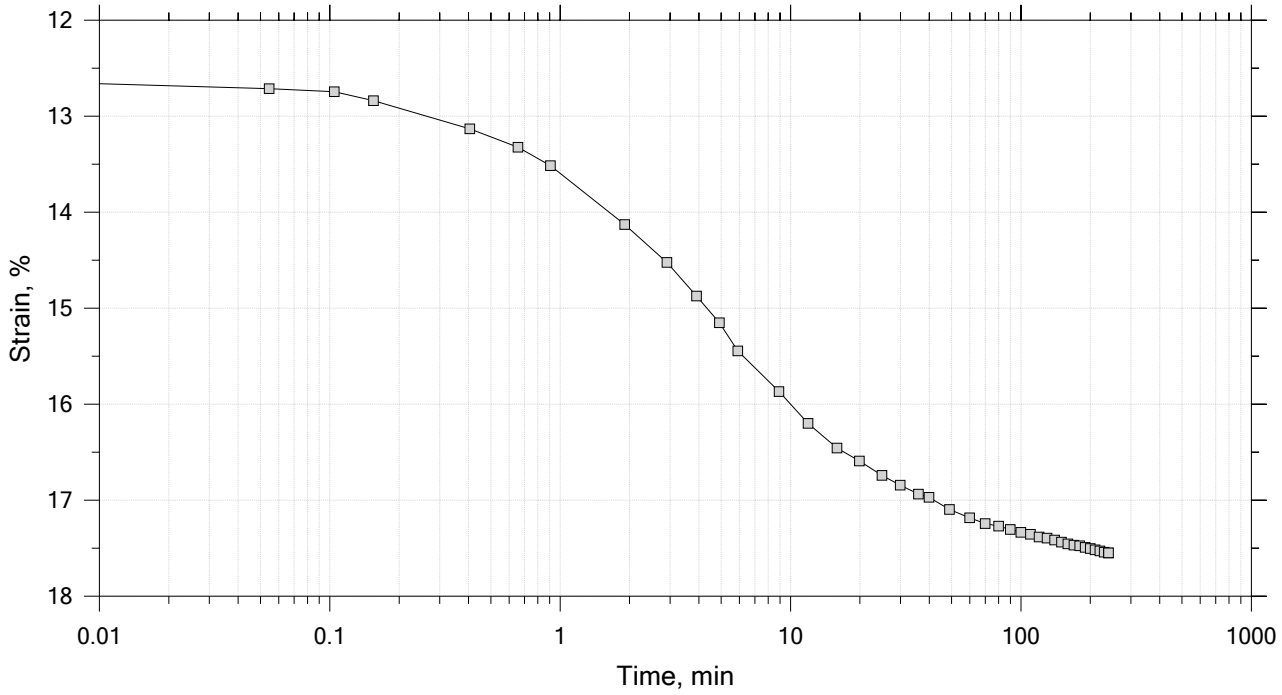
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

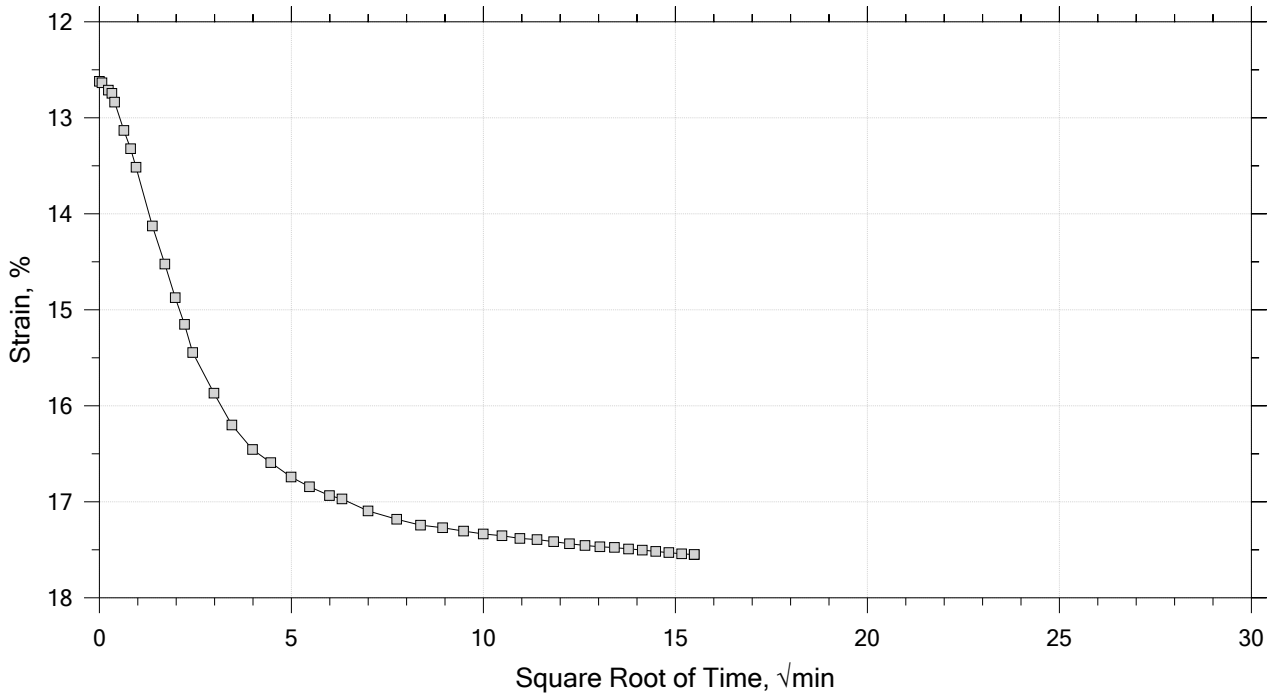
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





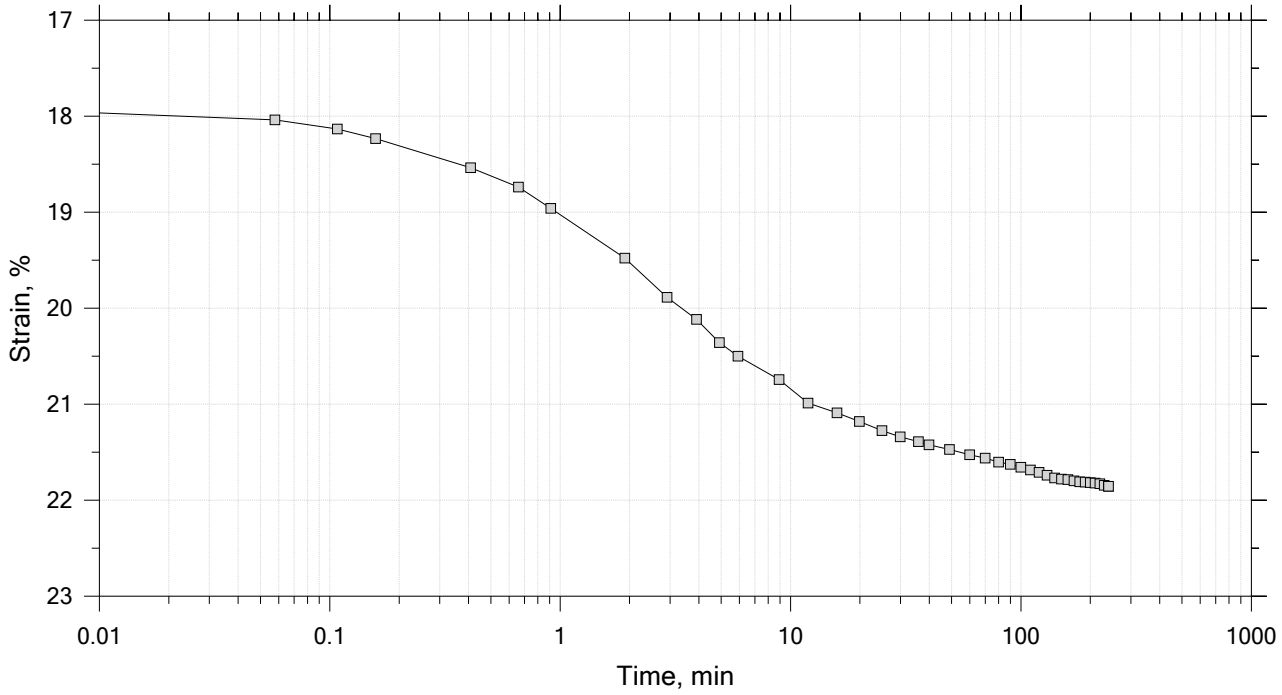
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

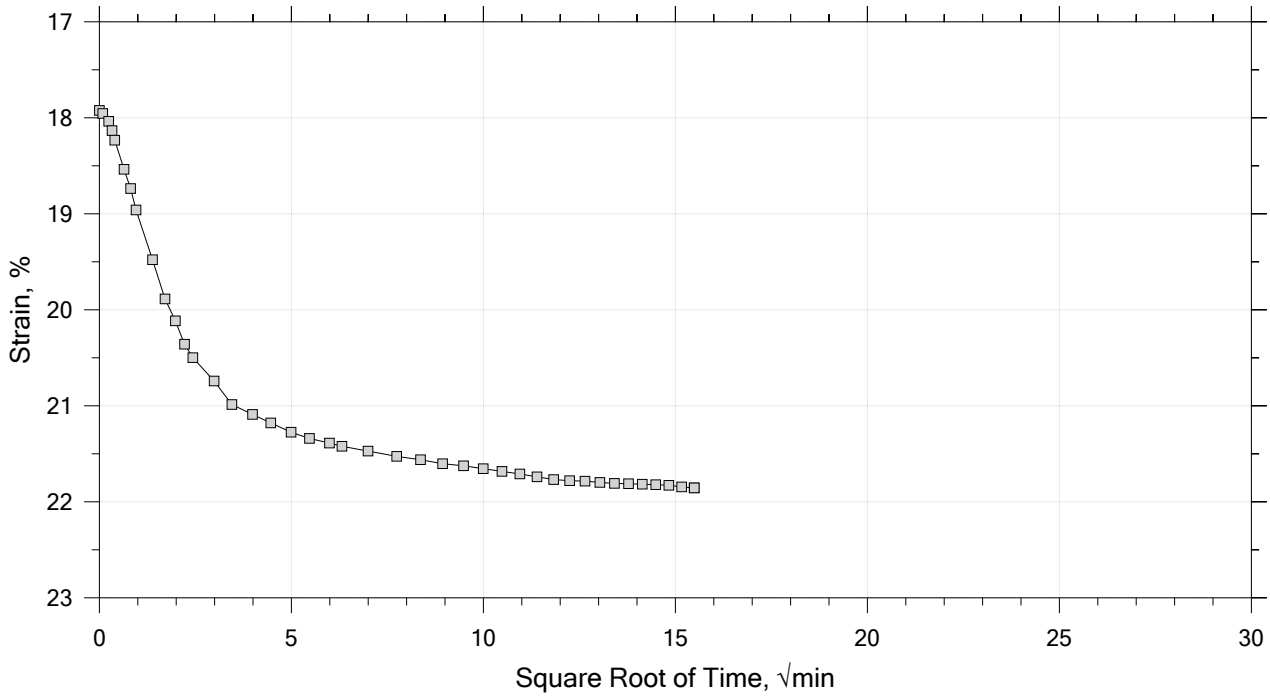
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

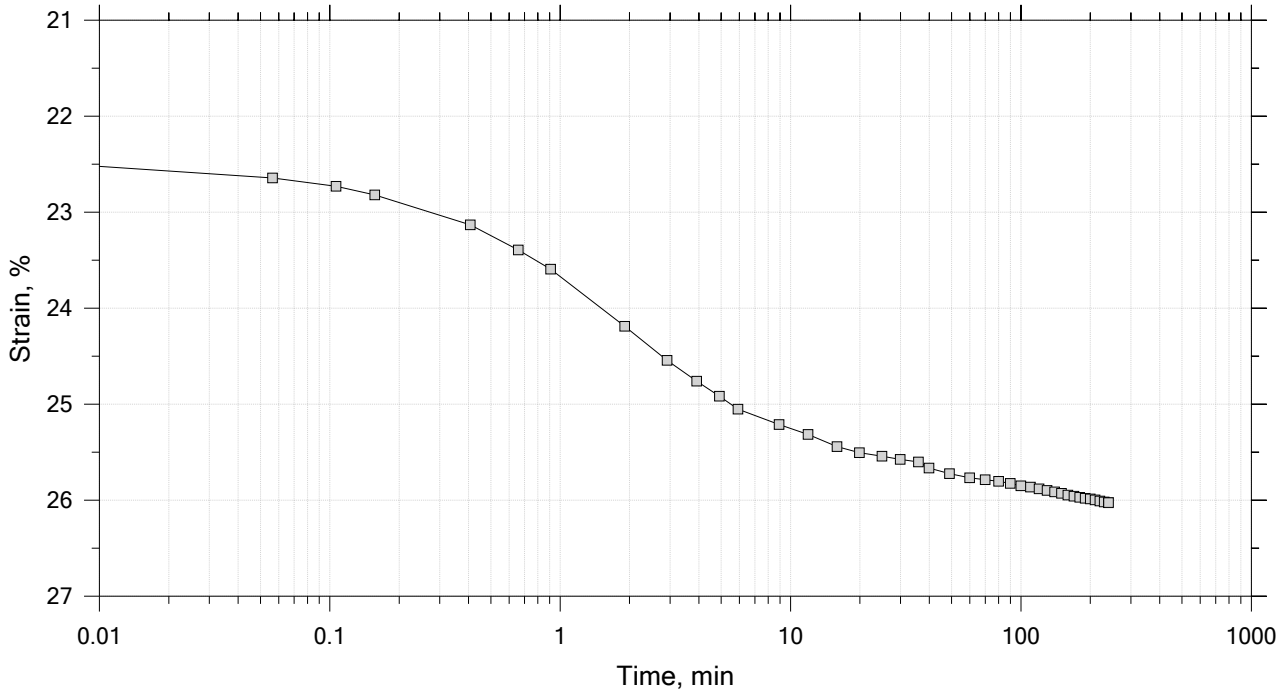


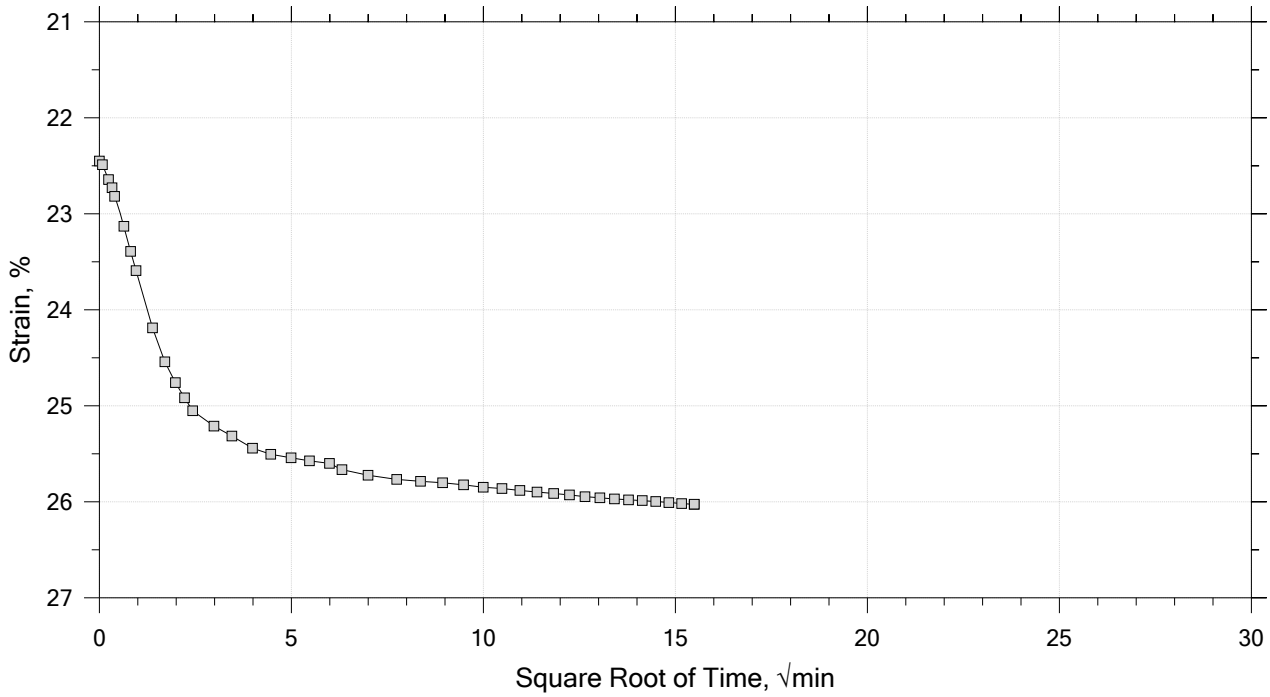


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

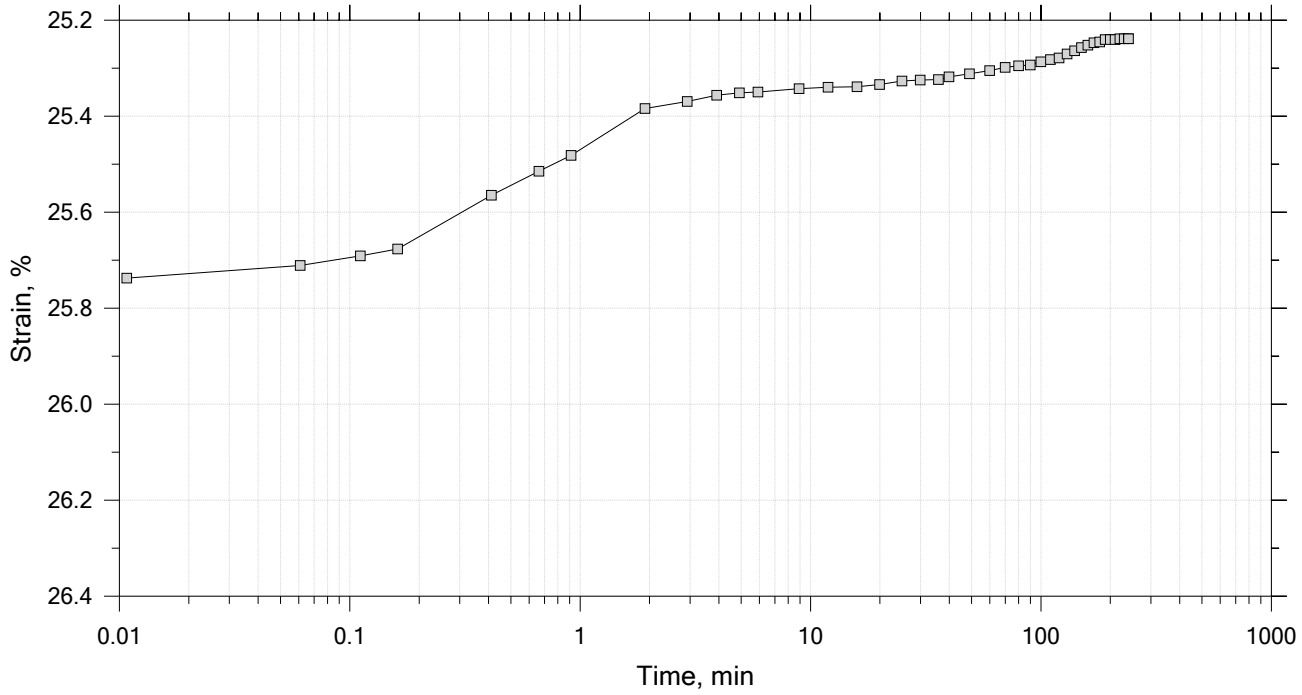


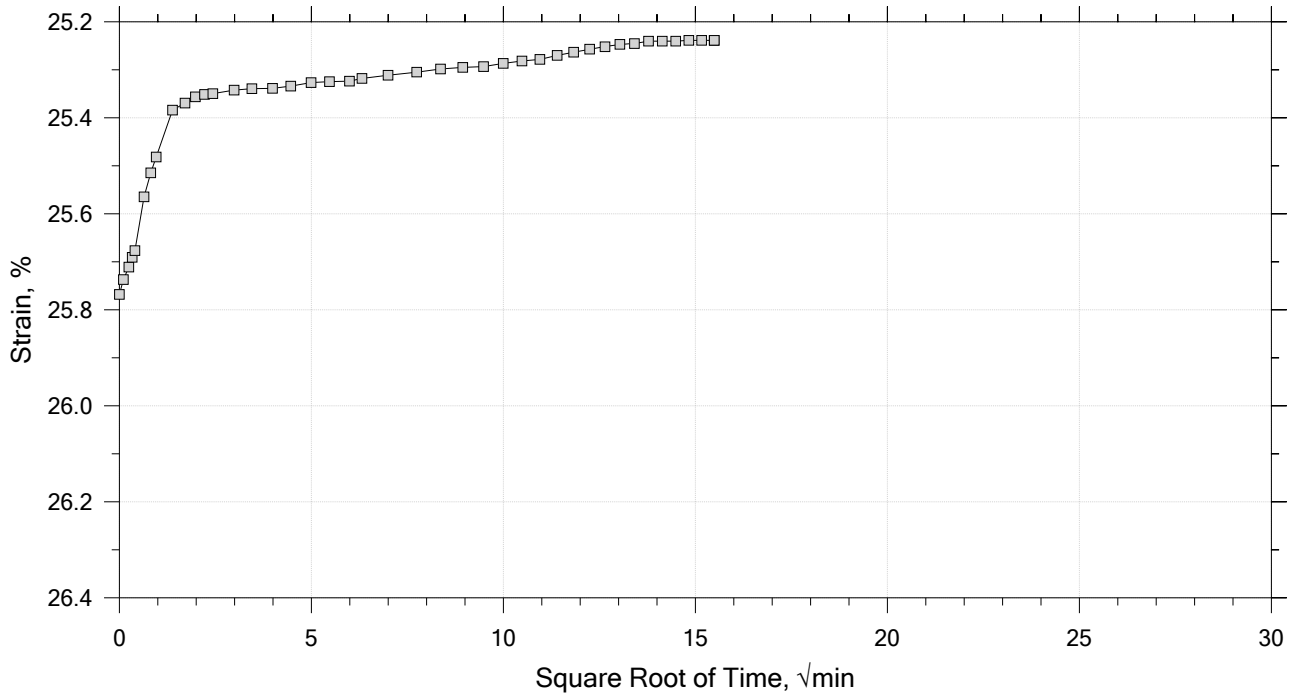


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





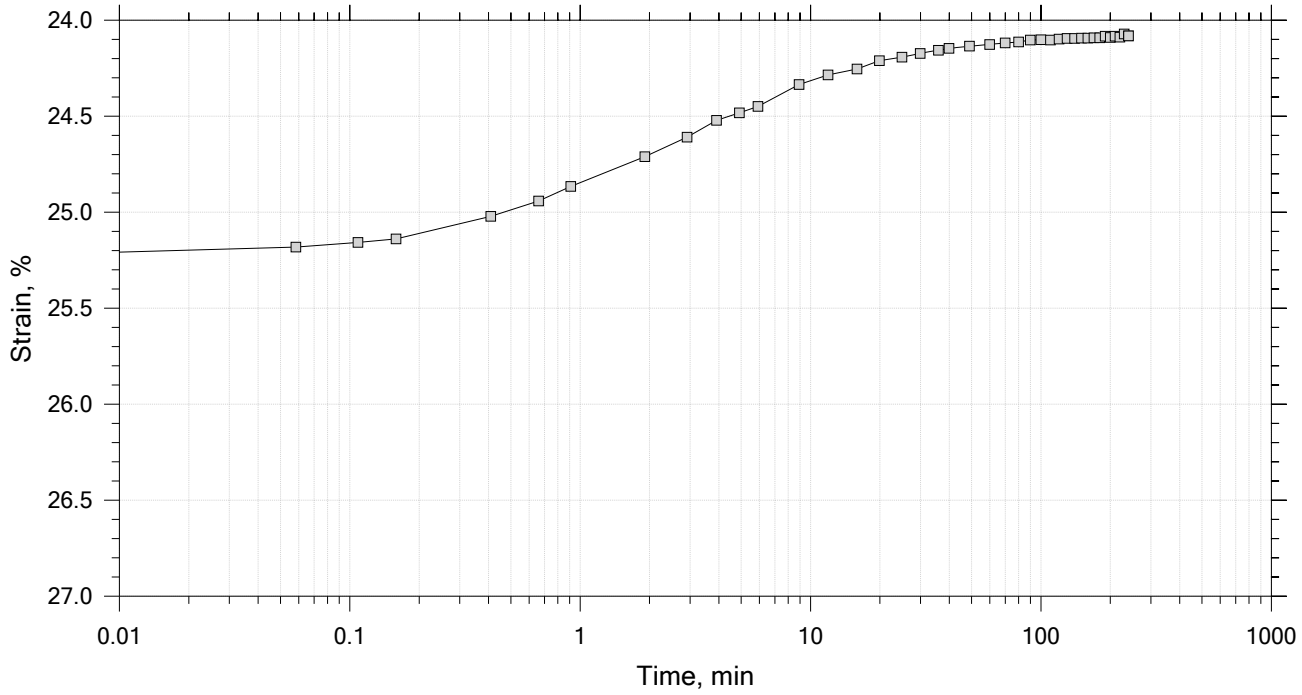
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

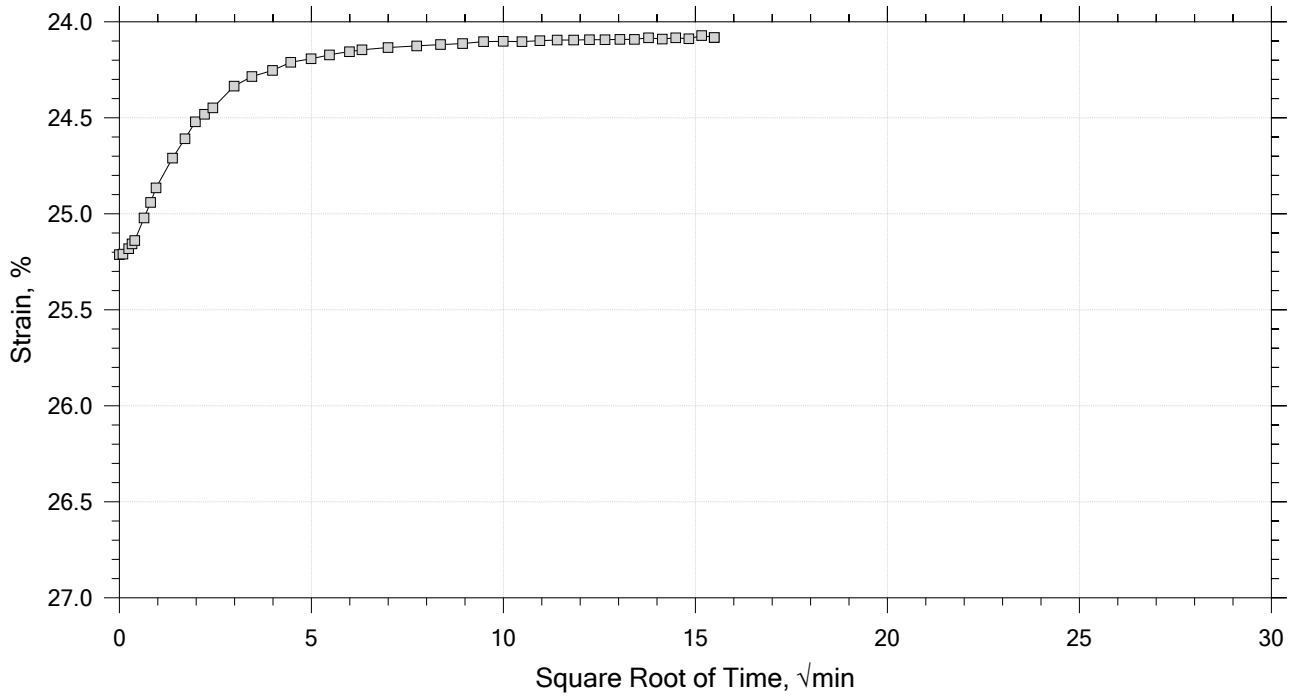
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

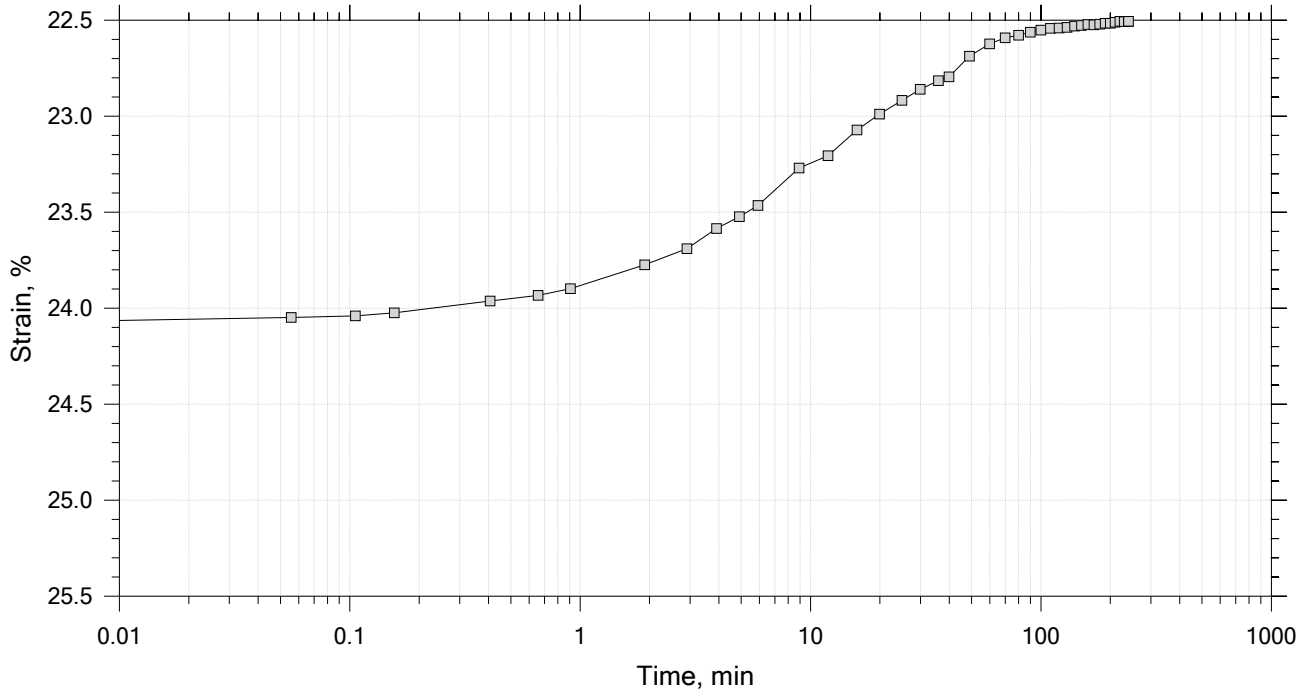


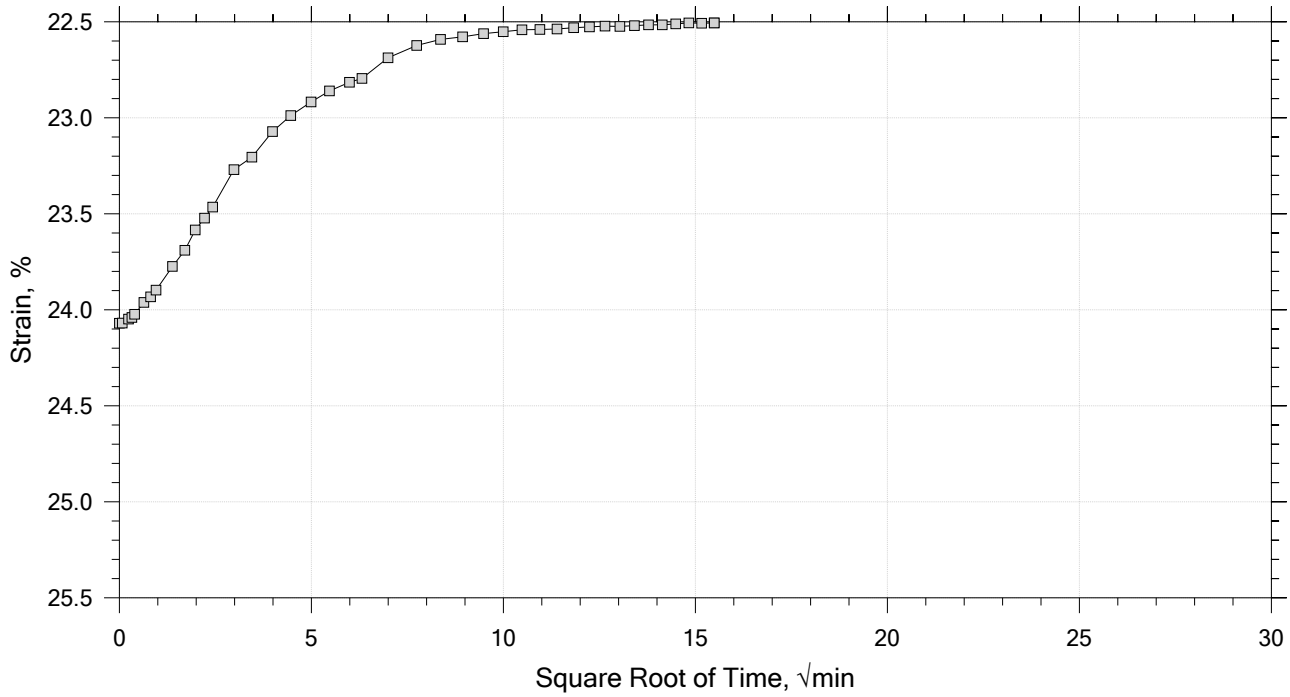


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

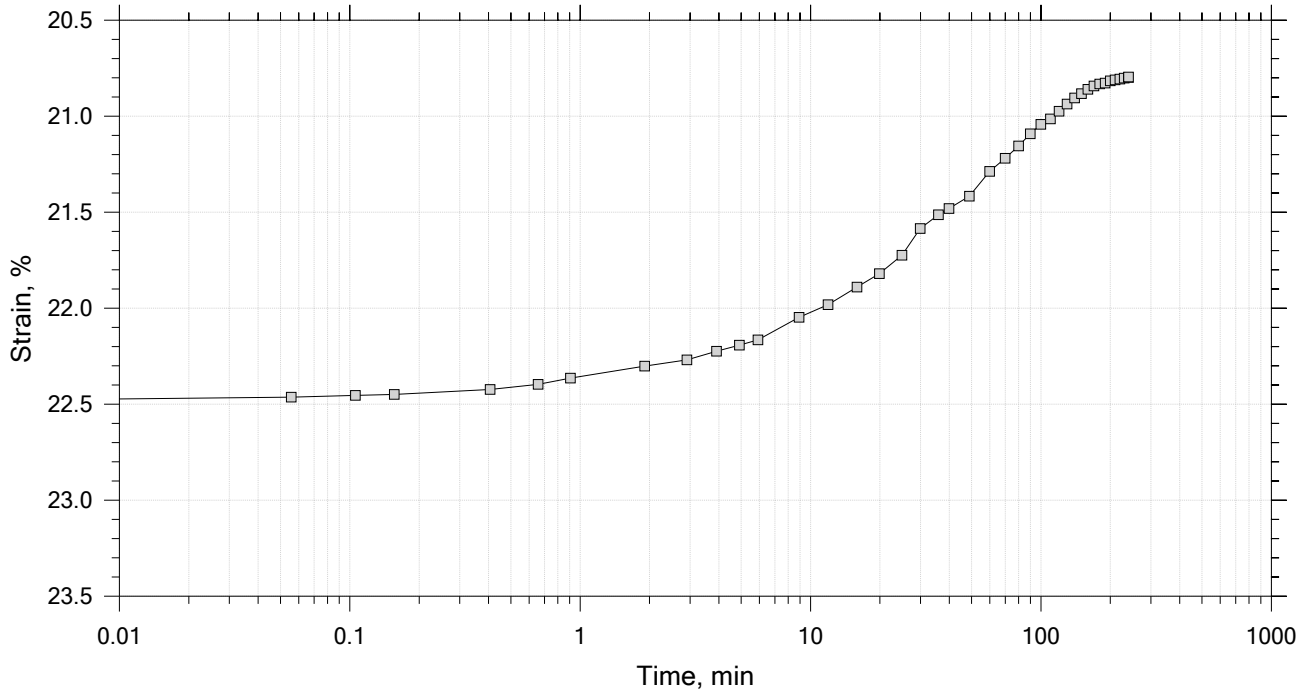


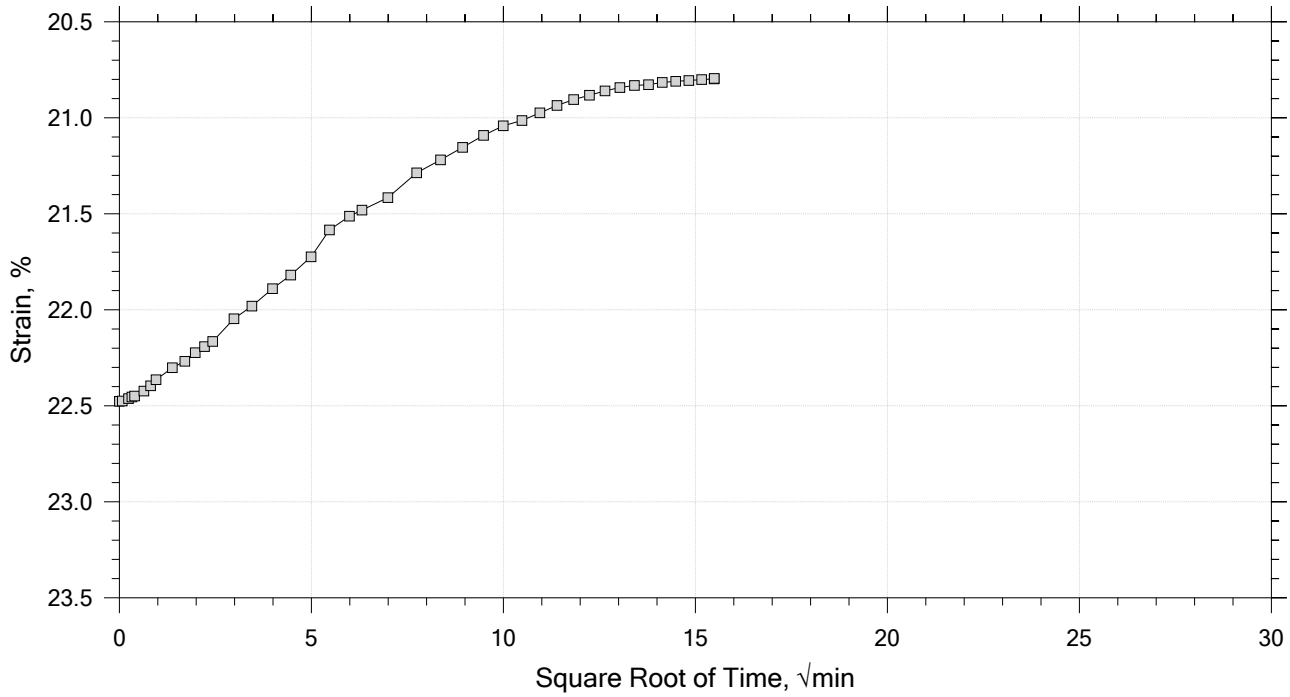


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

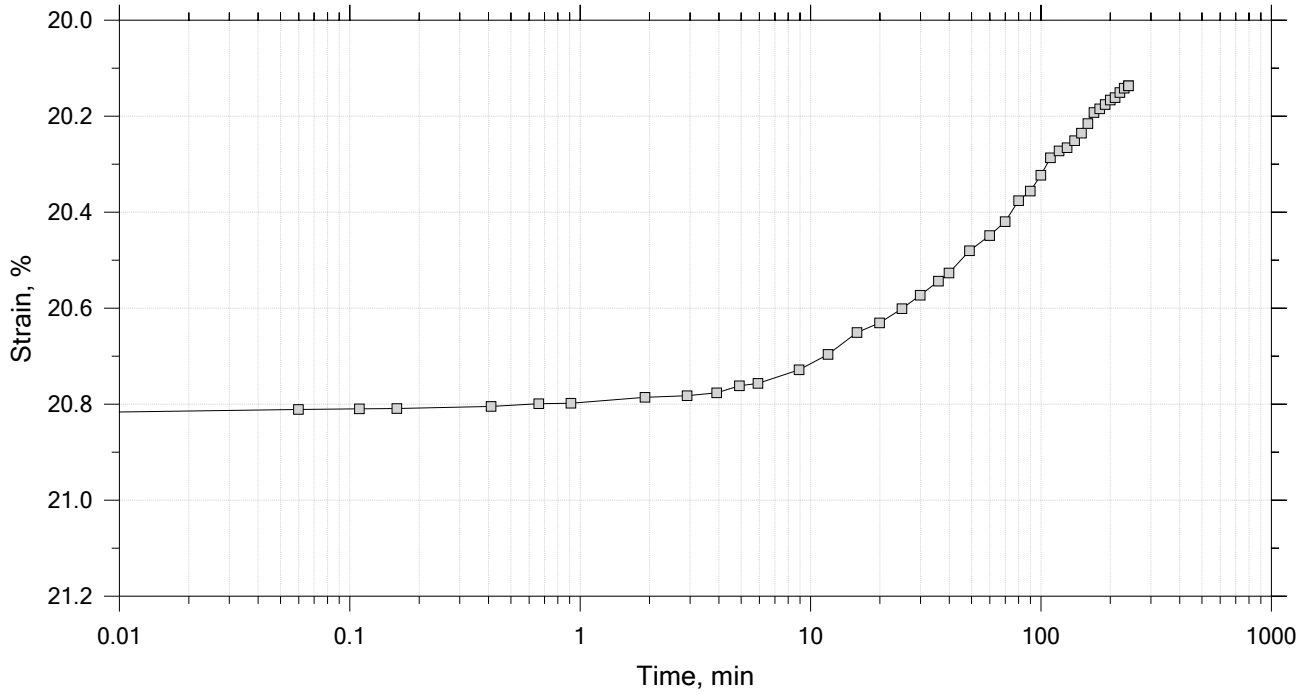


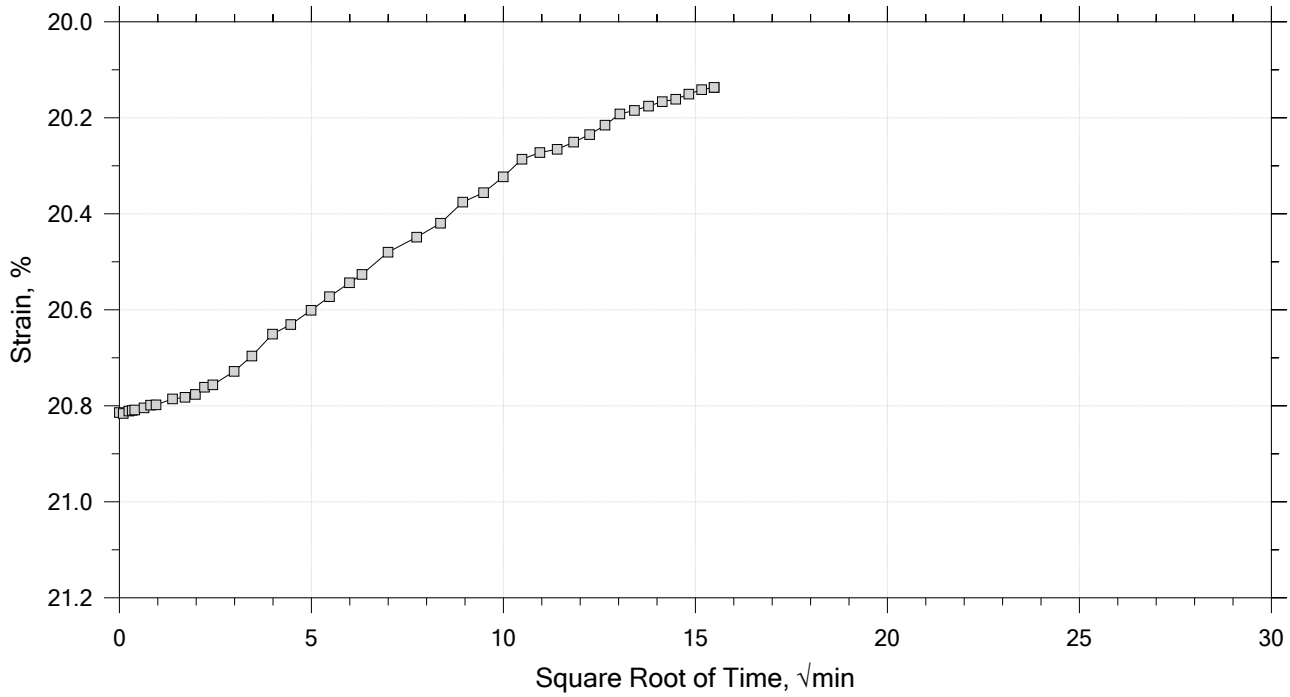


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Tested By: jlw	Checked By: anm
Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
Test No.: IP-7a	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.73	Liquid Limit: 25
Initial Height: 1.00 in	Initial Void Ratio: 0.977	Plastic Limit: 16
Final Height: 0.78 in	Final Void Ratio: 0.542	Plasticity Index: 9

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E0317	RING		E0570
Mass Container, gm	8.37	109.76	109.76	8.91
Mass Container + Wet Soil, gm	308.9	259.81	243	143.24
Mass Container + Dry Soil, gm	124.39	220.94	220.94	121
Mass Dry Soil, gm	116.02	111.18	111.18	112.09
Water Content, %	159.03	34.96	19.84	19.84
Void Ratio	---	0.98	0.54	---
Degree of Saturation, %	---	97.77	100.00	---
Dry Unit Weight, pcf	---	86.285	110.62	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

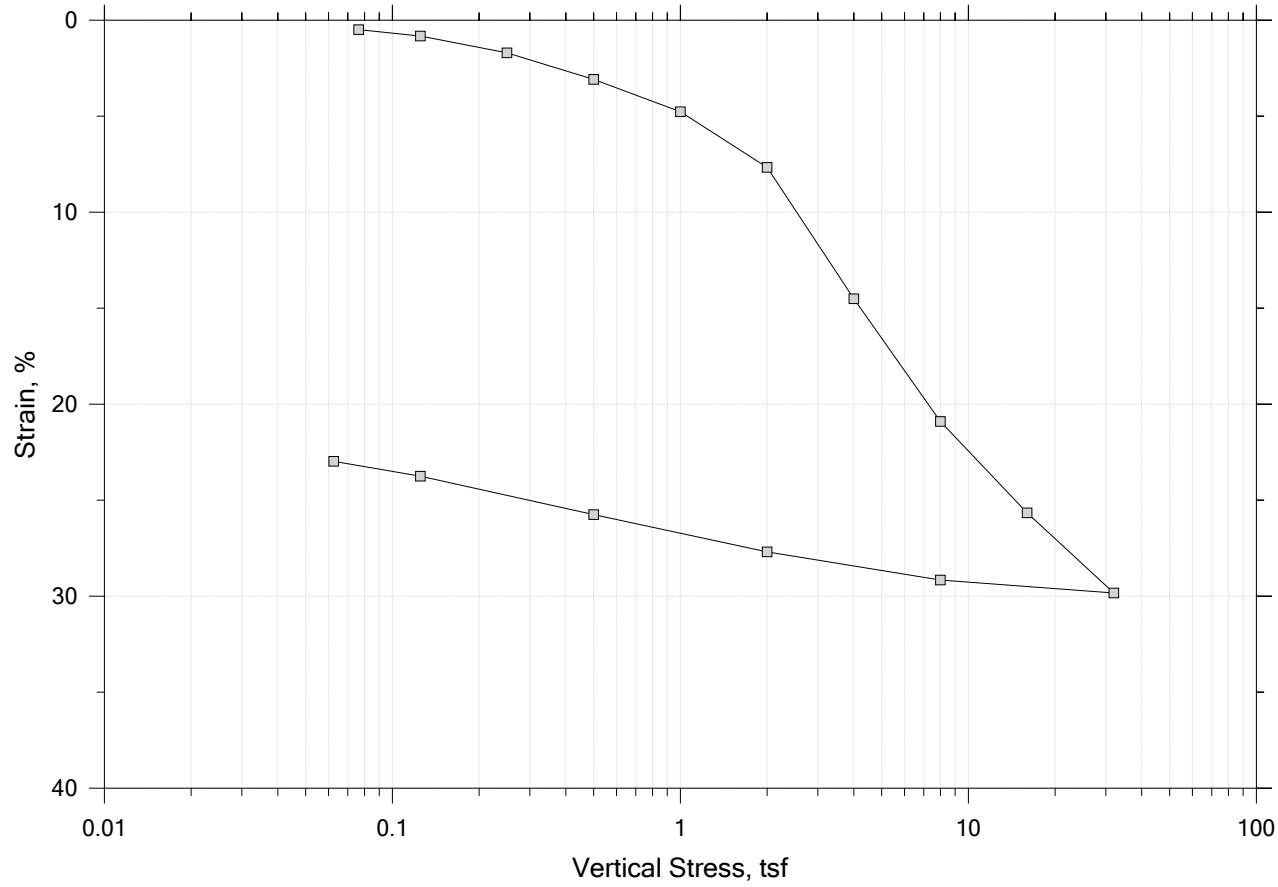
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0993	0.01687	0.944	1.69	136.143	2.55e-05	1.70e-01	8.12e-05
2	0.125	0.01625	0.945	1.63	---	---	-2.40e-02	---
3	0.250	0.01958	0.939	1.96	22.424	1.52e-04	2.66e-02	7.57e-05
4	0.500	0.02700	0.924	2.70	10.968	3.07e-04	2.97e-02	1.71e-04
5	1.00	0.04030	0.898	4.03	12.701	2.60e-04	2.66e-02	1.29e-04
6	2.00	0.06572	0.847	6.57	29.812	1.06e-04	2.54e-02	5.06e-05
7	4.00	0.1226	0.735	12.3	32.120	9.03e-05	2.84e-02	4.81e-05
8	8.00	0.1755	0.630	17.5	16.591	1.54e-04	1.32e-02	3.82e-05
9	16.0	0.2185	0.545	21.9	11.770	1.94e-04	5.38e-03	1.95e-05
10	32.0	0.2602	0.463	26.0	7.508	2.72e-04	2.61e-03	1.33e-05
11	8.00	0.2524	0.478	25.2	3.998	4.89e-04	3.27e-04	3.00e-06
12	2.00	0.2408	0.501	24.1	9.427	2.13e-04	1.93e-03	7.68e-06
13	0.500	0.2251	0.532	22.5	36.538	5.69e-05	1.05e-02	1.12e-05
14	0.125	0.2080	0.566	20.8	140.785	1.54e-05	4.56e-02	1.32e-05
15	0.0625	0.2014	0.579	20.1	191.037	1.17e-05	1.05e-01	2.31e-05

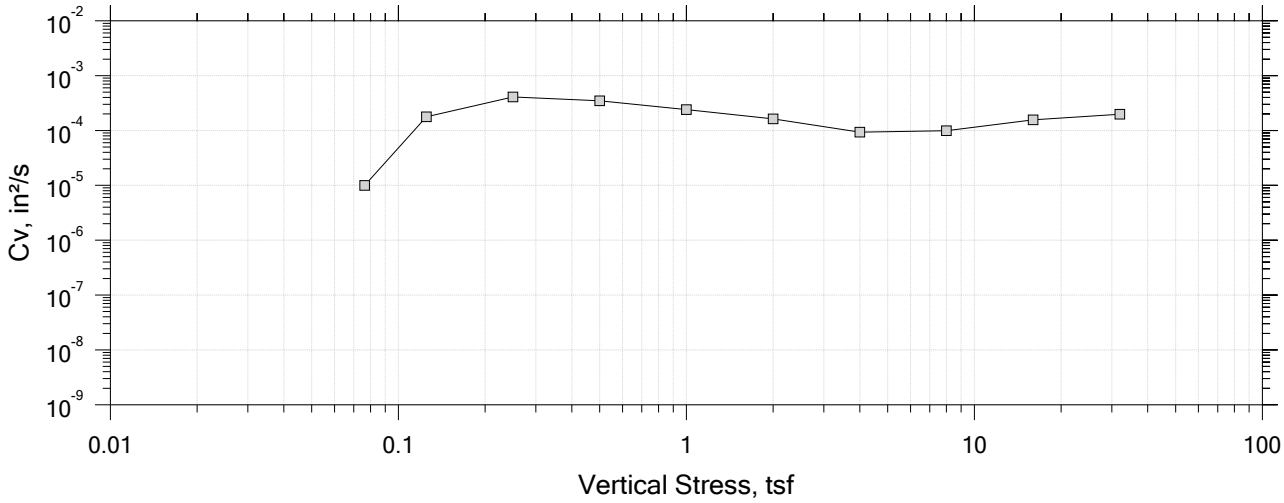
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		
	Displacement at End of Increment		

B-211 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





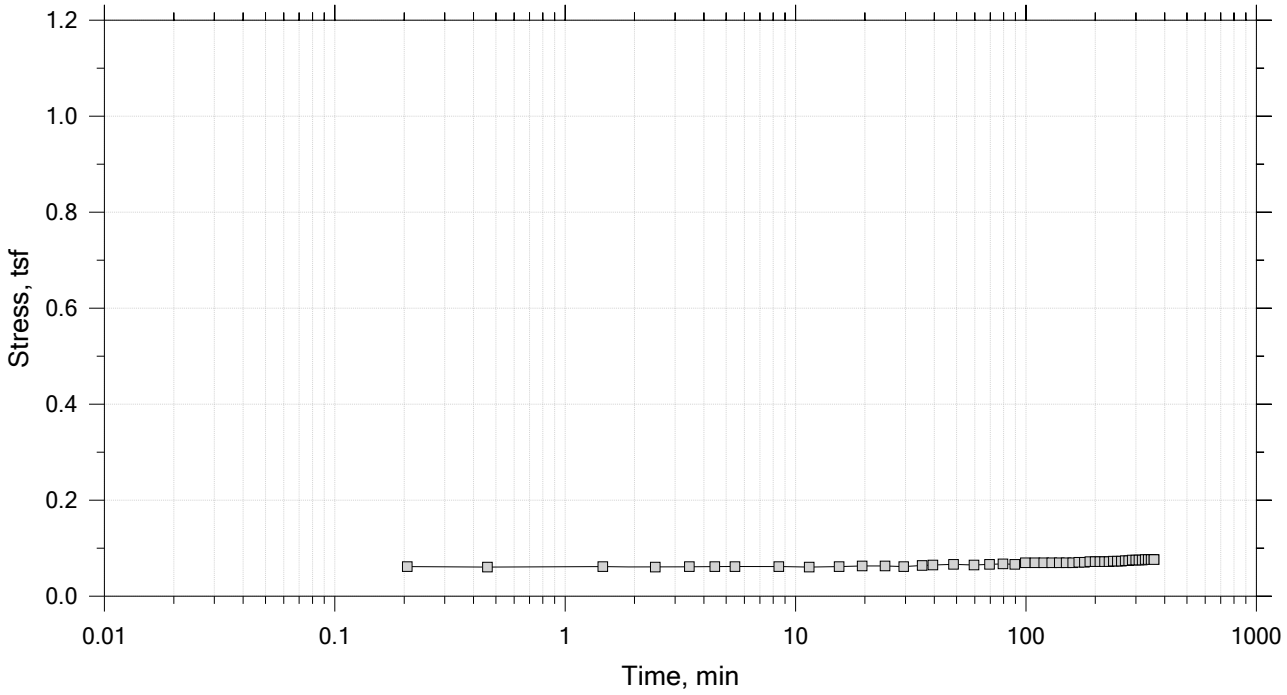
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

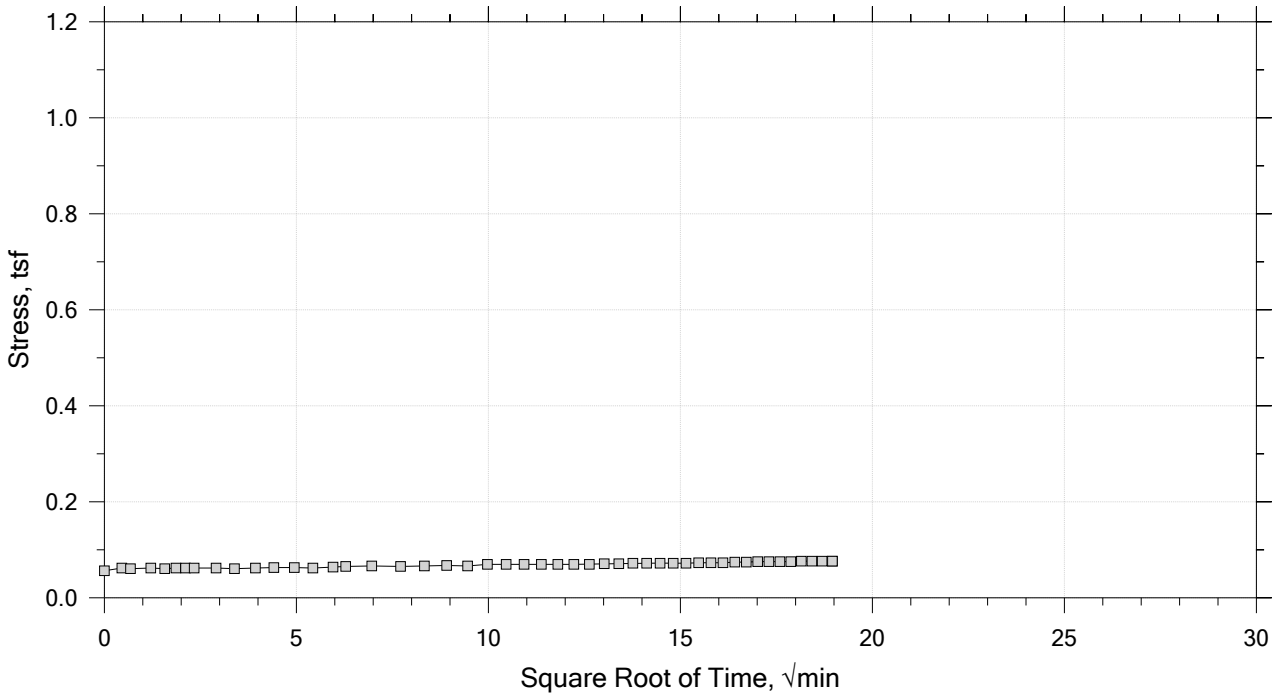
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15

Constant Volume Step

Stress: 0.0763 tsf





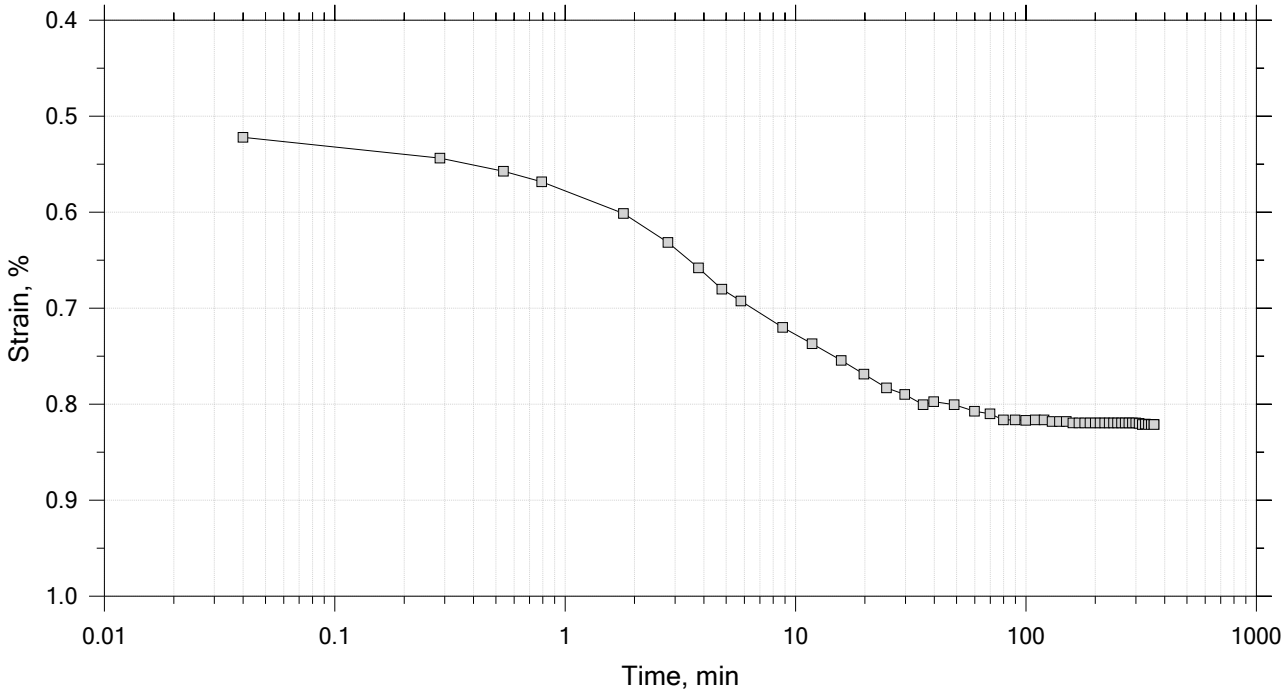
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

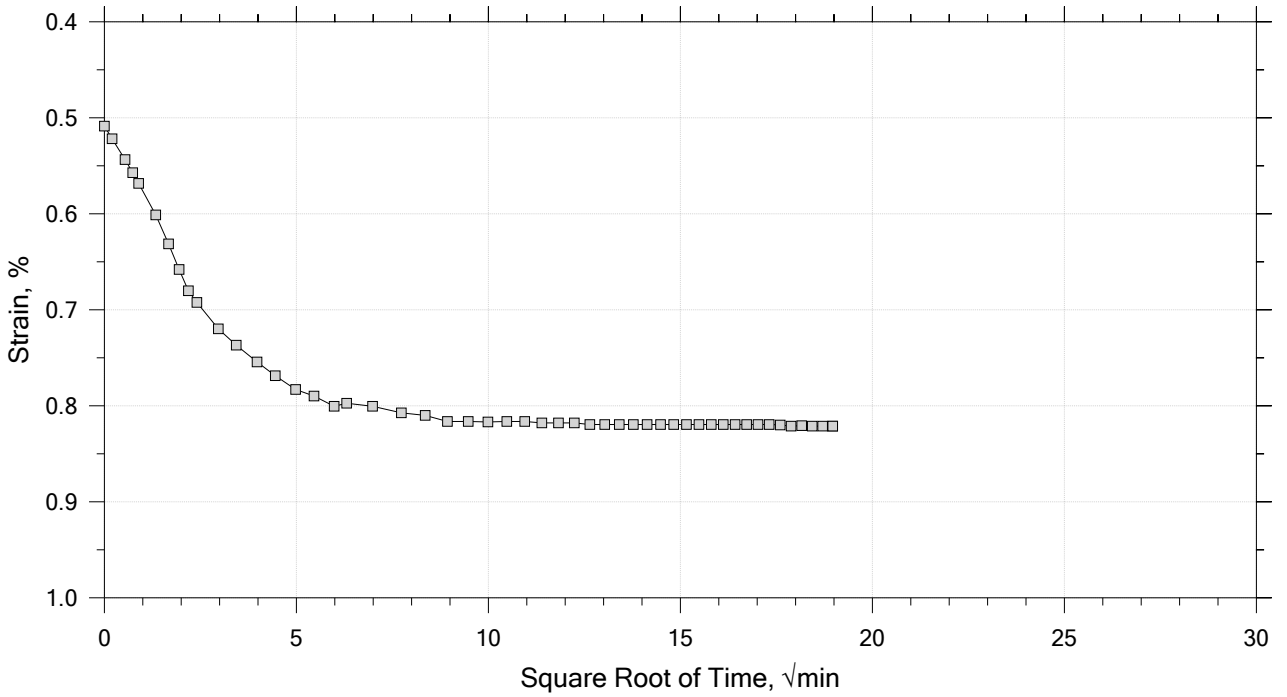
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf

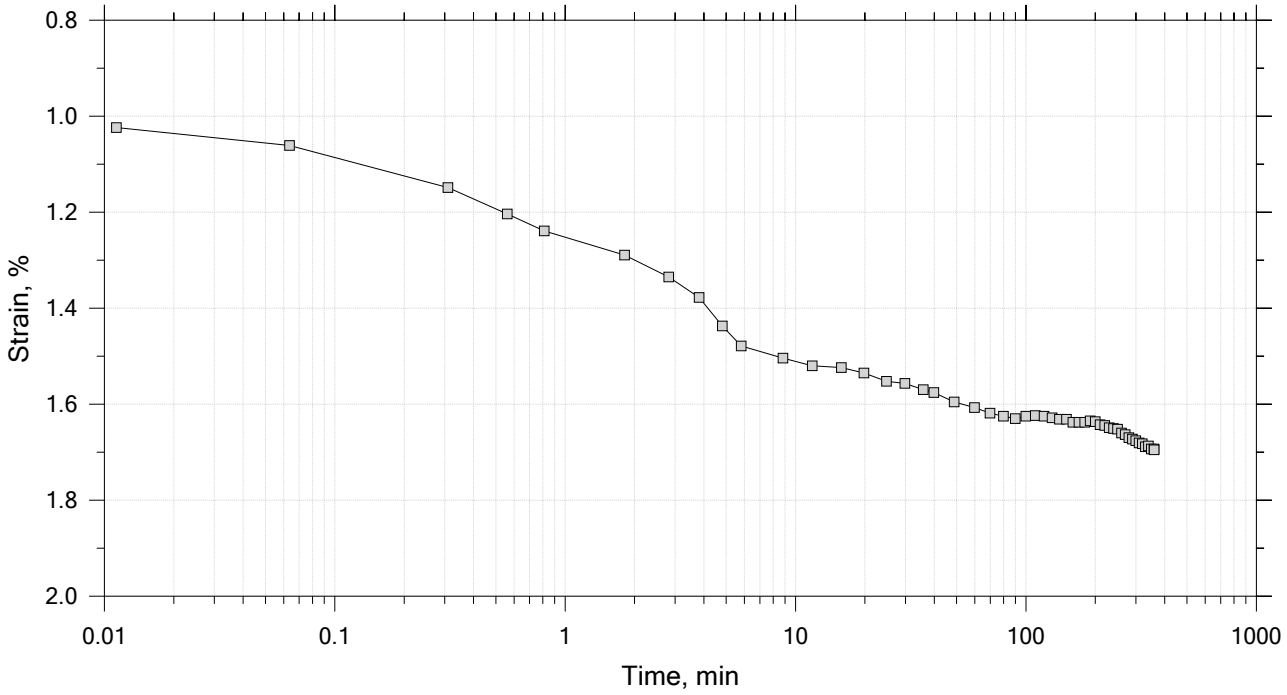


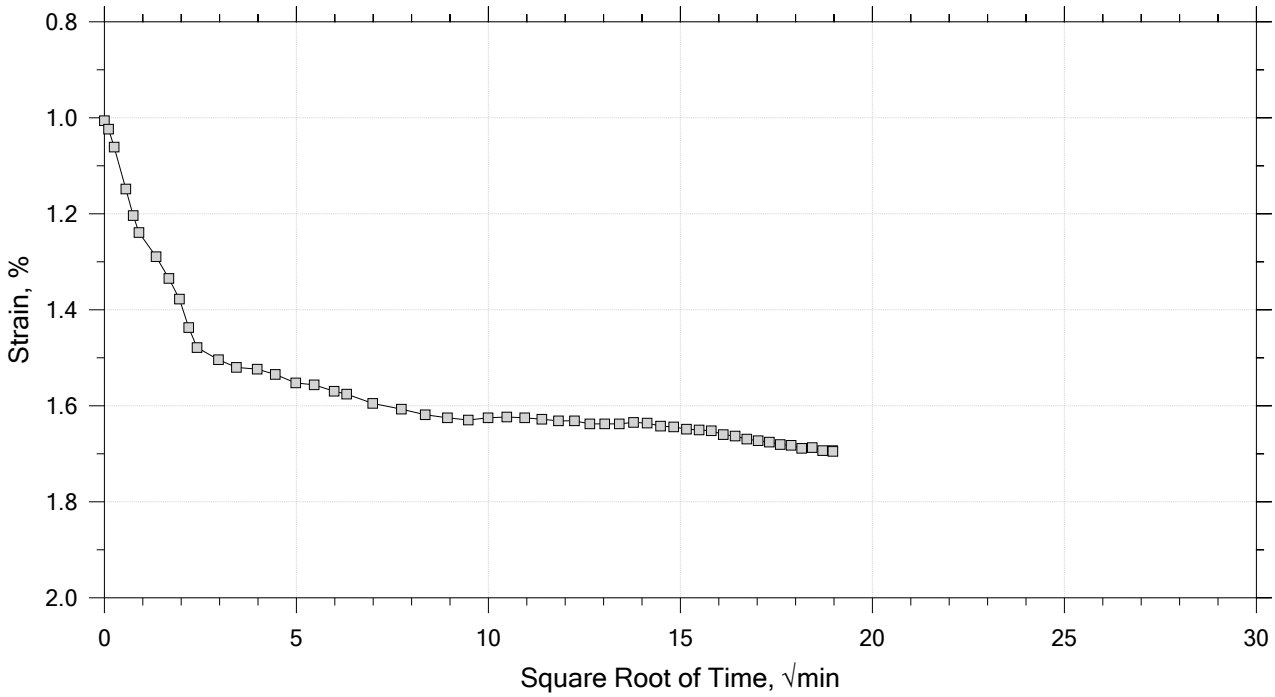


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

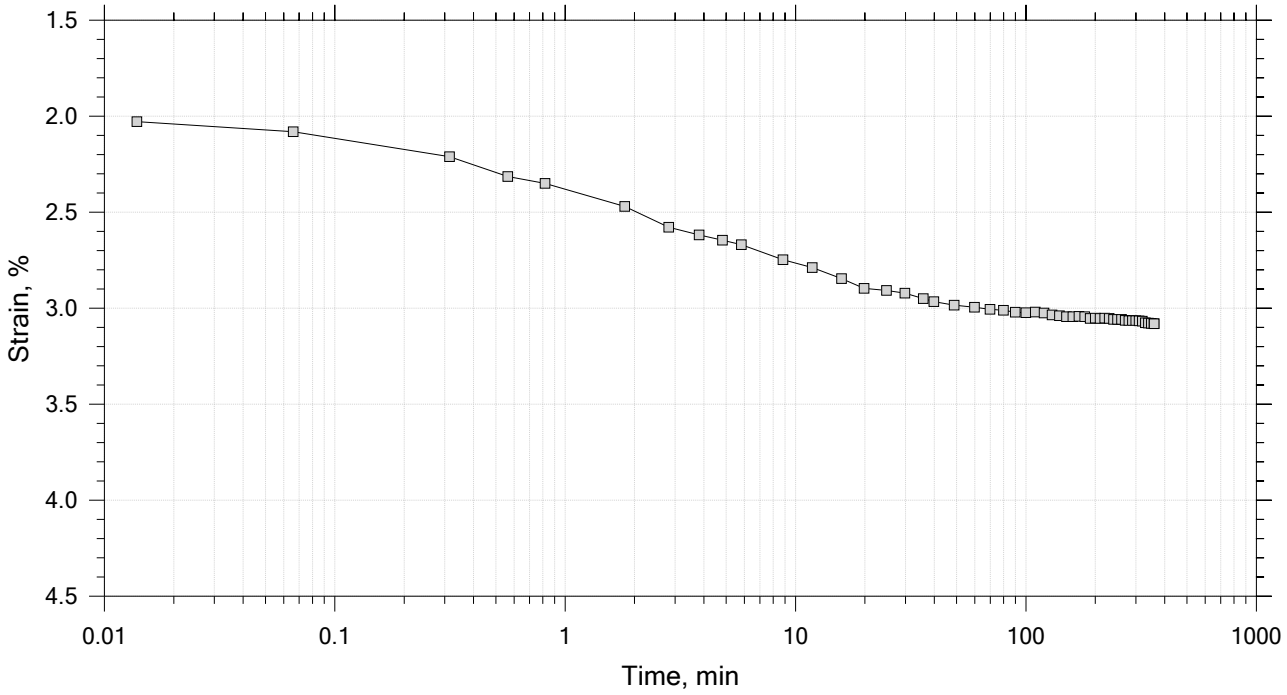


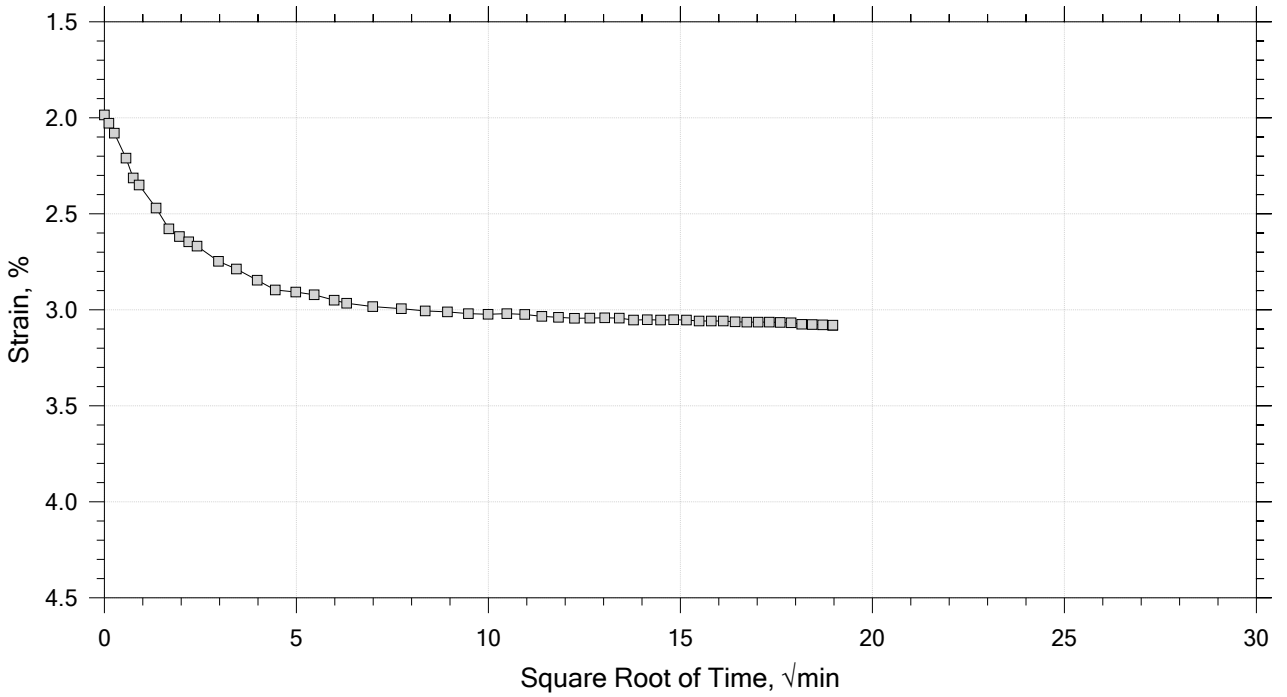


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





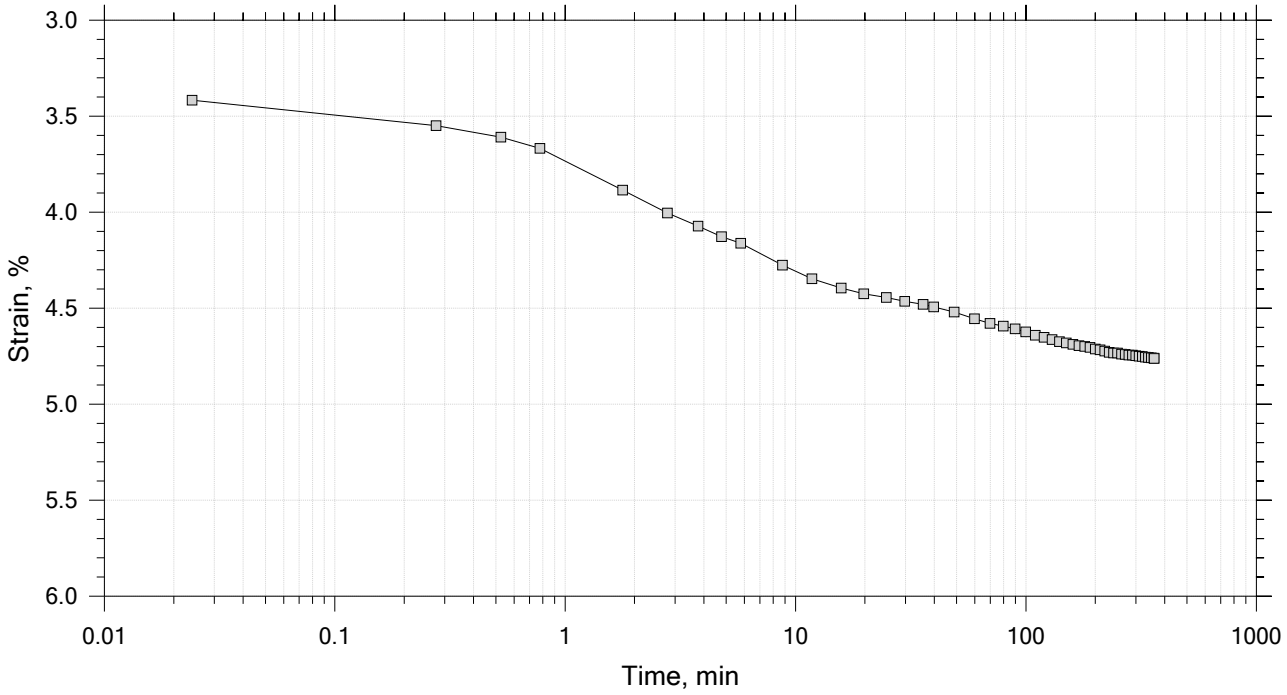
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

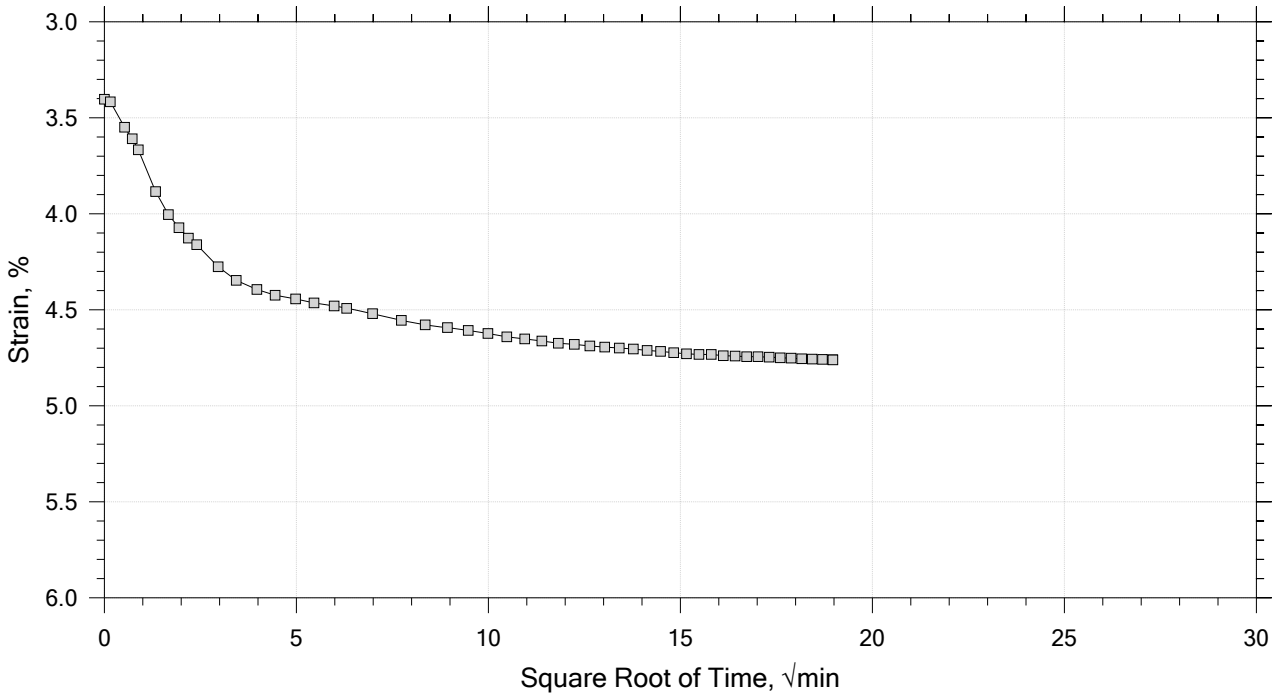
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





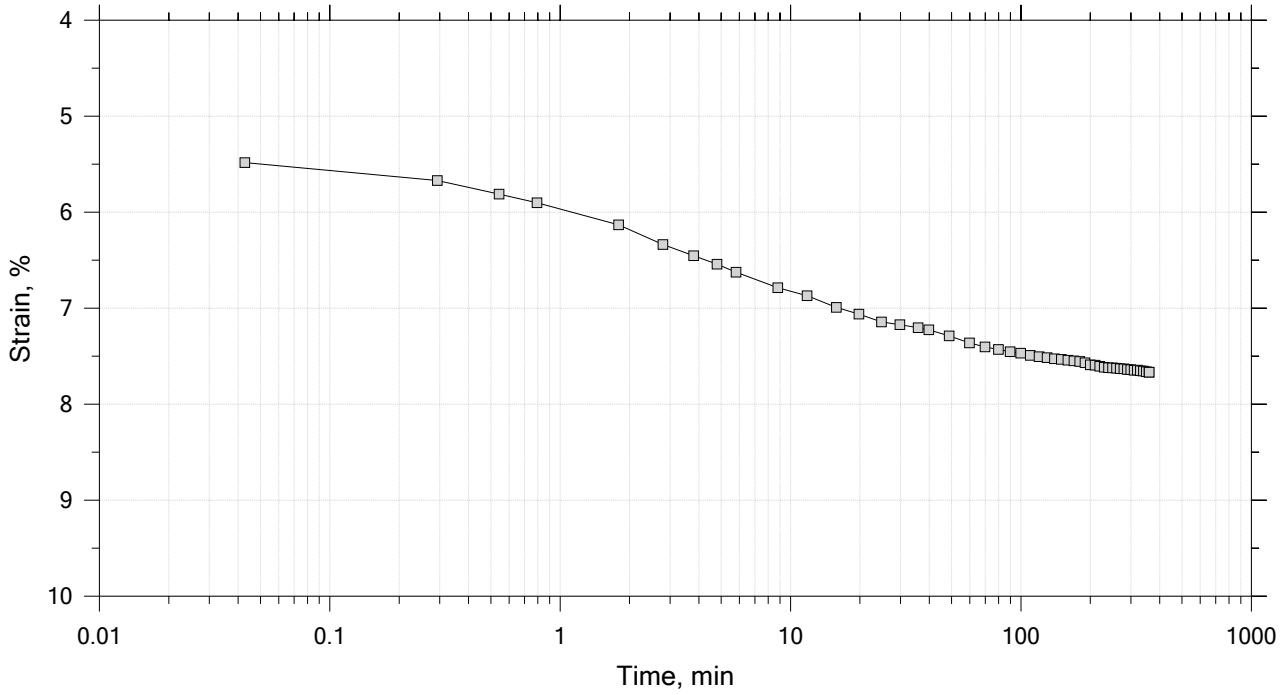
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

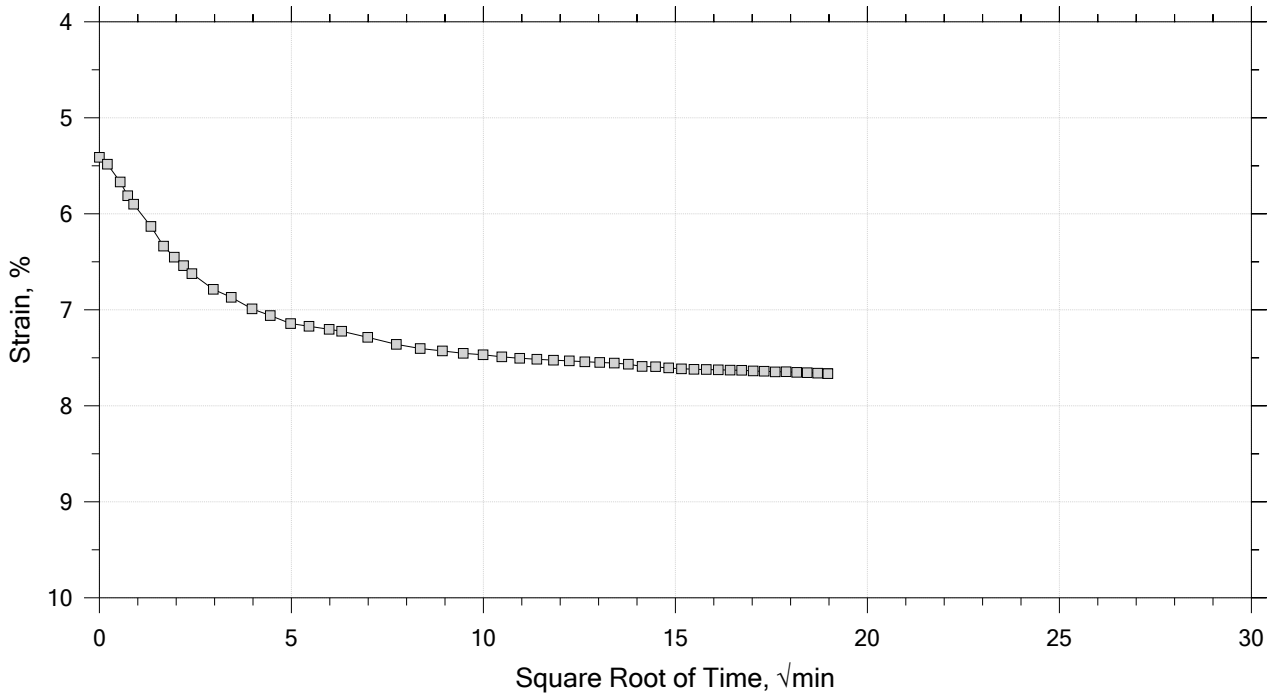
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





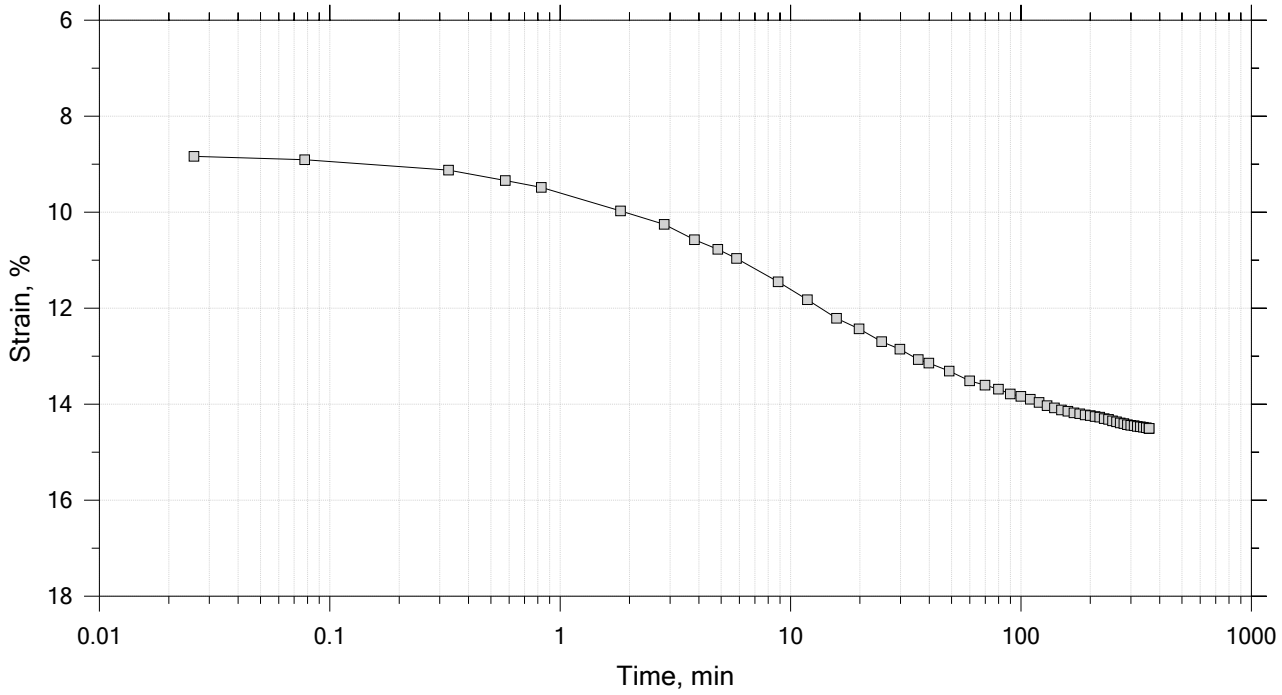
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

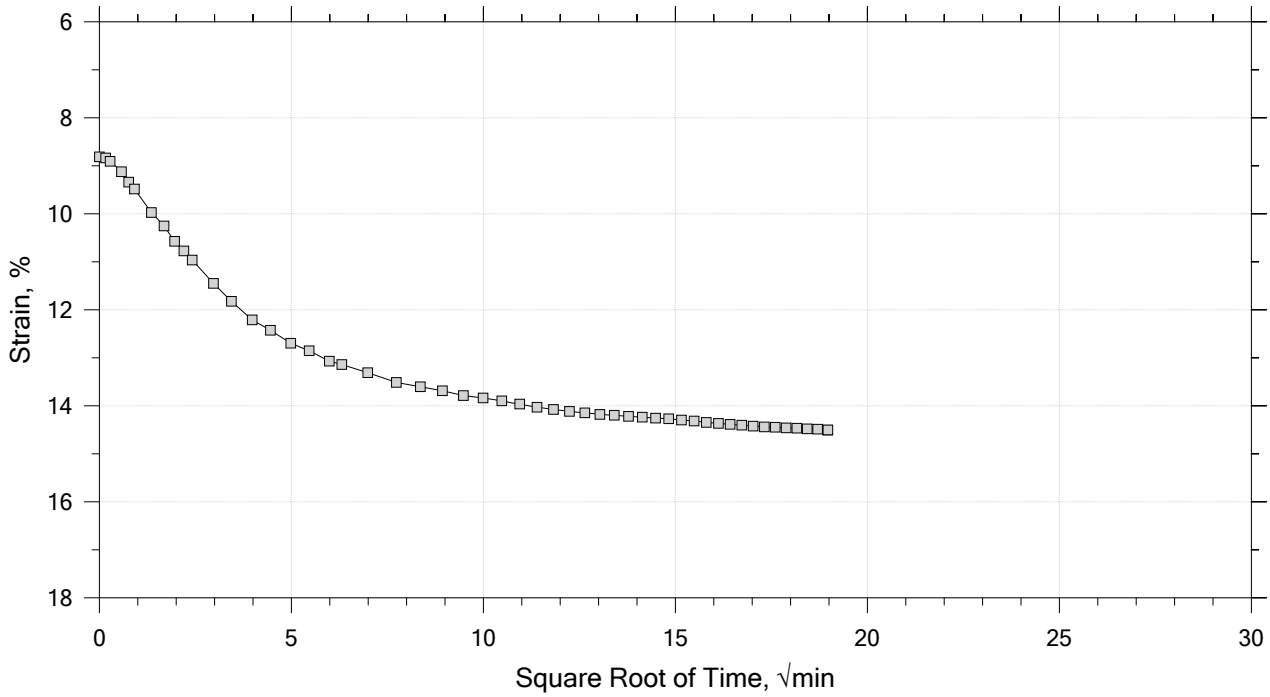
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





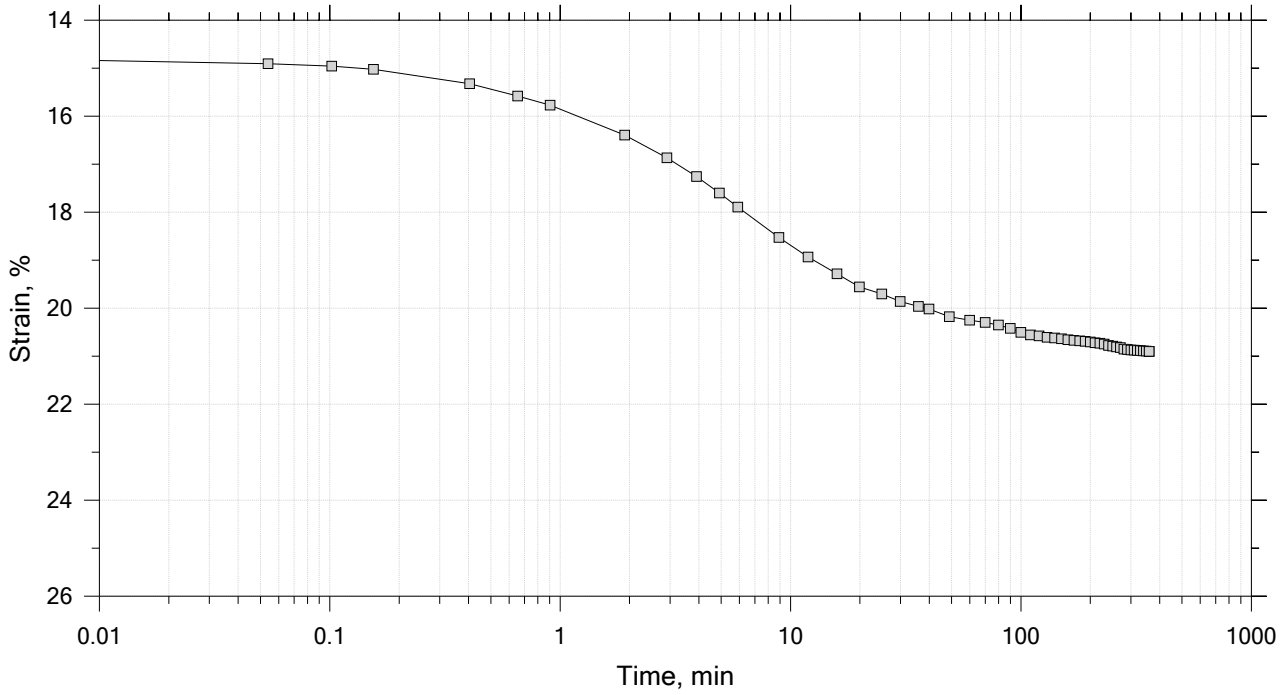
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

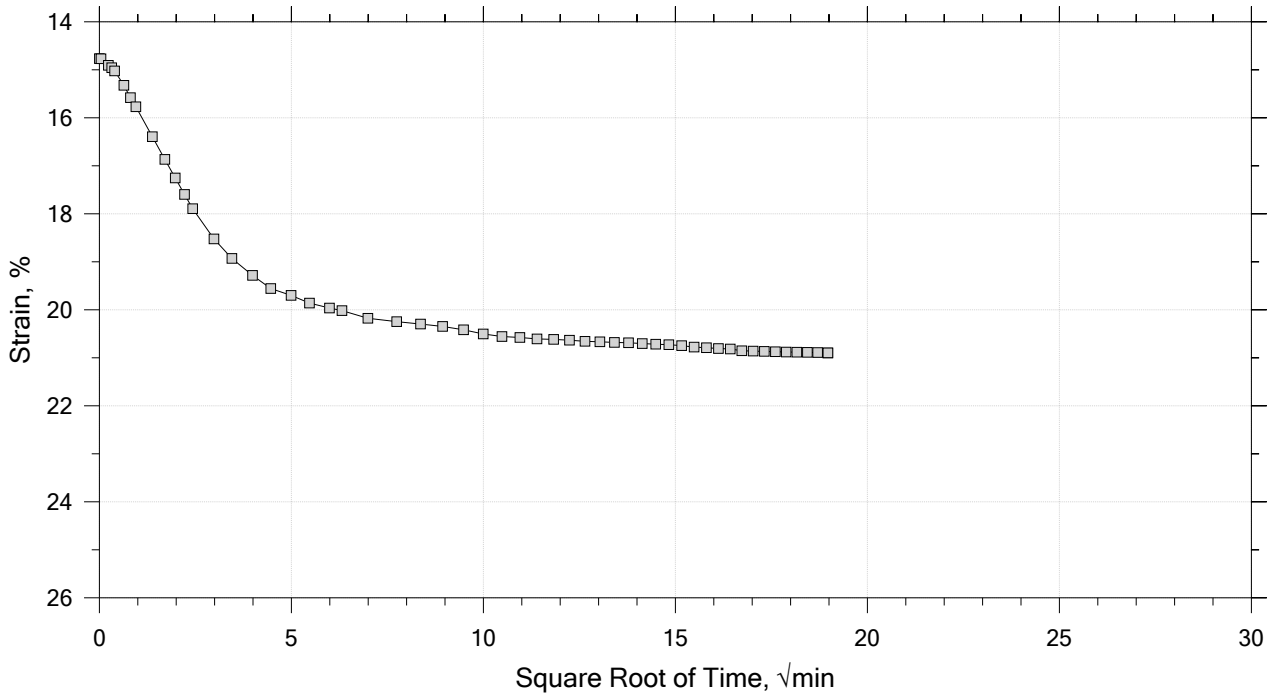
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





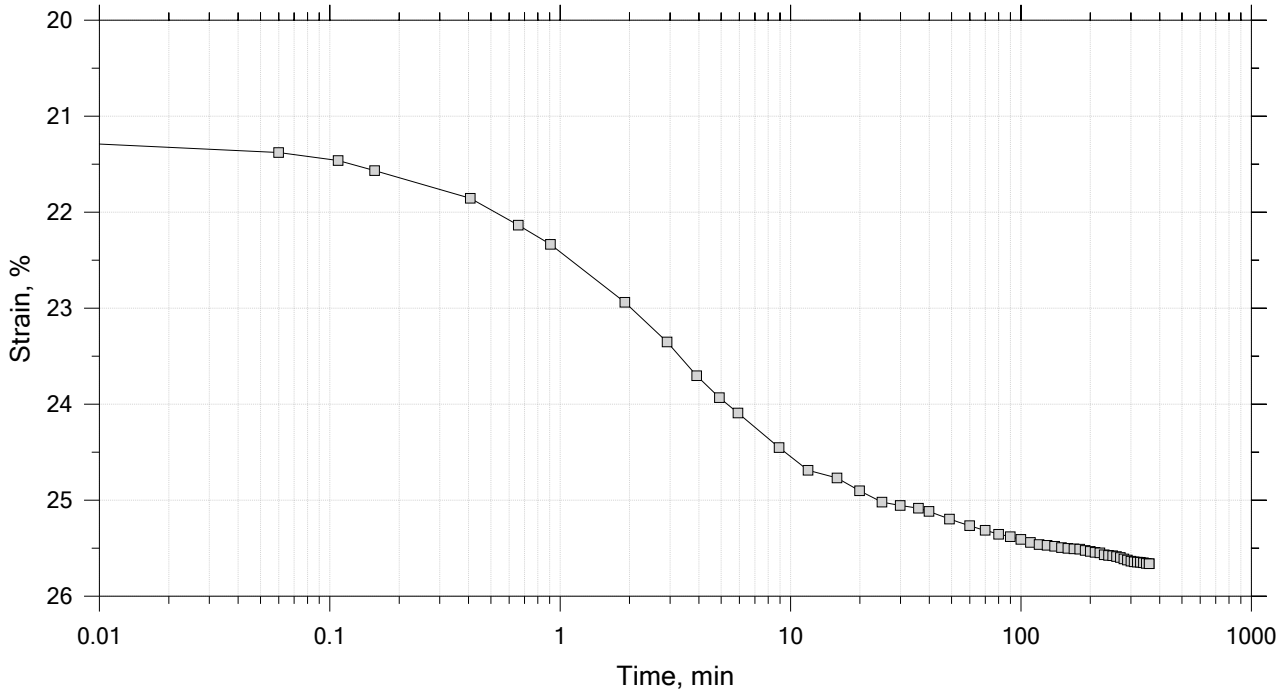
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

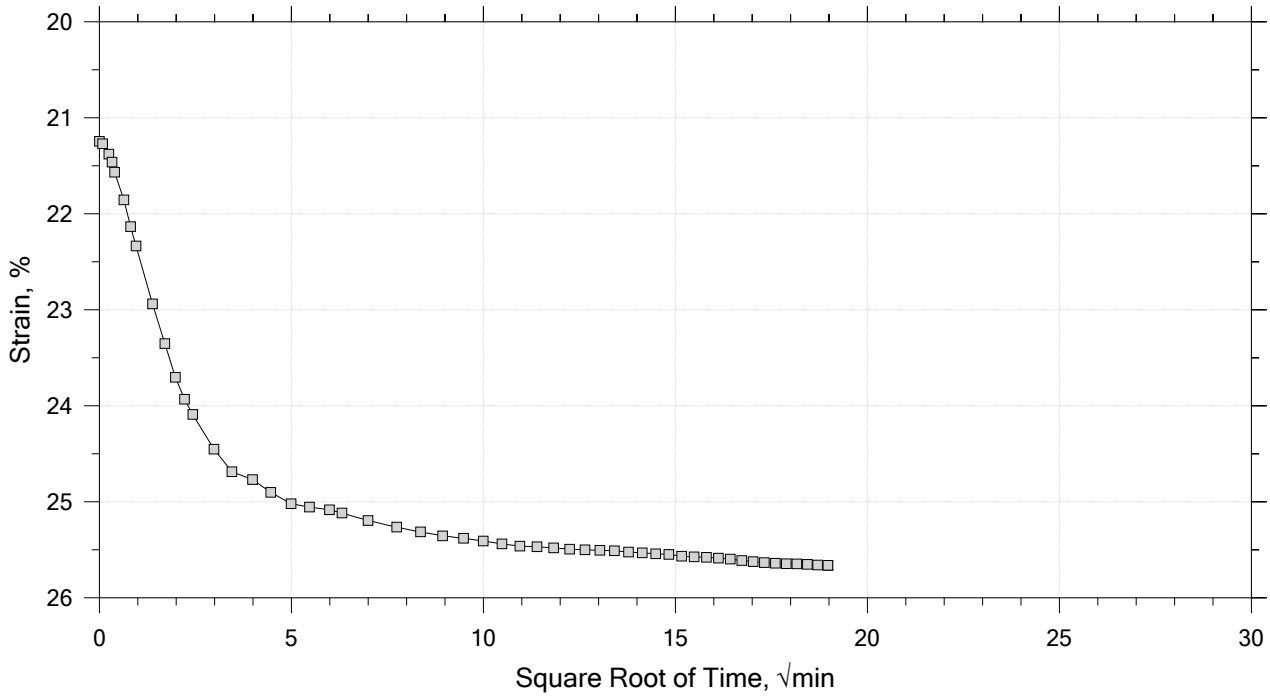
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

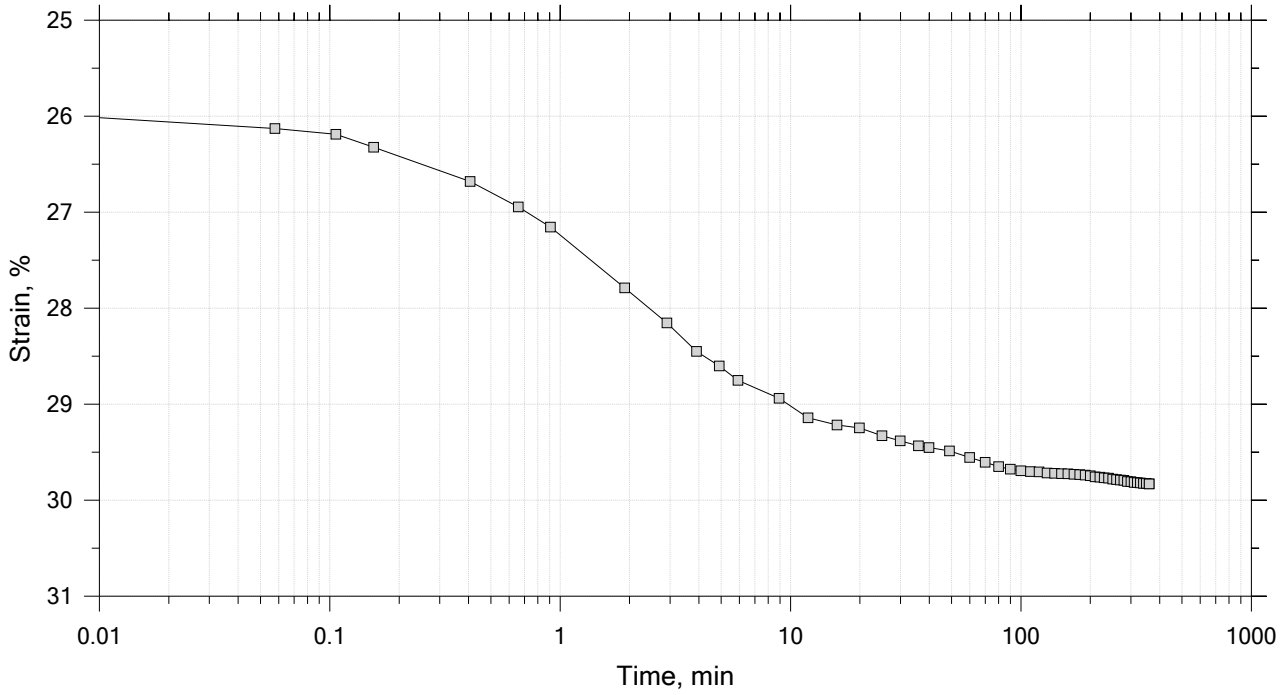


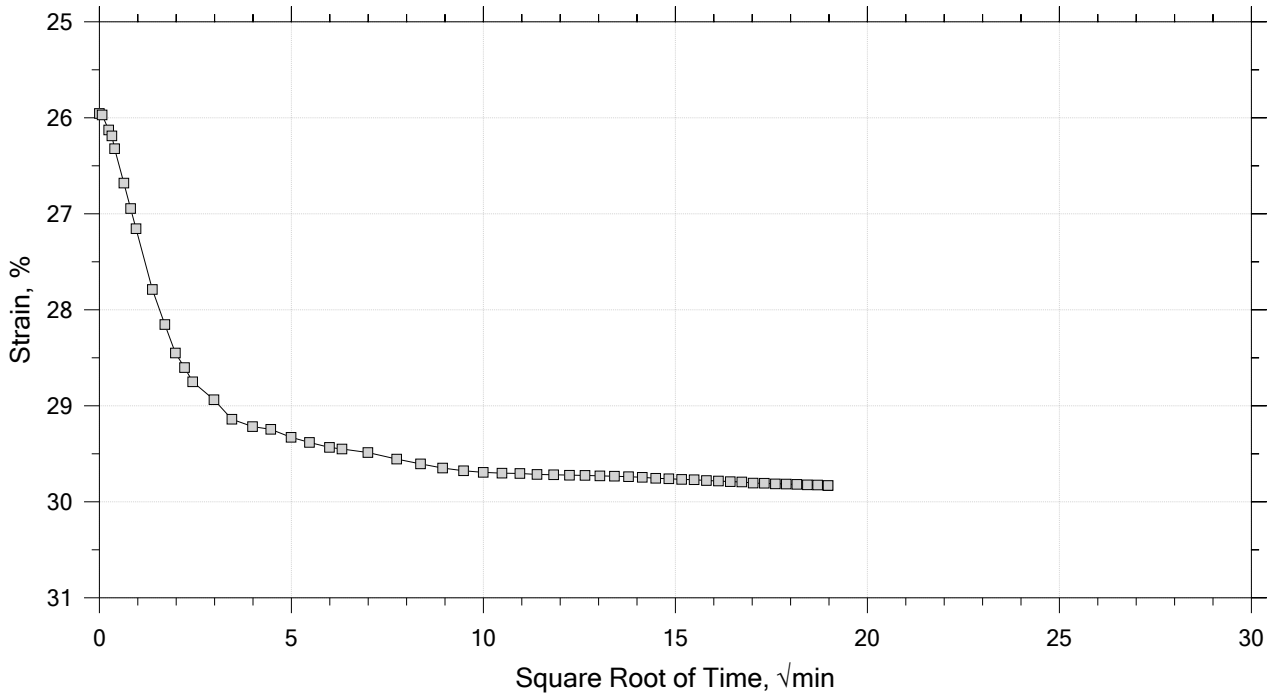


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

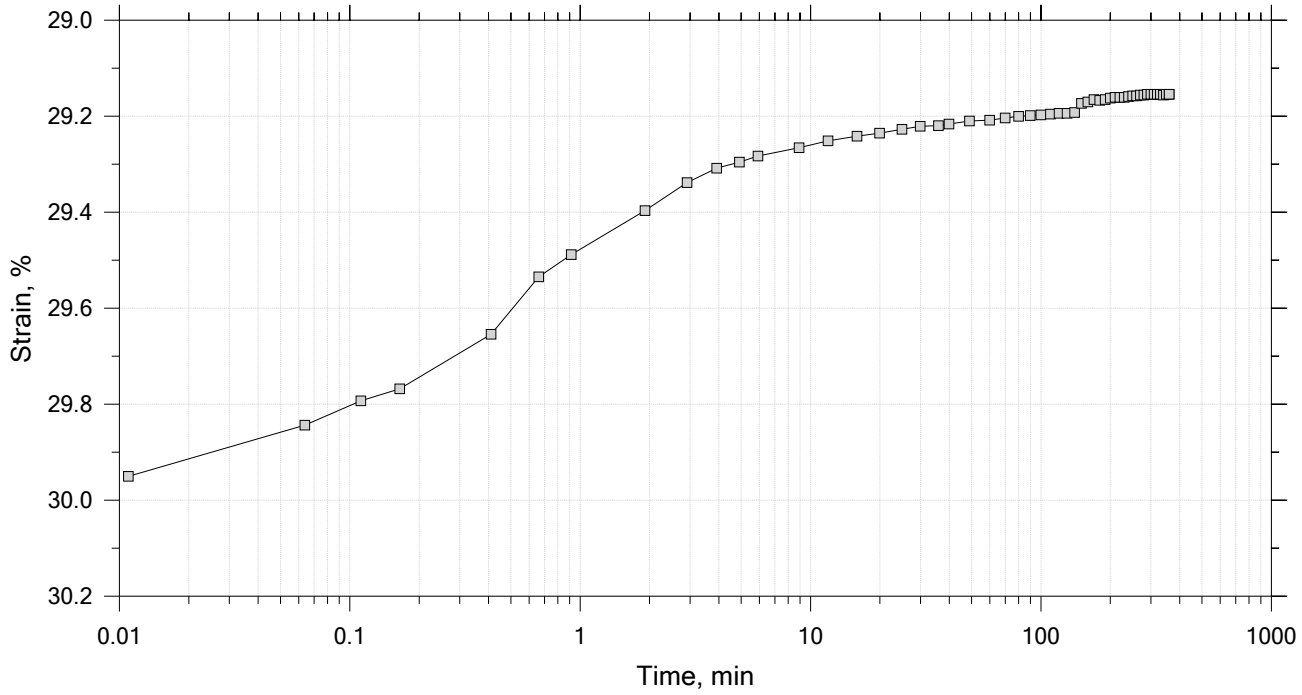


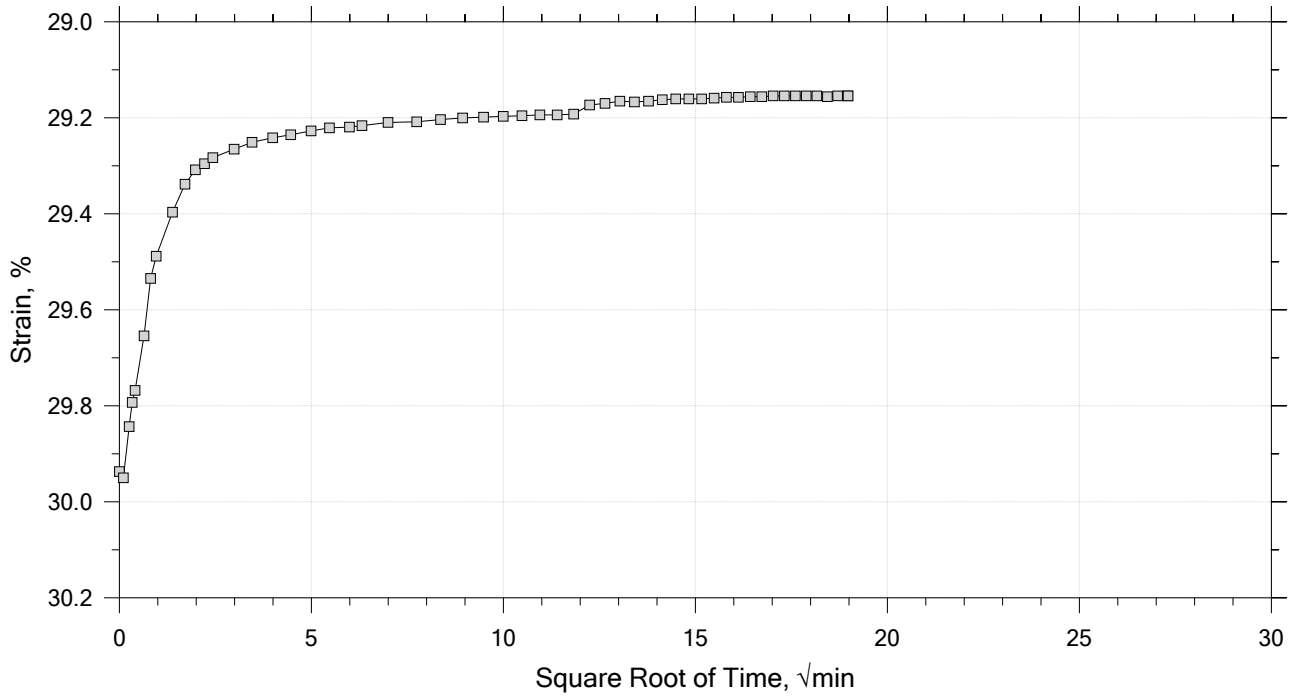


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





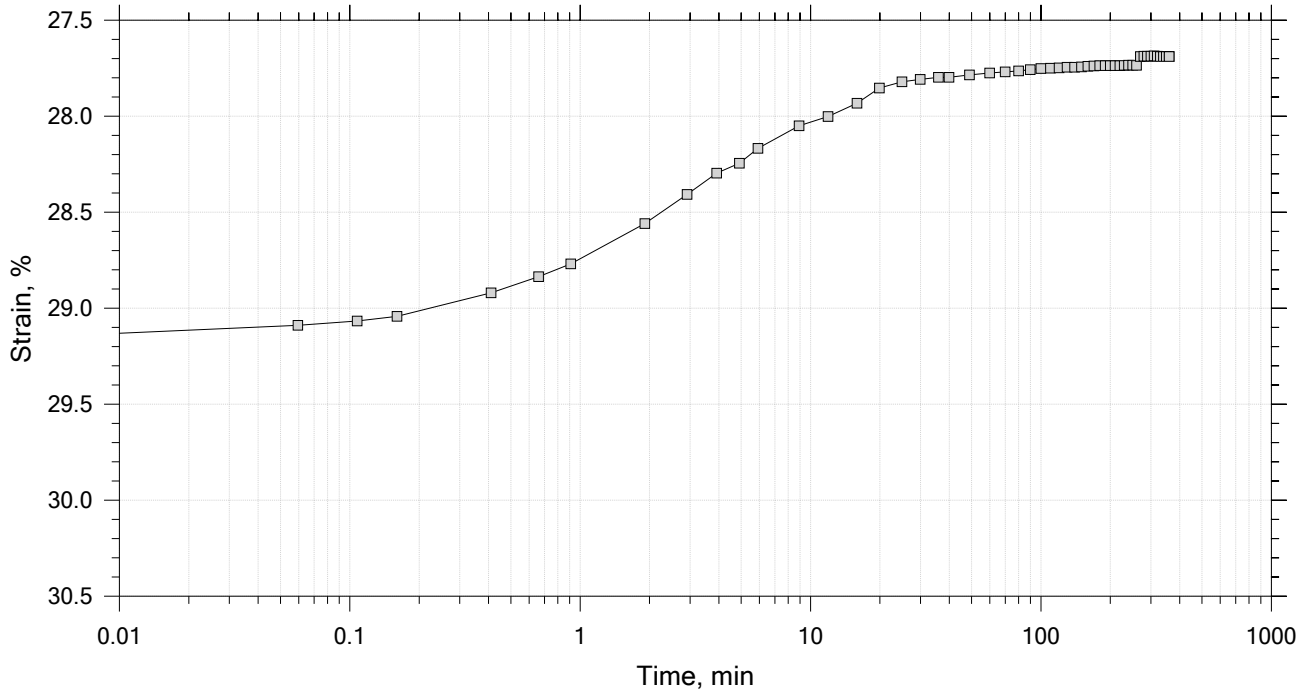
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

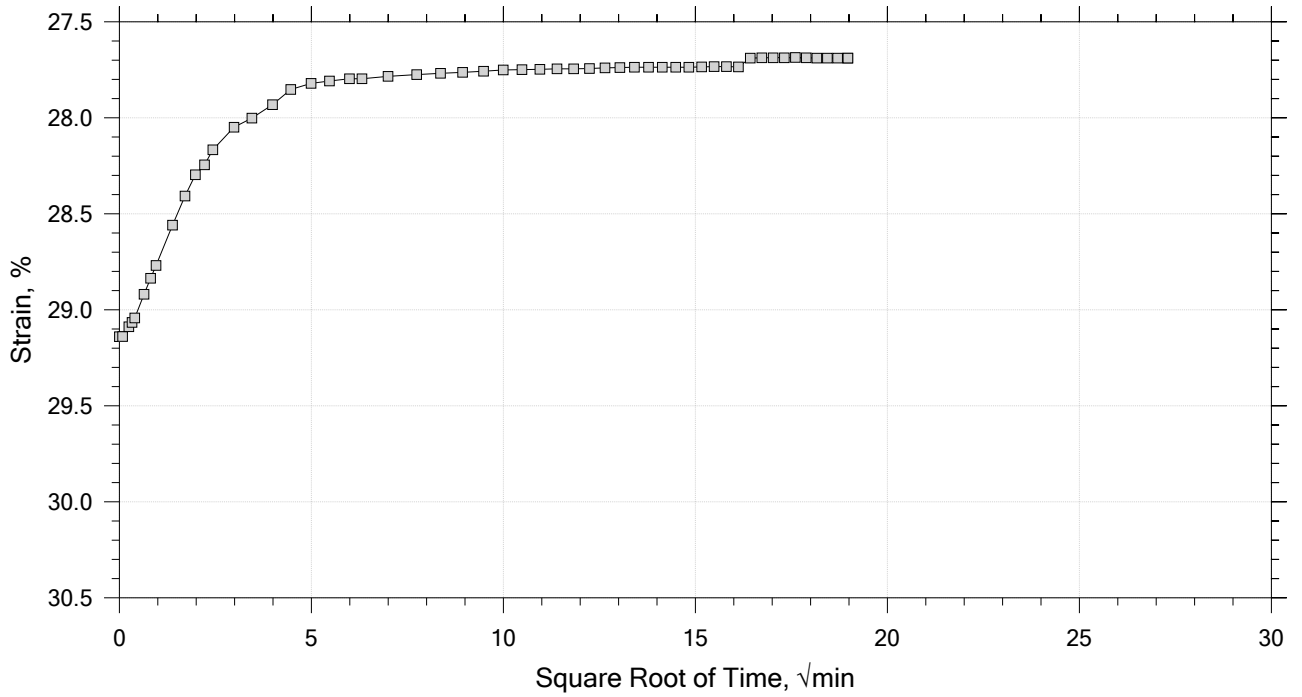
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

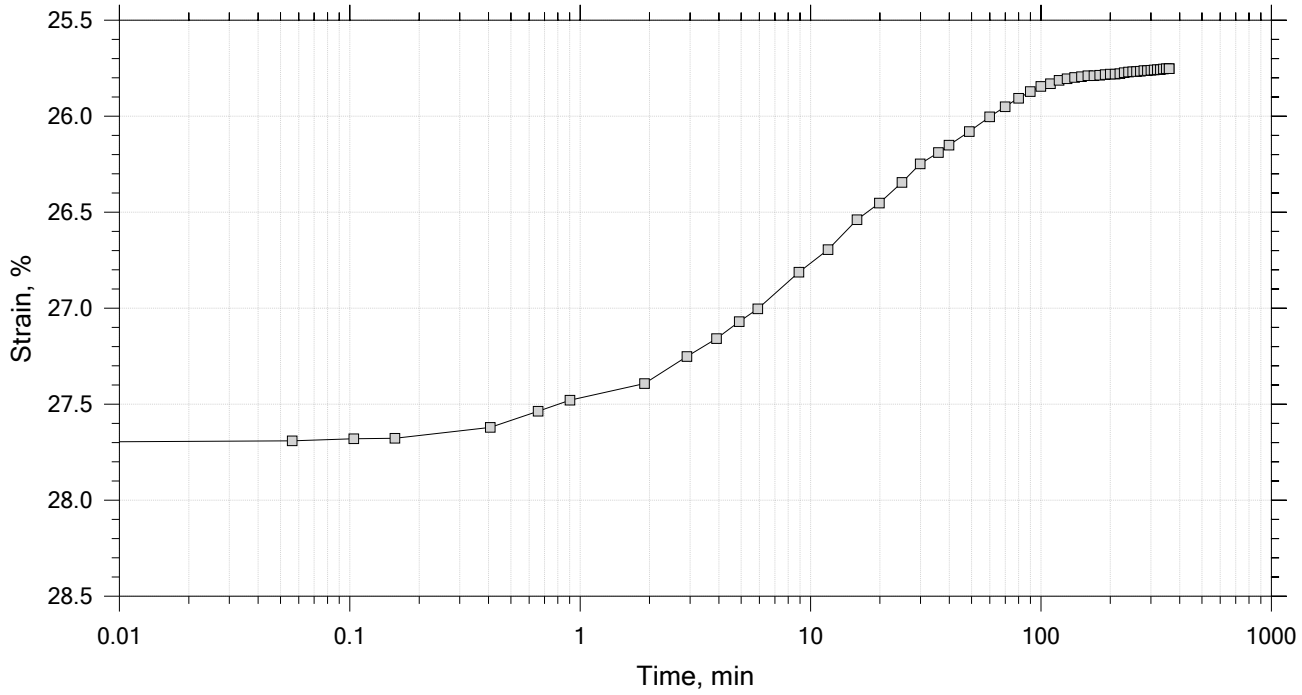


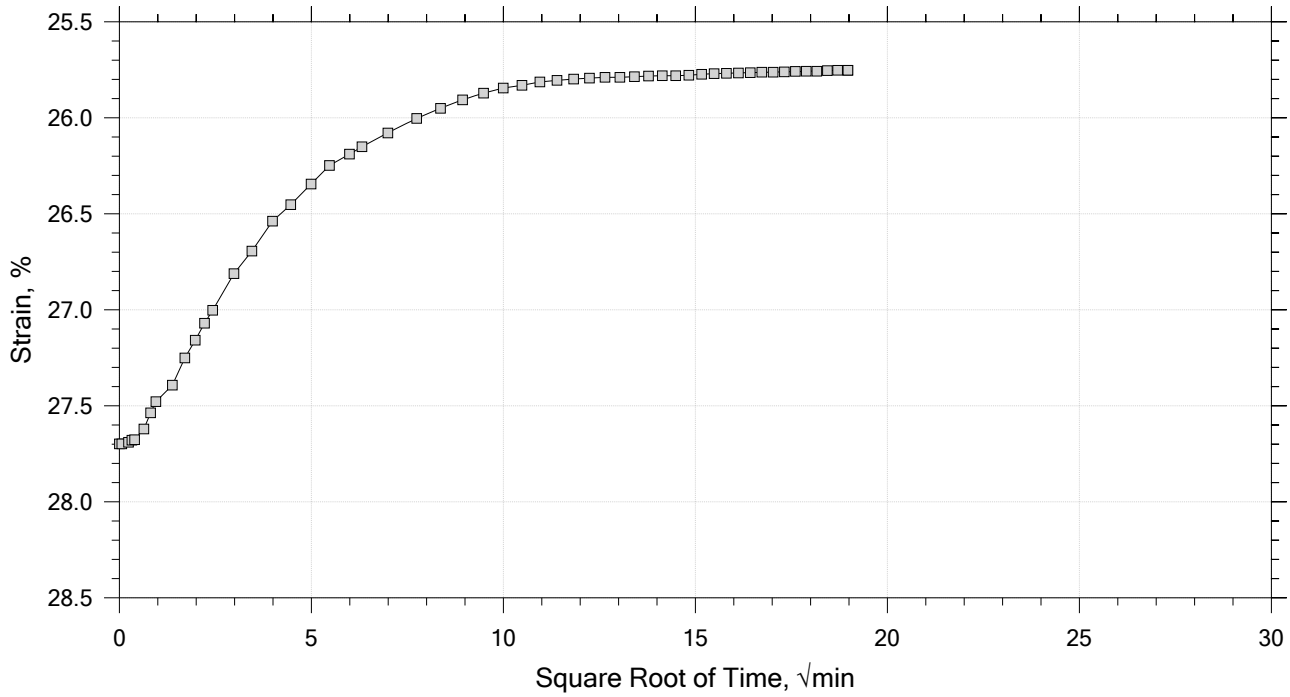


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

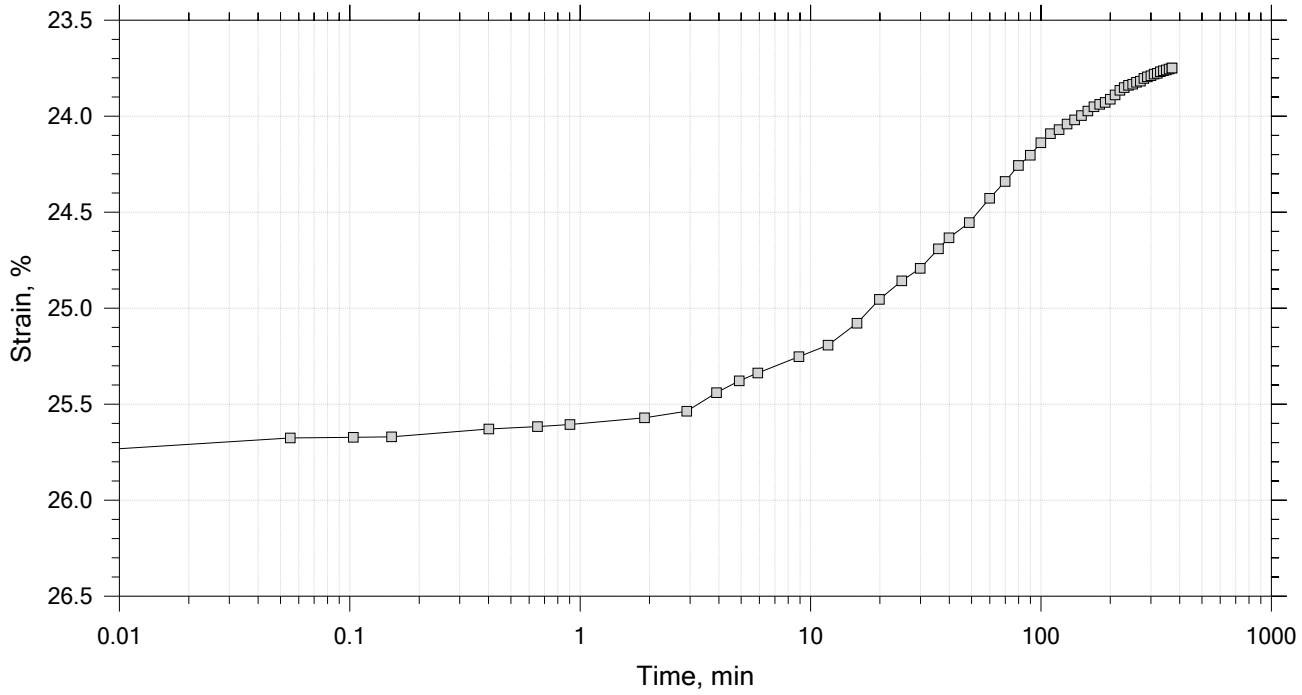


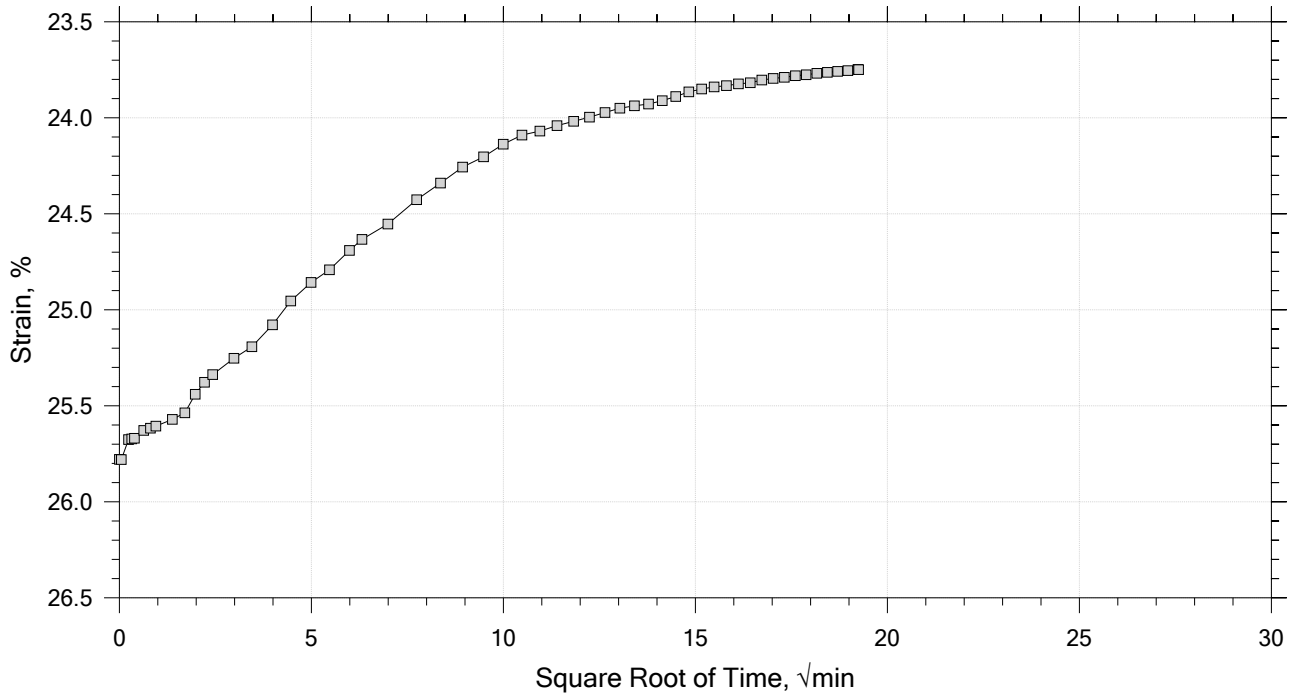


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

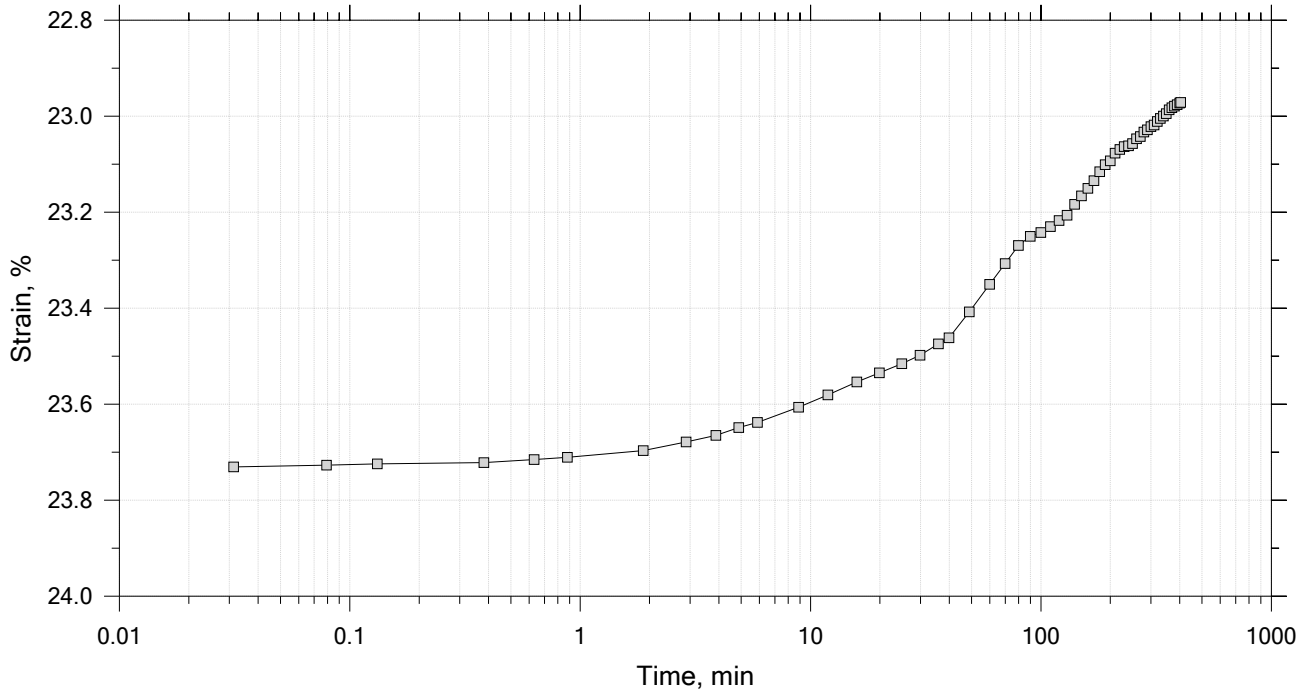


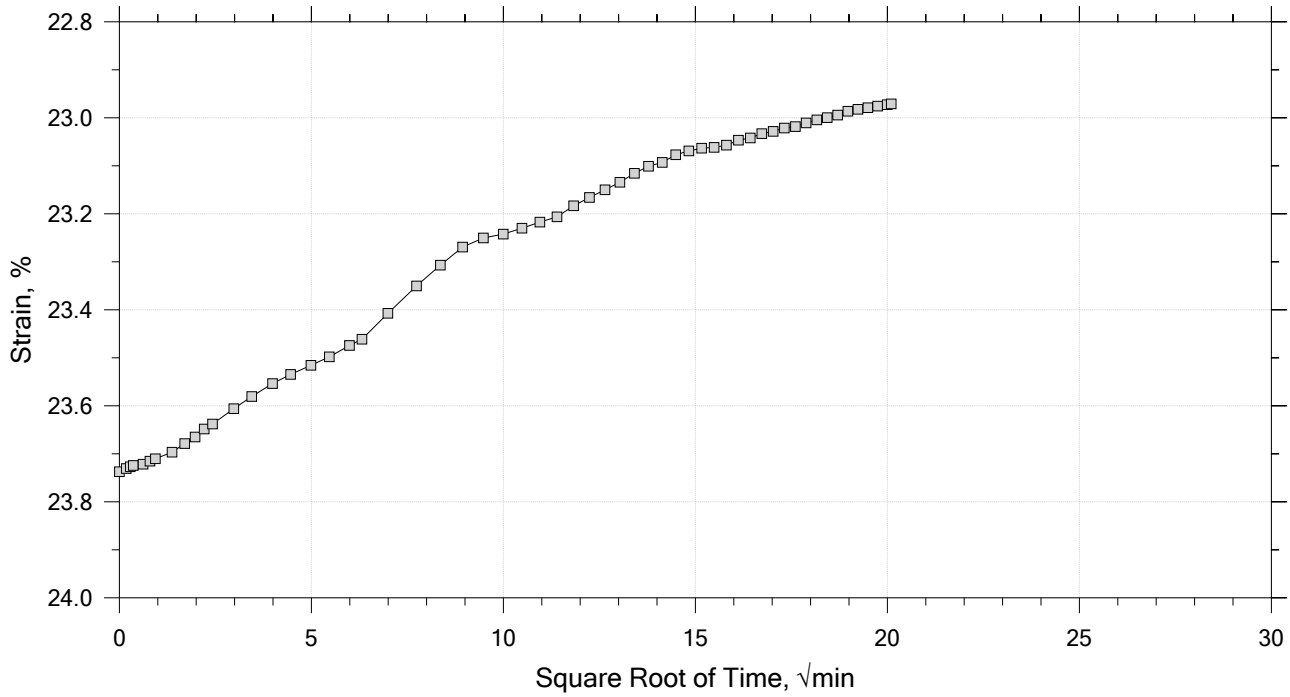


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 45
Initial Height: 1.00 in	Initial Void Ratio: 1.23	Plastic Limit: 22
Final Height: 0.80 in	Final Void Ratio: 0.787	Plasticity Index: 23

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E0537	RING		A1858
Mass Container, gm	8.18	110.95	110.95	8.26
Mass Container + Wet Soil, gm	164.66	253.83	238	134.83
Mass Container + Dry Soil, gm	118.7	209.66	209.66	106.6
Mass Dry Soil, gm	110.52	98.713	98.713	98.34
Water Content, %	41.59	44.74	28.71	28.71
Void Ratio	---	1.23	0.79	---
Degree of Saturation, %	---	99.42	100.00	---
Dry Unit Weight, pcf	---	76.609	95.762	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

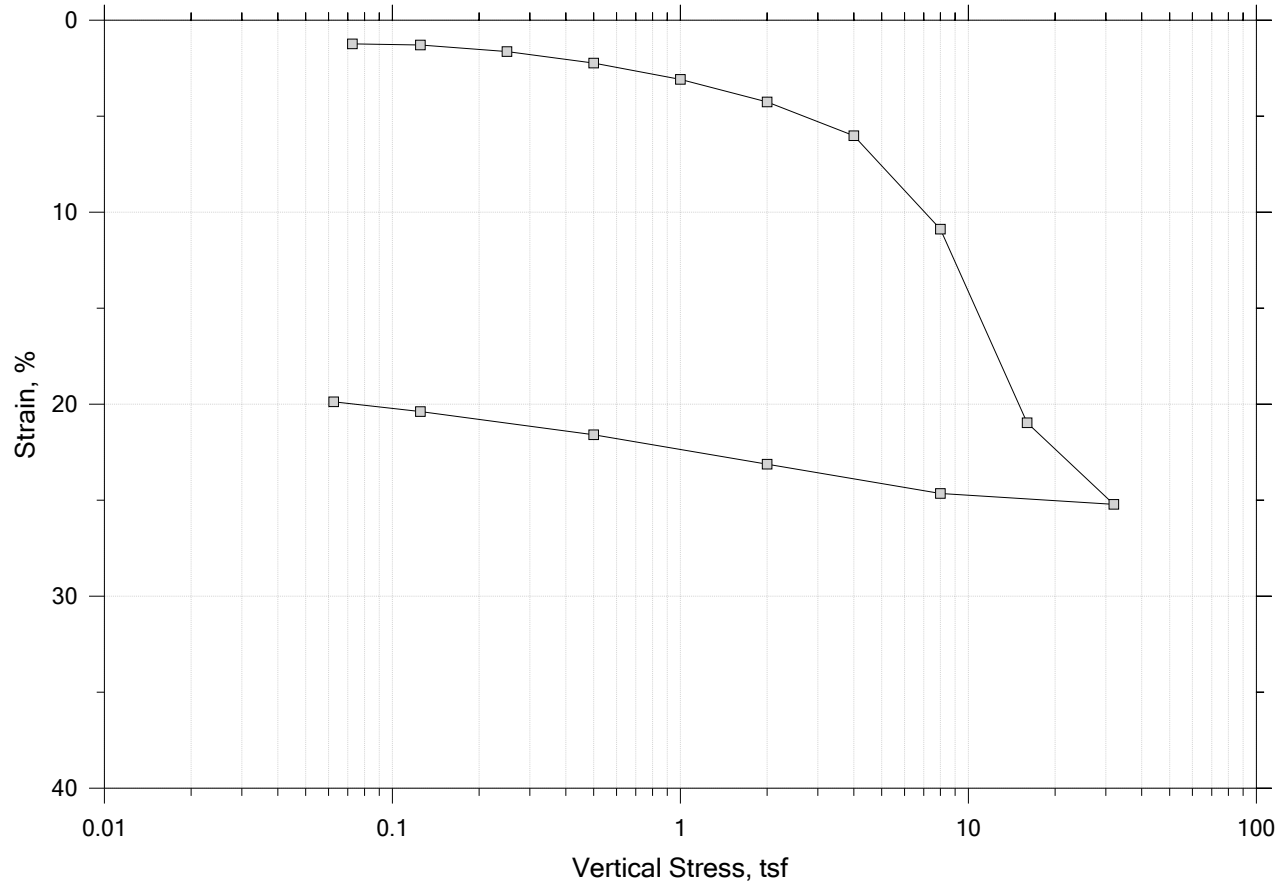
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0763	0.004897	1.22	0.490	354.175	9.93e-06	6.41e-02	1.19e-05
2	0.125	0.008211	1.22	0.821	19.614	1.78e-04	6.81e-02	2.27e-04
3	0.250	0.01695	1.20	1.69	8.427	4.09e-04	6.99e-02	5.35e-04
4	0.500	0.03080	1.16	3.08	9.684	3.48e-04	5.54e-02	3.61e-04
5	1.00	0.04761	1.13	4.76	13.589	2.40e-04	3.36e-02	1.51e-04
6	2.00	0.07666	1.06	7.67	19.112	1.63e-04	2.90e-02	8.85e-05
7	4.00	0.1450	0.910	14.5	29.882	9.35e-05	3.42e-02	5.99e-05
8	8.00	0.2090	0.767	20.9	24.156	9.91e-05	1.60e-02	2.97e-05
9	16.0	0.2566	0.660	25.7	13.285	1.57e-04	5.95e-03	1.75e-05
10	32.0	0.2983	0.567	29.8	9.304	1.98e-04	2.61e-03	9.67e-06
11	8.00	0.2915	0.582	29.2	4.018	4.37e-04	2.82e-04	2.31e-06
12	2.00	0.2769	0.615	27.7	13.095	1.38e-04	2.44e-03	6.32e-06
13	0.500	0.2575	0.658	25.8	43.625	4.35e-05	1.29e-02	1.05e-05
14	0.125	0.2375	0.703	23.7	123.458	1.62e-05	5.34e-02	1.62e-05
15	0.0625	0.2297	0.720	23.0	334.232	6.21e-06	1.24e-01	1.45e-05

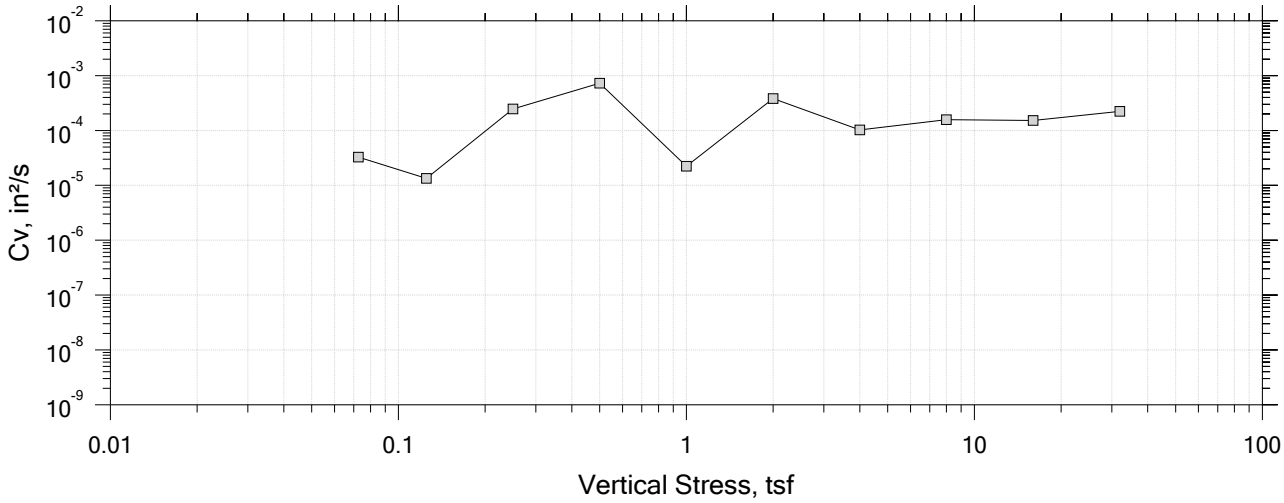
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

B-211 U-2

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

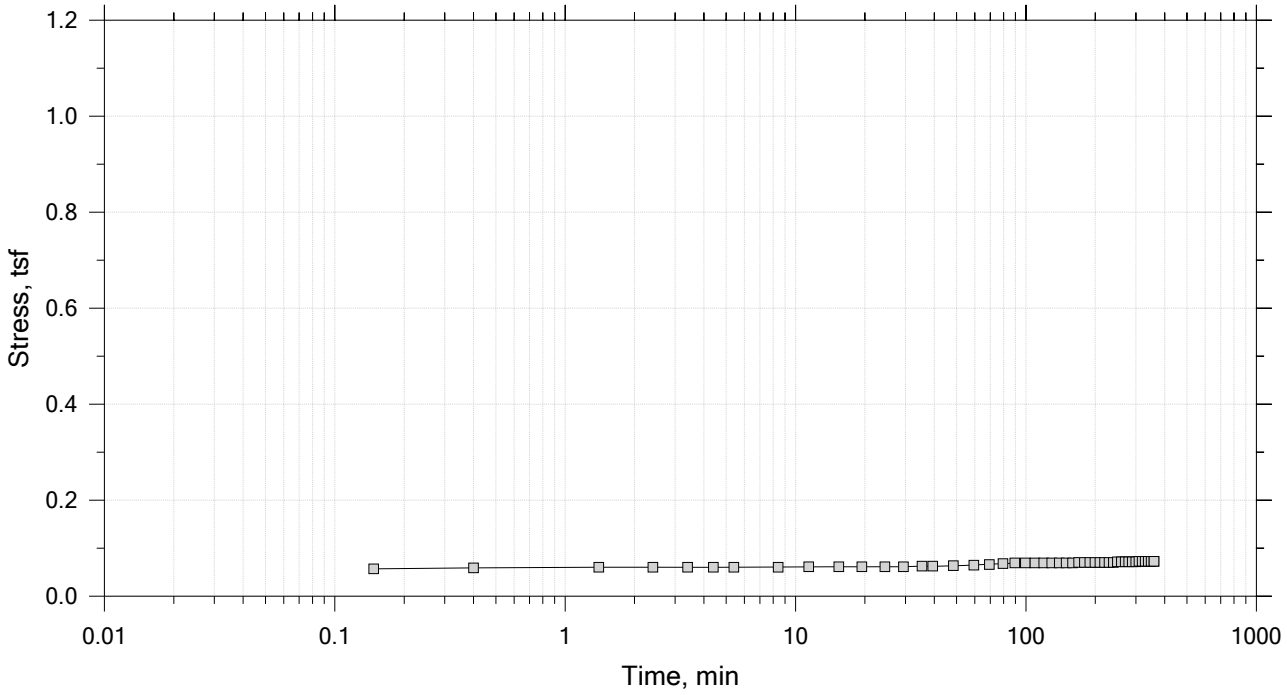


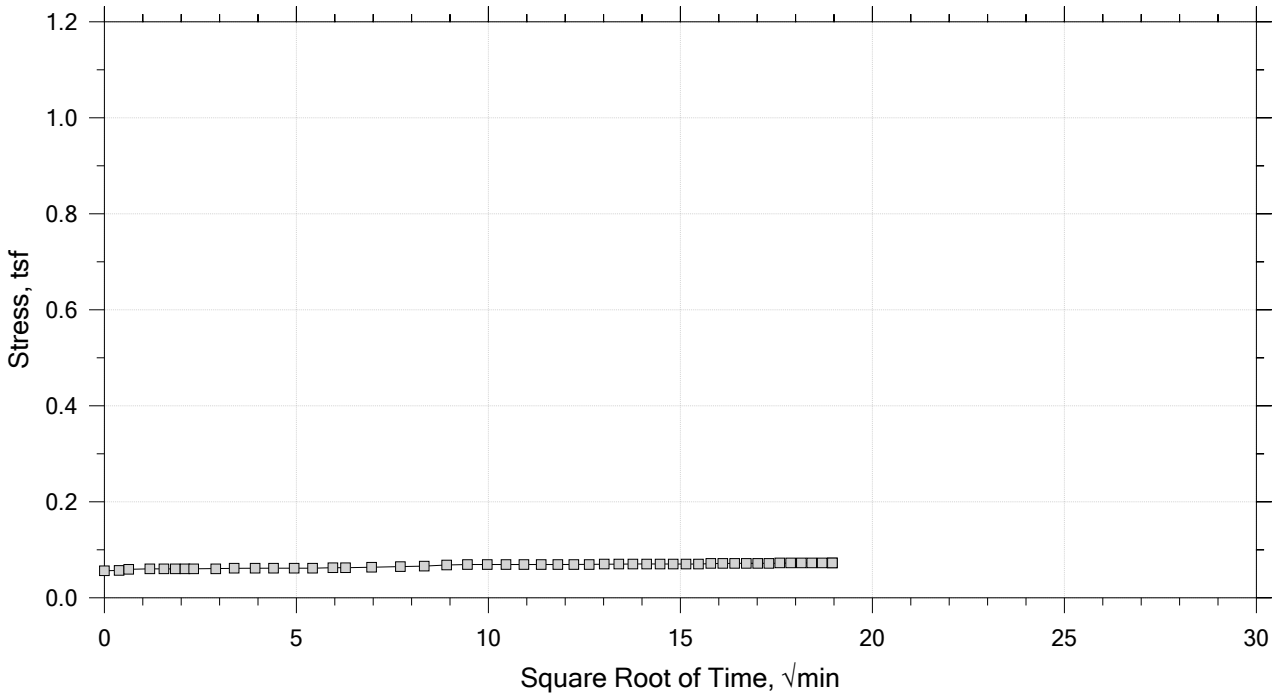


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0727 tsf

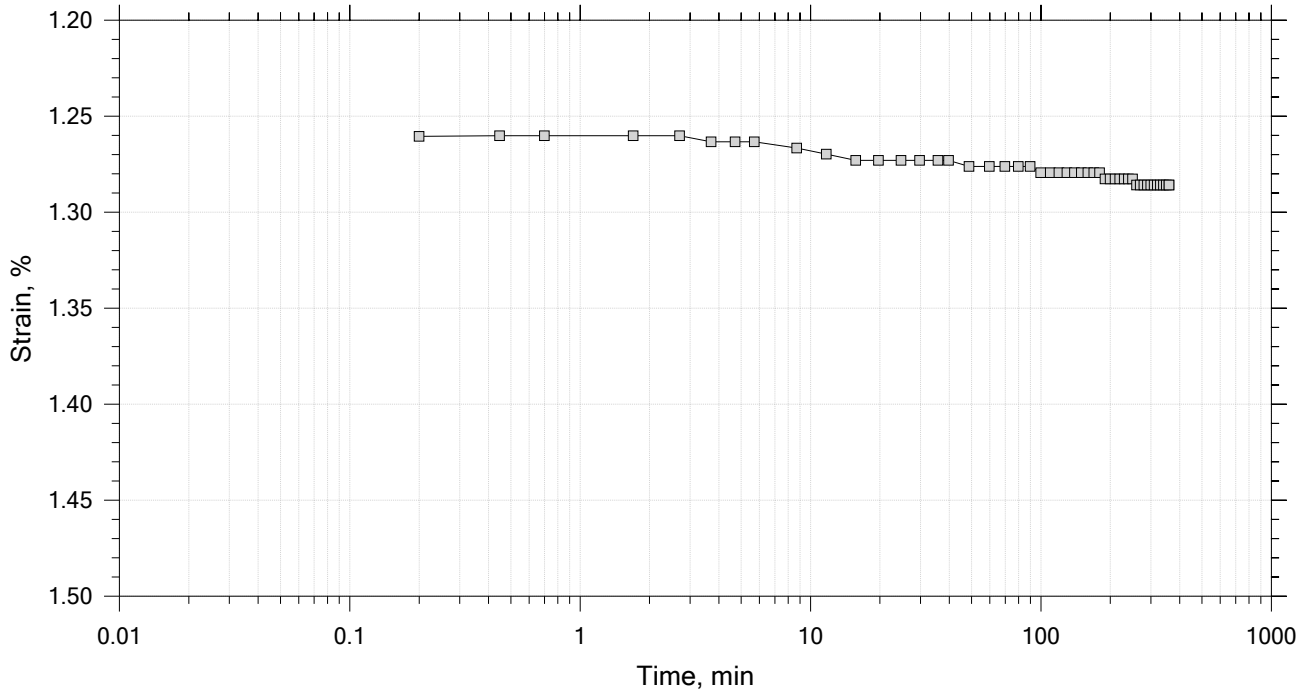


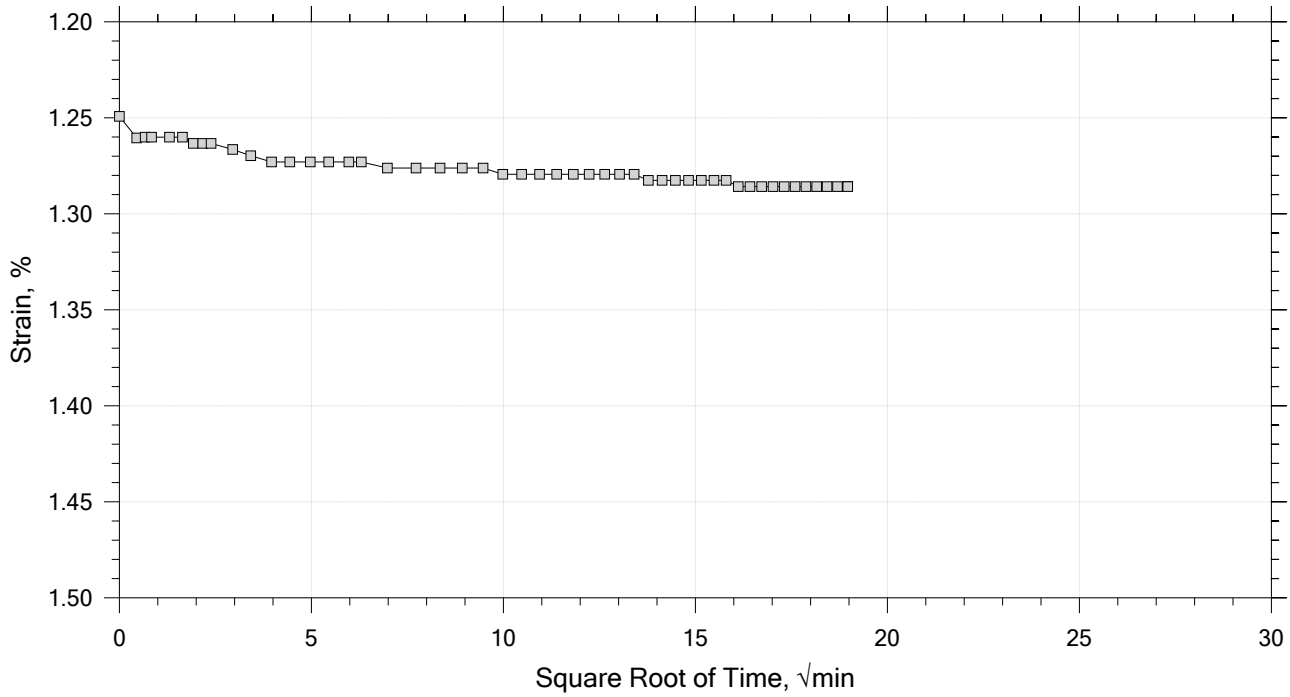


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

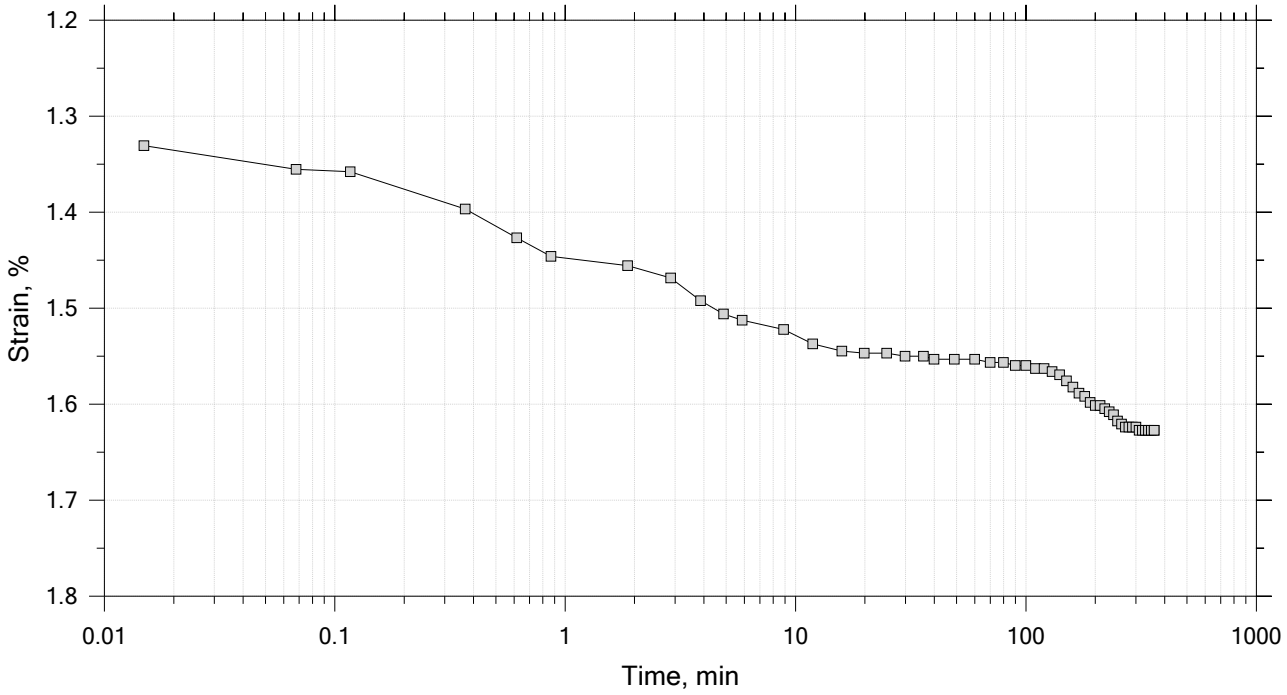


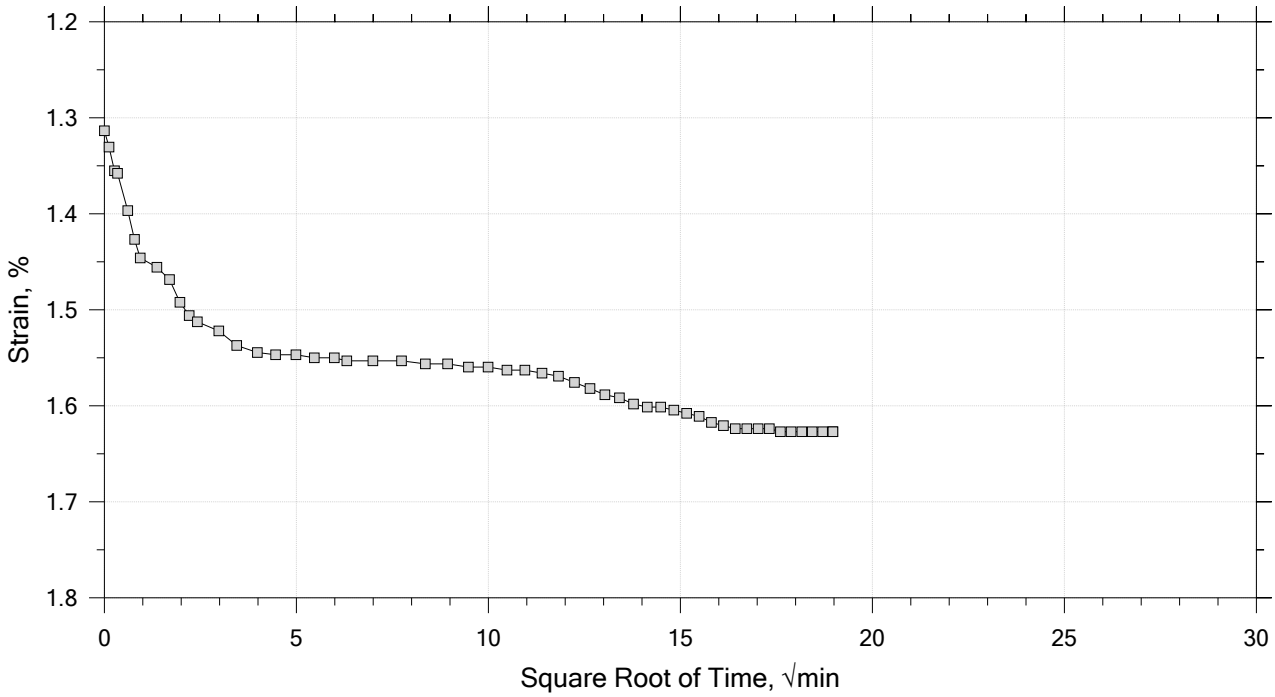


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

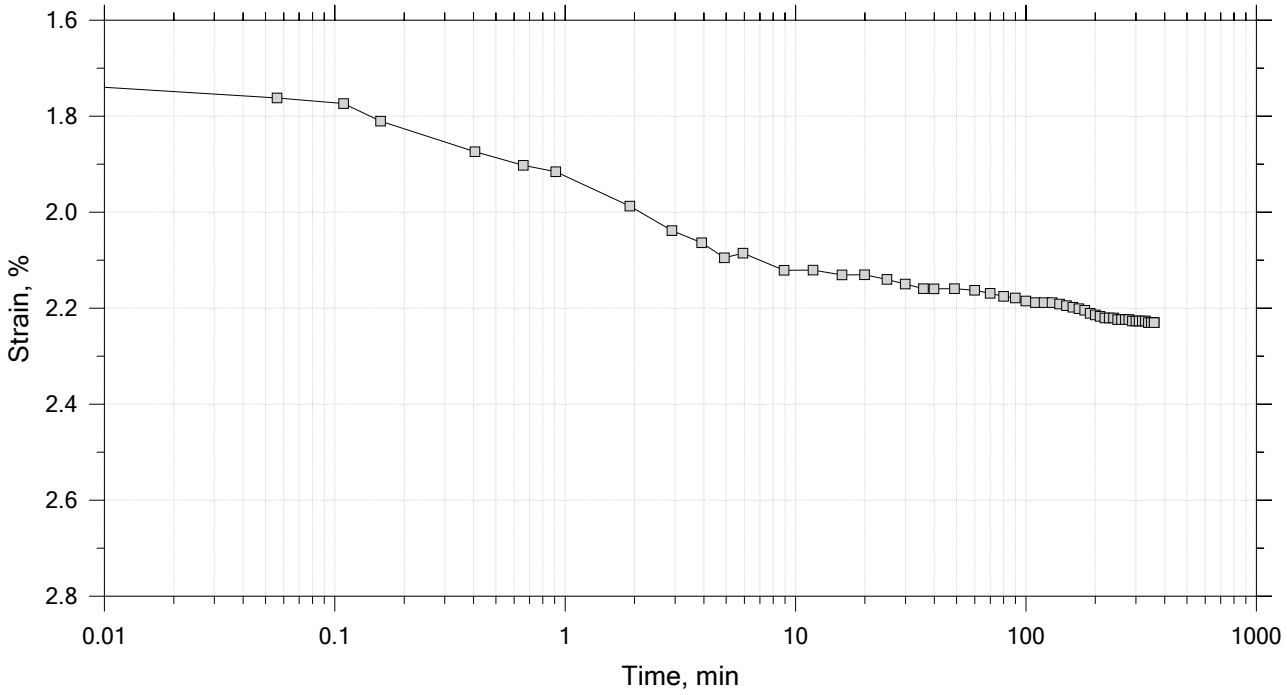


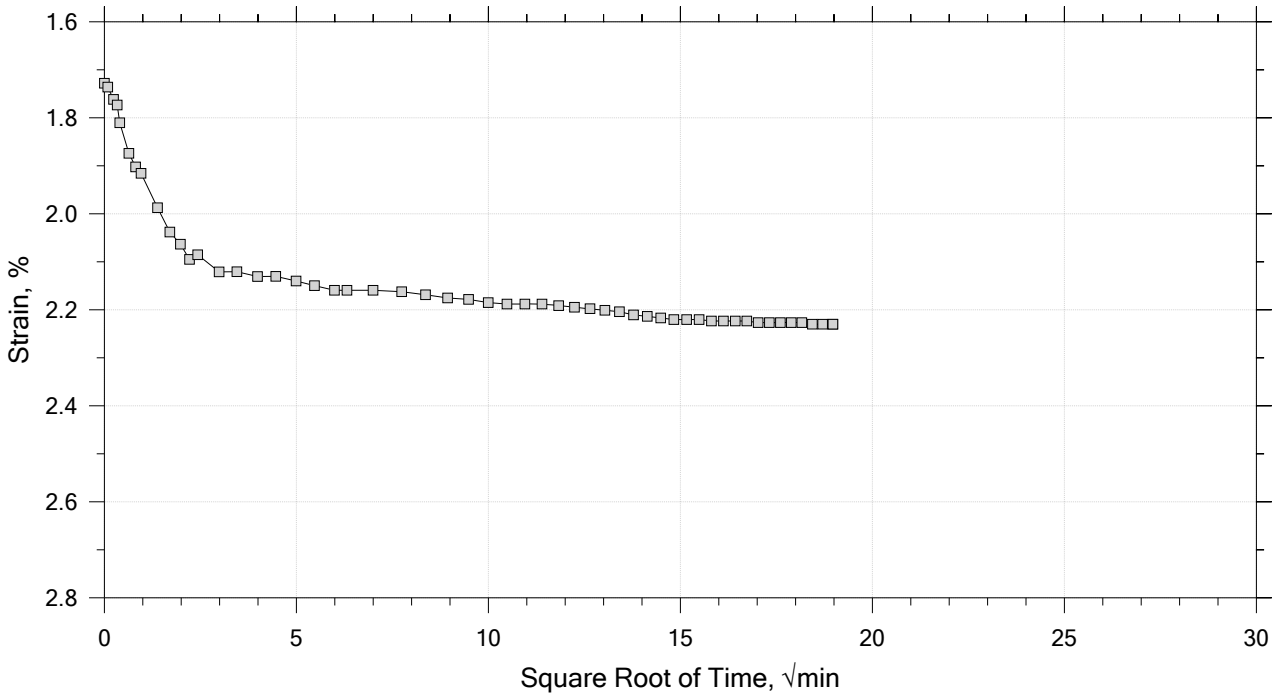


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





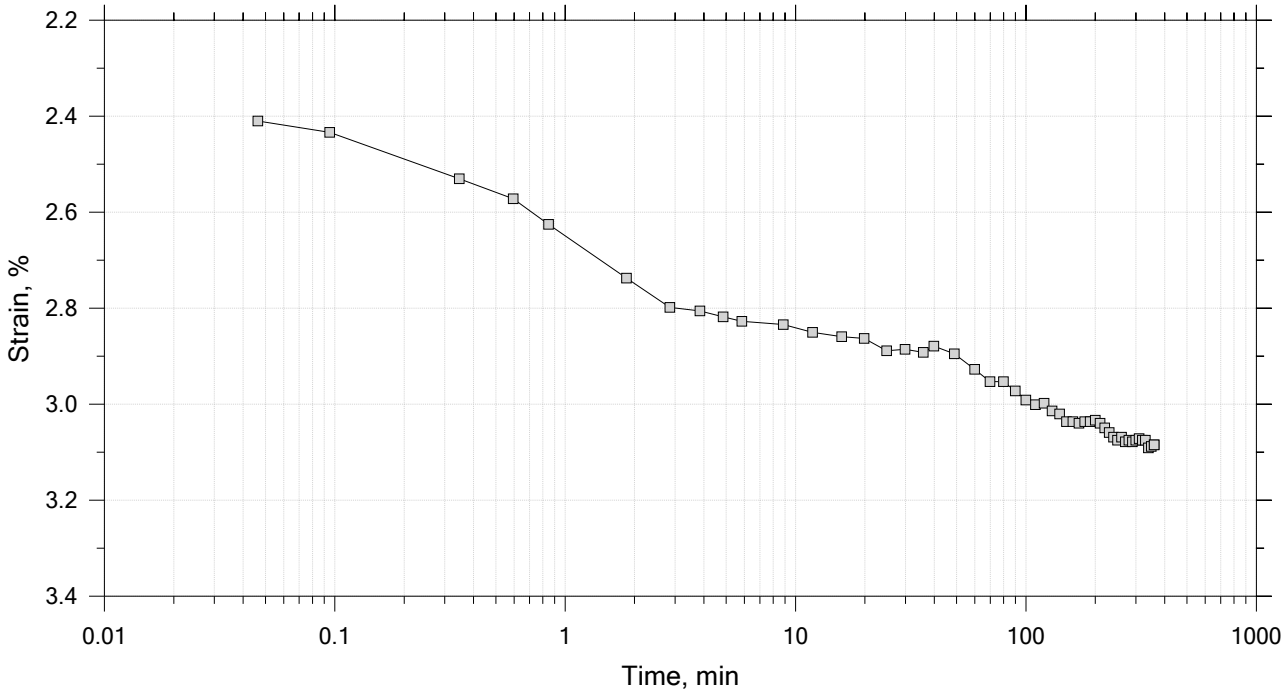
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

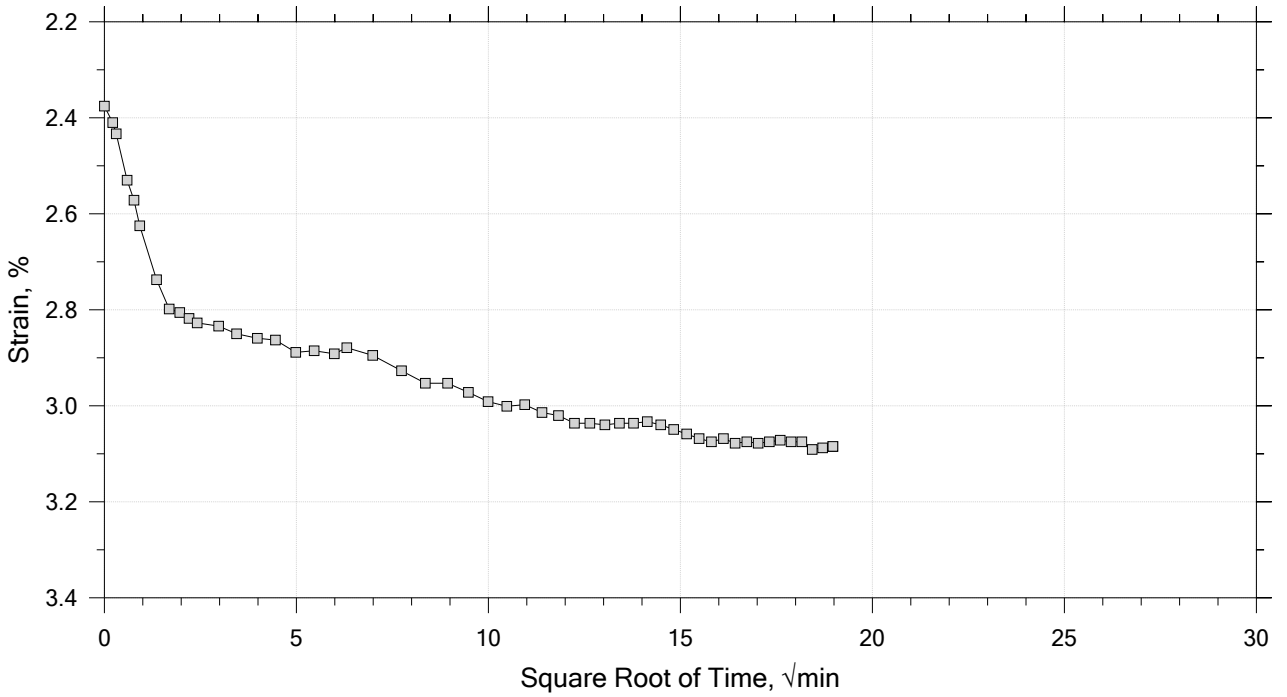
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





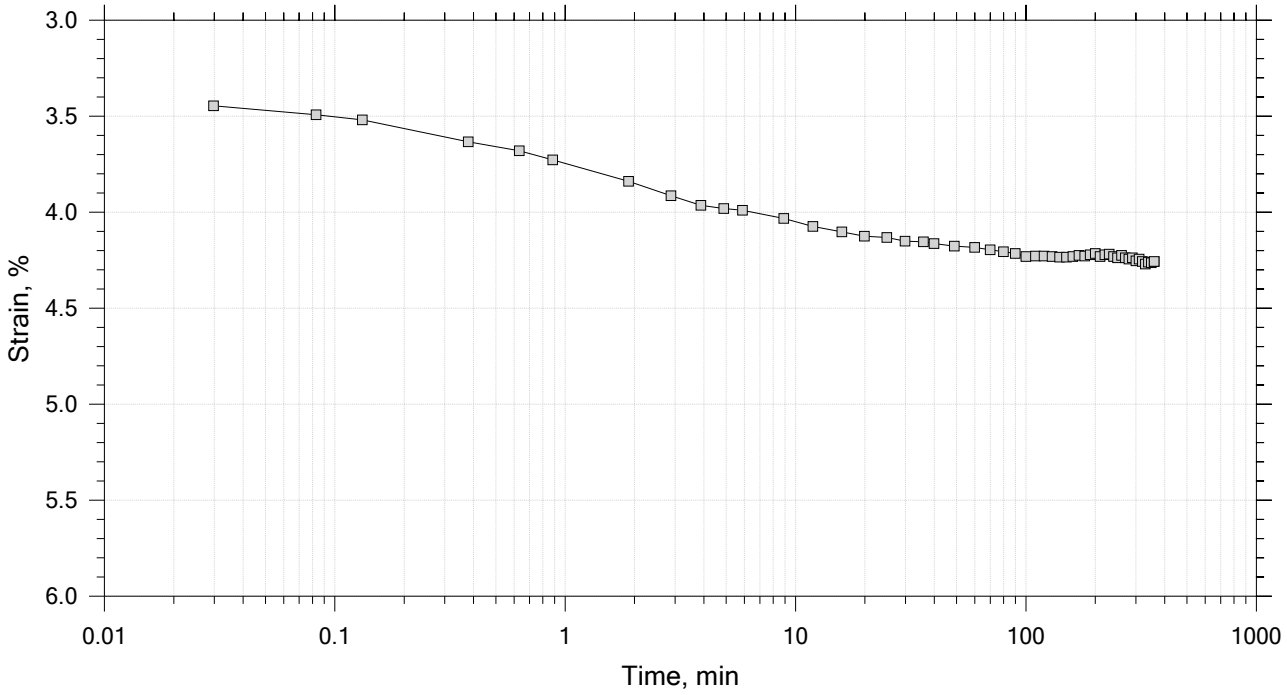
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

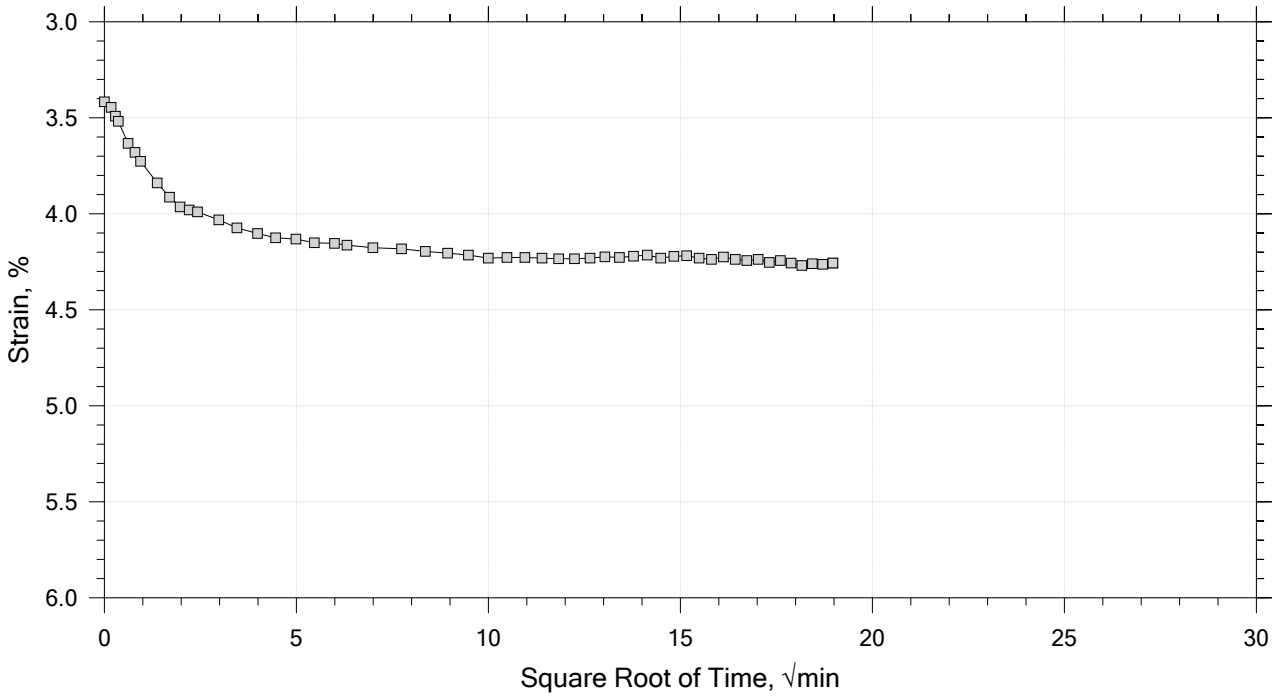
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





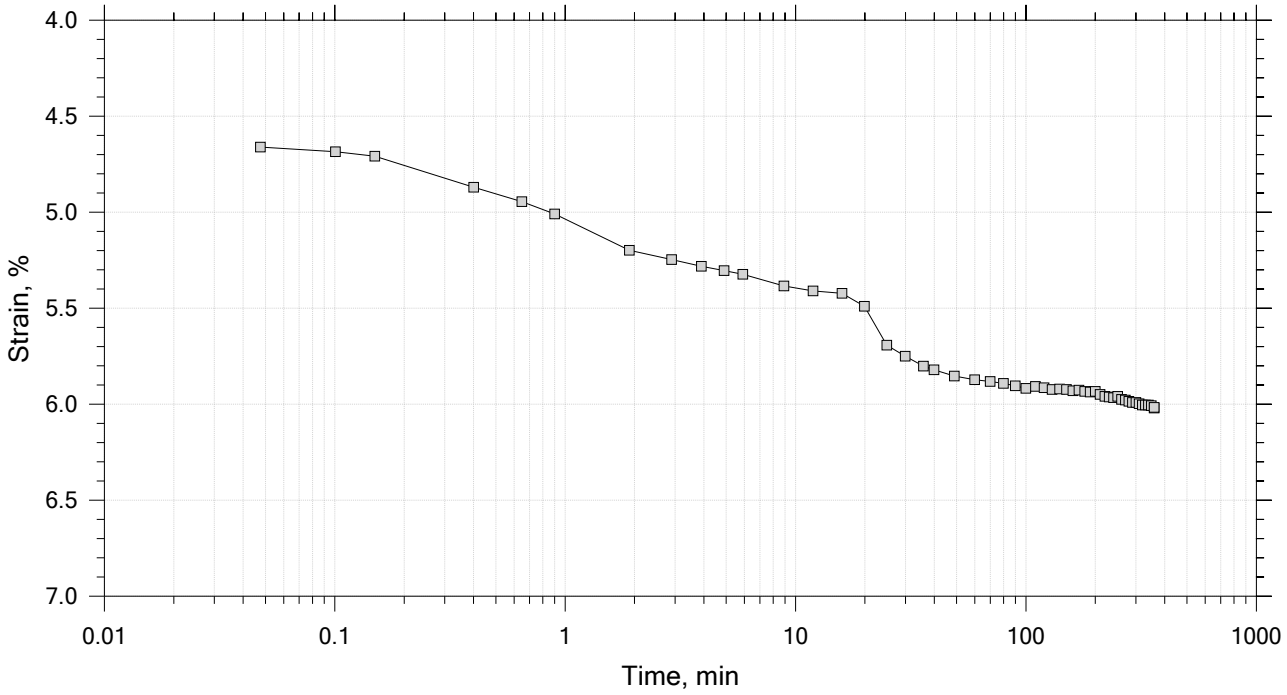
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

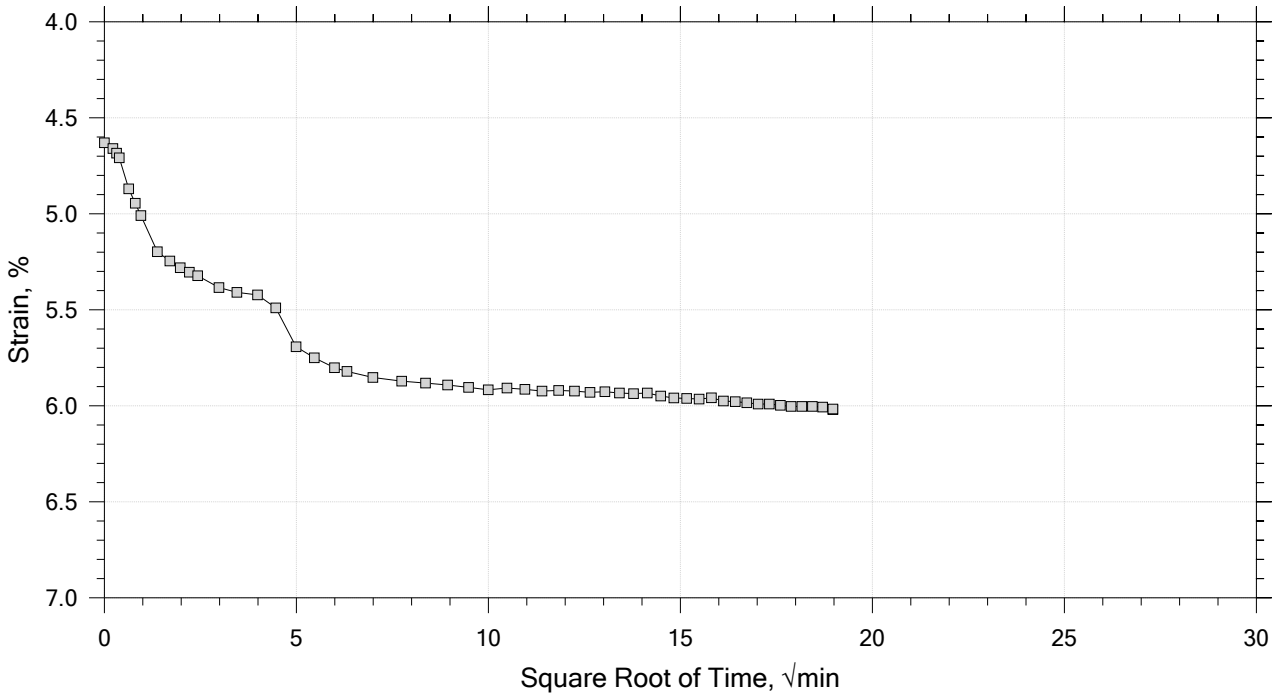
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





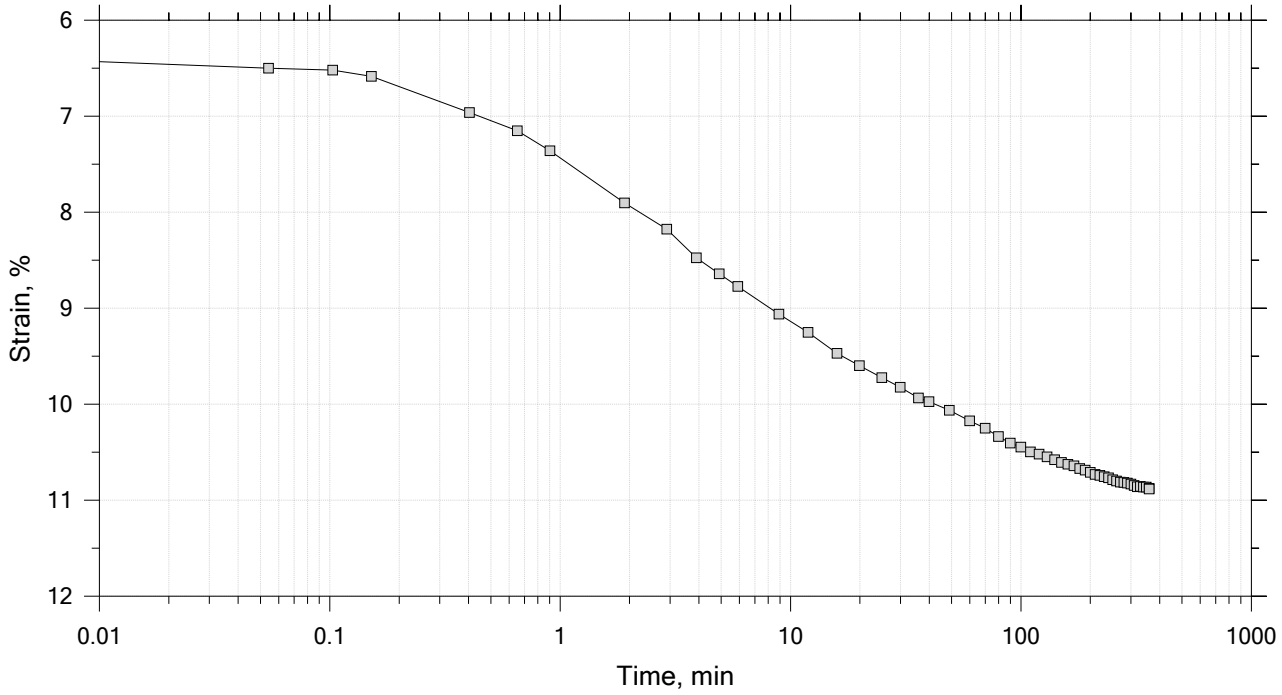
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

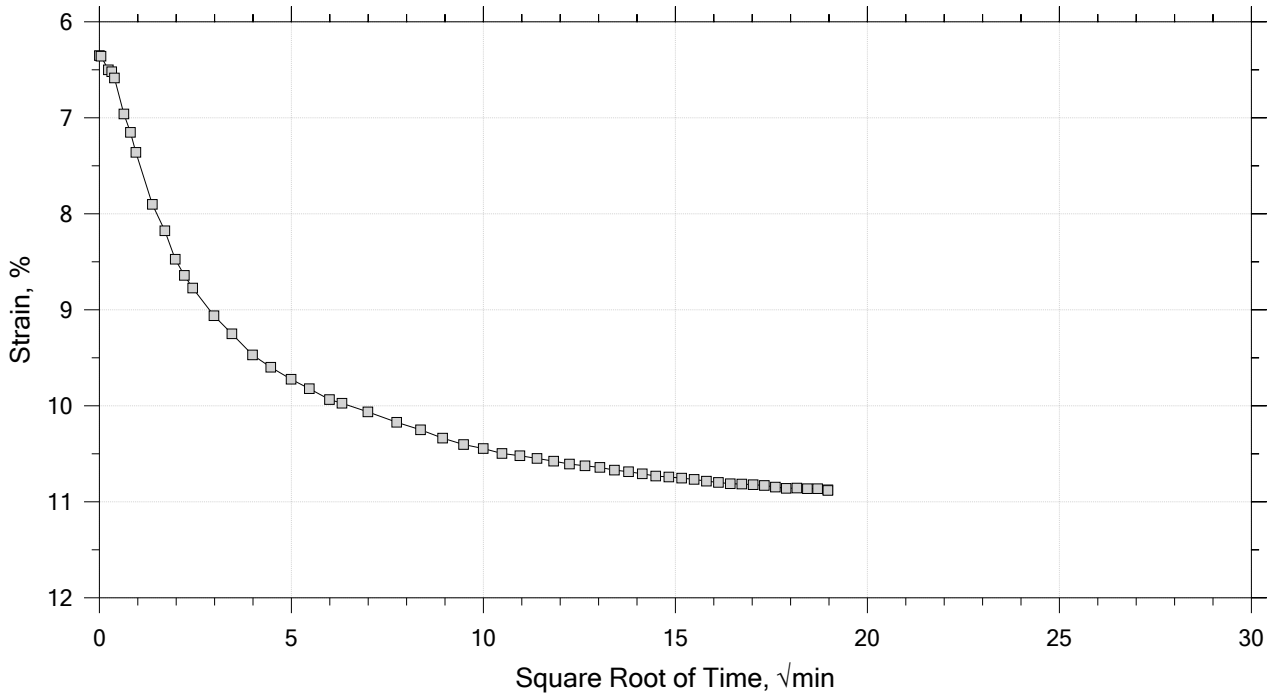
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf





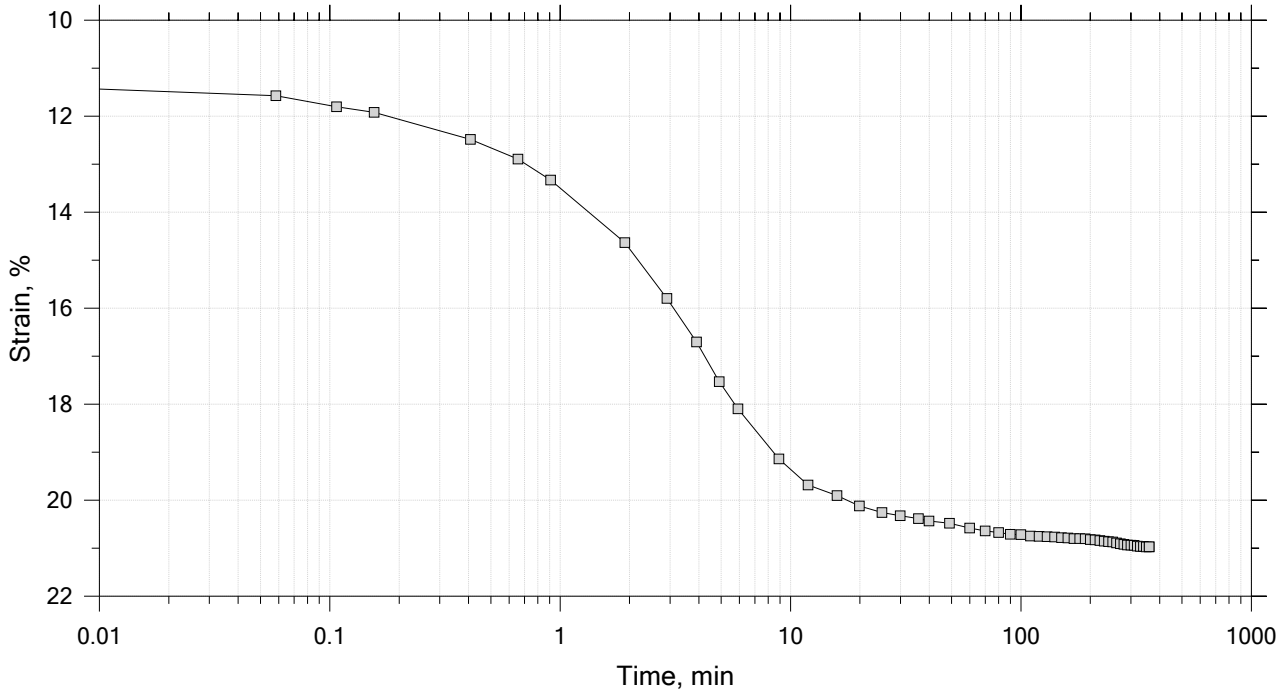
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

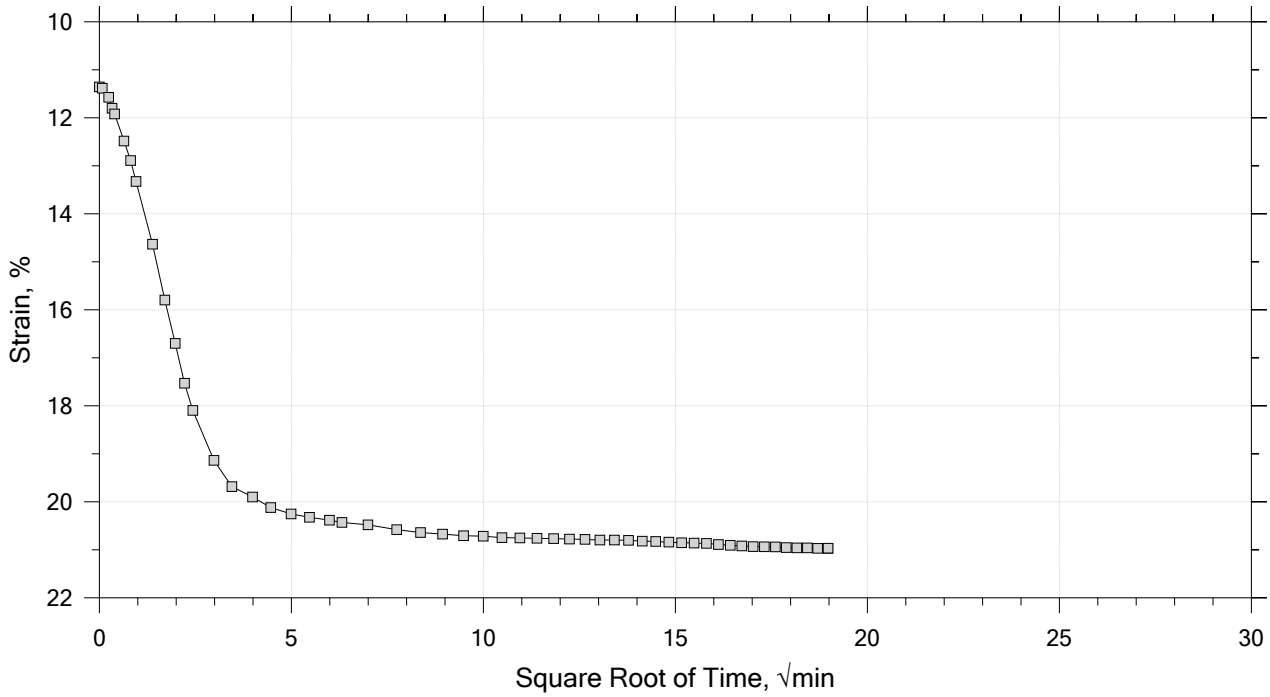
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf

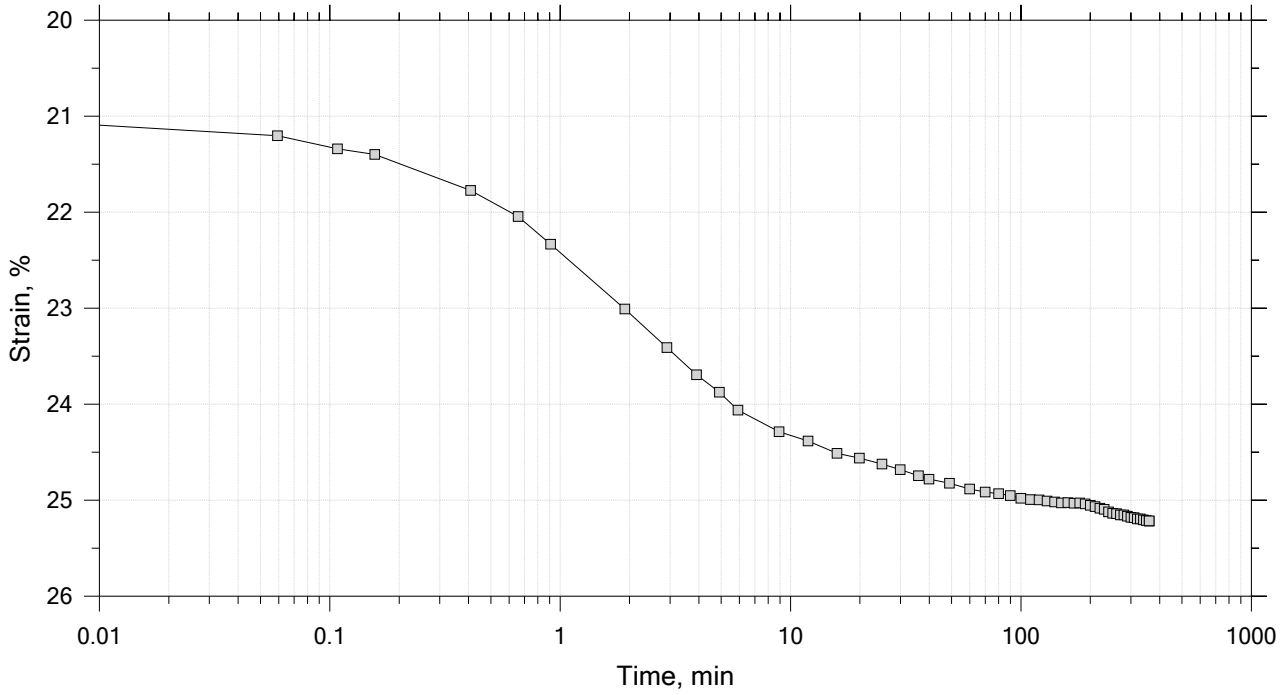


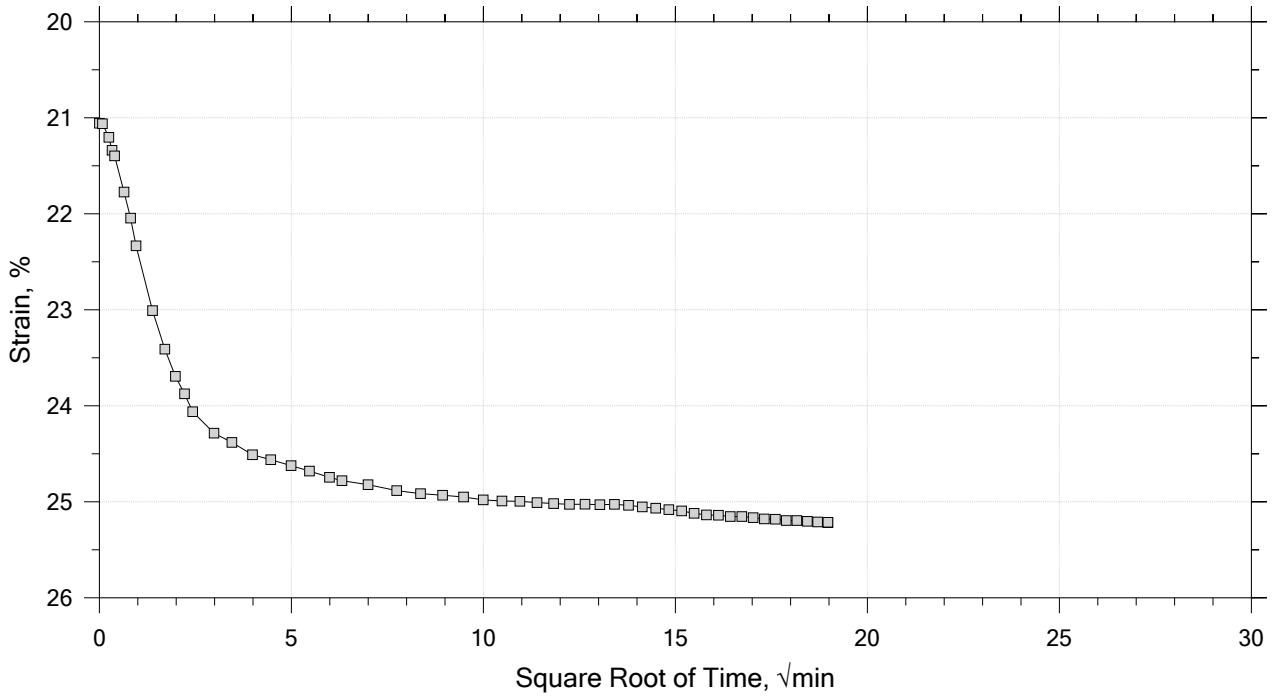


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

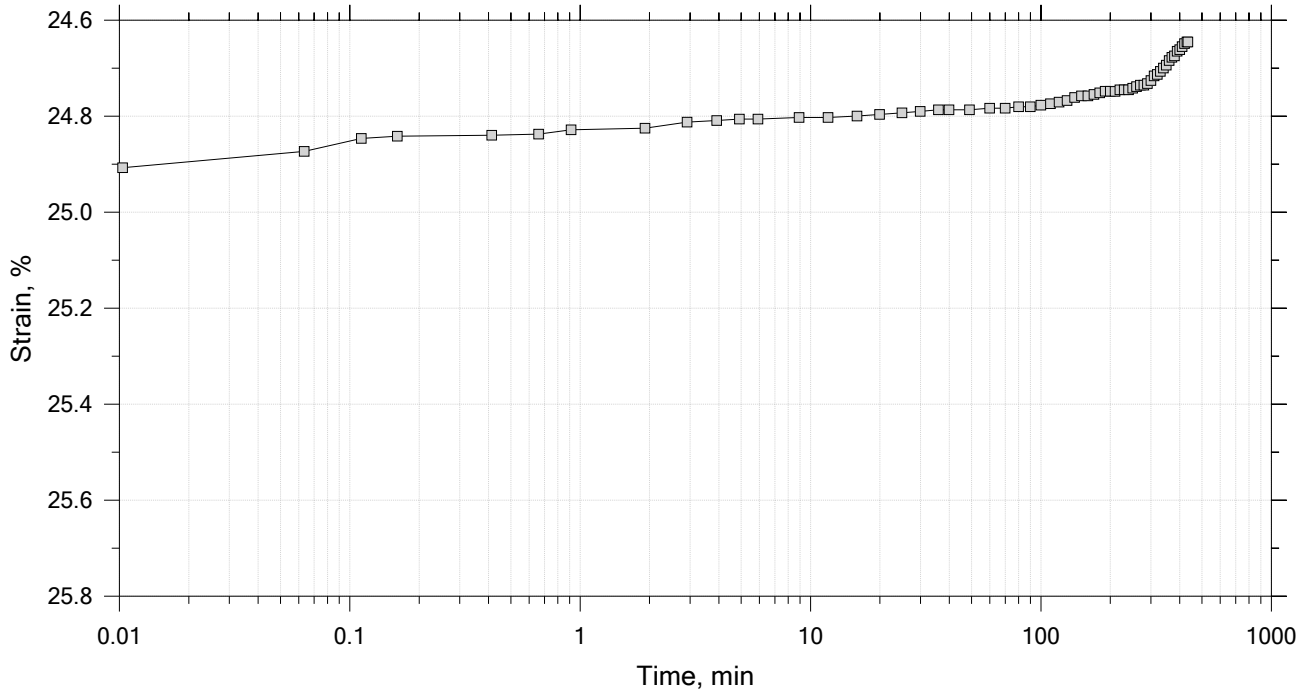


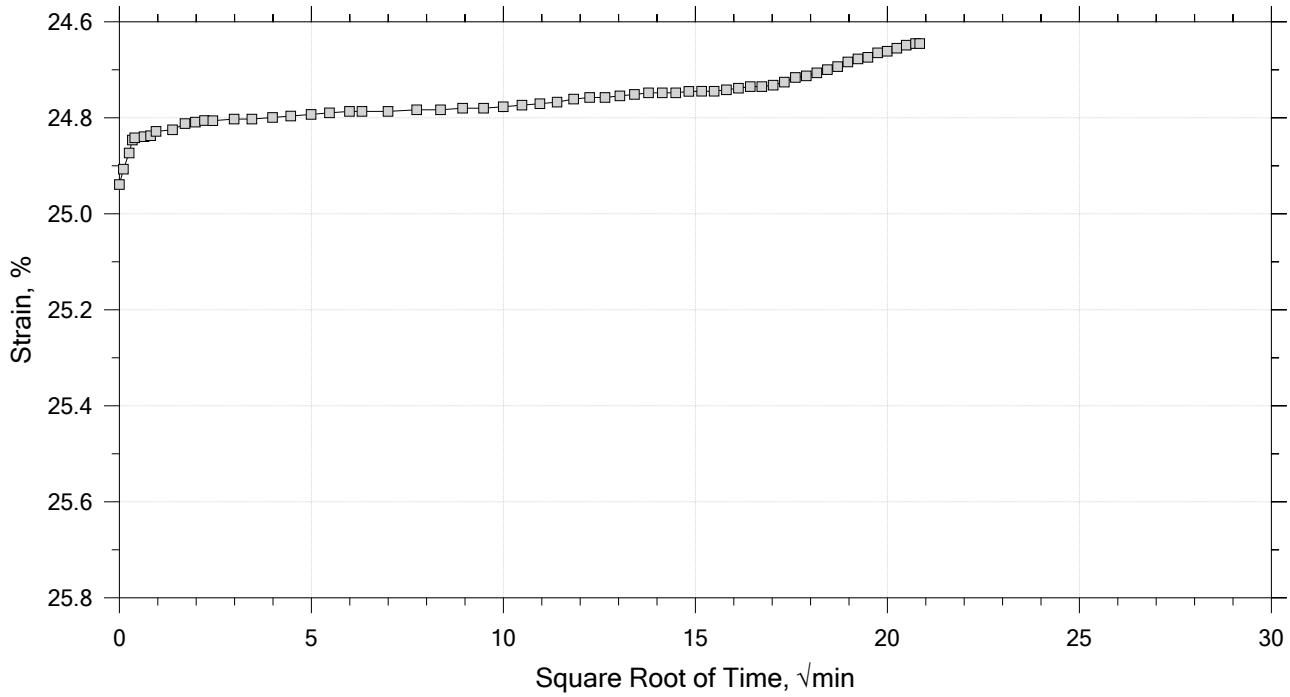


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf





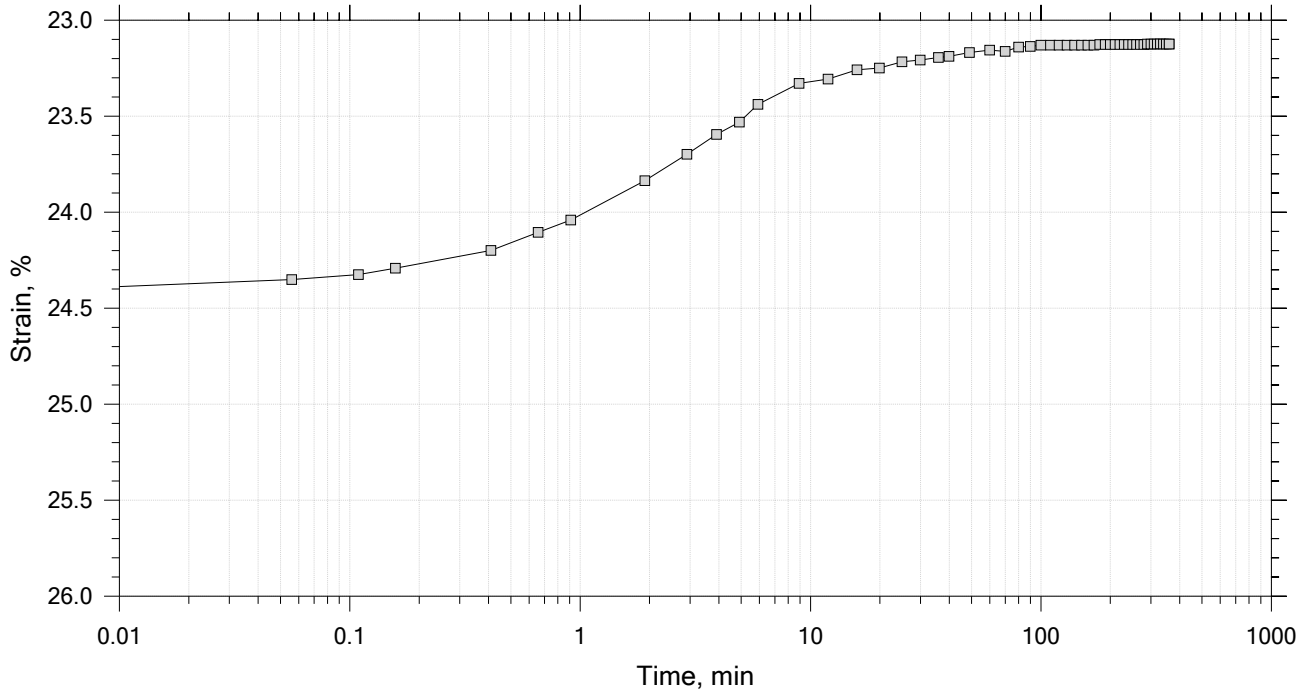
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

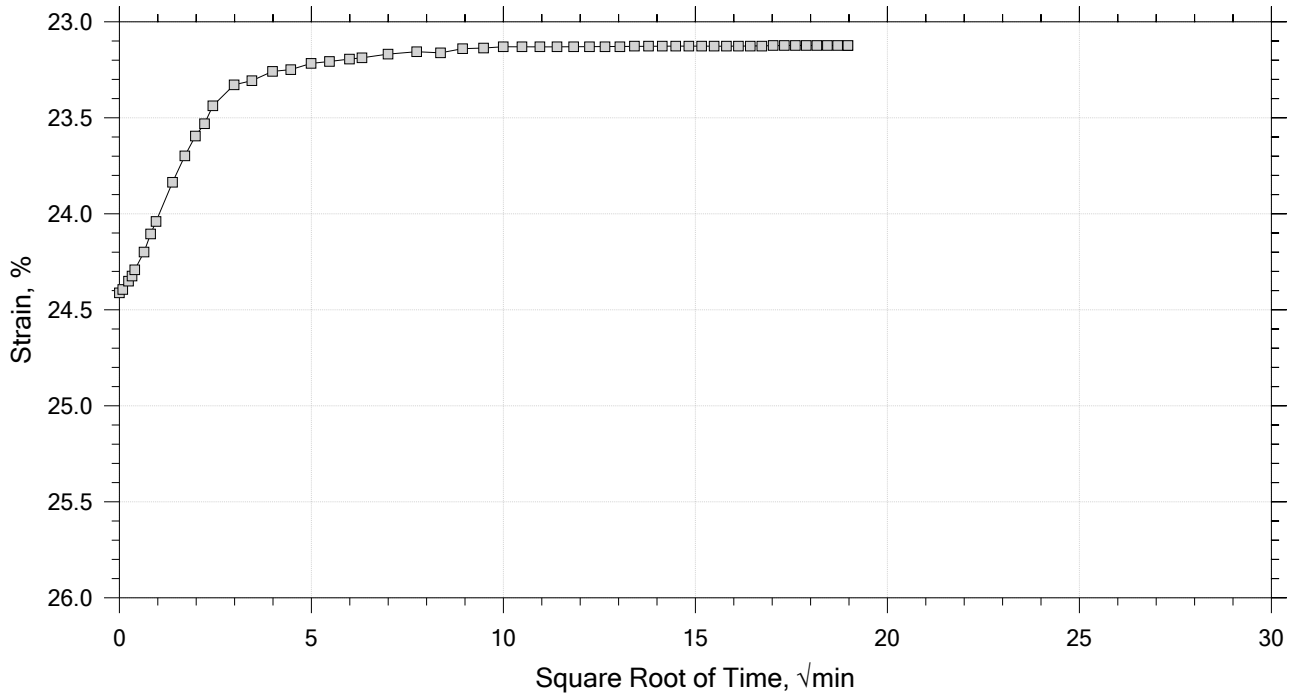
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf

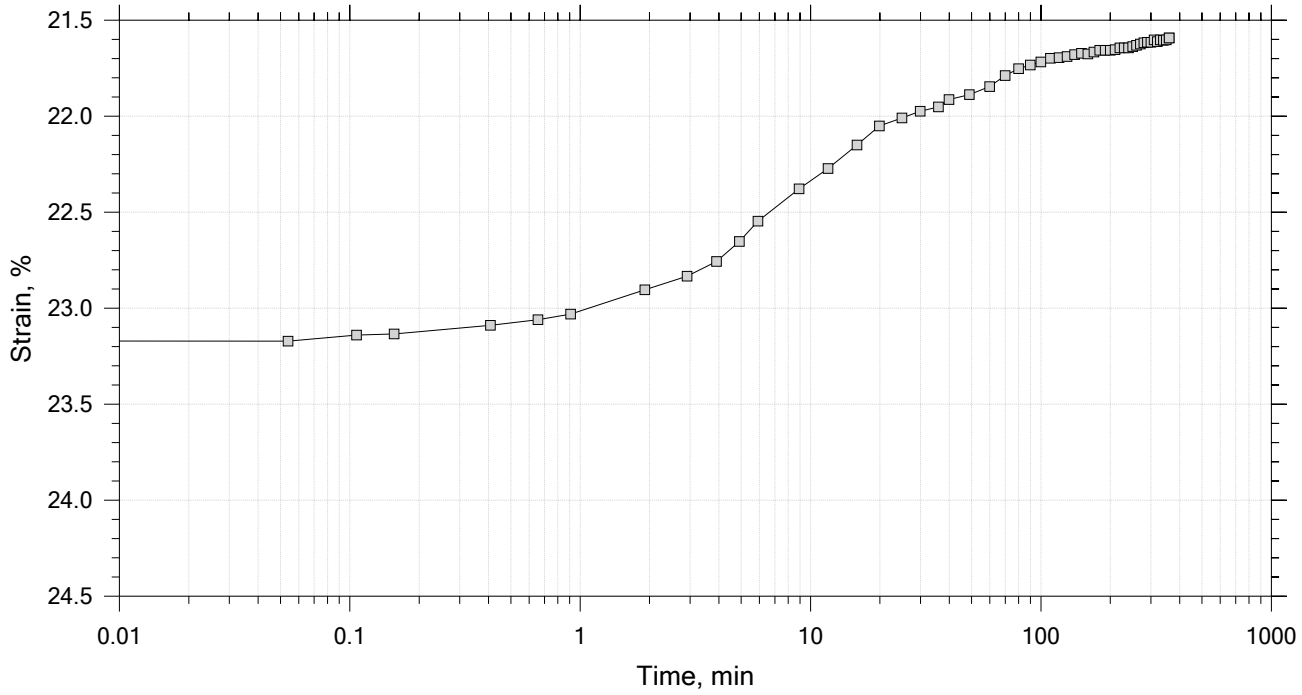


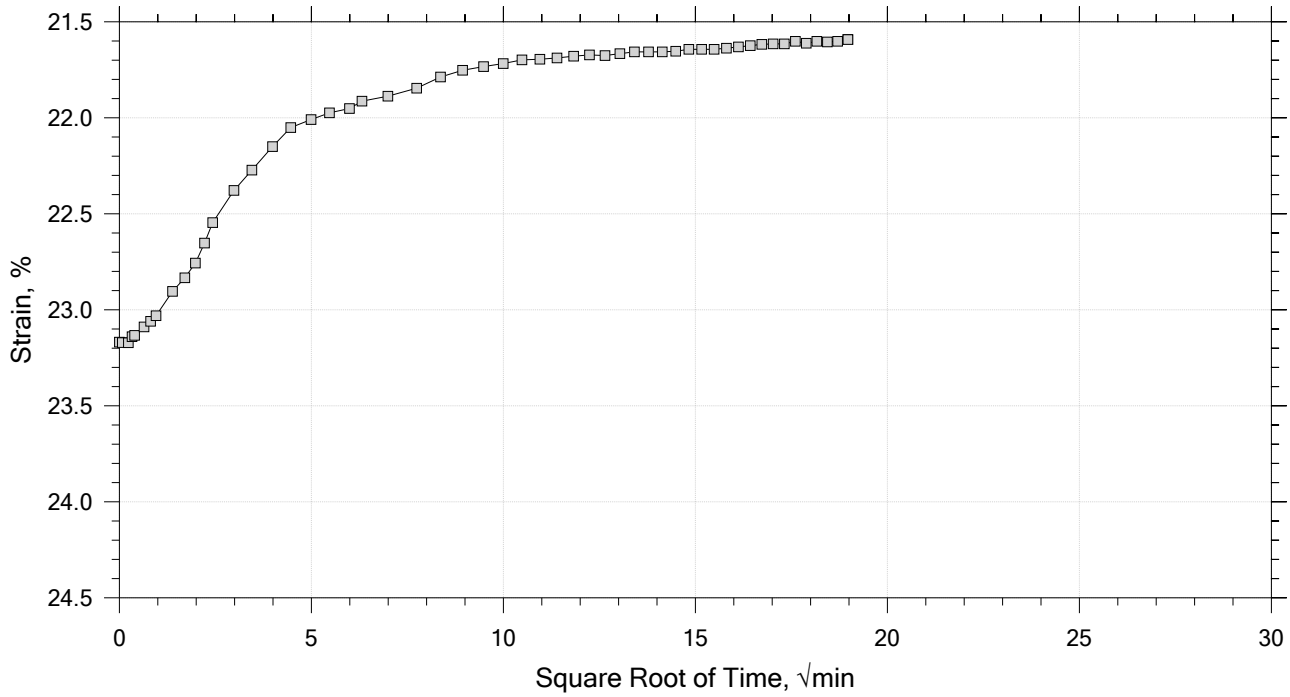


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

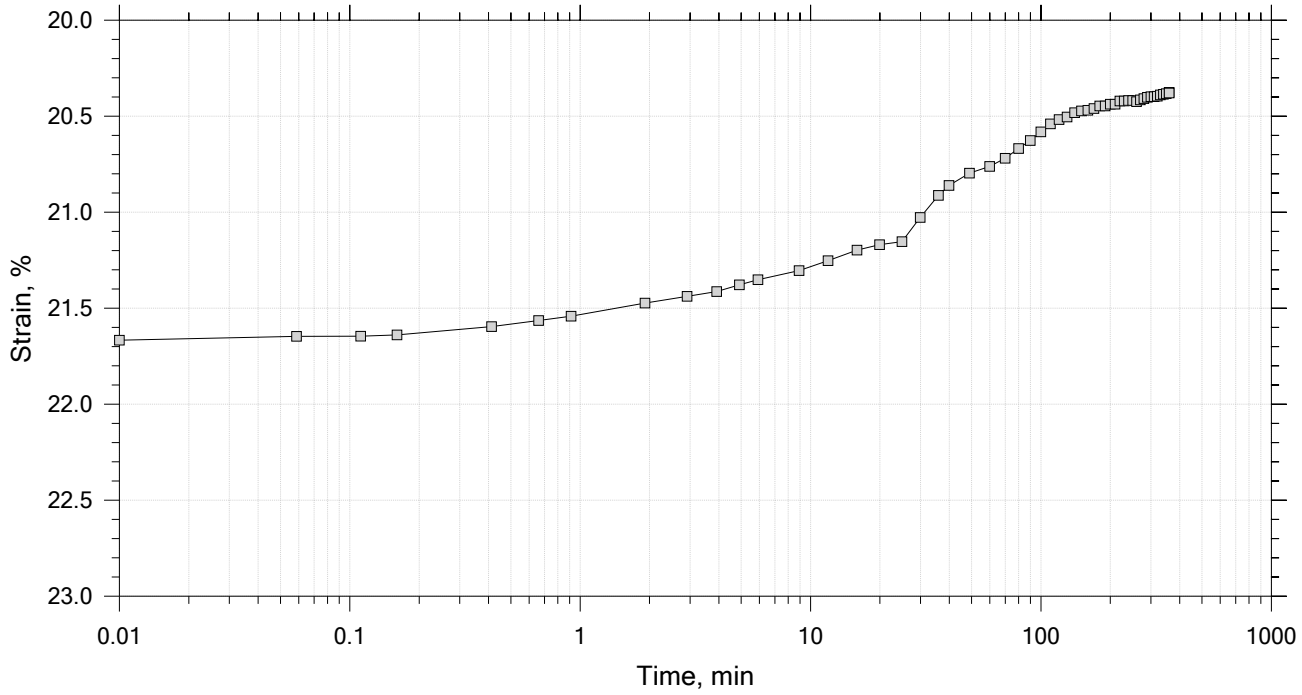


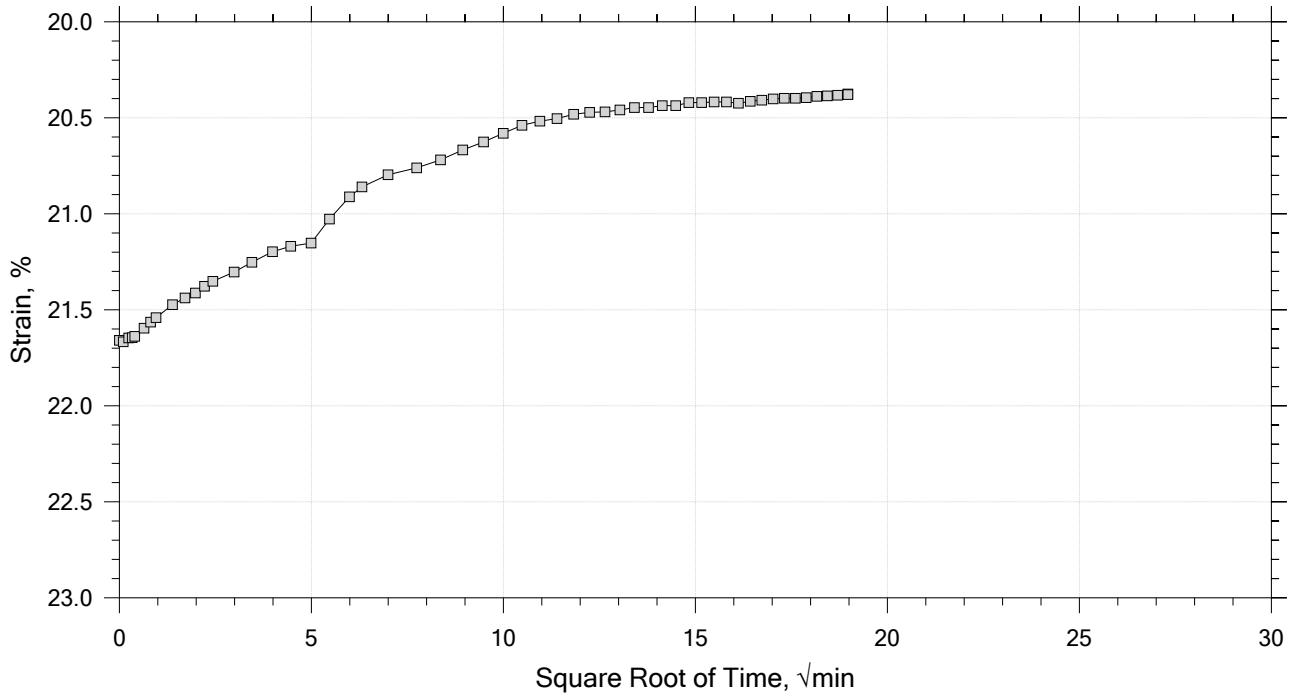


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

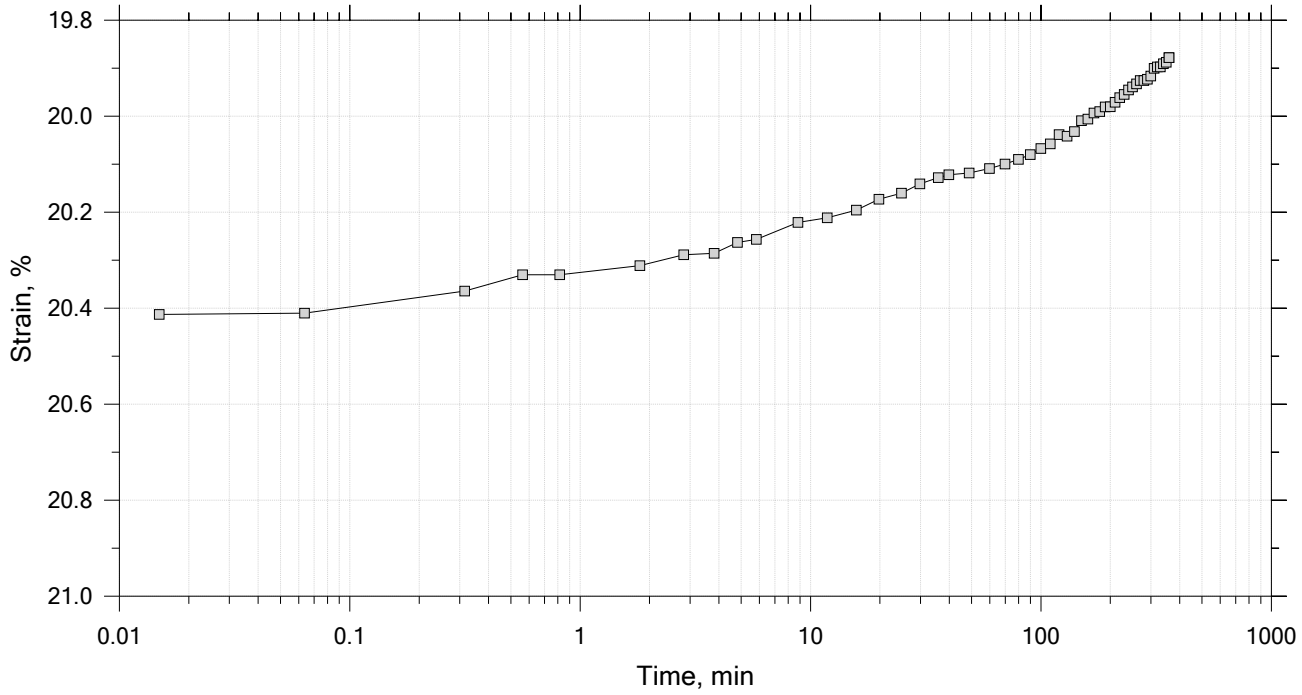


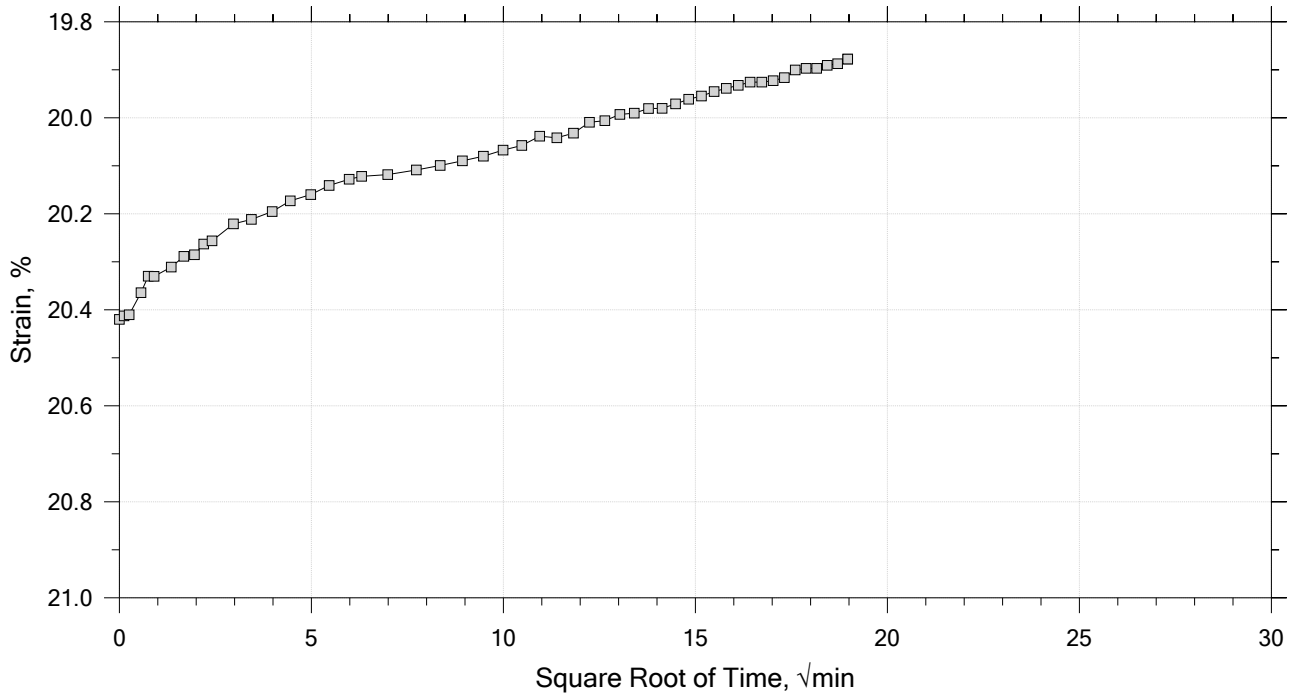


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-211	Tested By: trm	Checked By: anm
Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.74	Liquid Limit: 36
Initial Height: 1.00 in	Initial Void Ratio: 1.05	Plastic Limit: 18
Final Height: 0.81 in	Final Void Ratio: 0.657	Plasticity Index: 18

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E0962	RING		E0817
Mass Container, gm	8.95	112.28	112.28	8.17
Mass Container + Wet Soil, gm	129.38	260.42	246	140.73
Mass Container + Dry Soil, gm	95.67	220.18	220.18	115.13
Mass Dry Soil, gm	86.72	107.9	107.9	106.96
Water Content, %	38.87	37.30	23.93	23.93
Void Ratio	---	1.05	0.66	---
Degree of Saturation, %	---	97.90	100.00	---
Dry Unit Weight, pcf	---	83.736	103.38	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

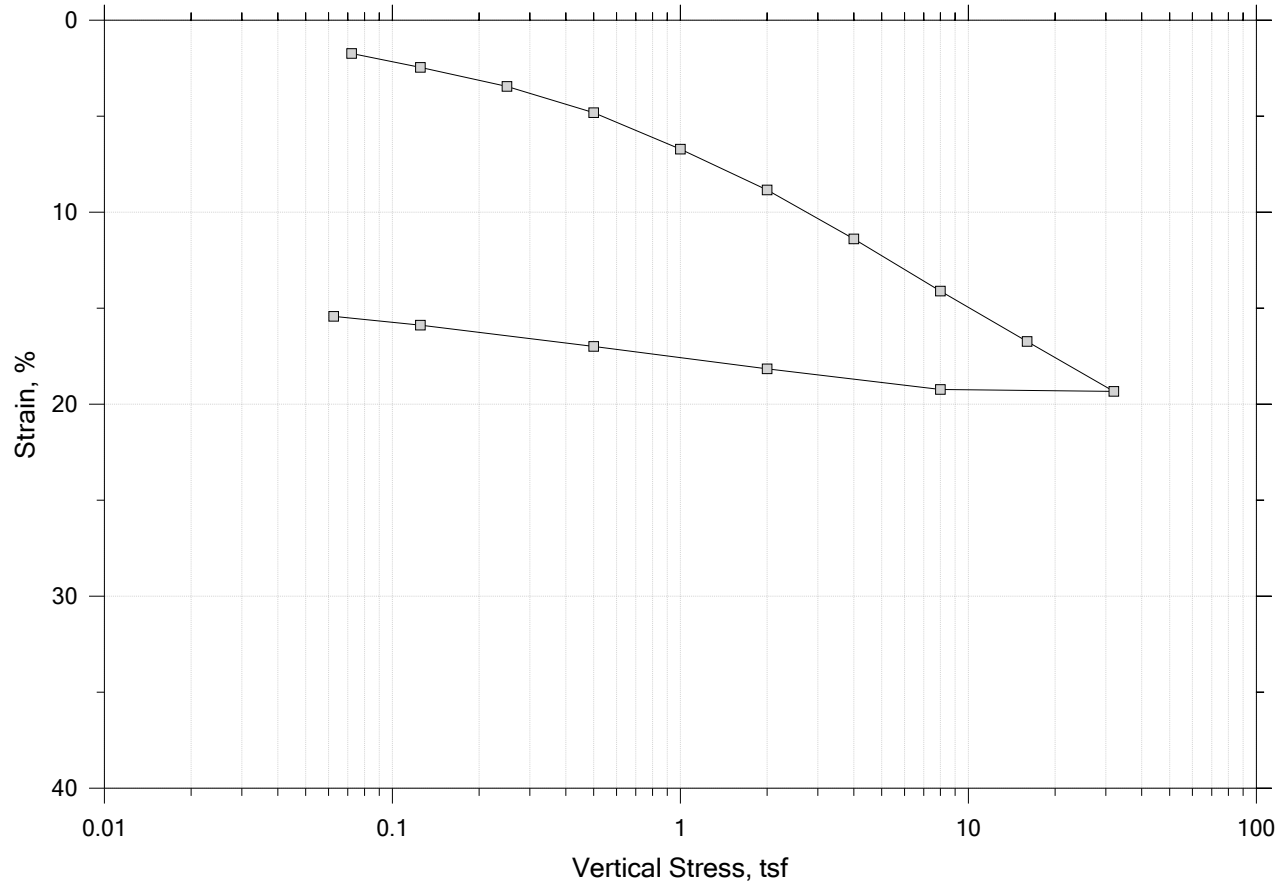
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0727	0.01233	1.02	1.23	106.853	3.27e-05	1.70e-01	1.04e-04
2	0.125	0.01286	1.02	1.29	257.383	1.34e-05	1.00e-02	2.51e-06
3	0.250	0.01627	1.01	1.63	13.876	2.47e-04	2.73e-02	1.26e-04
4	0.500	0.02230	1.00	2.23	4.679	7.26e-04	2.41e-02	3.28e-04
5	1.00	0.03085	0.982	3.08	149.775	2.24e-05	1.71e-02	7.16e-06
6	2.00	0.04257	0.958	4.26	8.609	3.81e-04	1.17e-02	8.36e-05
7	4.00	0.06017	0.922	6.02	31.057	1.02e-04	8.80e-03	1.69e-05
8	8.00	0.1088	0.823	10.9	18.755	1.58e-04	1.22e-02	3.60e-05
9	16.0	0.2097	0.616	21.0	16.463	1.52e-04	1.26e-02	3.58e-05
10	32.0	0.2521	0.529	25.2	9.334	2.24e-04	2.65e-03	1.11e-05
11	8.00	0.2465	0.541	24.6	---	---	2.37e-04	---
12	2.00	0.2312	0.572	23.1	12.418	1.65e-04	2.54e-03	7.83e-06
13	0.500	0.2159	0.604	21.6	34.064	6.25e-05	1.02e-02	1.20e-05
14	0.125	0.2038	0.628	20.4	133.658	1.65e-05	3.23e-02	1.00e-05
15	0.0625	0.1988	0.639	19.9	300.247	7.51e-06	8.02e-02	1.13e-05

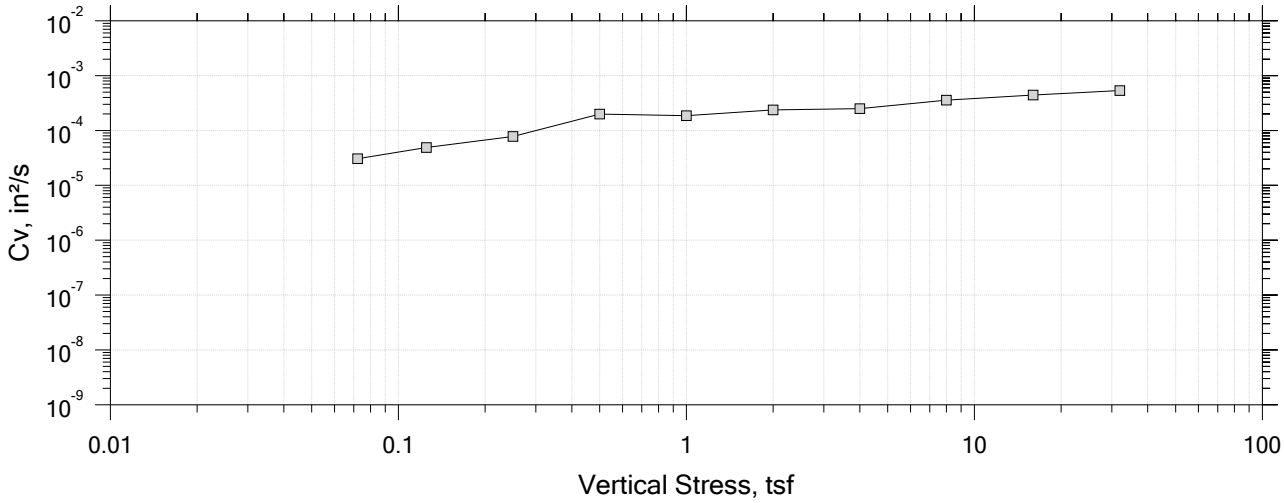
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		
	Displacement at End of Increment		

OS-5 U-1

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

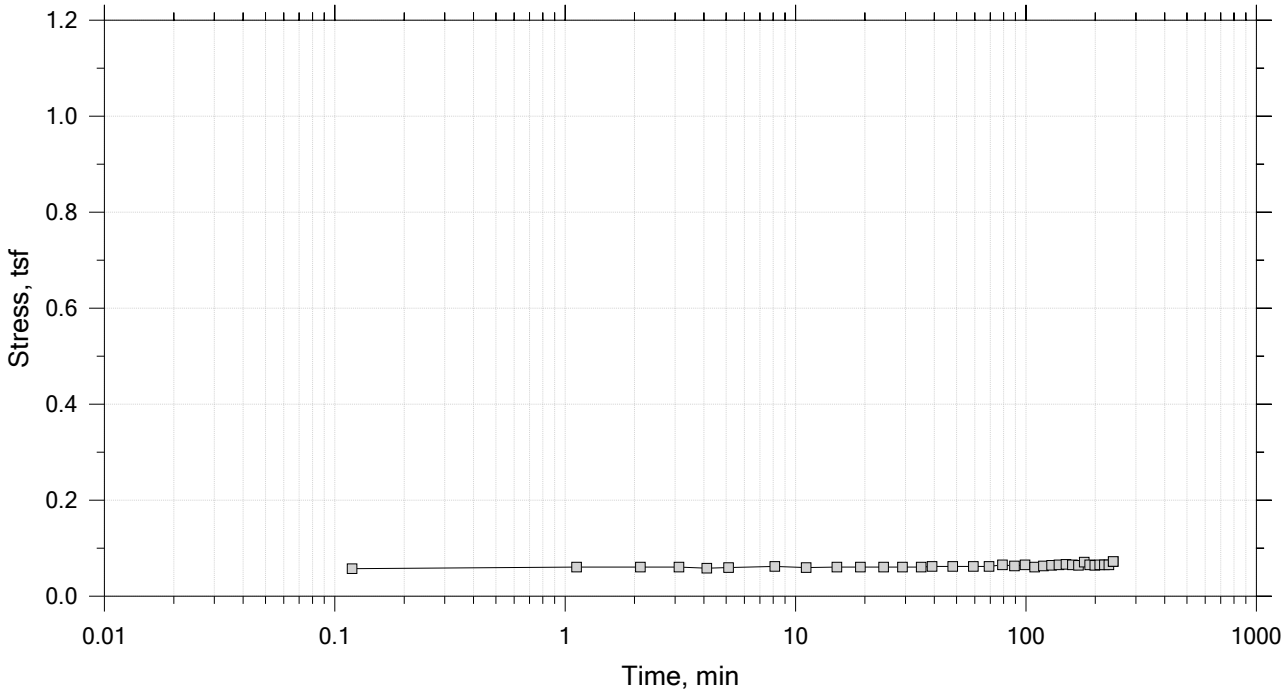


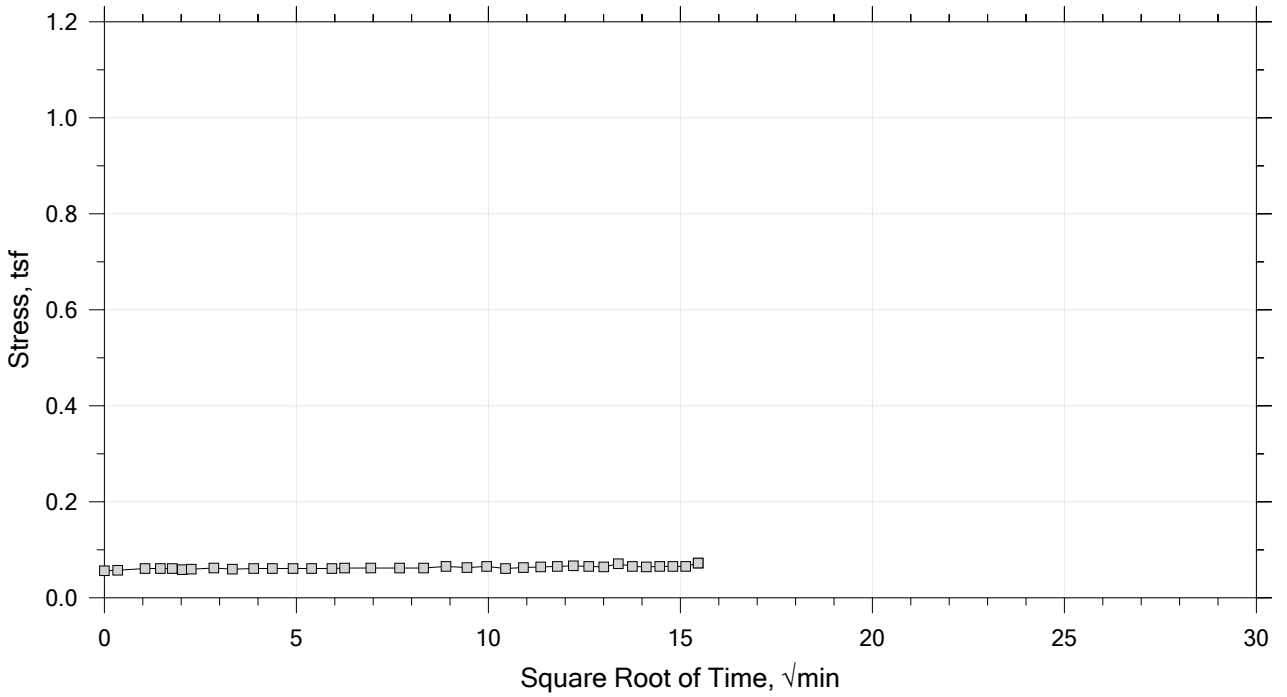


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: OS-5	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty sand		
	Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0722 tsf

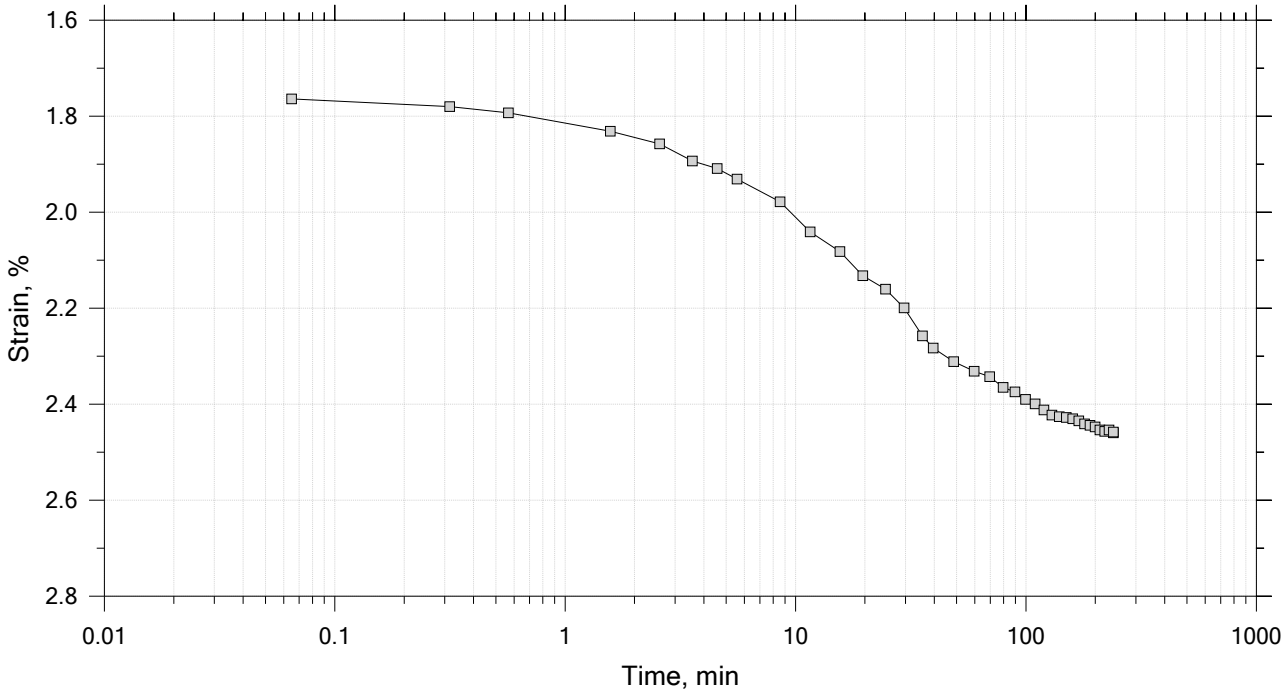


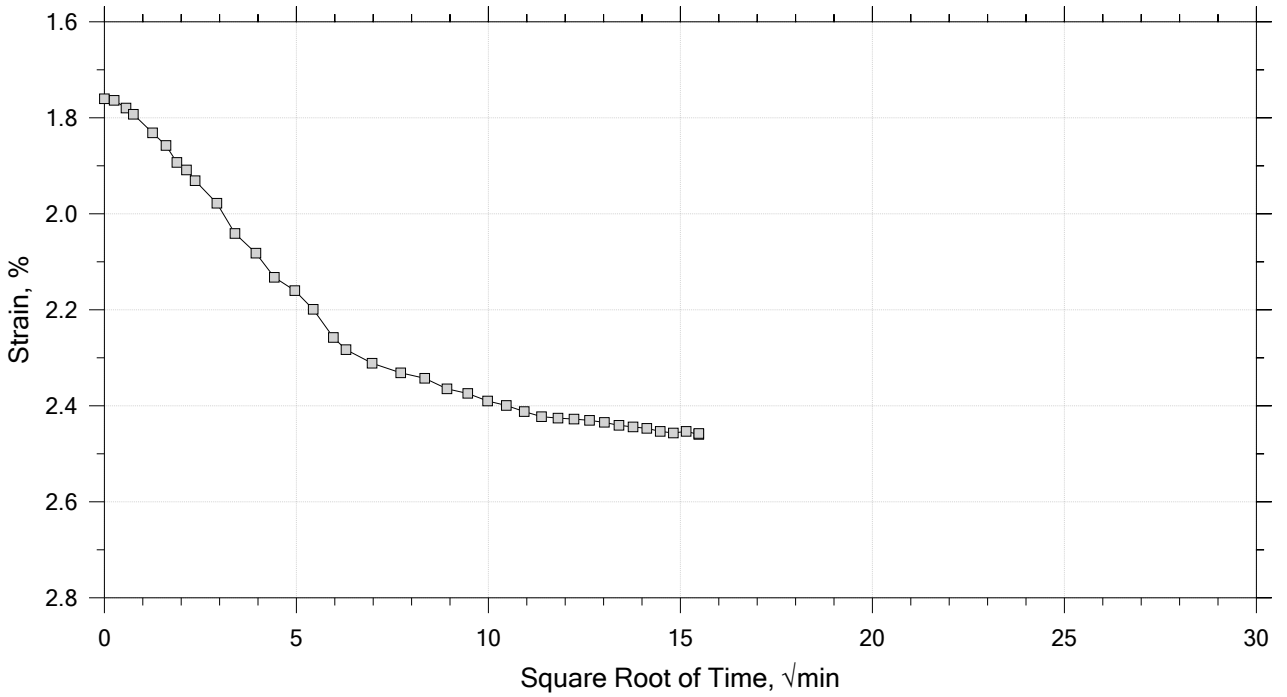


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: OS-5	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty sand		
	Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15
Constant Load Step
Stress: 0.125 tsf

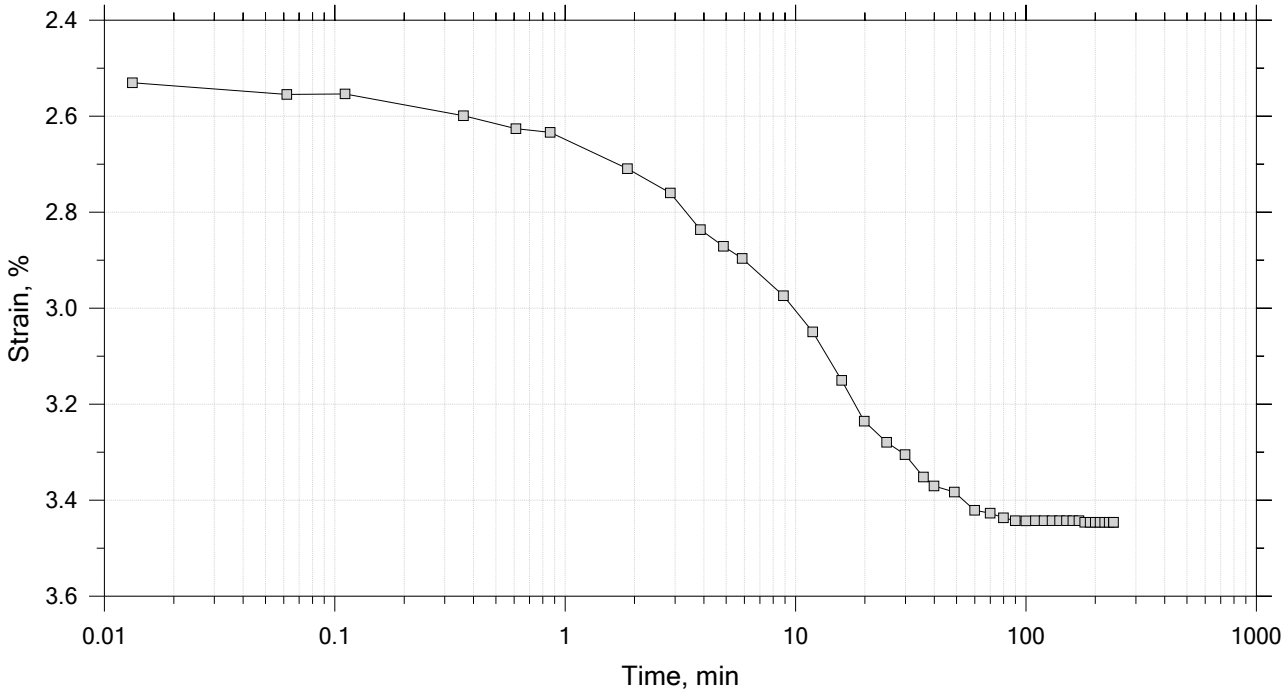


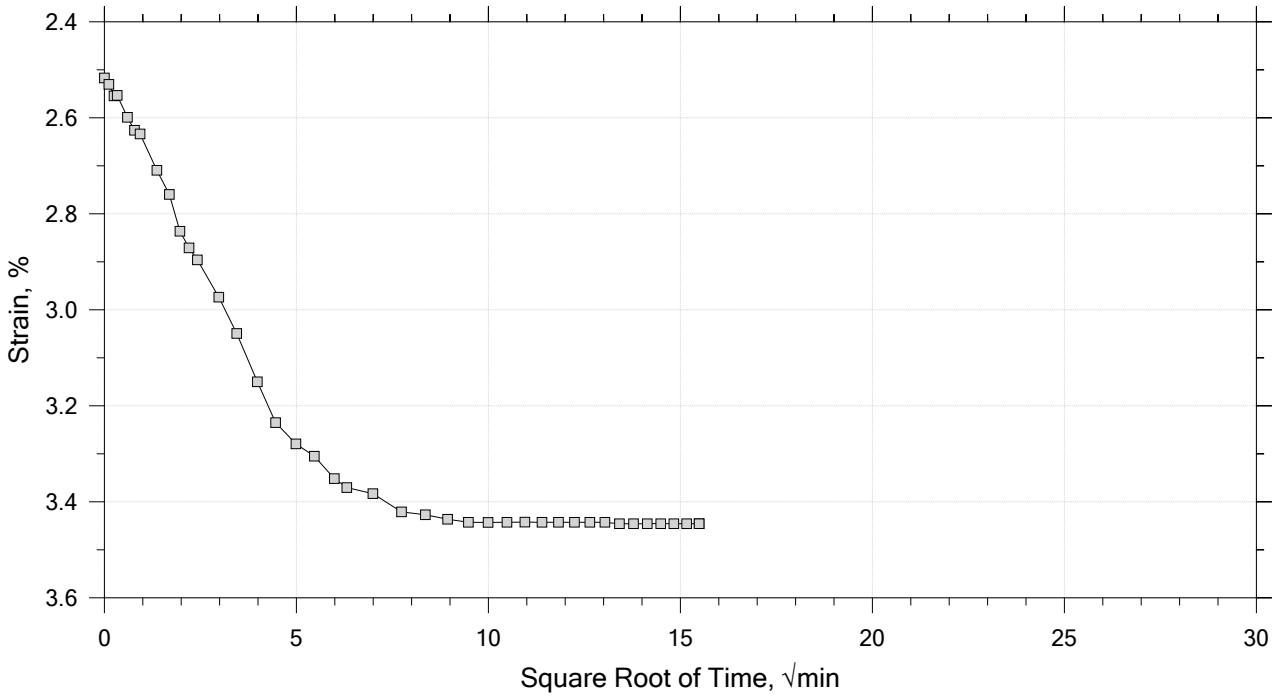


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15
Constant Load Step
Stress: 0.25 tsf

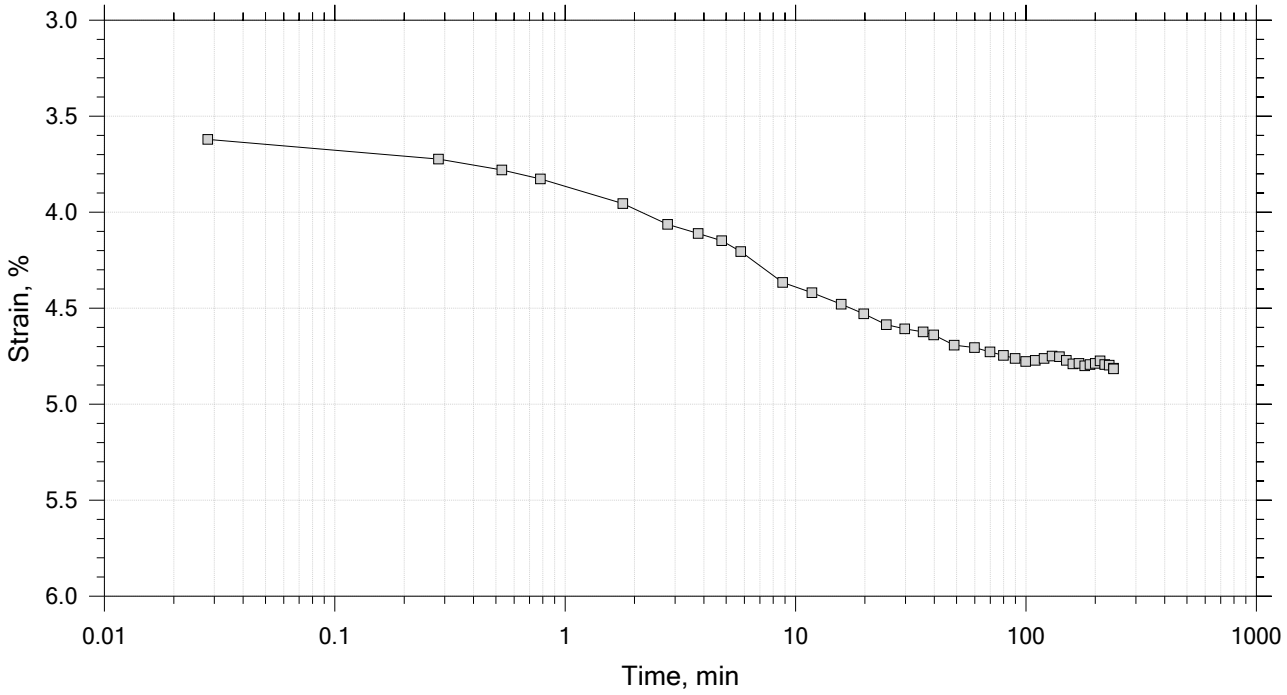


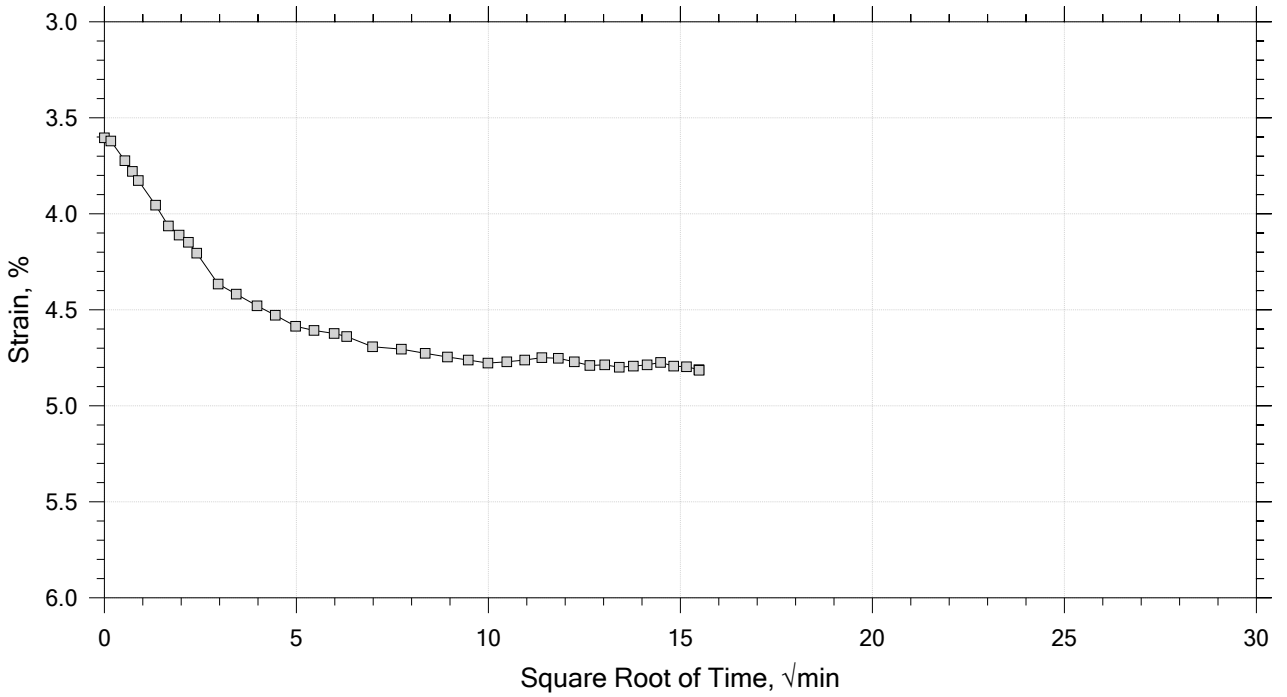


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15
Constant Load Step
Stress: 0.5 tsf





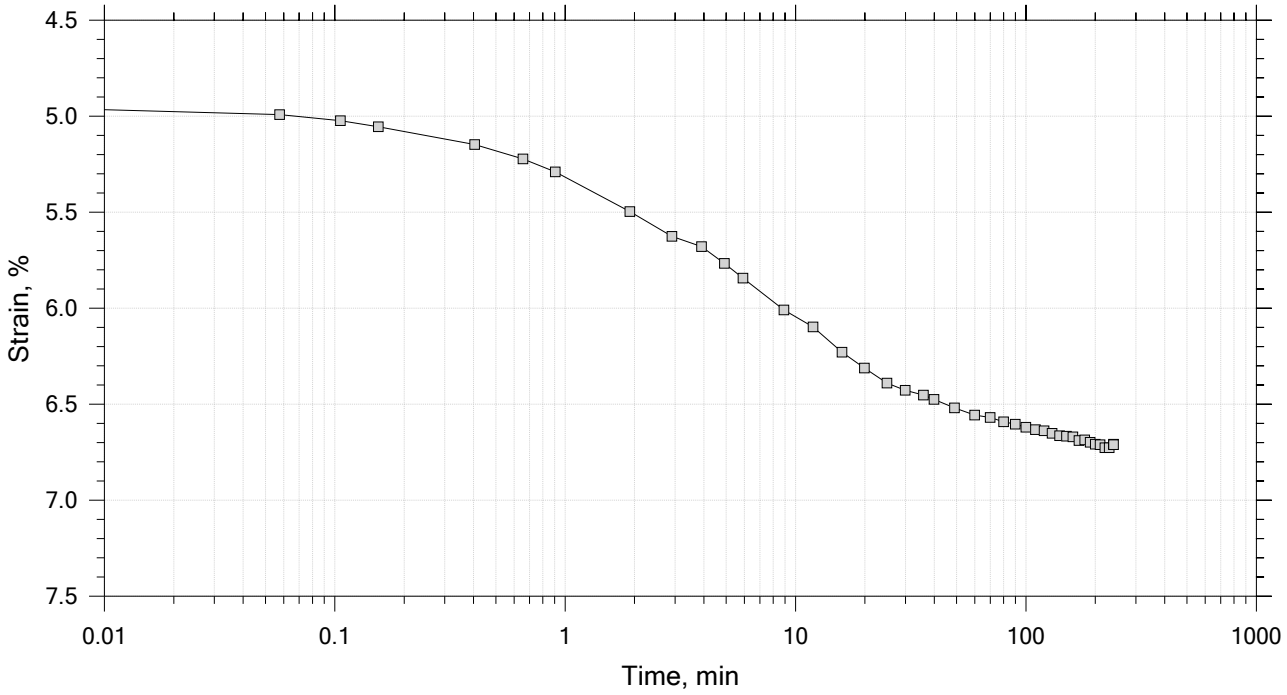
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

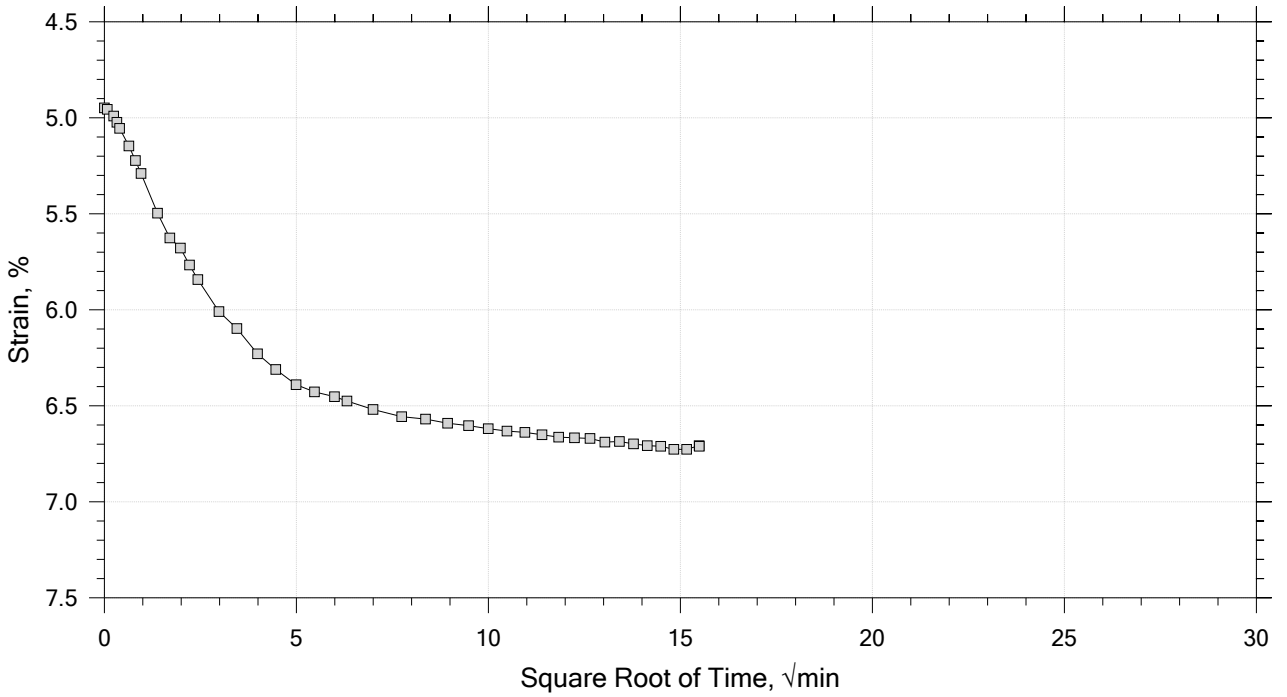
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf





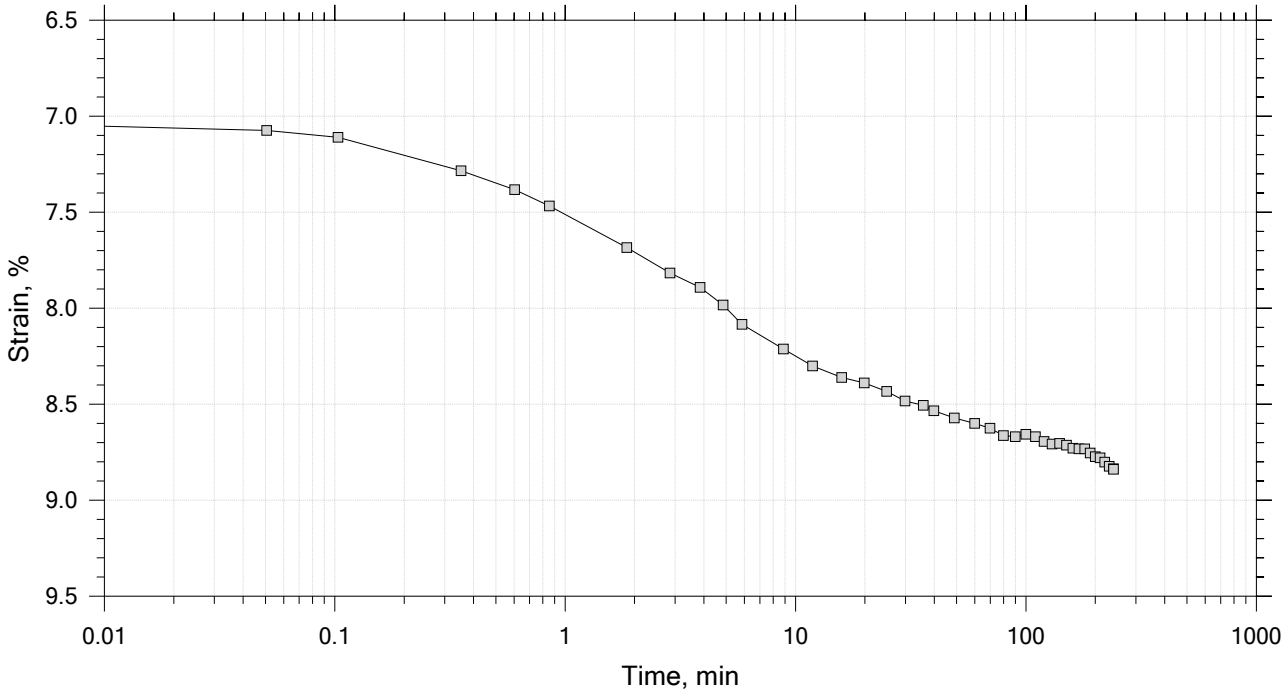
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

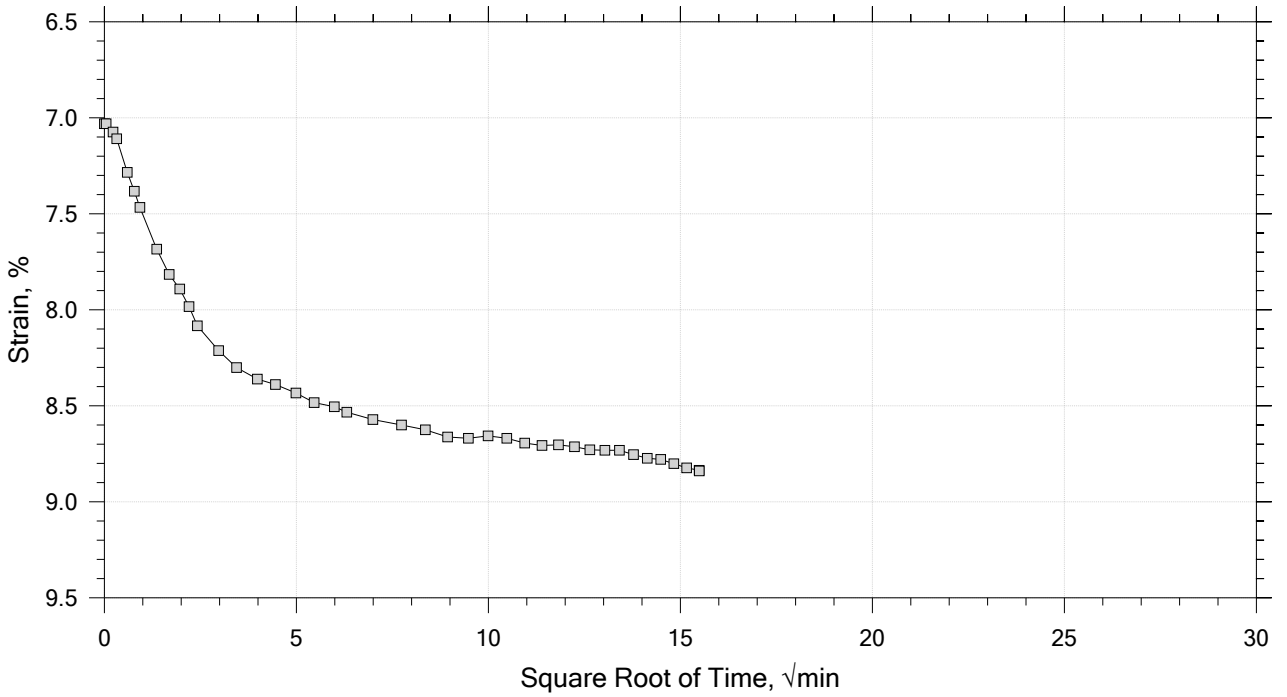
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf





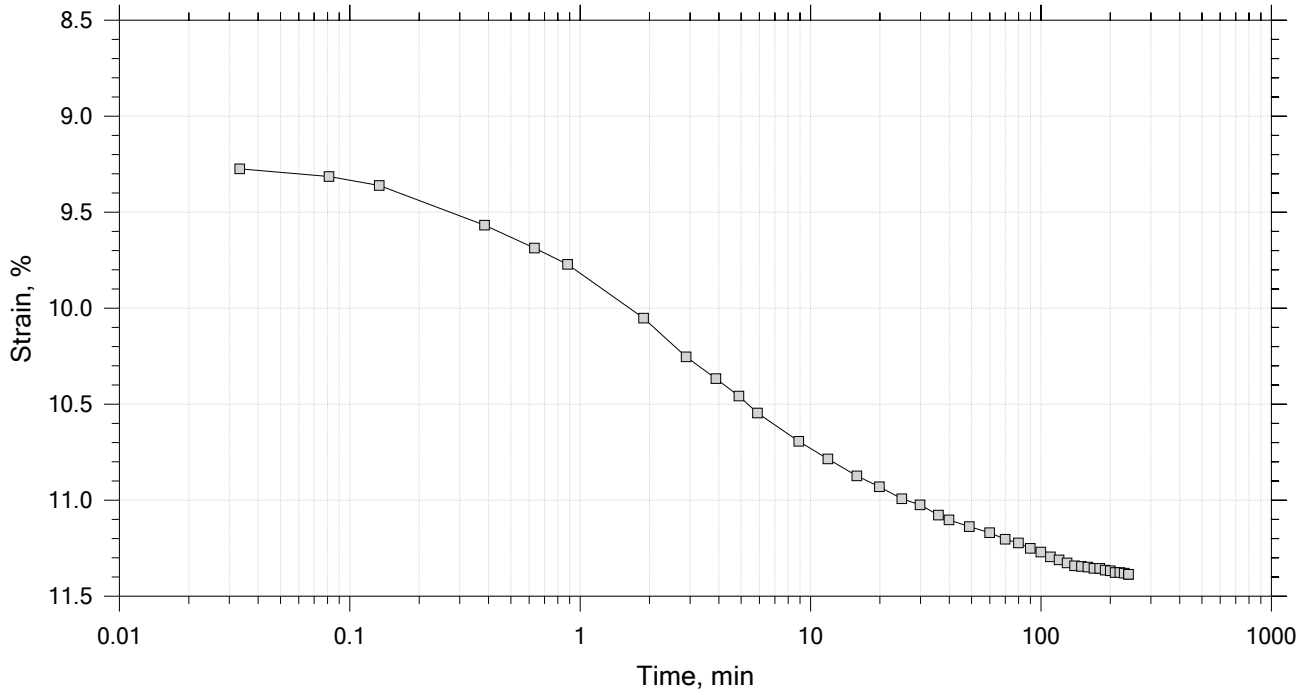
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

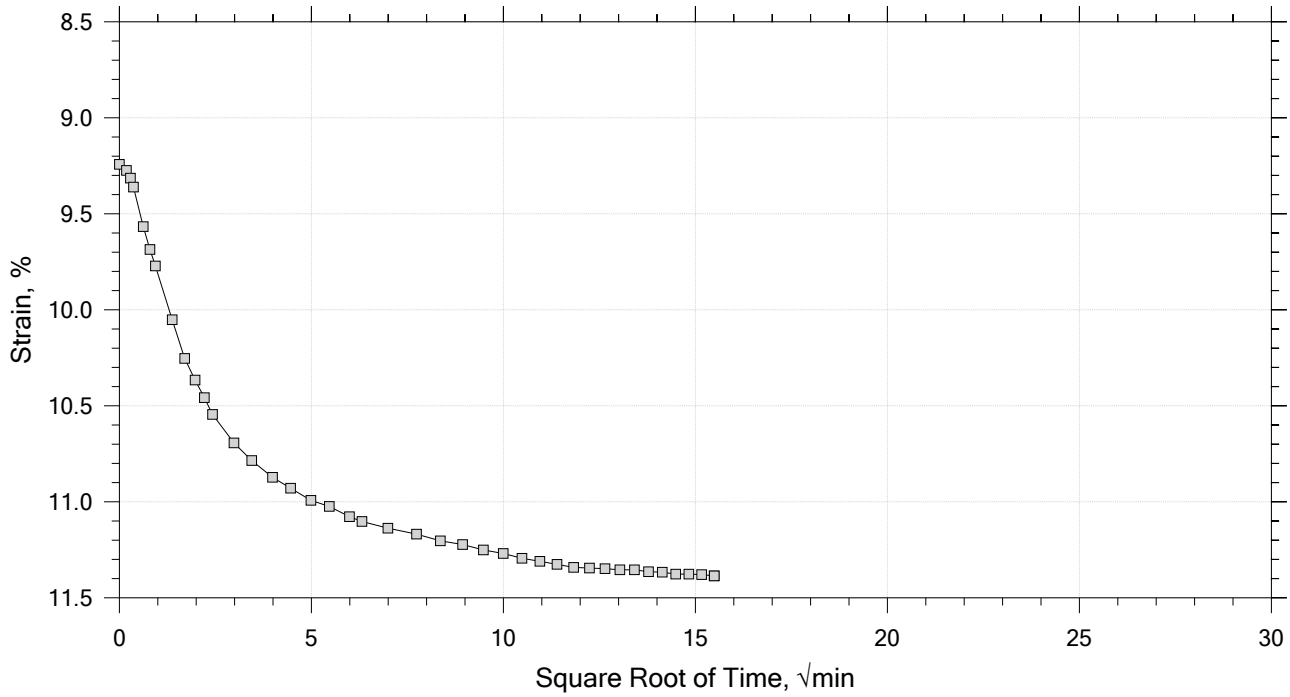
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf





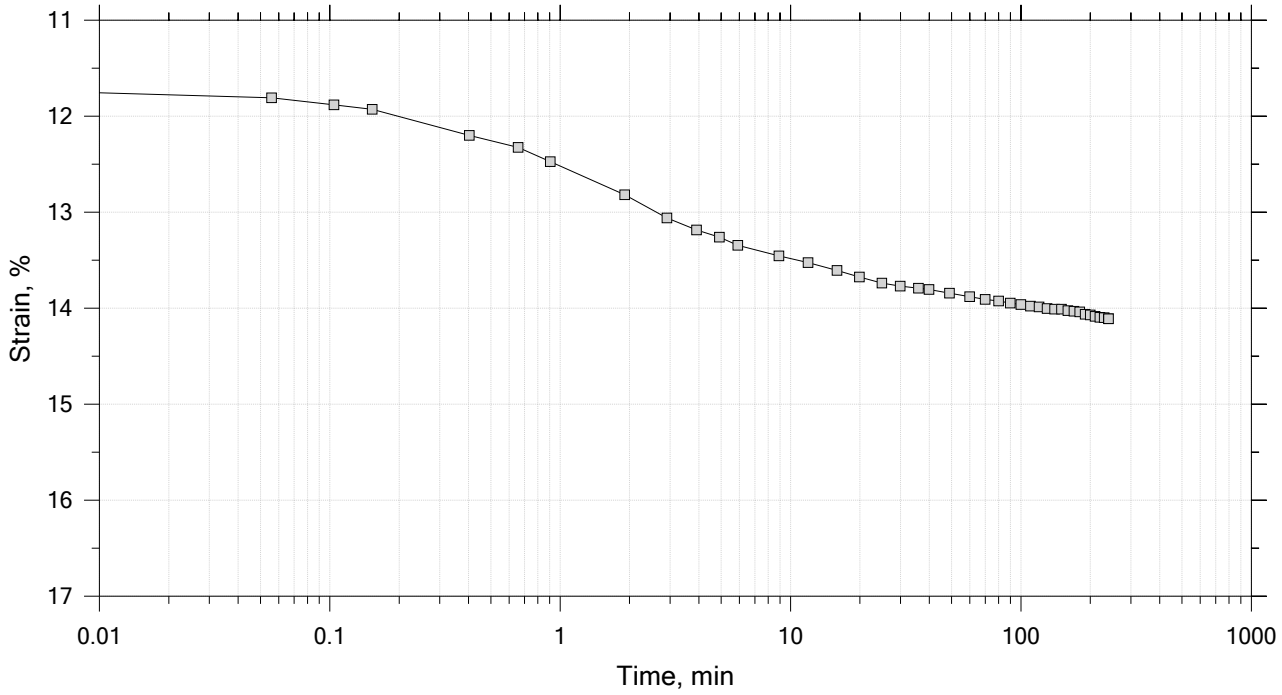
Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

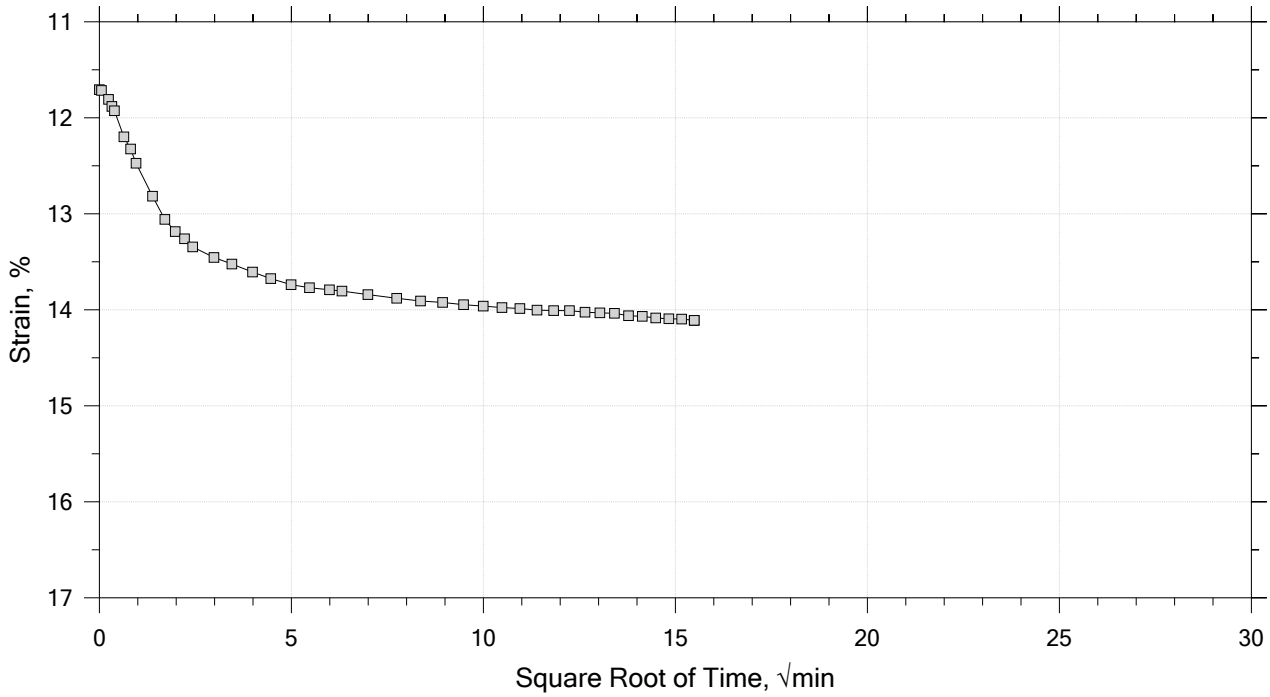
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf

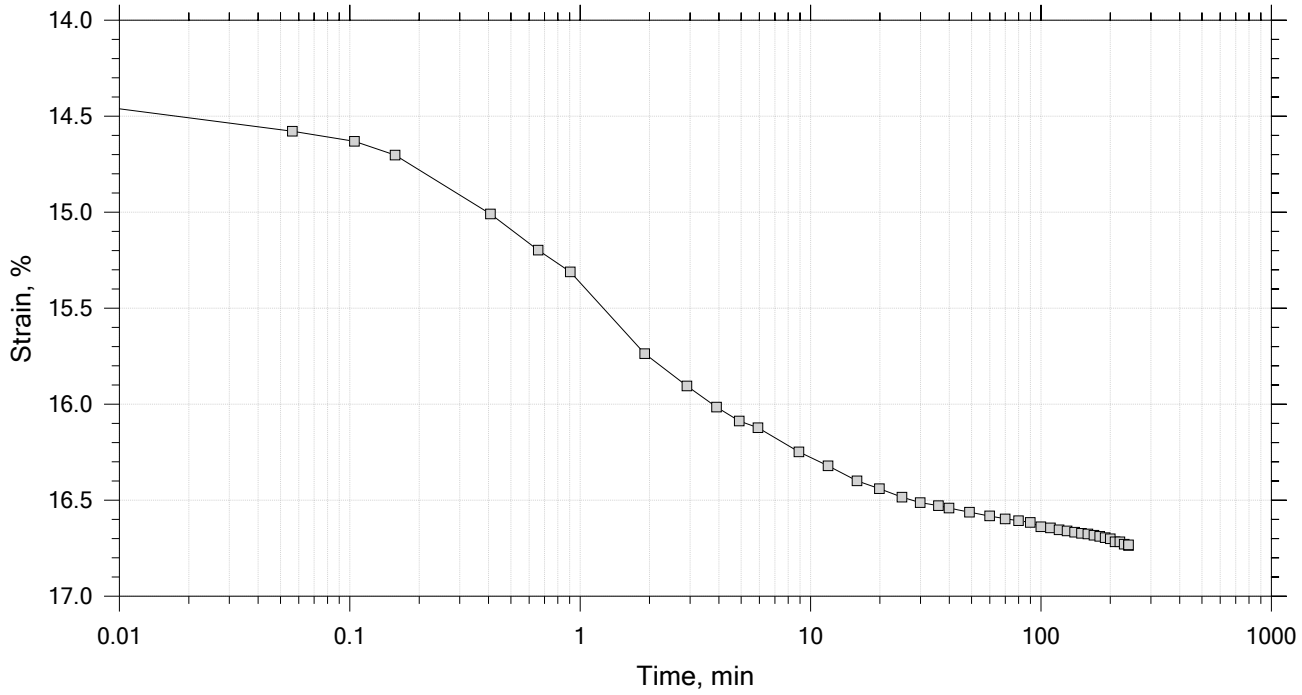


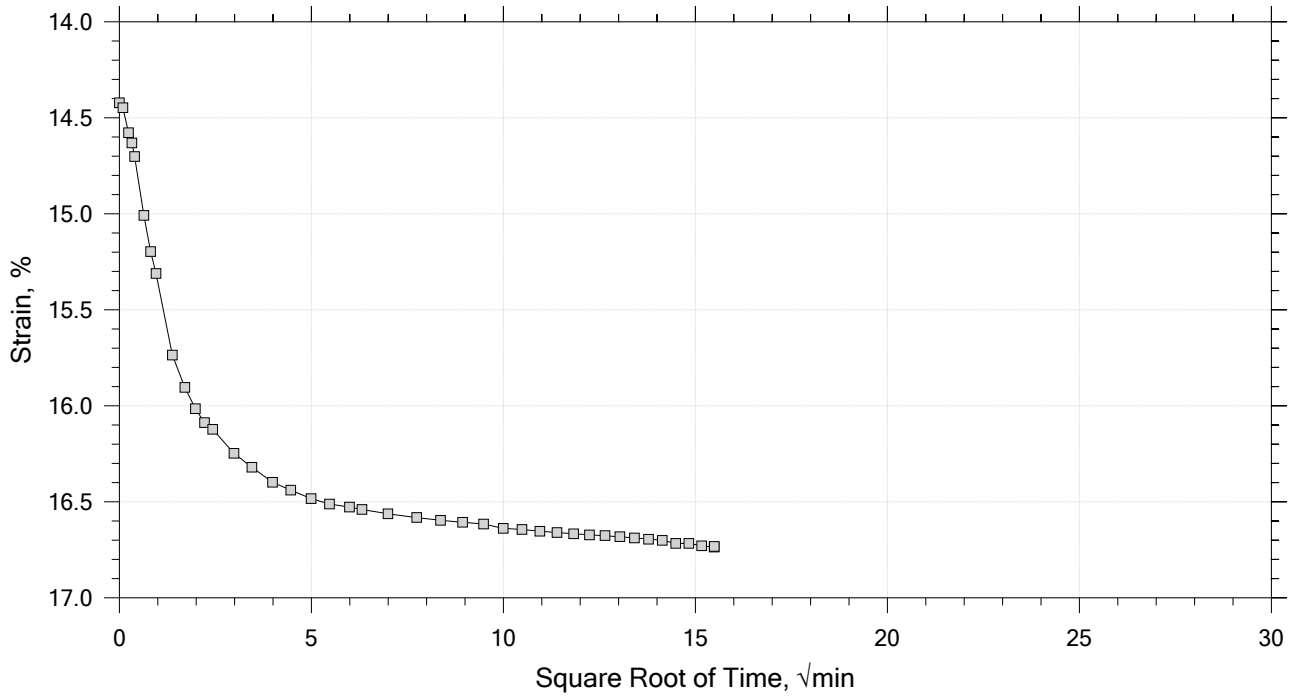


GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: OS-5	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty sand		
	Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15
Constant Load Step
Stress: 16 tsf

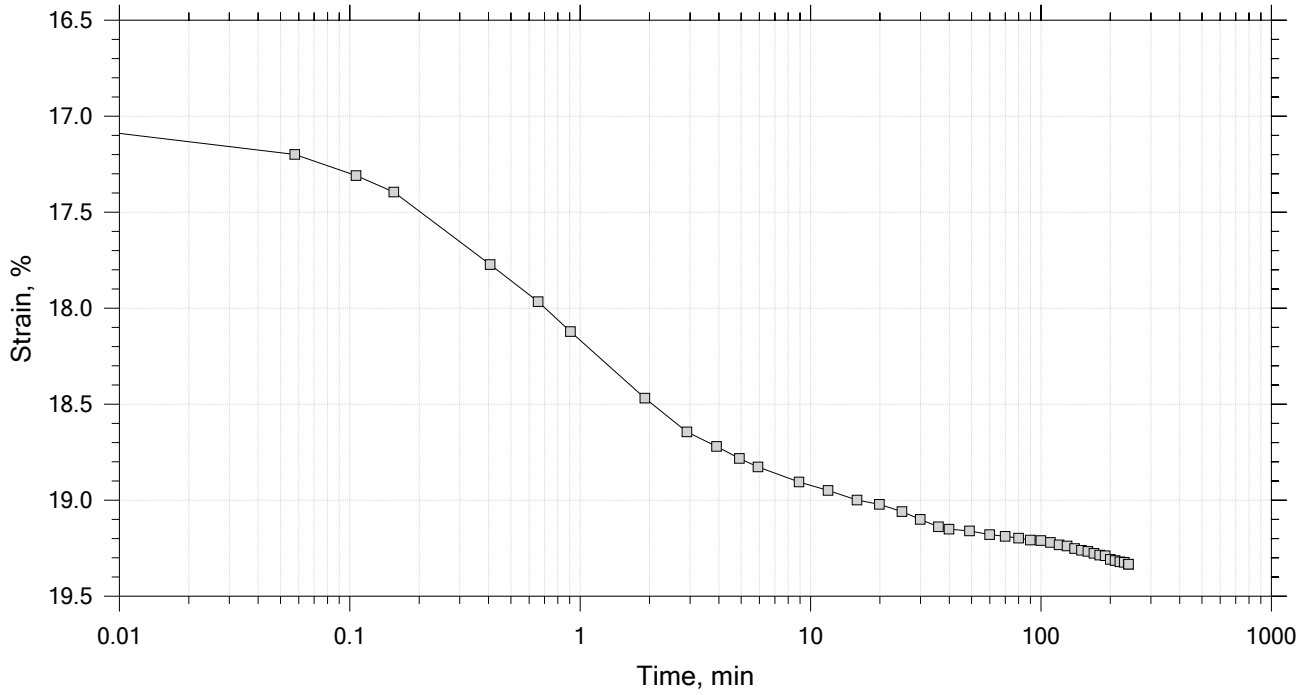


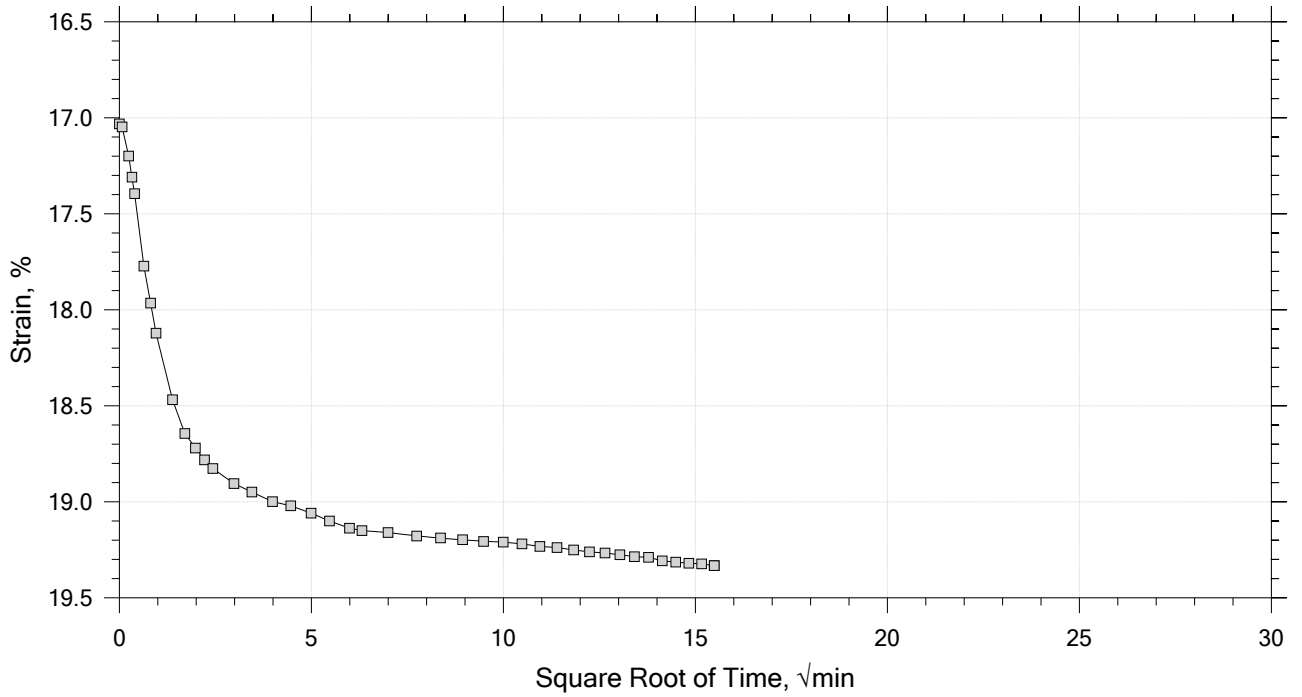


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15
Constant Load Step
Stress: 32 tsf

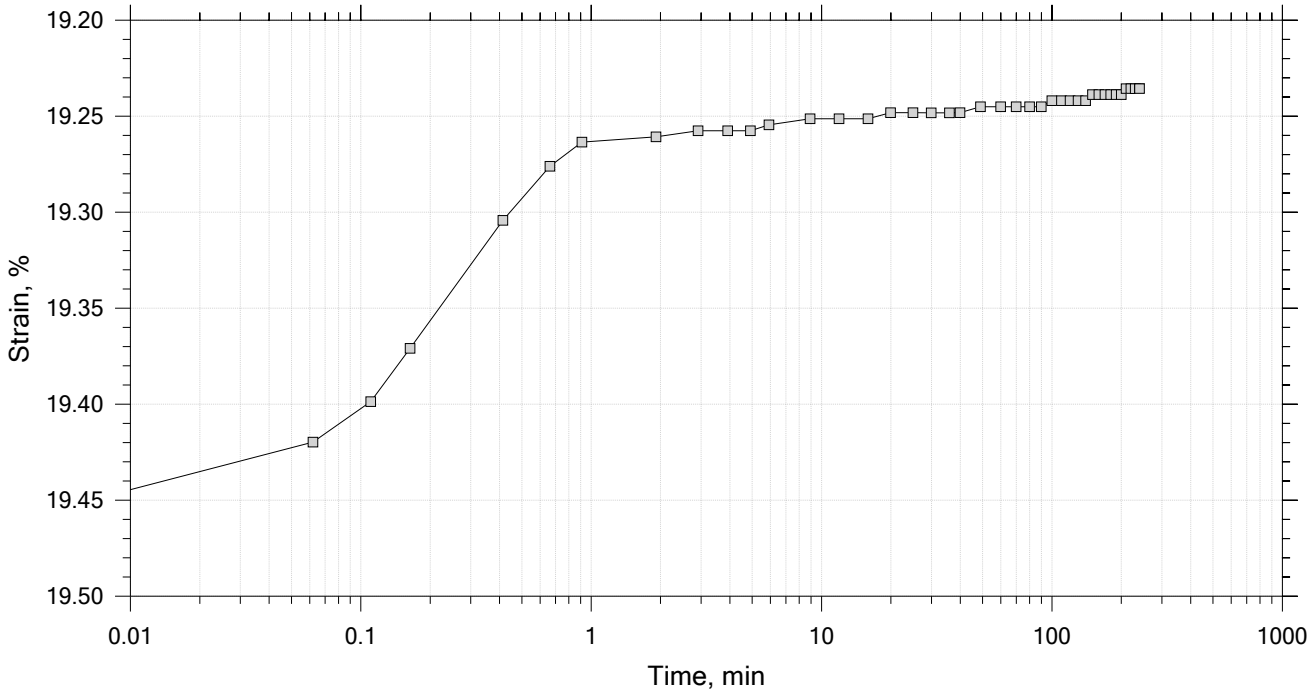


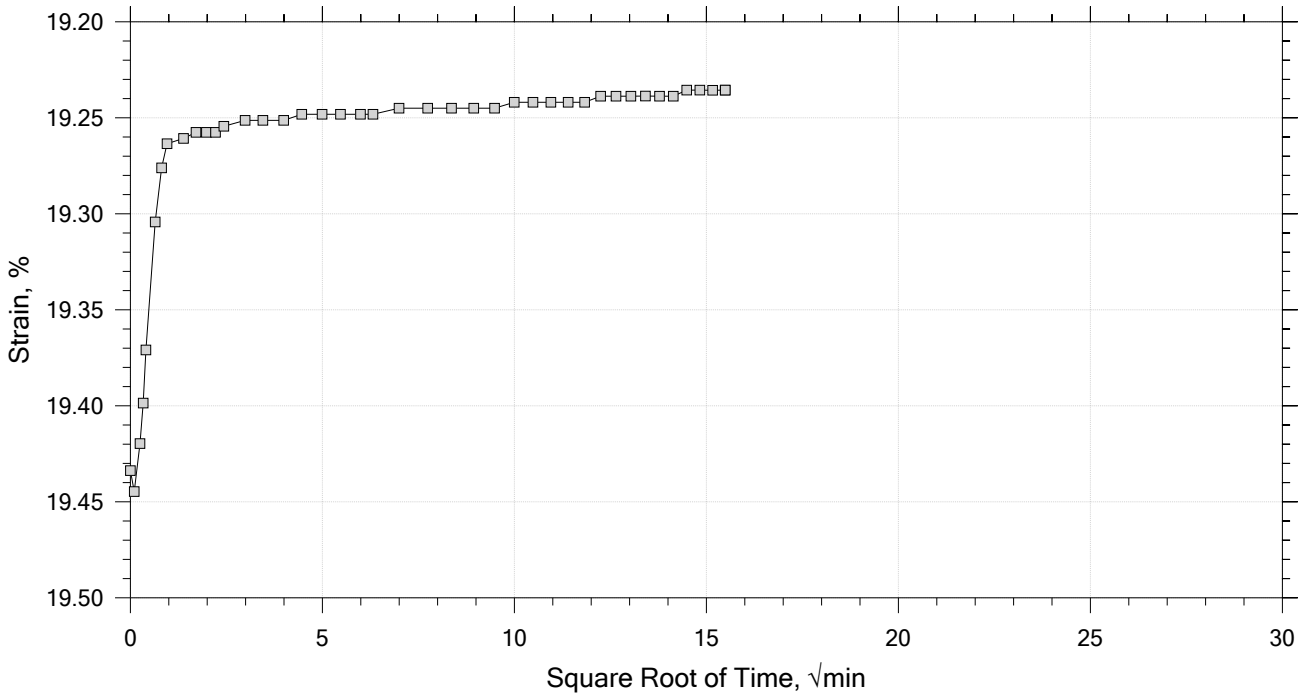


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15
Constant Load Step
Stress: 8 tsf

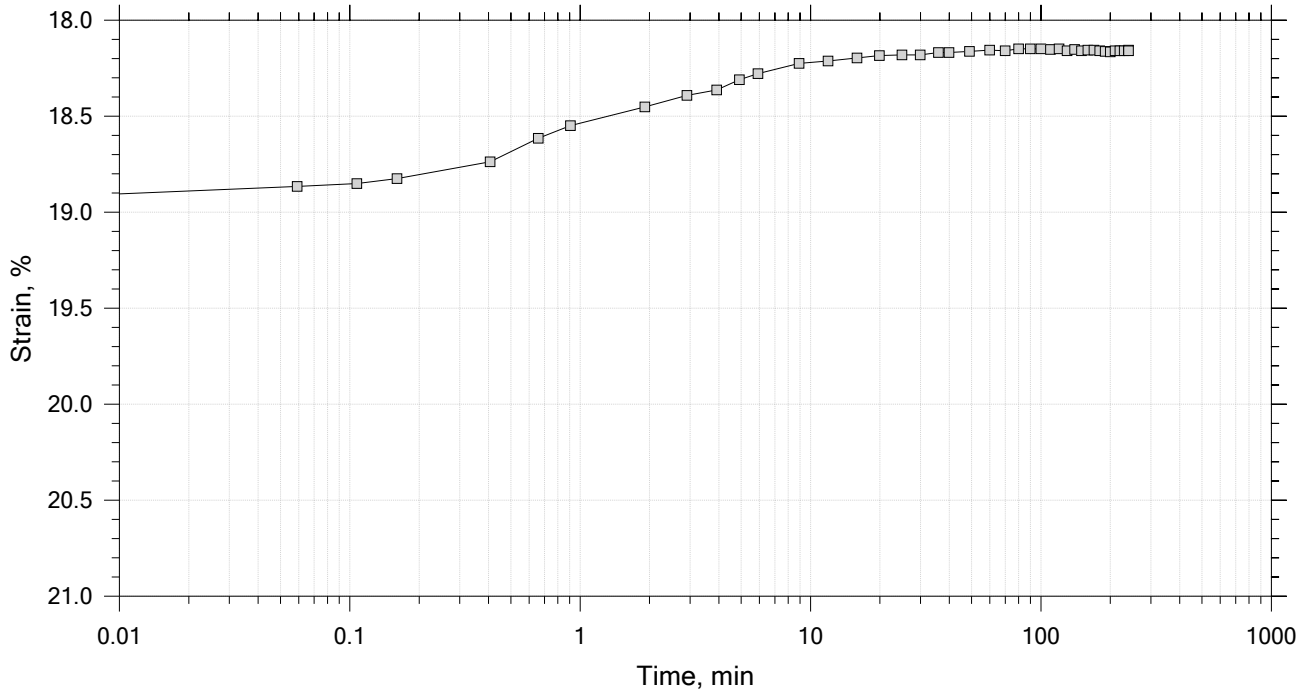


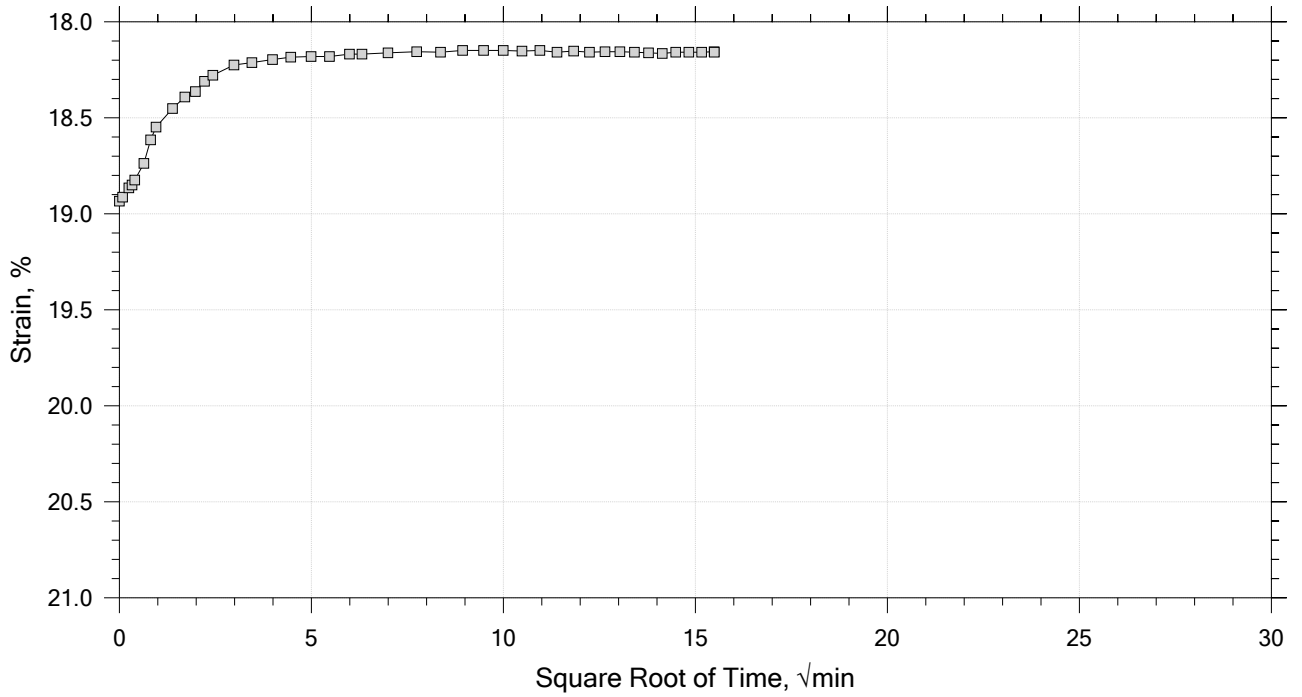


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15
Constant Load Step
Stress: 2 tsf

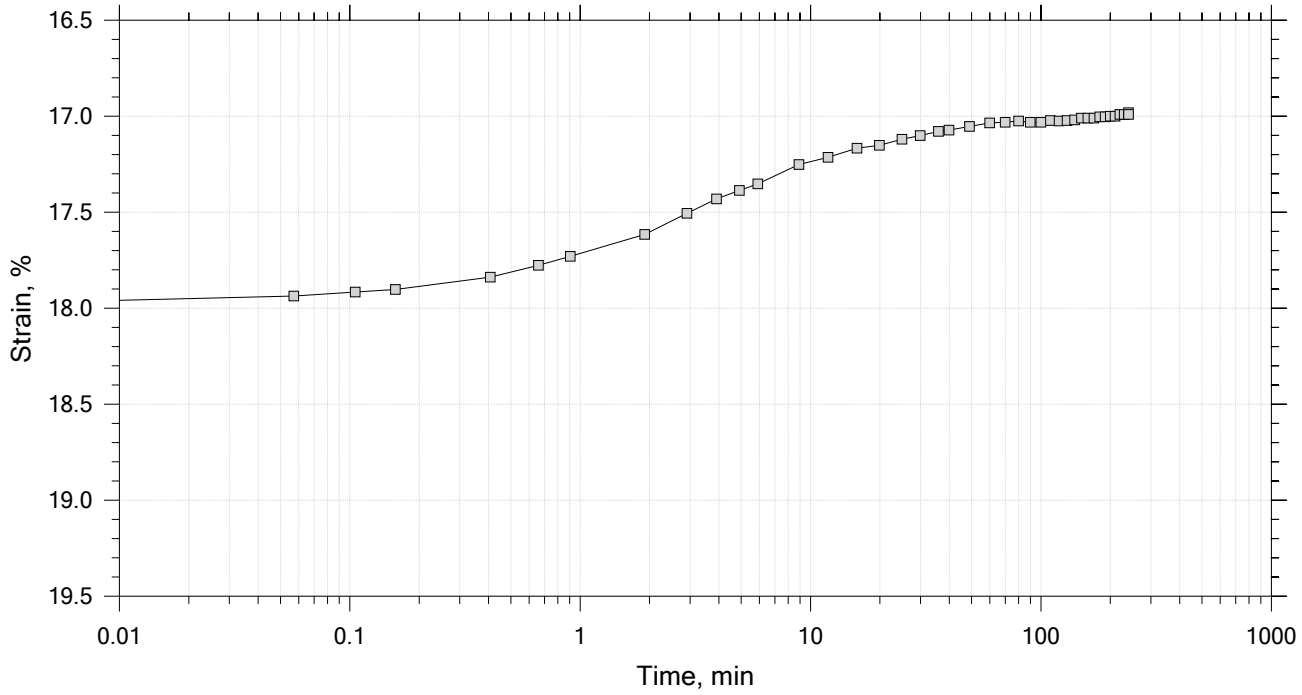


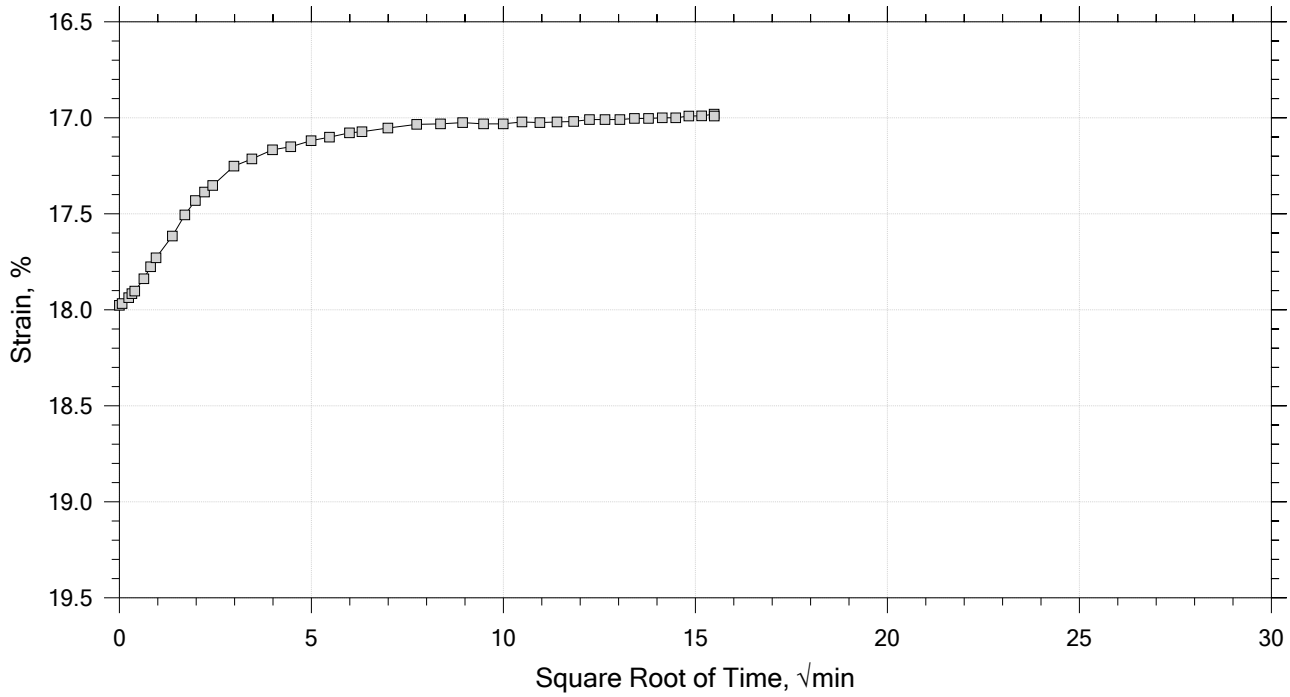


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15
Constant Load Step
Stress: 0.5 tsf

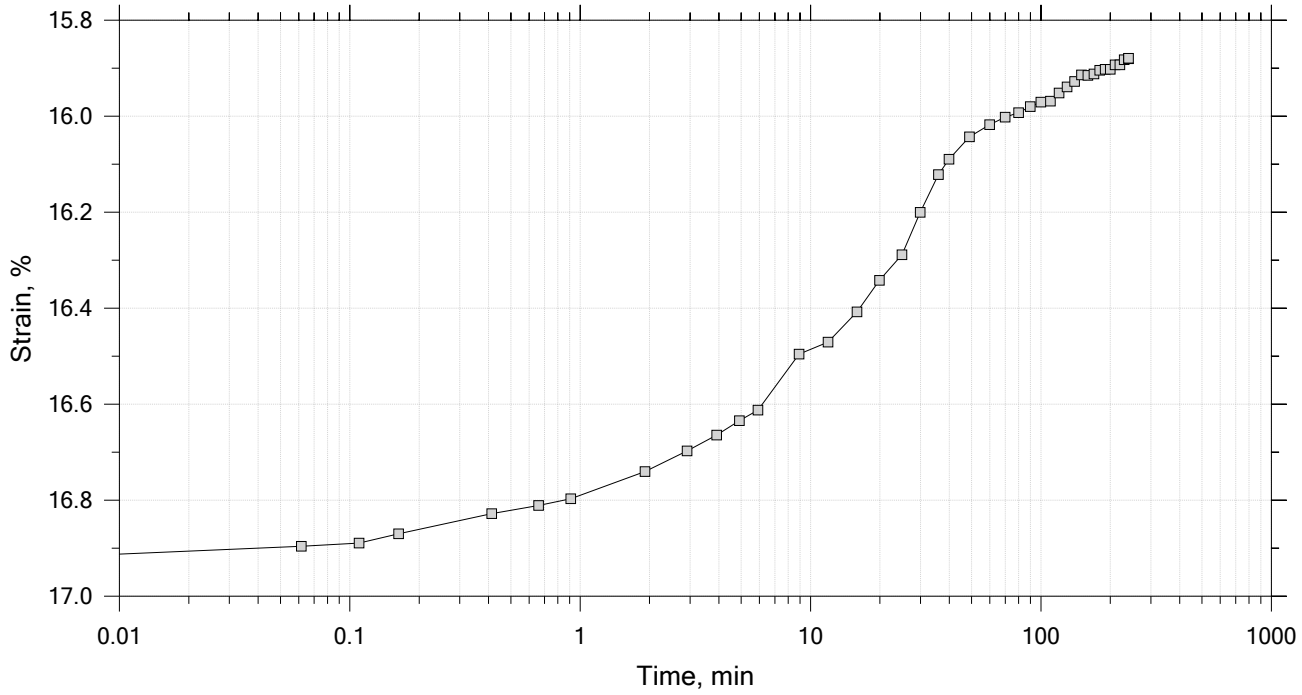


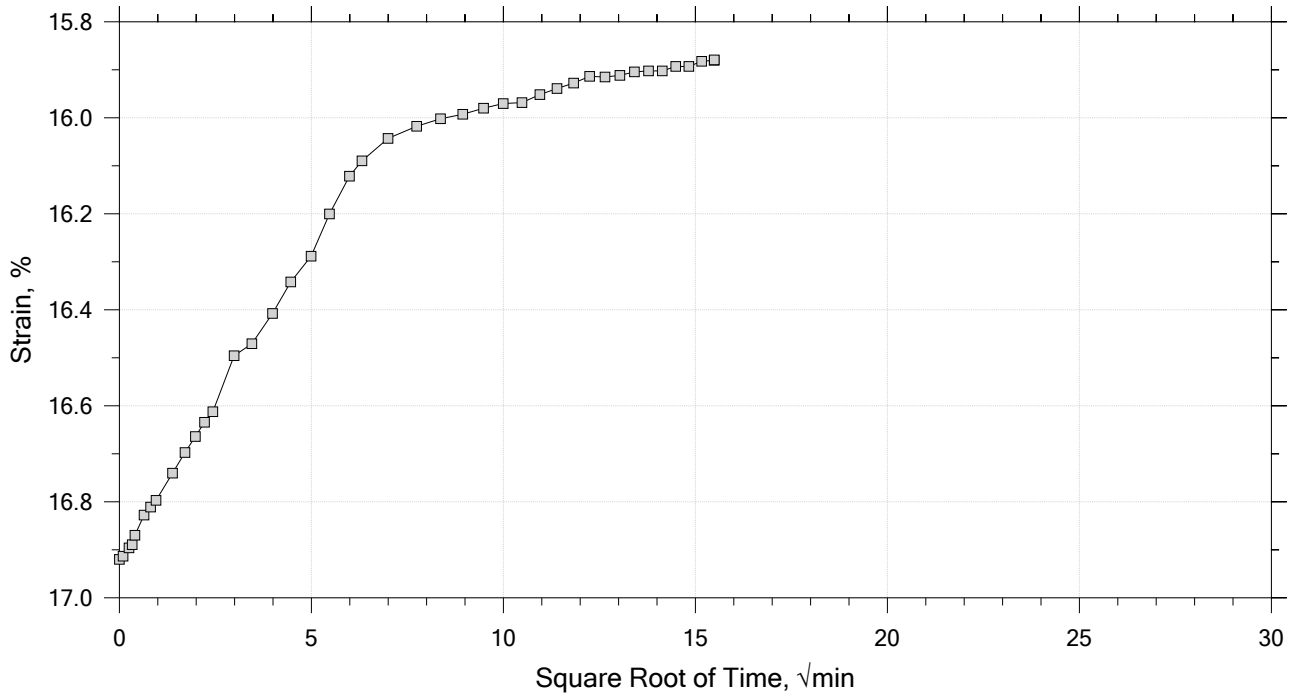


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15
Constant Load Step
Stress: 0.125 tsf

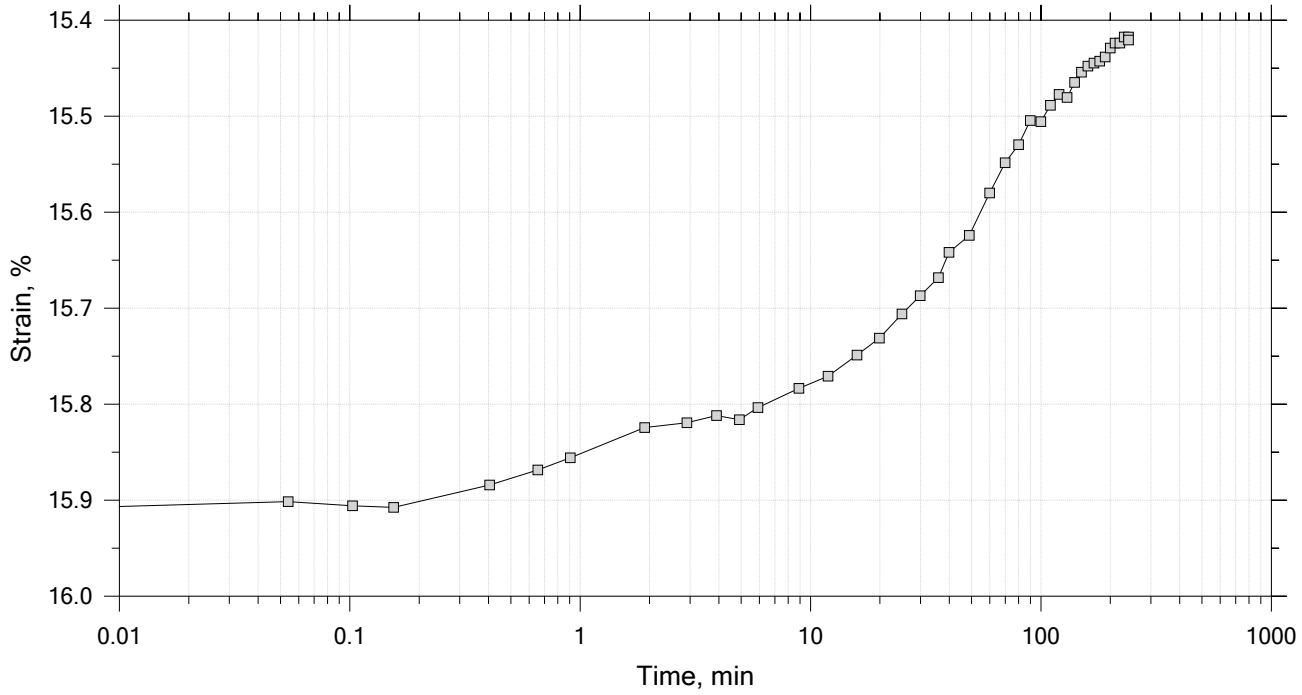


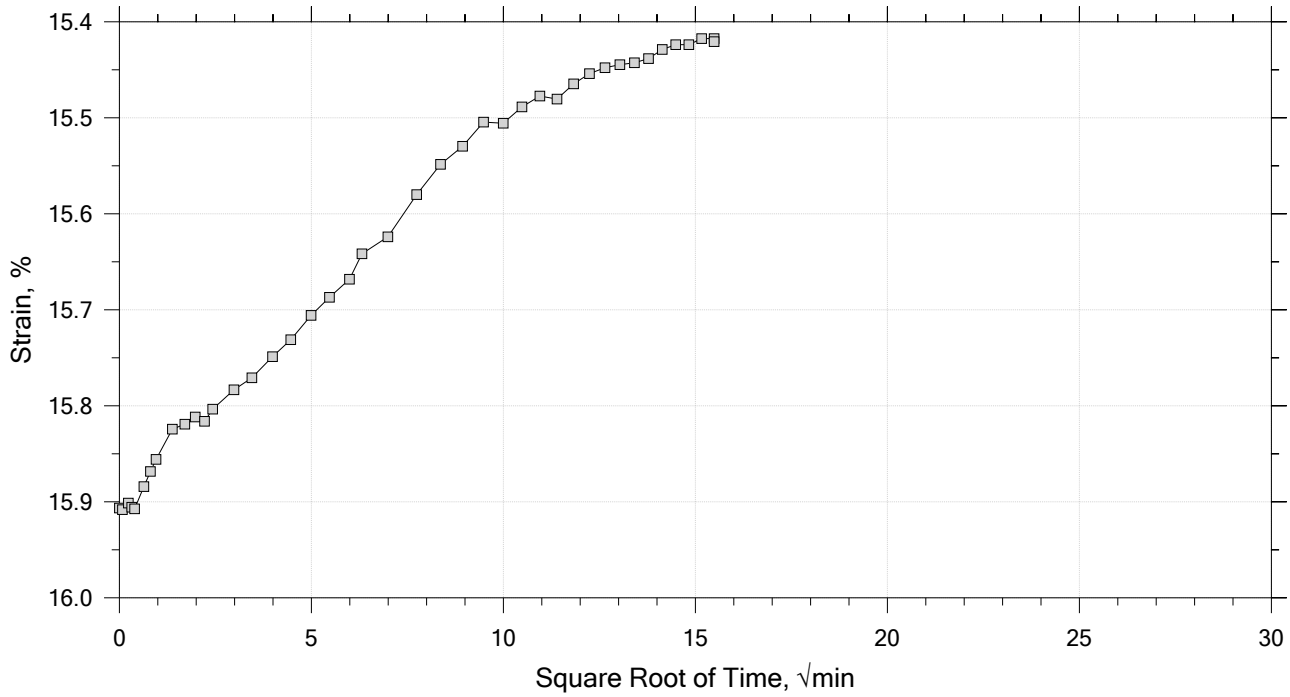


Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15
Constant Load Step
Stress: 0.0625 tsf





Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
Boring No.: OS-5	Tested By: trm	Checked By: anm
Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
Test No.: IP-4	Sample Type: intact	Elevation: ---
Description: Moist, gray silty sand		
Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.72	Liquid Limit: NP
Initial Height: 1.00 in	Initial Void Ratio: 0.83	Plastic Limit: NP
Final Height: 0.79 in	Final Void Ratio: 0.445	Plasticity Index: NP

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E0727	RING		B1206
Mass Container, gm	8.16	109.94	109.94	8.39
Mass Container + Wet Soil, gm	351.73	264.92	249	151.07
Mass Container + Dry Soil, gm	285.07	229.42	229.42	130.98
Mass Dry Soil, gm	276.91	119.48	119.48	122.59
Water Content, %	24.07	29.71	16.39	16.39
Void Ratio	---	0.83	0.45	---
Degree of Saturation, %	---	97.33	100.00	---
Dry Unit Weight, pcf	---	92.726	117.37	---

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.

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: OS-5	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty sand		
	Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

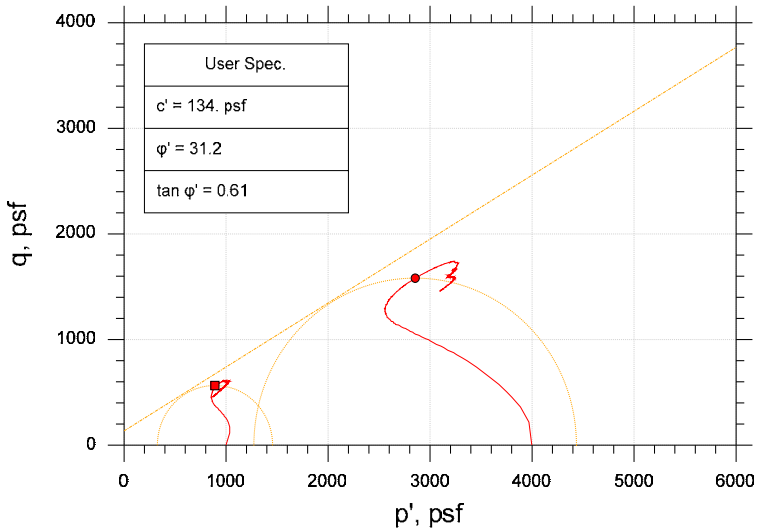
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0722	0.01727	0.798	1.73	113.324	3.06e-05	2.39e-01	1.37e-04
2	0.125	0.02458	0.785	2.46	69.085	4.90e-05	1.38e-01	1.27e-04
3	0.250	0.03446	0.766	3.45	42.790	7.78e-05	7.90e-02	1.15e-04
4	0.500	0.04815	0.741	4.82	16.296	1.99e-04	5.48e-02	2.04e-04
5	1.00	0.06711	0.707	6.71	16.812	1.87e-04	3.79e-02	1.33e-04
6	2.00	0.08839	0.668	8.84	12.643	2.38e-04	2.13e-02	9.47e-05
7	4.00	0.1139	0.621	11.4	11.383	2.51e-04	1.27e-02	5.98e-05
8	8.00	0.1411	0.571	14.1	7.529	3.57e-04	6.81e-03	4.56e-05
9	16.0	0.1673	0.523	16.7	5.702	4.43e-04	3.28e-03	2.72e-05
10	32.0	0.1933	0.476	19.3	4.456	5.33e-04	1.63e-03	1.62e-05
11	8.00	0.1924	0.478	19.2	1.617	1.42e-03	4.06e-05	1.08e-06
12	2.00	0.1816	0.497	18.2	5.358	4.36e-04	1.79e-03	1.47e-05
13	0.500	0.1699	0.519	17.0	11.699	2.05e-04	7.79e-03	2.99e-05
14	0.125	0.1588	0.539	15.9	65.889	3.74e-05	2.96e-02	2.08e-05
15	0.0625	0.1542	0.547	15.4	170.180	1.48e-05	7.34e-02	2.03e-05

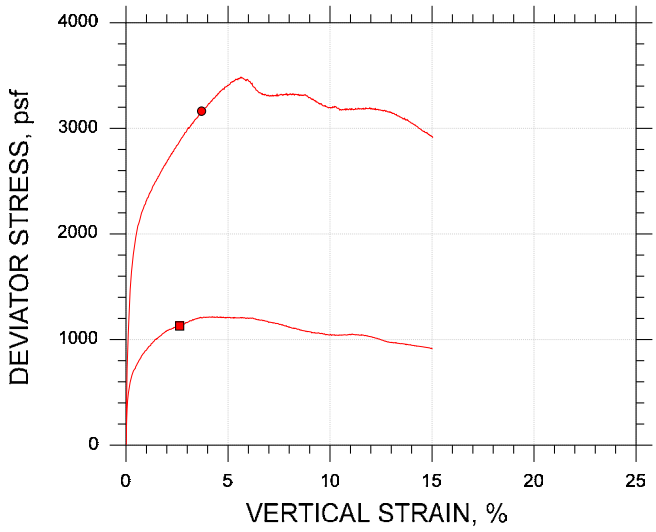
GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: OS-5	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 17-19 ft
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty sand		
	Remarks: System LTIII-A, Swell Pressure = 0.0722 tsf		
	Displacement at End of Increment		

CONSOLIDATION UNDRAINED TRIAXIAL

Client: Stantec, Inc	
Project Name: Saco Interch. Improv. Ex.35&36	
Project Location: Saco, ME	
Project Number: GTX-312785	
Tested By: md	Checked By: mcm
Boring ID: B-203	
Preparation: Intact	
Description: Moist, gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 28	Plastic Limit: 16
Plasticity Index: 12	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





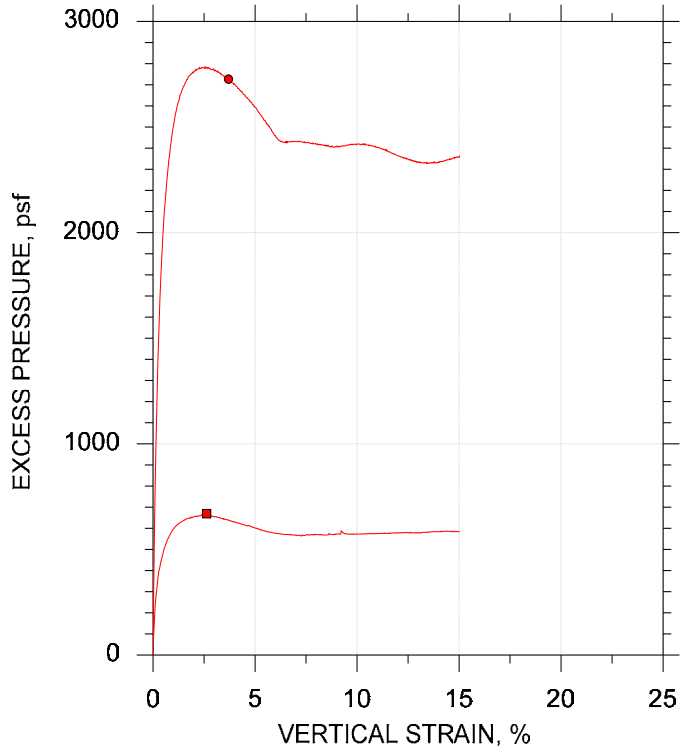
Symbol		■	●		
Sample ID		U-1	U-1		
Depth, ft		12-14	12-14		
Test Number		CU-2-1	CU-2-3		
Initial	Height, in	3.970	4.120		
	Diameter, in	1.930	1.930		
	Moisture Content (from Cuttings), %	37.5	23.8		
	Dry Density, pcf	83.5	99.8		
	Saturation (Wet Method), %	99.3	93.3		
	Void Ratio	1.02	0.689		
Before Shear	Moisture Content, %	34.9	23.6		
	Dry Density, pcf	86.8	103.		
	Cross-sectional Area (Method A), in²	2.855	2.870		
	Saturation, %	100.0	100.0		
	Void Ratio	0.942	0.637		
	Back Pressure, psf	2.173e+004	2.318e+004		
Vertical Effective Consolidation Stress, psf		994.2	3985.		
Horizontal Effective Consolidation Stress, psf		999.1	3996.		
Vertical Strain after Consolidation, %		0.5993	1.151		
Volumetric Strain after Consolidation, %		1.245	2.949		
Time to 50% Consolidation, min		---	12.96		
Shear Strength, psf		564.4	1581.		
Strain at Failure, %		2.63	3.70		
Strain Rate, %/min		0.01600	0.01600		
Deviator Stress at Failure, psf		1129.	3163.		
Effective Minor Principal Stress at Failure, psf		327.1	1273.		
Effective Major Principal Stress at Failure, psf		1456.	4435.		
B-Value		0.97	0.95		

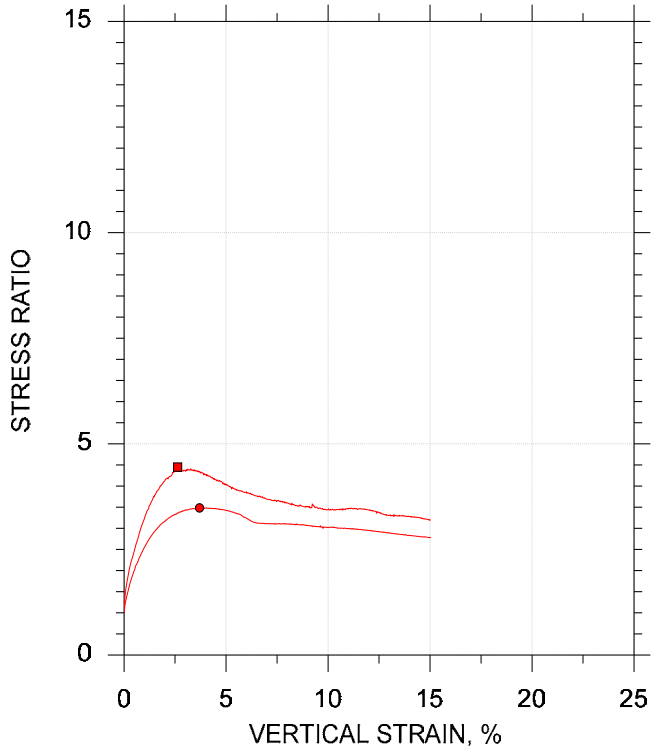
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

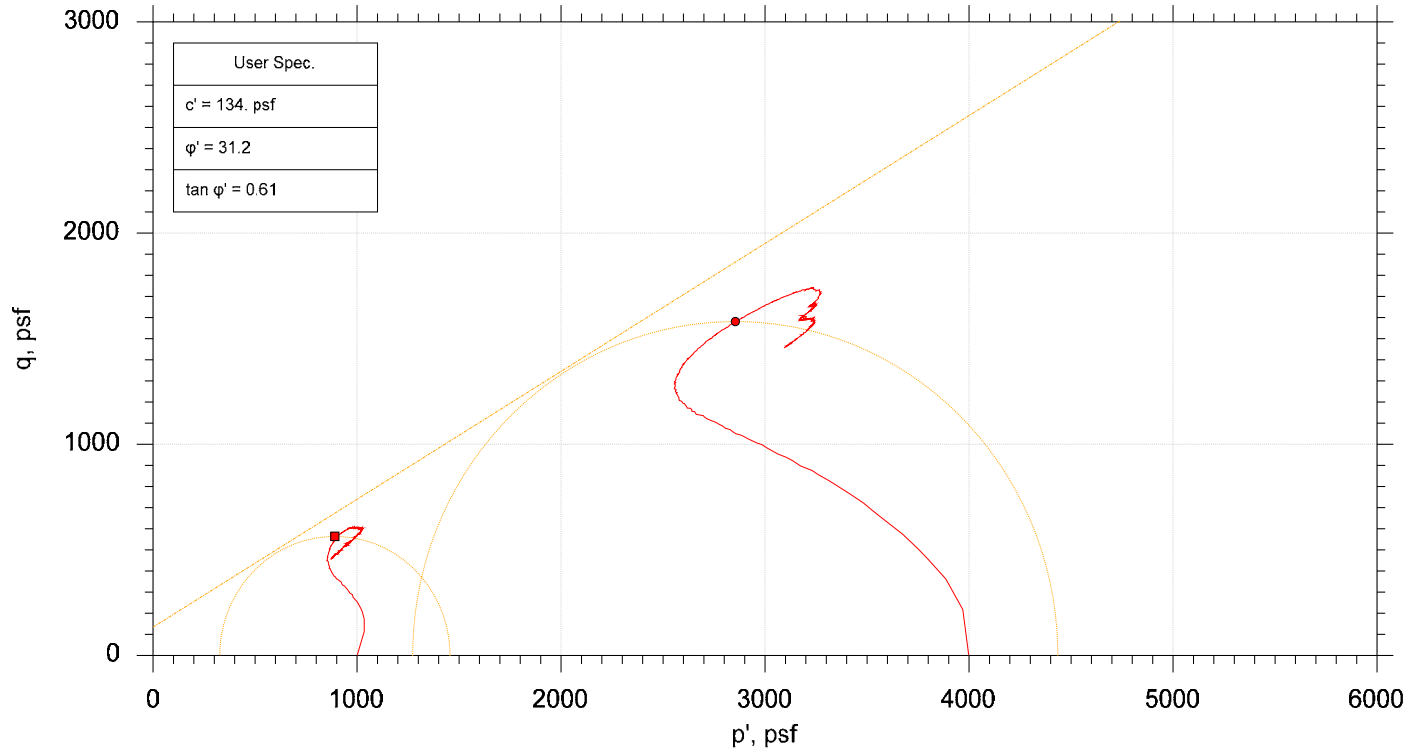
Remarks:

System Y

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







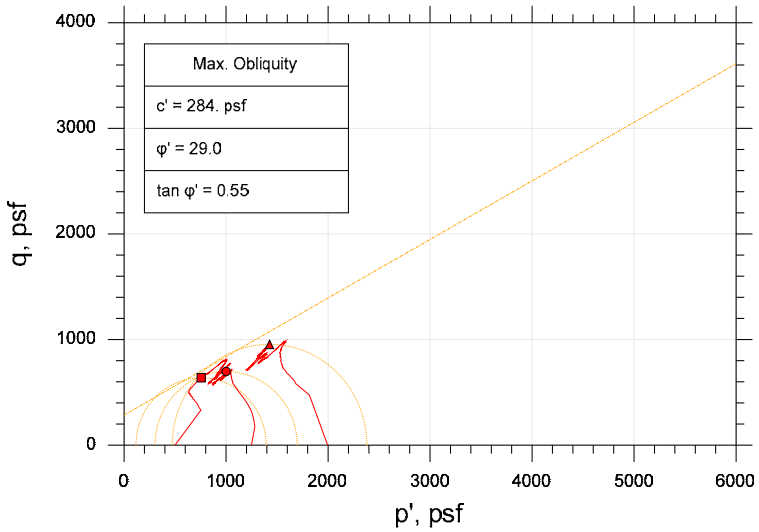
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-1	CU-2-1	12-14	md	1/25/21	mcm	2/8/21	312785-CU-2-1m.dat
●	U-1	CU-2-3	12-14	md	1/25/21	mcm	2/8/21	312785-CU-2-3m.dat

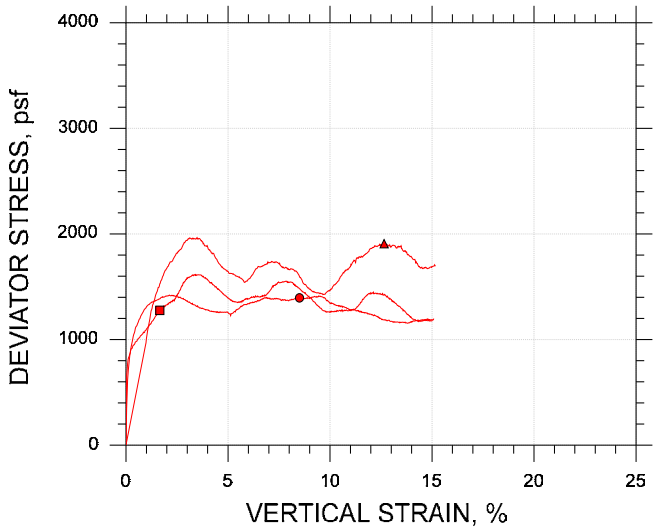
GeoTesting EXPRESS

Project: Saco Interch. Improv. Ex.35&36	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Sample Type: Intact	
Description: Moist, gray clay		
Remarks: System Y		

Client: Stantec, Inc.	
Project Name: Saco Intertech. Ex. 35 & 36	
Project Location: Saco, ME	
Project Number: GTX-312785	
Tested By: md	Checked By: mcm
Boring ID: B-208	
Preparation: intact	
Description: Moist gray clay	
Classification: ---	
Group Symbol: ---	
Liquid Limit: 25	Plastic Limit: 16
Plasticity Index: 9	Estimated Specific Gravity: 2.7

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

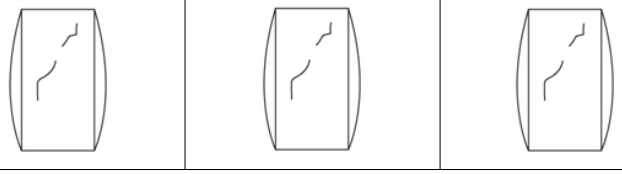




Symbol		■	●	▲
Sample ID		U-2	U-2	U-2
Depth, ft		18-20	18-20	18-20
Test Number		CU-1-1	CU-1-2	CU-1-3A
Initial	Height, in	4.600	4.300	4.600
	Diameter, in	1.960	1.950	2.010
	Moisture Content (from Cuttings), %	31.7	33.8	31.1
	Dry Density, pcf	89.5	87.0	91.2
	Saturation (Wet Method), %	97.0	97.3	99.0
	Void Ratio	0.884	0.938	0.848
Before Shear	Moisture Content, %	31.9	31.1	29.9
	Dry Density, pcf	90.5	91.6	93.3
	Cross-sectional Area (Method A), in²	3.005	2.881	3.102
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.862	0.841	0.807
	Back Pressure, psf	2.174e+004	2.175e+004	1.656e+004
Vertical Effective Consolidation Stress, psf		496.9	1244.	1996.
Horizontal Effective Consolidation Stress, psf		499.2	1247.	1996.
Vertical Strain after Consolidation, %		0.4363	0.5069	0.03769
Volumetric Strain after Consolidation, %		0.2652	1.985	2.478
Time to 50% Consolidation, min		---	---	49.00
Shear Strength, psf		638.1	697.1	953.6
Strain at Failure, %		1.66	8.50	12.7
Strain Rate, %/min		0.01600	0.01600	0.01600
Deviator Stress at Failure, psf		1276.	1394.	1907.
Effective Minor Principal Stress at Failure, psf		117.1	303.5	472.5
Effective Major Principal Stress at Failure, psf		1393.	1698.	2380.
B-Value		0.99	1.00	0.96

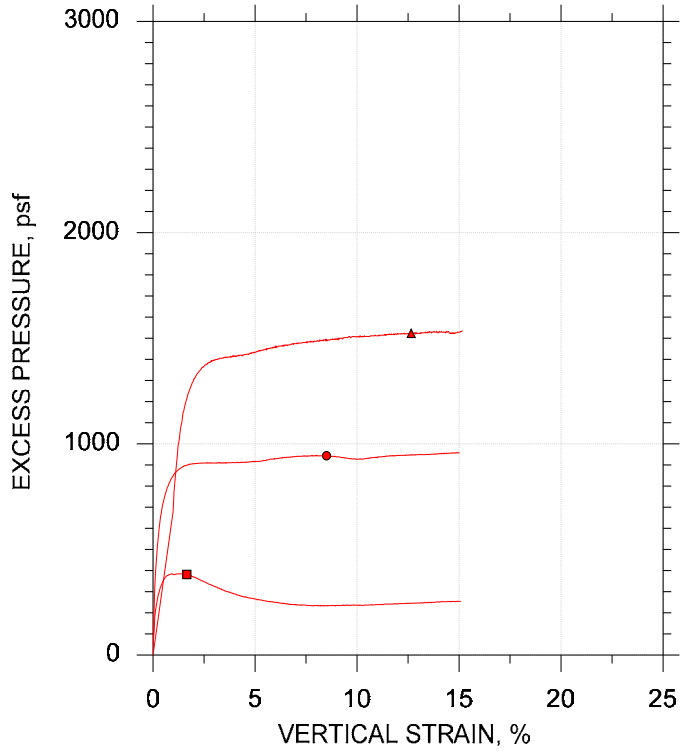
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Atterberg Limits determined by ASTM D4318.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

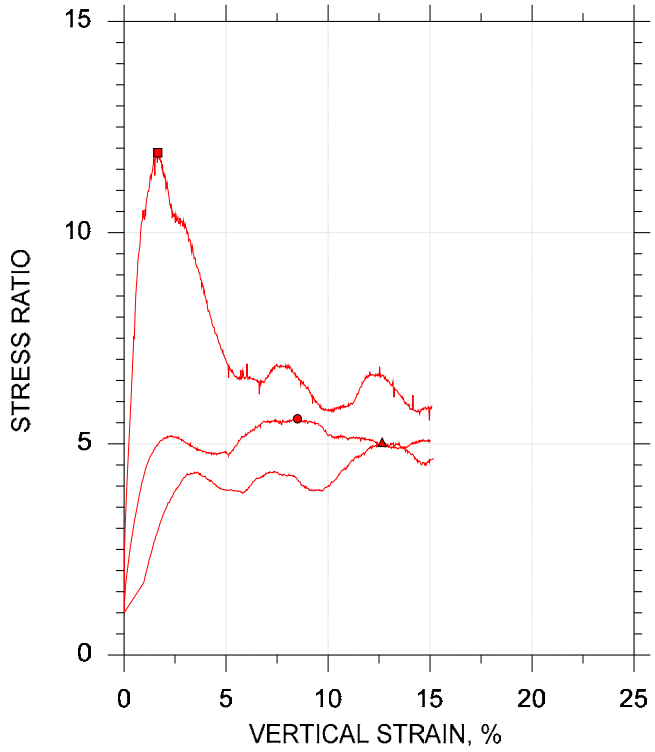
Remarks:

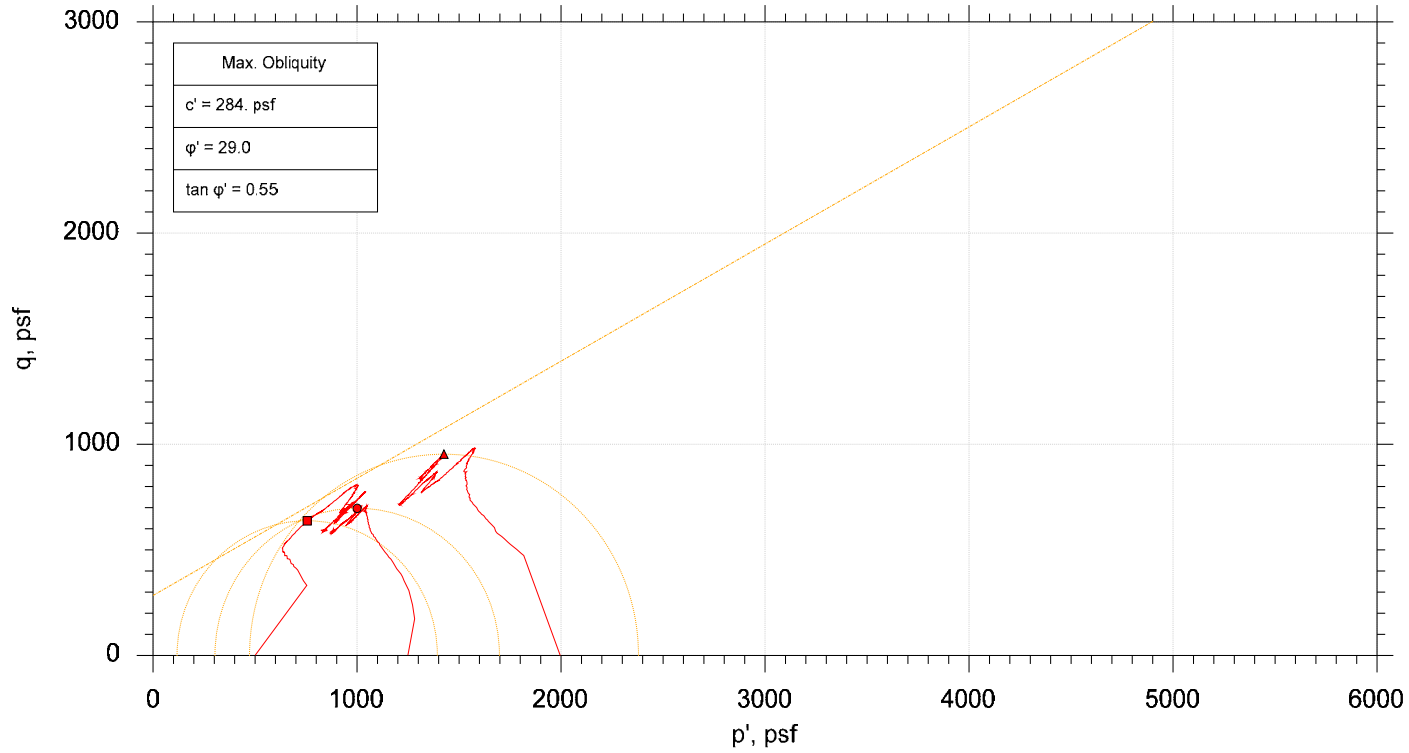


System RR

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-2	CU-1-1	18-20	md	1/7/21	mcm	2/8/21	312785-CU-1-1m.dat
●	U-2	CU-1-2	18-20	md	1/7/21	mcm	2/8/21	312785-CU-1-2m.dat
▲	U-2	CU-1-3A	18-20	trm	2/3/21	mcm	2/8/21	312785-CU-1-3Am.dat

GeoTesting EXPRESS

Project: Saco Intertech. Ex. 35 & 36	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Sample Type: intact	
Description: Moist gray clay		
Remarks: System RR		

ROCK CORE TESTING

Client:	Stantec Inc.				
Project:	ME Turnpike Authority Ex. 35/36 Interchange				
Location:	Saco, ME			Project No:	GTX-311093
Boring ID:	---	Sample Type:	---	Tested By:	jck
Sample ID:	---	Test Date:	01/06/20	Checked By:	smd
Depth :	---	Test Id:	537010		

Bulk Density and Compressive Strength of Rock Core Specimens by ASTM D7012 Method C

Boring ID	Sample Number	Depth	Bulk Density, pcf	Compressive strength, psi	Failure Type	Meets ASTM D4543	Note(s)
B-103	C-1	41.15 - 41.52 ft	167	4466	2	Yes	---
B-112	C-2	15.70 - 16.07 ft	175	3972	3	No	2,*

Notes: Density determined on core samples by measuring dimensions and weight and then calculating.

All specimens tested at the approximate as-received moisture content and at standard laboratory temperature.

The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.

Failure Type: 1 = Intact Material Failure; 2 = Discontinuity Failure; 3 = Intact Material and Discontinuity Failure (See attached photographs)

1: Best effort end preparation. See Tolerance report for details.
2: The as-received core did not meet the ASTM side straightness tolerance due to irregularities in the sample as cored.
3: Specimen L/D < 2.
4: The as-received core did not meet the ASTM minimum diameter tolerance of 1.875 inches.
5: Specimen diameter is less than 10 times maximum particle size.
6: Specimen diameter is less than 6 times maximum particle size.

*Because the indicated tested specimens did not meet the ASTM D4543 standard tolerances, the results reported here may differ from those for a test specimen within tolerances.

Client:	Stantec Inc.	Test Date:	1/3/2020
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange	Tested By:	jck
Project Location:	Saco, ME	Checked By:	smd
GTX #:	311093		
Boring ID:	B-103		
Sample ID:	C-1		
Depth:	41.15-41.52 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.43	4.44	4.44
Specimen Diameter, in:	1.99	2.00	2.00
Specimen Mass, g:	609.28		
Bulk Density, lb/ft^3	167	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

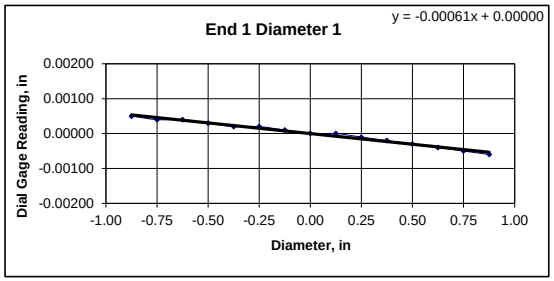
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00050	0.00040	0.00040	0.00030	0.00020	0.00020	0.00010	0.00000	0.00000	-0.00010	-0.00020	-0.00030	-0.00040	-0.00050	-0.00060
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00020

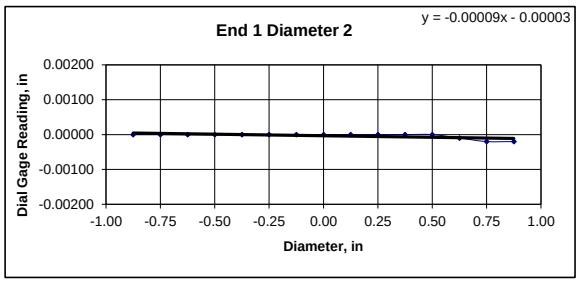
Difference between max and min readings, in:
0° = 0.00110 90° = 0.00020

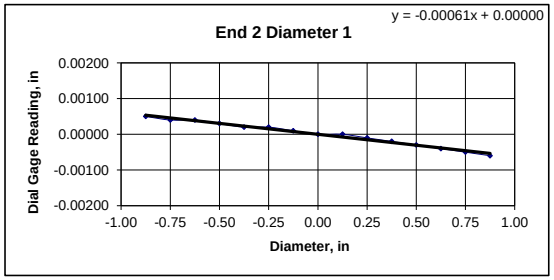
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00050	0.00040	0.00040	0.00030	0.00020	0.00020	0.00010	0.00000	0.00000	-0.00010	-0.00020	-0.00030	-0.00040	-0.00050	-0.00060
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010

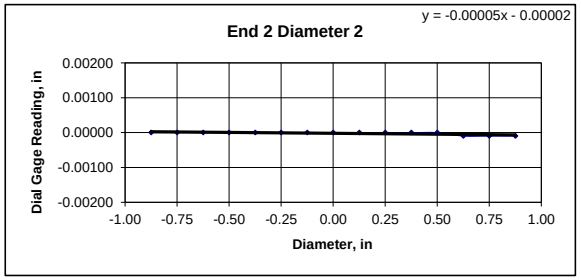
Difference between max and min readings, in:
0° = 0.0011 90° = 0.0001

Maximum difference must be < 0.0020 in. Difference = ± 0.00055
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00061
Angle of Best Fit Line: 0.03503

End 2:
Slope of Best Fit Line 0.00061
Angle of Best Fit Line: 0.03503

Maximum Angular Difference: 0.00000

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00009
Angle of Best Fit Line: 0.00507

End 2:
Slope of Best Fit Line 0.00005
Angle of Best Fit Line: 0.00295

Maximum Angular Difference: 0.00213

Parallelism Tolerance Met? YES
Spherically Seated

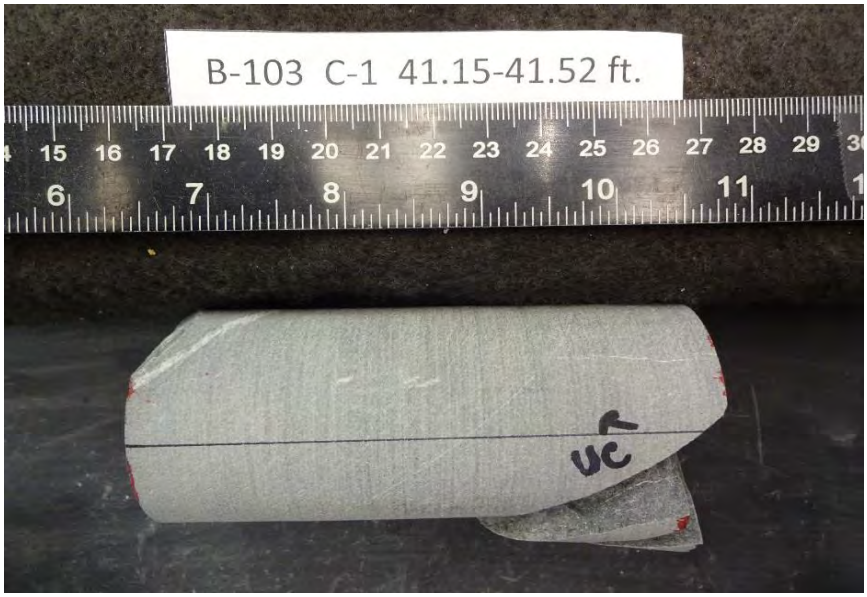
PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00110	1.995	0.00055	0.032	YES
Diameter 2, in (rotated 90°)	0.00020	1.995	0.00010	0.006	YES
END 2					
Diameter 1, in	0.00110	1.995	0.00055	0.032	YES
Diameter 2, in (rotated 90°)	0.00010	1.995	0.00005	0.003	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Stantec Inc.
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange
Project Location:	Saco, ME
GTX #:	311093
Test Date:	1/6/2020
Tested By:	jck
Checked By:	smd
Boring ID:	B-103
Sample ID:	C-1
Depth, ft:	41.15-41.52

After cutting and grinding



After break

Client:	Stantec Inc.	Test Date:	1/3/2020
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange	Tested By:	jck
Project Location:	Saco, ME	Checked By:	smd
GTX #:	311093		
Boring ID:	B-112		
Sample ID:	C-2		
Depth:	15.70-16.07 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.40	4.33	4.37
Specimen Diameter, in:	1.99	2.00	2.00
Specimen Mass, g:	626.64		
Bulk Density, lb/ft^3	175	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:
Is the maximum gap ≤ 0.02 in.? NO

Maximum difference must be < 0.020 in.
Straightness Tolerance Met? NO

END FLATNESS AND PARALLELISM (Procedure FP1)

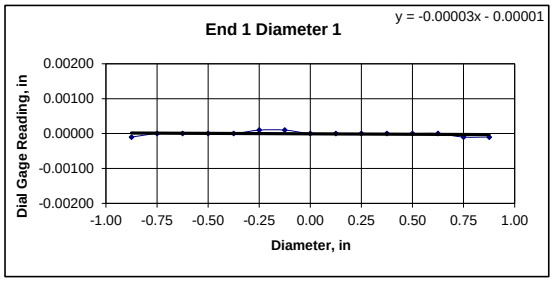
END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	-0.00080	-0.00070	-0.00060	-0.00040	-0.00020	-0.00010	0.00000	0.00000	0.00010	0.00020	0.00030	0.00040	0.00050	0.00060	0.00070

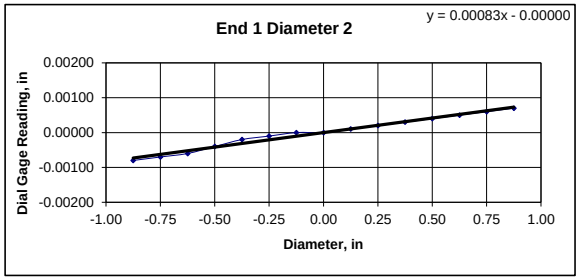
Difference between max and min readings, in:
0° = 0.00020 90° = 0.00150

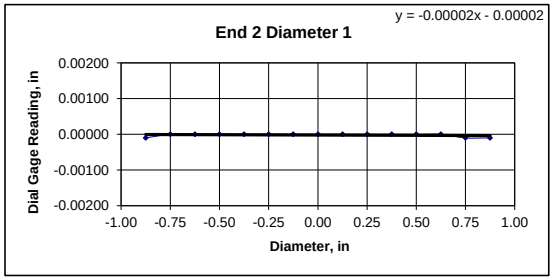
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010
Diameter 2, in (rotated 90°)	-0.00080	-0.00060	-0.00060	-0.00040	-0.00020	-0.00020	-0.00010	0.00000	0.00010	0.00030	0.00030	0.00040	0.00050	0.00060	0.00060

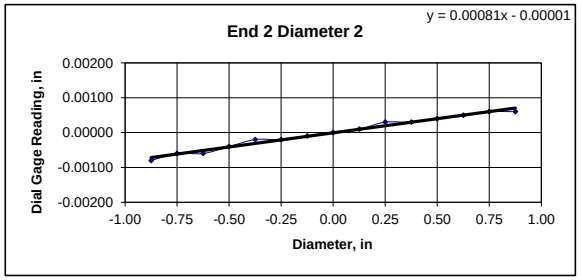
Difference between max and min readings, in:
0° = 0.0001 90° = 0.0014

Maximum difference must be < 0.0020 in. Difference = ± 0.00075
Flatness Tolerance Met? YES









DIAMETER 1

End 1:
Slope of Best Fit Line 0.00003
Angle of Best Fit Line: 0.00147

End 2:
Slope of Best Fit Line 0.00002
Angle of Best Fit Line: 0.00098

Maximum Angular Difference: 0.00049

Parallelism Tolerance Met? YES
Spherically Seated

DIAMETER 2

End 1:
Slope of Best Fit Line 0.00083
Angle of Best Fit Line: 0.04780

End 2:
Slope of Best Fit Line 0.00081
Angle of Best Fit Line: 0.04649

Maximum Angular Difference: 0.00131

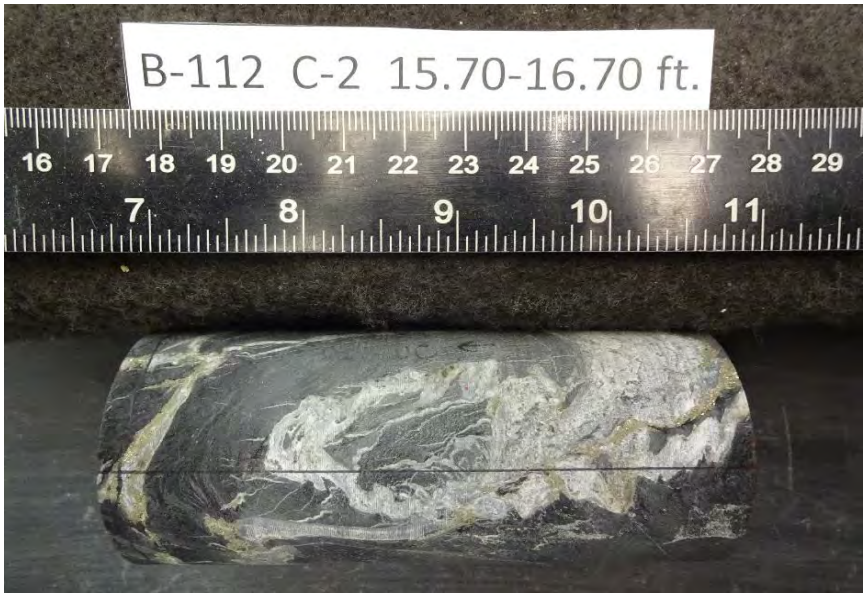
Parallelism Tolerance Met? YES
Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00020	1.995	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00150	1.995	0.00075	0.043	YES
END 2					
Diameter 1, in	0.00010	1.995	0.00005	0.003	YES
Diameter 2, in (rotated 90°)	0.00140	1.995	0.00070	0.040	YES

Maximum angle of departure must be ≤ 0.25°
Perpendicularity Tolerance Met? YES

Client:	Stantec Inc.
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange
Project Location:	Saco, ME
GTX #:	311093
Test Date:	1/6/2020
Tested By:	jck
Checked By:	smd
Boring ID:	B-112
Sample ID:	C-2
Depth, ft:	15.70-16.07



After cutting and grinding

After break

Appendix G Calculations

INDEX

1 - VANE SHEAR TEST RESULTS

Performed by: LGH
Checked by: TAD

FIELD VANE SHEAR TEST RESULTS

PROJECT NAME: Exit 35/36 Interchange Improvements
PROJECT NUMBER: 1.79E+08
LOCATION: Saco, ME

Vane Dimensions
D = 2.56 inches 65 mm
H = 5.12 inches 130 mm

Boring	GS Elev.	Test	Depth Top	Depth Bottom	Elevation	Undisturbed Traw (ft-lb)	Undisturbed Su-fv (psf)	PI	Cor. Factor u_v	Undisturbed Su (psf)	Remolded Traw (ft-lb)	Remolded Su-fv (psf)	Remolded Su (psf)
B-109	98.05	V-1	35.6	36	62.05	23.0	647	19	0.854	552	0	0	0
		V-2	36.6	37	61.05	21.0	590	19	0.854	504	1	28	24
B-111	99.86	V-1	42.6	43	56.86	26.0	731	16	0.870	636	9	253	220
		V-2	43.6	44	55.86	23.0	647	16	0.870	563	7	197	171
		V-3	52.6	53	46.86	19.0	534	21	0.844	451	3	84	71
		V-4	53.6	54	45.86	19.0	534	21	0.844	451	3	84	71
		V-5	60.6	61	38.86	23.0	647	21	0.844	546	4	112	95
		V-6	61.6	62	37.86	21.0	590	21	0.844	498	4	112	95
B-205	112.09	V-1	12.6	13	99.09	23.5	661	13	0.888	587	6.5	183	162
B-207	101.12	V-1	11.6	12	89.12	10.5	295	26	0.821	242	1	28	23
		V-2	12.6	13	88.12	19.0	534	26	0.821	438	4	112	92

Performed by: LGH
Checked by: TAD

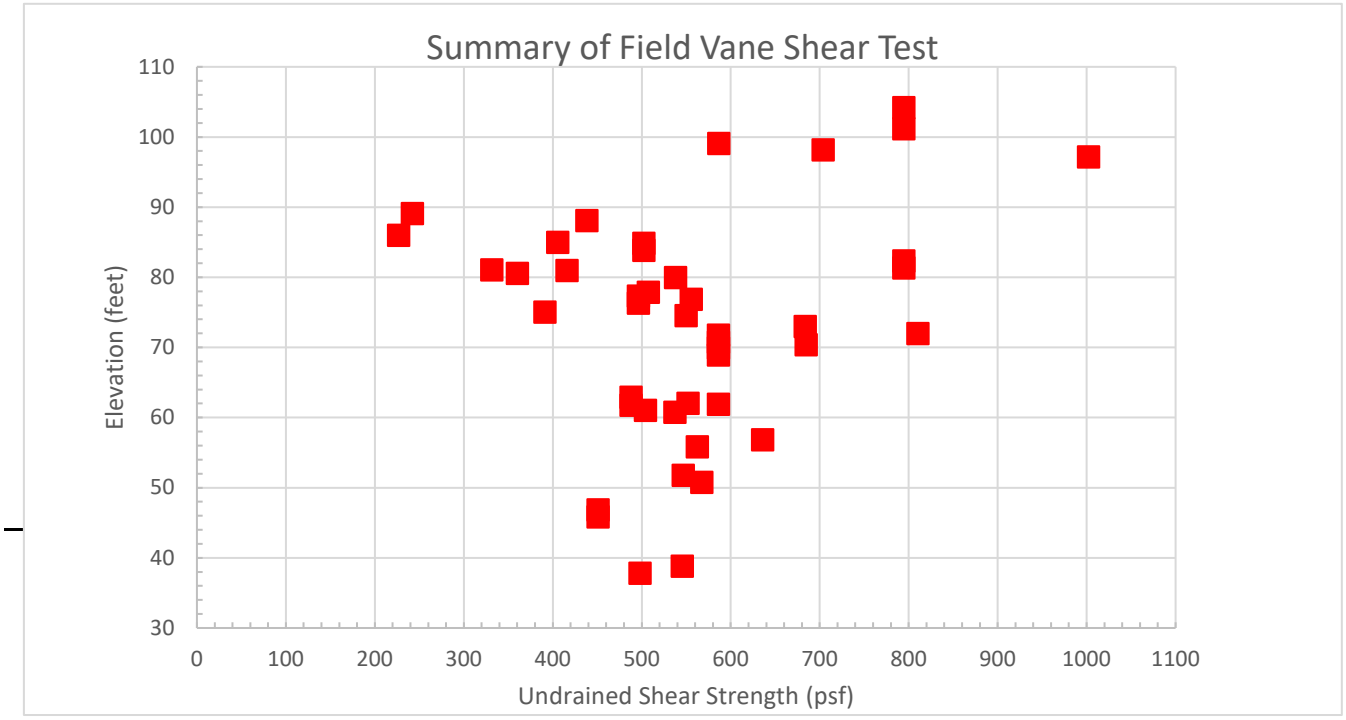
B-208	95.48	V-1	14	14.4	81.08	13.8	388	19	0.854	331	0.4	11	10
		V-2	14.5	14.9	80.58	15.0	422	19	0.854	360	1.2	34	29
		V-3	20	20.4	75.08	16.3	458	19	0.854	391	0.8	22	19
		V-4	20.5	20.9	74.58	22.9	644	19	0.854	550	4.1	115	98
B-209	125.81	V-1	55	55.4	70.41	29.2	821	23	0.834	685	4.2	118	99
B-210	125.95	V-1	55.6	56	69.95	25.0	703	23	0.834	586	12.5	351	293
		V-2	56.6	57	68.95	25.0	703	23	0.834	586	12.5	351	293
		V-3	62.6	63	62.95	20.8	585	23	0.834	488	8.3	233	195
		V-4	63.6	64	61.95	25.0	703	23	0.834	586	10.4	292	244
B-211	97.78	V-1	25.6	26	71.78	25.0	703	23	0.834	586	6.25	176	147
		V-2	26.6	27	70.78	25.0	703	23	0.834	586	8.3	233	195
		V-3	35.6	36	61.78	20.8	585	23	0.834	488	4.2	118	99
		V-4	36.6	37	60.78	22.9	644	23	0.834	537	6.25	176	147
		V-5	45.6	46	51.78	23.3	655	23	0.834	546	8.3	233	195
		V-6	46.6	47	50.78	24.2	680	23	0.834	568	10.4	292	244
OS-1	118.21	V-1	16.6	17	101.21	33.3	936	20	0.849	795	8.3	233	198
		V-2	13.6	14	104.21	33.3	936	20	0.849	795	12.5	351	298
OS-4	98.36	V-1	15.6	16	82.36	33.3	936	20	0.849	795	6.5	183	155
		V-2	16.6	17	81.36	33.3	936	20	0.849	795	6.5	183	155
		V-3	20.6	21	77.36	20.8	585	20	0.849	496	2	56	48
		V-4	21.6	22	76.36	20.8	585	20	0.849	496	2	56	48
OS-6	97.00	V-1	10.6	11	86.00	9.5	267	20	0.849	227	1	28	24
		V-2	11.6	12	85.00	17.0	478	20	0.849	406	2	56	48
		V-3	15.6	16	81.00	17.0	478	16	0.870	416	2	56	49
		V-4	16.6	17	80.00	22.0	619	16	0.870	538	3.3	93	81

Performed by: LGH
Checked by: TAD

	98.89	V-1	13.6	14	84.89	20.8	585	18	0.859	502	4.2	118	101
OS-8		V-2	14.6	15	83.89	20.8	585	18	0.859	502	4.2	118	101
		V-3	20.6	21	77.89	21.0	590	18	0.859	507	3.5	98	85
		V-4	21.6	22	76.89	23.0	647	18	0.859	556	4	112	97
	99.00	V-1	25.6	26	73.00	27.0	759	11	0.901	684	8.5	239	215
OS-10		V-2	26.6	27	72.00	32.0	900	11	0.901	810	10	281	253
	112.20	V-1	13.6	14	98.20	29.5	829	20	0.849	704	5	141	119
MA-5		V-2	14.6	15	97.20	42.0	1181	20	0.849	1002	11	309	262

PI	19
	16
	21
	12
	13
	26
	23
	18
	14
	19
	20
	16
	18
	11
Average	18

use PI = 20 when not available



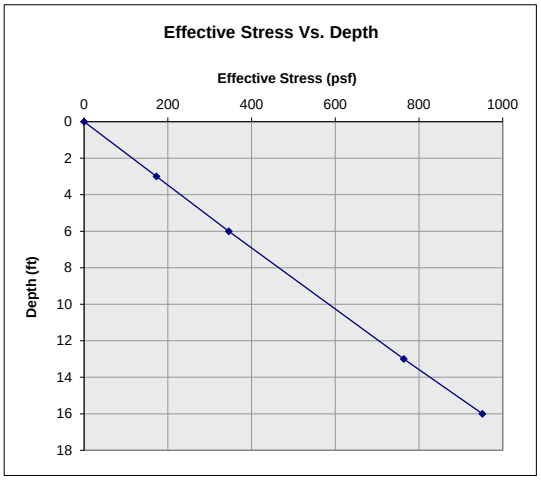
2 - BLOW COUNT CORRECTION

Boring Information:

Boring Number: B-106
Northing: ft
Easting: ft
Hammer/Sampling System: Cathead and Safety Hammer

Design Groundwater Depth: 0 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Marine Clay Crust	10.0	10.0	120
2	Lower Sand Deposit	10.0	20.0	125
3	Glacial Till	5.0	25.0	135
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_i: 60
Energy Standard, E_{rb}: 60
Rod Stickup, ft: 3

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Marine Clay Crust	S1	2.0	4.0	3.0	21	173	2.0	1.00	0.75	1.00	1.00	32	
Marine Clay Crust	S2	5.0	7.0	6.0	11	346	2.0	1.00	0.75	1.00	1.00	17	
Lower Sand Deposit	S3	12.0	14.0	13.0	7	764	1.6	1.00	0.85	1.00	1.00	10	
Lower Sand Deposit	S4	15.0	17.0	16.0	8	952	1.4	1.00	0.85	1.00	1.00	10	

N'60 Avgs:

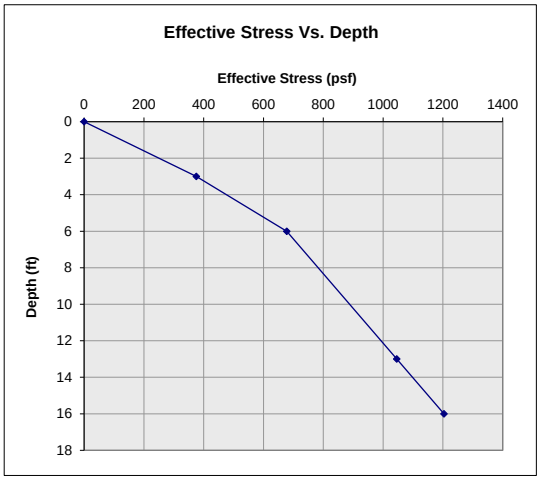
Notes: 1. C_n correction factor accounts for the effects of overburden as outlined in Bowles page 158.
2. n_1 correction factor accounts for the effects of different SPT hammer types and energy ratios as outlined in Bowles Table 3-3 (page 159).
3. n_2 correction factor accounts for the effects of the rod length (drill string) as outlined in Bowles Table 3-3 (page 159).

Boring Information:

Boring Number: B-109
Northing: ft
Easting: ft
Hammer/Sampling System: Cathead and Safety Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	5.0	5.0	125
2	Marine Clay Crust	37.0	42.0	115
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_i: 60
Energy Standard, E_{rb}: 60
Rod Stickup, ft: 3

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	2.0	4.0	3.0	24	375	2.0	1.00	0.75	1.00	1.00	36	
Marine Clay Crust	S2	5.0	7.0	6.0	3	678	1.7	1.00	0.75	1.00	1.00	4	
Marine Clay Crust	S3	12.0	14.0	13.0	0	1046	1.4	1.00	0.85	1.00	1.00	0	
Marine Clay Crust	S4	15.0	17.0	16.0	0	1204	1.3	1.00	0.85	1.00	1.00	0	

N'60 Avgs:

,

Notes: 1. C_n correction factor accounts for the effects of overburden as outlined in Bowles page 158.
2. n_1 correction factor accounts for the effects of different SPT hammer types and energy ratios as outlined in Bowles Table 3-3 (page 159).
3. n_2 correction factor accounts for the effects of the rod length (drill string) as outlined in Bowles Table 3-3 (page 159).

Boring Information:

Boring Number: B-111
Northing: ft
Easting: ft
Hammer/Sampling System: Cathead and Safety Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	28.0	28.0	120
2	Marine Clay Crust	54.0	82.0	115
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
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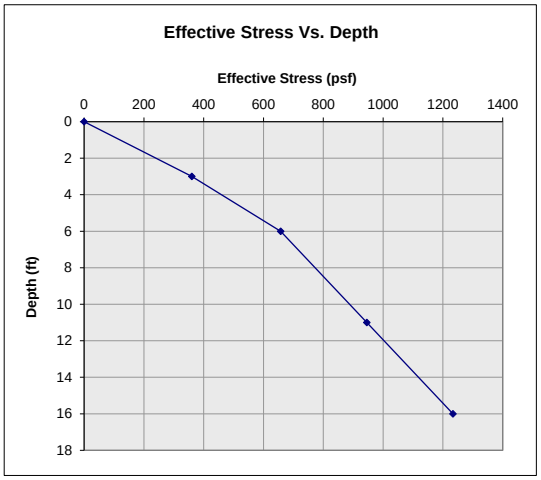


Sampler Information:

Hammer Energy Rating, E_i: 60
Energy Standard, E_{rb}: 60
Rod Stickup, ft: 3

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	2.0	4.0	3.0	1	360	2.0	1.00	0.75	1.00	1.00	2	
Upper Sand Deposit	S2	5.0	7.0	6.0	6	658	1.7	1.00	0.75	1.00	1.00	8	
Upper Sand Deposit	S3	10.0	12.0	11.0	15	946	1.5	1.00	0.85	1.00	1.00	19	
Upper Sand Deposit	S4	15.0	17.0	16.0	23	1234	1.3	1.00	0.85	1.00	1.00	25	
Upper Sand Deposit	S5	20.0	22.0	21.0	40	1522	1.1	1.00	0.95	1.00	1.00	44	
		N'60 Avgs:											

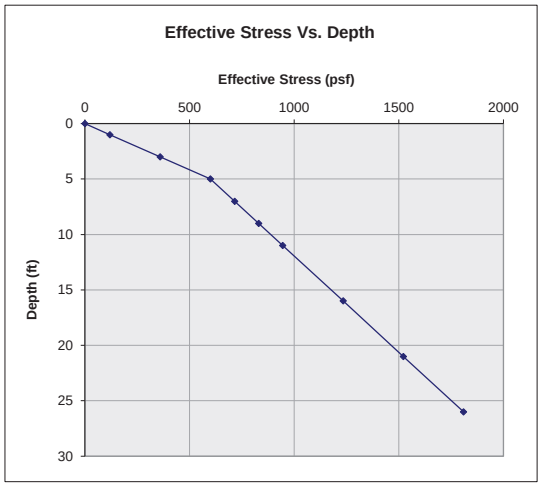
Notes: 1. C_n correction factor accounts for the effects of overburden as outlined in Bowles page 158.
2. n_1 correction factor accounts for the effects of different SPT hammer types and energy ratios as outlined in Bowles Table 3-3 (page 159).
3. n_2 correction factor accounts for the effects of the rod length (drill string) as outlined in Bowles Table 3-3 (page 159).

Boring Information:

Boring Number: B-201
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Marine Clay Crust	12.0	12.0	120
2	Marine Clay Soft	16.0	28.0	120
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Marine Clay Crust	S1	0.0	2.0	1.0	4	120	2.0	1.42	0.75	1.00	1.00	9	
Marine Clay Crust	S2	2.0	4.0	3.0	20	360	2.0	1.42	0.75	1.00	1.00	43	
Marine Clay Crust	S3	4.0	6.0	5.0	7	600	1.8	1.42	0.75	1.00	1.00	14	
Marine Clay Crust	S4	6.0	8.0	7.0	14	715	1.7	1.42	0.75	1.00	1.00	25	
Marine Clay Crust	S5	8.0	10.0	9.0	2	830	1.6	1.42	0.75	1.00	1.00	3	
Marine Clay Crust	S6	10.0	12.0	11.0	4	946	1.5	1.42	0.85	1.00	1.00	7	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1234	1.3	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S8	20.0	22.0	21.0	0	1522	1.1	1.42	0.95	1.00	1.00	0	
Marine Clay Soft	S9	25.0	27.0	26.0	7	1810	1.1	1.42	0.95	1.00	1.00	10	

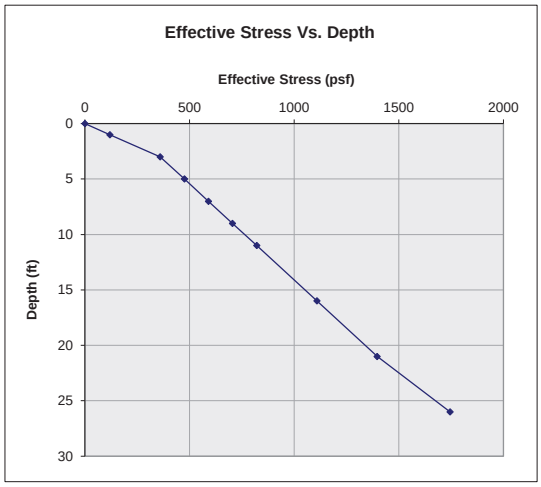
N'60 Avgs: 12

Boring Information:

Boring Number: B-202
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 3 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	22.0	22.0	120
2	Glacial Till	5.0	27.0	135
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

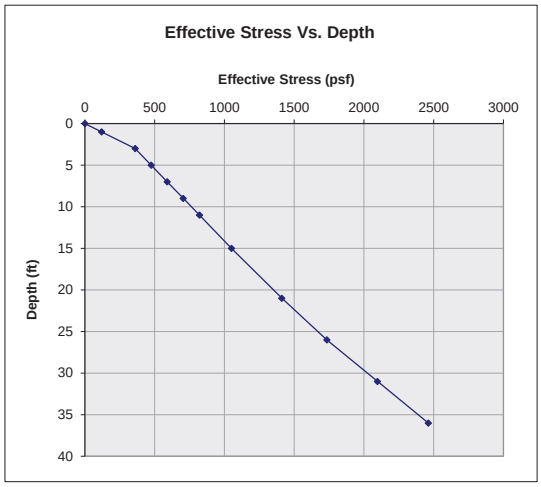
Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	2	120	2.0	1.42	0.75	1.00	1.00	4	
Upper Sand Deposit	S2	2.0	4.0	3.0	14	360	2.0	1.42	0.75	1.00	1.00	30	
Upper Sand Deposit	S3	4.0	6.0	5.0	14	475	2.0	1.42	0.75	1.00	1.00	30	
Upper Sand Deposit	S4	6.0	8.0	7.0	26	590	1.8	1.42	0.75	1.00	1.00	51	
Upper Sand Deposit	S5	8.0	10.0	9.0	12	706	1.7	1.42	0.75	1.00	1.00	21	
Upper Sand Deposit	S6	10.0	12.0	11.0	35	821	1.6	1.42	0.85	1.00	1.00	66	
Upper Sand Deposit	S7	15.0	17.0	16.0	9	1109	1.3	1.42	0.85	1.00	1.00	15	
Upper Sand Deposit	S8	20.0	22.0	21.0	30	1397	1.2	1.42	0.95	1.00	1.00	48	
Glacial Till	S9	25.0	27.0	26.0	49	1745	1.1	1.42	0.95	1.00	1.00	71	

Boring Information:

Boring Number:	B-203	
Northing:		ft
Easting:		ft
Hammer/Sampling System:	Automatic Hammer	
Design Groundwater Depth:	3	ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Marine Clay Crust	12.0	12.0	120
2	Marine Clay Soft	6.0	18.0	120
3	Lower Sand Deposit	7.0	25.0	125
4	Glacial Till	15.0	40.0	135
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r:	85	B-57 ATV
Energy Standard, E_{rb}:	60	Do not change
Rod Stickup, ft:	3	Do not change

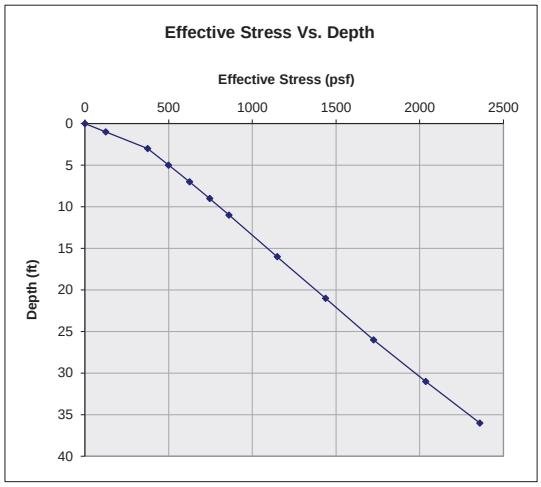
Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Marine Clay Crust	S1	0.0	2.0	1.0	5	120	2.0	1.42	0.75	1.00	1.00	11	
Marine Clay Crust	S2	2.0	4.0	3.0	21	360	2.0	1.42	0.75	1.00	1.00	45	
Marine Clay Crust	S3	4.0	6.0	5.0	12	475	2.0	1.42	0.75	1.00	1.00	26	
Marine Clay Crust	S4	6.0	8.0	7.0	14	590	1.8	1.42	0.75	1.00	1.00	27	
Marine Clay Crust	S5	8.0	10.0	9.0	4	706	1.7	1.42	0.75	1.00	1.00	7	
Marine Clay Crust	S6	10.0	12.0	11.0	4	821	1.6	1.42	0.85	1.00	1.00	8	
Marine Clay Soft	S7	14.0	16.0	15.0	0	1051	1.4	1.42	0.85	1.00	1.00	0	
Lower Sand Deposit	S8	20.0	22.0	21.0	27	1412	1.2	1.42	0.95	1.00	1.00	43	
Glacial Till	S9	25.0	27.0	26.0	30	1735	1.1	1.42	0.95	1.00	1.00	43	
Glacial Till	S10	30.0	32.0	31.0	57	2098	1.0	1.42	1.00	1.00	1.00	79	
Glacial Till	S11	35.0	37.0	36.0	57	2461	0.9	1.42	1.00	1.00	1.00	73	

Boring Information:

Boring Number: B-204
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 3 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	8.0	8.0	125
2	Marine Clay Crust	4.0	12.0	120
3	Marine Clay Soft	14.5	26.5	120
4	Lower Sand Deposit	8.5	35.0	125
5	Glacial Till	2.0	37.0	135
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

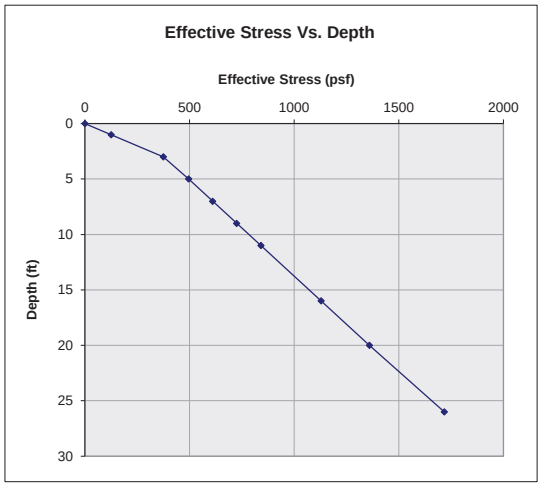
Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	7	125	2.0	1.42	0.75	1.00	1.00	15	
Upper Sand Deposit	S2	2.0	4.0	3.0	20	375	2.0	1.42	0.75	1.00	1.00	43	
Upper Sand Deposit	S3	4.0	6.0	5.0	32	500	2.0	1.42	0.75	1.00	1.00	68	
Upper Sand Deposit	S4	6.0	8.0	7.0	30	625	1.8	1.42	0.75	1.00	1.00	57	
Marine Clay Crust	S5	8.0	10.0	9.0	2	746	1.6	1.42	0.75	1.00	1.00	3	
Marine Clay Crust	S6	10.0	12.0	11.0	4	861	1.5	1.42	0.85	1.00	1.00	7	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1149	1.3	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S8	20.0	22.0	21.0	1	1437	1.2	1.42	0.95	1.00	1.00	2	
Marine Clay Soft	S9	25.0	27.0	26.0	0	1725	1.1	1.42	0.95	1.00	1.00	0	
Lower Sand Deposit	S11	30.0	32.0	31.0	0	2035	1.0	1.42	1.00	1.00	1.00	0	
Glacial Till	S12	35.0	37.0	36.0	29	2358	0.9	1.42	1.00	1.00	1.00	38	

N'60 Avgs: 21.1

Boring Information:

Boring Number:	B-205	
Northing:		ft
Easting:		ft
Hammer/Sampling System:	Automatic Hammer	
Design Groundwater Depth:	3	ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	4.0	4.0	125
2	Marine Clay Crust	8.0	12.0	120
3	Marine Clay Soft	11.5	23.5	120
4	Lower Sand Deposit	6.0	29.5	125
5	Glacial Till	4.5	34.0	135
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r:	85	B-57 ATV
Energy Standard, E_{rb}:	60	Do not change
Rod Stickup, ft:	3	Do not change

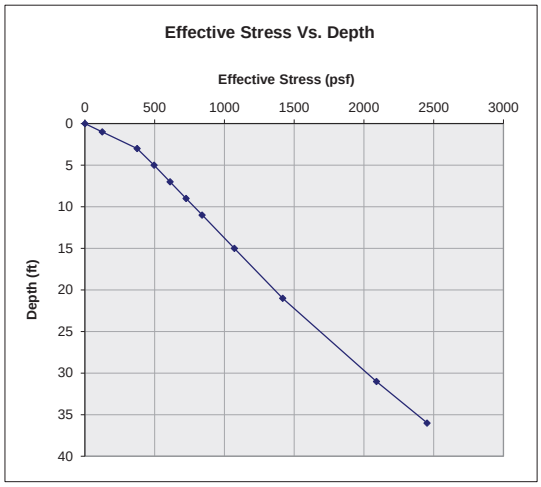
Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	3	125	2.0	1.42	0.75	1.00	1.00	6	
Upper Sand Deposit	S2	2.0	4.0	3.0	22	375	2.0	1.42	0.75	1.00	1.00	47	
Marine Clay Crust	S3	4.0	6.0	5.0	19	495	2.0	1.42	0.75	1.00	1.00	40	
Marine Clay Crust	S4	6.0	8.0	7.0	18	610	1.8	1.42	0.75	1.00	1.00	35	
Marine Clay Crust	S5	8.0	10.0	9.0	8	726	1.7	1.42	0.75	1.00	1.00	14	
Marine Clay Crust	S6	10.0	12.0	11.0	14	841	1.5	1.42	0.85	1.00	1.00	26	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1129	1.3	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S8	19.0	21.0	20.0	2	1359	1.2	1.42	0.95	1.00	1.00	3	
Lower Sand Deposit	S9	25.0	27.0	26.0	3	1717	1.1	1.42	0.95	1.00	1.00	4	

Boring Information:

Boring Number: B-206
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 3 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	4.0	4.0	125
2	Marine Clay Crust	4.0	8.0	120
3	Marine Clay Soft	16.5	24.5	120
4	Glacial Till	12.5	37.0	135
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	2	125	2.0	1.42	0.75	1.00	1.00	4	
Upper Sand Deposit	S2	2.0	4.0	3.0	27	375	2.0	1.42	0.75	1.00	1.00	57	
Marine Clay Crust	S3	4.0	6.0	5.0	4	495	2.0	1.42	0.75	1.00	1.00	9	
Marine Clay Crust	S4	6.0	8.0	7.0	4	610	1.8	1.42	0.75	1.00	1.00	8	
Marine Clay Soft	S5	8.0	10.0	9.0	0	726	1.7	1.42	0.75	1.00	1.00	0	
Marine Clay Soft	S6	10.0	12.0	11.0	0	841	1.5	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S7	14.0	16.0	15.0	9	1071	1.4	1.42	0.85	1.00	1.00	15	
Marine Clay Soft	S8	20.0	22.0	21.0	0	1417	1.2	1.42	0.95	1.00	1.00	0	
Glacial Till	S9	30.0	32.0	31.0	25	2090	1.0	1.42	1.00	1.00	1.00	35	
Glacial Till	S10	35.0	37.0	36.0	27	2453	0.9	1.42	1.00	1.00	1.00	35	

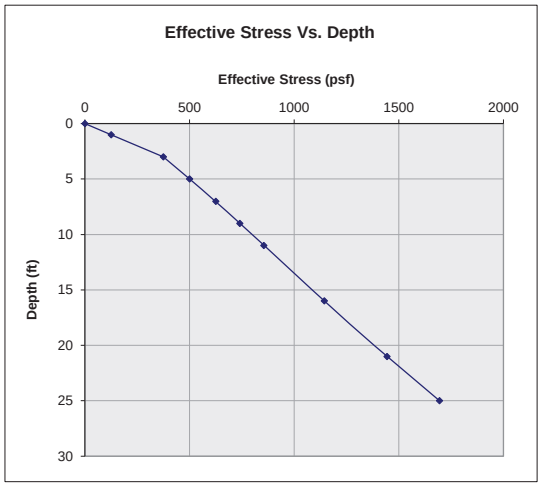
N'60 Avgs: 16.2

Boring Information:

Boring Number: B-207
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 3 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	4.0	4.0	125
2	Upper Sand Deposit	3.0	7.0	125
3	Marine Clay Soft	11.5	18.5	120
4	Lower Sand Deposit	7.5	26.0	125
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	3	125	2.0	1.42	0.75	1.00	1.00	6	
Embankment Fill	S2	2.0	4.0	3.0	14	375	2.0	1.42	0.75	1.00	1.00	30	
Upper Sand Deposit	S3	4.0	6.0	5.0	20	500	2.0	1.42	0.75	1.00	1.00	42	
Marine Clay Soft	S4	6.0	8.0	7.0	9	625	1.8	1.42	0.75	1.00	1.00	17	
Marine Clay Soft	S5	8.0	10.0	9.0	0	741	1.6	1.42	0.75	1.00	1.00	0	
Marine Clay Soft	S6	10.0	12.0	11.0	0	856	1.5	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1144	1.3	1.42	0.85	1.00	1.00	0	
Lower Sand Deposit	S8	20.0	22.0	21.0	27	1444	1.2	1.42	0.95	1.00	1.00	43	
Lower Sand Deposit	S9	24.0	26.0	25.0	86	1695	1.1	1.42	0.95	1.00	1.00	126	

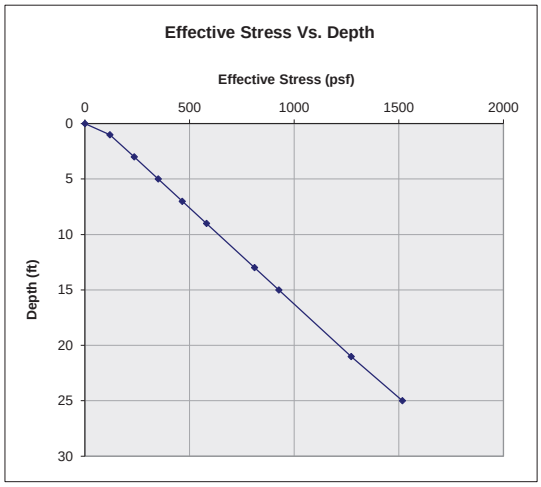
N'60 Avgs: 29.4

Boring Information:

Boring Number: B-208
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 1 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Marine Clay Crust	8.0	8.0	120
2	Marine Clay Soft	14.0	22.0	120
3	Lower Sand Deposit	8.0	30.0	125
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

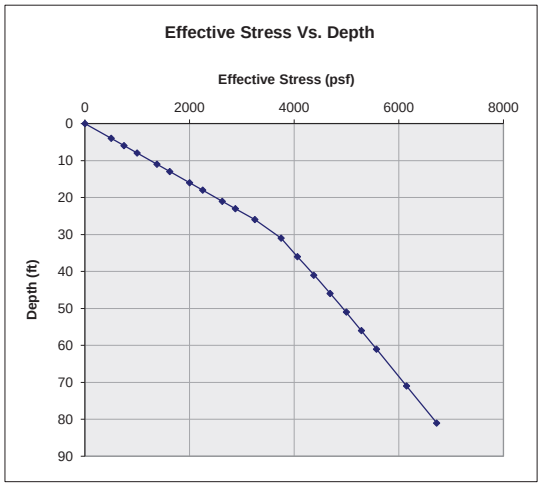
Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Marine Clay Crust	S1	0.0	2.0	1.0	3	120	2.0	1.42	0.75	1.00	1.00	6	
Marine Clay Crust	S2	2.0	4.0	3.0	14	235	2.0	1.42	0.75	1.00	1.00	30	
Marine Clay Crust	S3	4.0	6.0	5.0	9	350	2.0	1.42	0.75	1.00	1.00	19	
Marine Clay Crust	S4	6.0	8.0	7.0	7	466	2.0	1.42	0.75	1.00	1.00	15	
Marine Clay Soft	S5	8.0	10.0	9.0	1	581	1.9	1.42	0.75	1.00	1.00	2	
Marine Clay Soft	S6	12.0	14.0	13.0	0	811	1.6	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S7	14.0	16.0	15.0	0	926	1.5	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S8	20.0	22.0	21.0	0	1272	1.3	1.42	0.95	1.00	1.00	0	
Lower Sand Deposit	S9	24.0	26.0	25.0	0	1517	1.1	1.42	0.95	1.00	1.00	0	

N'60 Avgs: 8.0

Boring Information:

Boring Number:	B-209	
Northing:		ft
Easting:		ft
Hammer/Sampling System:	Automatic Hammer	
Design Groundwater Depth:	29	ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	27.0	27.0	125
2	Upper Sand Deposit	23.0	50.0	125
3	Marine Clay Soft	42.0	92.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

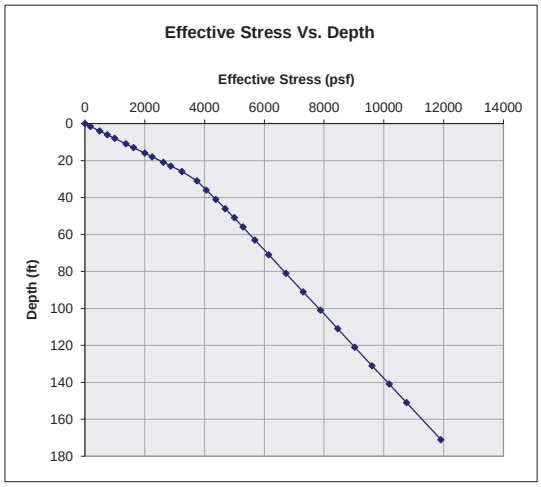
Hammer Energy Rating, E_r:	87	B-57 Truck
Energy Standard, E_{rb}:	60	Do not change
Rod Stickup, ft:	3	Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	3.0	5.0	4.0	11	500	2.0	1.45	0.75	1.00	1.00	24	
Embankment Fill	S2	5.0	7.0	6.0	17	750	1.6	1.45	0.75	1.00	1.00	30	
Embankment Fill	S3	7.0	9.0	8.0	19	1000	1.4	1.45	0.75	1.00	1.00	29	
Embankment Fill		10.0	12.0	11.0	7	1375	1.2	1.45	0.85	1.00	1.00	10	
Embankment Fill	S4	12.0	14.0	13.0	12	1625	1.1	1.45	0.85	1.00	1.00	16	
Embankment Fill	S5	15.0	17.0	16.0	73	2000	1.0	1.45	0.85	1.00	1.00	90	
Embankment Fill	S6	17.0	19.0	18.0	63	2250	0.9	1.45	0.95	1.00	1.00	82	
Embankment Fill	S7	20.0	22.0	21.0	69	2625	0.9	1.45	0.95	1.00	1.00	83	
Embankment Fill	S8	22.0	24.0	23.0	74	2875	0.8	1.45	0.95	1.00	1.00	85	
Embankment Fill	S9	25.0	27.0	26.0	74	3250	0.8	1.45	0.95	1.00	1.00	80	
Upper Sand Deposit	S10	30.0	32.0	31.0	17	3750	0.7	1.45	1.00	1.00	1.00	18	
Upper Sand Deposit	S11	35.0	37.0	36.0	19	4063	0.7	1.45	1.00	1.00	1.00	19	
Upper Sand Deposit	S12	40.0	42.0	41.0	9	4376	0.7	1.45	1.00	1.00	1.00	9	
Upper Sand Deposit	S13	45.0	47.0	46.0	33	4689	0.7	1.45	1.00	1.00	1.00	31	
Marine Clay Soft	S14	50.0	52.0	51.0	0	4997	0.6	1.45	1.00	1.00	1.00	0	

Boring Information:

Boring Number:	B-210	
Northing:		ft
Easting:		ft
Hammer/Sampling System:	Automatic Hammer	
Design Groundwater Depth:	29	ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	26.5	26.5	125
2	Upper Sand Deposit	23.5	50.0	125
3	Marine Clay Soft	129.0	179.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

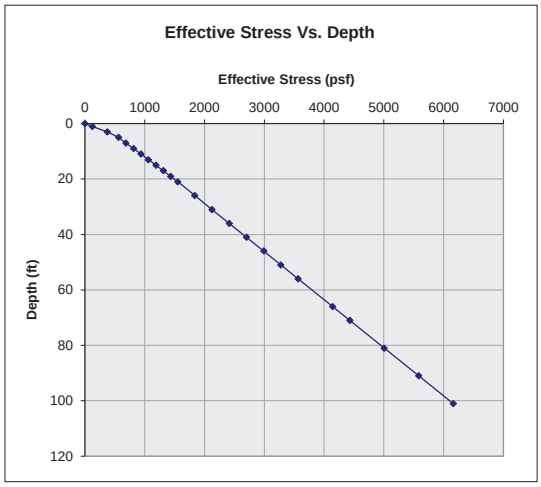
Hammer Energy Rating, E_r:	87	B-57 Truck
Energy Standard, E_{rb}:	60	Do not change
Rod Stickup, ft:	3	Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.5	2.5	1.5	44	188	2.0	1.45	0.75	1.00	1.00	96	
Embankment Fill	S2	3.0	5.0	4.0	36	500	2.0	1.45	0.75	1.00	1.00	78	
Embankment Fill	S3	5.0	7.0	6.0	41	750	1.6	1.45	0.75	1.00	1.00	73	
Embankment Fill	S4	7.0	9.0	8.0	30	1000	1.4	1.45	0.75	1.00	1.00	46	
Embankment Fill	S5	10.0	12.0	11.0	47	1375	1.2	1.45	0.85	1.00	1.00	70	
Embankment Fill	S6	12.0	14.0	13.0	43	1625	1.1	1.45	0.85	1.00	1.00	59	
Embankment Fill	S7	15.0	17.0	16.0	58	2000	1.0	1.45	0.85	1.00	1.00	71	
Embankment Fill	S8	17.0	19.0	18.0	83	2250	0.9	1.45	0.95	1.00	1.00	108	
Embankment Fill	S9	20.0	22.0	21.0	85	2625	0.9	1.45	0.95	1.00	1.00	102	
Embankment Fill	S10	22.0	24.0	23.0	73	2875	0.8	1.45	0.95	1.00	1.00	84	
Embankment Fill	S11	25.0	27.0	26.0	80	3250	0.8	1.45	0.95	1.00	1.00	86	
Upper Sand Deposit	S12	30.0	32.0	31.0	36	3750	0.7	1.45	1.00	1.00	1.00	38	
Upper Sand Deposit	S13	35.0	37.0	36.0	20	4063	0.7	1.45	1.00	1.00	1.00	20	
Upper Sand Deposit	S14	40.0	42.0	41.0	17	4376	0.7	1.45	1.00	1.00	1.00	17	
Upper Sand Deposit	S15	45.0	47.0	46.0	20	4689	0.7	1.45	1.00	1.00	1.00	19	

Boring Information:

Boring Number:	B-211	
Northing:		ft
Easting:		ft
Hammer/Sampling System:	Automatic Hammer	
Design Groundwater Depth:	4	ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	18.3	18.3	125
2	Marine Clay Crust	1.7	20.0	120
3	Marine Clay Soft	82.0	102.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

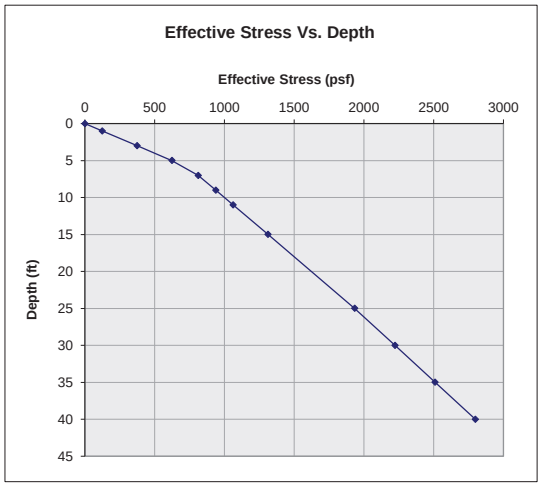
Hammer Energy Rating, E_r:	85	B-57 ATV
Energy Standard, E_{rb}:	60	Do not change
Rod Stickup, ft:	3	Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	4	125	2.0	1.42	0.75	1.00	1.00	9	
Upper Sand Deposit	S2	2.0	4.0	3.0	4	375	2.0	1.42	0.75	1.00	1.00	9	
Upper Sand Deposit	S3	4.0	6.0	5.0	3	563	1.9	1.42	0.75	1.00	1.00	6	
Upper Sand Deposit	S4	6.0	8.0	7.0	6	688	1.7	1.42	0.75	1.00	1.00	11	
Upper Sand Deposit	S5	8.0	10.0	9.0	9	813	1.6	1.42	0.75	1.00	1.00	15	
Upper Sand Deposit	S6	10.0	12.0	11.0	11	938	1.5	1.42	0.85	1.00	1.00	19	
Upper Sand Deposit	S7	12.0	14.0	13.0	7	1063	1.4	1.42	0.85	1.00	1.00	12	
Upper Sand Deposit	S8	14.0	16.0	15.0	15	1189	1.3	1.42	0.85	1.00	1.00	23	
Upper Sand Deposit	S9	16.0	18.0	17.0	18	1314	1.2	1.42	0.95	1.00	1.00	30	
Marine Clay Crust	S10	18.0	20.0	19.0	5	1436	1.2	1.42	0.95	1.00	1.00	8	
Marine Clay Soft	S11	20.0	22.0	21.0	0	1551	1.1	1.42	0.95	1.00	1.00	0	
Marine Clay Soft	S12	25.0	27.0	26.0	0	1839	1.0	1.42	0.95	1.00	1.00	0	
Marine Clay Soft	S13	30.0	32.0	31.0	0	2127	1.0	1.42	1.00	1.00	1.00	0	
Marine Clay Soft	S14	35.0	37.0	36.0	0	2415	0.9	1.42	1.00	1.00	1.00	0	
Marine Clay Soft	S15	40.0	42.0	41.0	0	2703	0.9	1.42	1.00	1.00	1.00	0	

Boring Information:

Boring Number:	B-212	
Northing:		ft
Easting:		ft
Hammer/Sampling System:	Automatic Hammer	
Design Groundwater Depth:	6	ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Desposit	24.0	24.0	125
2	Marine Clay Soft	76.0	100.0	120
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r:	85	B-57 ATV
Energy Standard, E_{rb}:	60	Do not change
Rod Stickup, ft:	3	Do not change

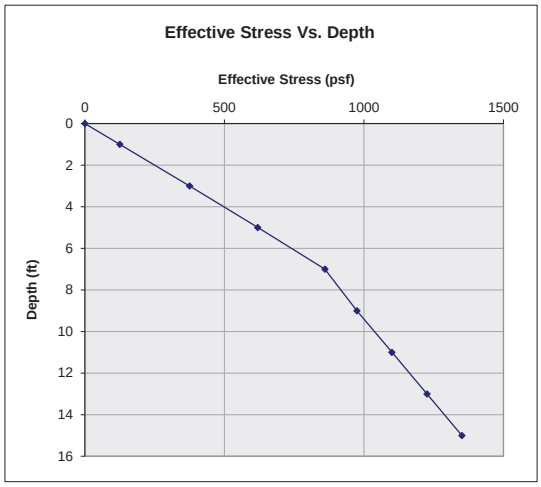
Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Desposit	S1	0.0	2.0	1.0	2	125	2.0	1.42	0.75	1.00	1.00	4	
Upper Sand Desposit	S2	2.0	4.0	3.0	15	375	2.0	1.42	0.75	1.00	1.00	32	
Upper Sand Desposit	S3	4.0	6.0	5.0	28	625	1.8	1.42	0.75	1.00	1.00	53	
Upper Sand Desposit	S4	6.0	8.0	7.0	25	813	1.6	1.42	0.75	1.00	1.00	42	
Upper Sand Desposit	S5	8.0	10.0	9.0	46	938	1.5	1.42	0.75	1.00	1.00	71	
Upper Sand Desposit	S6	10.0	12.0	11.0	32	1063	1.4	1.42	0.85	1.00	1.00	53	
Upper Sand Desposit	S7	14.0	16.0	15.0	28	1313	1.2	1.42	0.85	1.00	1.00	42	
Marine Clay Soft	S8	24.0	26.0	25.0	2	1934	1.0	1.42	0.95	1.00	1.00	3	
Marine Clay Soft	S9	29.0	31.0	30.0	0	2222	0.9	1.42	1.00	1.00	1.00	0	
Marine Clay Soft	S10	34.0	36.0	35.0	0	2510	0.9	1.42	1.00	1.00	1.00	0	
Marine Clay Soft	S11	39.0	41.0	40.0	0	2798	0.8	1.42	1.00	1.00	1.00	0	

Boring Information:

Boring Number: B-213
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 7 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Desposit	4.0	4.0	125
2	Marine Clay Crust	5.0	9.0	120
3	Lower Sand Deposit	7.0	16.0	125
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Desposit	S1	0.0	2.0	1.0	3	125	2.0	1.42	0.75	1.00	1.00	6	
Upper Sand Desposit	S2	2.0	4.0	3.0	21	375	2.0	1.42	0.75	1.00	1.00	45	
Marine Clay Crust	S3	4.0	6.0	5.0	11	620	1.8	1.42	0.75	1.00	1.00	21	
Marine Clay Crust	S4	6.0	8.0	7.0	13	860	1.5	1.42	0.75	1.00	1.00	21	
Lower Sand Deposit	S5	8.0	10.0	9.0	12	975	1.4	1.42	0.75	1.00	1.00	18	
Lower Sand Deposit	S6	10.0	12.0	11.0	4	1100	1.3	1.42	0.85	1.00	1.00	6	
Lower Sand Deposit	S7	12.0	14.0	13.0	19	1226	1.3	1.42	0.85	1.00	1.00	29	
Lower Sand Deposit	S8	14.0	16.0	15.0	11	1351	1.2	1.42	0.85	1.00	1.00	16	

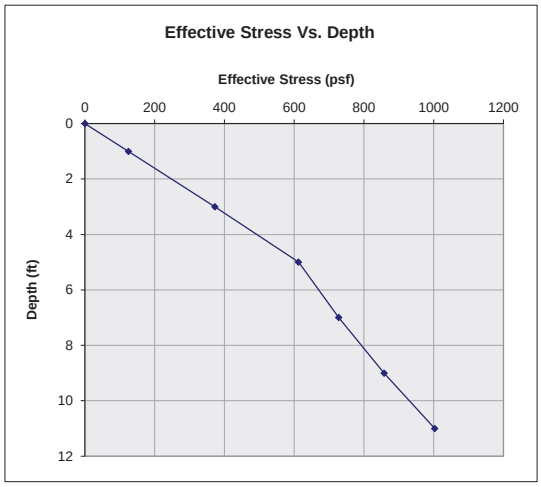
N'60 Avgs: 20.4

Boring Information:

Boring Number: B-214
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	2.5	2.5	125
2	Marine Clay Crust	5.5	8.0	120
3	Glacial Till	4.0	12.0	135
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	4	125	2.0	1.42	0.75	1.00	1.00	9	
Marine Clay Crust	S2	2.0	4.0	3.0	18	373	2.0	1.42	0.75	1.00	1.00	38	
Marine Clay Crust	S3	4.0	6.0	5.0	12	613	1.8	1.42	0.75	1.00	1.00	23	
Marine Clay Crust	S4	6.0	8.0	7.0	25	728	1.7	1.42	0.75	1.00	1.00	44	
Glacial Till	S5	8.0	10.0	9.0	50/3"	858	1.5	1.42	0.75	1.00	1.00	#VALUE!	
Glacial Till	S6	10.0	12.0	11.0	100/3"	1003	1.4	1.42	0.85	1.00	1.00	#VALUE!	

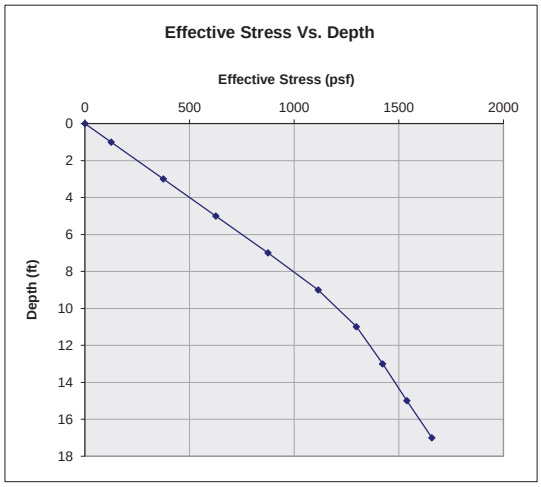
N'60 Avgs: 28.5

Boring Information:

Boring Number: B-215
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 10 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	7.0	7.0	125
2	Marine Clay Crust	3.0	10.0	120
3	Upper Sand Deposit	3.0	13.0	125
4	Marine Clay Crust	3.0	16.0	120
5	Lower Sand Deposit	2.0	18.0	125
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	9	125	2.0	1.42	0.75	1.00	1.00	19	
Embankment Fill	S2	2.0	4.0	3.0	13	375	2.0	1.42	0.75	1.00	1.00	28	
Embankment Fill	S3	4.0	6.0	5.0	15	625	1.8	1.42	0.75	1.00	1.00	29	
Marine Clay Crust	S4	6.0	8.0	7.0	9	875	1.5	1.42	0.75	1.00	1.00	14	
Marine Clay Crust	S5	8.0	10.0	9.0	11	1115	1.3	1.42	0.75	1.00	1.00	16	
Upper Sand Deposit	S6	10.0	12.0	11.0	34	1298	1.2	1.42	0.85	1.00	1.00	51	
Marine Clay Crust	S7	12.0	14.0	13.0	15	1423	1.2	1.42	0.85	1.00	1.00	21	
Marine Clay Crust	S8	14.0	16.0	15.0	19	1538	1.1	1.42	0.85	1.00	1.00	26	
Lower Sand Deposit	S9	16.0	18.0	17.0	35	1658	1.1	1.42	0.95	1.00	1.00	52	

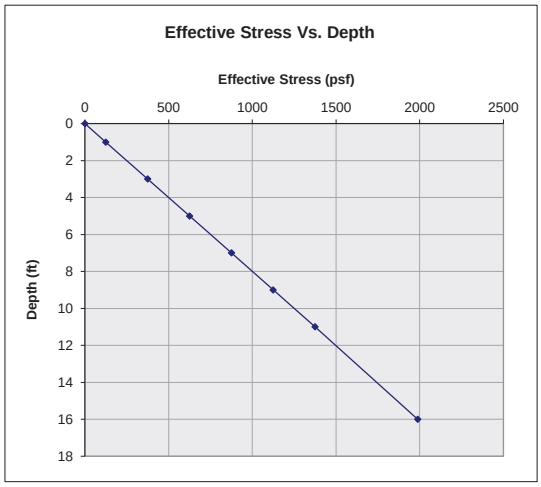
N'60 Avgs: 28.4

Boring Information:

Boring Number: B-216
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 1000 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	13.5	13.5	125
2	Marine Clay Soft	3.5	17.0	120
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	2	125	2.0	1.42	0.75	1.00	1.00	4	
Embankment Fill	S2	2.0	4.0	3.0	15	375	2.0	1.42	0.75	1.00	1.00	32	
Embankment Fill	S3	4.0	6.0	5.0	24	625	1.8	1.42	0.75	1.00	1.00	46	
Embankment Fill	S4	6.0	8.0	7.0	31	875	1.5	1.42	0.75	1.00	1.00	50	
Embankment Fill	S5	8.0	10.0	9.0	33	1125	1.3	1.42	0.75	1.00	1.00	47	
Embankment Fill	S6	10.0	12.0	11.0	50	1375	1.2	1.42	0.85	1.00	1.00	73	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1988	1.0	1.42	0.85	1.00	1.00	0	

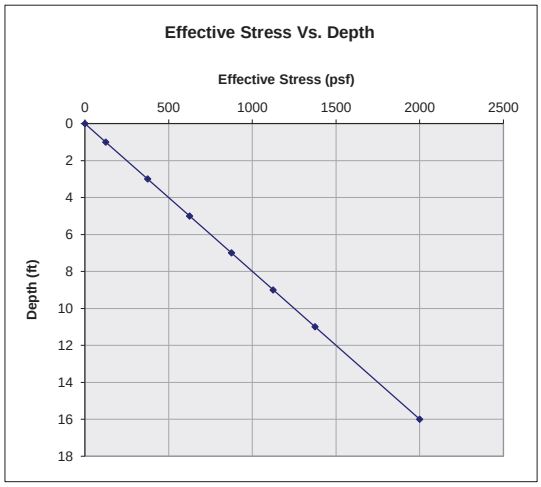
N'60 Avgs: 35.8

Boring Information:

Boring Number: B-217
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 1000 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	17.0	17.0	125
2		#N/A		
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	16	125	2.0	1.42	0.75	1.00	1.00	34	
Embankment Fill	S2	2.0	4.0	3.0	28	375	2.0	1.42	0.75	1.00	1.00	60	
Embankment Fill	S3	4.0	6.0	5.0	34	625	1.8	1.42	0.75	1.00	1.00	65	
Embankment Fill	S4	6.0	8.0	7.0	82	875	1.5	1.42	0.75	1.00	1.00	132	
Embankment Fill	S5	8.0	10.0	9.0	54	1125	1.3	1.42	0.75	1.00	1.00	77	
Embankment Fill	S6	10.0	12.0	11.0	100	1375	1.2	1.42	0.85	1.00	1.00	145	
Embankment Fill	S7	15.0	17.0	16.0	34	2000	1.0	1.42	0.85	1.00	1.00	41	

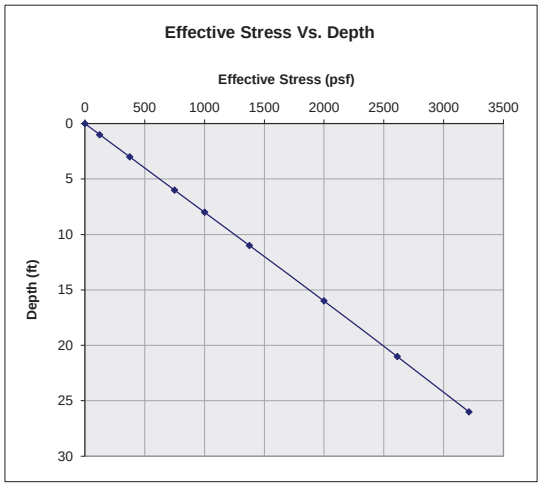
N'60 Avgs: 78.9

Boring Information:

Boring Number: MA-1
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 1000 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	13.5	13.5	125
2	Upper Sand Deposit	5.0	18.5	125
3	Marine Clay Crust	8.5	27.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	29	125	2.0	1.42	0.75	1.00	1.00	62	
Embankment Fill	S2	2.0	4.0	3.0	30	375	2.0	1.42	0.75	1.00	1.00	64	
Embankment Fill	S3	5.0	7.0	6.0	53	750	1.6	1.42	0.75	1.00	1.00	92	
Embankment Fill	S4	7.0	9.0	8.0	62	1000	1.4	1.42	0.75	1.00	1.00	93	
Embankment Fill	S5	10.0	12.0	11.0	42	1375	1.2	1.42	0.85	1.00	1.00	61	
Upper Sand Deposit	S6	15.0	17.0	16.0	41	2000	1.0	1.42	0.85	1.00	1.00	49	
Marine Clay Crust	S7	20.0	22.0	21.0	28	2613	0.9	1.42	0.95	1.00	1.00	33	
Marine Clay Crust	S8	25.0	27.0	26.0	6	3213	0.8	1.42	0.95	1.00	1.00	6	

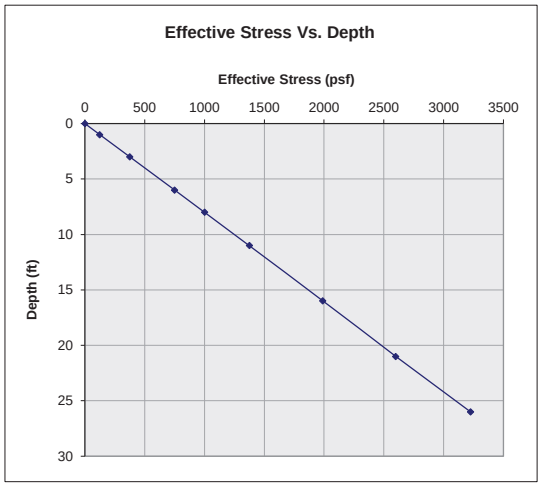
N'60 Avgs: 57.5

Boring Information:

Boring Number: MA-2
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 1000 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	13.5	13.5	125
2	Marine Clay Crust	5.0	18.5	120
3	Upper Sand Deposit	8.5	27.0	125
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	10	125	2.0	1.42	0.75	1.00	1.00	21	
Embankment Fill	S2	2.0	4.0	3.0	66	375	2.0	1.42	0.75	1.00	1.00	140	
Embankment Fill	S3	5.0	7.0	6.0	47	750	1.6	1.42	0.75	1.00	1.00	82	
Embankment Fill	S4	7.0	9.0	8.0	74	1000	1.4	1.42	0.75	1.00	1.00	111	
Embankment Fill	S5	10.0	12.0	11.0	38	1375	1.2	1.42	0.85	1.00	1.00	55	
Marine Clay Crust	S6	15.0	17.0	16.0	4	1988	1.0	1.42	0.85	1.00	1.00	5	
Upper Sand Deposit	S7	20.0	22.0	21.0	34	2600	0.9	1.42	0.95	1.00	1.00	40	
Upper Sand Deposit	S8	25.0	27.0	26.0	10	3225	0.8	1.42	0.95	1.00	1.00	11	

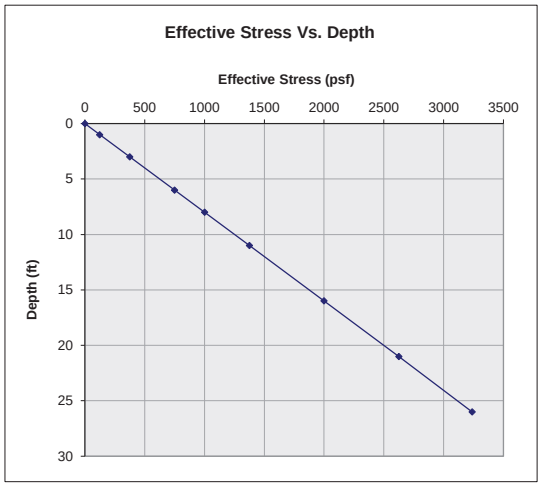
N'60 Avgs: 58.1

Boring Information:

Boring Number: MA-3
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 1000 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	15.0	15.0	125
2	Upper Sand Deposit	8.5	23.5	125
3	Marine Clay Crust	3.5	27.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	39	125	2.0	1.42	0.75	1.00	1.00	83	
Embankment Fill	S2	2.0	4.0	3.0	33	375	2.0	1.42	0.75	1.00	1.00	70	
Embankment Fill	S3	5.0	7.0	6.0	23	750	1.6	1.42	0.75	1.00	1.00	40	
Embankment Fill	S4	7.0	9.0	8.0	26	1000	1.4	1.42	0.75	1.00	1.00	39	
Embankment Fill	S5	10.0	12.0	11.0	33	1375	1.2	1.42	0.85	1.00	1.00	48	
Upper Sand Deposit	S6	15.0	17.0	16.0	82	2000	1.0	1.42	0.85	1.00	1.00	99	
Upper Sand Deposit	S7	20.0	22.0	21.0	29	2625	0.9	1.42	0.95	1.00	1.00	34	
Marine Clay Crust	S8	25.0	27.0	26.0	28	3238	0.8	1.42	0.95	1.00	1.00	30	

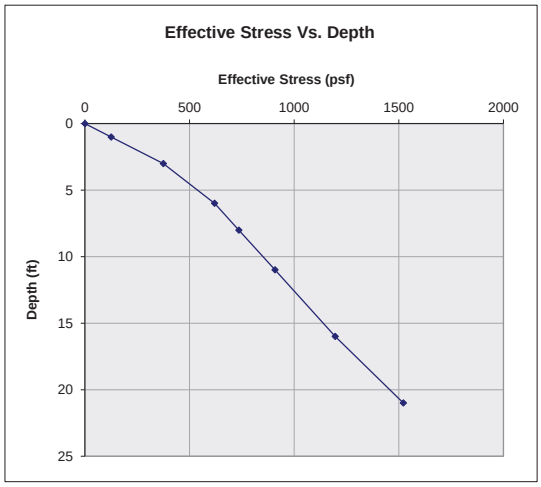
N'60 Avgs: 55.3

Boring Information:

Boring Number: MA-4
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 4 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	5.0	5.0	125
2	Marine Clay Crust	7.0	12.0	120
3	Marine Clay Soft	6.5	18.5	120
4	Glacial Till	4.5	23.0	135
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	4	125	2.0	1.42	0.75	1.00	1.00	9	
Upper Sand Deposit	S2	2.0	4.0	3.0	16	375	2.0	1.42	0.75	1.00	1.00	34	
Marine Clay Crust	S3	5.0	7.0	6.0	9	620	1.8	1.42	0.75	1.00	1.00	17	
Marine Clay Crust	S4	7.0	9.0	8.0	21	735	1.6	1.42	0.75	1.00	1.00	37	
Marine Clay Crust	S5	10.0	12.0	11.0	7	908	1.5	1.42	0.85	1.00	1.00	13	
Marine Clay Soft	S6	15.0	17.0	16.0	0	1196	1.3	1.42	0.85	1.00	1.00	0	
Glacial Till	S7	20.0	22.0	21.0	30	1522	1.1	1.42	0.95	1.00	1.00	46	

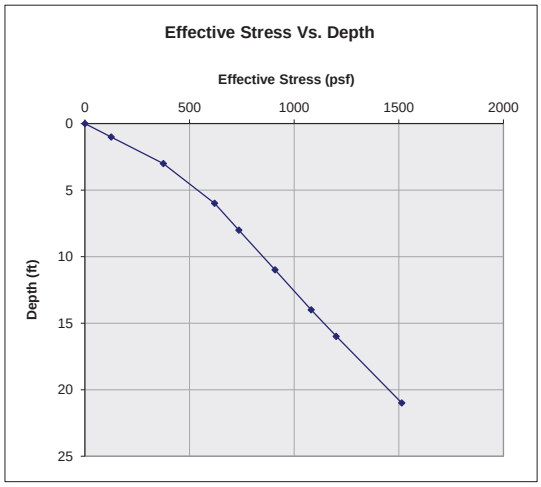
N'60 Avgs: 22.2

Boring Information:

Boring Number: MA-5
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 4 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	5.0	5.0	125
2	Marine Clay Crust	7.0	12.0	120
3	Marine Clay Soft	3.0	15.0	120
4	Lower Sand Deposit	7.0	22.0	125
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	3	125	2.0	1.42	0.75	1.00	1.00	6	
Upper Sand Deposit	S2	2.0	4.0	3.0	13	375	2.0	1.42	0.75	1.00	1.00	28	
Marine Clay Crust	S3	5.0	7.0	6.0	10	620	1.8	1.42	0.75	1.00	1.00	19	
Marine Clay Crust	S4	7.0	9.0	8.0	15	735	1.6	1.42	0.75	1.00	1.00	26	
Marine Clay Crust	S5	10.0	12.0	11.0	5	908	1.5	1.42	0.85	1.00	1.00	9	
Marine Clay Soft	S6	13.0	15.0	14.0	0	1081	1.4	1.42	0.85	1.00	1.00	0	
Lower Sand Deposit	S7	15.0	17.0	16.0	7	1201	1.3	1.42	0.85	1.00	1.00	11	
Lower Sand Deposit	S8	20.0	22.0	21.0	14	1514	1.1	1.42	0.95	1.00	1.00	22	

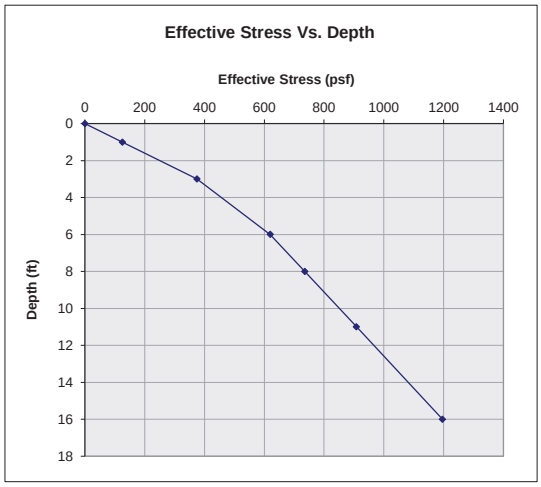
N'60 Avgs: 15.1

Boring Information:

Boring Number: MA-6
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 4 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Fill	2.5	2.5	125
2	Upper Sand Deposit	2.5	5.0	125
3	Marine Clay Crust	7.0	12.0	120
4	Marine Clay Soft	7.0	19.0	120
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Fill	S1	0.0	2.0	1.0	19	125	2.0	1.42	0.75	1.00	1.00	40	
Upper Sand Deposit	S2	2.0	4.0	3.0	19	375	2.0	1.42	0.75	1.00	1.00	40	
Marine Clay Crust	S3	5.0	7.0	6.0	14	620	1.8	1.42	0.75	1.00	1.00	27	
Marine Clay Crust	S4	7.0	9.0	8.0	14	735	1.6	1.42	0.75	1.00	1.00	25	
Marine Clay Crust	S5	10.0	12.0	11.0	4	908	1.5	1.42	0.85	1.00	1.00	7	
Marine Clay Soft	S6	15.0	17.0	16.0	0	1196	1.3	1.42	0.85	1.00	1.00	0	

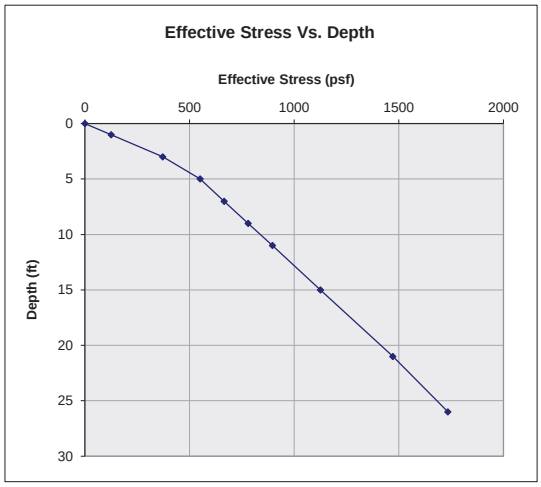
N'60 Avgs: 23.2

Boring Information:

Boring Number: OS-1
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 4 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	2.5	2.5	125
2	Upper Sand Deposit	9.5	12.0	120
3	Marine Clay Crust	9.0	21.0	120
4	Marie Clay Soft	39.0	60.0	115
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	9	125	2.0	1.42	0.75	1.00	1.00	19	
Upper Sand Deposit	S2	2.0	4.0	3.0	6	373	2.0	1.42	0.75	1.00	1.00	13	
Upper Sand Deposit	S3	4.0	6.0	5.0	27	550	1.9	1.42	0.75	1.00	1.00	55	
Upper Sand Deposit	S4	6.0	8.0	7.0	33	665	1.7	1.42	0.75	1.00	1.00	61	
Upper Sand Deposit	S5	8.0	10.0	9.0	41	781	1.6	1.42	0.75	1.00	1.00	70	
Upper Sand Deposit	S6	10.0	12.0	11.0	23	896	1.5	1.42	0.85	1.00	1.00	41	
Marine Clay Crust	S7	14.0	16.0	15.0	0	1126	1.3	1.42	0.85	1.00	1.00	0	
Marie Clay Soft	S8	20.0	22.0	21.0	2	1472	1.2	1.42	0.95	1.00	1.00	3	
Marie Clay Soft	S9	25.0	27.0	26.0	0	1735	1.1	1.42	0.95	1.00	1.00	0	

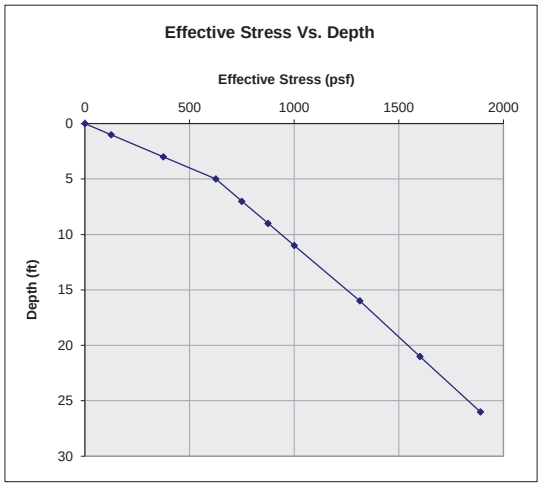
N'60 Avgs: 29.1

Boring Information:

Boring Number: OS-2
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Emankment Fill	1.0	1.0	125
2	Upper Sand Deposit	15.0	16.0	125
3	Marine Clay Crust	7.5	23.5	120
4	Marine Clay Soft	82.5	106.0	120
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	8	125	2.0	1.42	0.75	1.00	1.00	17	
Upper Sand Deposit	S2	2.0	4.0	3.0	17	375	2.0	1.42	0.75	1.00	1.00	36	
Upper Sand Deposit	S3	4.0	6.0	5.0	6	625	1.8	1.42	0.75	1.00	1.00	11	
Upper Sand Deposit	S4	6.0	8.0	7.0	19	750	1.6	1.42	0.75	1.00	1.00	33	
Upper Sand Deposit	S5	8.0	10.0	9.0	29	875	1.5	1.42	0.75	1.00	1.00	47	
Upper Sand Deposit	S6	10.0	12.0	11.0	54	1001	1.4	1.42	0.85	1.00	1.00	92	
Marine Clay Crust	S7	15.0	17.0	16.0	22	1314	1.2	1.42	0.85	1.00	1.00	33	
Marine Clay Crust	S8	20.0	22.0	21.0	8	1602	1.1	1.42	0.95	1.00	1.00	12	
Marine Clay Soft	S9	25.0	27.0	26.0	0	1890	1.0	1.42	0.95	1.00	1.00	0	

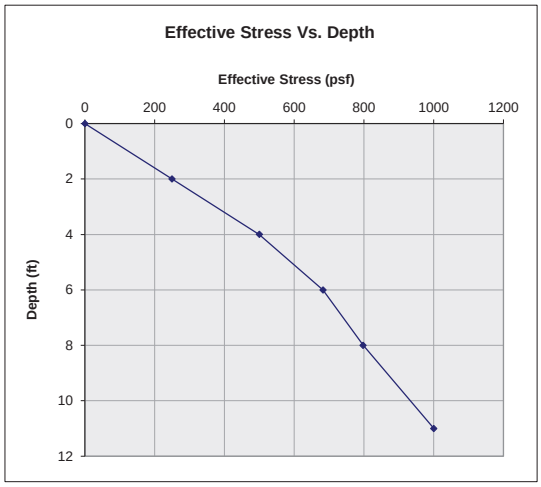
N'60 Avgs: 31.2

Boring Information:

Boring Number: OS-3
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	5.0	5.0	125
2	Marine Clay Crust	4.0	9.0	120
3	Glacial Till	5.0	14.0	135
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 Truck
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	1.0	3.0	2.0	40	250	2.0	1.45	0.75	1.00	1.00	87	
Embankment Fill	S2	3.0	5.0	4.0	27	500	2.0	1.45	0.75	1.00	1.00	59	
Marine Clay Crust	S3	5.0	7.0	6.0	10	683	1.7	1.45	0.75	1.00	1.00	19	
Marine Clay Crust	S4	7.0	9.0	8.0	12	798	1.6	1.45	0.75	1.00	1.00	21	
Glacial Till	S5	10.0	12.0	11.0	46	1001	1.4	1.45	0.85	1.00	1.00	80	

N'60 Avgs: 53.0

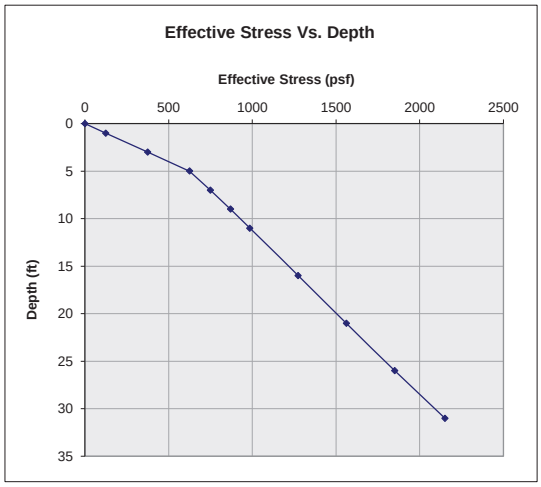
Notes: 1. C_n correction factor accounts for the effects of overburden as outlined in Bowles page 158.

Boring Information:

Boring Number: OS-4
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	4.0	4.0	125
2	Upper Sand Deposit	4.0	8.0	125
3	Marine Clay Crust	4.0	12.0	120
4	Marine Clay Soft	16.5	28.5	120
5	Lower Sand Deposit	6.5	35.0	125
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 87 B-57 Truck
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	20	125	2.0	1.45	0.75	1.00	1.00	44	
Embankment Fill	S2	2.0	4.0	3.0	14	375	2.0	1.45	0.75	1.00	1.00	30	
Upper Sand Deposit	S3	4.0	6.0	5.0	10	625	1.8	1.45	0.75	1.00	1.00	19	
Upper Sand Deposit	S4	6.0	8.0	7.0	12	750	1.6	1.45	0.75	1.00	1.00	21	
Marine Clay Crust	S5	8.0	10.0	9.0	23	870	1.5	1.45	0.75	1.00	1.00	38	
Marine Clay Crust	S6	10.0	12.0	11.0	5	986	1.4	1.45	0.85	1.00	1.00	9	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1274	1.3	1.45	0.85	1.00	1.00	0	
Marine Clay Soft	S8	20.0	22.0	21.0	0	1562	1.1	1.45	0.95	1.00	1.00	0	
Marine Clay Soft	S9	25.0	27.0	26.0	0	1850	1.0	1.45	0.95	1.00	1.00	0	
Lower Sand Deposit	S10	30.0	32.0	31.0	13	2150	1.0	1.45	1.00	1.00	1.00	18	

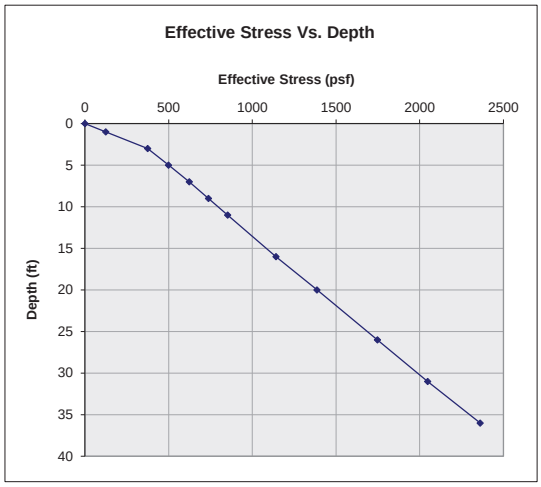
N'60 Avgs: 18.0

Boring Information:

Boring Number: OS-5
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 3 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	2.0	2.0	125
2	Upper Sand Deposit	4.5	6.5	125
3	Marine Clay Soft	10.5	17.0	120
4	Lower Sand Deposit	6.0	23.0	125
5	Marine Clay Soft	5.5	28.5	120
6	Lower Sand Deposit	8.5	37.0	125
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	6	125	2.0	1.42	0.75	1.00	1.00	13	
Upper Sand Deposit	S2	2.0	4.0	3.0	20	375	2.0	1.42	0.75	1.00	1.00	43	
Upper Sand Deposit	S3	4.0	6.0	5.0	16	500	2.0	1.42	0.75	1.00	1.00	34	
Marine Clay Soft	S4	6.0	8.0	7.0	6	623	1.8	1.42	0.75	1.00	1.00	11	
Marine Clay Soft	S5	8.0	10.0	9.0	0	738	1.6	1.42	0.75	1.00	1.00	0	
Marine Clay Soft	S6	10.0	12.0	11.0	0	853	1.5	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1141	1.3	1.42	0.85	1.00	1.00	0	
Lower Sand Deposit	S8	19.0	21.0	20.0	7	1387	1.2	1.42	0.95	1.00	1.00	11	
Marine Clay Soft	S9	25.0	27.0	26.0	0	1747	1.1	1.42	0.95	1.00	1.00	0	
Lower Sand Deposit	S10	30.0	32.0	31.0	16	2048	1.0	1.42	1.00	1.00	1.00	22	
Lower Sand Deposit	S11	35.0	37.0	36.0	10	2361	0.9	1.42	1.00	1.00	1.00	13	

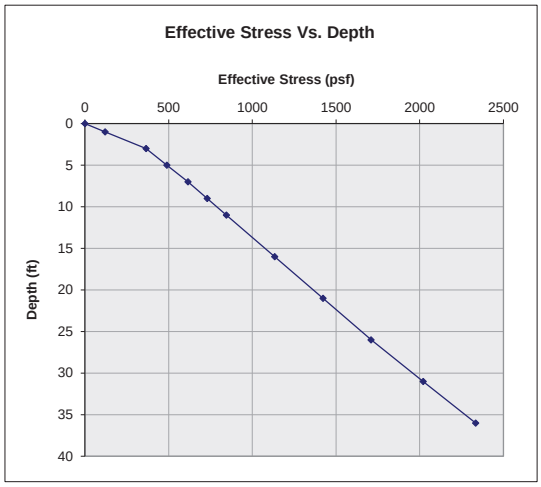
N'60 Avgs: 13.4

Boring Information:

Boring Number: OS-6
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 3 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Marine Clay Crust	2.0	2.0	120
2	Upper Sand Deposit	5.0	7.0	125
3	Marine Clay Soft	19.5	26.5	120
4	Lower Sand Deposit	13.5	40.0	125
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Marine Clay Crust	S1	0.0	2.0	1.0	6	120	2.0	1.42	0.75	1.00	1.00	13	
Upper Sand Deposit	S2	2.0	4.0	3.0	22	365	2.0	1.42	0.75	1.00	1.00	47	
Upper Sand Deposit	S3	4.0	6.0	5.0	8	490	2.0	1.42	0.75	1.00	1.00	17	
Marine Clay Soft	S4	6.0	8.0	7.0	8	615	1.8	1.42	0.75	1.00	1.00	15	
Marine Clay Soft	S5	8.0	10.0	9.0	0	731	1.7	1.42	0.75	1.00	1.00	0	
Marine Clay Soft	S6	10.0	12.0	11.0	0	846	1.5	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S7	15.0	17.0	16.0	0	1134	1.3	1.42	0.85	1.00	1.00	0	
Marine Clay Soft	S8	20.0	22.0	21.0	0	1422	1.2	1.42	0.95	1.00	1.00	0	
Marine Clay Soft	S9	25.0	27.0	26.0	0	1710	1.1	1.42	0.95	1.00	1.00	0	
Lower Sand Deposit	S10	30.0	32.0	31.0	7	2020	1.0	1.42	1.00	1.00	1.00	10	
Lower Sand Deposit	S11	35.0	37.0	36.0	28	2333	0.9	1.42	1.00	1.00	1.00	37	

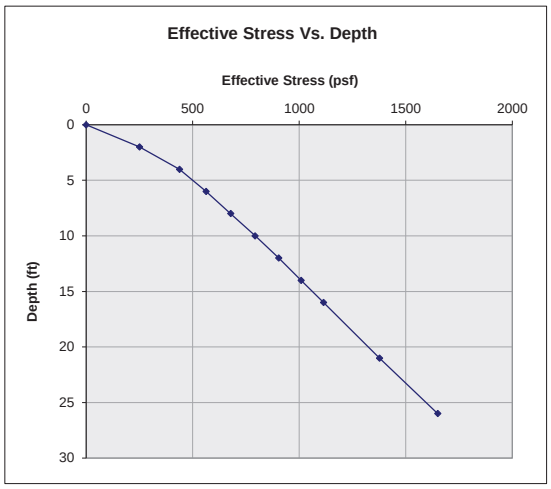
N'60 Avgs: 12.6

Boring Information:

Boring Number: OS-8
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 3 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	6.0	6.0	125
2	Marine Clay Crust	5.0	11.0	120
3	Marine Clay Soft	13.0	24.0	115
4	Lower Sand Deposit	4.0	28.0	120
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 Truck
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

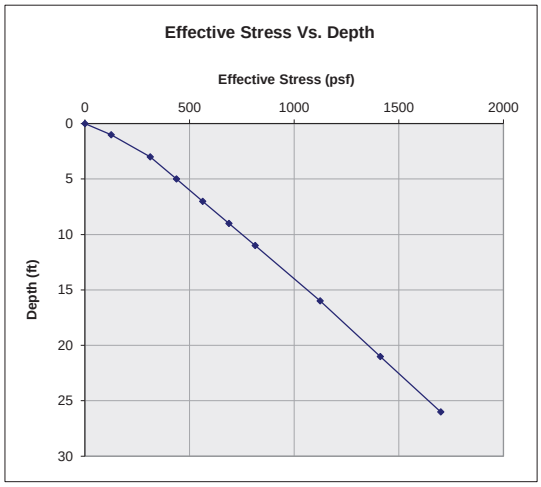
Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	1.0	3.0	2.0	39	250	2.0	1.45	0.75	1.00	1.00	85	
Embankment Fill	S2	3.0	5.0	4.0	48	438	2.0	1.45	0.75	1.00	1.00	104	
Marine Clay Crust	S3	5.0	7.0	6.0	23	563	1.9	1.45	0.75	1.00	1.00	47	
Marine Clay Crust	S4	7.0	9.0	8.0	16	678	1.7	1.45	0.75	1.00	1.00	30	
Marine Clay Crust	S5	9.0	11.0	10.0	4	793	1.6	1.45	0.75	1.00	1.00	7	
Marine Clay Soft	S6	11.0	13.0	12.0	2	903	1.5	1.45	0.85	1.00	1.00	4	
Marine Clay Soft	S7	13.0	15.0	14.0	0	1009	1.4	1.45	0.85	1.00	1.00	0	
Marine Clay Soft	S8	15.0	17.0	16.0	0	1114	1.3	1.45	0.85	1.00	1.00	0	
Marine Clay Soft	S9	20.0	22.0	21.0	0	1377	1.2	1.45	0.95	1.00	1.00	0	
Lower Sand Deposit	S10	25.0	27.0	26.0	0	1650	1.1	1.45	0.95	1.00	1.00	0	

Boring Information:

Boring Number: OS-9
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 2 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	15.5	15.5	125
2	Marine Clay Crust	3.5	19.0	120
3	Marine Clay Soft	8.0	27.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	7	125	2.0	1.42	0.75	1.00	1.00	15	
Upper Sand Deposit	S2	2.0	4.0	3.0	19	313	2.0	1.42	0.75	1.00	1.00	40	
Upper Sand Deposit	S3	4.0	6.0	5.0	24	438	2.0	1.42	0.75	1.00	1.00	51	
Upper Sand Deposit	S4	6.0	8.0	7.0	16	563	1.9	1.42	0.75	1.00	1.00	32	
Upper Sand Deposit	S5	8.0	10.0	9.0	24	688	1.7	1.42	0.75	1.00	1.00	43	
Upper Sand Deposit	S6	10.0	12.0	11.0	17	813	1.6	1.42	0.85	1.00	1.00	32	
Marine Clay Crust	S7	15.0	17.0	16.0	6	1124	1.3	1.42	0.85	1.00	1.00	10	
Marine Clay Soft	S8	20.0	22.0	21.0	0	1412	1.2	1.42	0.95	1.00	1.00	0	
Marine Clay Soft	S9	25.0	27.0	26.0	0	1700	1.1	1.42	0.95	1.00	1.00	0	

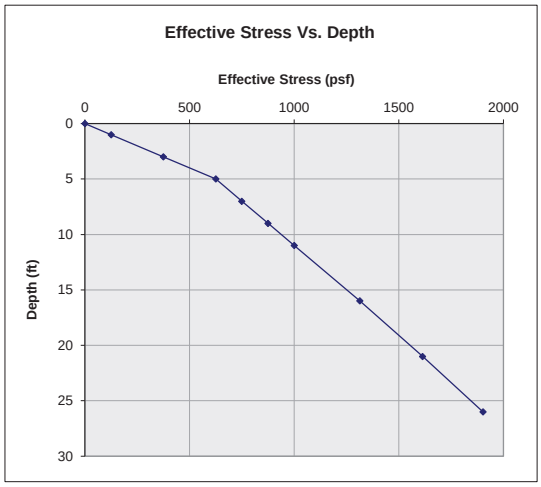
N'60 Avgs: 24.8

Boring Information:

Boring Number: OS-10
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Embankment Fill	2.0	2.0	125
2	Upper Sand Deposit	16.5	18.5	125
3	Marine Clay Soft	108.5	127.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Embankment Fill	S1	0.0	2.0	1.0	15	125	2.0	1.42	0.75	1.00	1.00	32	
Upper Sand Deposit	S2	2.0	4.0	3.0	24	375	2.0	1.42	0.75	1.00	1.00	51	
Upper Sand Deposit	S3	4.0	6.0	5.0	25	625	1.8	1.42	0.75	1.00	1.00	48	
Upper Sand Deposit	S4	6.0	8.0	7.0	19	750	1.6	1.42	0.75	1.00	1.00	33	
Upper Sand Deposit	S5	8.0	10.0	9.0	33	875	1.5	1.42	0.75	1.00	1.00	53	
Upper Sand Deposit	S6	10.0	12.0	11.0	42	1001	1.4	1.42	0.85	1.00	1.00	72	
Upper Sand Deposit	S7	15.0	17.0	16.0	25	1314	1.2	1.42	0.85	1.00	1.00	37	
Marine Clay Soft	S8	20.0	22.0	21.0	0	1614	1.1	1.42	0.95	1.00	1.00	0	
Marine Clay Soft	S9	25.0	27.0	26.0	0	1902	1.0	1.42	0.95	1.00	1.00	0	

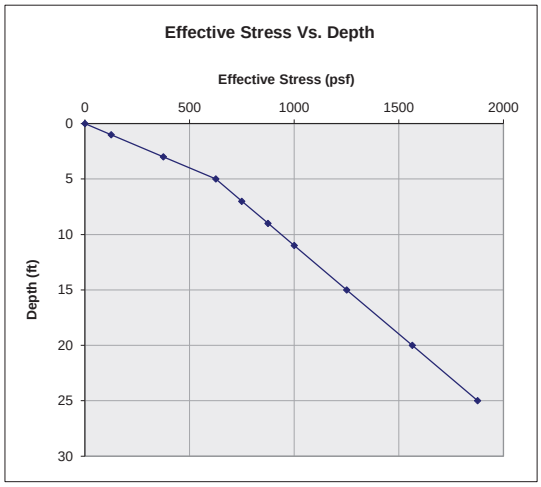
N'60 Avgs: 36.1

Boring Information:

Boring Number: OS-11
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	25.5	25.5	125
2	Glacial Till	0.5	26.0	135
3		#N/A		
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	N/A			0	N/A	0							
Upper Sand Deposit	S1	0.0	2.0	1.0	4	125	2.0	1.42	0.75	1.00	1.00	9	
Upper Sand Deposit	S2	2.0	4.0	3.0	17	375	2.0	1.42	0.75	1.00	1.00	36	
Upper Sand Deposit	S3	4.0	6.0	5.0	11	625	1.8	1.42	0.75	1.00	1.00	21	
Upper Sand Deposit	S4	6.0	8.0	7.0	29	750	1.6	1.42	0.75	1.00	1.00	50	
Upper Sand Deposit	S5	8.0	10.0	9.0	25	875	1.5	1.42	0.75	1.00	1.00	40	
Upper Sand Deposit	S6	10.0	12.0	11.0	18	1001	1.4	1.42	0.85	1.00	1.00	31	
Upper Sand Deposit	S7	14.0	16.0	15.0	20	1251	1.3	1.42	0.85	1.00	1.00	30	
Upper Sand Deposit	S8	19.0	21.0	20.0	12	1564	1.1	1.42	0.95	1.00	1.00	18	
Upper Sand Deposit	S9	24.0	26.0	25.0	46	1877	1.0	1.42	0.95	1.00	1.00	64	

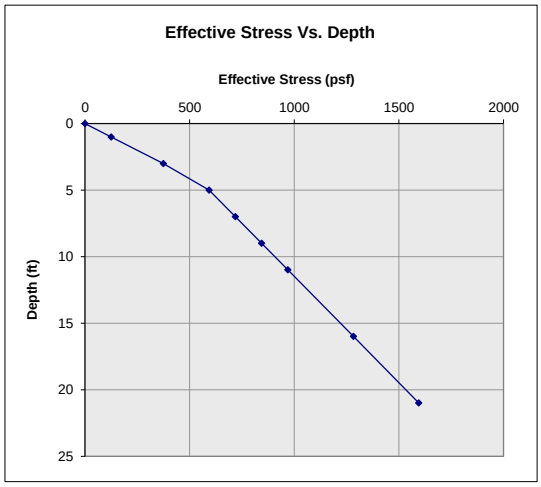
N'60 Avgs: 33.3

Boring Information:

Boring Number: OS-12
Northing: ft
Easting: ft
Hammer/Sampling System: Automatic Hammer

Design Groundwater Depth: 4.5 ft

Stratum Number	Soil Type	Thickness	Bottom Depth	Unit Weight
0	Ground Surface	0.0	0.0	#N/A
1	Upper Sand Deposit	25.0	25.0	125
2	Marine Clay Crust	8.5	33.5	120
3	Marine Clay Soft	66.5	100.0	120
4		#N/A		
5		#N/A		
6		#N/A		
7		#N/A		
8		#N/A		
9		#N/A		
10		#N/A		



Sampler Information:

Hammer Energy Rating, E_r: 85 B-57 ATV
Energy Standard, E_{rb}: 60 Do not change
Rod Stickup, ft: 3 Do not change

Stratum	Sample	Sample Depth Information (ft) Top	Bottom	N-Value Depth	N	Effective Stress (psf)	Correction Factors C_N	η_1	η_2	η_3	η_4	N'60	Remarks
Ground Surface	**N/A**			**0**	**N/A**	**0**							
Upper Sand Deposit	S1	0.0	2.0	1.0	5	125	2.0	1.42	0.75	1.00	1.00	11	
Upper Sand Deposit	S2	2.0	4.0	3.0	10	375	2.0	1.42	0.75	1.00	1.00	21	
Upper Sand Deposit	S3	4.0	6.0	5.0	20	594	1.8	1.42	0.75	1.00	1.00	39	
Upper Sand Deposit	S4	6.0	8.0	7.0	22	719	1.7	1.42	0.75	1.00	1.00	39	Bottom of Ftg
Upper Sand Deposit	S5	8.0	10.0	9.0	22	844	1.5	1.42	0.75	1.00	1.00	36	
Upper Sand Deposit	S6	10.0	12.0	11.0	19	969	1.4	1.42	0.85	1.00	1.00	33	
Upper Sand Deposit	S7	15.0	17.0	16.0	14	1282	1.2	1.42	0.85	1.00	1.00	21	
Upper Sand Deposit	S8	20.0	22.0	21.0	21	1595	1.1	1.42	0.95	1.00	1.00	32	
Marine Clay Crust	S9	25.0	27.0	26.0	1	1903	1.0	1.42	0.95	1.00	1.00	1	
Marine Clay Crust	S10	30.0	32.0	31.0	12	2191	1.0	1.42	1.00	1.00	1.00	16	
Marine Clay Soft	S11	35.0	37.0	36.0	0	2479	0.9	1.42	1.00	1.00	1.00	0	

N'60 Avgs: 22.3

3 - SOIL STRENGTH PARAMETERS

Lower Sand Deposit

B-106, OS-4, OS-5, OS-6, OS-8, B-203, B-204, B-205, B-207, B-208,

N60' = 4 and 52 blows per foot
(corrected for depth and hammer efficiency)

Given the wide range and several low values use N'60 = 10 bpf

Drained Friction Angle of Granular Soils (modified after Bowles, 1977)

$N1_{60}$	ϕ_f
<4	25–30
4	27–32
10	30–35
30	35–40
50	38–43

Use phi = 30, which is conservative

Performed By: TAD
Checked By: LGH

Table 2-9

RELATIVE DENSITY OF SAND VERSUS N

N Value (blows/ft or 305 mm)	Relative Density	D_r (%)
0 to 4	very loose	0 to 15
4 to 10	loose	15 to 35
10 to 30	medium	35 to 65
30 to 50	dense	65 to 85
> 50	very dense	85 to 100

Dr = 35 %

Source: Terzaghi and Peck (27), p. 341 and Lambe and Whitman (6), p. 31.

Use SM soil type

Dry Unit Wt = 1.65 x 62.4pcf = 103 pcf
Moist Unit Wt = 1.10 x 103 = 113 pcf, Use 115 pcf

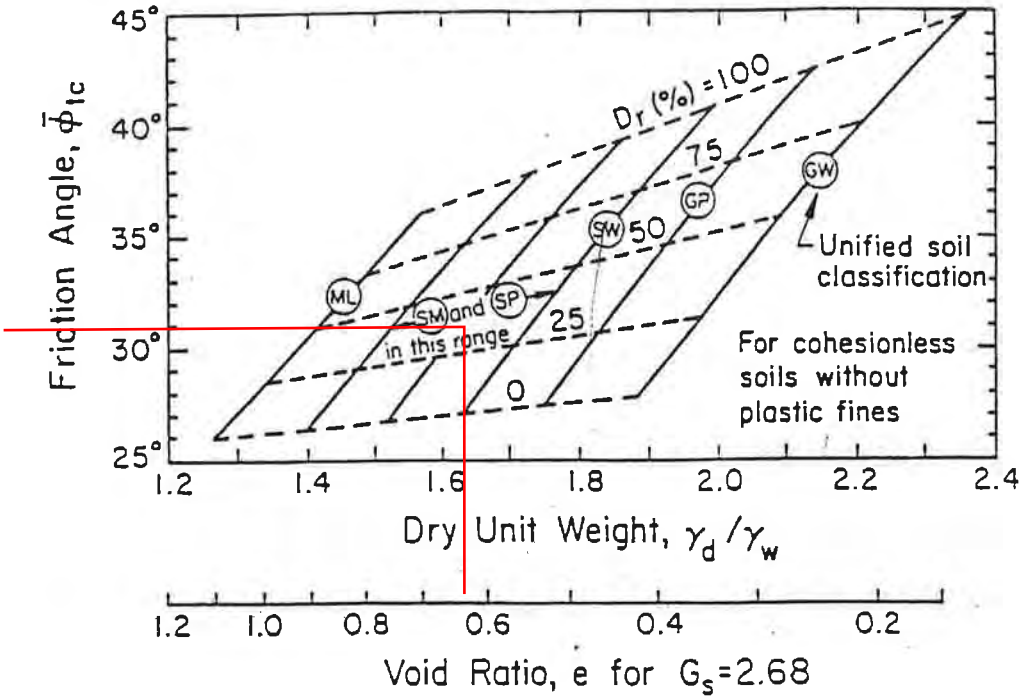


Figure 4-8. $\bar{\phi}_{tc}$ versus Relative Density and Unit Weight

Source: NAVFAC (6), p. 7.1-149.

Performed By: TAD
Checked By: LGH

Upper Sand Deposit

B-109, B-111
B-202, 204, 205 to 207, 209 to 214
OS-1, 2, 4, 5, 6, 9, 10 and 11

N60' = Medium dense to dense, with a few loose and a some very dense vlaues
(Corrected for Depth and hammer efficiency)

Bowles, 1977)

$N1_{60}$	ϕ_f
<4	25–30
4	27–32
10	30–35
30	35–40
50	38–43

Use phi = 31 to 32, which is conservative

Performed By: TAD
Checked By: LGH

Table 2-9

RELATIVE DENSITY OF SAND VERSUS N

N Value (blows/ft or 305 mm)	Relative Density	D_r (%)
0 to 4	very loose	0 to 15
4 to 10	loose	15 to 35
10 to 30	medium	35 to 65
30 to 50	dense	65 to 85
> 50	very dense	85 to 100

Dr = 50 %

Source: Terzaghi and Peck (27), p. 341 and Lambe and Whitman (6), p. 31.

Use SM soil type

Dry Unit Wt = 1.68 x 62.4pcf = 105 pcf
Moist Unit Wt = 1.10 x 105 = 115 pcf, Use 120 pcf

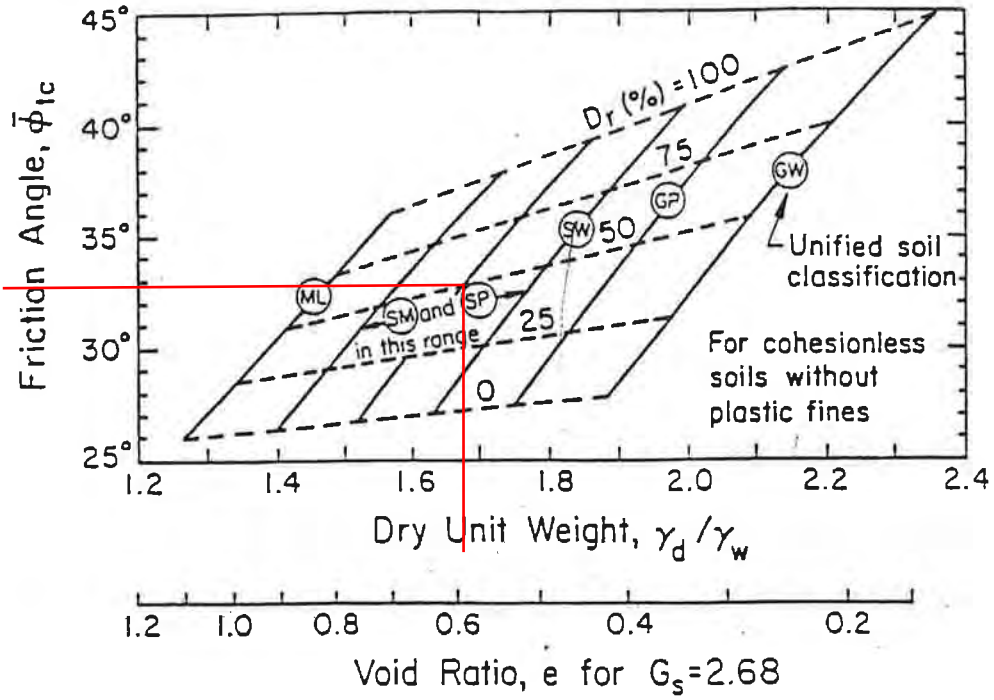


Figure 4-8. $\bar{\phi}_{tc}$ versus Relative Density and Unit Weight

Source: NAVFAC (6), p. 7.1-149.

Performed By: TAD
Checked By: LGH

UNIT WEIGHT OF CLAY

Client:	Stantec Inc.		
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange		
Project Location:	Saco, ME		
GTX #:	311093	Tested By:	md
Test Date:	01/13/20	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-103	U-1	15-17	Top	Moist, gray clay	118.4	27.9	92.5	0.19	0.21	0.25	0.22
			Middle	Moist, gray clay	113.7		7.4	0.30	0.20	0.25	0.25
			Bottom	Moist, gray clay	103.7	39.9	74.1	0.10	0.15	0.16	0.14
B-106	U-1	10-12	Top	Moist, olive gray silty sand	126.0	32.5	95.1	0.35	0.30	0.35	0.33
			Middle	Moist, olive gray silty sand	125.6		5.6	0.20	0.25	0.24	0.23
			Bottom	Moist, olive gray silty sand	122.7	20.1	102.2	0.30	0.35	0.30	0.32
B-109	U-1	30-32	Top	Moist, gray clay	113.2	38.3	81.9	0.25	0.25	0.30	0.27
			Middle	Moist, gray clay	112.5		.1	0.20	0.20	0.22	0.21
			Bottom	Moist, gray clay	110.1	42.7	77.2	0.25	0.15	0.15	0.18
B-109	U-2	40-42	Top	Moist, gray silty clayey sand	118.9	30.8	90.9	0.22	0.25	0.25	0.24
			Middle	Moist, gray silty clayey sand	141.9		.5	0.10	0.20	0.12	0.14
			Bottom	Moist, gray silty clayey sand	138.6	10.7	125.1	0.18	0.17	0.23	0.19

112 pcf

125 pcf

112 pcf

133 pcf

407 psf

587 psf

440 psf

380 psf

GeoTesting EXPRESS

Client:	Stantec Inc.		
Project Name:	ME Turnpike Authority Ex. 35/36 Interchange		
Project Location:	Saco, ME		
GTX #:	311093	Tested By:	md
Test Date:	01/13/20	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-111	U-1	30-32	Top	Moist, gray clay	119.1	27.5	93.5	0.33	0.32	0.28	0.31
			Middle	Moist, gray clay	119.2	118 pcf	94.0	0.29	0.25	0.34	0.29
			Bottom	Moist, gray clay	116.1	26.9	91.5	0.30	0.32	0.35	0.32
B-111	U-2	40-42	Top	Moist, gray clay	114.9	26.6	90.8	0.65	0.55	0.50	0.57
			Middle	Moist, gray clay	114.1	115 pcf	90.9	0.55	0.56	0.57	0.56
			Bottom	Moist, gray clay	115.6	27.8	90.5	0.30	0.40	0.34	0.35
B-111	U-3	50-52	Top	Moist, olive gray clay	111.6	36.9	81.5	0.22	0.25	0.25	0.24
			Middle	Moist, olive gray clay	111.8	111 pcf	83.2	0.25	0.20	0.22	0.22
			Bottom	Moist, olive gray clay	108.9	38.8	78.5	0.23	0.25	0.26	0.25

613 psf

987 psf

473 psf

Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes
Moisture content determined by ASTM D2216 at 110° C

Client:	Stantec Inc.		
Project Name:	Saco Interch. Improv. Ex. 35 & 36		
Project Location:	Saco, ME		
GTX #:	312785	Tested By:	md
Test Date:	10/15/19	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-203	U-1	12-14	Top	Moist, gray clay	113.2	29.6	87.3	0.30	0.30	0.29	0.30
			Middle	Moist, gray clay	123.0	118 pcf	.5	0.41	0.36	0.40	0.39
			Bottom	Moist, gray clay	117.2	34.2	87.3	0.20	0.23	0.21	0.21
B-207	U-1	13-15	Top	Moist, gray clay	108.6	41.9	76.6	0.35	0.31	0.31	0.32
			Middle	Moist, gray clay	107.4	107 pcf	.5	0.25	0.25	0.24	0.25
			Bottom	Moist, gray clay	103.6	43.8	72	0.31	0.30	0.32	0.31
B-211	U-1	62-64	Top	Moist, gray clay	109.0	42.8	76.3	0.25	0.27	0.28	0.27
			Middle	Moist, gray clay	109.0	109 pcf	.1	0.26	0.30	0.28	0.28
			Bottom	Moist, gray clay	109.1	41.6	77.0	0.30	0.30	0.29	0.30
B-211	U-1	70-72	Top	Moist, gray clay	116.4	31.6	88.5	0.34	0.36	0.34	0.35
			Middle	Moist, gray clay	109.9	114 pcf	.3	0.39	0.34	0.33	0.35
			Bottom	Moist, gray clay	114.9	38.9	83	0.31	0.30	0.36	0.32

600 psf

587 psf

567 psf

680 psf

Client:	Stantec Inc.		
Project Name:	Saco Interch. Improv. Ex. 35 & 36		
Project Location:	Saco, ME		
GTX #:	312785	Tested By:	md
Test Date:	10/15/19	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
OS-5	U-1	17-19	Top	Moist, gray silty sand	117.0	34.3	87.1	0.35	0.32	0.30	0.32
			Middle	Moist, gray silty sand	112.0	114 pcf	.7	0.27	0.32	0.28	0.29
			Bottom	Moist, gray silty sand	112.8	24.1	91.0	0.34	0.30	0.30	0.31

613 psf

Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes
Moisture content determined by ASTM D2216 at 110° C

Client:	Stantec Inc.		
Project Name:	Saco Interch. Improv. Ex. 35 & 36		
Project Location:	Saco, ME		
GTX #:	312785	Tested By:	md
Test Date:	01/28/21	Checked By:	emm

Tube Handling with Moisture Content (ASTM D2216), Density of Soil (ASTM D7263), Hand-Held Torvane, and Visual Description

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft^3	Moisture Content, %	Dry Density, lb/ft^3	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-206	U-1	12-14	Top	Moist, dark gray clay	108.5	29.3	83.9	0.40	0.40	0.40	0.40
			Middle	Moist, dark gray clay	111.6	37.8	81.0	0.20	0.20	0.20	0.20
			Bottom	Moist, dark gray clay	113.9	40.7	81.0	0.30	0.30	0.35	0.32
B-209	U-2	90-92	Top	Moist, dark gray clay	115.6	37.8	83.9	0.35	0.35	0.35	0.35
			Middle	Moist, dark gray clay	109.7	39.1	78.9	0.40	0.40	0.40	0.40
			Bottom	Moist, dark gray clay	112.2	40.0	80.1	0.28	0.25	0.28	0.27
B-210	U-1	65-67	Top	Moist, dark gray clay	120.8	28.3	94.2	0.40	0.38	0.40	0.39
			Middle	Moist, dark gray clay	123.6	27.8	96.7	0.35	0.33	0.38	0.35
			Bottom	Moist, dark gray clay	124.6	25.2	99.5	0.30	0.32	0.35	0.32

613 psf

680 psf

706 psf

Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes
Moisture content determined by ASTM D2216 at 110° C

EFFECTIVE FRICTION ANGLE OF CLAY

Correlation between N60 Values and Undrained Shear Strength

Consistency	Field Identification	Undrained Shear Strength, S_u (psf)	Standard Penetration Test Blowcount* (blows/ft)
Very soft	Easily penetrated several inches by fist	< 250	< 2
Soft	Easily penetrated several inches by thumb	250 - 500	2 - 4
Medium	Can be penetrated several inches by thumb with moderate effort	500 - 1000	4 - 8
Stiff	Readily indented by thumb but penetrated only with great effort	1000 - 2000	8 - 15
Very stiff	Readily indented by thumbnail	2000 - 4000	15 - 30
Hard	Indented with difficulty by thumbnail	> 4000	> 30

**The correlation between undrained strength and SPT blowcount is rather unreliable*

Reference: From Peck, et al. 1974

The marine clay crust was encountered in numerous borings across the site. The N60 generally ranged from a low of 6 bpf to a high of 33 bpf. N-values are not corrected for depth.

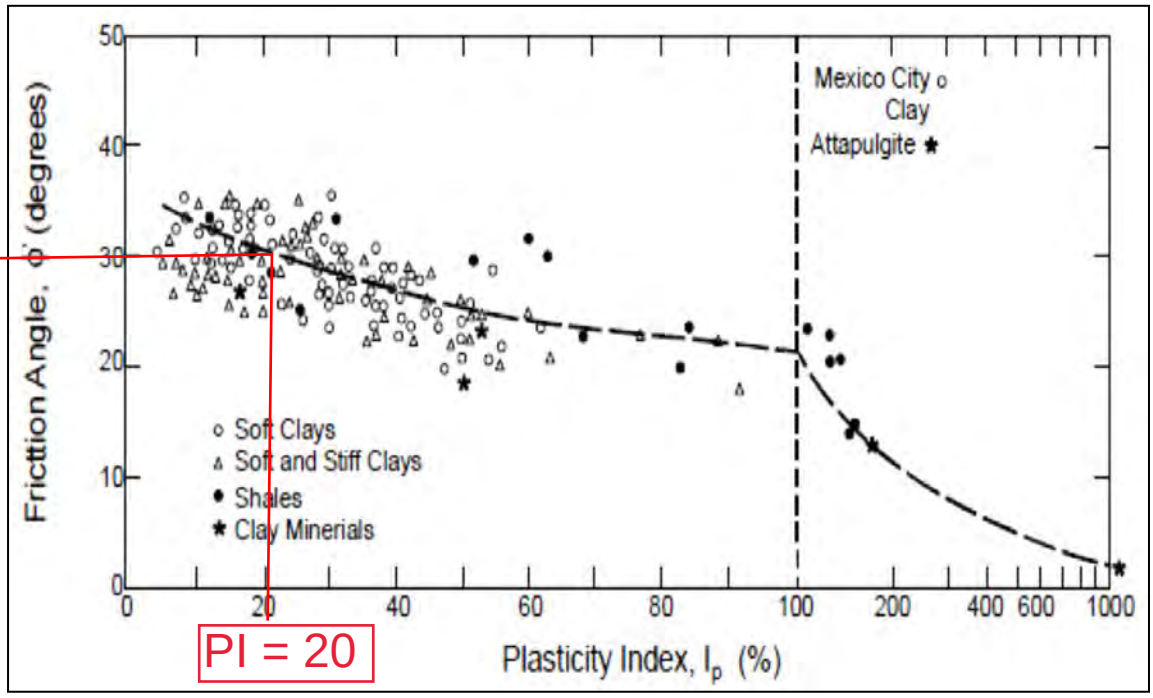
Range = 6 to 33, most values are above 8 bpf.

Use Su = 1,000 to 2000 psf for the crust

Performed By: TAD
Checked By: LGH

Stantec

Phi = 30 degrees

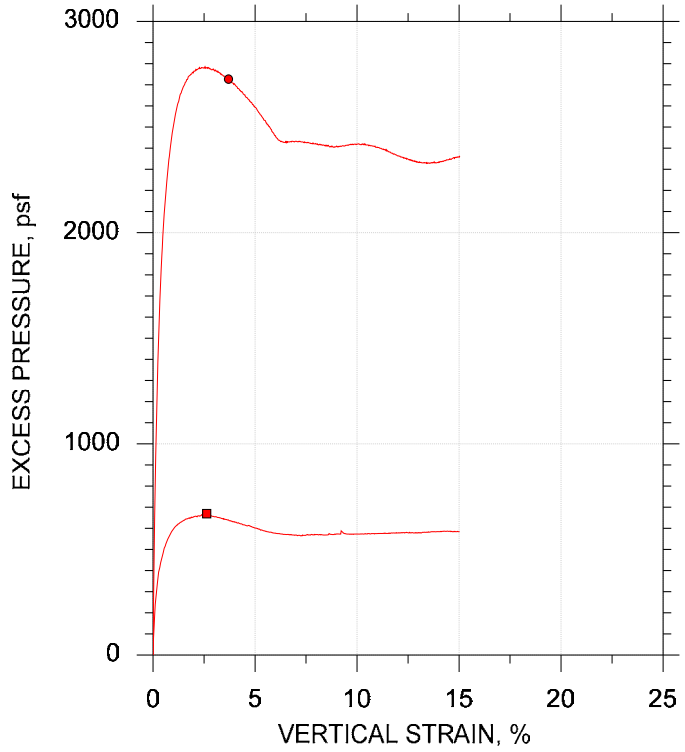


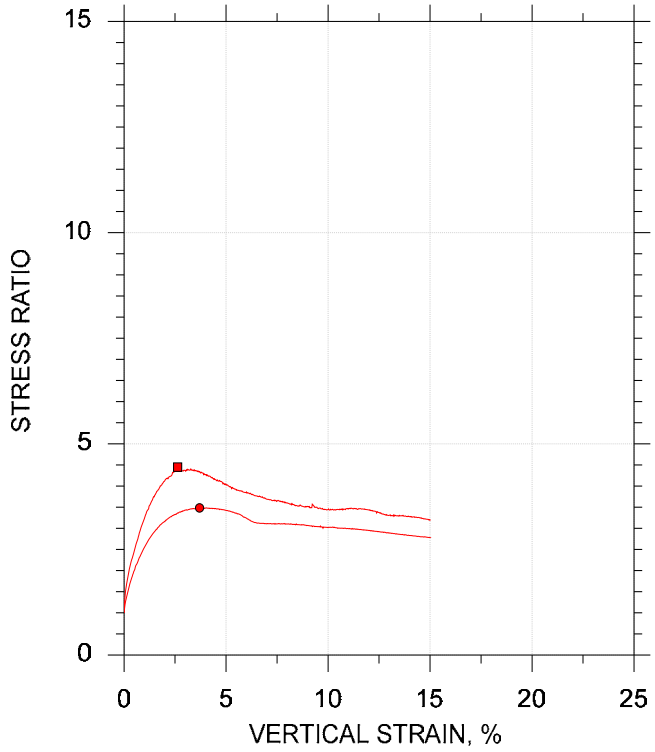
Source: FHWA GEC No. 5

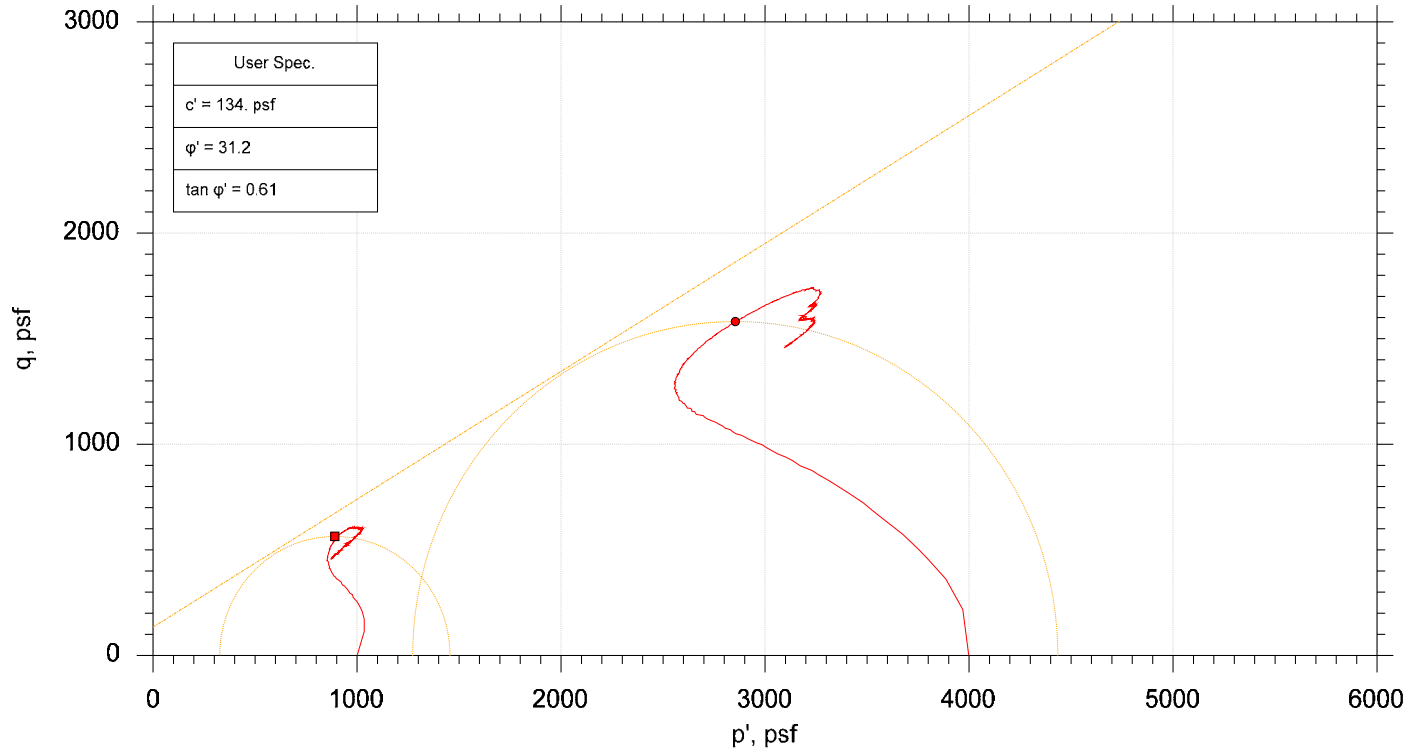
Figure 4: Relationship between ϕ' and PI

Performed By: TAD
Checked By: LGH

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





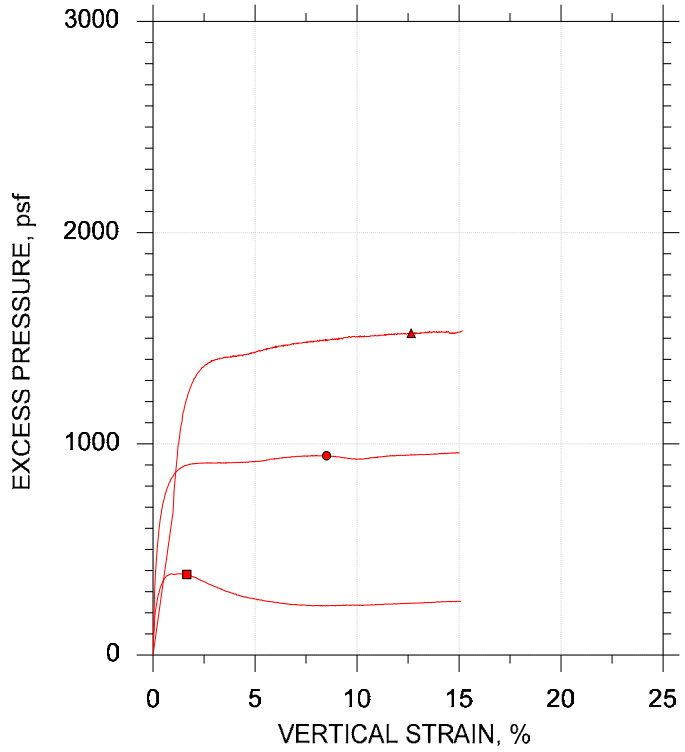


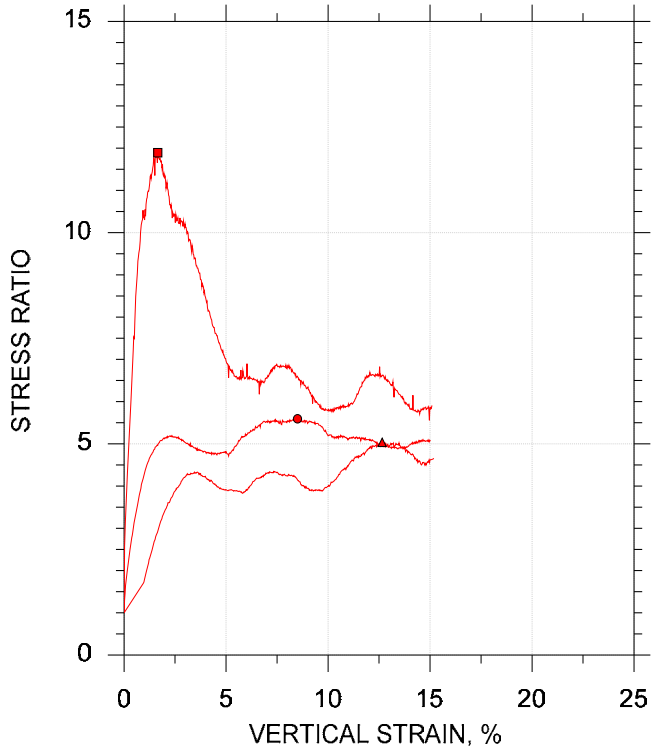
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-1	CU-2-1	12-14	md	1/25/21	mcm	2/8/21	312785-CU-2-1m.dat
●	U-1	CU-2-3	12-14	md	1/25/21	mcm	2/8/21	312785-CU-2-3m.dat

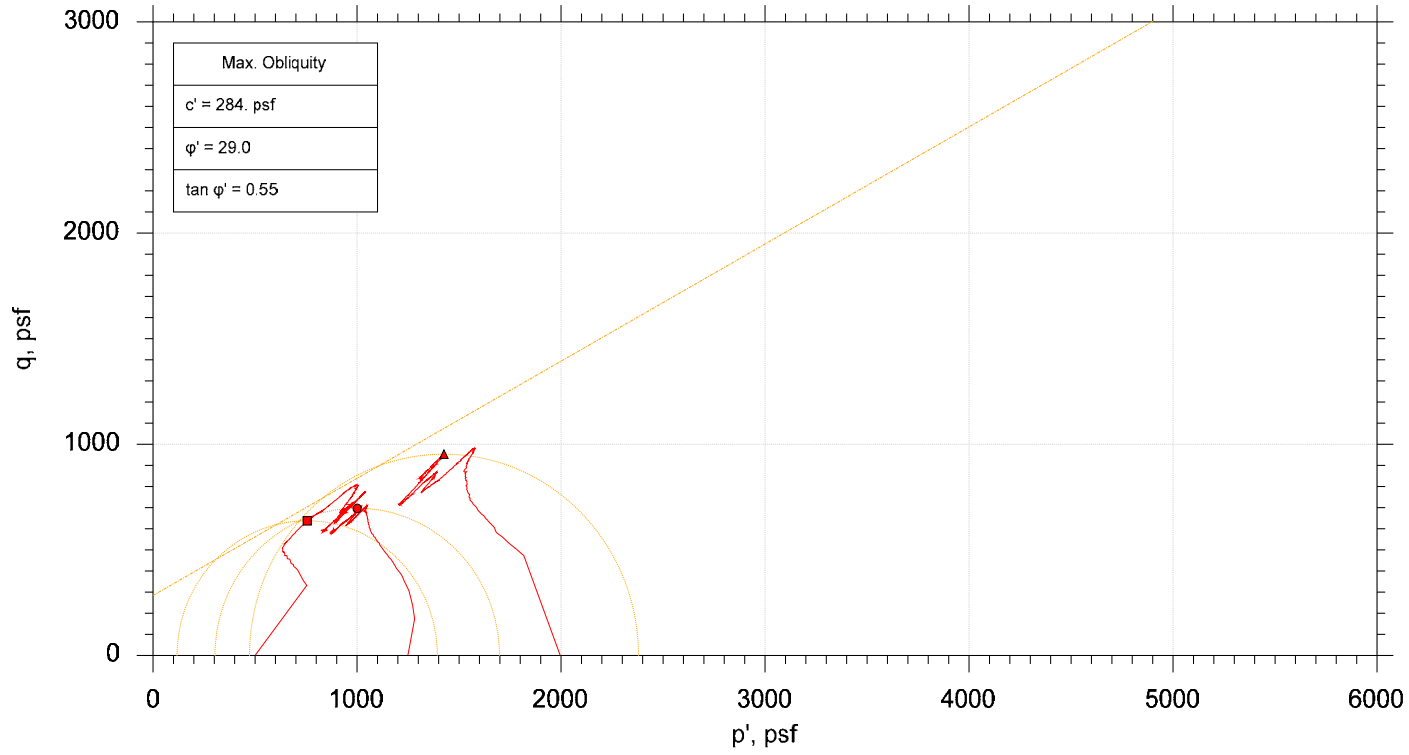
GeoTesting EXPRESS

Project: Saco Interch. Improv. Ex.35&36	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-203	Sample Type: Intact	
Description: Moist, gray clay		
Remarks: System Y		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	U-2	CU-1-1	18-20	md	1/7/21	mcm	2/8/21	312785-CU-1-1m.dat
●	U-2	CU-1-2	18-20	md	1/7/21	mcm	2/8/21	312785-CU-1-2m.dat
▲	U-2	CU-1-3A	18-20	trm	2/3/21	mcm	2/8/21	312785-CU-1-3Am.dat

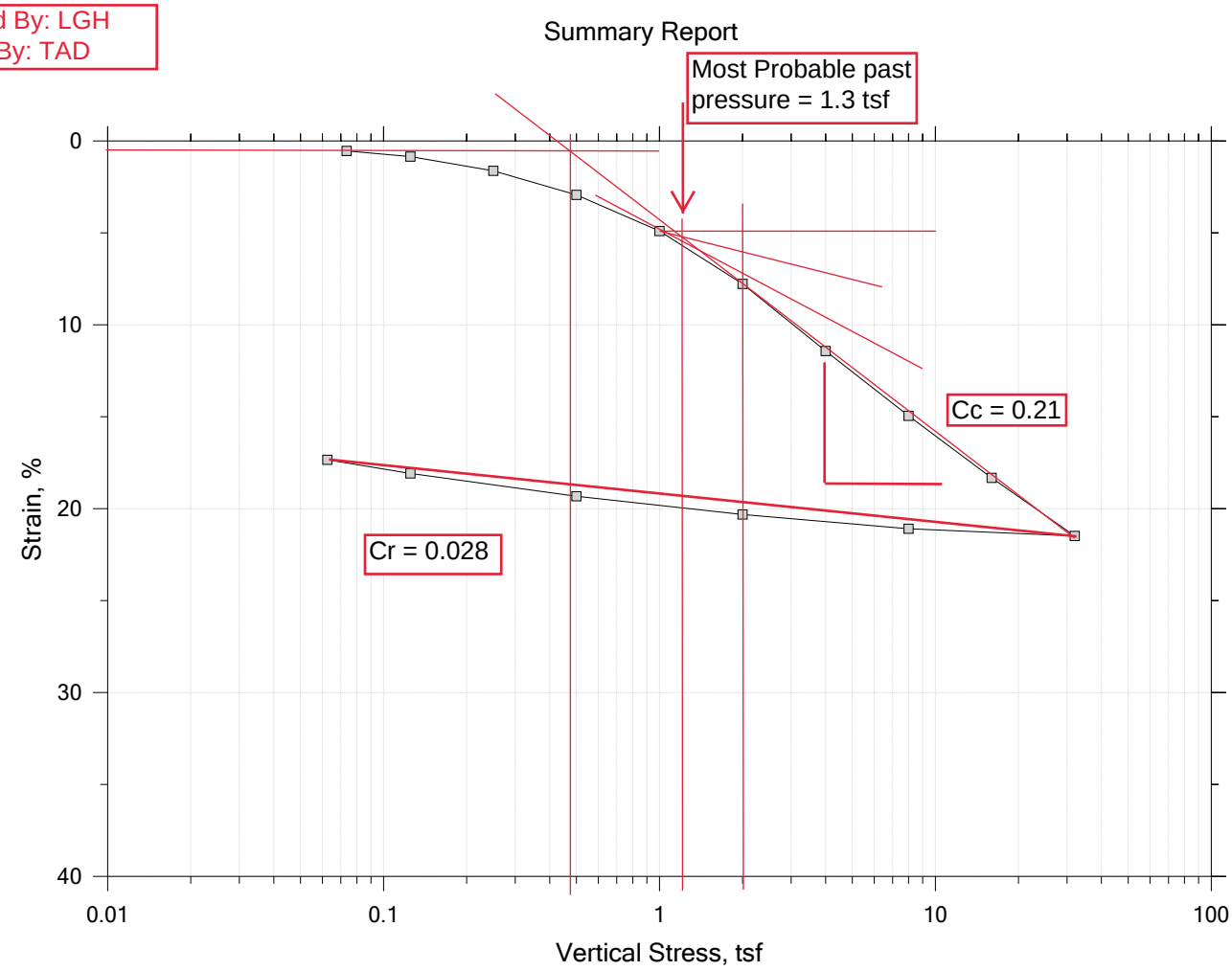
GeoTesting EXPRESS

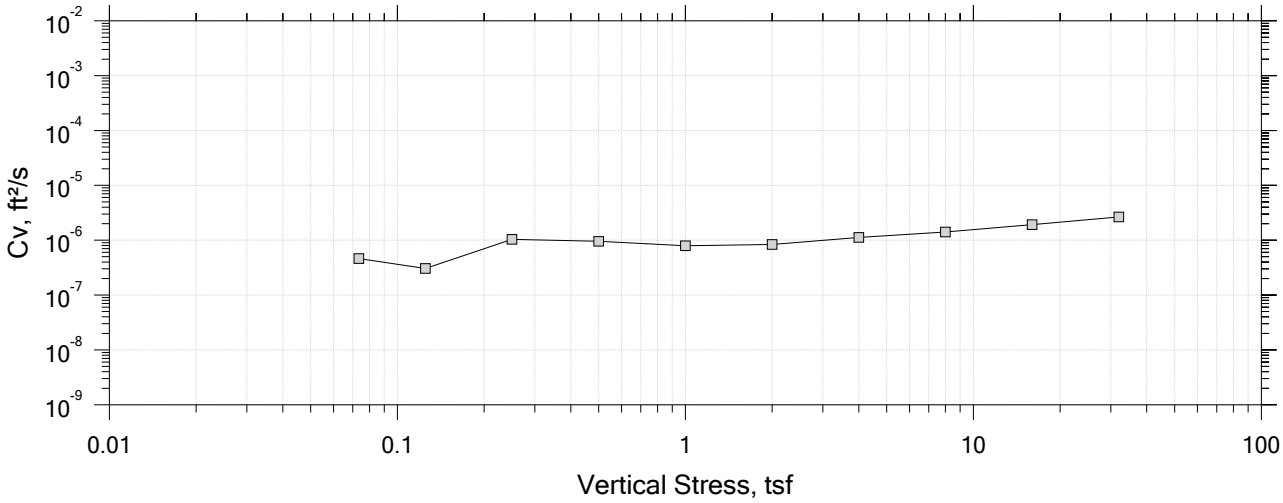
Project: Saco Intertech. Ex. 35 & 36	Location: Saco, ME	Project No.: GTX-312785
Boring No.: B-208	Sample Type: intact	
Description: Moist gray clay		
Remarks: System RR		

4 - CONSOLIDATION PROPERTIES

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed By: LGH
Checked By: TAD





GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0734	0.005365	0.819	0.536	51.875	4.70e-07	7.31e-02	9.27e-05
2	0.125	0.008509	0.813	0.851	67.442	3.59e-07	6.09e-02	5.90e-05
3	0.250	0.01625	0.799	1.63	19.901	1.20e-06	6.20e-02	2.01e-04
4	0.500	0.02929	0.775	2.93	20.930	1.12e-06	5.22e-02	1.57e-04
5	1.00	0.04899	0.739	4.90	30.224	7.50e-07	3.94e-02	7.97e-05
6	2.00	0.07776	0.687	7.78	26.566	8.10e-07	2.88e-02	6.29e-05
7	4.00	0.1142	0.620	11.4	18.123	1.11e-06	1.82e-02	5.44e-05
8	8.00	0.1495	0.555	14.9	15.075	1.23e-06	8.81e-03	2.92e-05
9	16.0	0.1833	0.494	18.3	10.641	1.60e-06	4.22e-03	1.83e-05
10	32.0	0.2148	0.436	21.5	7.155	2.20e-06	1.97e-03	1.17e-05
11	8.00	0.2109	0.443	21.1	2.998	5.07e-06	1.64e-04	2.24e-06
12	2.00	0.2032	0.457	20.3	9.627	1.60e-06	1.28e-03	5.54e-06
13	0.500	0.1933	0.475	19.3	27.397	5.76e-07	6.61e-03	1.03e-05
14	0.125	0.1808	0.498	18.1	110.989	1.46e-07	3.31e-02	1.31e-05
15	0.0625	0.1734	0.512	17.3	324.936	5.11e-08	1.19e-01	1.65e-05

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-103	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/10/20	Depth: 15-17
	Test No.: IP-6B	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System F, Swell Pressure = 0.0734 tsf		
	Displacement at End of Increment		

Stantec

B-103

U-1

15'-17'

$e_o = 0.83$

Most probable $\sigma_p' = 1.3$ tsf

Minimum possible $\sigma_p' = 0.48$ tsf

Maximum possible $\sigma_p' = 3.0$ tsf

$$C_c = \frac{e_6 - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_6}\right)} = \frac{.687 - .436}{\log\left(\frac{32}{2}\right)} = .208$$

$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.512 - .436}{\log\left(\frac{32}{.0625}\right)} = .028$$

$$CR = \frac{C_c}{1 + e_o} = \frac{.208}{1 + .83} = .114$$

Performed By: LGH
Checked By: TAD

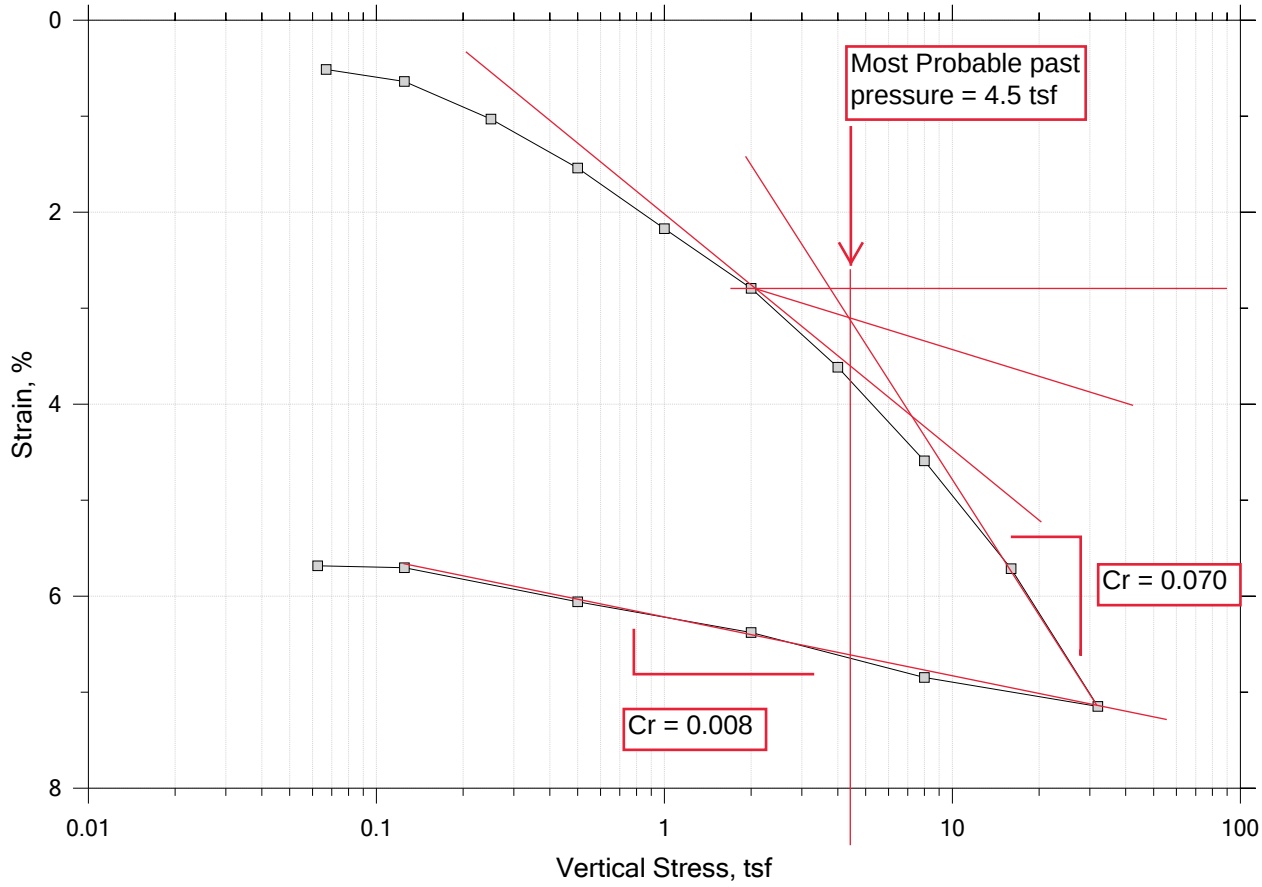
Designed by: Checked by:

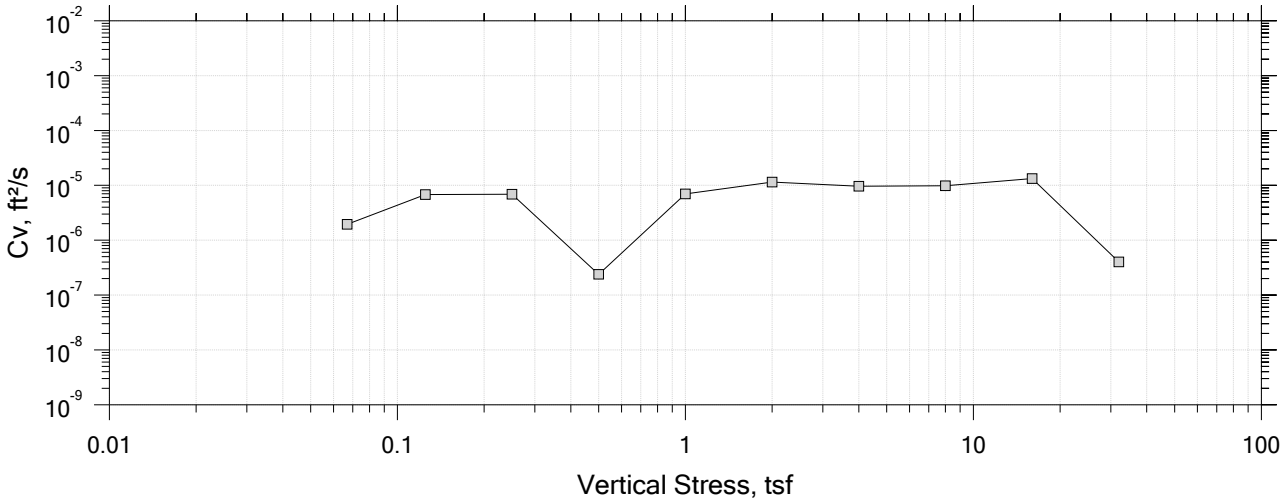
Performed By: LGH
Checked By: TAD

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

Atterberg lab test results indicate material is non-plastic. Therefore, Casagrande Construction is difficult to perform. results should be used with caution.





GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0669	0.005135	0.622	0.513	16.070	1.52e-06	7.68e-02	3.15e-04
2	0.125	0.006374	0.620	0.637	6.530	3.71e-06	2.13e-02	2.14e-04
3	0.250	0.01029	0.614	1.03	4.526	5.33e-06	3.13e-02	4.50e-04
4	0.500	0.01540	0.605	1.54	89.293	2.68e-07	2.05e-02	1.48e-05
5	1.00	0.02171	0.595	2.17	5.536	4.27e-06	1.26e-02	1.45e-04
6	2.00	0.02793	0.585	2.79	2.981	7.83e-06	6.21e-03	1.31e-04
7	4.00	0.03615	0.572	3.61	3.865	5.95e-06	4.11e-03	6.59e-05
8	8.00	0.04590	0.556	4.59	5.347	4.22e-06	2.44e-03	2.78e-05
9	16.0	0.05713	0.537	5.71	4.187	5.27e-06	1.40e-03	2.00e-05
10	32.0	0.07148	0.514	7.15	48.227	4.45e-07	8.96e-04	1.08e-06
11	8.00	0.06846	0.519	6.85	19.909	1.07e-06	1.26e-04	3.62e-07
12	2.00	0.06378	0.527	6.38	1.863	1.15e-05	7.80e-04	2.42e-05
13	0.500	0.06058	0.532	6.06	6.786	3.18e-06	2.13e-03	1.83e-05
14	0.125	0.05704	0.537	5.70	18.699	1.16e-06	9.44e-03	2.96e-05
15	0.0625	0.05683	0.538	5.68	63.953	3.41e-07	3.28e-03	3.02e-06

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-106	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 10-12
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray silty sand		
	Remarks: System E, Swell Pressure = 0.0669 tsf		
	Displacement at End of Increment		

Stantec

B-106

U-1

10'-12'

$e_o = 0.63$

Most Probable = 4.5 tsf

$$C_c = \frac{e_8 - e_{10}}{\log\left(\frac{e_{10}}{e_8}\right)} = \frac{0.556 - 0.514}{\log\left(\frac{32}{8}\right)} = \frac{0.042}{0.602} = 0.070$$

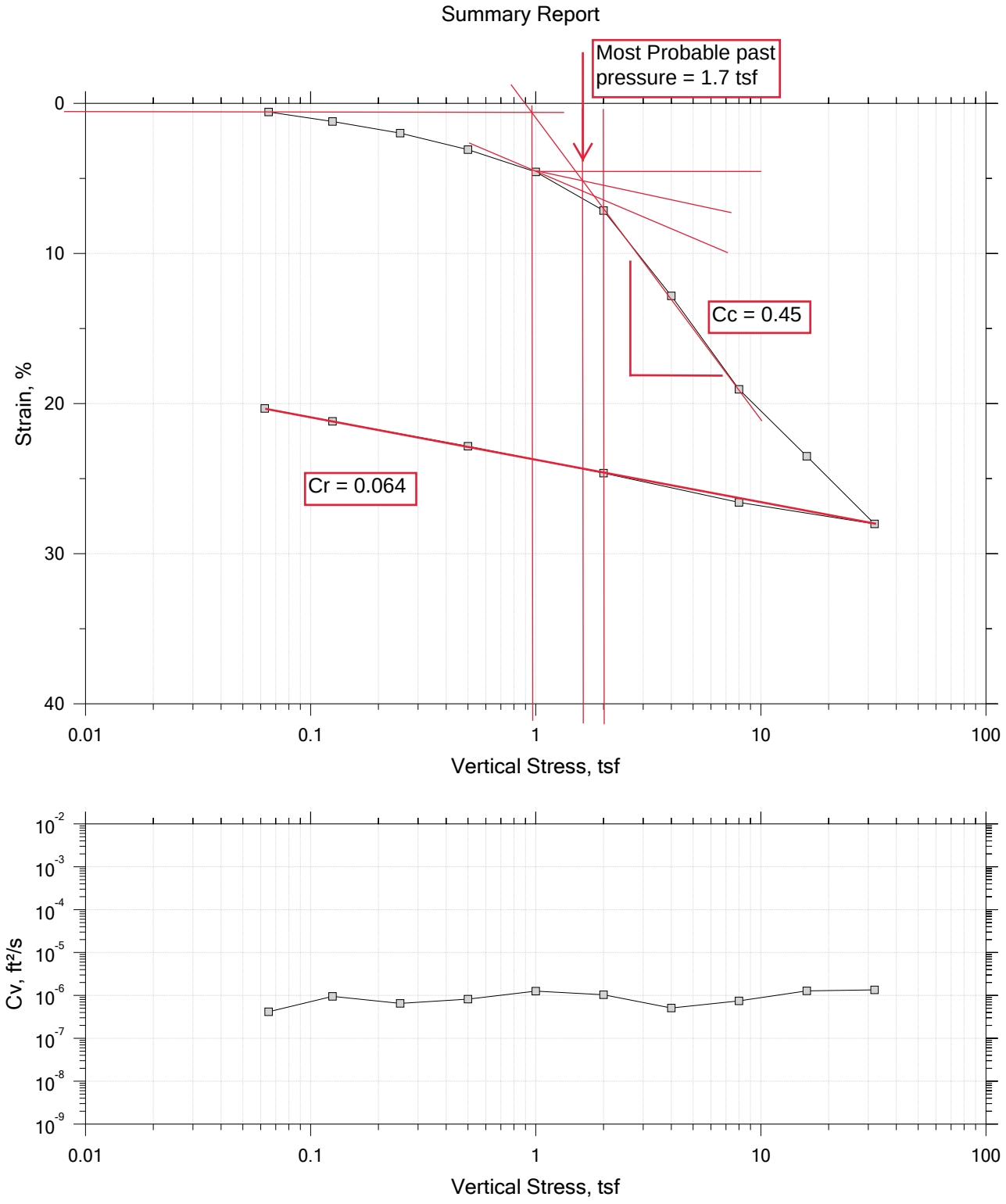
$$C_r = \frac{e_{14} - e_{10}}{\log\left(\frac{e_{10}}{e_{14}}\right)} = \frac{0.537 - 0.514}{\log\left(\frac{32}{0.0625}\right)} = \frac{0.023}{2.71} = 0.008$$

Performed By: LGH
Checked By: TAD

Designed by: LGH Checked by: TAD

Performed By: LGH
Checked By: TAD

One-Dimensional Consolidation by ASTM D2435 - Method B



GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0651	0.005708	1.23	0.571	65.067	3.75e-07	8.77e-02	8.87e-05
2	0.125	0.01203	1.22	1.20	23.429	1.03e-06	1.06e-01	2.93e-04
3	0.250	0.01981	1.20	1.98	37.566	6.33e-07	6.22e-02	1.06e-04
4	0.500	0.03077	1.18	3.08	28.514	8.18e-07	4.39e-02	9.67e-05
5	1.00	0.04560	1.14	4.56	16.883	1.34e-06	2.97e-02	1.08e-04
6	2.00	0.07142	1.09	7.14	27.220	7.99e-07	2.58e-02	5.56e-05
7	4.00	0.1282	0.959	12.8	42.809	4.64e-07	2.84e-02	3.56e-05
8	8.00	0.1905	0.819	19.0	27.979	6.20e-07	1.56e-02	2.60e-05
9	16.0	0.2351	0.719	23.5	12.652	1.20e-06	5.57e-03	1.81e-05
10	32.0	0.2802	0.617	28.0	10.921	1.24e-06	2.82e-03	9.41e-06
11	8.00	0.2658	0.650	26.6	6.144	2.11e-06	6.00e-04	3.42e-06
12	2.00	0.2463	0.694	24.6	16.416	8.27e-07	3.25e-03	7.25e-06
13	0.500	0.2284	0.734	22.8	50.237	2.84e-07	1.19e-02	9.15e-06
14	0.125	0.2118	0.771	21.2	176.816	8.44e-08	4.41e-02	1.00e-05
15	0.0625	0.2032	0.790	20.3	182.047	8.46e-08	1.37e-01	3.13e-05

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

Stantec

B-109

U-1

30'-32'

$e_o = 1.25$

Most probable $\sigma_p' = 1.7$ tsf

Minimum possible $\sigma_p' = 0.98$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

$$C_c = \frac{e_6 - e_8}{\log\left(\frac{\sigma_8}{\sigma_6}\right)} = \frac{1.09 - .819}{\log\left(\frac{8}{2}\right)} = 0.450$$

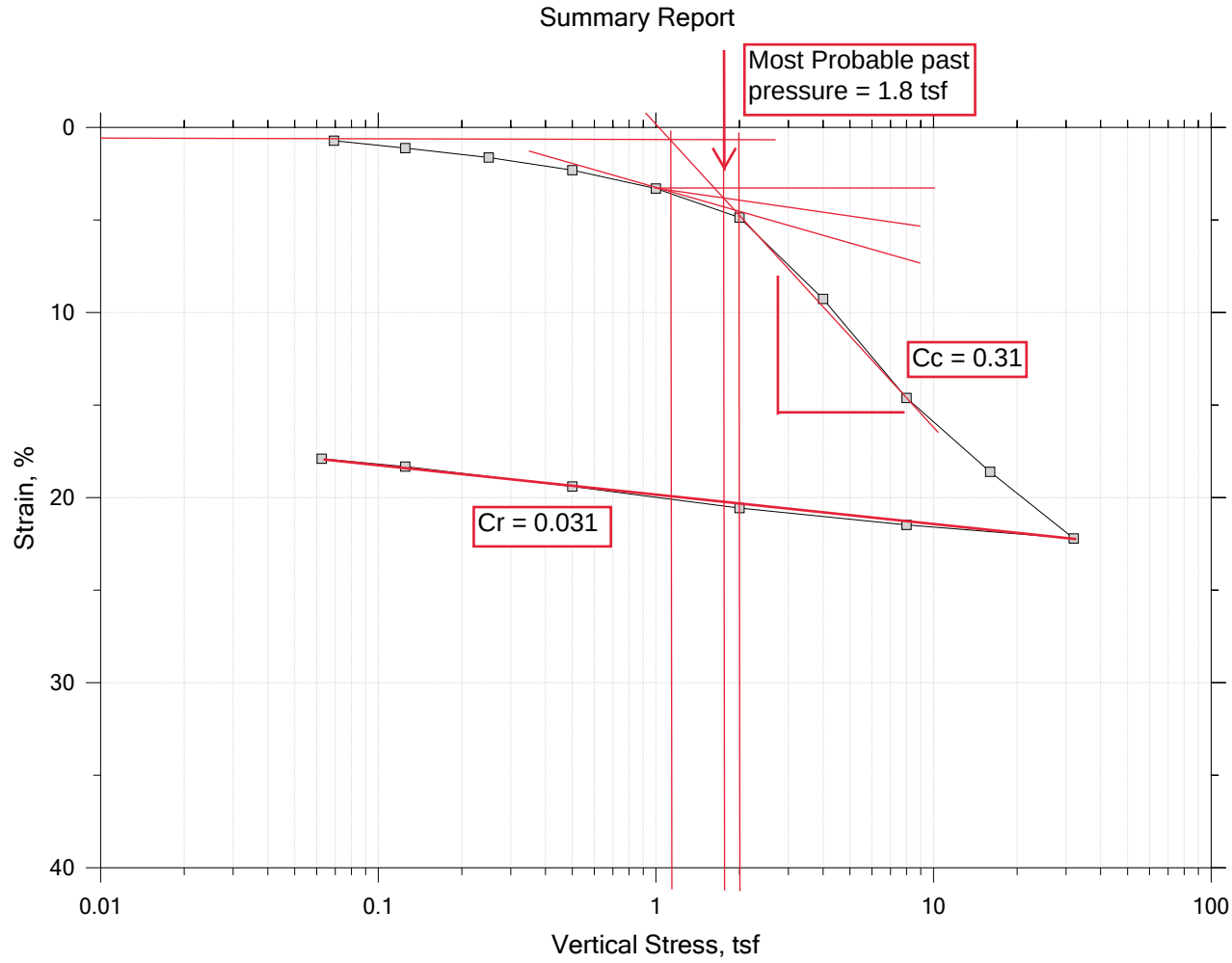
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.790 - .617}{\log\left(\frac{32}{.0625}\right)} = 0.064$$

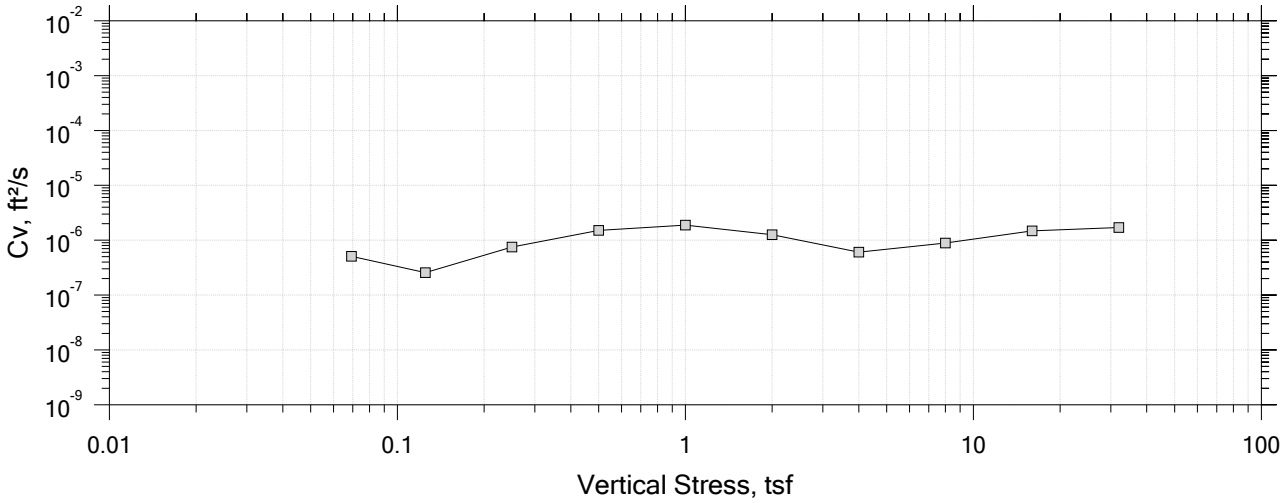
$$CR = \frac{C_c}{1+e_o} = \frac{.450}{1+1.25} = 0.200$$

Performed By: LGH
Checked By: TAD

Performed By: LGH
Checked By: TAD

One-Dimensional Consolidation by ASTM D2435 - Method B





GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0693	0.007111	0.911	0.711	43.917	5.55e-07	1.03e-01	1.54e-04
2	0.125	0.01111	0.904	1.11	107.875	2.23e-07	7.17e-02	4.32e-05
3	0.250	0.01620	0.894	1.62	35.883	6.65e-07	4.08e-02	7.32e-05
4	0.500	0.02308	0.881	2.31	20.395	1.16e-06	2.75e-02	8.58e-05
5	1.00	0.03296	0.862	3.30	17.335	1.34e-06	1.98e-02	7.13e-05
6	2.00	0.04863	0.832	4.86	19.046	1.19e-06	1.57e-02	5.01e-05
7	4.00	0.09261	0.747	9.26	37.804	5.61e-07	2.20e-02	3.32e-05
8	8.00	0.1462	0.644	14.6	24.279	7.84e-07	1.34e-02	2.83e-05
9	16.0	0.1861	0.567	18.6	12.351	1.38e-06	4.99e-03	1.86e-05
10	32.0	0.2221	0.498	22.2	10.297	1.51e-06	2.25e-03	9.16e-06
11	8.00	0.2147	0.512	21.5	2.959	5.07e-06	3.05e-04	4.17e-06
12	2.00	0.2056	0.529	20.6	10.039	1.52e-06	1.52e-03	6.25e-06
13	0.500	0.1940	0.552	19.4	32.600	4.82e-07	7.76e-03	1.01e-05
14	0.125	0.1832	0.572	18.3	121.658	1.33e-07	2.87e-02	1.03e-05
15	0.0625	0.1790	0.581	17.9	181.993	9.04e-08	6.80e-02	1.66e-05

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-109	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 1/10/20	Depth: 40-42
	Test No.: IP-2B	Sample Type: intact	Elevation: ---
	Description: Moist, gray silty clayey sand		
	Remarks: System X, Swell Pressure = 0.0693 tsf		
	Displacement at End of Increment		

Stantec

B-109

U-2

40'-42'

$e_o = 0.93$

Most probable $\sigma_p' = 1.8$ tsf

Minimum possible $\sigma_p' = 1.2$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

$$C_c = \frac{e_6 - e_8}{\log\left(\frac{\sigma_8}{\sigma_6}\right)} = \frac{.832 - .644}{\log\left(\frac{8}{2}\right)} = 0.312$$

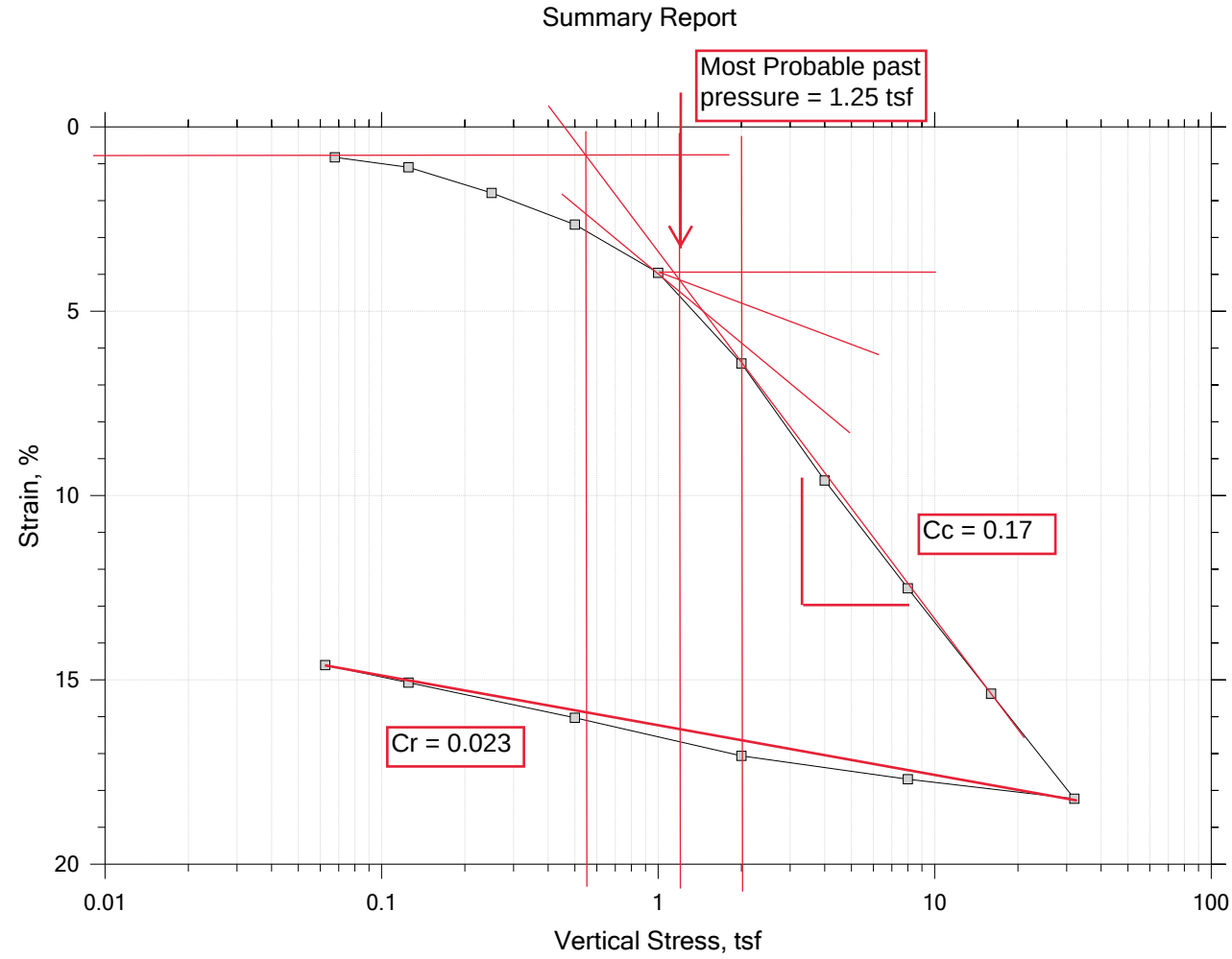
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{1F}}\right)} = \frac{.581 - .498}{\log\left(\frac{32}{.0625}\right)} = 0.031$$

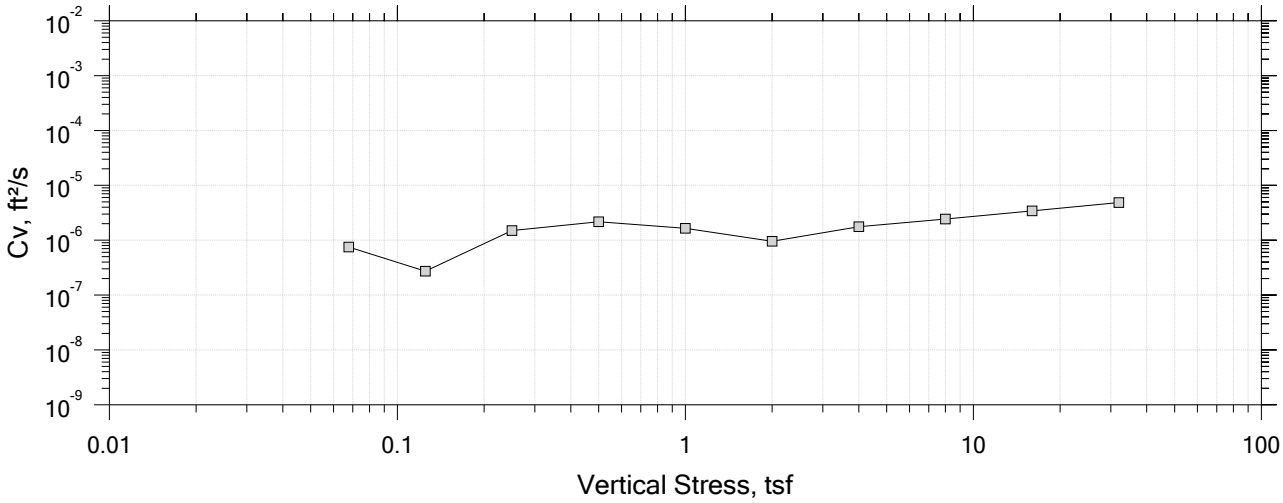
$$CR = \frac{C_c}{1 + e_o} = \frac{.312}{1 + .93} = 0.162$$

Performed By: LGH
Checked By: TAD

Performed By: LGH
Checked By: TAD

One-Dimensional Consolidation by ASTM D2435 - Method B





GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0678	0.008237	0.701	0.824	27.468	8.86e-07	1.22e-01	2.90e-04
2	0.125	0.01093	0.697	1.09	87.575	2.75e-07	4.70e-02	3.48e-05
3	0.250	0.01791	0.685	1.79	20.803	1.15e-06	5.59e-02	1.73e-04
4	0.500	0.02647	0.670	2.65	11.681	2.01e-06	3.42e-02	1.85e-04
5	1.00	0.03958	0.648	3.96	17.482	1.31e-06	2.62e-02	9.28e-05
6	2.00	0.06418	0.605	6.42	25.750	8.57e-07	2.46e-02	5.68e-05
7	4.00	0.09590	0.551	9.59	14.813	1.40e-06	1.59e-02	6.00e-05
8	8.00	0.1252	0.501	12.5	9.628	2.02e-06	7.31e-03	3.98e-05
9	16.0	0.1537	0.452	15.4	5.975	3.04e-06	3.57e-03	2.93e-05
10	32.0	0.1823	0.403	18.2	4.409	3.85e-06	1.78e-03	1.85e-05
11	8.00	0.1770	0.412	17.7	257.244	6.42e-08	2.21e-04	3.83e-08
12	2.00	0.1706	0.423	17.1	3.906	4.29e-06	1.05e-03	1.22e-05
13	0.500	0.1603	0.441	16.0	14.496	1.18e-06	6.89e-03	2.19e-05
14	0.125	0.1507	0.457	15.1	67.624	2.59e-07	2.55e-02	1.78e-05
15	0.0625	0.1460	0.465	14.6	135.510	1.31e-07	7.58e-02	2.68e-05

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/26/19	Depth: 30-32
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System O, Swell Pressure = 0.0678 tsf		
	Displacement at End of Increment		

Stantec

B-111

U-1

30'-32'

$e_o = 0.72$

Most Probable $\sigma_p' = 1.25$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

Minimum possible $\sigma_p' = 0.55$ tsf

$$C_c = \frac{e_b - e_g}{\log\left(\frac{\sigma_g}{\sigma_b}\right)} = \frac{.605 - .452}{\log\left(\frac{16}{2}\right)} = 0.169$$

$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.465 - .403}{\log\left(\frac{32}{.9625}\right)} = 0.023$$

$$CR = \frac{C_c}{1+e_o} = \frac{.169}{1+.72} = 0.098$$

Performed By: LGH
Checked By: TAD

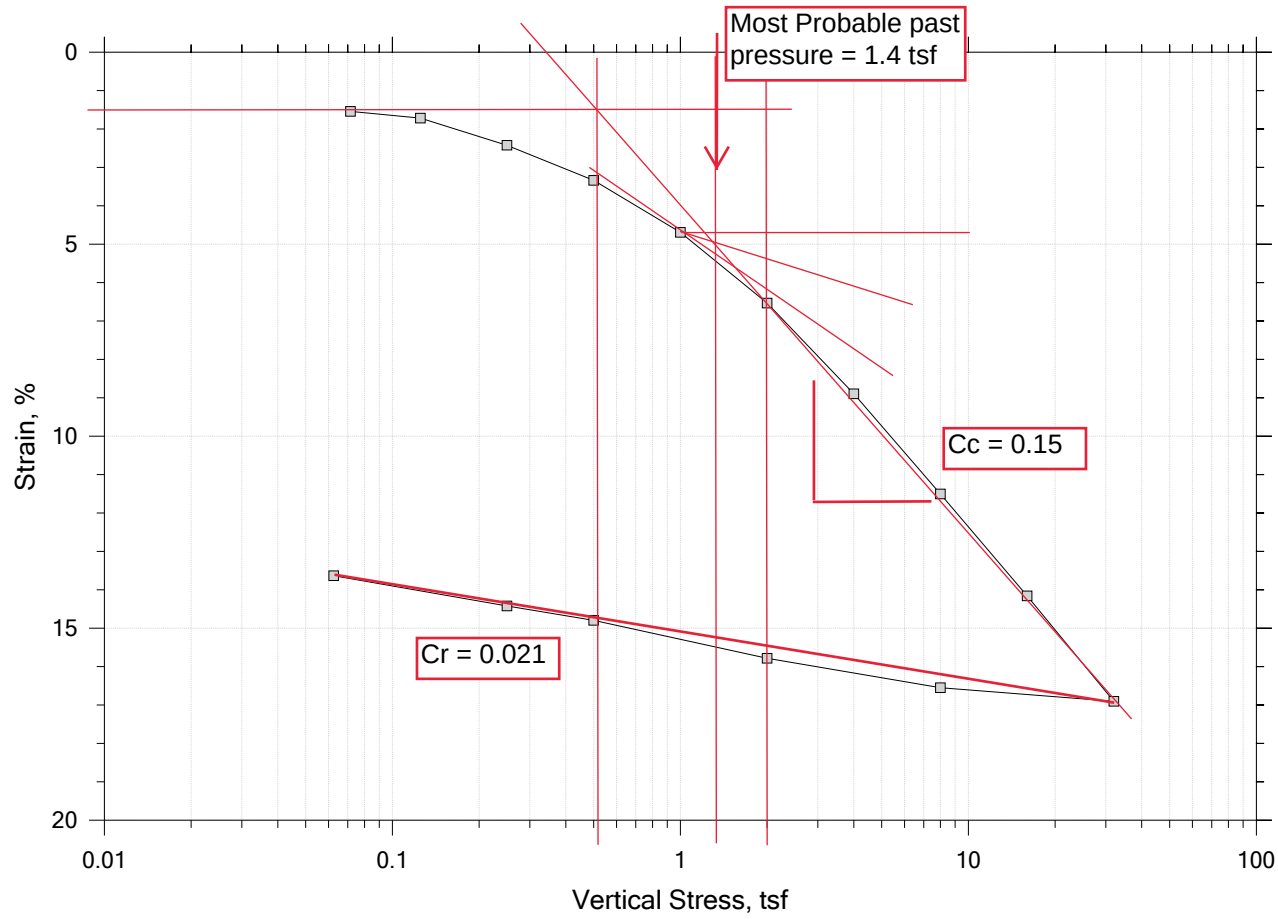
Designed by:

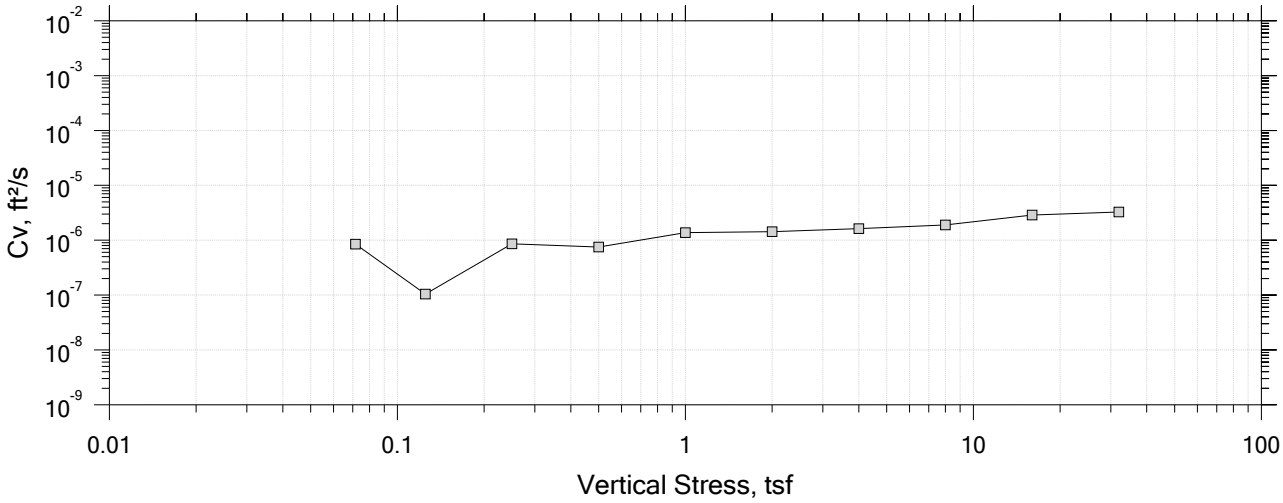
Checked by:

Performed By: LGH
Checked By: TAD

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report





GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0715	0.01541	0.727	1.54	22.398	1.08e-06	2.15e-01	6.27e-04
2	0.125	0.01717	0.724	1.72	209.337	1.13e-07	3.30e-02	1.01e-05
3	0.250	0.02422	0.711	2.42	19.935	1.18e-06	5.64e-02	1.80e-04
4	0.500	0.03335	0.695	3.34	33.697	6.87e-07	3.65e-02	6.77e-05
5	1.00	0.04689	0.672	4.69	18.174	1.24e-06	2.71e-02	9.09e-05
6	2.00	0.06533	0.639	6.53	15.101	1.45e-06	1.84e-02	7.20e-05
7	4.00	0.08895	0.598	8.90	16.813	1.24e-06	1.18e-02	3.96e-05
8	8.00	0.1150	0.552	11.5	11.631	1.70e-06	6.52e-03	2.99e-05
9	16.0	0.1416	0.506	14.2	7.311	2.55e-06	3.32e-03	2.28e-05
10	32.0	0.1691	0.457	16.9	6.052	2.89e-06	1.72e-03	1.34e-05
11	8.00	0.1655	0.464	16.5	2.904	5.86e-06	1.49e-04	2.36e-06
12	2.00	0.1578	0.477	15.8	7.626	2.26e-06	1.28e-03	7.79e-06
13	0.500	0.1480	0.494	14.8	22.789	7.73e-07	6.57e-03	1.37e-05
14	0.250	0.1442	0.501	14.4	66.592	2.69e-07	1.51e-02	1.09e-05
15	0.0625	0.1363	0.515	13.6	106.131	1.71e-07	4.19e-02	1.93e-05

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 12/27/19	Depth: 40-42
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System E, Swell Pressure = 0.0715 tsf		
	Displacement at End of Increment		

Stantec

B-111

U-2

40'-42'

$e_o = 0.75$

Most probable $\sigma_p' = 1.4$ tsf

Minimum possible $\sigma_p' = 0.52$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

$$C_c = \frac{e_6 - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_6}\right)} = \frac{.639 - .457}{\log\left(\frac{32}{2}\right)} = 0.151$$

$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.515 - .457}{\log\left(\frac{32}{.0625}\right)} = 0.021$$

$$CR = \frac{C_c}{1 + e_o} = \frac{.151}{1 + .75} = 0.086$$

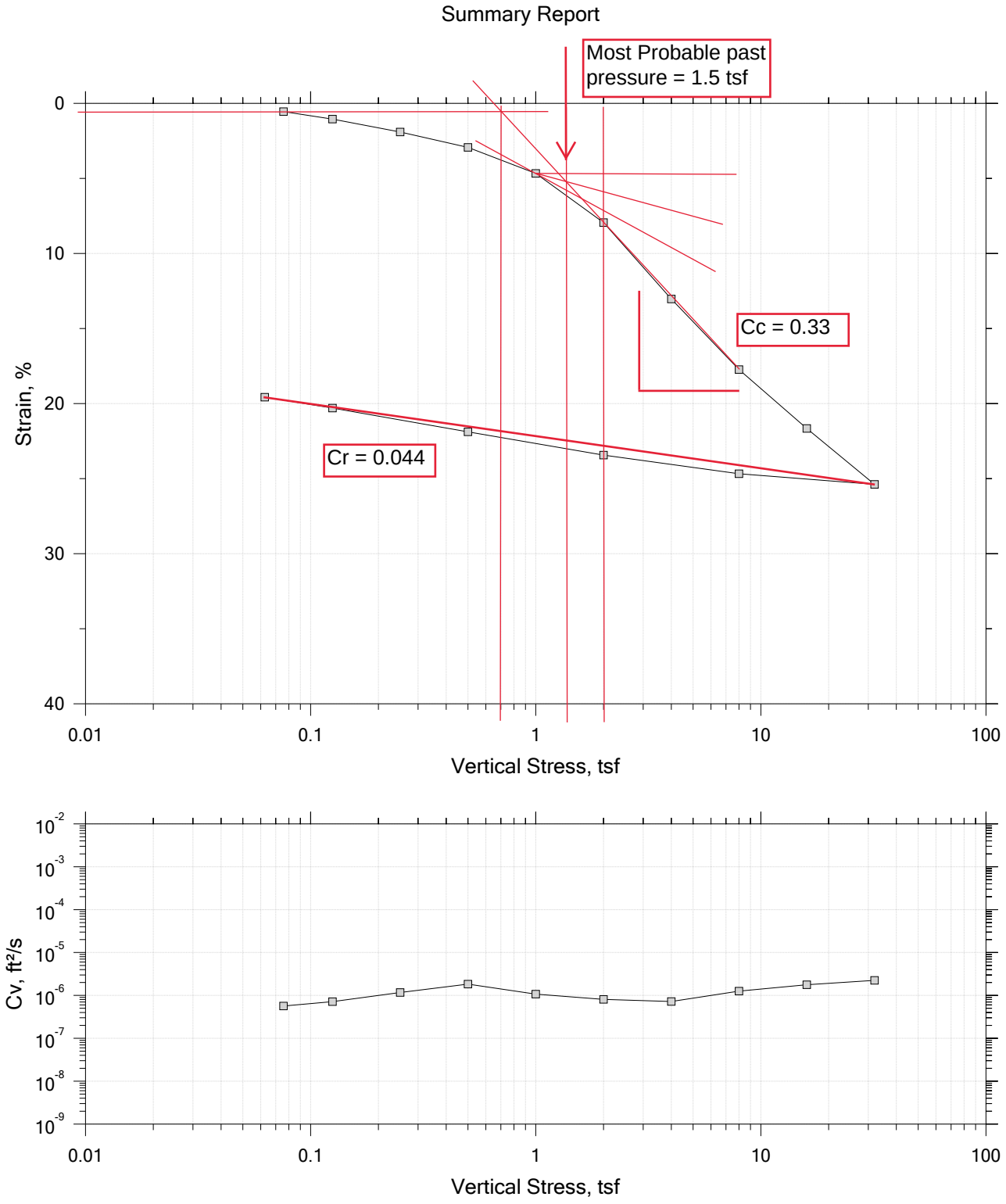
Performed By: LGH
Checked By: TAD

Designed by:

Checked by:

Performed By: LGH
Checked By: TAD

One-Dimensional Consolidation by ASTM D2435 - Method B



GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.0758	0.005504	1.03	0.550	35.165	6.94e-07	7.26e-02	1.36e-04
2	0.125	0.01044	1.02	1.04	43.633	5.53e-07	1.00e-01	1.50e-04
3	0.250	0.01907	1.00	1.91	22.798	1.04e-06	6.91e-02	1.95e-04
4	0.500	0.02935	0.982	2.93	13.332	1.75e-06	4.11e-02	1.94e-04
5	1.00	0.04666	0.947	4.67	17.260	1.32e-06	3.46e-02	1.23e-04
6	2.00	0.07937	0.880	7.94	27.764	7.76e-07	3.27e-02	6.84e-05
7	4.00	0.1303	0.776	13.0	30.518	6.44e-07	2.55e-02	4.42e-05
8	8.00	0.1774	0.680	17.7	15.904	1.10e-06	1.18e-02	3.51e-05
9	16.0	0.2166	0.600	21.7	10.006	1.58e-06	4.90e-03	2.09e-05
10	32.0	0.2538	0.524	25.4	7.296	1.97e-06	2.33e-03	1.24e-05
11	8.00	0.2467	0.538	24.7	4.388	3.14e-06	2.97e-04	2.51e-06
12	2.00	0.2343	0.564	23.4	9.777	1.45e-06	2.07e-03	8.09e-06
13	0.500	0.2188	0.595	21.9	35.746	4.11e-07	1.03e-02	1.14e-05
14	0.125	0.2030	0.628	20.3	113.877	1.34e-07	4.21e-02	1.52e-05
15	0.0625	0.1957	0.643	19.6	261.660	6.01e-08	1.17e-01	1.89e-05

GeoTesting EXPRESS	Project: ME Turnpike Authority Ex. 35/36	Location: Saco, ME	Project No.: GTX-311093
	Boring No.: B-111	Tested By: trm	Checked By: anm
	Sample No.: U-3	Test Date: 12/26/19	Depth: 50-52
	Test No.: IP-4	Sample Type: intact	Elevation: ---
	Description: Moist, olive gray clay		
	Remarks: System W, Swell Pressure = 0.0758 tsf		
	Displacement at End of Increment		

Stantec

B-111

U-3

50'-52'

$e_o = 1.04$

Most probable $\sigma_p' = 1.5$ tsf

Minimum possible $\sigma_p' = 0.7$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

$$C_c = \frac{e_6 - e_8}{\log\left(\frac{\sigma_8}{\sigma_6}\right)} = \frac{.880 - .680}{\log\left(\frac{8}{2}\right)} = 0.332$$

$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.643 - .524}{\log\left(\frac{32}{.0625}\right)} = 0.044$$

$$CR = \frac{C_c}{1 + e_o} = 0.163$$

Performed By: LGH
Checked By: TAD

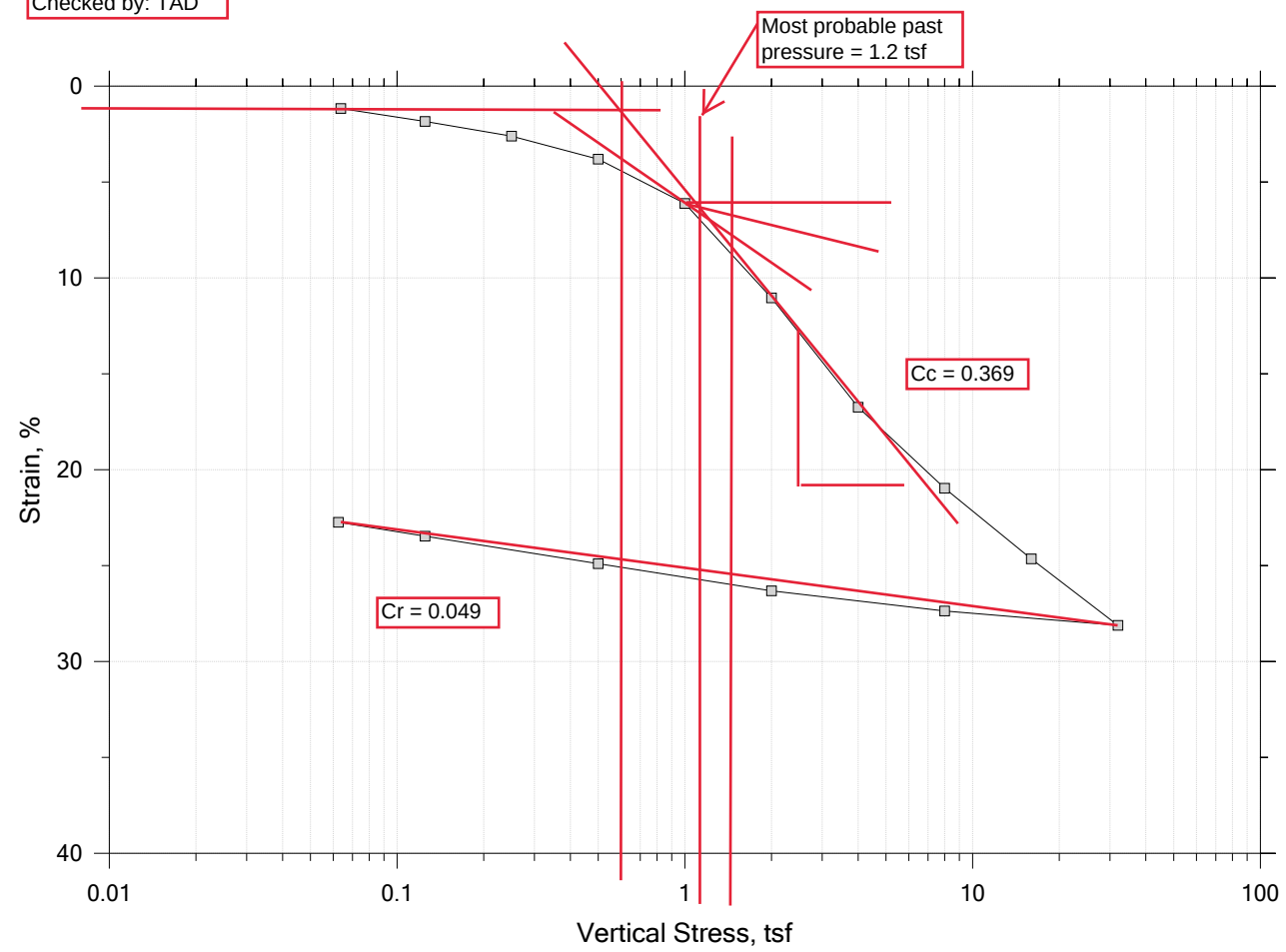
Designed by:

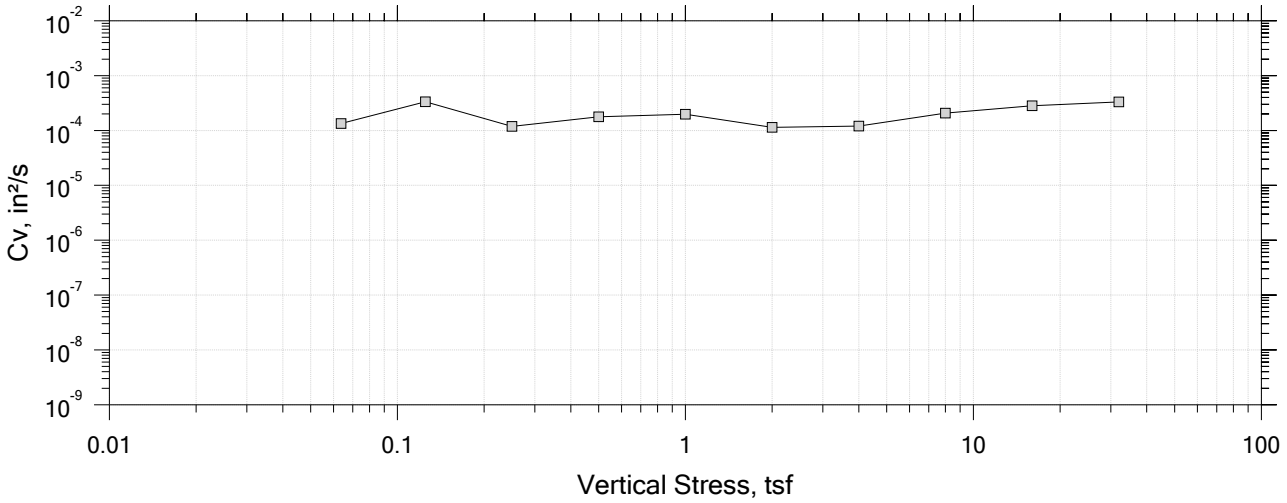
Checked by:

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by: TAD

Summary Report





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0637	0.01163	1.06	1.16	26.019	1.34e-04	1.82e-01	4.59e-04
2	0.125	0.01836	1.05	1.84	10.238	3.35e-04	1.10e-01	6.89e-04
3	0.250	0.02608	1.03	2.61	28.471	1.19e-04	6.18e-02	1.37e-04
4	0.500	0.03807	1.01	3.81	18.596	1.78e-04	4.80e-02	1.60e-04
5	1.00	0.06112	0.961	6.11	16.116	1.98e-04	4.61e-02	1.71e-04
6	2.00	0.1104	0.858	11.0	25.930	1.14e-04	4.93e-02	1.05e-04
7	4.00	0.1674	0.739	16.7	21.709	1.21e-04	2.85e-02	6.45e-05
8	8.00	0.2097	0.651	21.0	11.194	2.08e-04	1.06e-02	4.11e-05
9	16.0	0.2465	0.574	24.7	7.437	2.83e-04	4.60e-03	2.44e-05
10	32.0	0.2811	0.501	28.1	5.789	3.31e-04	2.16e-03	1.34e-05
11	8.00	0.2736	0.517	27.4	2.986	6.18e-04	3.12e-04	3.62e-06
12	2.00	0.2632	0.539	26.3	9.116	2.07e-04	1.75e-03	6.79e-06
13	0.500	0.2490	0.568	24.9	29.979	6.52e-05	9.44e-03	1.15e-05
14	0.125	0.2347	0.598	23.5	88.996	2.28e-05	3.82e-02	1.63e-05
15	0.0625	0.2274	0.614	22.7	264.240	7.91e-06	1.17e-01	1.73e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-203	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 12-14
	Test No.: IP-5	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-E, Swell Pressure = 0.0637 tsf		
	Displacement at End of Increment		

Performed by: LGH
Checked by: TAD

B-203

U-1

12'-14'

$e_o = 1.09$

Most probable $\sigma_p' =$ 1.2 tsf

Minimum possible $\sigma_p' =$ 0.6 tsf

Maximum possible $\sigma_p' =$ 1.5 tsf

$$C_c = \frac{e_5 - e_7}{\log\left(\frac{\sigma_7}{\sigma_5}\right)} = \frac{.961 - .739}{\log\left(\frac{4}{1}\right)} = 0.369$$

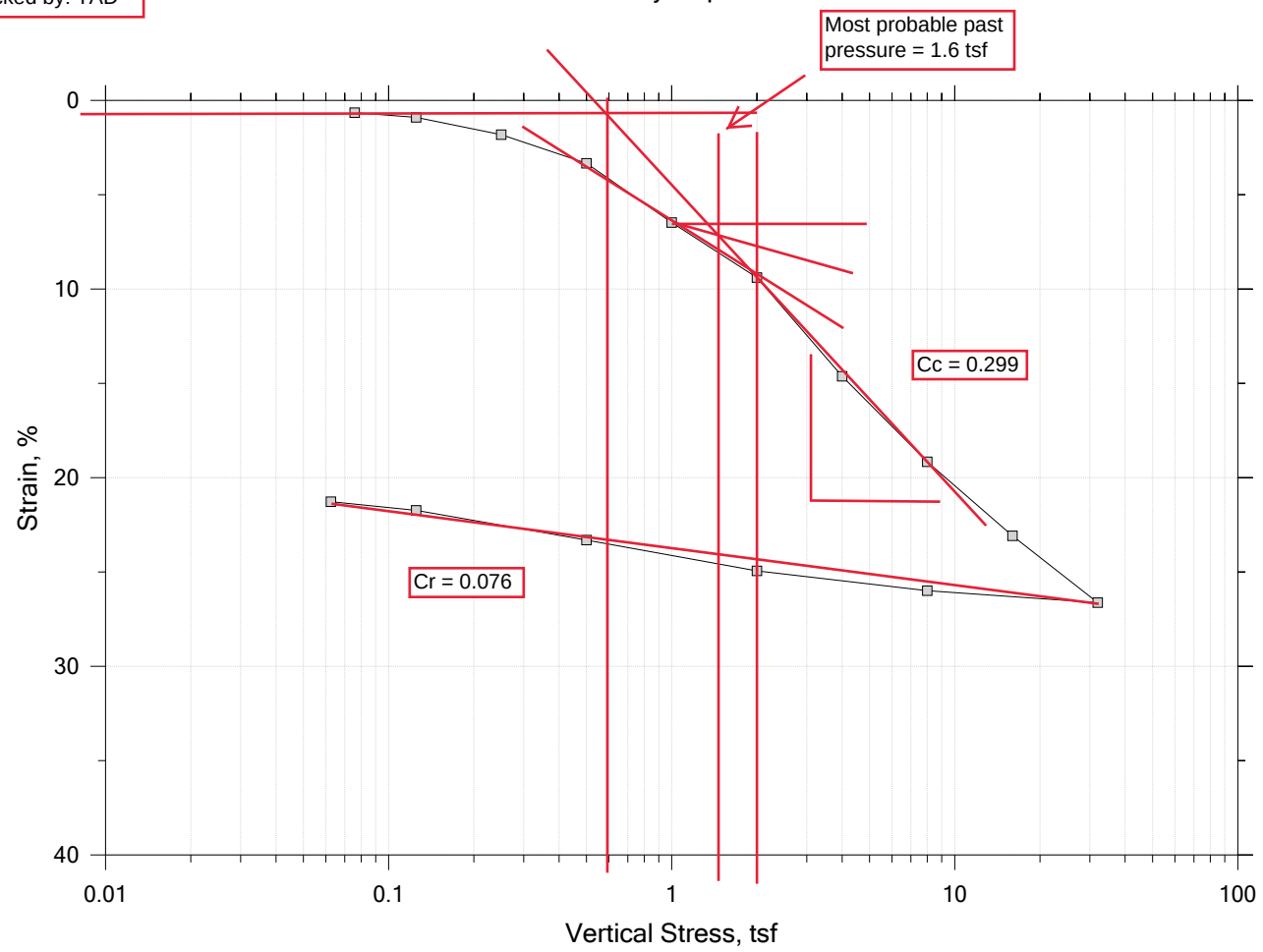
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.614 - .501}{\log\left(\frac{12.2}{.062}\right)} = 0.049$$

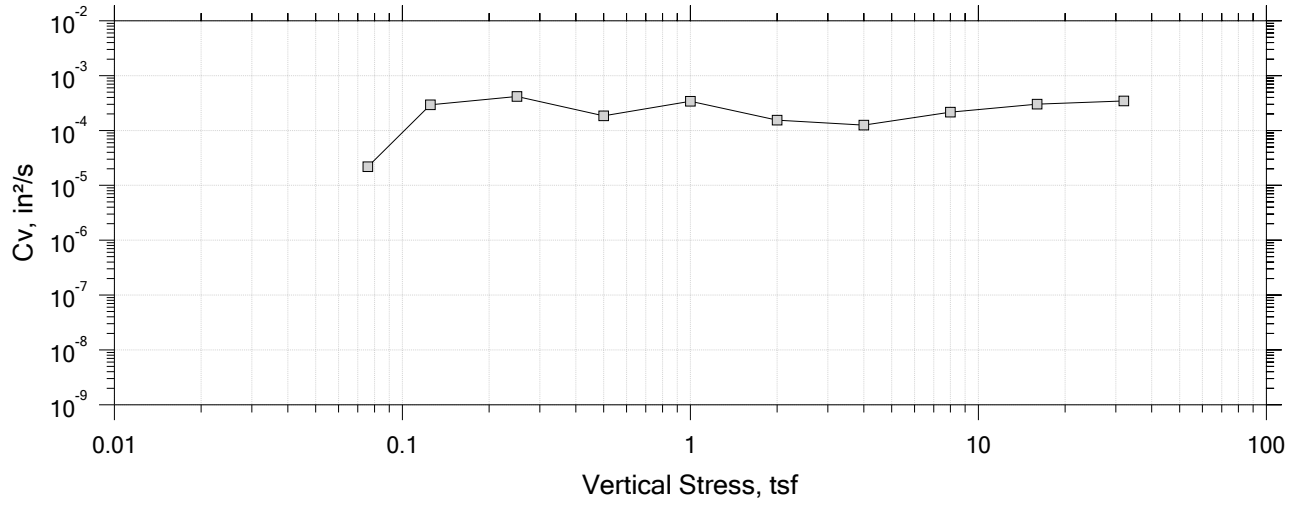
$$CR = \frac{C_c}{1+e_o} = \frac{.369}{1+1.09} = 0.177$$

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by: TAD

Summary Report





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0759	0.006477	0.832	0.648	160.690	2.18e-05	8.53e-02	3.49e-05
2	0.125	0.008986	0.827	0.899	11.811	2.95e-04	5.11e-02	2.82e-04
3	0.250	0.01810	0.810	1.81	8.225	4.18e-04	7.29e-02	5.71e-04
4	0.500	0.03328	0.782	3.33	18.123	1.85e-04	6.07e-02	2.10e-04
5	1.00	0.06476	0.724	6.48	9.401	3.40e-04	6.30e-02	4.01e-04
6	2.00	0.09391	0.670	9.39	19.464	1.54e-04	2.92e-02	8.40e-05
7	4.00	0.1462	0.574	14.6	21.821	1.25e-04	2.62e-02	6.14e-05
8	8.00	0.1916	0.490	19.2	11.296	2.16e-04	1.13e-02	4.59e-05
9	16.0	0.2309	0.418	23.1	7.289	3.02e-04	4.91e-03	2.77e-05
10	32.0	0.2662	0.353	26.6	5.791	3.45e-04	2.21e-03	1.43e-05
11	8.00	0.2599	0.364	26.0	2.983	6.43e-04	2.61e-04	3.15e-06
12	2.00	0.2494	0.384	24.9	9.500	2.07e-04	1.76e-03	6.82e-06
13	0.500	0.2331	0.414	23.3	20.309	1.00e-04	1.09e-02	2.04e-05
14	0.125	0.2173	0.443	21.7	36.140	5.87e-05	4.20e-02	4.62e-05
15	0.0625	0.2128	0.451	21.3	108.205	2.01e-05	7.29e-02	2.75e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-205	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/14/20	Depth: 17-19
	Test No.: IP-6	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-F, Swell Pressure = 0.0759 tsf		
	Displacement at End of Increment		

Performed by: LGH
Checked by: TAD

B-205

U-1

17' - 19'

$c_o = 0.843$

Most probable $\sigma_p' = 1.6$ tsf

Minimum possible $\sigma_p' = 0.55$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

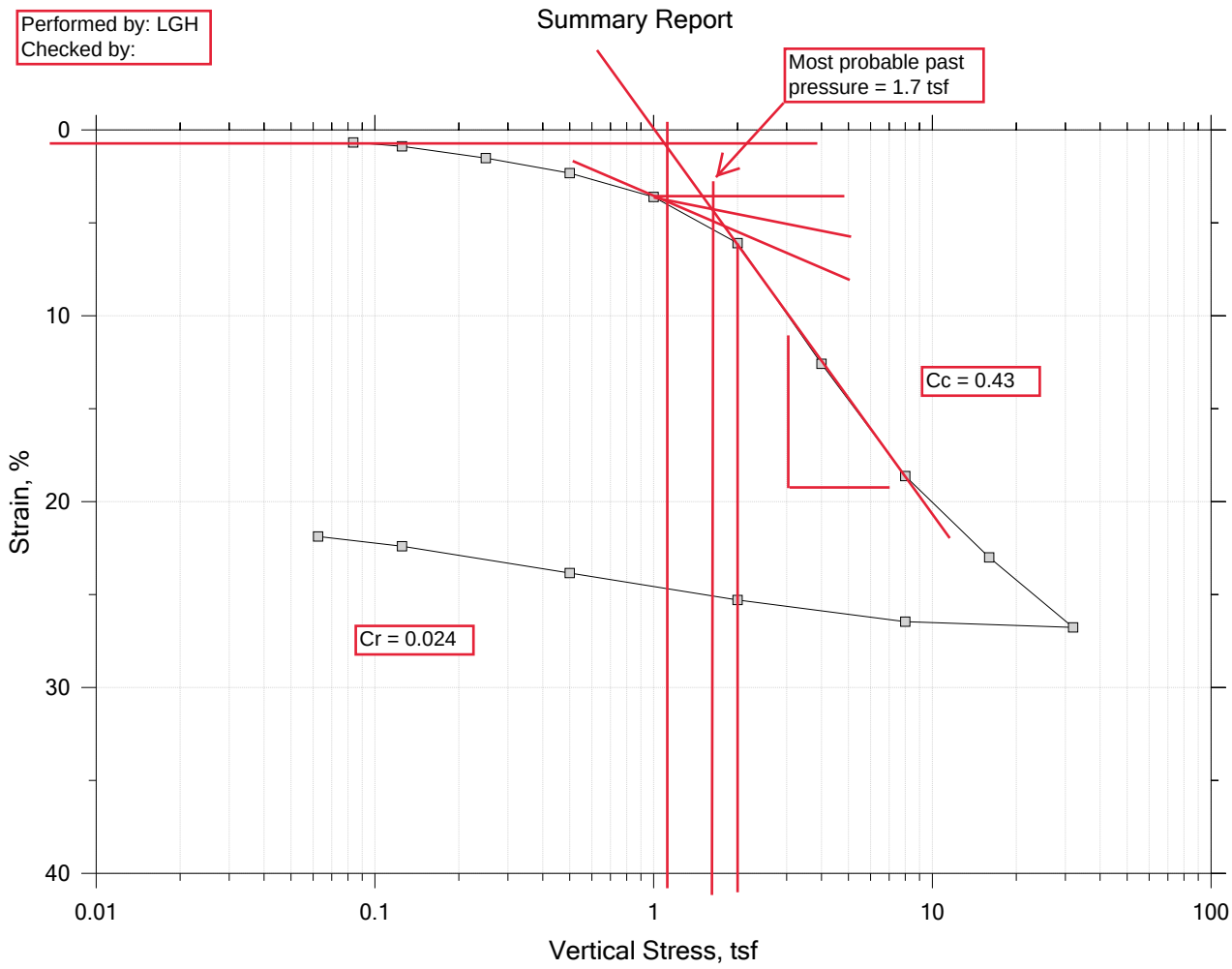
$$C_c = \frac{e_6 - e_8}{\log\left(\frac{\sigma_8}{\sigma_6}\right)} = \frac{.67 - .49}{\log\left(\frac{8}{2}\right)} = 0.299$$

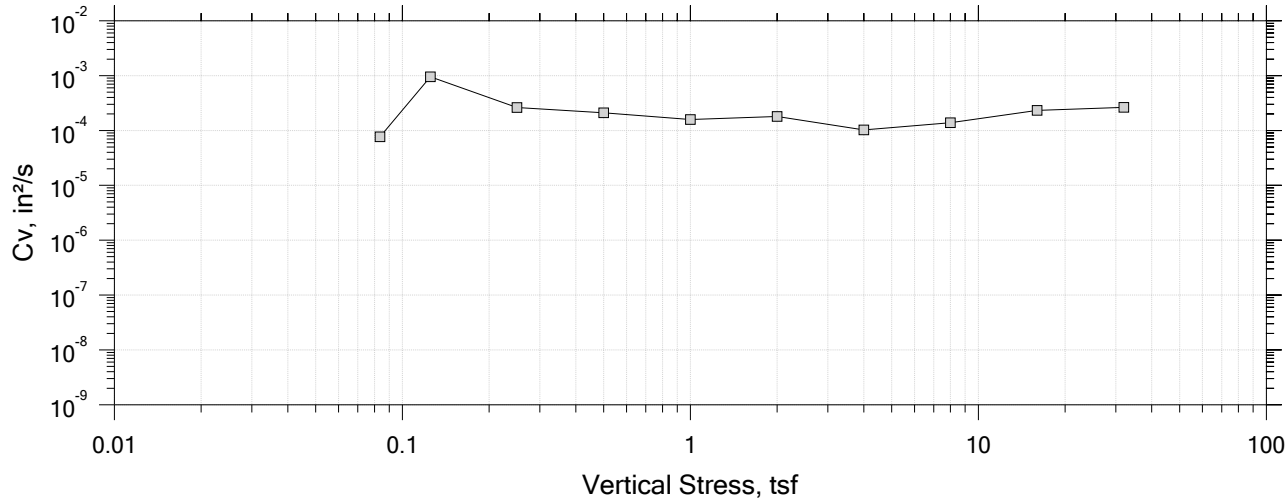
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.451 - .353}{\log\left(\frac{12.2}{.062}\right)} = 0.076$$

$$CR = \frac{C_c}{1 + e_o} = \frac{.299}{1 + .843} = 0.162$$

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by:





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay with fine sand		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0836	0.006732	1.06	0.673	45.677	7.68e-05	8.05e-02	1.16e-04
2	0.125	0.008766	1.06	0.877	3.643	9.55e-04	4.92e-02	8.79e-04
3	0.250	0.01510	1.05	1.51	13.192	2.61e-04	5.07e-02	2.48e-04
4	0.500	0.02319	1.03	2.32	16.182	2.10e-04	3.24e-02	1.27e-04
5	1.00	0.03604	1.00	3.60	21.025	1.58e-04	2.57e-02	7.62e-05
6	2.00	0.06088	0.950	6.09	17.753	1.80e-04	2.48e-02	8.38e-05
7	4.00	0.1258	0.815	12.6	28.306	1.03e-04	3.25e-02	6.24e-05
8	8.00	0.1862	0.690	18.6	18.116	1.39e-04	1.51e-02	3.93e-05
9	16.0	0.2300	0.599	23.0	9.546	2.32e-04	5.47e-03	2.38e-05
10	32.0	0.2676	0.521	26.8	7.547	2.64e-04	2.35e-03	1.16e-05
11	8.00	0.2646	0.527	26.5	5.965	3.19e-04	1.27e-04	7.60e-07
12	2.00	0.2529	0.551	25.3	7.728	2.51e-04	1.95e-03	9.16e-06
13	0.500	0.2384	0.582	23.8	38.199	5.26e-05	9.66e-03	9.52e-06
14	0.125	0.2240	0.611	22.4	126.891	1.65e-05	3.84e-02	1.18e-05
15	0.0625	0.2188	0.622	21.9	130.170	1.65e-05	8.38e-02	2.58e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-206	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 1/7/20	Depth: 12-14
	Test No.: IP-9	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System LTIII-A, Swell Pressure = 0.0836 tsf		
	Displacement at End of Increment		

Stantec

Performed by: TAD
Checked by: LGH

B-206

U-1

12'-14'

$e_o = 1.08$

Most probable $\sigma'_p = 1.7$ tsf = 3,400 psf

Minimum possible $\sigma'_p = 1.2$ tsf

Maximum possible $\sigma'_p = 2.0$ tsf

$$C_c = \frac{e_6 - e_8}{\log\left(\frac{\sigma_8}{\sigma_6}\right)} = \frac{0.950 - 0.690}{\log\left(\frac{8}{2}\right)} = 0.43$$

$$C_r = \frac{e_{14} - e_{12}}{\log\left(\frac{\sigma_{12}}{\sigma_{14}}\right)} = \frac{0.611 - 0.551}{\log\left(\frac{2}{0.125}\right)} = 0.050$$

$$CR = \frac{C_c}{1 + e_o} = \frac{0.43}{1 + 1.08} = 0.21$$

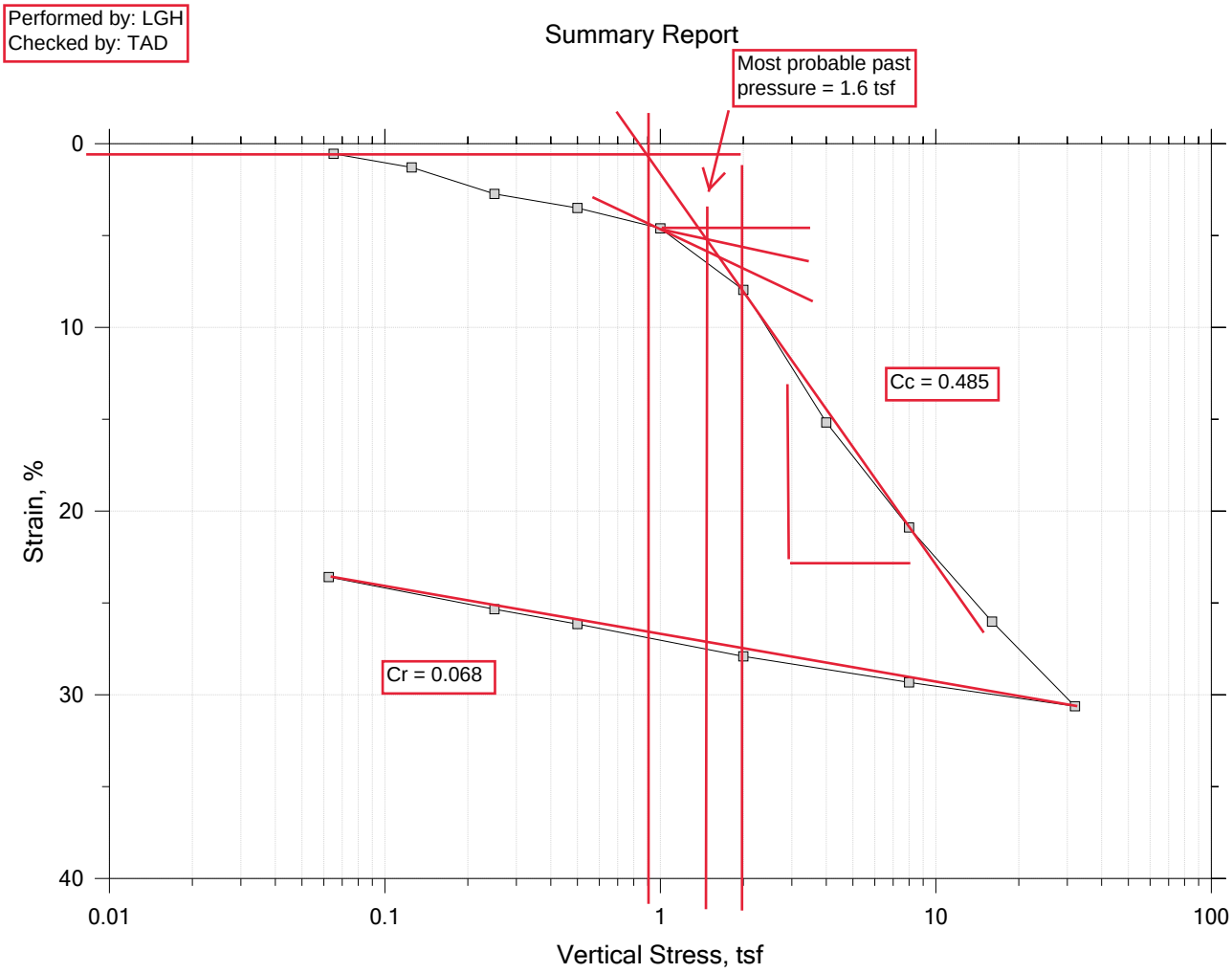
$$RR = \frac{C_r}{1 + e_o} = \frac{0.050}{1 + 1.08} = 0.024$$

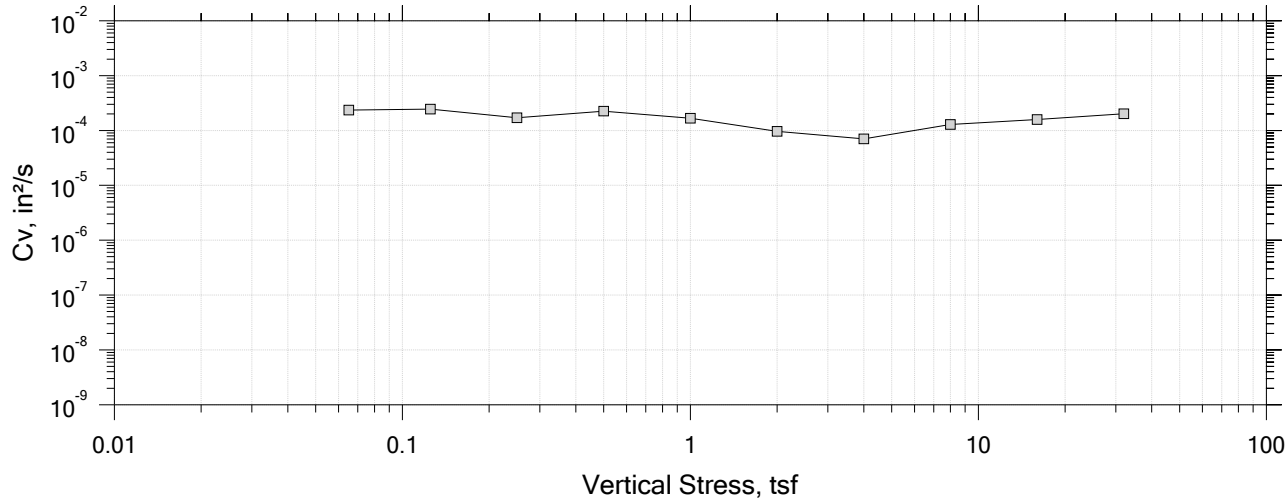
Designed by:

Checked by:

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by: TAD





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0651	0.005433	1.21	0.543	14.872	2.36e-04	8.34e-02	3.69e-04
2	0.125	0.01291	1.19	1.29	14.190	2.44e-04	1.25e-01	5.72e-04
3	0.250	0.02730	1.16	2.73	19.857	1.71e-04	1.15e-01	3.69e-04
4	0.500	0.03494	1.14	3.49	14.711	2.25e-04	3.05e-02	1.29e-04
5	1.00	0.04608	1.12	4.61	19.494	1.67e-04	2.23e-02	6.96e-05
6	2.00	0.07954	1.05	7.95	32.257	9.62e-05	3.35e-02	6.03e-05
7	4.00	0.1517	0.885	15.2	39.363	7.02e-05	3.61e-02	4.75e-05
8	8.00	0.2089	0.758	20.9	18.391	1.29e-04	1.43e-02	3.46e-05
9	16.0	0.2601	0.644	26.0	13.024	1.59e-04	6.40e-03	1.91e-05
10	32.0	0.3063	0.542	30.6	9.003	2.02e-04	2.88e-03	1.09e-05
11	8.00	0.2933	0.571	29.3	4.168	4.16e-04	5.42e-04	4.22e-06
12	2.00	0.2790	0.602	27.9	12.954	1.39e-04	2.37e-03	6.17e-06
13	0.500	0.2615	0.641	26.1	42.094	4.47e-05	1.17e-02	9.80e-06
14	0.250	0.2534	0.659	25.3	122.849	1.59e-05	3.25e-02	9.65e-06
15	0.0625	0.2359	0.698	23.6	174.684	1.15e-05	9.29e-02	2.01e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-207	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 13-15 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0836, Swell Pressure = 0.0651 tsf		
	Displacement at End of Increment		

Performed by: LGH
Checked by: TAD

B-207

U-1

13'-15'

$e_o = 1.22$

Most probable $\sigma_p' = 1.6$ tsf

Minimum possible $\sigma_p' = 0.95$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

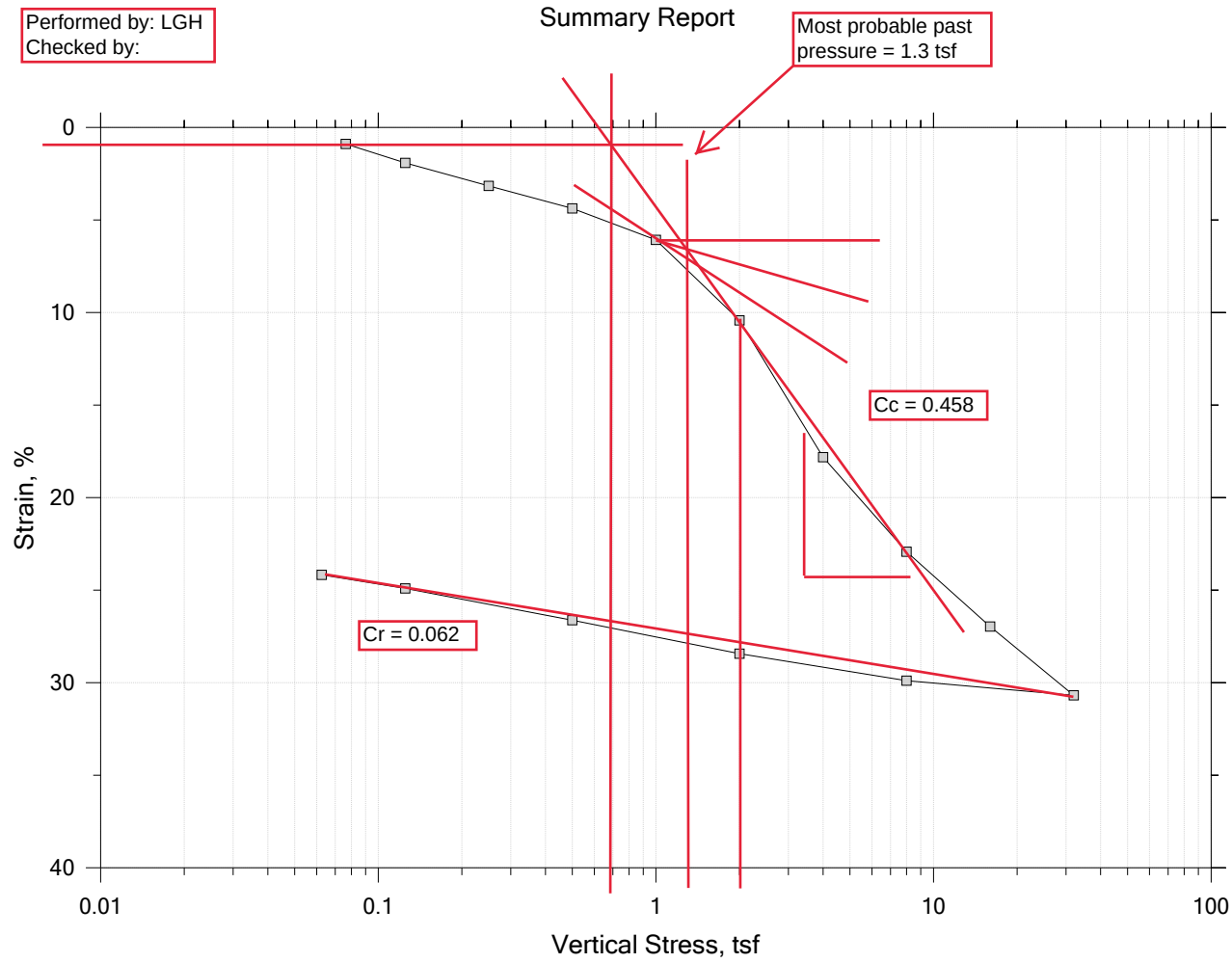
$$C_c = \frac{e_6 - e_8}{\log\left(\frac{\sigma_8}{\sigma_6}\right)} = \frac{1.05 - .758}{\log\left(\frac{8}{2}\right)} = 0.485$$

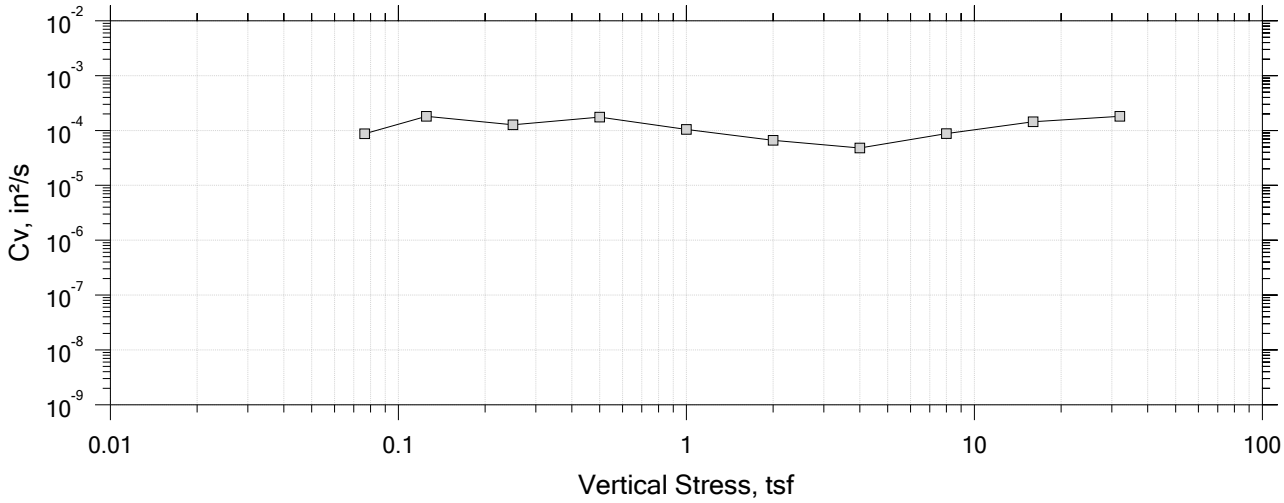
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.698 - .542}{\log\left(\frac{12.2}{.062}\right)} = 0.068$$

$$CR = \frac{C_c}{1 + e_o} = \frac{.485}{1 + 1.22} = 0.218$$

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by:





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0763	0.008853	1.19	0.885	40.284	8.69e-05	1.16e-01	1.89e-04
2	0.125	0.01913	1.17	1.91	18.926	1.82e-04	2.11e-01	7.18e-04
3	0.250	0.03155	1.14	3.15	26.514	1.27e-04	9.94e-02	2.36e-04
4	0.500	0.04374	1.11	4.37	18.623	1.76e-04	4.88e-02	1.60e-04
5	1.00	0.06075	1.07	6.08	30.332	1.05e-04	3.40e-02	6.67e-05
6	2.00	0.1043	0.978	10.4	44.823	6.64e-05	4.35e-02	5.41e-05
7	4.00	0.1781	0.815	17.8	54.381	4.79e-05	3.69e-02	3.32e-05
8	8.00	0.2292	0.702	22.9	25.522	8.78e-05	1.28e-02	2.10e-05
9	16.0	0.2697	0.613	27.0	13.832	1.44e-04	5.05e-03	1.36e-05
10	32.0	0.3069	0.531	30.7	9.895	1.81e-04	2.32e-03	7.87e-06
11	8.00	0.2989	0.548	29.9	4.059	4.23e-04	3.29e-04	2.61e-06
12	2.00	0.2843	0.580	28.4	11.994	1.48e-04	2.44e-03	6.76e-06
13	0.500	0.2662	0.620	26.6	50.998	3.64e-05	1.20e-02	8.21e-06
14	0.125	0.2490	0.658	24.9	163.926	1.19e-05	4.58e-02	1.02e-05
15	0.0625	0.2418	0.674	24.2	274.959	7.32e-06	1.16e-01	1.59e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 12/28/20	Depth: 10-12
	Test No.: IP-7	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

Performed by: LGH
Checked by: TAD

B-208

U-1

10' - 12'

$e_o = 1.21$

Most probable $\sigma_p' = 1.3$ tsf

Minimum possible $\sigma_p' = 0.7$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

$$C_c = \frac{e_o - e_8}{\log\left(\frac{\sigma_8'}{\sigma_o'}\right)} = \frac{0.978 - 0.702}{\log\left(\frac{8}{2}\right)} = 0.458$$

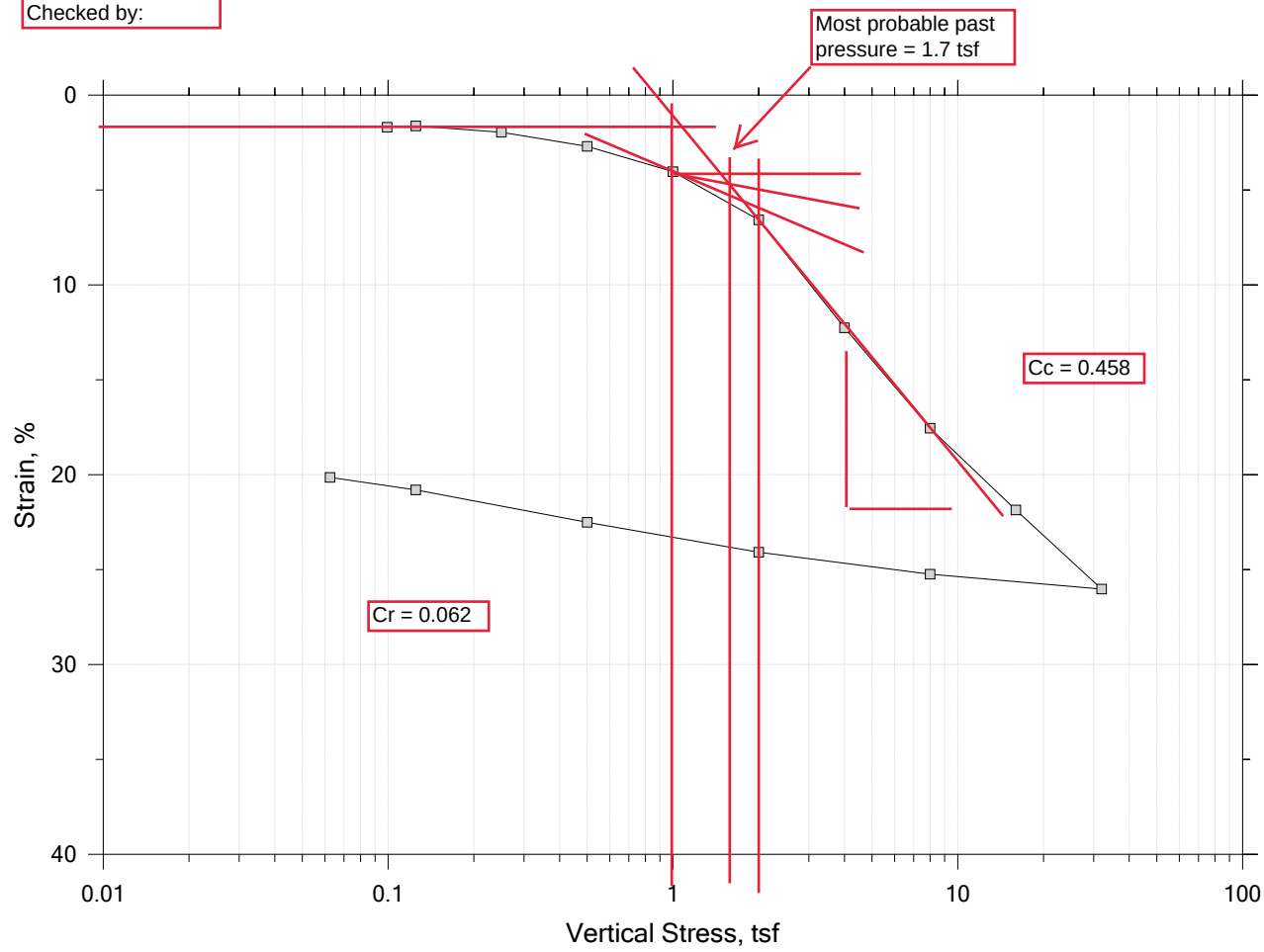
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_o}{\sigma_{15}}\right)} = \frac{0.674 - 0.531}{\log\left(\frac{12.2}{.062}\right)} = 0.062$$

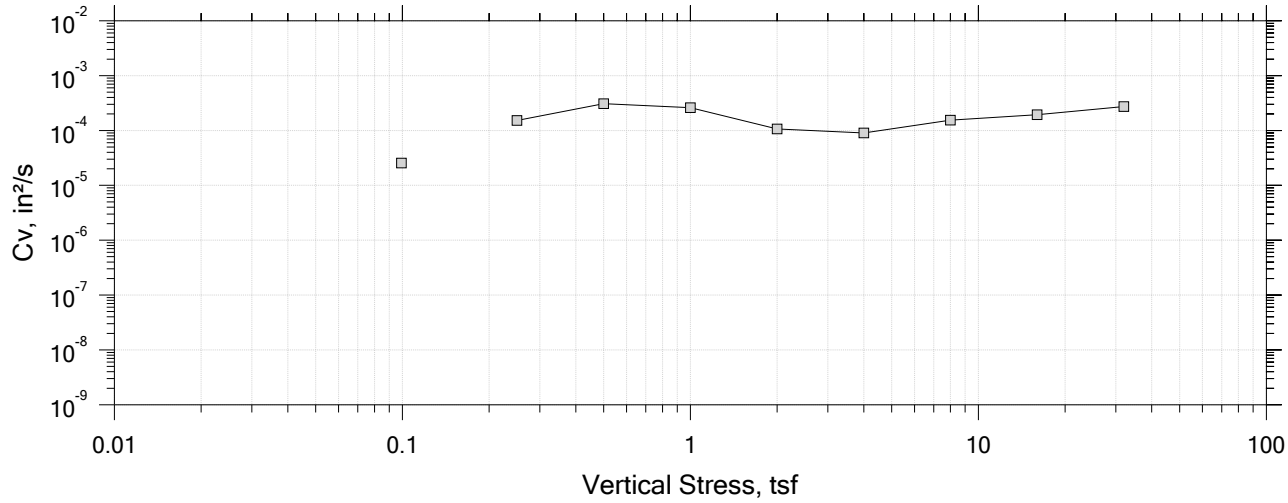
$$CR = \frac{C_c}{1 + e_o} = \frac{.458}{1 + 1.21} = 0.207$$

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by:

Summary Report





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0993	0.01687	0.944	1.69	136.143	2.55e-05	1.70e-01	8.12e-05
2	0.125	0.01625	0.945	1.63	---	---	-2.40e-02	---
3	0.250	0.01958	0.939	1.96	22.424	1.52e-04	2.66e-02	7.57e-05
4	0.500	0.02700	0.924	2.70	10.968	3.07e-04	2.97e-02	1.71e-04
5	1.00	0.04030	0.898	4.03	12.701	2.60e-04	2.66e-02	1.29e-04
6	2.00	0.06572	0.847	6.57	29.812	1.06e-04	2.54e-02	5.06e-05
7	4.00	0.1226	0.735	12.3	32.120	9.03e-05	2.84e-02	4.81e-05
8	8.00	0.1755	0.630	17.5	16.591	1.54e-04	1.32e-02	3.82e-05
9	16.0	0.2185	0.545	21.9	11.770	1.94e-04	5.38e-03	1.95e-05
10	32.0	0.2602	0.463	26.0	7.508	2.72e-04	2.61e-03	1.33e-05
11	8.00	0.2524	0.478	25.2	3.998	4.89e-04	3.27e-04	3.00e-06
12	2.00	0.2408	0.501	24.1	9.427	2.13e-04	1.93e-03	7.68e-06
13	0.500	0.2251	0.532	22.5	36.538	5.69e-05	1.05e-02	1.12e-05
14	0.125	0.2080	0.566	20.8	140.785	1.54e-05	4.56e-02	1.32e-05
15	0.0625	0.2014	0.579	20.1	191.037	1.17e-05	1.05e-01	2.31e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-208	Tested By: jlw	Checked By: anm
	Sample No.: U-2	Test Date: 12/31/20	Depth: 18-20
	Test No.: IP-7a	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-0837, Swell Pressure = 0.0993 tsf		
	Displacement at End of Increment		

Performed by: LGH
Checked by: TAD

B-208

U-2

18'-20'

$e_o = 0.977$

Most probable $\sigma_p' = 1.7$ tsf

Minimum possible $\sigma_p' = 1.0$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

$$C_c = \frac{e_b - e_8}{\log\left(\frac{\sigma_8'}{\sigma_b'}\right)} = \frac{0.847 - 0.630}{\log\left(\frac{8}{2}\right)} = 0.360$$

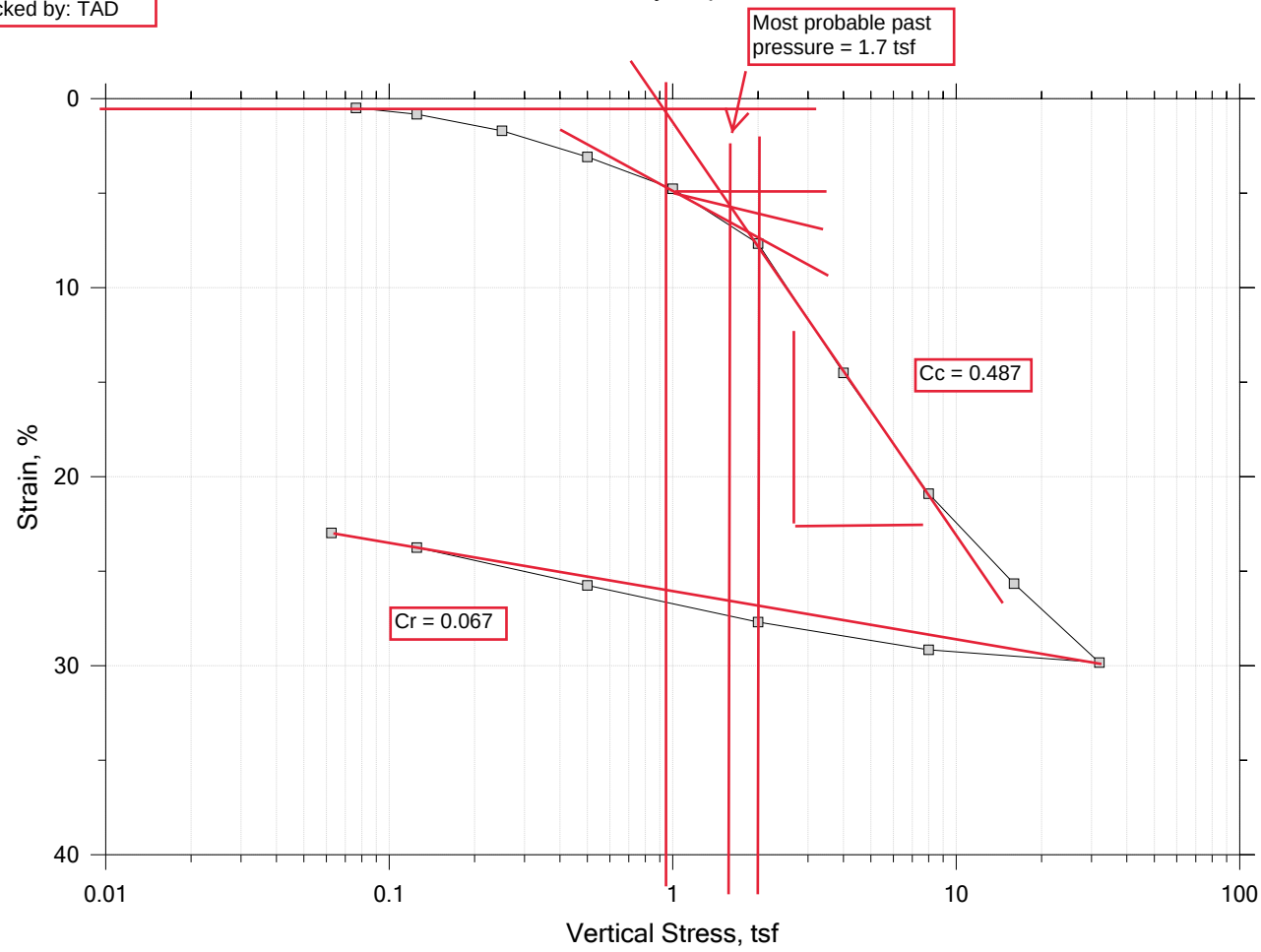
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{e_{10}}{e_{15}}\right)} = \frac{0.579 - 0.463}{\log\left(\frac{12.2}{.062}\right)} = 0.051$$

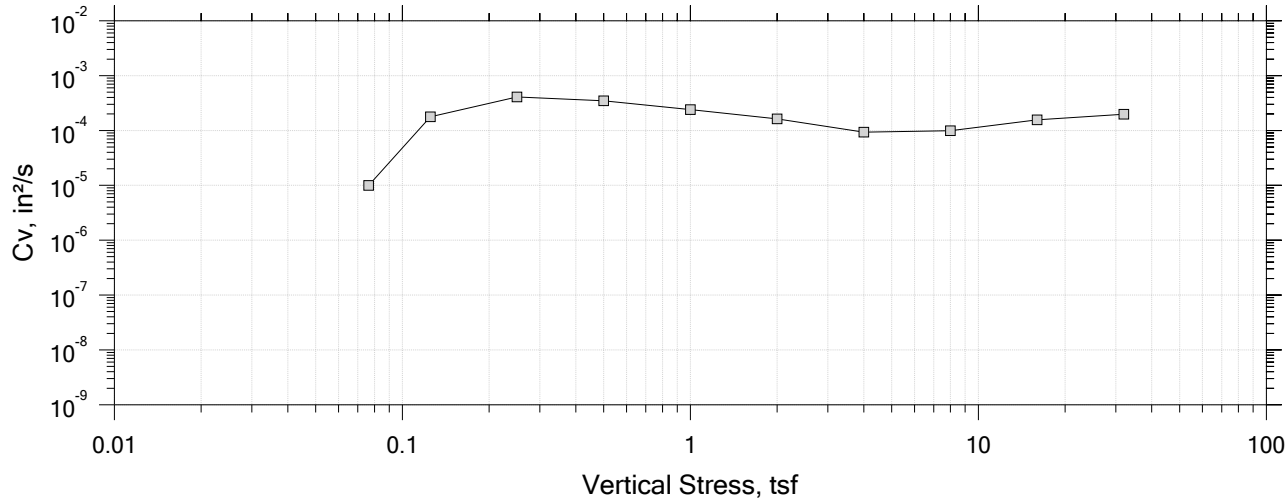
$$CR = \frac{C_c}{1+e_o} = \frac{0.360}{1+.977} = 0.182$$

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by: TAD

Summary Report





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0763	0.004897	1.22	0.490	354.175	9.93e-06	6.41e-02	1.19e-05
2	0.125	0.008211	1.22	0.821	19.614	1.78e-04	6.81e-02	2.27e-04
3	0.250	0.01695	1.20	1.69	8.427	4.09e-04	6.99e-02	5.35e-04
4	0.500	0.03080	1.16	3.08	9.684	3.48e-04	5.54e-02	3.61e-04
5	1.00	0.04761	1.13	4.76	13.589	2.40e-04	3.36e-02	1.51e-04
6	2.00	0.07666	1.06	7.67	19.112	1.63e-04	2.90e-02	8.85e-05
7	4.00	0.1450	0.910	14.5	29.882	9.35e-05	3.42e-02	5.99e-05
8	8.00	0.2090	0.767	20.9	24.156	9.91e-05	1.60e-02	2.97e-05
9	16.0	0.2566	0.660	25.7	13.285	1.57e-04	5.95e-03	1.75e-05
10	32.0	0.2983	0.567	29.8	9.304	1.98e-04	2.61e-03	9.67e-06
11	8.00	0.2915	0.582	29.2	4.018	4.37e-04	2.82e-04	2.31e-06
12	2.00	0.2769	0.615	27.7	13.095	1.38e-04	2.44e-03	6.32e-06
13	0.500	0.2575	0.658	25.8	43.625	4.35e-05	1.29e-02	1.05e-05
14	0.125	0.2375	0.703	23.7	123.458	1.62e-05	5.34e-02	1.62e-05
15	0.0625	0.2297	0.720	23.0	334.232	6.21e-06	1.24e-01	1.45e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-1	Test Date: 11/30/20	Depth: 62-64 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-16-0834, Swell Pressure = 0.0763 tsf		
	Displacement at End of Increment		

Performed by: LGH
Checked by: TAD

B-211

U-1

62'-64'

$e_o = 1.23$

Most probable $\sigma_p' = 1.7$ tsf

Minimum possible $\sigma_p' = 0.95$ tsf

Maximum possible $\sigma_p' = 2.0$ tsf

$$C_c = \frac{e_6 - e_8}{\log\left(\frac{\sigma_8}{\sigma_6}\right)} = \frac{1.06 - .767}{\log\left(\frac{8}{6}\right)} = 0.487$$

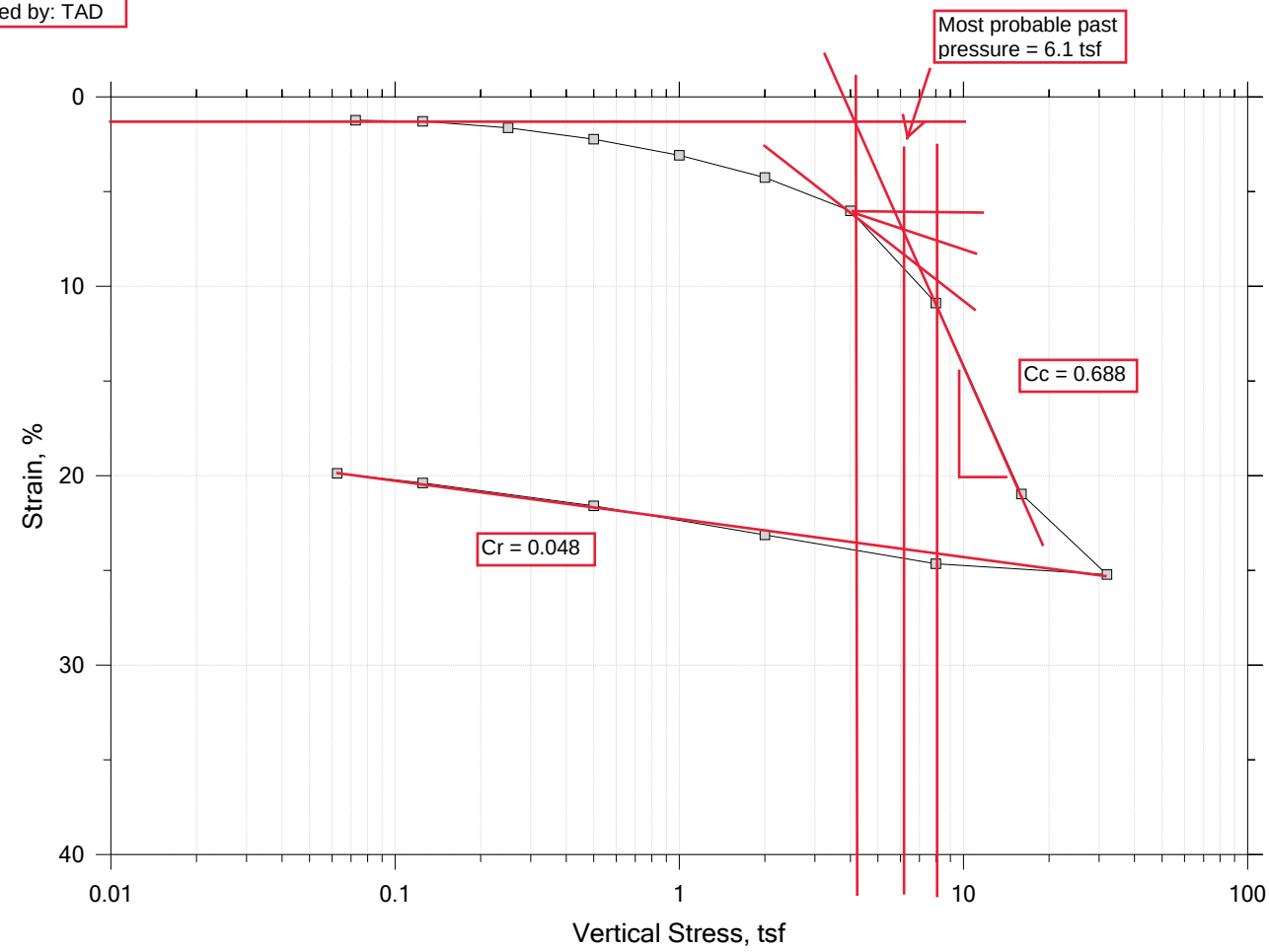
$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.72 - .567}{\log\left(\frac{12.2}{.062}\right)} = 0.067$$

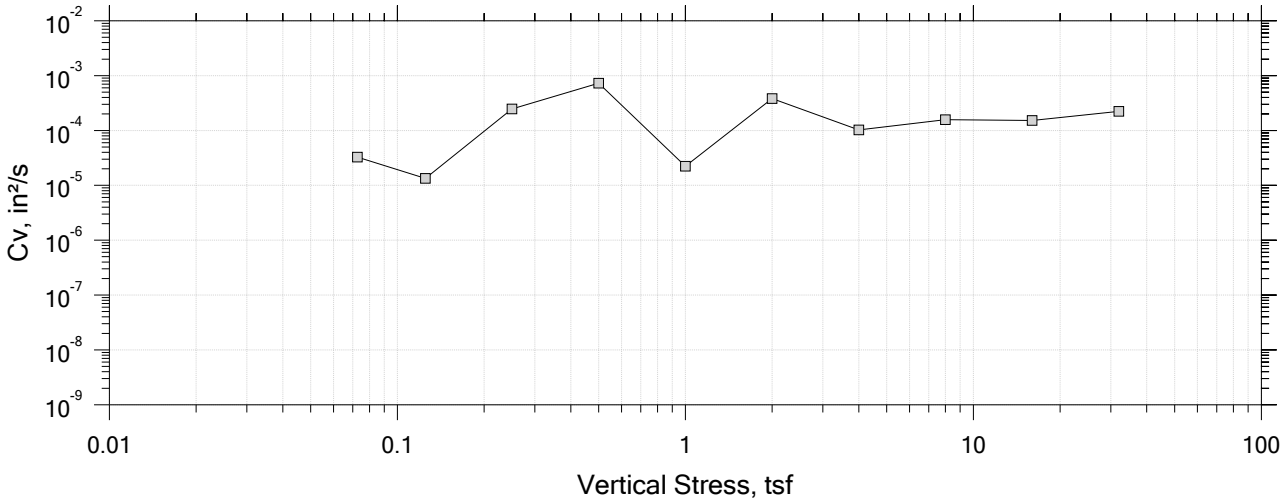
$$CR = \frac{C_c}{1 + e_o} = \frac{.487}{1 + 1.23} = 0.218$$

One-Dimensional Consolidation by ASTM D2435 - Method B

Performed by: LGH
Checked by: TAD

Summary Report





GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv in²/s	Mv 1/tsf	k ft/day
1	0.0727	0.01233	1.02	1.23	106.853	3.27e-05	1.70e-01	1.04e-04
2	0.125	0.01286	1.02	1.29	257.383	1.34e-05	1.00e-02	2.51e-06
3	0.250	0.01627	1.01	1.63	13.876	2.47e-04	2.73e-02	1.26e-04
4	0.500	0.02230	1.00	2.23	4.679	7.26e-04	2.41e-02	3.28e-04
5	1.00	0.03085	0.982	3.08	149.775	2.24e-05	1.71e-02	7.16e-06
6	2.00	0.04257	0.958	4.26	8.609	3.81e-04	1.17e-02	8.36e-05
7	4.00	0.06017	0.922	6.02	31.057	1.02e-04	8.80e-03	1.69e-05
8	8.00	0.1088	0.823	10.9	18.755	1.58e-04	1.22e-02	3.60e-05
9	16.0	0.2097	0.616	21.0	16.463	1.52e-04	1.26e-02	3.58e-05
10	32.0	0.2521	0.529	25.2	9.334	2.24e-04	2.65e-03	1.11e-05
11	8.00	0.2465	0.541	24.6	---	---	2.37e-04	---
12	2.00	0.2312	0.572	23.1	12.418	1.65e-04	2.54e-03	7.83e-06
13	0.500	0.2159	0.604	21.6	34.064	6.25e-05	1.02e-02	1.20e-05
14	0.125	0.2038	0.628	20.4	133.658	1.65e-05	3.23e-02	1.00e-05
15	0.0625	0.1988	0.639	19.9	300.247	7.51e-06	8.02e-02	1.13e-05

GeoTesting EXPRESS	Project: Saco Interchange Improvements	Location: Saco, ME	Project No.: GTX-312785
	Boring No.: B-211	Tested By: trm	Checked By: anm
	Sample No.: U-2	Test Date: 11/30/20	Depth: 70-72 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System LTIII-B, Swell Pressure = 0.0727 tsf		
	Displacement at End of Increment		

Performed by: LGH
Checked by: TAD

B-211

U-2

70' - 72'

$e_o = 1.05$

Most probable $\sigma_p' = 6.1$ tsf

Minimum possible $\sigma_p' = 4.2$ tsf

Maximum possible $\sigma_p' = 8.0$ tsf

$$C_c = \frac{e_8 - e_9}{\log\left(\frac{\sigma_9}{\sigma_8}\right)} = \frac{.823 - .616}{\log\left(\frac{16}{8}\right)} = 0.688$$

$$C_r = \frac{e_{15} - e_{10}}{\log\left(\frac{\sigma_{10}}{\sigma_{15}}\right)} = \frac{.639 - .529}{\log\left(\frac{12.2}{.062}\right)} = 0.048$$

$$CR = \frac{C_c}{1+e_o} = \frac{.688}{1+1.05} = 0.336$$

5 - SEISMIC SITE ANALYSIS

Performed by: TAD
Checked by: LGH

SEISMIC SITE CALCULATIONS
PROJECT NAME: Exit 35/36 Interchange Improvements
PROJECT NUMBER: 179450063
LOCATION: Saco, Maine

EXIT 35 SB - SOUTH BOUND OFF RAMP

TEST BORINGS USED FOR ANALYSIS:
OS-5
OS-6

Site class is E if all four are true:

More than 10 feet of soft clay:	Yes	About 18 feet in OS-6
PI > 20:	Yes/No	16 and 20 based on lab test
MC > 40:	Yes	40 and 43% based on lab test
Ave Su < 500 psf:	Yes	Average is about 450 psf

Say site class E to be conservative.

Performed by: TAD
Checked by: LGH

SEISMIC SITE CALCULATIONS
PROJECT NAME: Exit 35/36 Interchange Improvements
PROJECT NUMBER: 179450063
LOCATION: Interchange, Saco, Maine

SPT Correction Factor: 1

EXIT 35 SB - SOUTH BOUND ON RAMP

TEST BORINGS USED FOR ANALYSIS:
BORING NO: B-103

N Method (Sands)

N-Value	Corrected N-Value	Thickness (d) [feet]	d/N
15	15	20	1.33
NA (clay)	-	5	-
NA (clay)	-	5	-
NA (clay)	-	4	-
NA (clay)	-	6	-
NA (clay)	-	4	-
10	10	6	0.60
43	43	5	0.12
88	88	5	0.06
Bedrock	100	40	0.40
	Sum	76.00	2.51
		N' =	30.3
		SITE CLASS: D	

> 50 = C
15 to 50 = D
<15 = E

s_u Method (Clays)

s_u (psf)	Thickness (d) [feet]	d/s_u
NA (sand)	20	-
1500	5	0.0033
1500	5	0.0033
1500	4	0.0027
500	6	0.0120
500	4	0.0080
NA (sand)	6	-
NA (sand)	5	-
NA (sand)	5	-
Bedrock	40	-
	24	0.03
	N' =	818.2
	SITE CLASS: E	

> 2000 = C
1000 to 200(
<1000 = E

Note:
-Bedrock assumed to have SPT N-value of 100 blows per foot

Performed by: TAD
Checked by: LGH

SEISMIC SITE CALCULATIONS
PROJECT NAME: Exit 35/36 Interchange Improvements
PROJECT NUMBER: 179450063
LOCATION: Interchange, Saco, Maine

SPT Correction Factor: 1

EXIT 35 NB - NORTHBOUND ON/OFF RAMP

TEST BORINGS USED FOR ANALYSIS:

BORING NO: B-112

N-Value	Corrected N-Value	Thickness (d) [feet]	d/N
6	6	5	0.83
16	16	4	0.25
50	50	1	0.02
Bedrock	100	90	0.90
	Sum	100	2.00
		N' =	49.9

BORING NO: B-113

N-Value	Corrected N-Value	Thickness (d) [feet]	d/N
11	11	8	0.73
Bedrock	100	92	0.92
	Sum	100	1.65
		N' =	60.7

SITE CLASS: C

> 50 = C
15 to 50 = D
<15 = E

Note:
-Bedrock assumed to have SPT N-value of 100 blows per foot

6 - SETTLEMENT AND STABILITY

SETTLEMENT ANALYSIS

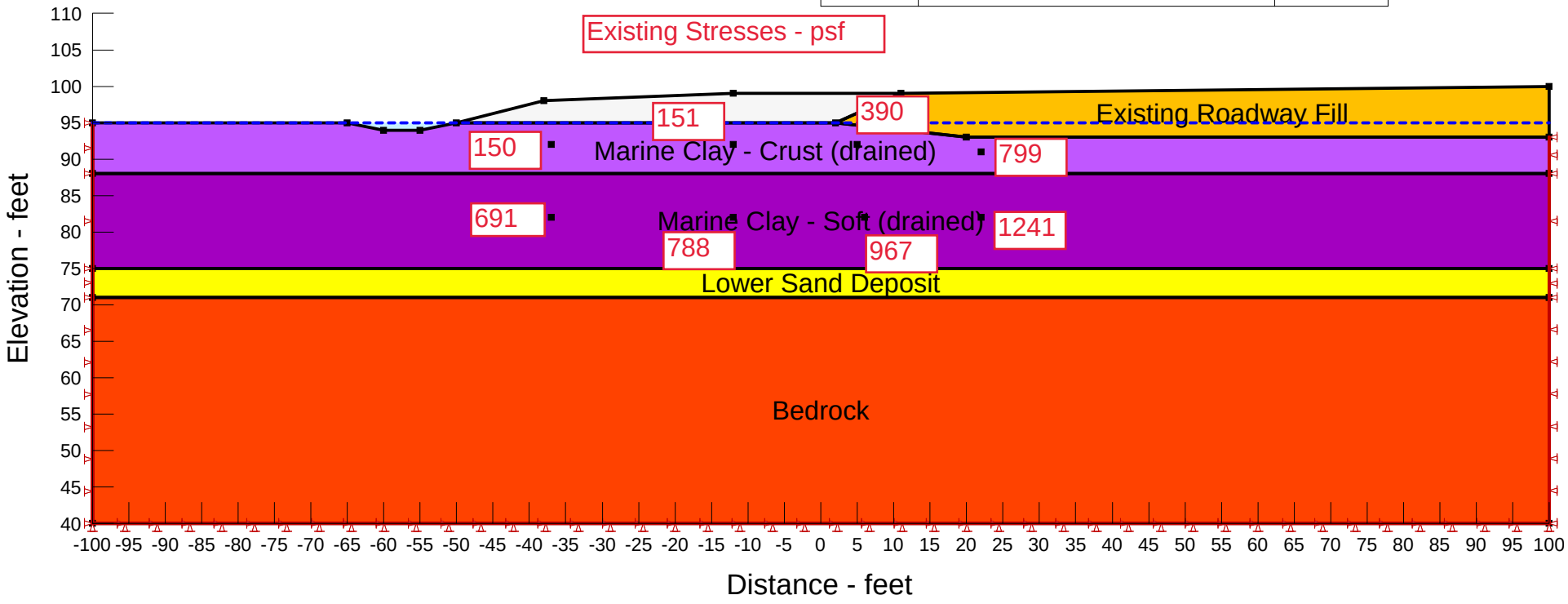
Collector Distributor Roadway

Performed by: TAD
Checked by: LGH

Color	Name	Unit Weight (pcf)
	Bedrock	150
	Existing Roadway Fill	125
	Lower Sand Deposit	120
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2729+00
Settlement Analysis



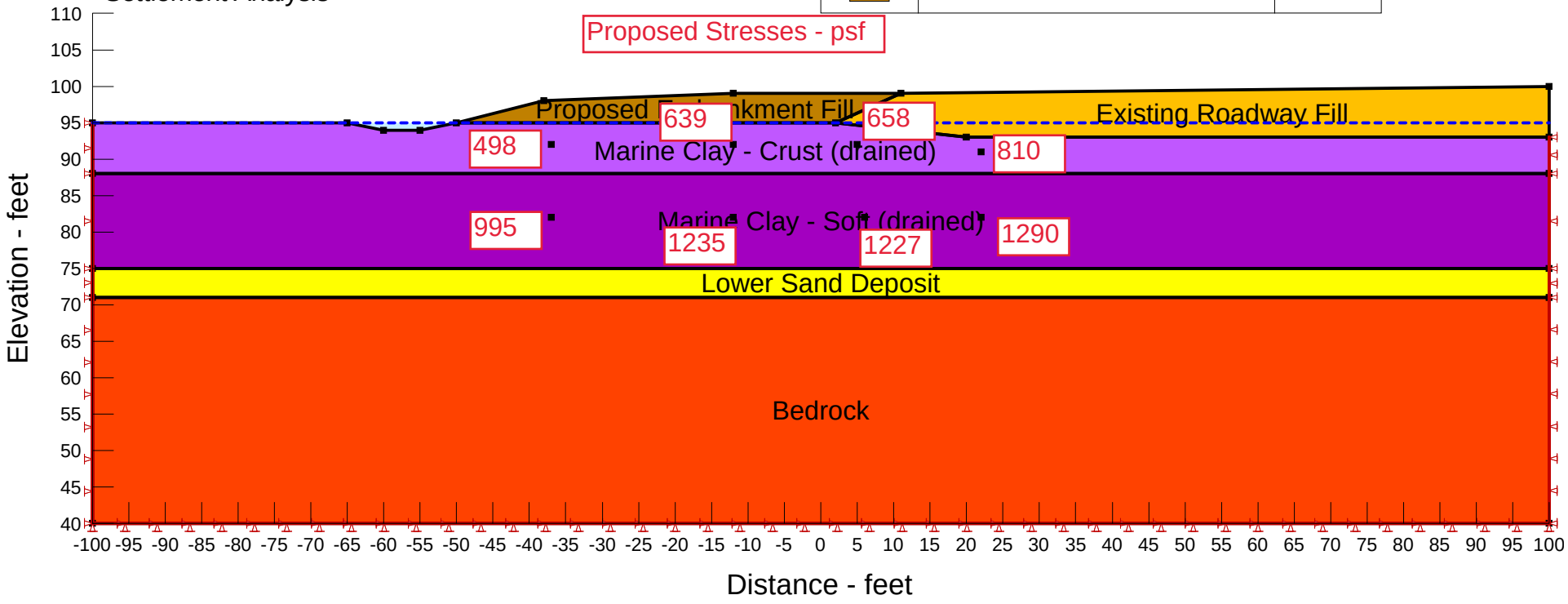
Performed by: TAD
Checked by: LGH

		(pcf)
	Bedrock	150
	Existing Roadway Fill	125
	Lower Sand Deposit	120
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115
	Proposed Embankment Fill	125

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2729+00
Settlement Analysis

Proposed Stresses - psf

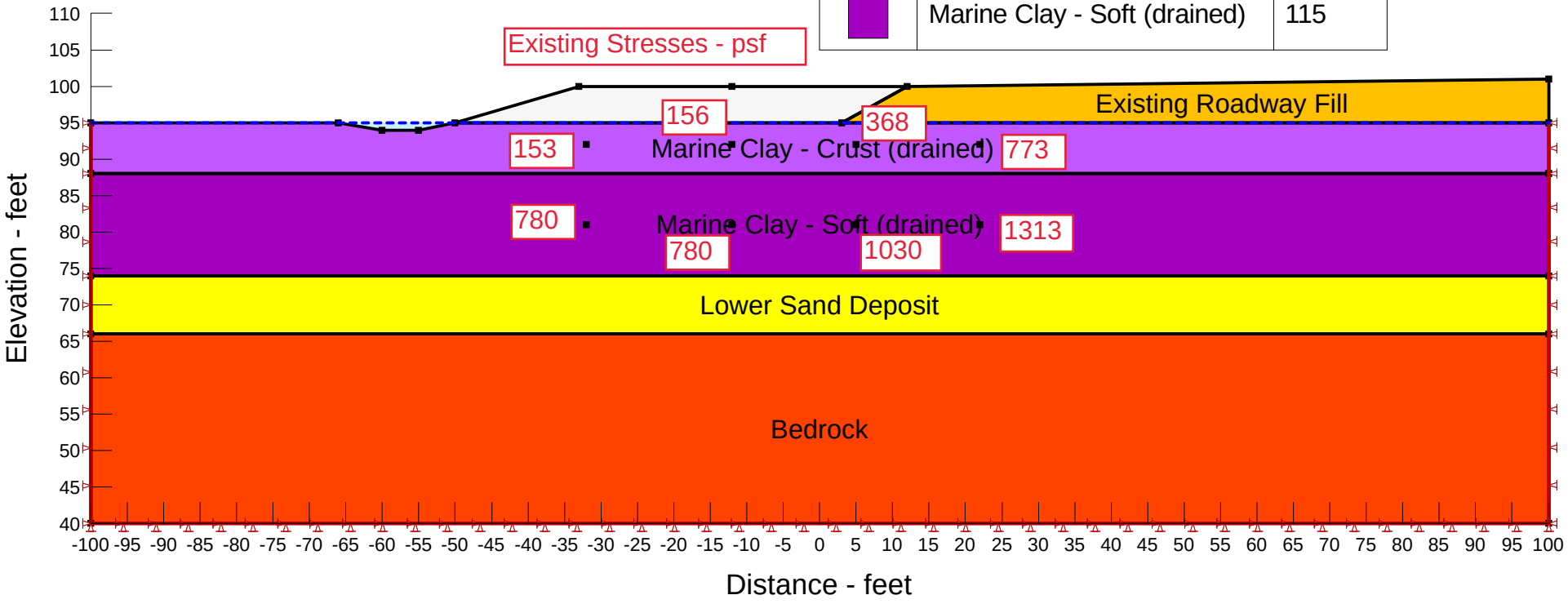


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2732+50
Settlement Analysis

Color	Name	Unit Weight (pcf)
	Bedrock	150
	Existing Roadway Fill	125
	Lower Sand Deposit	120
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115

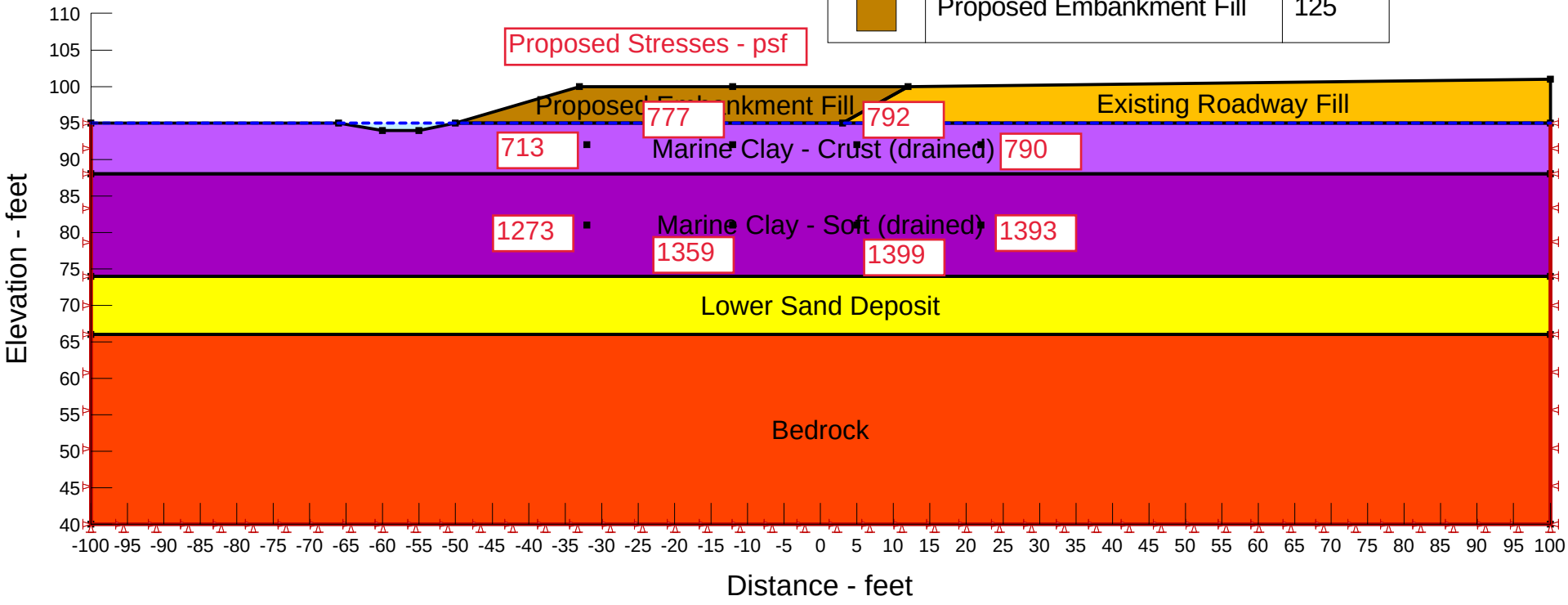


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2732+50
Settlement Analysis

		Weight (pcf)
	Bedrock	150
	Existing Roadway Fill	125
	Lower Sand Deposit	120
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115
	Proposed Embankment Fill	125



Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements

Settlement Estimate

Location: Maine Turnpike

COLLECTOR DISTRIBUTOR ROADWAY STA 2729+00

Location of Analysis			Based on Max ($\sigma_{p'}$)	Stresses from Geostudio			PRIMARY SETTLEMENT				Time for 90% Consol			Secondary Settlement (inches) - 20 yrs		
							Marine Clay - Crust				Cv (ft2/day)		Time	Upper Clay		Total
Station	Offset	Area	(CR or RR)	Elevation (ft)	Ex. Effective Stress (psf)	Prop. Effective Stress (psf)	CR	RR	Ho	Settlement (inches)	Virgin	Recomp	(years)	Ca - Virgin	Ca-Recomp	(inches)
2729+00	-33	Edge of Proposed	Use RR	92	150	498	0.17	0.024	5	0.75	0.12	0.12	1.7	0.010	0.010	1.15
		Southbound Pavement	Use RR	82	691	995	0.17	0.024	14	0.64						
										1.40						
2729+00	-12	Center of Southbound	Use RR	92	151	639	0.17	0.024	5	0.91	0.12	0.12	1.7	0.010	0.010	1.15
		Lanes	Use RR	82	788	1235	0.17	0.024	14	0.79						
										1.71						
2729+00	5	Median of B/t C-D and	Use RR	92	390	658	0.17	0.024	5	0.33	0.12	0.12	1.7	0.010	0.010	1.15
		mainline	Use RR	82	967	1227	0.17	0.024	14	0.42						
										0.75						
2729+00	22	Center of outside lane of	Use RR	92	799	810	0.17	0.024	5	0.01	0.12	0.12	1.7	0.010	0.010	1.15
		mainline	Use RR	82	1241	1290	0.17	0.024	14	0.07						
										0.08						

Max. Past Pressure (psf) =	2600	at El. 84 (B-208)
	3400	at El. 76 (B-208)

Input for Unit Weights:

	(PCF)
Proposed Fill	125
Existing Fill	125
Marine Clay - Crust	120
Marine Clay - Soft	115

Primary Consolidation

For stress increases completely in the virgin range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

For stress increases completely in the recompression range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

Time to Complete Primary Consolidation

$t = T^*(H_{dr})^2/Cv$ Double drainage conditions
T = 0.848

Secondary Consolidation

$Ss = (C\alpha/(1+e_p))^*(Ho)^*(\Delta\log t)$

Secondary consolidation starts at end of primary.

Assume 25 years for duration of secondary consolidation.

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements

Settlement Estimate

Location: Maine Turnpike

COLLECTOR DISTRIBUTOR ROADWAY STA 2732+00

Location of Analysis			Based on Max ($\sigma_{p'}$)	Stresses from Geostudio			PRIMARY SETTLEMENT				Time for 90% Consol			Secondary Settlement (inches) - 20 yrs		
							Marine Clay - Crust			Settlement	Cv (ft2/day)		Time	Upper Clay		Total
Station	Offset	Area	(CR or RR)	Elevation (ft)	Ex. Effective Stress (psf)	Prop. Effective Stress (psf)	CR	RR	Ho	(inches)	Virgin	Recomp	(years)	Ca - Virgin	Ca-Recomp	(inches)
2732+50	-33	Edge of Proposed	Use RR	92	153	713	0.17	0.024	5	0.96	0.12	0.12	1.7	0.010	0.010	1.15
		Southbound Pavement	Use RR	81	780	1273	0.17	0.024	14	0.87						
										1.83						
2732+50	-12	Center of Southbound	Use RR	92	156	777	0.17	0.024	5	1.01	0.12	0.12	1.7	0.010	0.010	1.15
		Lanes	Use RR	81	780	1359	0.17	0.024	14	0.98						
										2.00						
2732+50	5	Median of B/t C-D and	Use RR	92	368	792	0.17	0.024	5	0.48	0.12	0.12	1.7	0.010	0.010	1.15
		mainline	Use RR	81	1030	1399	0.17	0.024	14	0.54						
										1.03						
2732+50	22	Center of outside lane of	Use RR	92	773	790	0.17	0.024	5	0.01	0.12	0.12	1.7	0.010	0.010	1.15
		mainline	Use RR	81	1313	1393	0.17	0.024	14	0.10						
										0.12						
Max. Past Pressure (psf) =		2600	at El. 84													
		3400	at El. 76													

Input for Unit Weights:

	(PCF)
Proposed Fill	125
Existing Fill	125
Marine Clay - Crust	120
Marine Clay - Soft	115

Primary Consolidation

For stress increases completely in the virgin range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

For stress increases completely in the recompression range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

Time to Complete Primary Consolidation

$t = T^*(H_{dr})^2/Cv$ Double drainage conditions
$T = 0.848$

Secondary Consolidation

$Ss = (C\alpha/(1+e_p))^*(Ho)^*(\Delta\log t)$

Secondary consolidation starts at end of primary.

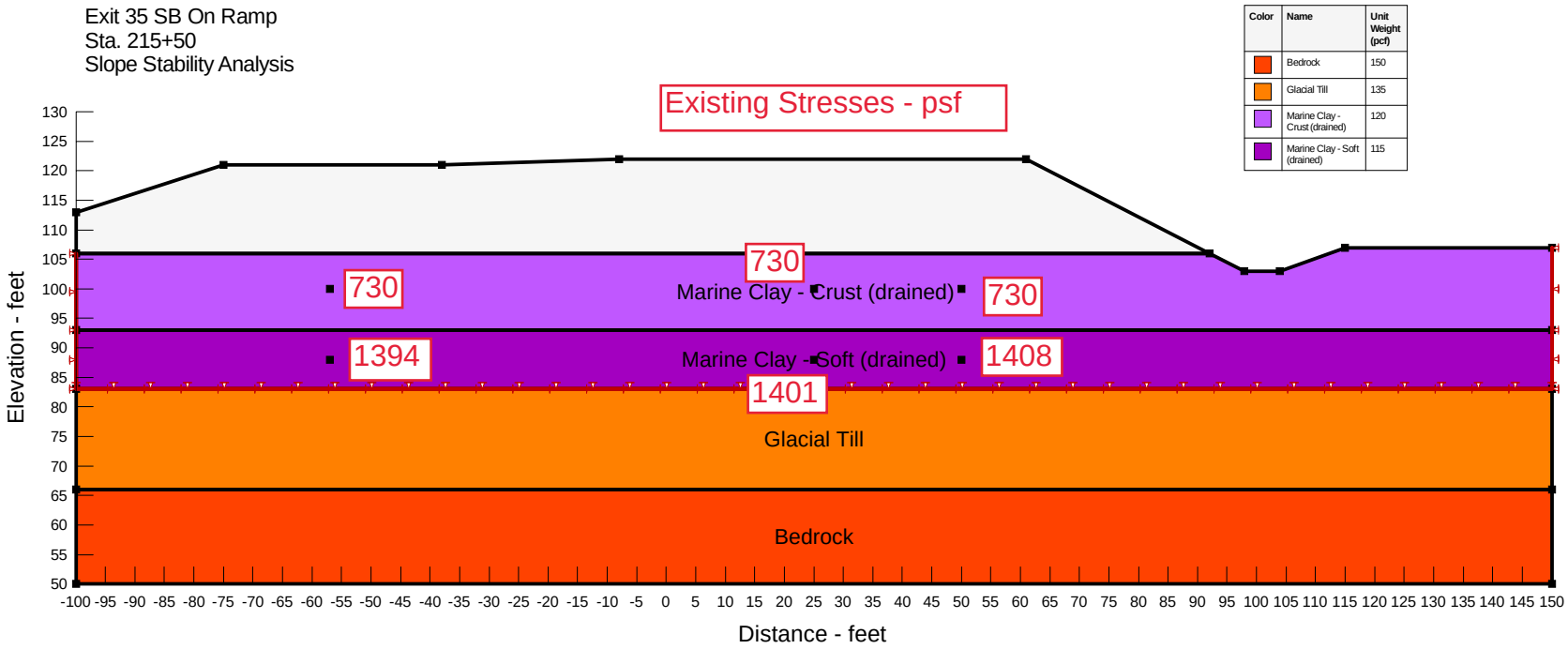
Assume 25 years for duration of secondary consolidation.

Exit 35 SB On Ramp

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

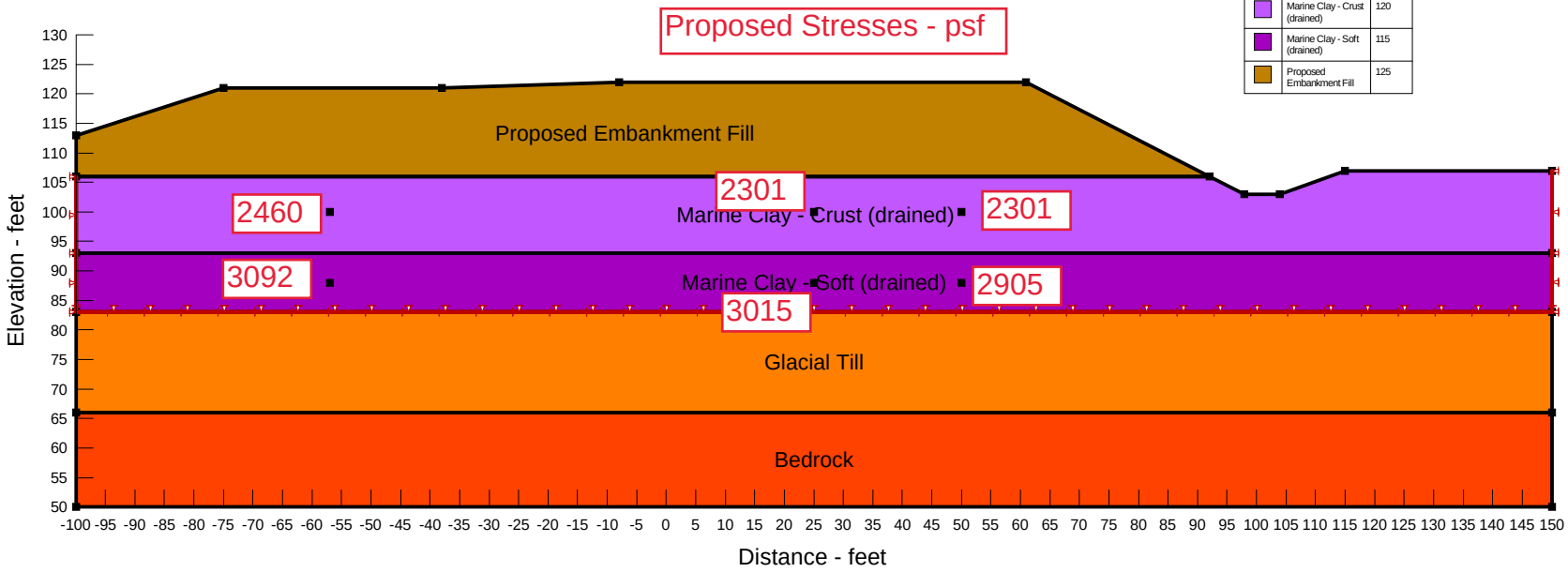
Exit 35 SB On Ramp
Sta. 215+50
Slope Stability Analysis



Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB On Ramp
Sta. 215+50
Slope Stability Analysis

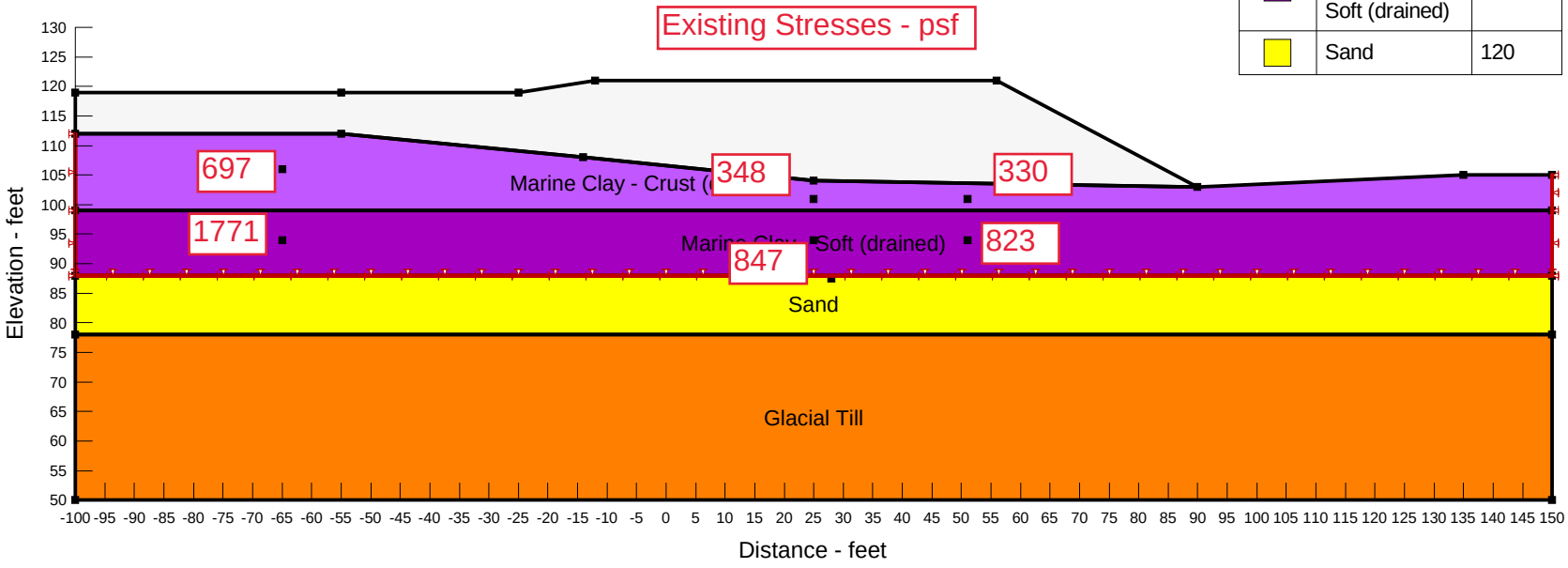


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB On Ramp
Sta. 217+50
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Glacial Till	135
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115
	Sand	120

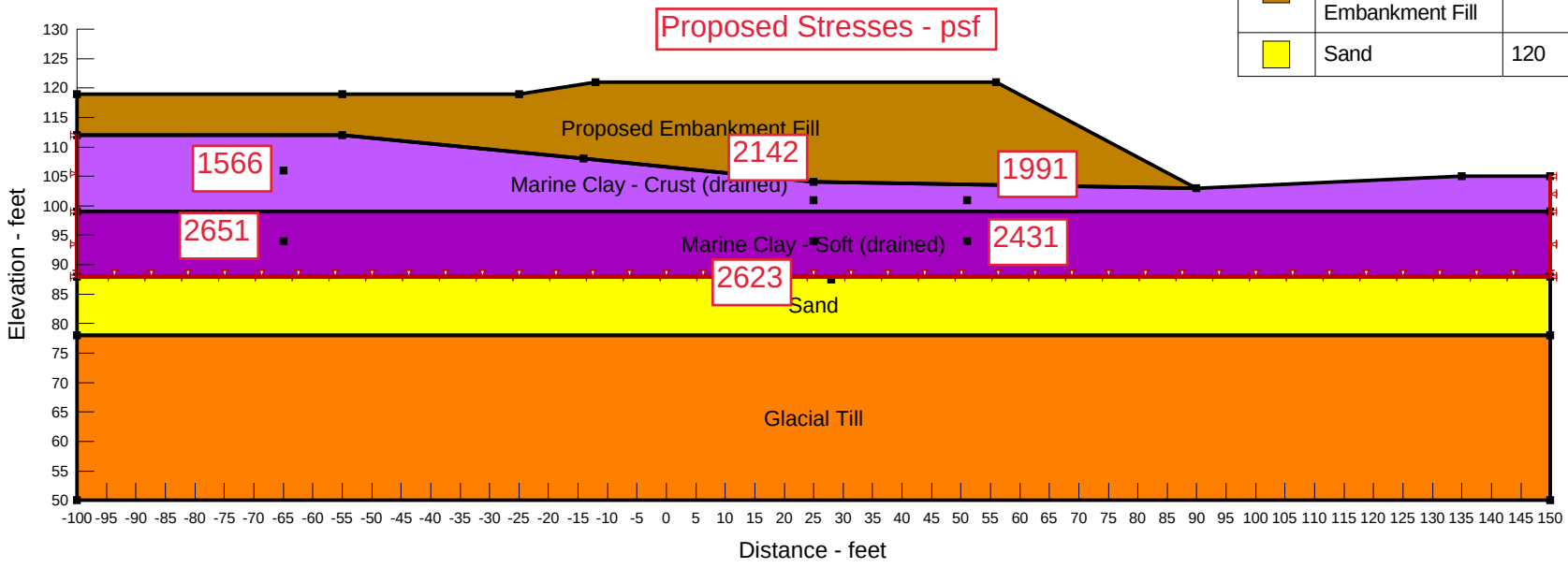


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB On Ramp
Sta. 217+50
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Glacial Till	135
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115
	Proposed Embankment Fill	125
	Sand	120



Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements

Settlement Estimate

Location:Exit 35 On Ramp (Boring B-103)

SOUTHBOUND ON RAMP STA 215+50

Location of Analysis			Based on Max (σp')	Stresses from Geostudio			PRIMARY SETTLEMENT							Time for 90% Consol			Secondary Settlement (inches)				
							Marine Clay - Crust			Marine Clay - Soft			Settlement	Cv (ft2/day)		Time	Upper Clay		Lower Clay		Total
Station	Offset	Area	(CR or RR)	Elevation	Ex. Effective Stress (psf)	Prop. Effective Stress (psf)	CR	RR	Ho	CR	RR	Ho	(inches)	Virgin	Recomp	(years)	Ca - Virgin	Ca-Recomp	Ca - Virgin	Ca-Recomp	(inches)
215+50	50	Right Side EOP Exit 35 On Ramp	Use RR	100	730	2301	0.170	0.024	11				1.58	0.12	0.12	2.1	0.010	0.010	0.010	0.010	1.41
			Use CR	88	1408	2905				0.170	0.0240	10	1.69								
												Total	3.27								
215+50	25	Center of Proposed Exit 35 On Ramp	Use RR	100	730	2301	0.170	0.024	11				1.58	0.12	0.12	2.1	0.010	0.010	0.010	0.010	1.41
			Use CR	88	1401	3015				0.170	0.0240	10	2.02								
												Total	3.60								
215+50	-57	Below Admin Building	Use RR	100	730	2460	0.170	0.024	11				1.67	0.12	0.12	2.1	0.010	0.010	0.010	0.010	1.41
			Use CR	88	1394	3092				0.170	0.0240	10	2.24								
												Total	3.92								

Max. Past Pressure (psf) =	2400	at El. 91 (B-203)
Max. Past Pressure (psf) =	2600	at El. 90 (B-103)

Input for Unit Weights:

	(PCF)
Proposed Fill	125
Existing Fill	125
Marine Clay - Crust	120
Marine Clay - Soft	115

Primary Consolidation

For stress increases completely in the virgin range:
$Sc = (CR)(Ho)\log(\sigma'_{pc}/\sigma'_{vo})$

For stress increases completely in the recompression range:
$Sc = (CR)(Ho)\log(\sigma'_{pc}/\sigma'_{vo})$

Time to Complete Primary Consolidation

$t = T^*(H_{dr})^2/Cv$ Double drainage conditions
$T = 0.848$

Secondary Consolidation

$Ss = (C\alpha/(1+e_p))^*(Ho)^*(\Delta \log t)$

Secondary consolidation starts at end of primary.

Assume 25 years for duration of secondary consolidation.

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements

Settlement Estimate

Location:Exit 35 On Ramp (Boring B-103)

SOUTHBOUND ON RAMP STA 217+50

Location of Analysis			Based on Max (σp')	Stresses from Geostudio			PRIMARY SETTLEMENT							Time for 90% Consol			Secondary Settlement (inches)				
							Marine Clay - Crust			Marine Clay - Soft				Cv (ft2/day)		Time	Upper Clay		Lower Clay		Total
Station	Offset	Area	(CR or RR)	Elevation	Ex. Effective Stress (psf)	Prop. Effective Stress (psf)	CR	RR	Ho	CR	RR	Ho	Settlement (inches)	Virgin	Recomp	(years)	Ca - Virgin	Ca-Recomp	Ca - Virgin	Ca-Recomp	(inches)
217+50		Right Side EOP Exit 35 On Ramp	Use RR	106	697	1566	0.170	0.024	13				1.32	0.12	0.12	2.8	0.010	0.010	0.010	0.010	1.43
			Use RR	94	1771	2651				0.170	0.0240	11	0.56								
												Total	1.87								
217+50		Center of Proposed Exit 35 On Ramp	Use RR	101	348	2142	0.170	0.024	5				1.14	0.12	0.12	1.2	0.010	0.010	0.010	0.010	1.30
			Use RR	94	847	2623				0.170	0.0240	11	1.56								
												Total	2.69								
217+50		Park and Ride	Use RR	101	330	1991	0.170	0.024	4				0.90	0.12	0.12	1.1	0.010	0.010	0.010	0.010	1.27
			Use RR	94	823	2431				0.170	0.0240	11	1.49								
												Total	2.39								
Max. Past Pressure (psf) = 3200			at El. 94 (B-205)																		

Input for Unit Weights:

	(PCF)
Proposed Fill	125
Existing Fill	125
Marine Clay - Crust	120
Marine Clay - Soft	115

Primary Consolidation

For stress increases completely in the virgin range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

For stress increases completely in the recompression range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

Time to Complete Primary Consolidation

$t = T*(H_{dr})^2/Cv$ Double drainage conditions

T = 0.848

Secondary Consolidation

$Ss = (C\alpha/(1+e_p))*(Ho)*(\Delta \log t)$

Secondary consolidation starts at end of primary.

Assume 25 years for duration of secondary consolidation.

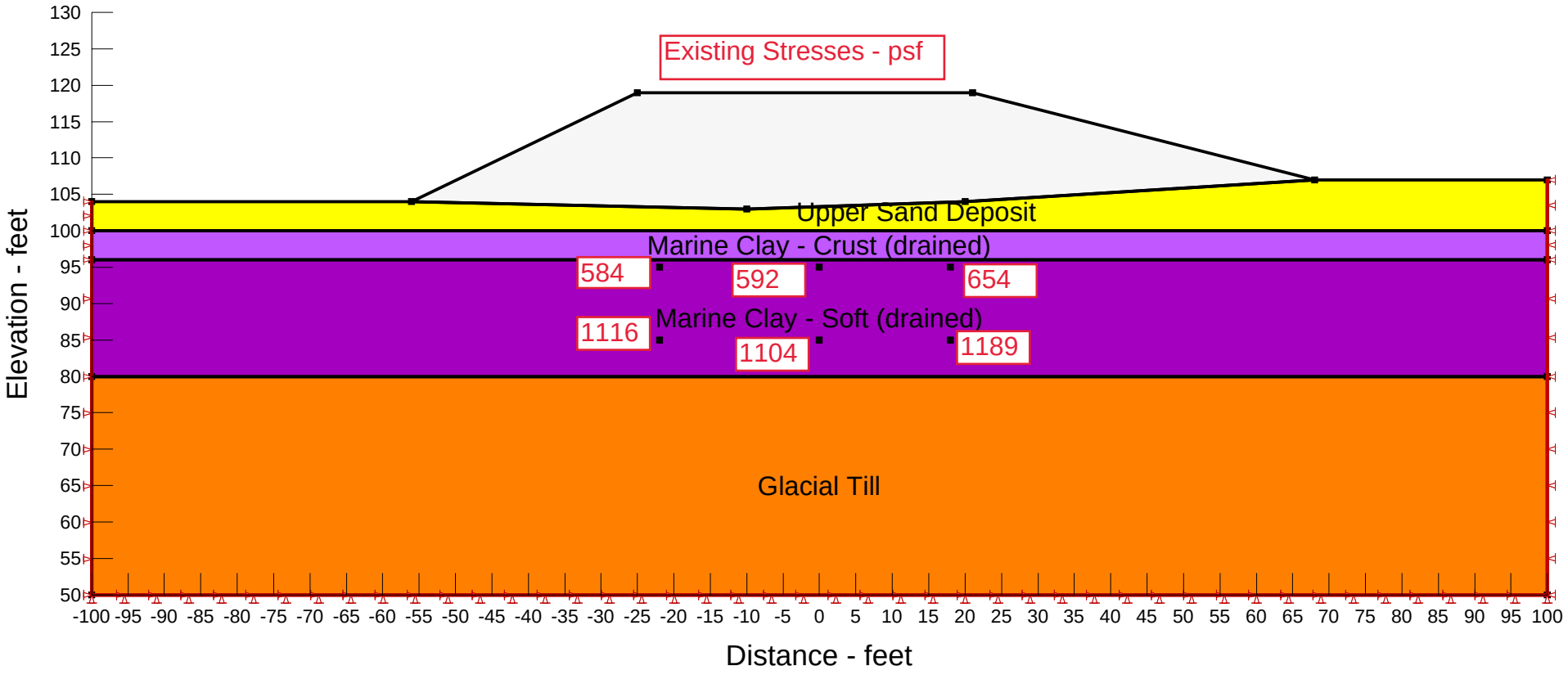
Exit 35 SB Off Ramp

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 321+50
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Glacial Till	135
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115
	Upper Sand Deposit	120

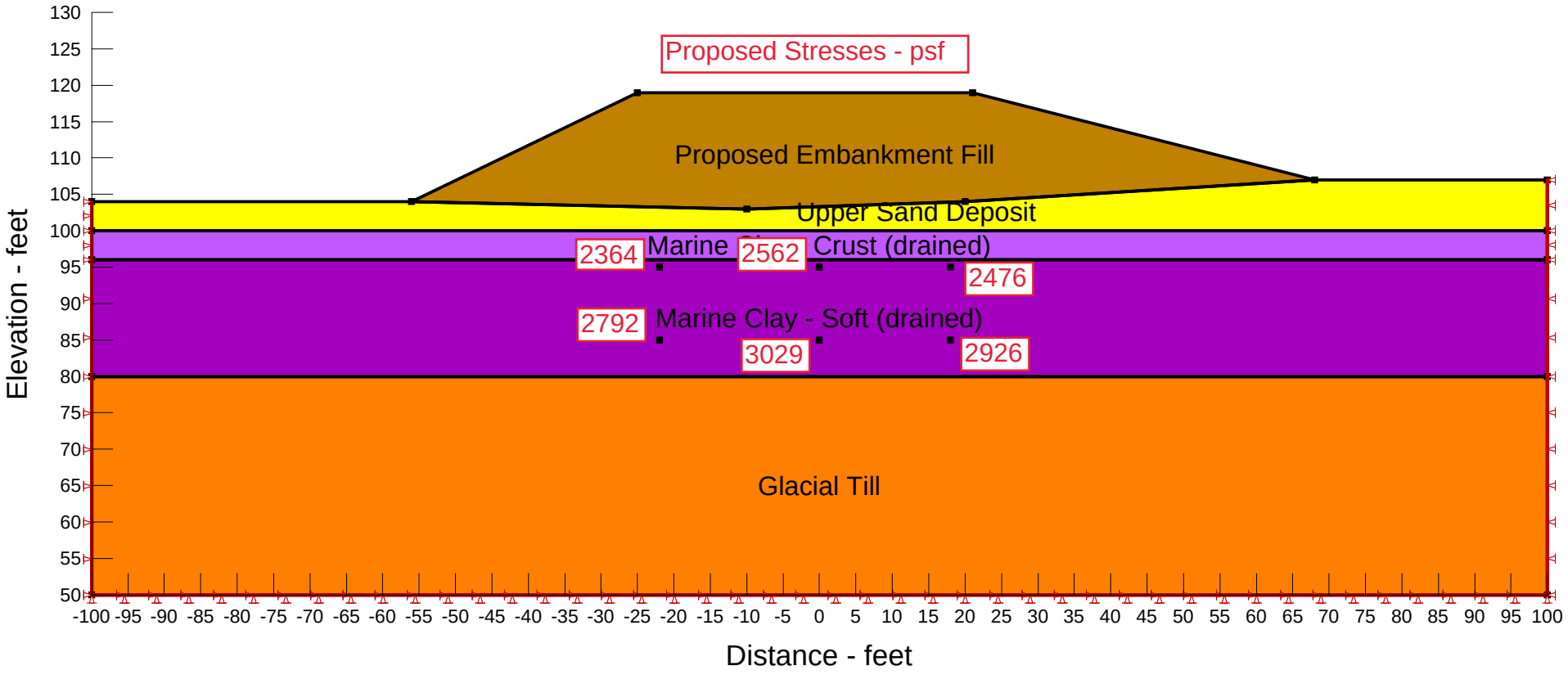


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 321+50
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Glacial Till	135
	Marine Clay - Crust (drained)	120
	Marine Clay - Soft (drained)	115
	Proposed Embankment Fill	125
	Upper Sand Deposit	120

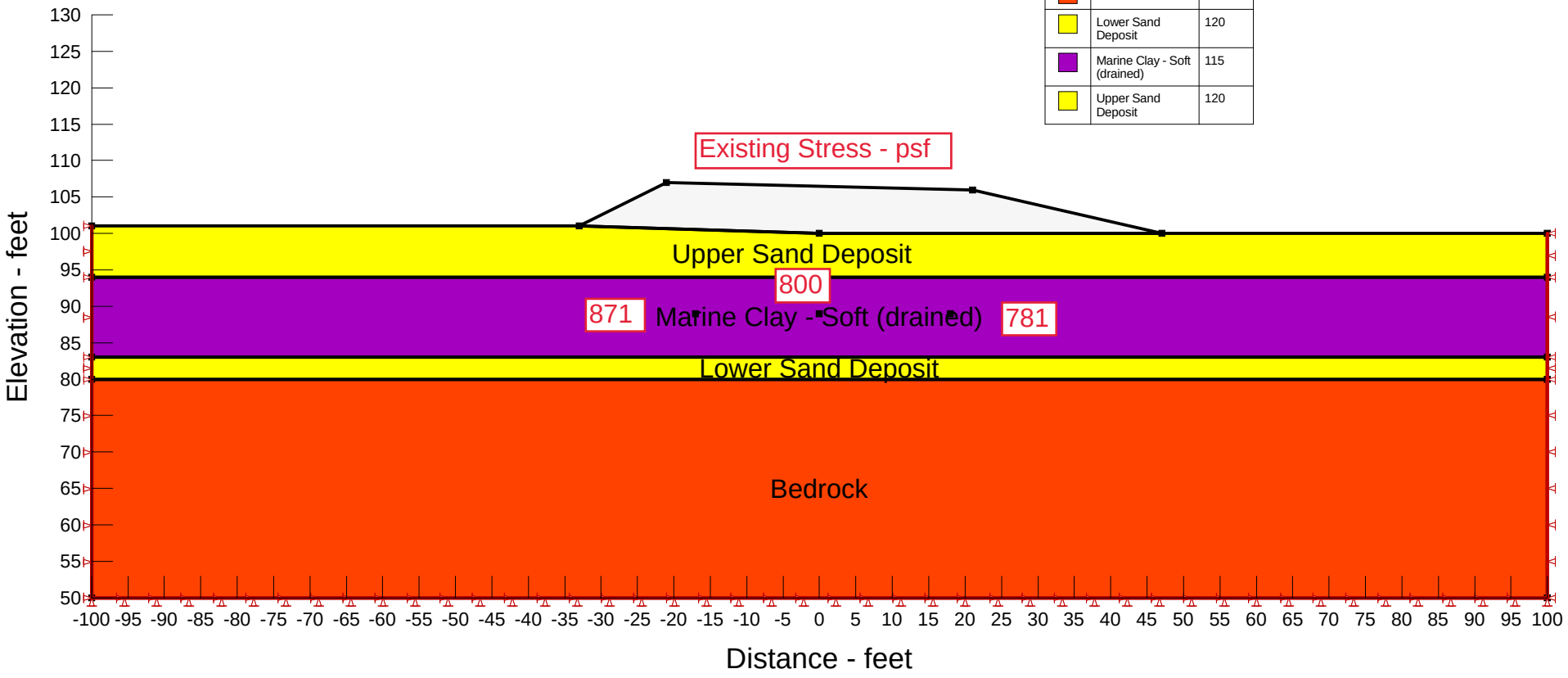


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 324+00
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Bedrock	150
	Lower Sand Deposit	120
	Marine Clay - Soft (drained)	115
	Upper Sand Deposit	120

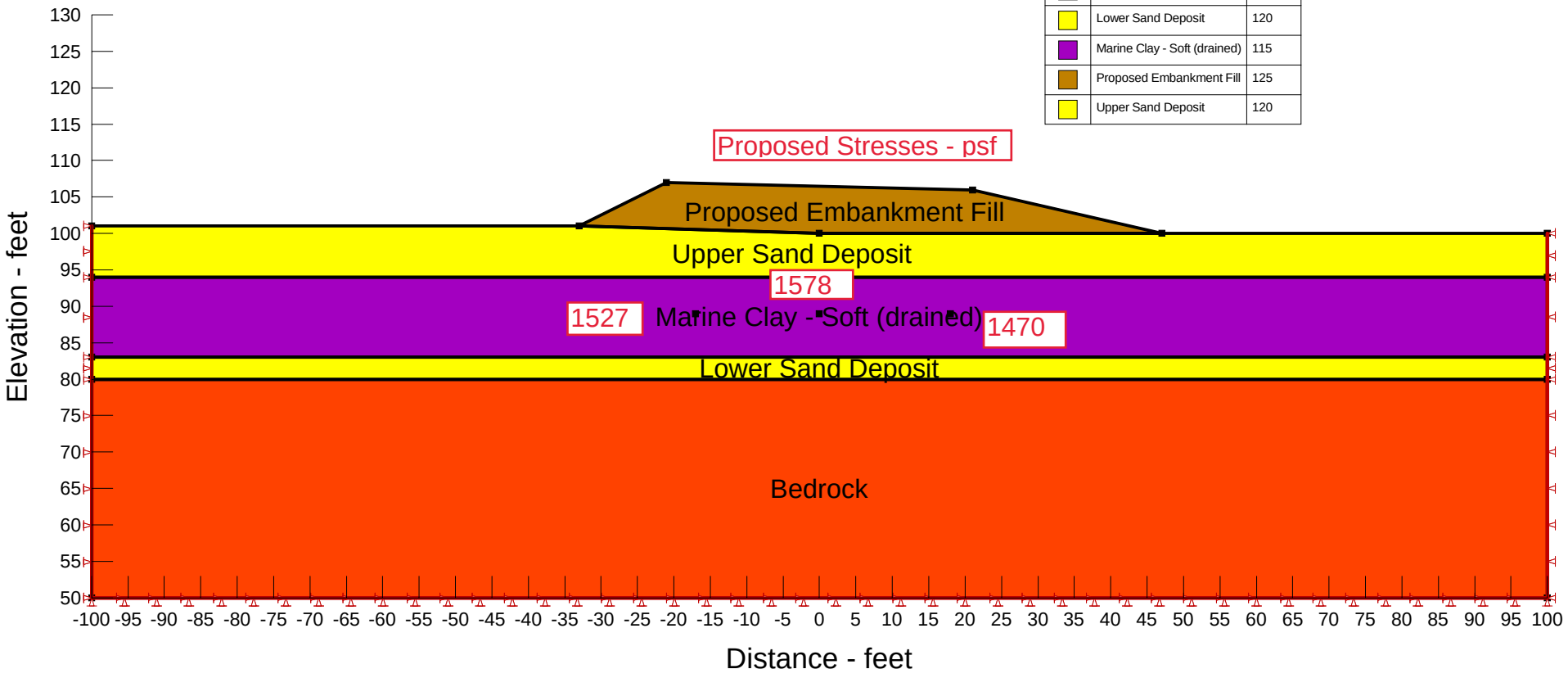


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 324+00
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Bedrock	150
	Lower Sand Deposit	120
	Marine Clay - Soft (drained)	115
	Proposed Embankment Fill	125
	Upper Sand Deposit	120

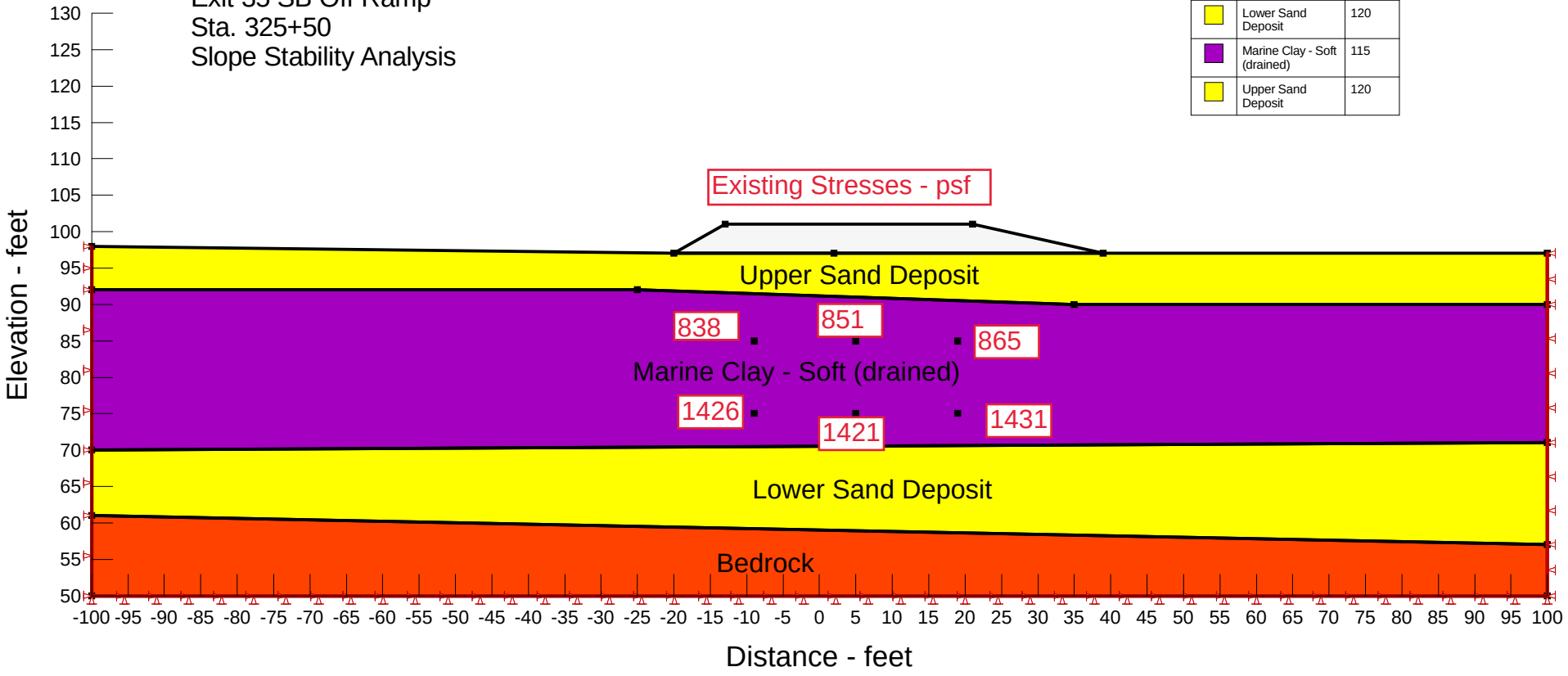


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 325+50
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Bedrock	150
	Lower Sand Deposit	120
	Marine Clay - Soft (drained)	115
	Upper Sand Deposit	120

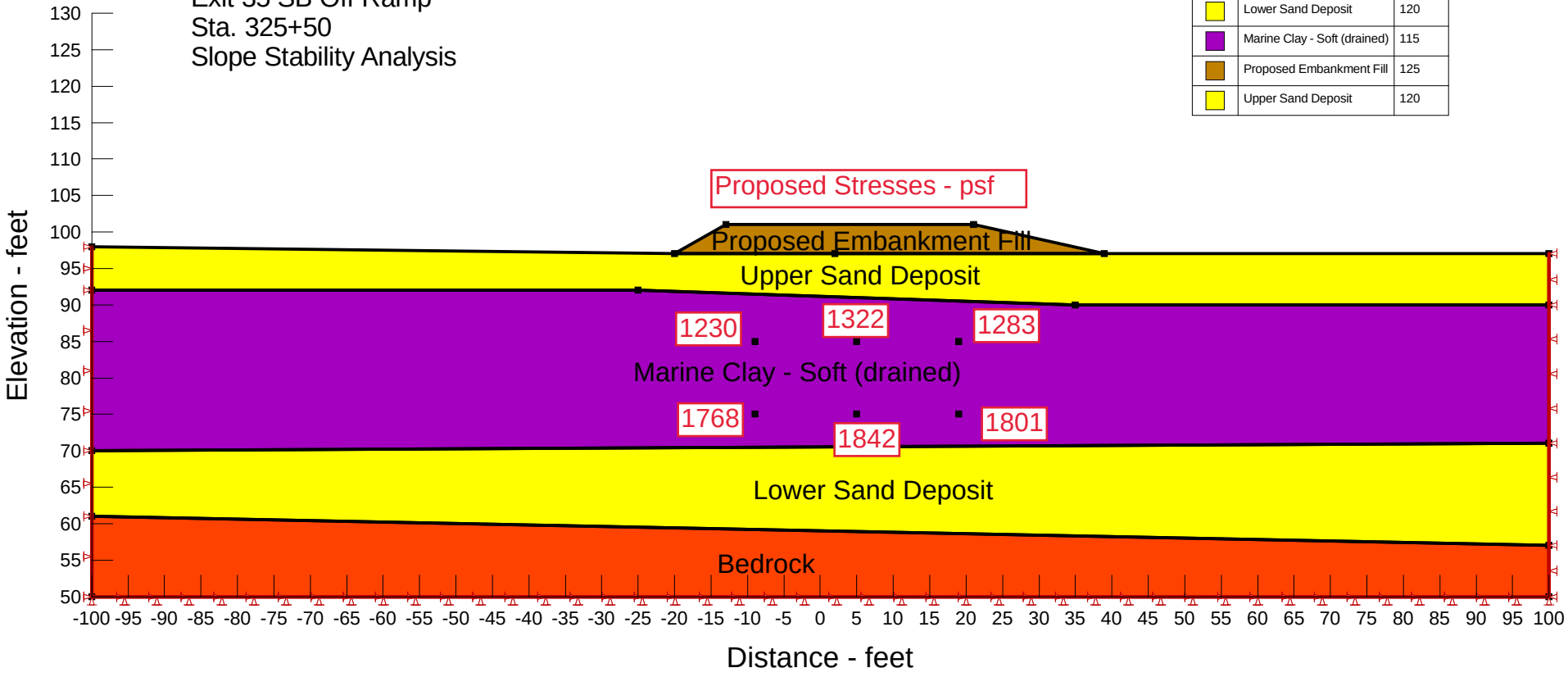


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 325+50
Slope Stability Analysis

Color	Name	Unit Weight (pcf)
	Bedrock	150
	Lower Sand Deposit	120
	Marine Clay - Soft (drained)	115
	Proposed Embankment Fill	125
	Upper Sand Deposit	120



Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements

SOUTHBOUND OFF RAMP STA 321+50

Settlement Estimate

Location:Exit 35 Off Ramp

Location of Analysis			Based on Plots	Stresses from Geostudio			PRIMARY SETTLEMENT				Time for 90% Consol			Secondary Settlement (inches)		
							Marine Clay				Cv (ft2/day)			Upper Clay		
Station	Offset	Area	(CR or RR)	Elevation (ft)	Ex. Effective Stress (psf)	Prop. Effective Stress (psf)	CR	RR	Ho	Settlement (inches)	Virgin	Recomp	Time (years)	Ca - Virgin	Ca-Recomp	Total (inches)
321+50	0	Center of Proposed Exit	RR	95	584	2364	0.170	0.0240	10	1.75	0.12	0.12	1.9	0.010	0.010	1.33
		35 Off Ramp		85	1116	2792	0.170	0.0240	10	1.15						
										2.90						
321+50	-22	Left Guard Rail	RR	95	592	2562	0.170	0.0240	10	1.83	0.12	0.12	1.9	0.010	0.010	1.33
				85	1104	3029	0.170	0.0240	10	1.26						
										3.09						
321+50	18	Right Guard Rail	RR	95	654	2476	0.170	0.0240	10	1.67	0.12	0.12	1.9	0.010	0.010	1.33
				85	1189	2926	0.170	0.0240	10	1.13						
										2.79						

Max. Past Pressure (psf) =	3400	at El. 91.5 (B-206)
Max. Past Pressure (psf) =	3200	at El. 87 (B-207)

Input for Unit Weights:

	(PCF)
Proposed Fill	125
Existing Fill	125
Marine Clay - Crust	120
Marine Clay - Soft	115

Note: Treat the crust and soft clay units as one layer, both are overconsolidated

Primary Consolidation

For stress increases completely in the virgin range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

For stress increases completely in the recompression range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

Time to Complete Primary Consolidation

$t = T*(H_{dr})^2/Cv$ Double drainage conditions
T = 0.848

Secondary Consolidation

$Ss = (C\alpha/(1+e_p))*(Ho)*(\Delta\log t)$

Secondary consolidation starts at end of primary.

Assume 25 years for duration of secondary consolidation.

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements

SOUTHBOUND OFF RAMP STA 324+00

Settlement Estimate

Location:Exit 35 Off Ramp

				Stresses from Geostudio			PRIMARY SETTLEMENT				Time for 90% Consol			Secondary Settlement (inches)		
Location of Analysis			Based on Plots				Marine Clay			Settlement	Cv (ft2/day)		Time	Upper Clay		Total
Station	Offset	Area	(CR or RR)	Elevation (ft)	Ex. Effective Stress (psf)	Prop. Effective Stress (psf)	CR	RR	Ho	(inches)	Virgin	Recomp	(years)	Ca - Virgin	Ca-Recomp	(inches)
324+00	0	Center of Proposed Exit 35 Off Ramp	RR	89	800	1578	0.170	0.0240	10	0.85 **0.85**	0.12	0.12	0.5	0.010	0.010	1.06
324+00	-17	Left Guard Rail	RR	89	871	1527	0.170	0.0240	10	0.70 **0.70**	0.12	0.12	0.5	0.010	0.010	1.06
324+00	18	Right Guard Rail	RR	89	781	1470	0.170	0.0240	10	0.79 **0.79**	0.12	0.12	0.5	0.010	0.010	1.06
Max. Past Pressure (psf) =		3200	at El. 87 (B-207)													

Input for Unit Weights:

	(PCF)
Proposed Fill	125
Existing Fill	125
Marine Clay - Crust	120
Marine Clay - Soft	115

Note: Treat the crust and soft clay units as one layer, both are overconsolidated

Primary Consolidation

For stress increases completely in the virgin range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

For stress increases completely in the recompression range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

Time to Complete Primary Consolidation

$t = T*(H_{dr})^2/Cv$ Double drainage conditions
T = 0.848

Secondary Consolidation

$Ss = (C\alpha/(1+e_p))*(Ho)*(\Delta\log t)$

Secondary consolidation starts at end of primary.

Assume 25 years for duration of secondary consolidation.

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements

SOUTHBOUND OFF RAMP STA 325+50

Settlement Estimate

Location:Exit 35 Off Ramp

Location of Analysis			Based on Plots	Stresses from Geostudio			PRIMARY SETTLEMENT				Time for 90% Consol			Secondary Settlement (inches)		
							Marine Clay				Cv (ft2/day)			Upper Clay		
Station	Offset	Area	(CR or RR)	Elevation (ft)	Ex. Effective Stress (psf)	Prop. Effective Stress (psf)	CR	RR	Ho	Settlement (inches)	Virgin	Recomp	Time (years)	Ca - Virgin	Ca-Recomp	Total (inches)
325+50	0	Center of Proposed Exit	RR	85	851	1230	0.170	0.024	10	0.46	0.12	0.12	1.9	0.010	0.010	1.33
		35 Off Ramp		75	1421	1768	0.170	0.024	10	0.27						
										0.73						
325+50	-22	Left Guard Rail	RR	85	838	1322	0.170	0.024	10	0.57	0.12	0.12	1.9	0.010	0.010	1.33
				75	1426	1842	0.170	0.024	10	0.32						
										0.89						
325+50	18	Right Guard Rail	RR	85	865	1283	0.170	0.024	10	0.49	0.12	0.12	1.9	0.010	0.010	1.33
				75	1431	1801	0.170	0.024	10	0.29						
										0.78						

Max. Past Pressure (psf) =	2600	at El. 84 (B-208)
Max. Past Pressure (psf) =	3200	at El. 76 (B-208)
Max. Past Pressure (psf) =	3200	at El. 87 (B-207)

Input for Unit Weights:

	(PCF)
Proposed Fill	125
Existing Fill	125
Marine Clay - Crust	120
Marine Clay - Soft	115

Primary Consolidation

For stress increases completely in the virgin range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

For stress increases completely in the recompression range:
$Sc = (CR)(Ho)\log(\sigma'_{pr}/\sigma'_{ex})$

Time to Complete Primary Consolidation

$t = T^*(H_{dr})^2/Cv$ Double drainage conditions
T = 0.848

Secondary Consolidation

$Ss = (C\alpha/(1+e_p))^*(Ho)^*(\Delta \log t)$

Secondary consolidation starts at end of primary.

Assume 25 years for duration of secondary consolidation.

STABILITY ANALYSIS

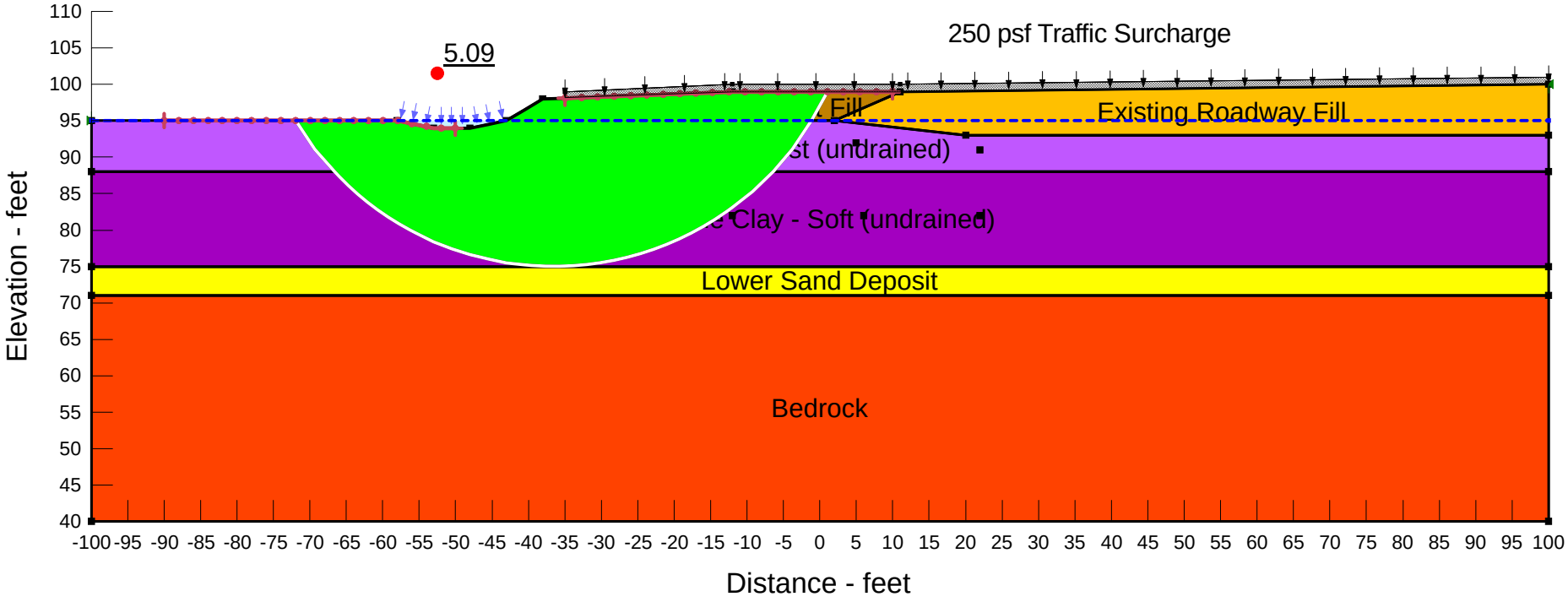
Collector Distributor Roadway

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2729+00
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Bedrock	Mohr-Coulomb	150	10,000	45
	Existing Roadway Fill	Mohr-Coulomb	125	0	34
	Lower Sand Deposit	Mohr-Coulomb	120	0	30
	Marine Clay - Crust (undrained)	Mohr-Coulomb	120	1,500	0
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	500	0
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34

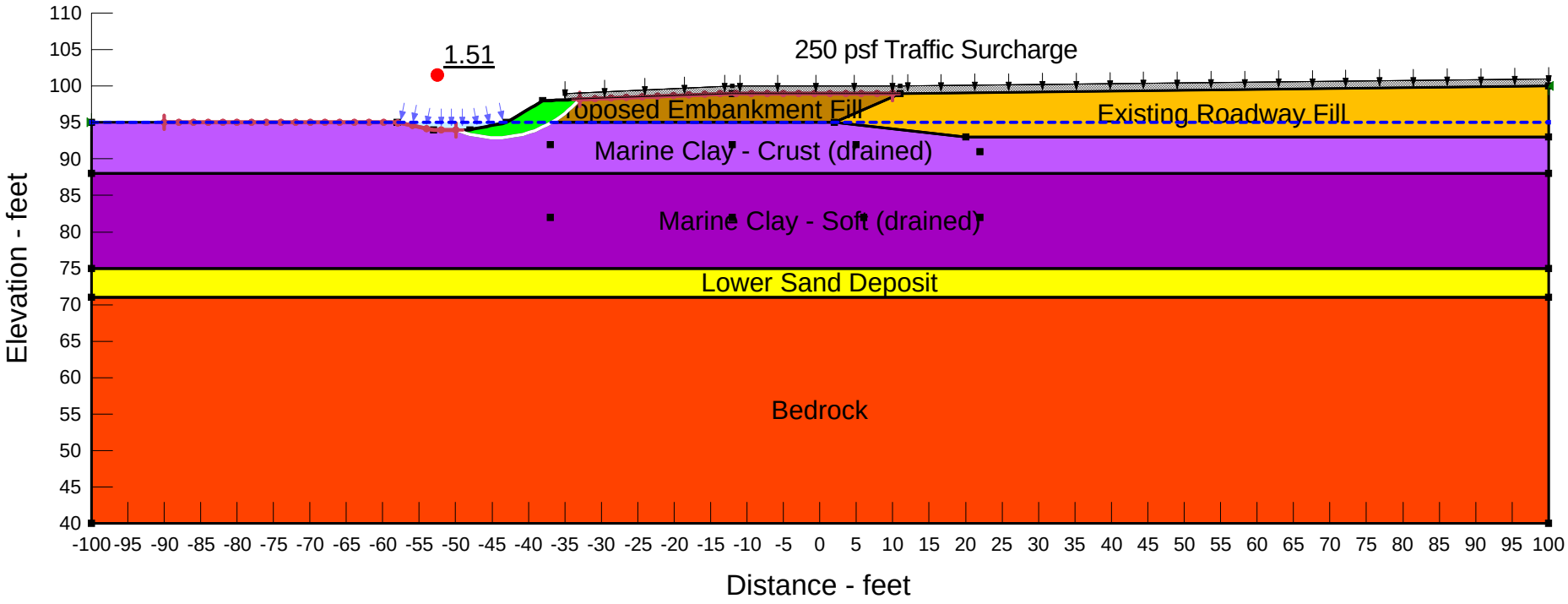


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2729+00
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Bedrock	Mohr-Coulomb	150	10,000	45
	Existing Roadway Fill	Mohr-Coulomb	125	0	34
	Lower Sand Deposit	Mohr-Coulomb	120	0	30
	Marine Clay - Crust (drained)	Mohr-Coulomb	120	0	30
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34

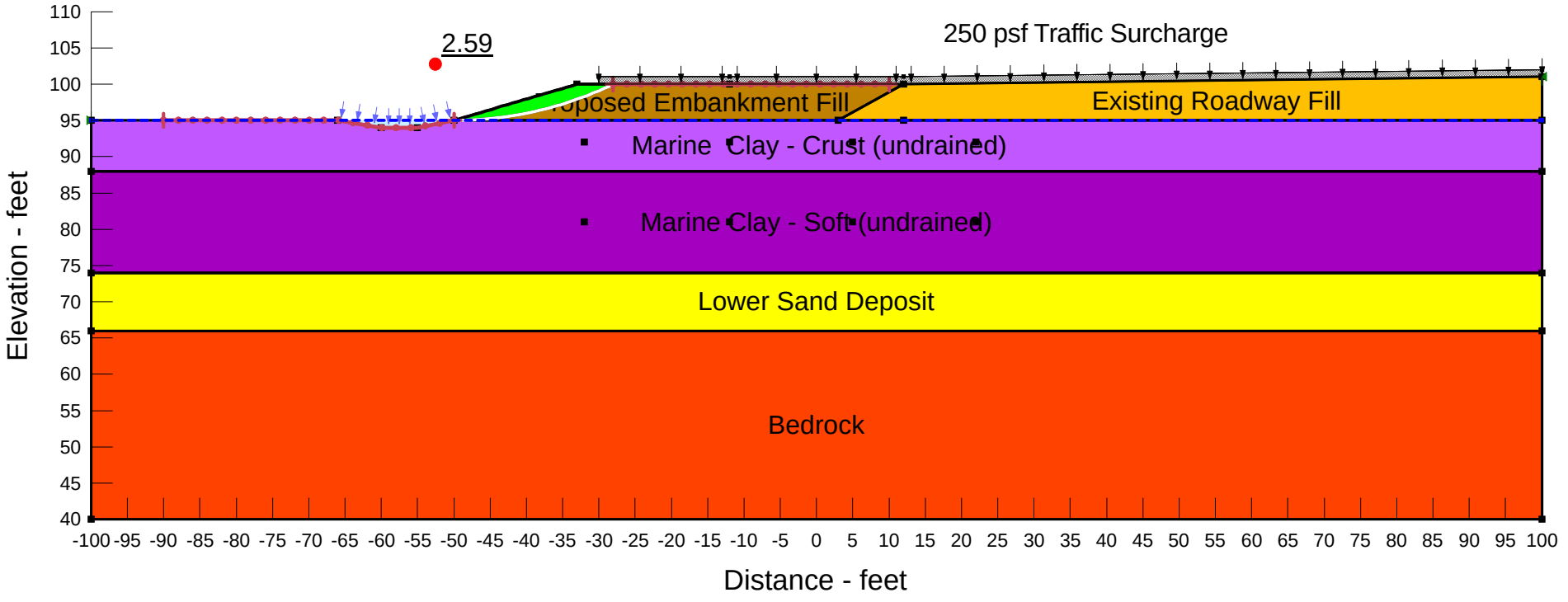


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2732+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Bedrock	Mohr-Coulomb	150	10,000	45
	Existing Roadway Fill	Mohr-Coulomb	125	0	34
	Lower Sand Deposit	Mohr-Coulomb	120	0	30
	Marine Clay - Crust (undrained)	Mohr-Coulomb	120	1,500	0
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	500	0
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34

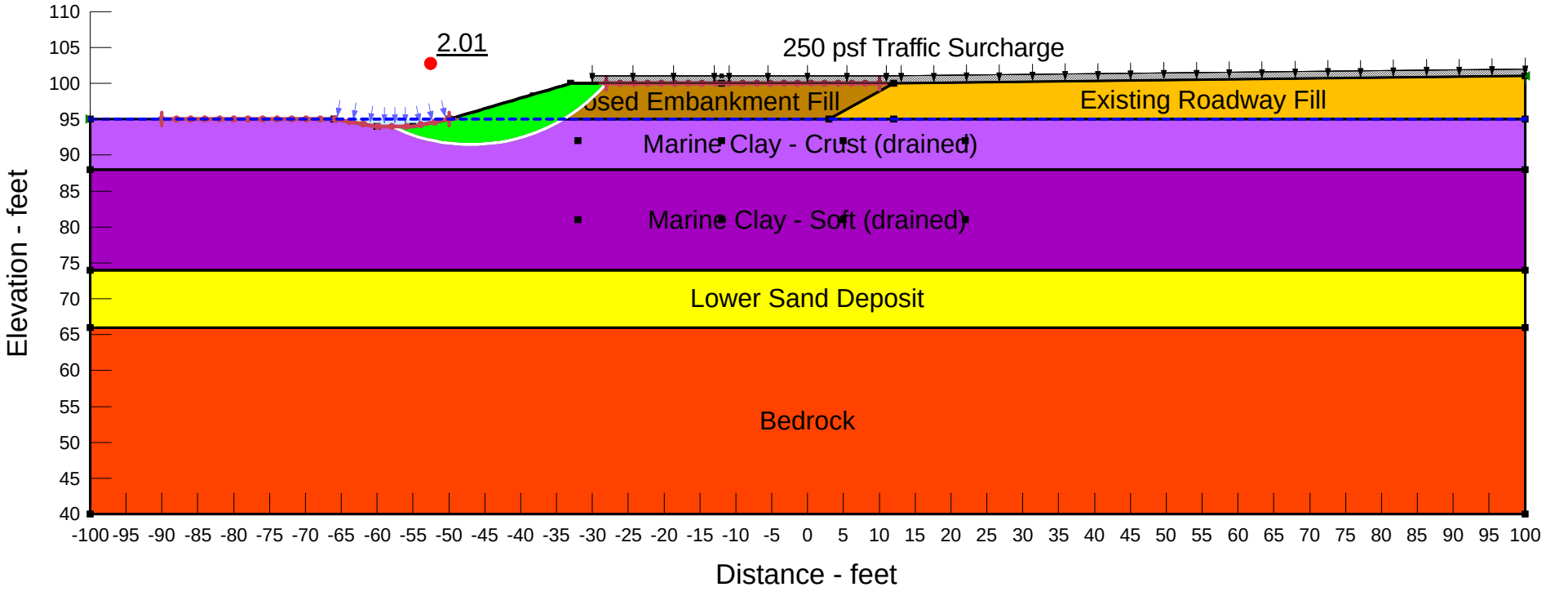


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Maine Turnpike
Sta. 2732+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi (°)
	Bedrock	Mohr-Coulomb	150	10,000	45
	Existing Roadway Fill	Mohr-Coulomb	125	0	34
	Lower Sand Deposit	Mohr-Coulomb	120	0	30
	Marine Clay - Crust (drained)	Mohr-Coulomb	120	0	30
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34



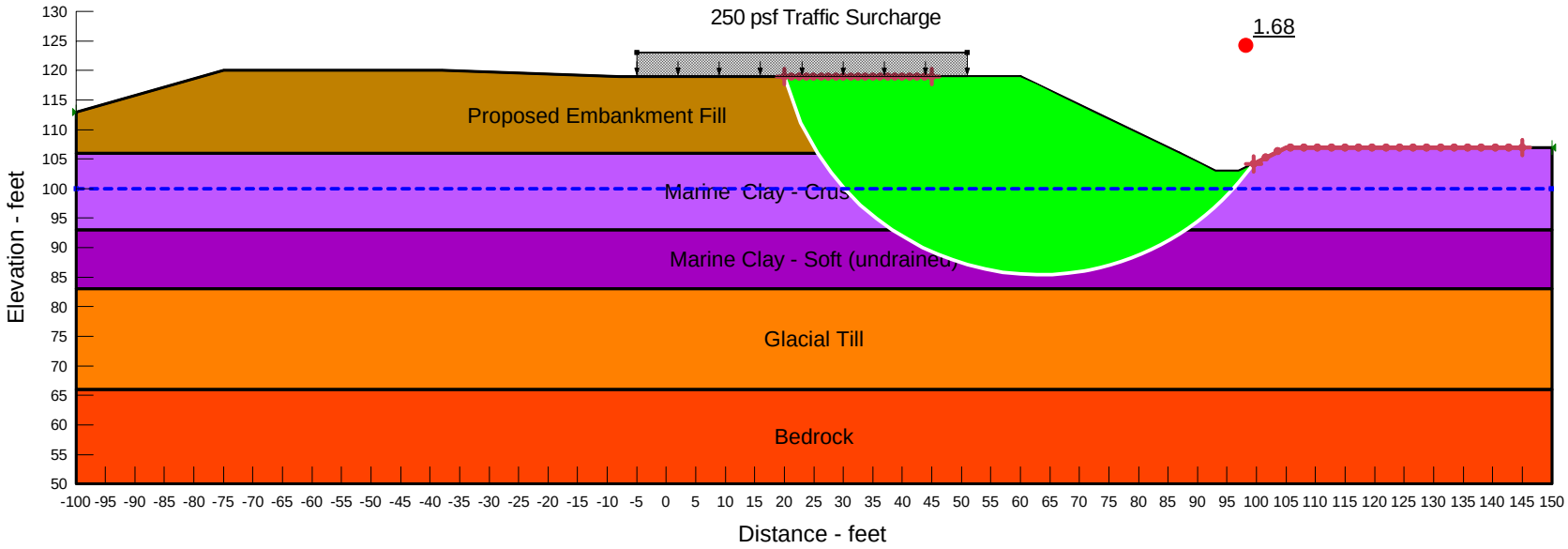
Exit 35 SB On Ramp

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB On Ramp
Sta. 215+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Glacial Till	Mohr-Coulomb	135	0	36	0	1
	Marine Clay - Crust (undrained)	Mohr-Coulomb	120	1,500	0	0	1
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1

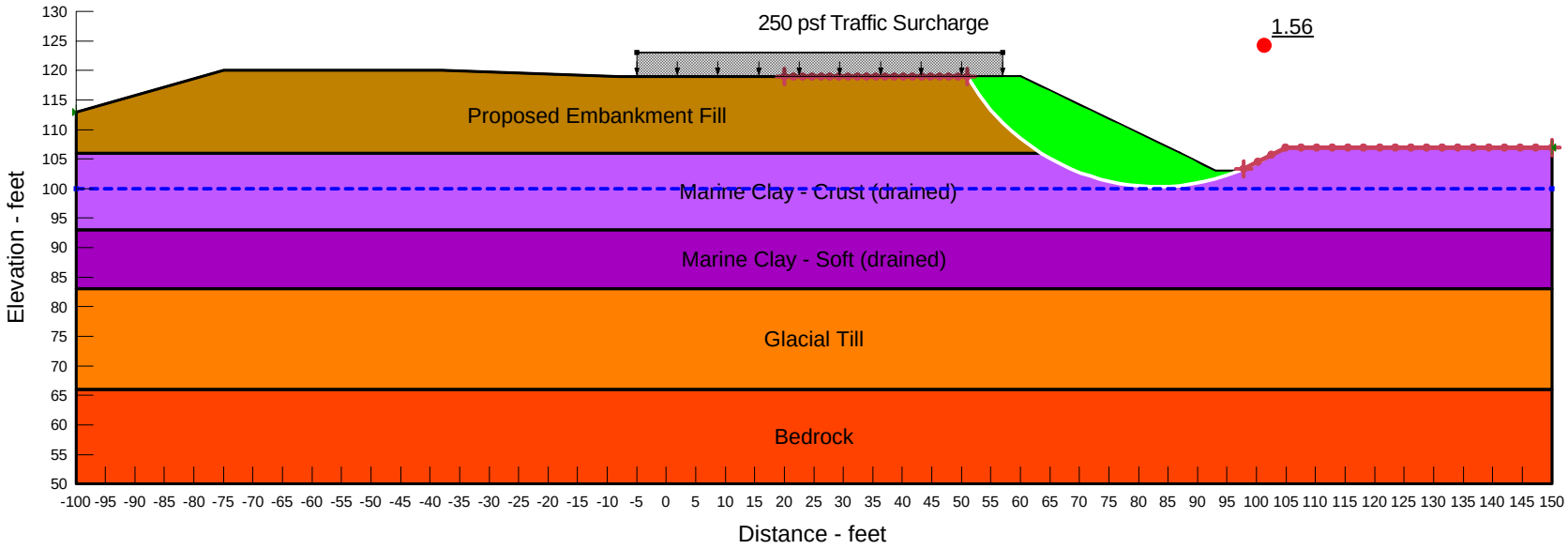


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB On Ramp
Sta. 215+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Glacial Till	Mohr-Coulomb	135	0	36	0	1
	Marine Clay - Crust (drained)	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1

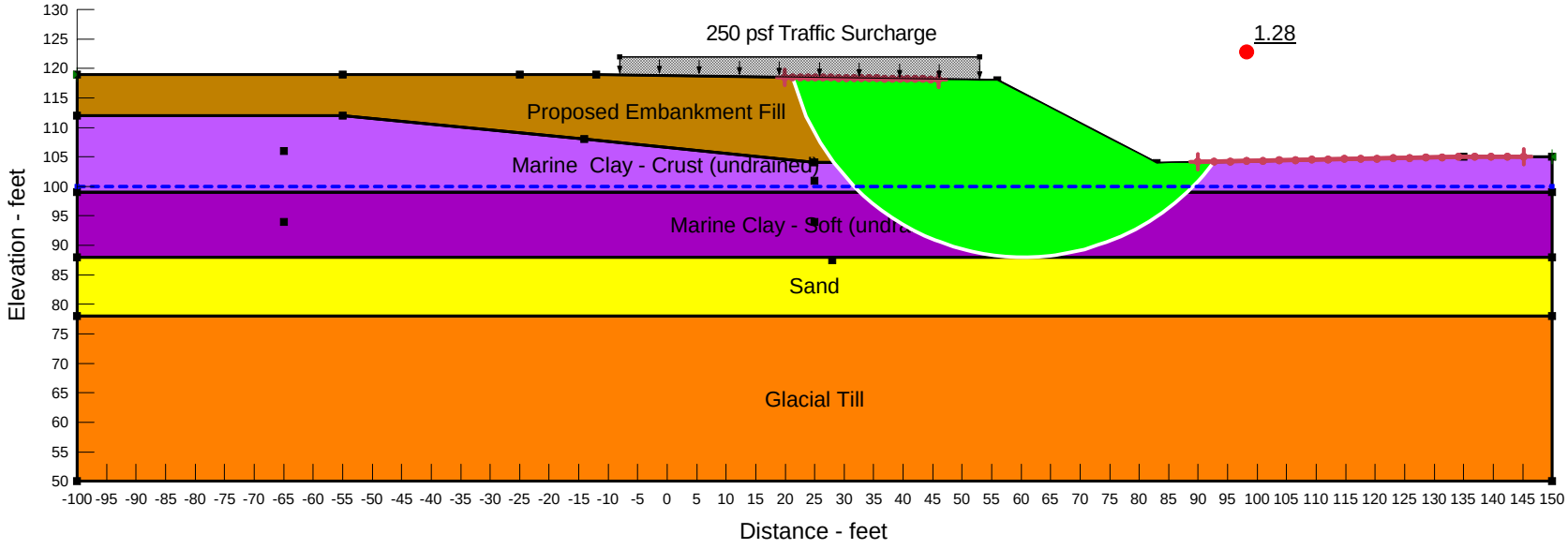


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB On Ramp
Sta. 217+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Glacial Till	Mohr-Coulomb	135	0	36
	Marine Clay - Crust (undrained)	Mohr-Coulomb	120	1,500	0
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34
	Sand	Mohr-Coulomb	120	0	31

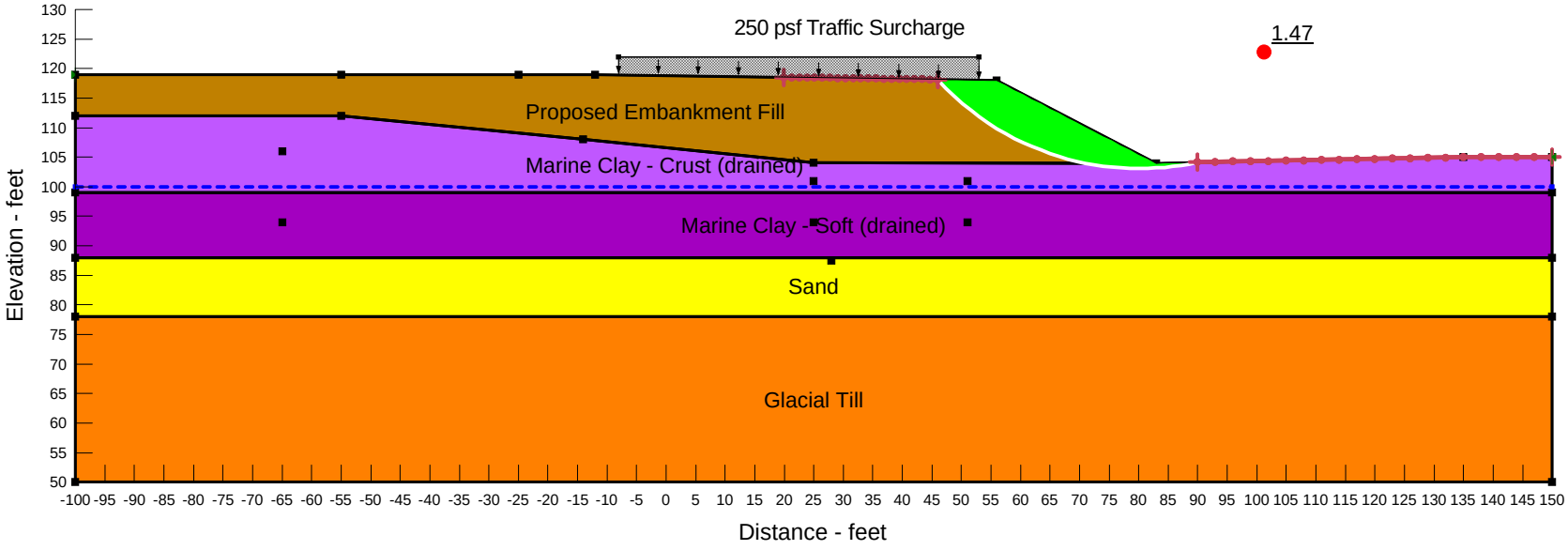


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB On Ramp
Sta. 217+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Glacial Till	Mohr-Coulomb	135	0	36
	Marine Clay - Crust (drained)	Mohr-Coulomb	120	0	30
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34
	Sand	Mohr-Coulomb	120	0	31



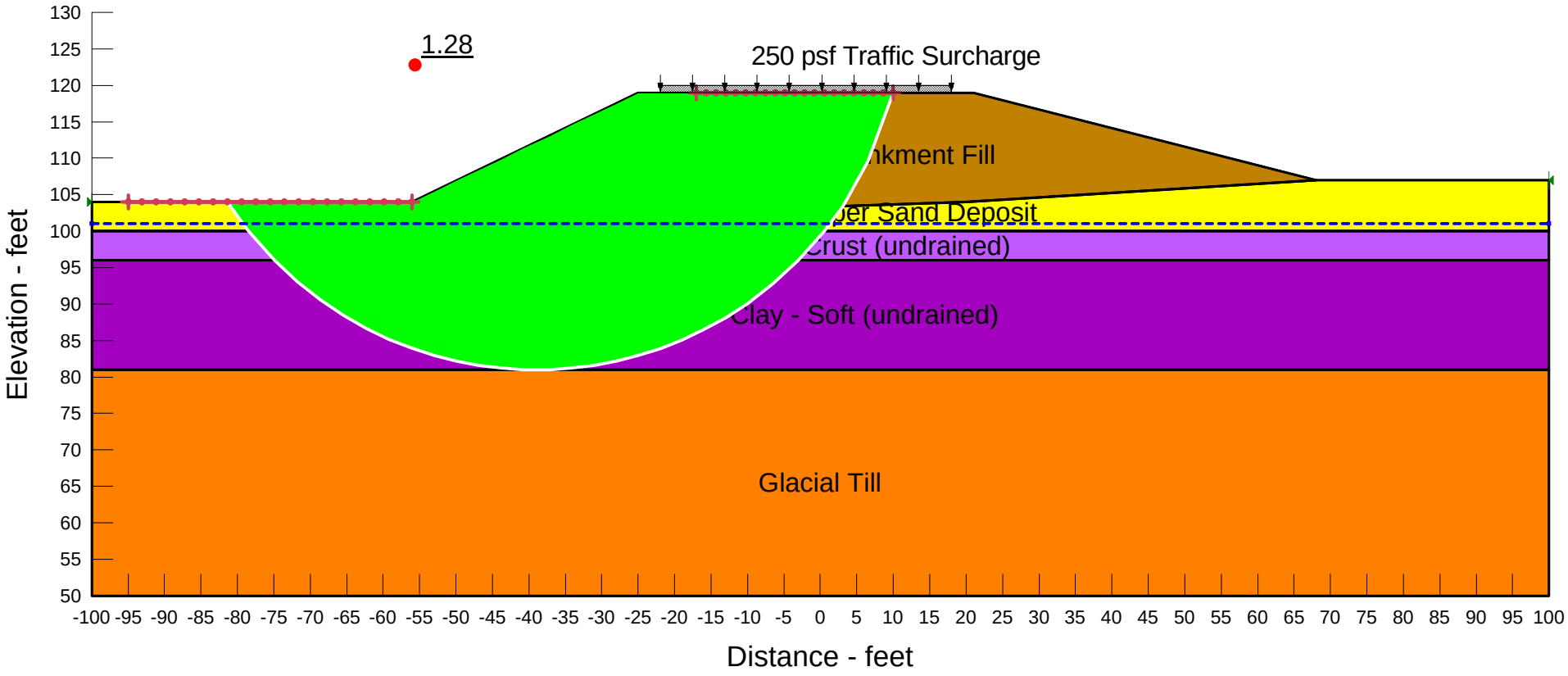
Exit 35 SB Off ramp

Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 321+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Glacial Till	Mohr-Coulomb	135	0	36	0	1
	Marine Clay - Crust (undrained)	Mohr-Coulomb	120	1,000	0	0	1
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

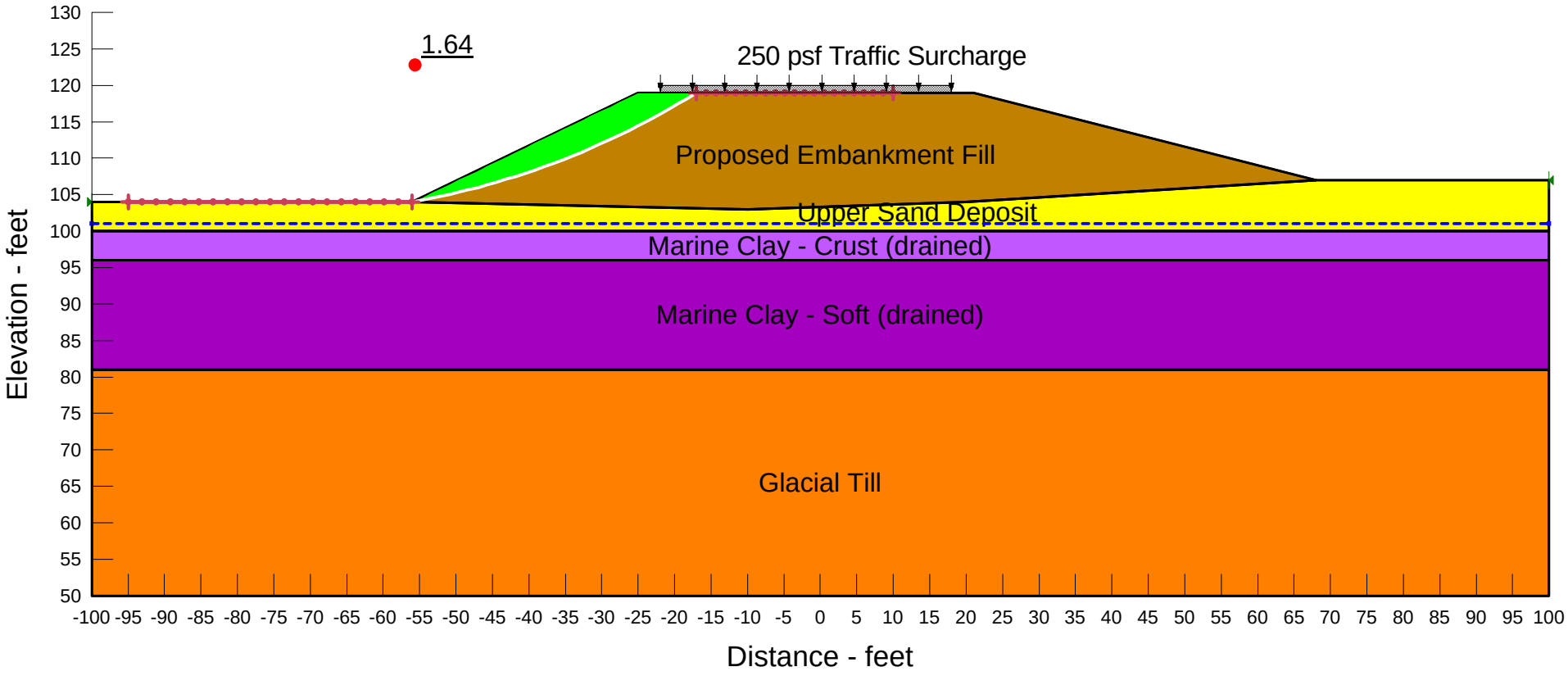


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 321+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Glacial Till	Mohr-Coulomb	135	0	36	0	1
	Marine Clay - Crust (drained)	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

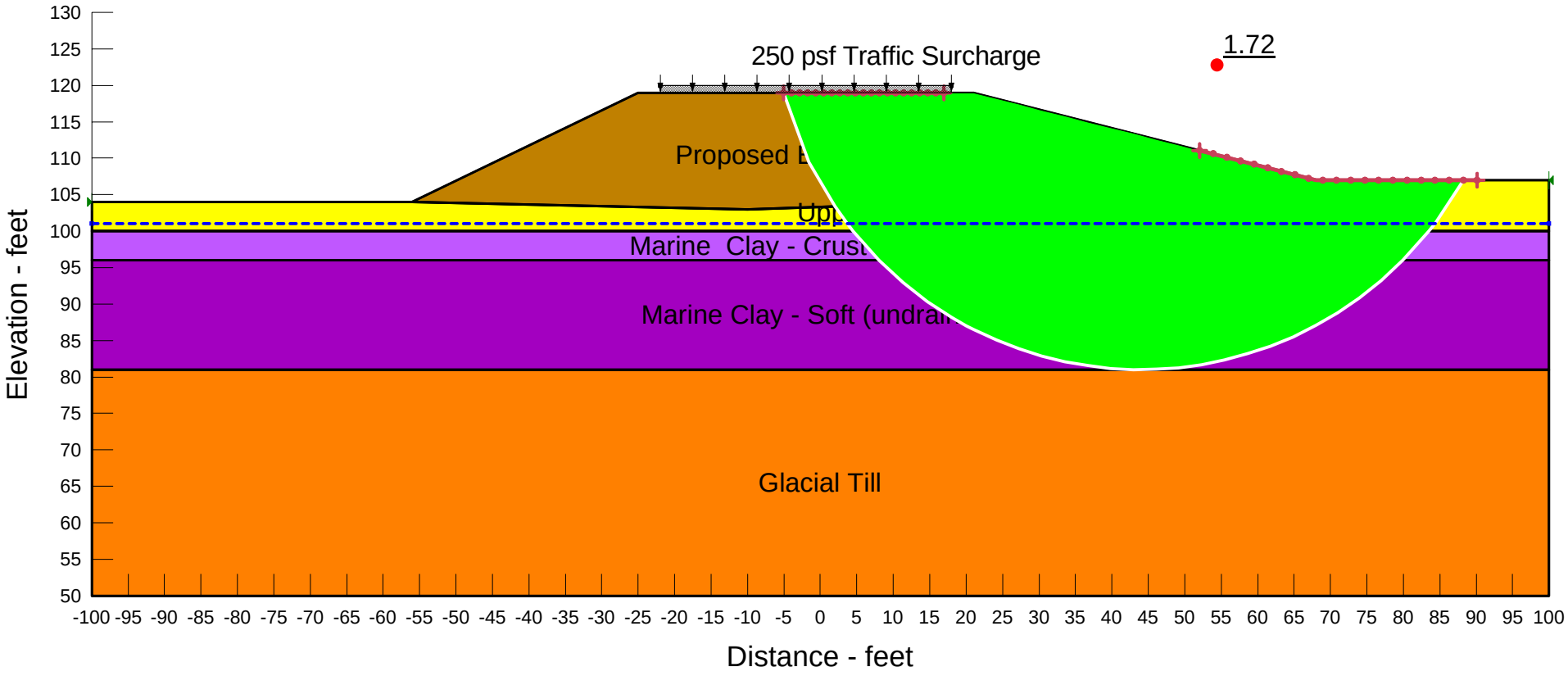


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 321+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Glacial Till	Mohr-Coulomb	135	0	36	0	1
	Marine Clay - Crust (undrained)	Mohr-Coulomb	120	1,000	0	0	1
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

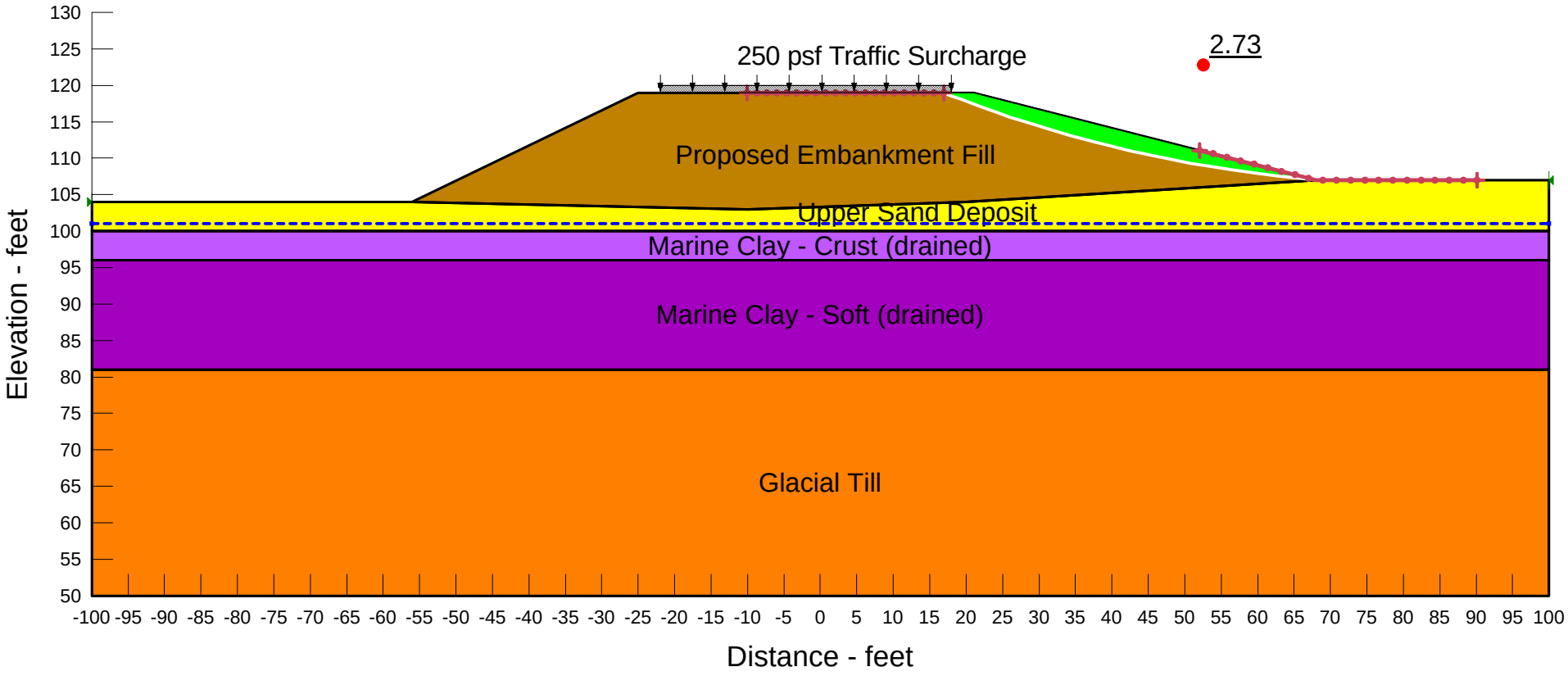


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 321+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Glacial Till	Mohr-Coulomb	135	0	36	0	1
	Marine Clay - Crust (drained)	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

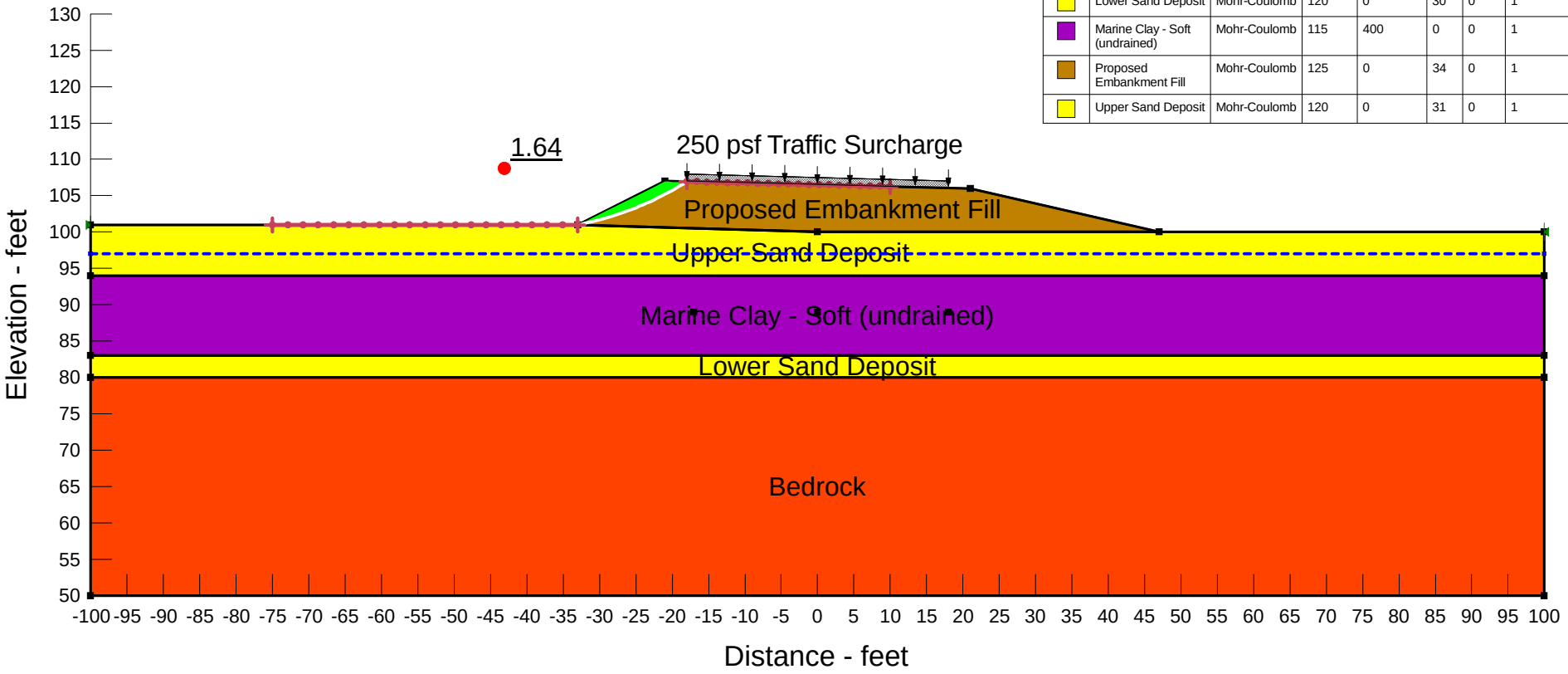


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 324+00
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

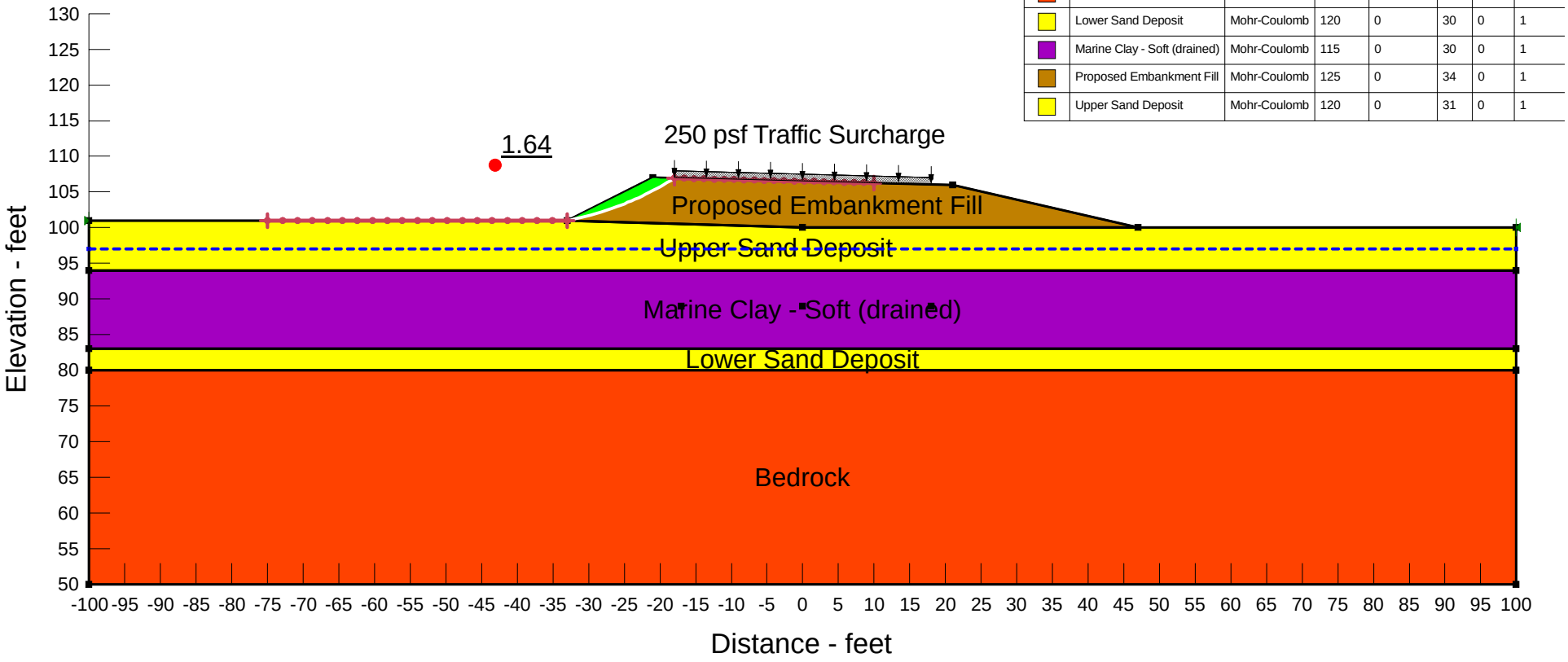


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 324+00
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezome Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

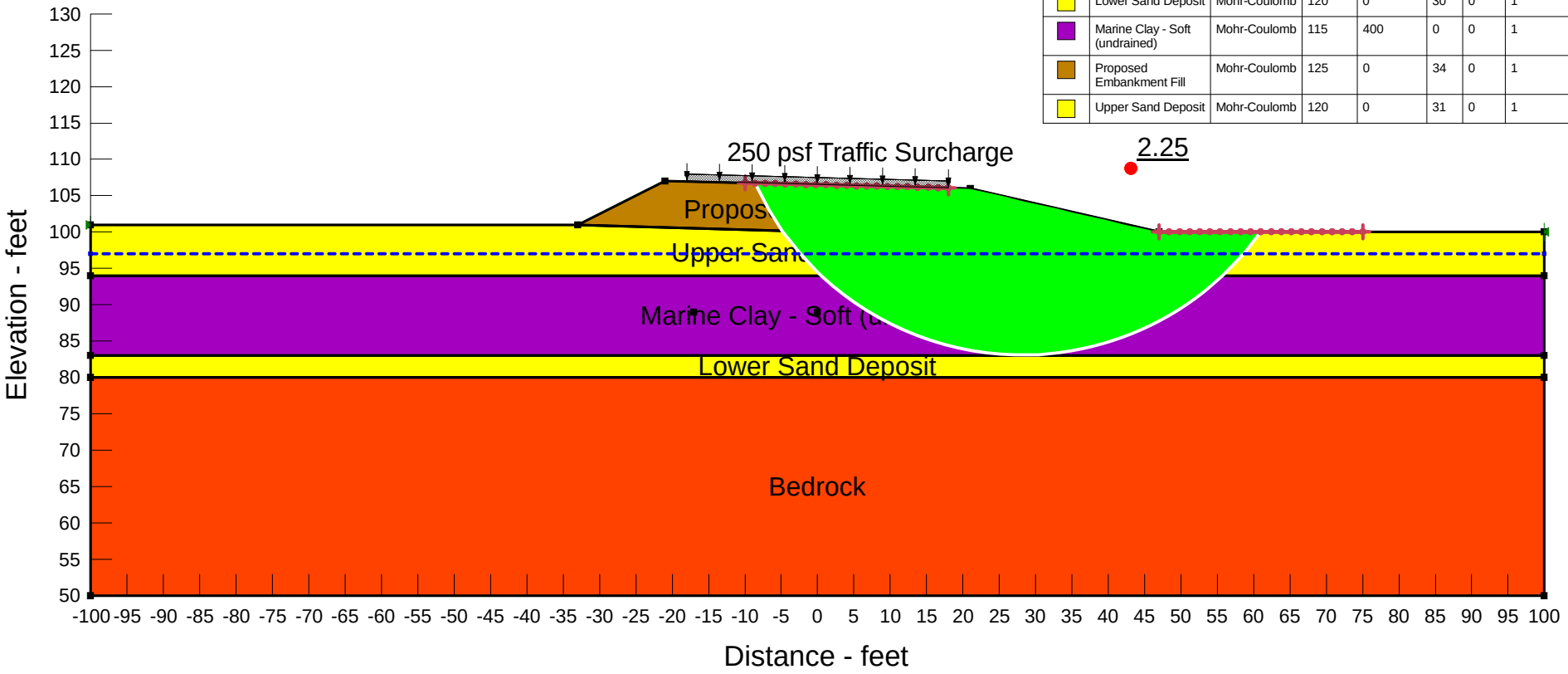


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 324+00
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

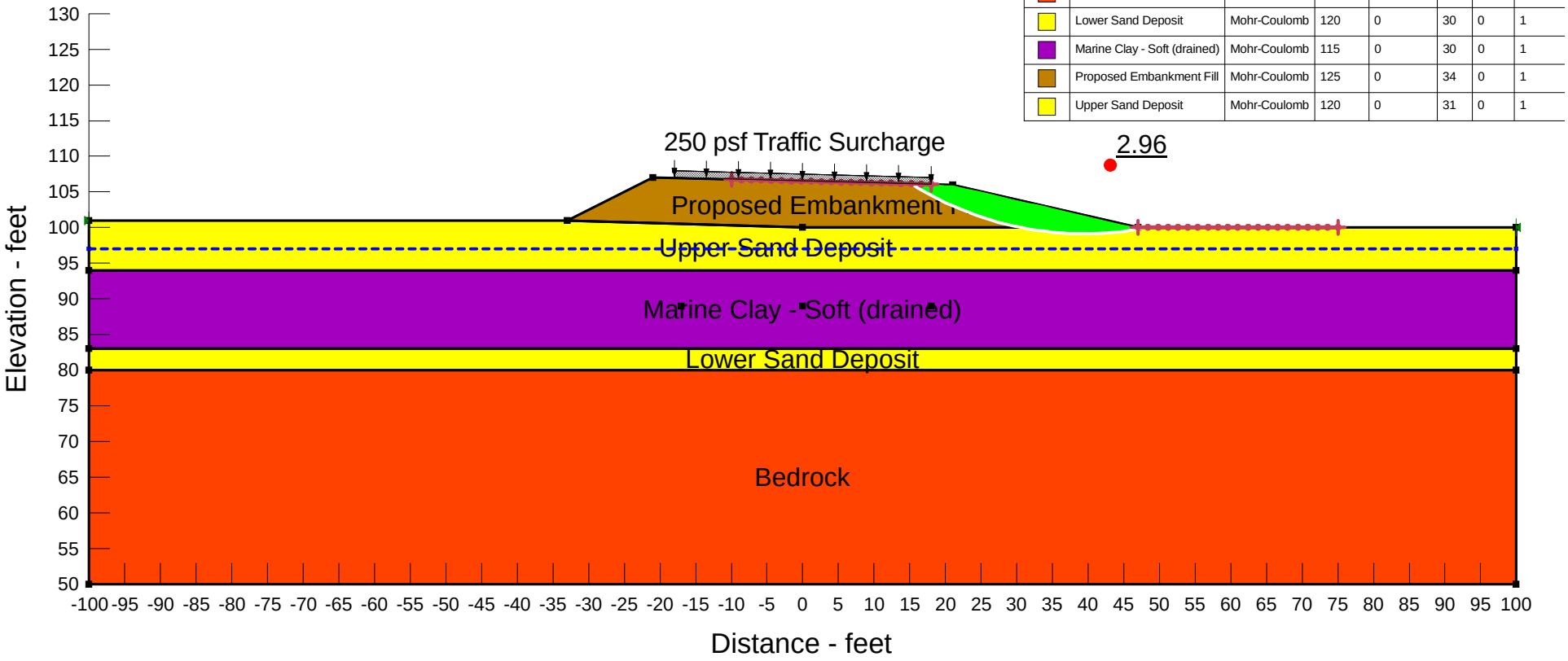


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 324+00
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezome Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

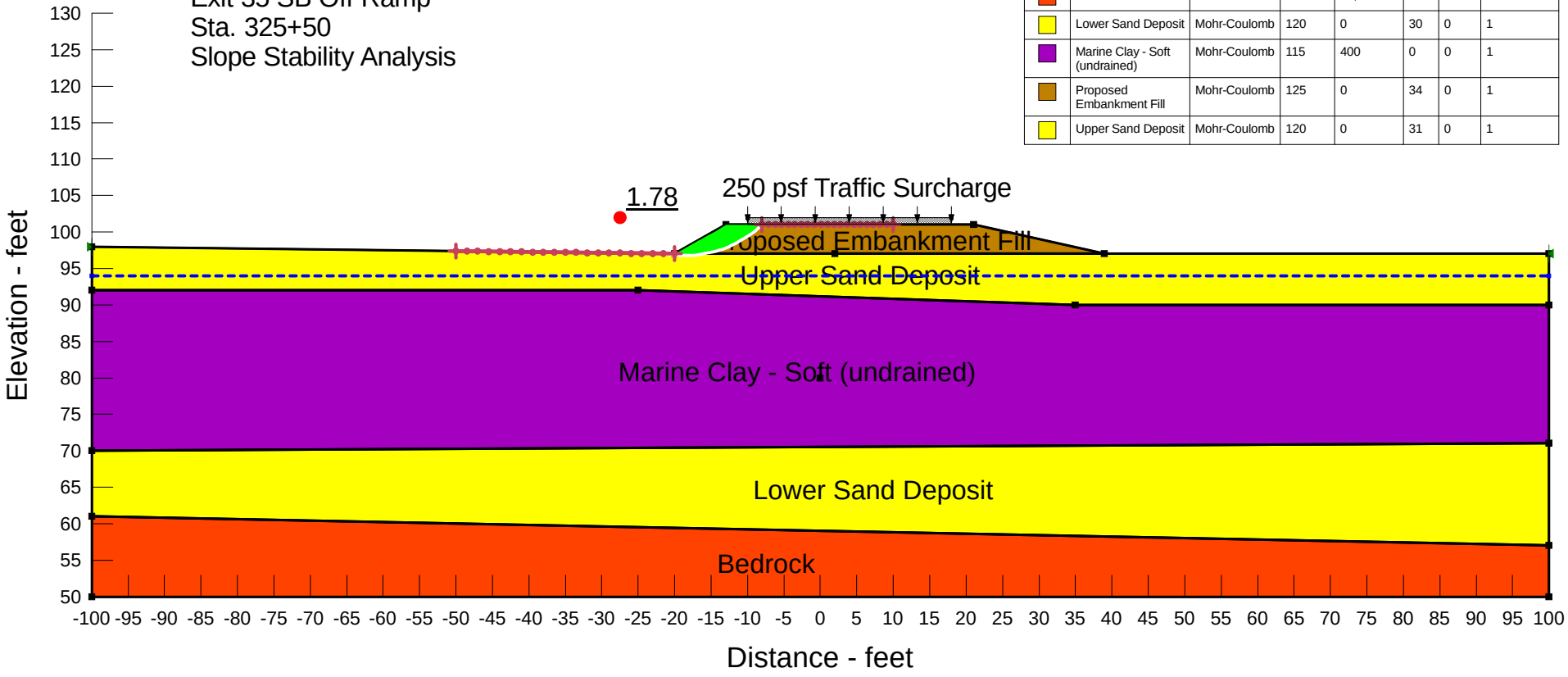


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 325+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

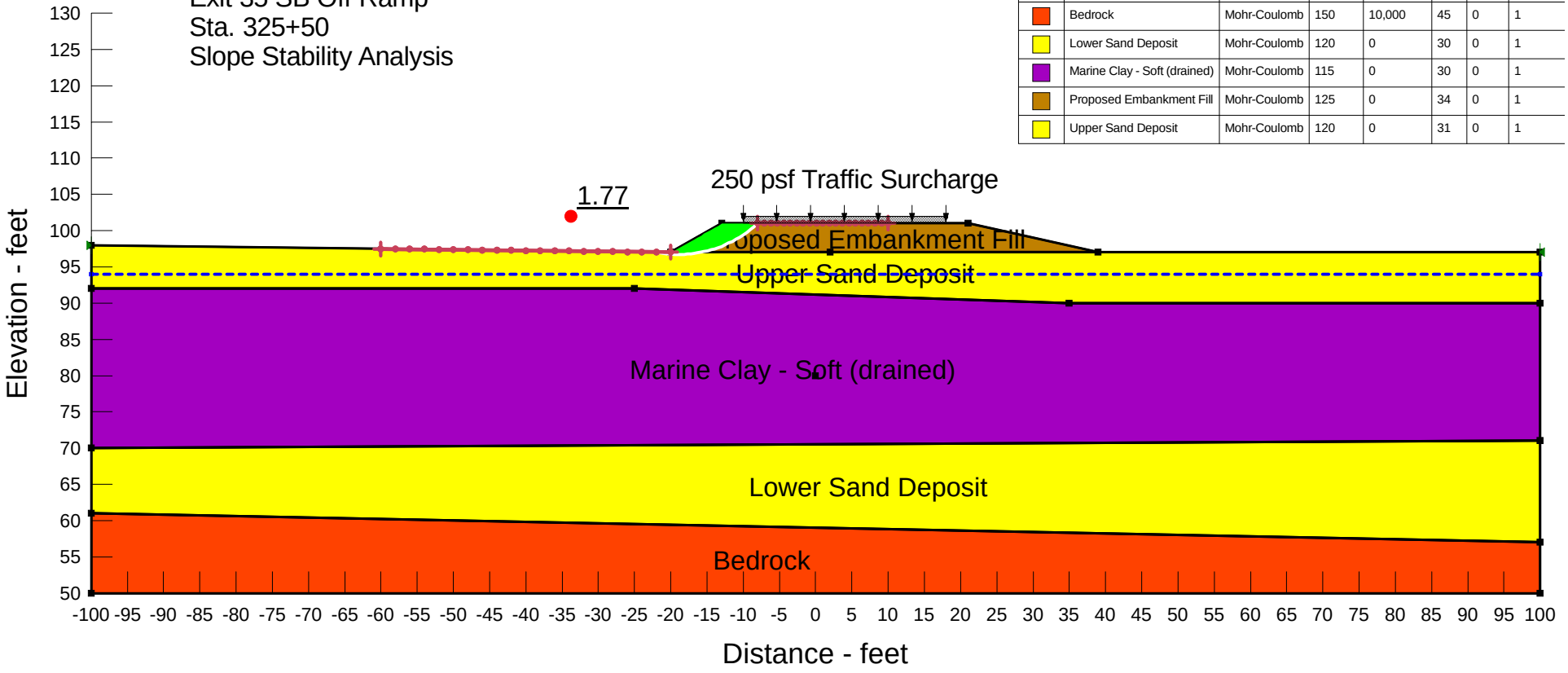


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 325+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezomet Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

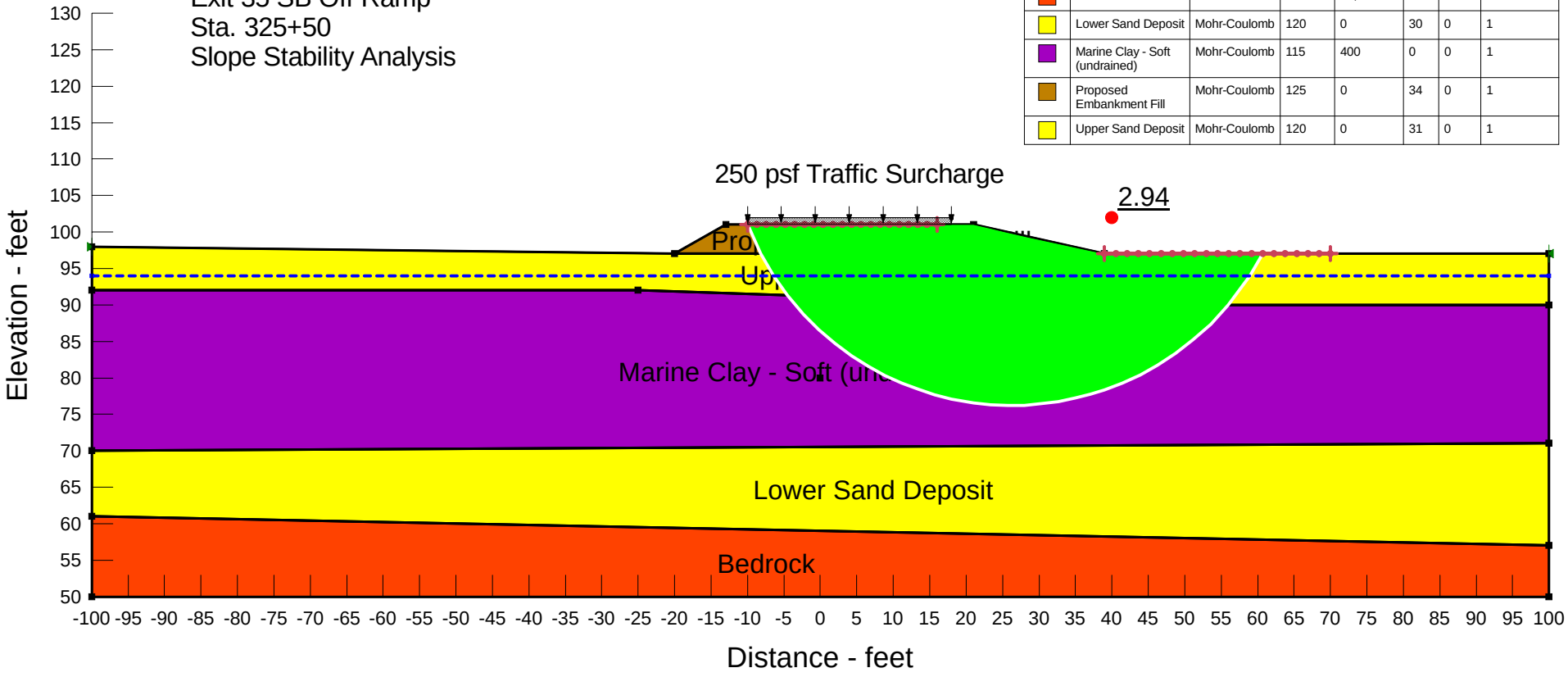


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 325+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (undrained)	Mohr-Coulomb	115	400	0	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1

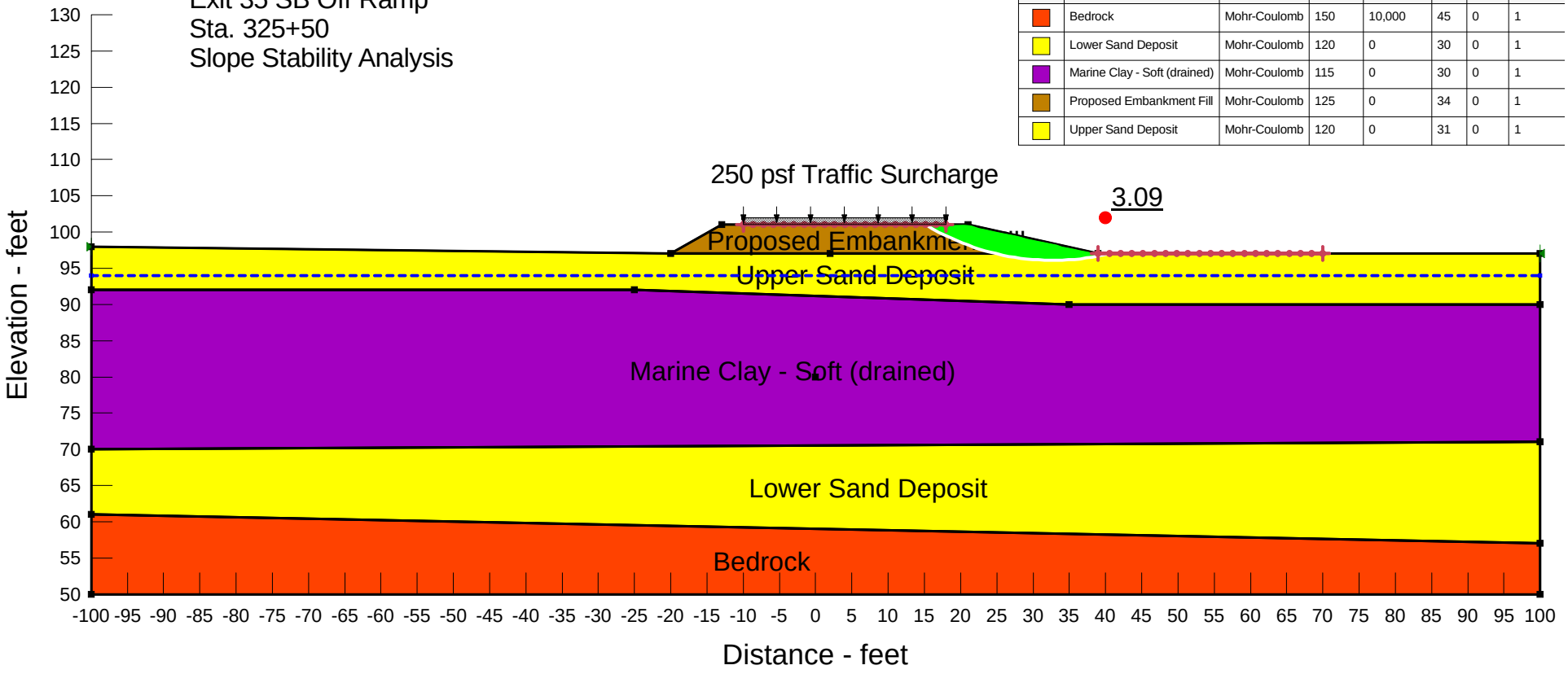


Performed by: TAD
Checked by: LGH

Exit 35 and 36 Interchange Improvements
Saco, Maine

Exit 35 SB Off Ramp
Sta. 325+50
Slope Stability Analysis

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezomet Line
	Bedrock	Mohr-Coulomb	150	10,000	45	0	1
	Lower Sand Deposit	Mohr-Coulomb	120	0	30	0	1
	Marine Clay - Soft (drained)	Mohr-Coulomb	115	0	30	0	1
	Proposed Embankment Fill	Mohr-Coulomb	125	0	34	0	1
	Upper Sand Deposit	Mohr-Coulomb	120	0	31	0	1



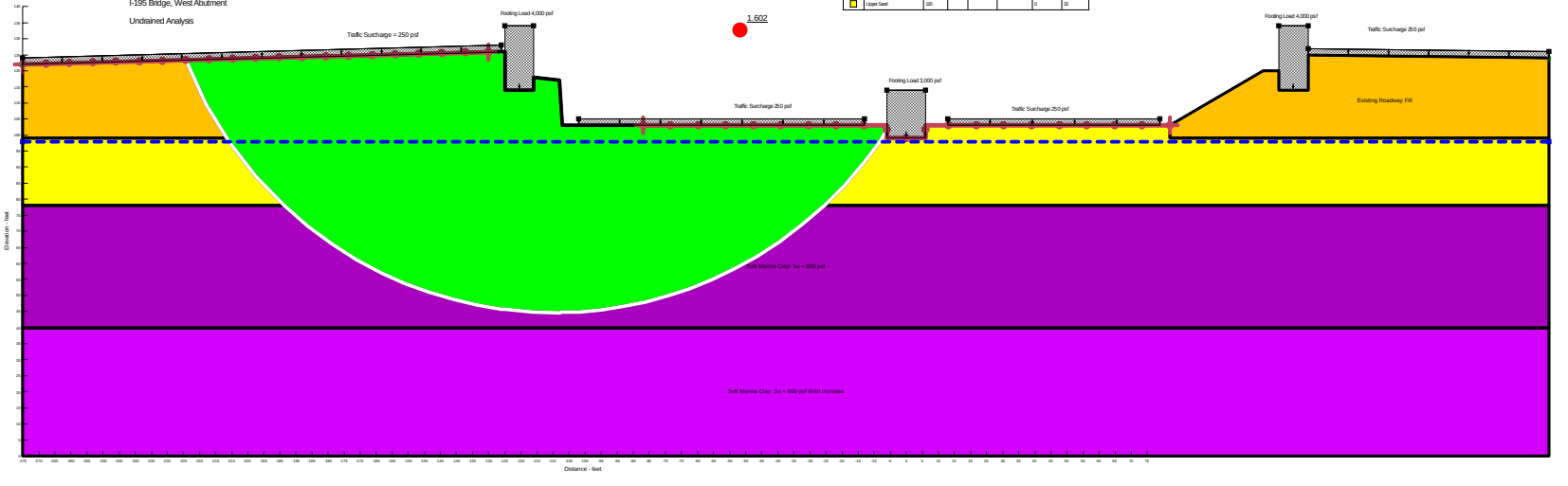
Global Stability – Soil Nail Wall Area

Exit 35 and 36 Interchange Improvements
Saco, Maine

Existing Condition
I-195 Bridge, West Abutment

Undrained Analysis

Color	Name	Unit Weight (pcf)	C-Top of Layer (psf)	C-Rate of Change (psf/ft)	C-Maximum (psf)	Effective Cohesion (psf)	Effective Friction Angle(°)
	Existing Roadway Fill	125				0	34
	Soft Marine Clay: Su= 600psf	115				600	0
	Soft Marine Clay: Su= 600psf With Increase	115	600	10	2000		
	Soil Nail Wall	125				10000	45
	Upper Sand	120				0	32

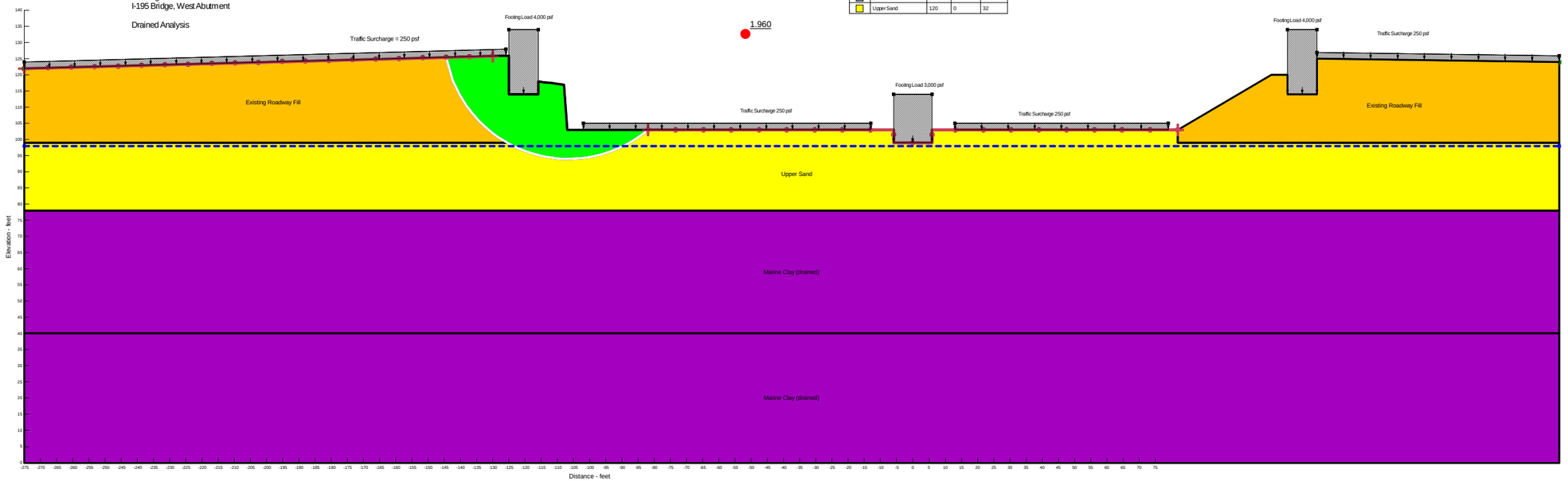


Exit 35 and 36 Interchange Improvements
Saco, Maine

Existing Condition
I-195 Bridge, West Abutment

Drained Analysis

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Existing Roadway Fill	125	0	34
	Marine Clay (drained)	115	0	30
	Soil Nail Wall	125	10,000	45
	Upper Sand	120	0	32



7 – WICK DRAIN CALCULATIONS

Performed By: LGH
Checked By: TAD

Exit 35 and Exit 36 Interchange Improvements
PVD Drains

Wick Spacing (feet)	Estimated Waiting Period (days)	Estimated Waiting Period (months)
4	83	3
5	142	5
6	220	7

			Typical Values
Uh =	0.95		90 % to 95 %
dc =	0	ft	(3.0 ft to 5.0 ft) x 1.05 for triangular array
	4.2	ft	
	5.25	ft	
	6.3	ft	
ch =	0.18	ft^2/day	(1.2 to 1.5) x cv
			Used x 1.5
F(n) =	-		
	2.3		
	2.5		
	2.7		
Fs =	0		Typically ignored
Fr =	0		Typically ignored
dw =	2.5	inches	2.5 inches
cv =	0.12	ft^2/day	

Exit 35 and Exit 36 Interchange Improvements
PVD Drains

Performed By: LGH
Checked By: TAD

Wick Spacing (feet)	Estimated Waiting Period (days)	Estimated Waiting Period (months)
4	106	3
5	183	6
6	282	9

			Typical Values
Uh =	0.95		90 % to 95 %
dc =	0	ft	(3.0 ft to 5.0 ft) x 1.05 for triangular array
	4.2	ft	
	5.25	ft	
	6.3	ft	
ch =	0.14	ft^2/day	(1.2 to 1.5) x cv
			used x 1.2
F(n) =	-		
	2.3		
	2.5		
	2.7		
Fs =	0		Typically ignored
Fr =	0		Typically ignored
dw =	2.5	inches	2.5 inches
cv =	0.12	ft^2/day	

$$t = \frac{d_c^2}{8c_h}\left[F(n) + F_s + F_r\right]\ln\left[\frac{1}{1-\overline{U}_h}\right] \qquad \text{[Eq. 2-1]}$$

where:

t	=	time required to achieve desired average degree of consolidation
$\overline{U}_h$	=	average degree of consolidation due to horizontal drainage
d_c	=	diameter of the cylinder of influence of the drain (drain influence zone)
c_h	=	coefficient of consolidation for horizontal drainage
F(n)	=	drain spacing factor
F_s	=	Soil disturbance factor (smear zone)
F_r	=	Well resistance factor

The drain spacing factor F(n) is determined as follows:

$$F(n) = \ln\left(\frac{d_c}{d_w}\right) - 0.75 \quad (\textit{simplified}) \qquad \text{[Eq. 2-2]}$$

where:

d_w	=	diameter of an equivalent circular drain

Note that Equation 2-1 does not consider consolidation from vertical drainage.

The following discussion of the components of Equation 2-1 should provide an understanding of the factors that can affect the design of PVD systems.

8 – STRUCTURES BEARING AND SETTLEMENT

BEARING CAPACITY AND SETTLEMENT

Overhead Sign Structures

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**1670+75 RIGHT Boring OS-2 (w/data from OS-1)**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**
PROJECT NUMBER:	**179450125**
LOCATION:	**Saco, MA**

FACTORED BEARING RESISTANCE **GRANULAR ANALYSIS**

Engineering Inputs:

Total unit weight of soil, ϒ:	
Above footing (pcf)	125.0 pcf
Below footing (pcf)	120.0 pcf
Friction angle, ϕ	32
Groundwater depth, D_w	0.0 ft
Undrained shear strength	0.0 psf
Footing Depth, D_f (feet)	5.0 ft
Footing Length, L (feet)	20.0 ft
Bearing Strata	Medium dense fine sand

Footing Depth	5 ft	5 ft	5 ft	5 ft	5 ft
Effective Footing Width	10.0 ft	12.0 ft	14.0 ft	16.0 ft	18.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	16.8 ksf	18.2 ksf	19.6 ksf	20.7 ksf	21.8 ksf
Strength Limit (includes ϕ=0.45)	7.5 ksf	8.2 ksf	8.8 ksf	9.3 ksf	9.8 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	2.9 ksf	2.6 ksf	2.4 ksf	2.3 ksf	2.1 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

Performed by: TAD
Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.36	0.36	0.36	0.36	0.36
Youngs Nodulus, E_s	2.7	2.7	2.7	2.7	2.7
Shape factor, B_z	1.10	1.09	1.09	1.09	1.08
N_c	35.5	35.5	35.5	35.5	35.5
S_c	1.33	1.39	1.46	1.52	1.59
N_{cm}	47.10	49.42	51.74	54.06	56.38
N_q	23.2	23.2	23.2	23.2	23.2
S_q	1.31	1.37	1.44	1.50	1.56
N_{qm}	30.4	31.9	33.3	34.8	36.2
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	30.2	30.2	30.2	30.2	30.2
S_Υ	0.80	0.76	0.72	0.68	0.64
$N_{\Upsilon m}$	24.2	23.0	21.7	20.5	19.3
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v		
Clay:	Lower	Upper	Lower	Upper	
Soft clay	-	-	0.40	0.50	
Medium stiff	0.347	2.08	0.40	0.50	Use v = 0.45
Stiff clay	2.08	6.94	0.40	0.50	Use Es = 1.2 ksi
Very stiff clay	6.94	13.89	0.40	0.50	
Silt	0.278	2.78	0.30	0.35	
Fine Sand:					
Loose fine sand	1.11	1.67	0.25	0.25	
Medium dense fine sand	1.67	2.78	0.25	0.25	
Dense fine sand	2.78	4.17	0.25	0.25	
Sand:					
Loose sand	1.39	4.17	0.20	0.36	
Medium dense sand	4.17	6.94	0.20	0.36	Use v = 0.25
Dense sand	6.94	11.11	0.30	0.40	Use Es = 5.5 ksi
Gravel:					
Loose gravel	4.17	11.11	0.20	0.35	
Medium dense gravel	11.11	13.89	0.20	0.35	
Dense gravel	13.89	27.78	0.30	0.40	

As per AASHTO use an weighted average value when soil varies.
From bottom of footing to a depth of 30 feet (assumed 2B):

	Thickness	Es (ksi)	v
Upper Sand	11	5.5	0.25
Medium Stiff Clay	8	1.2	0.45
Soft Clay	11	1	0.4
Wieghted Average =		2.70	0.36

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

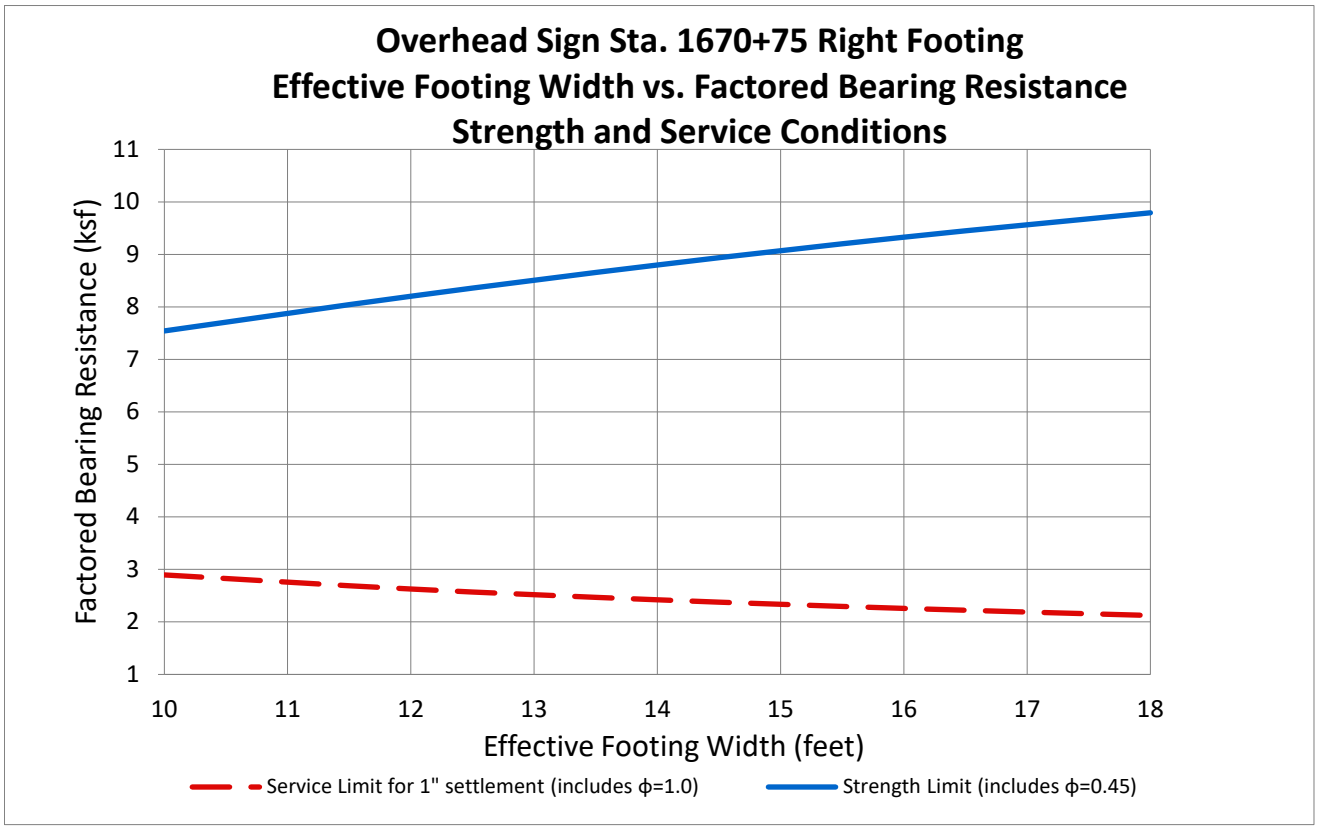
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



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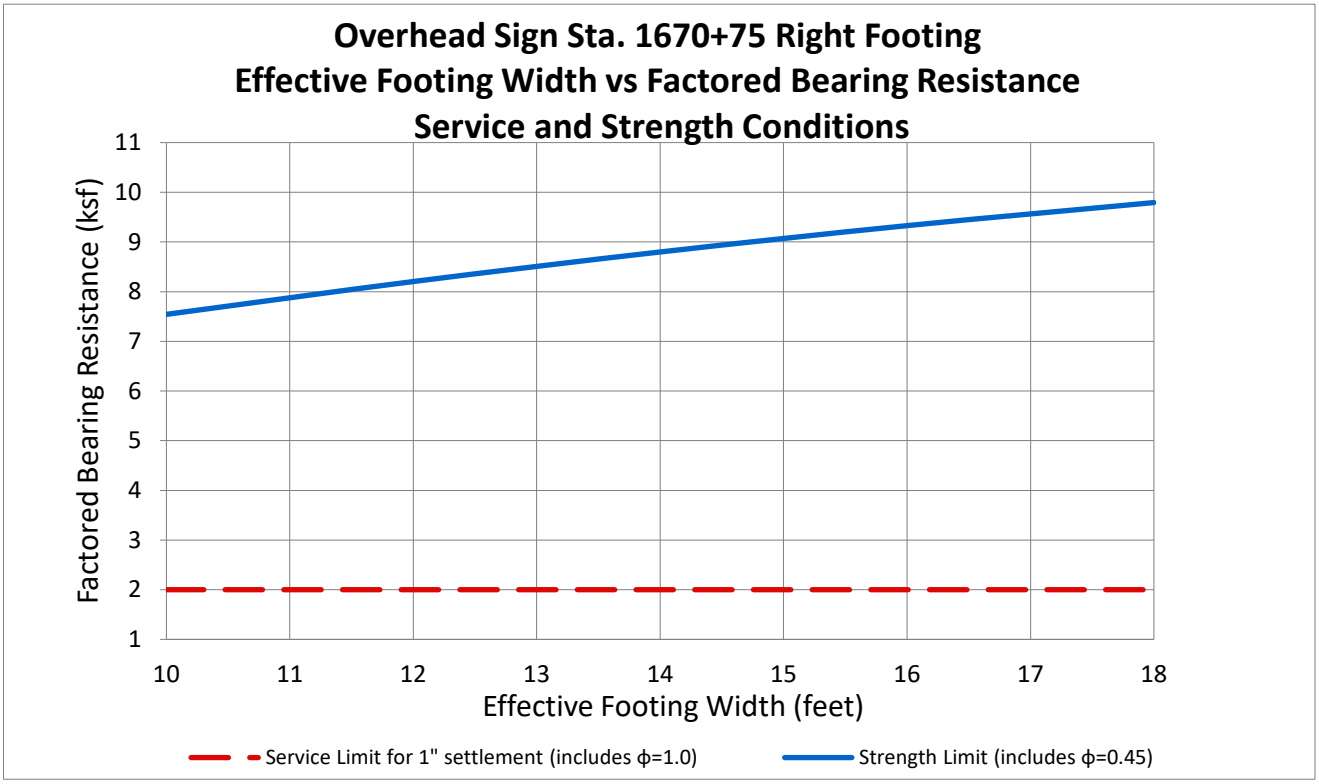
Checked by: LGH

Simplified Service Limit State Figure



	10 ft	18.0 ft
Service Lower Limit	2.0 ksf	2.0 ksf

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**1670+75 RIGHT Boring OS-2 (data from OS-1)**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**
PROJECT NUMBER:	**179450125**
LOCATION:	**Saco, MA**

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:	
Above footing (pcf)	120.0 pcf
Below footing (pcf)	115.0 pcf
Friction angle, ϕ	0
Groundwater depth, D_w	0.0 ft
Undrained shear strength	500.0 psf
Footing Depth, D_f (feet)	16.0 ft
Footing Length, L (feet)	20.0 ft
Bearing Strata	Stiff clay

CLAY ANALYSIS

Notes:

This analysis evaluates the bearing resistance at the top of the clay layer as an equivalent footing. Check if the clay has adequate bearing resistance to support the equivalent footing. Based on the granular analysis the footing size will be limited by the service condition at 2,000 psf. The maximum appllied factored bearing pressure would be 1.5 x 2000 psf = 3000 psf. This assumes a load factor of 1.5. Using a minimum footing width of 10 feet bearing at 5 feet, the equivalent footing would be a minimum of 21 feet wide at the top of clay (Df = 16 feet). So, the maximum applied factored bearing pressure would be (3000 psf)*(10/21) = **1.4 ksf**. Based on the table and figures below the factored bearing resistance is at least **1.8 ksf**. Therefore the clay is strong enough for the equivalent footing. Service condition was addressed in the granular analysis.

Note: The use of Su = 500 psf is conservative. The measured values ranged from 800 psf at OS-1 and are expected to decrease 500 psf with depth.

Footing Depth	16 ft	16 ft	16 ft	16 ft	16 ft
Effective Footing Width	21.0 ft	23.0 ft	25.0 ft	27.0 ft	29.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Stiff clay	Stiff clay	Stiff clay	Stiff clay	Stiff clay
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	4.1 ksf	4.1 ksf	4.2 ksf	4.2 ksf	4.3 ksf
Strength Limit (includes ϕ=0.45)	1.8 ksf	1.9 ksf	1.9 ksf	1.9 ksf	1.9 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	0.6 ksf	0.5 ksf	0.5 ksf	0.5 ksf	0.5 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

Performed by: TAD
Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.41	0.41	0.41	0.41	0.41
Youngs Nodulus, E_s	0.75	0.75	0.75	0.75	0.75
Shape factor, B_z	1.08	1.08	1.08	1.07	1.07
N_c	5.14	5.14	5.14	5.14	5.14
S_c	1.21	1.23	1.25	1.27	1.29
N_{cm}	6.22	6.32	6.43	6.53	6.63
N_q	1	1	1	1	1
S_q	1.00	1.00	1.00	1.00	1.00
N_{qm}	1.0	1.0	1.0	1.0	1.0
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	0	0	0	0	0
S_Υ	1.00	1.00	1.00	1.00	1.00
$N_{\Upsilon m}$	0.0	0.0	0.0	0.0	0.0
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v	
Clay:	**Lower**	**Upper**	**Lower**	**Upper**
Soft clay	-	-	0.40	0.50
Medium stiff	0.347	2.08	0.40	0.50
Stiff clay	2.08	6.94	0.40	0.50
Very stiff clay	6.94	13.89	0.40	0.50
Silt	0.278	2.78	0.30	0.35
Fine Sand:				
Loose fine sand	1.11	1.67	0.25	0.25
Medium dense fine sand	1.67	2.78	0.25	0.25
Dense fine sand	2.78	4.17	0.25	0.25
Sand:				
Loose sand	1.39	4.17	0.20	0.36
Medium dense sand	4.17	6.94	0.20	0.36
Dense sand	6.94	11.11	0.30	0.40
Gravel:				
Loose gravel	4.17	11.11	0.20	0.35
Medium dense gravel	11.11	13.89	0.20	0.35
Dense gravel	13.89	27.78	0.30	0.40

As per AASHTO use an weighted average value when soil varies.

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

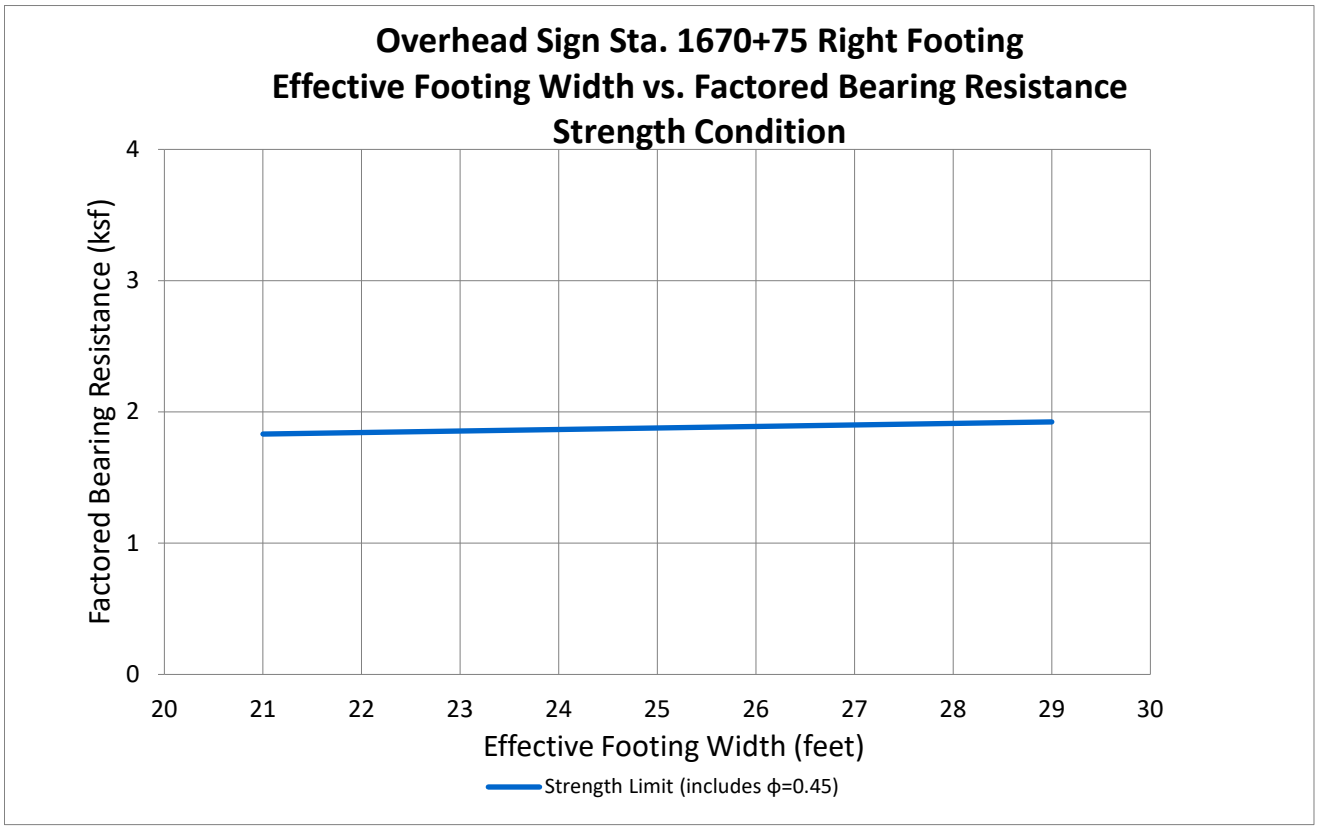
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

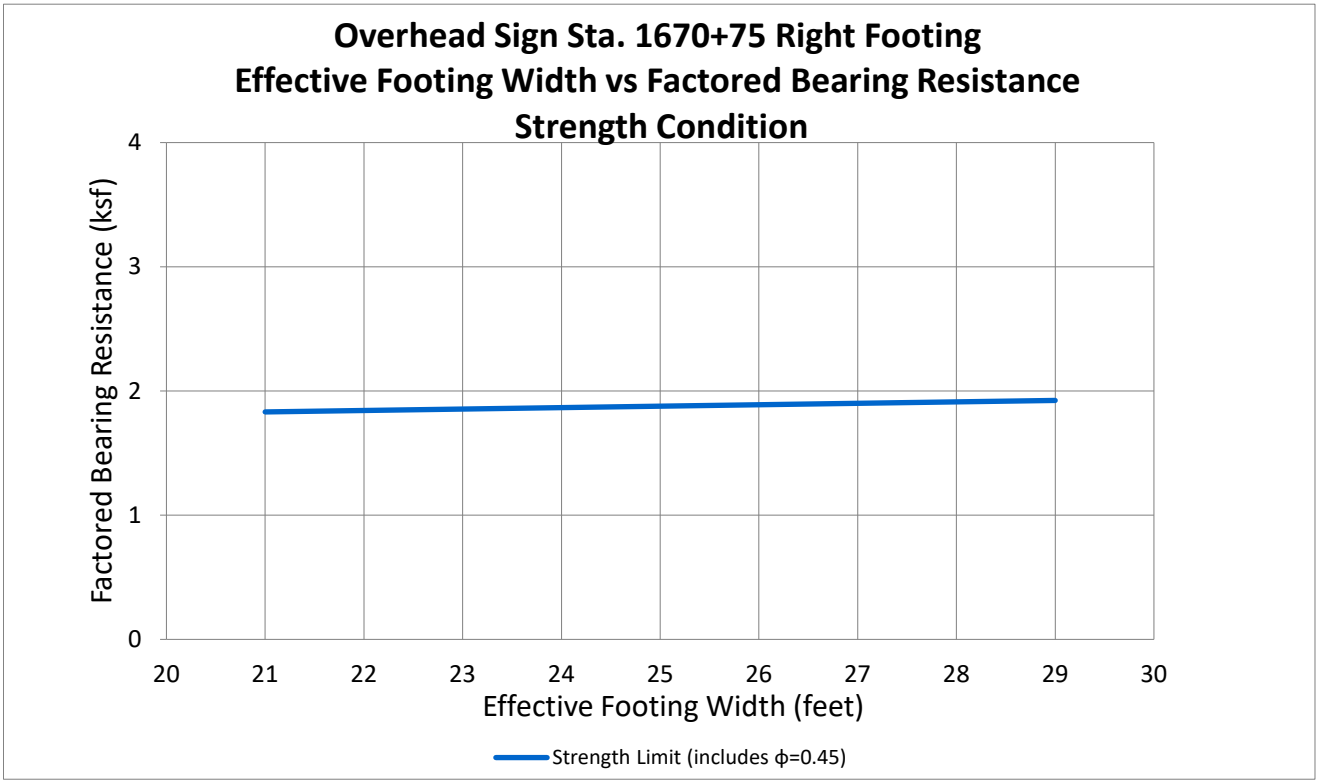
Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



Performed by: TAD
Checked by: LGH

Simplified Service Limit State Figure



	21 ft	29.0 ft
Service Lower Limit	0.0 ksf	0.0 ksf

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**1718+50 CANTILEVER**	**Boring: OS-3**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**	
PROJECT NUMBER:	**179450125**	
LOCATION:	**Saco, MA**	

Stantec

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:

Above footing (pcf)	125.0 pcf
Below footing (pcf)	120.0 pcf
Friction angle, ϕ	0
Groundwater depth, D_w	0.0 ft
Undrained shear strength	1000.0 psf
Footing Depth, D_f (feet)	5.0 ft
Footing Length, L (feet)	20.0 ft
Bearing Strata	Stiff Clay

Footing Depth	5 ft	5 ft	5 ft	5 ft	5 ft
Effective Footing Width	10.0 ft	12.0 ft	14.0 ft	16.0 ft	18.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Stiff Clay	Stiff Clay	Stiff Clay	Stiff Clay	Stiff Clay
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	6.0 ksf	6.1 ksf	6.2 ksf	6.3 ksf	6.4 ksf
Strength Limit (includes ϕ=0.45)	2.7 ksf	2.7 ksf	2.8 ksf	2.8 ksf	2.9 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	2.6 ksf	2.3 ksf	2.2 ksf	2.0 ksf	1.9 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

Performed by: TAD
Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.5	0.5	0.5	0.5	0.5
Youngs Nodulus, E_s	2.08	2.08	2.08	2.08	2.08
Shape factor, B_z	1.10	1.09	1.09	1.09	1.08
N_c	5.14	5.14	5.14	5.14	5.14
S_c	1.10	1.12	1.14	1.16	1.18
N_{cm}	5.65	5.76	5.86	5.96	6.07
N_q	1	1	1	1	1
S_q	1.00	1.00	1.00	1.00	1.00
N_{qm}	1.0	1.0	1.0	1.0	1.0
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_γ	0	0	0	0	0
S_γ	1.00	1.00	1.00	1.00	1.00
$N_{\gamma m}$	0.0	0.0	0.0	0.0	0.0
$C_{w\gamma}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v		
Clay:	**Lower**	**Upper**	**Lower**	**Upper**	
Soft clay	-	-	0.40	0.50	
Medium stiff	0.347	2.08	0.40	0.50	Use v = 0.50
Stiff clay	2.08	6.94	0.40	0.50	Use Es = 2.08 ksi
Very stiff clay	6.94	13.89	0.40	0.50	
Silt	0.278	2.78	0.30	0.35	
Fine Sand:					
Loose fine sand	1.11	1.67	0.25	0.25	
Medium dense fine sand	1.67	2.78	0.25	0.25	
Dense fine sand	2.78	4.17	0.25	0.25	
Sand:					
Loose sand	1.39	4.17	0.20	0.36	
Medium dense sand	4.17	6.94	0.20	0.36	
Dense sand	6.94	11.11	0.30	0.40	
Gravel:					
Loose gravel	4.17	11.11	0.20	0.35	
Medium dense gravel	11.11	13.89	0.20	0.35	
Dense gravel	13.89	27.78	0.30	0.40	

As per AASHTO use an weighted average value when soil varies.

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

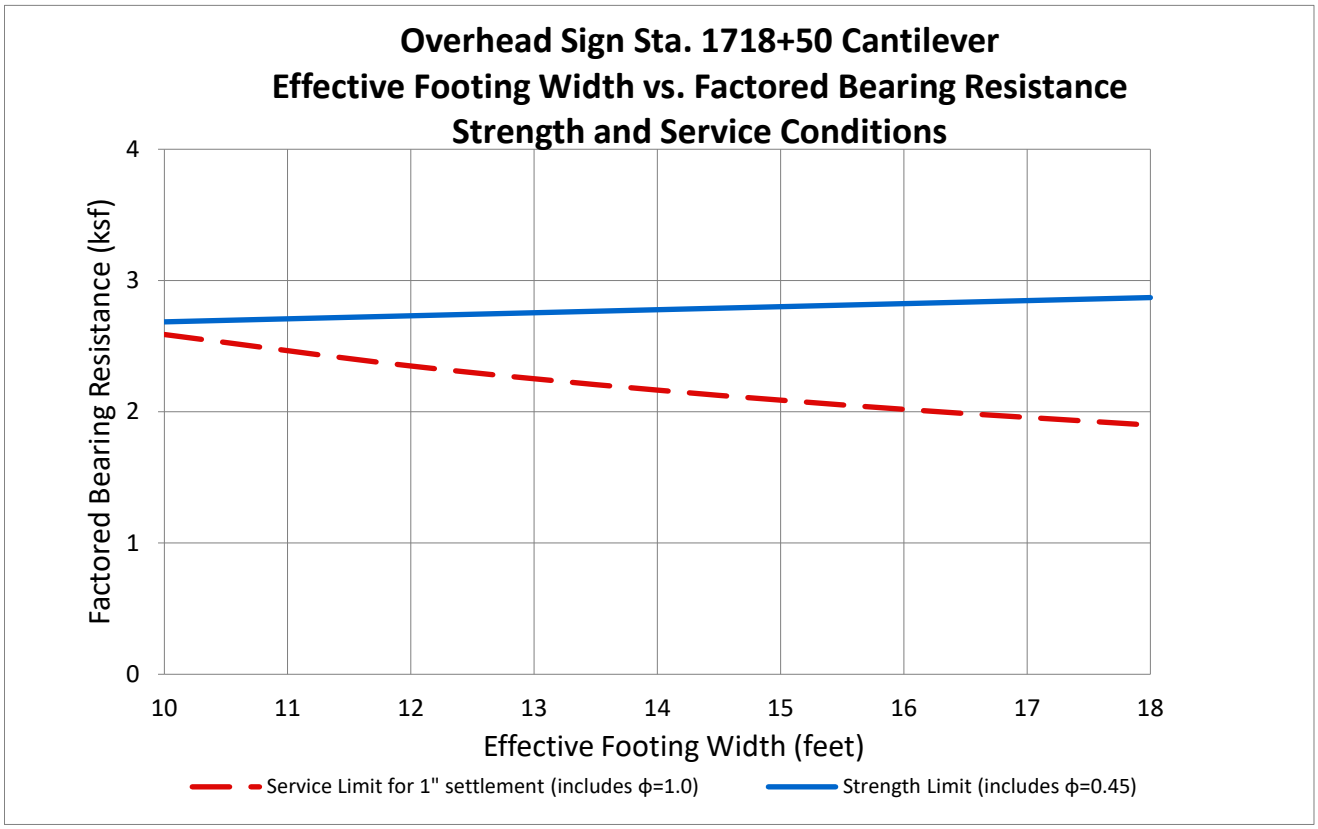
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
>1.5B+D_f	1.0	1.0

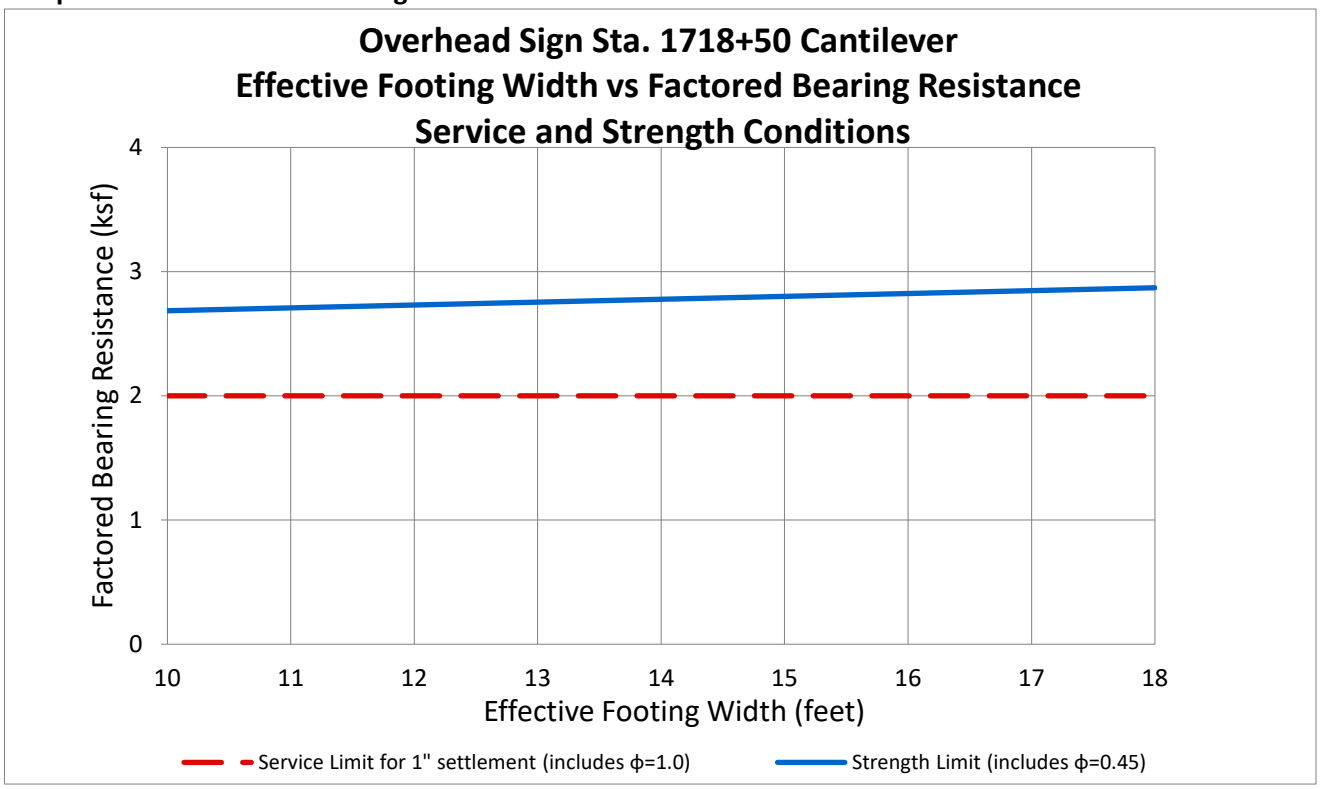
Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



Performed by: TAD
Checked by: LGH

Simplified Service Limit State Figure



Note: The bearing capacity is conservative because the stiff clay is thin and the underlying glacial till was ignored.

	10 ft	18.0 ft
Service Lower Limit	2.0 ksf	2.0 ksf

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**1731+30 CANTILEVER**	**Boring OS-4**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**	
PROJECT NUMBER:	**179450125**	
LOCATION:	**Saco, MA**	

Stantec

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:

Above footing (pcf)	125.0 pcf	
Below footing (pcf)	120.0 pcf	Note: ranges from 115(soft) to 120(crust) pcf
Friction angle, ϕ	0	
Groundwater depth, D_w	0.0 ft	
Undrained shear strength	1000.0 psf	
Footing Depth, D_f (feet)	5.0 ft	
Footing Length, L (feet)	20.0 ft	
Bearing Strata	Stiff Clay	

Footing Depth	5 ft	5 ft	5 ft	5 ft	5 ft
Effective Footing Width	10.0 ft	12.0 ft	14.0 ft	16.0 ft	18.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Stiff Clay	Stiff Clay	Stiff Clay	Stiff Clay	Stiff Clay
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	6.0 ksf	6.1 ksf	6.2 ksf	6.3 ksf	6.4 ksf
Strength Limit (includes ϕ=0.45)	2.7 ksf	2.7 ksf	2.8 ksf	2.8 ksf	2.9 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	2.6 ksf	2.3 ksf	2.2 ksf	2.0 ksf	1.9 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

Performed by: TAD
Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.5	0.5	0.5	0.5	0.5
Youngs Nodulus, E_s	2.08	2.08	2.08	2.08	2.08
Shape factor, B_z	1.10	1.09	1.09	1.09	1.08
N_c	5.14	5.14	5.14	5.14	5.14
S_c	1.10	1.12	1.14	1.16	1.18
N_{cm}	5.65	5.76	5.86	5.96	6.07
N_q	1	1	1	1	1
S_q	1.00	1.00	1.00	1.00	1.00
N_{qm}	1.0	1.0	1.0	1.0	1.0
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	0	0	0	0	0
S_Υ	1.00	1.00	1.00	1.00	1.00
$N_{\Upsilon m}$	0.0	0.0	0.0	0.0	0.0
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v		
Clay:	Lower	Upper	Lower	Upper	
Soft clay	-	-	0.40	0.50	
Medium stiff	0.347	2.08	0.40	0.50	Use v = 0.50
Stiff clay	2.08	6.94	0.40	0.50	Use Es = 2.08 ks
Very stiff clay	6.94	13.89	0.40	0.50	
Silt	0.278	2.78	0.30	0.35	
Fine Sand:					
Loose fine sand	1.11	1.67	0.25	0.25	
Medium dense fine sand	1.67	2.78	0.25	0.25	
Dense fine sand	2.78	4.17	0.25	0.25	
Sand:					
Loose sand	1.39	4.17	0.20	0.36	
Medium dense sand	4.17	6.94	0.20	0.36	
Dense sand	6.94	11.11	0.30	0.40	
Gravel:					
Loose gravel	4.17	11.11	0.20	0.35	
Medium dense gravel	11.11	13.89	0.20	0.35	
Dense gravel	13.89	27.78	0.30	0.40	

As per AASHTO use an weighted average value when soil varies.
Use values for the high end of the stiff clay because the data shows Su = 800 to 1,300 psf in the 15 feet directly below the footing (about 1B) and because the the sand layer is conservatively ignored.

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

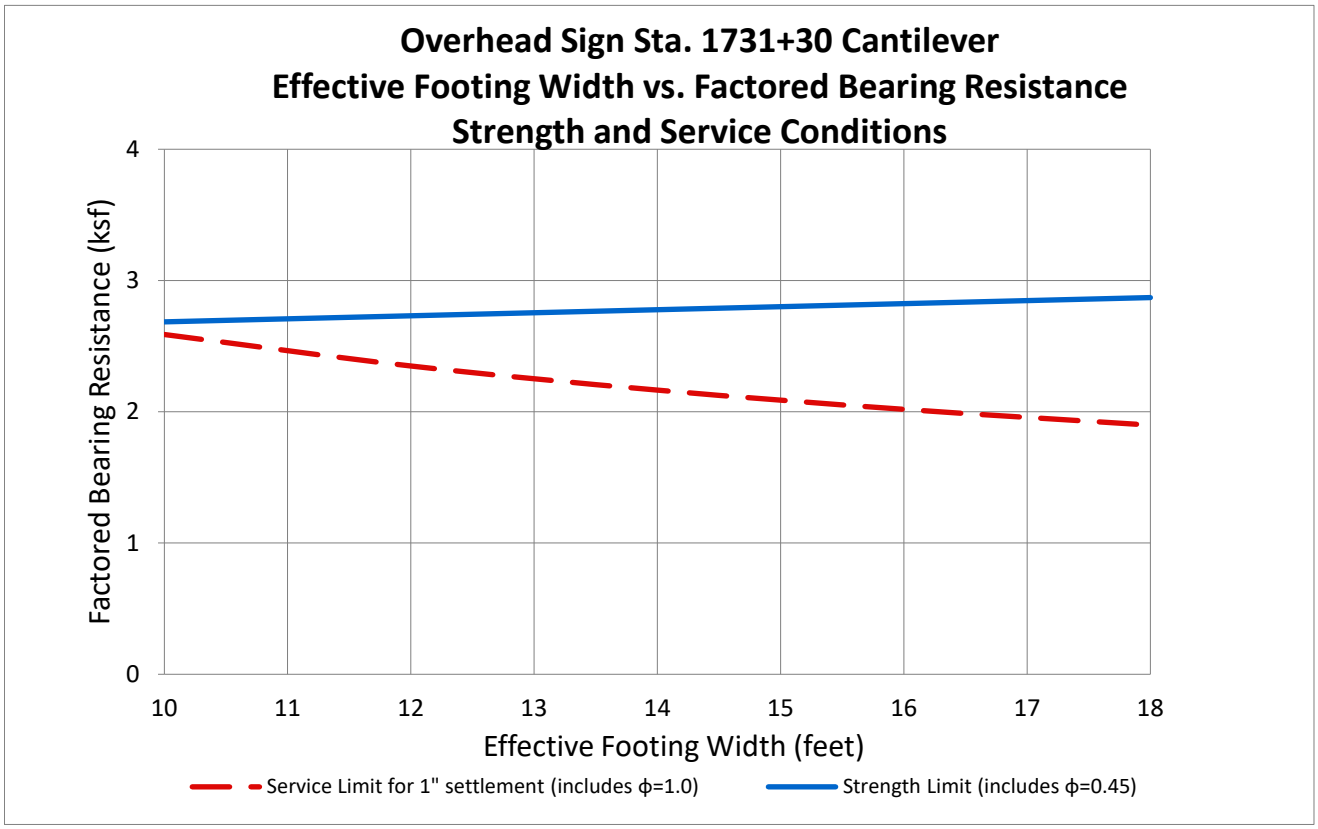
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
>1.5B+D_f	1.0	1.0

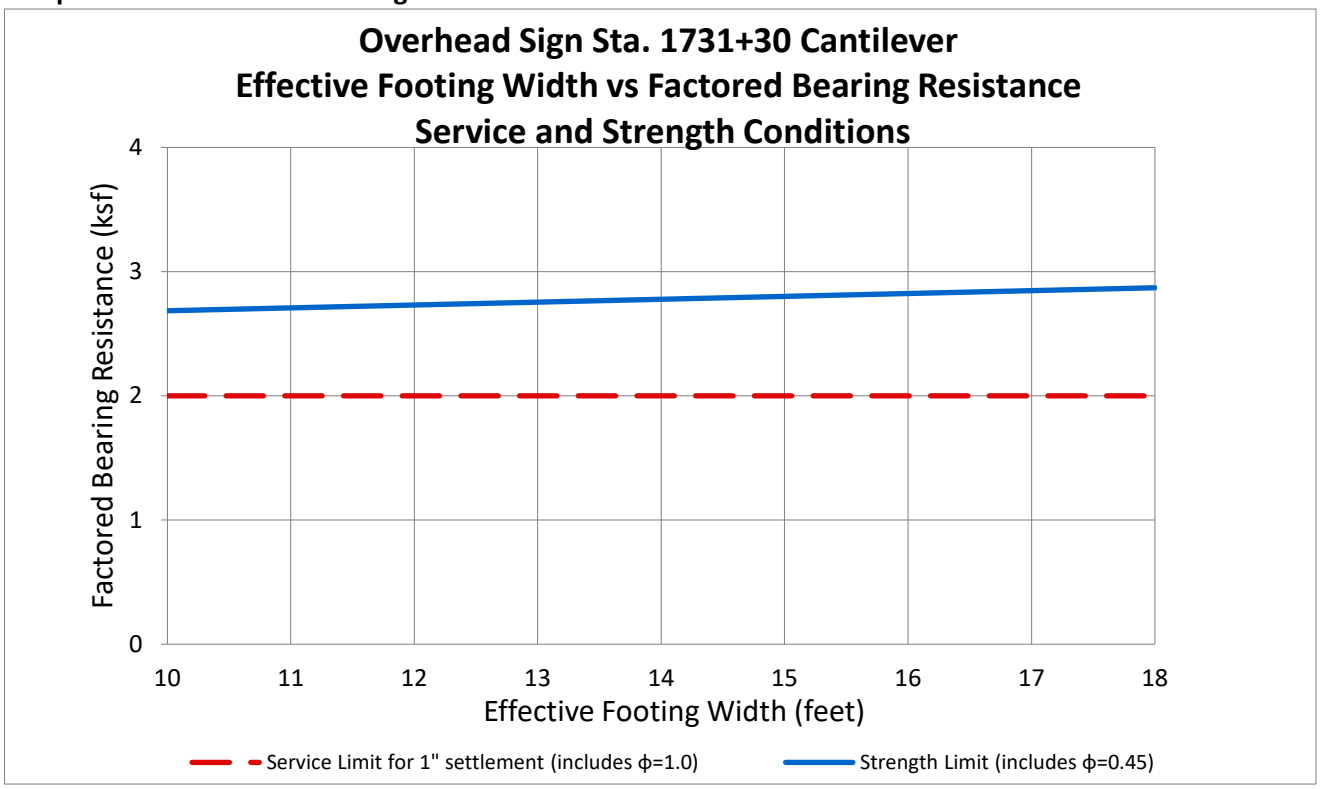
Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



Performed by: TAD
Checked by: LGH

Simplified Service Limit State Figure



	10 ft	18.0 ft
Service Lower Limit	2.0 ksf	2.0 ksf

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**1740+50 LEFT**	**Boring OS-9**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**	
PROJECT NUMBER:	**179450125**	
LOCATION:	**Saco, MA**	

Stantec

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:	
Above footing (pcf)	125.0 pcf
Below footing (pcf)	120.0 pcf
Friction angle, ϕ	32
Groundwater depth, D_w	0.0 ft
Undrained shear strength	0.0 psf
Footing Depth, D_f (feet)	5.0 ft
Footing Length, L (feet)	20.0 ft
Bearing Strata	Medium dense fine sand

Footing Depth	5 ft	5 ft	5 ft	5 ft	5 ft
Effective Footing Width	10.0 ft	12.0 ft	14.0 ft	16.0 ft	18.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	16.8 ksf	18.2 ksf	19.6 ksf	20.7 ksf	21.8 ksf
Strength Limit (includes ϕ=0.45)	7.5 ksf	8.2 ksf	8.8 ksf	9.3 ksf	9.8 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	2.2 ksf	2.0 ksf	1.9 ksf	1.7 ksf	1.6 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

Performed by: TAD
Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.37	0.37	0.37	0.37	0.37
Youngs Nodulus, E_s	2.07	2.07	2.07	2.07	2.07
Shape factor, B_z	1.10	1.09	1.09	1.09	1.08
N_c	35.5	35.5	35.5	35.5	35.5
S_c	1.33	1.39	1.46	1.52	1.59
N_{cm}	47.10	49.42	51.74	54.06	56.38
N_q	23.2	23.2	23.2	23.2	23.2
S_q	1.31	1.37	1.44	1.50	1.56
N_{qm}	30.4	31.9	33.3	34.8	36.2
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	30.2	30.2	30.2	30.2	30.2
S_Υ	0.80	0.76	0.72	0.68	0.64
$N_{\Upsilon m}$	24.2	23.0	21.7	20.5	19.3
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v		
Clay:	Lower	Upper	Lower	Upper	
Soft clay	-	-	0.40	0.50	
Medium stiff	0.347	2.08	0.40	0.50	Use v = 0.45
Stiff clay	2.08	6.94	0.40	0.50	Use Es = 1.6 ksi
Very stiff clay	6.94	13.89	0.40	0.50	
Silt	0.278	2.78	0.30	0.35	
Fine Sand:					
Loose fine sand	1.11	1.67	0.25	0.25	
Medium dense fine sand	1.67	2.78	0.25	0.25	Use v = 0.25
Dense fine sand	2.78	4.17	0.25	0.25	Use Es = 2.78 ks
Sand:					
Loose sand	1.39	4.17	0.20	0.36	
Medium dense sand	4.17	6.94	0.20	0.36	
Dense sand	6.94	11.11	0.30	0.40	
Gravel:					
Loose gravel	4.17	11.11	0.20	0.35	
Medium dense gravel	11.11	13.89	0.20	0.35	
Dense gravel	13.89	27.78	0.30	0.40	

As per AASHTO use an weighted average value when soil varies.
From bottom of footing to a depth of 30 feet (assumed 2B):

	Thickness	Es (ksi)	v
Upper Sand	12	2.78	0.25
Medium Stiff Clay	18	1.6	0.45
Wieghted Average =		2.07	0.37

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

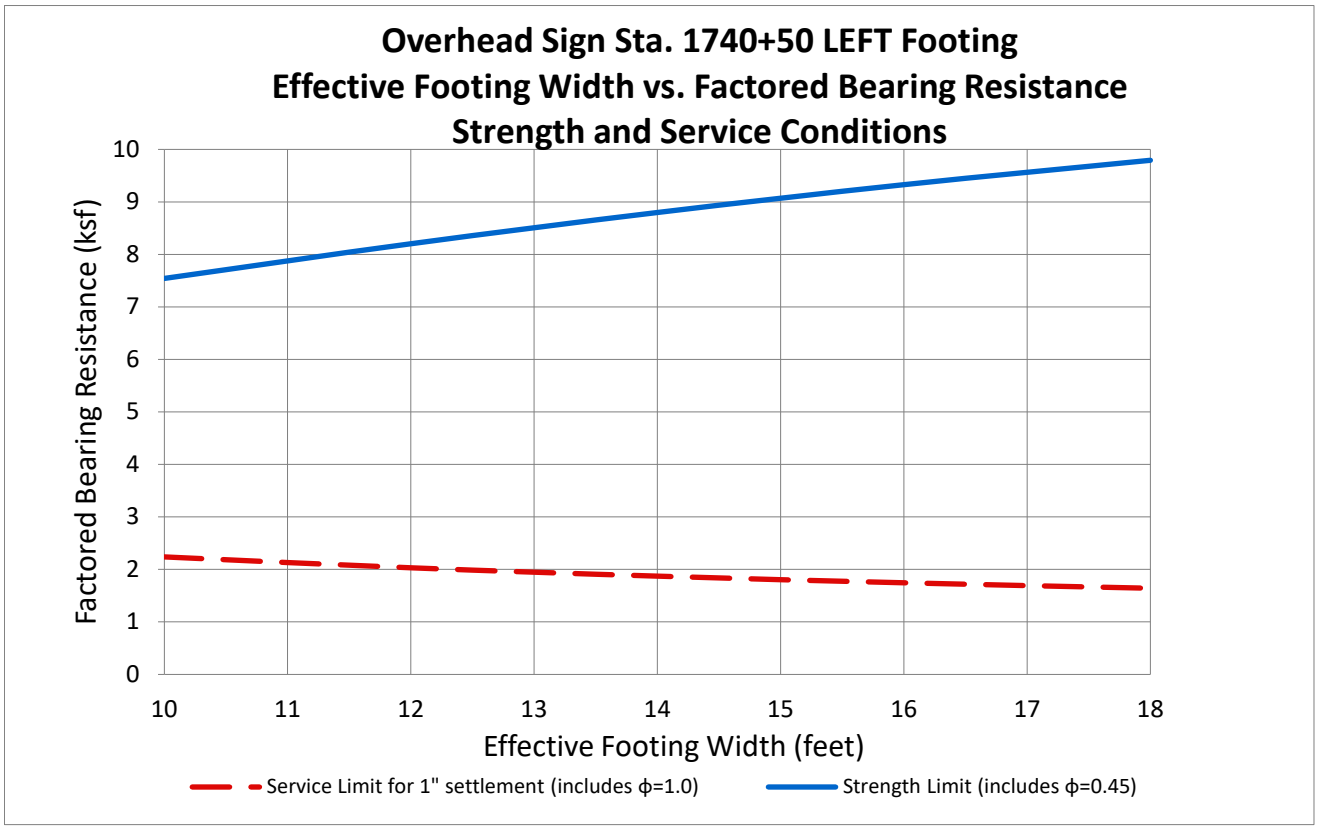
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

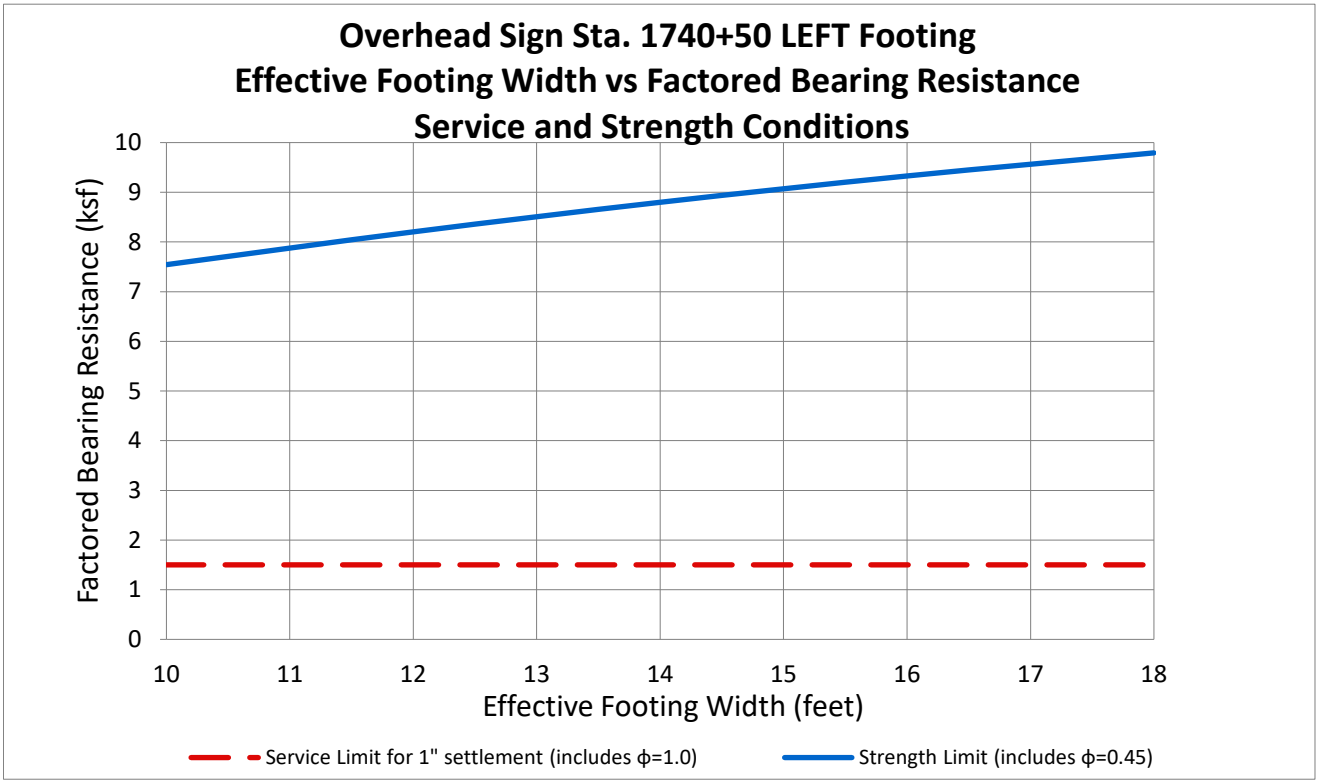
Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



Performed by: TAD
Checked by: LGH

Simplified Service Limit State Figure



	10 ft	18.0 ft
Service Lower Limit	1.5 ksf	1.5 ksf

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**1740+50 LT_RT**	**Boring OS-9 and OS-10**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**	
PROJECT NUMBER:	**179450125**	
LOCATION:	**Saco, MA**	

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:	
Above footing (pcf)	120.0 pcf
Below footing (pcf)	115.0 pcf
Friction angle, ϕ	0
Groundwater depth, D_w	0.0 ft
Undrained shear strength	500.0 psf
Footing Depth, D_f (feet)	17.0 ft
Footing Length, L (feet)	20.0 ft
Bearing Strata	Stiff clay

Notes:

This analysis evaluates the bearing resistance at the top of the clay layer as an equivalent footing. Check if the clay has adequate bearing resistance to support the equivalent footing. Based on the granular analysis the footing size will be limited by the service condition at 1,500 psf. The maximum appllied factored bearing pressure would be 1.5 x 1500 psf = 2250 psf. This assumes a load factor of 1.5. Using a minimum footing width of 10 feet bearing at 5 feet, the equivalent footing would be a minimum of 22 feet wide at the top of clay (Df = 17 feet). So, the maximum applied factored bearing pressure would be (2250 psf)*(10/22) = **1.0 ksf**. Based on the table and figures below the factored bearing resistance is at least **1.9 ksf.** Therefore the clay is strong enough for the equivalent footing. Service condition was addressed in the granular analysis.

Note: The use of Su = 500 psf is conservative. The measured values ranged from 1000 psf at OS-9 and are expected to decrease 500 psf with depth.

Footing Depth	17 ft	17 ft	17 ft	17 ft	17 ft
Effective Footing Width	21.0 ft	23.0 ft	25.0 ft	27.0 ft	29.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Stiff clay	Stiff clay	Stiff clay	Stiff clay	Stiff clay
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	4.1 ksf	4.2 ksf	4.2 ksf	4.3 ksf	4.3 ksf
Strength Limit (includes ϕ=0.45)	1.9 ksf	1.9 ksf	1.9 ksf	1.9 ksf	2.0 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	1.6 ksf	1.5 ksf	1.4 ksf	1.4 ksf	1.3 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

Performed by: TAD
Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.45	0.45	0.45	0.45	0.45
Youngs Nodulus, E_s	2	2	2	2	2
Shape factor, B_z	1.08	1.08	1.08	1.07	1.07
N_c	5.14	5.14	5.14	5.14	5.14
S_c	1.21	1.23	1.25	1.27	1.29
N_{cm}	6.22	6.32	6.43	6.53	6.63
N_q	1	1	1	1	1
S_q	1.00	1.00	1.00	1.00	1.00
N_{qm}	1.0	1.0	1.0	1.0	1.0
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	0	0	0	0	0
S_Υ	1.00	1.00	1.00	1.00	1.00
$N_{\Upsilon m}$	0.0	0.0	0.0	0.0	0.0
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v	
Clay:	**Lower**	**Upper**	**Lower**	**Upper**
Soft clay	-	-	0.40	0.50
Medium stiff	0.347	2.08	0.40	0.50
Stiff clay	2.08	6.94	0.40	0.50
Very stiff clay	6.94	13.89	0.40	0.50
Silt	0.278	2.78	0.30	0.35
Fine Sand:				
Loose fine sand	1.11	1.67	0.25	0.25
Medium dense fine sand	1.67	2.78	0.25	0.25
Dense fine sand	2.78	4.17	0.25	0.25
Sand:				
Loose sand	1.39	4.17	0.20	0.36
Medium dense sand	4.17	6.94	0.20	0.36
Dense sand	6.94	11.11	0.30	0.40
Gravel:				
Loose gravel	4.17	11.11	0.20	0.35
Medium dense gravel	11.11	13.89	0.20	0.35
Dense gravel	13.89	27.78	0.30	0.40

As per AASHTO use an weighted average value when soil varies.

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

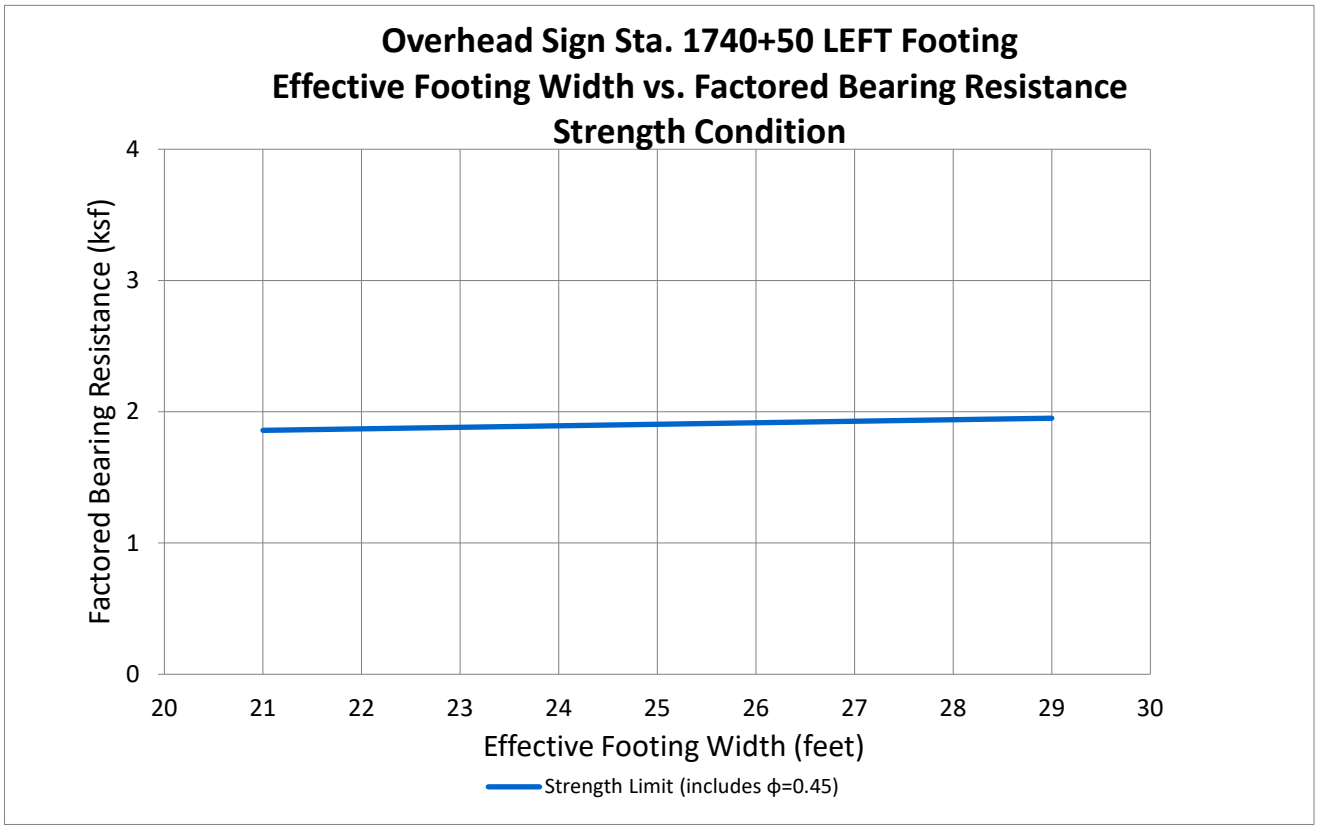
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
>1.5B+D_f	1.0	1.0

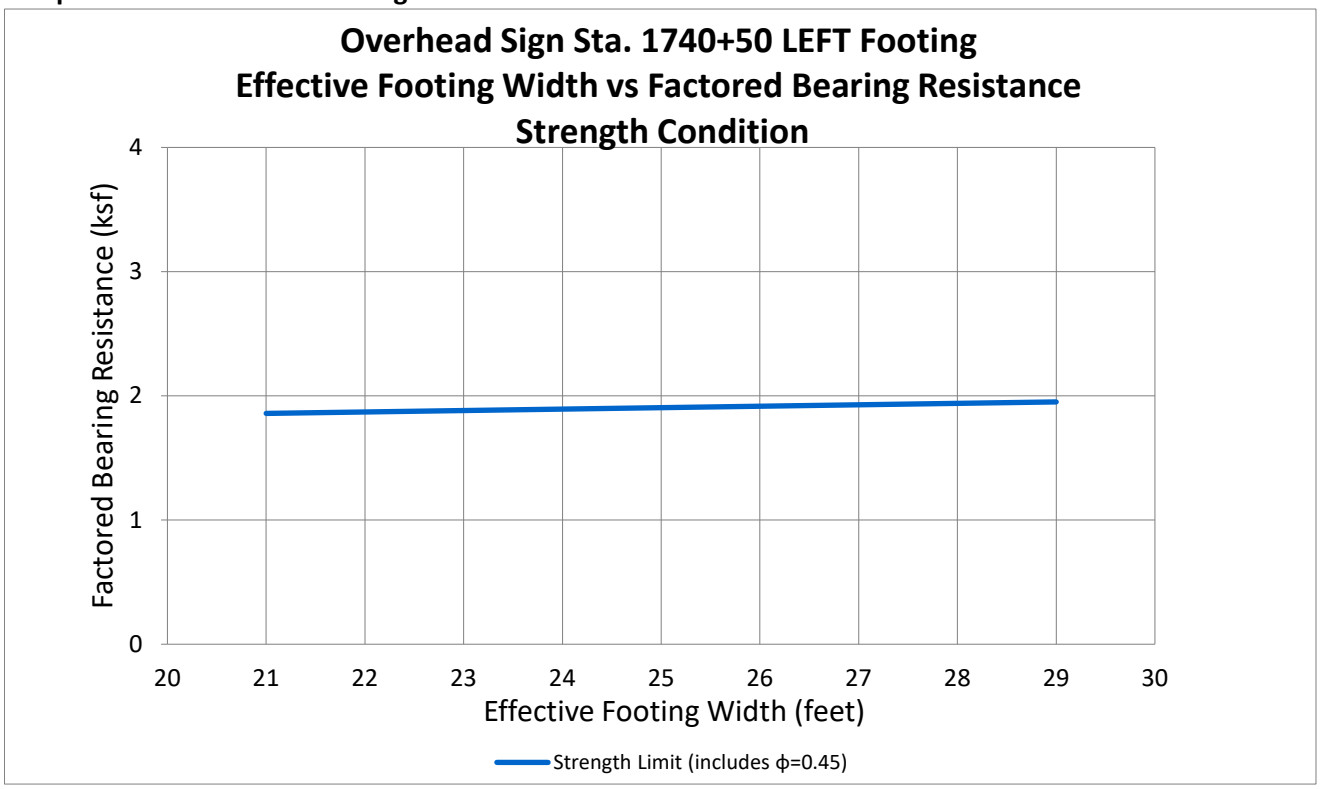
Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



Performed by: TAD
Checked by: LGH

Simplified Service Limit State Figure



	21 ft	29.0 ft
Service Lower Limit	0.0 ksf	0.0 ksf

LRFD BEARING RESISTANCE PLOTS

Structure	**1763+00 Cantilever**	**Boring OS-12**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**	
PROJECT NUMBER:	**179450125**	
LOCATION:	**Saco, MA**	

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:	
Above footing (pcf)	125.0 pcf
Below footing (pcf)	120.0 pcf
Friction angle, ϕ	32
Groundwater depth, D_w	0.0 ft
Undrained shear strength	0.0 psf
Footing Depth, D_f (feet)	5.0 ft
Footing Length, L (feet)	20.0 ft
Bearing Strata	Medium dense fine sand

Footing Depth	5 ft	5 ft	5 ft	5 ft	5 ft
Effective Footing Width	10.0 ft	12.0 ft	14.0 ft	16.0 ft	18.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	16.8 ksf	18.2 ksf	19.6 ksf	20.7 ksf	21.8 ksf
Strength Limit (includes ϕ=0.45)	7.5 ksf	8.2 ksf	8.8 ksf	9.3 ksf	9.8 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	2.3 ksf	2.0 ksf	1.9 ksf	1.8 ksf	1.7 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.33	0.33	0.33	0.33	0.33
Youngs Nodulus, E_s	2.15	2.15	2.15	2.15	2.15
Shape factor, B_z	1.10	1.09	1.09	1.09	1.08
N_c	35.5	35.5	35.5	35.5	35.5
S_c	1.33	1.39	1.46	1.52	1.59
N_{cm}	47.10	49.42	51.74	54.06	56.38
N_q	23.2	23.2	23.2	23.2	23.2
S_q	1.31	1.37	1.44	1.50	1.56
N_{qm}	30.4	31.9	33.3	34.8	36.2
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	30.2	30.2	30.2	30.2	30.2
S_Υ	0.80	0.76	0.72	0.68	0.64
$N_{\Upsilon m}$	24.2	23.0	21.7	20.5	19.3
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v		
Clay:	Lower	Upper	Lower	Upper	
Soft clay	-	-	0.40	0.50	
Medium stiff	0.347	2.08	0.40	0.50	Use v = 0.45
Stiff clay	2.08	6.94	0.40	0.50	Use Es = 1.2 ksi
Very stiff clay	6.94	13.89	0.40	0.50	
Silt	0.278	2.78	0.30	0.35	
Fine Sand:					
Loose fine sand	1.11	1.67	0.25	0.25	
Medium dense fine sand	1.67	2.78	0.25	0.25	Use v = 0.25
Dense fine sand	2.78	4.17	0.25	0.25	Use Es = 2.78 ks
Sand:					
Loose sand	1.39	4.17	0.20	0.36	
Medium dense sand	4.17	6.94	0.20	0.36	
Dense sand	6.94	11.11	0.30	0.40	
Gravel:					
Loose gravel	4.17	11.11	0.20	0.35	
Medium dense gravel	11.11	13.89	0.20	0.35	
Dense gravel	13.89	27.78	0.30	0.40	

As per AASHTO use an weighted average value when soil varies.
From bottom of footing to a depth of 30 feet (assumed 2B):

	Thickness	Es (ksi)	v
Upper Sand	18	2.78	0.25
Medium Stiff Clay	12	1.2	0.45
Wieghted Average =		2.15	0.33

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

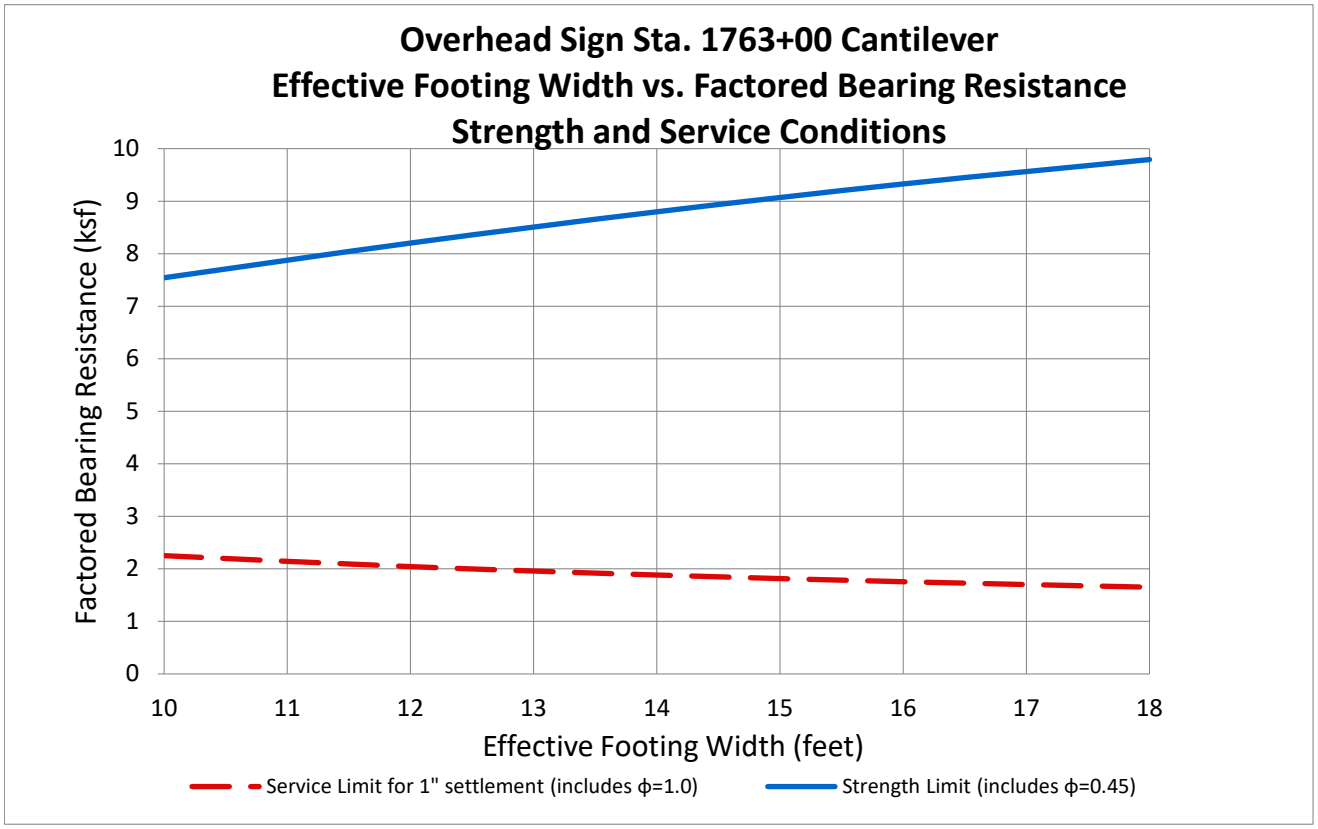
Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

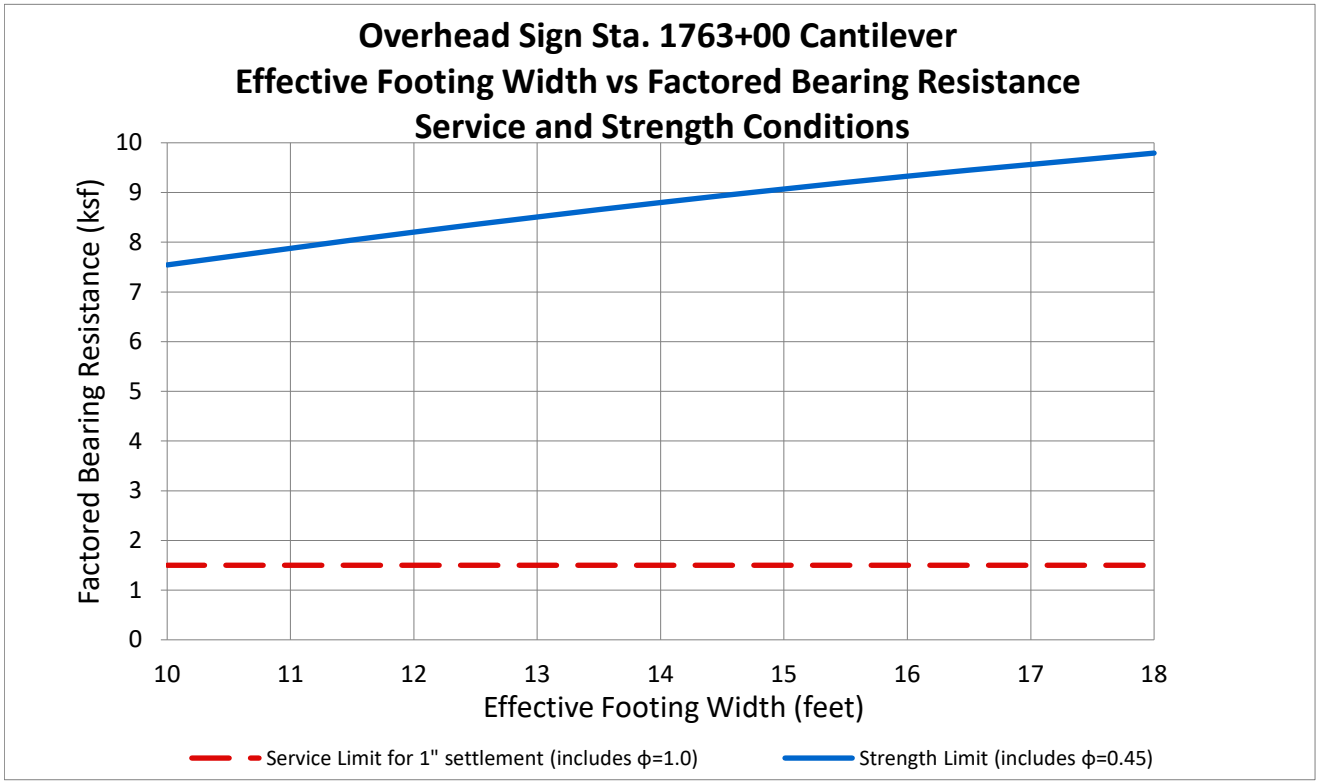
Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

Strength and Service Limit State Figure



Simplified Service Limit State Figure



	10 ft	18.0 ft
Service Lower Limit	1.5 ksf	1.5 ksf

LRFD BEARING RESISTANCE PLOTS

Structure	**1763+00**	**Boring OS-12**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**	
PROJECT NUMBER:	**179450125**	
LOCATION:	**Saco, MA**	

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:	
Above footing (pcf)	120.0 pcf
Below footing (pcf)	115.0 pcf
Friction angle, ϕ	0
Groundwater depth, D_w	0.0 ft
Undrained shear strength	500.0 psf
Footing Depth, D_f (feet)	23.0 ft
Footing Length, L (feet)	20.0 ft
Bearing Strata	Stiff clay

Notes:

This analysis evaluates the bearing resistance at the top of the clay layer as an equivalent footing. Check if the clay has adequate bearing resistance to support the equivalent footing. Based on the granular analysis the footing size will be limited by the service condition at 1,500 psf. The maximum appllied factored bearing pressure would be 1.5 x 1500 psf = 2,250 psf. This assumes a load factor of 1.5. Using a minimum footing width of 10 feet bearing at 5 feet, the equivalent footing would be a minimum of 28 feet wide at the top of clay (Df = 23 feet). So, the maximum applied factored bearing pressure would be (2,250 psf)*(10/28) = **0.8 ksf.** Based on the table and figures below the factored bearing resistance is at least **2.0 ksf.** Therefore the clay is strong enough for the equivalent footing. Service condition was addressed in the granular analysis.

Note: The use of Su = 500 psf is conservative.

Footing Depth	23 ft	23 ft	23 ft	23 ft	23 ft
Effective Footing Width	22.0 ft	24.0 ft	26.0 ft	28.0 ft	30.0 ft
Footing Length	20.0 ft	20.0 ft	20.0 ft	20.0 ft	20.0 ft
Bearing Strata	Stiff clay	Stiff clay	Stiff clay	Stiff clay	Stiff clay
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	4.5 ksf	4.6 ksf	4.6 ksf	4.7 ksf	4.7 ksf
Strength Limit (includes ϕ=0.45)	2.0 ksf	2.1 ksf	2.1 ksf	2.1 ksf	2.1 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	1.5 ksf	1.5 ksf	1.4 ksf	1.4 ksf	1.3 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.45	0.45	0.45	0.45	0.45
Youngs Nodulus, E_s	2	2	2	2	2
Shape factor, B_z	1.08	1.08	1.08	1.07	1.07
N_c	5.14	5.14	5.14	5.14	5.14
S_c	1.22	1.24	1.26	1.28	1.30
N_{cm}	6.27	6.37	6.48	6.58	6.68
N_q	1	1	1	1	1
S_q	1.00	1.00	1.00	1.00	1.00
N_{qm}	1.0	1.0	1.0	1.0	1.0
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	0	0	0	0	0
S_Υ	1.00	1.00	1.00	1.00	1.00
$N_{\Upsilon m}$	0.0	0.0	0.0	0.0	0.0
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v	
Clay:	**Lower**	**Upper**	**Lower**	**Upper**
Soft clay	-	-	0.40	0.50
Medium stiff	0.347	2.08	0.40	0.50
Stiff clay	2.08	6.94	0.40	0.50
Very stiff clay	6.94	13.89	0.40	0.50
Silt	0.278	2.78	0.30	0.35
Fine Sand:				
Loose fine sand	1.11	1.67	0.25	0.25
Medium dense fine sand	1.67	2.78	0.25	0.25
Dense fine sand	2.78	4.17	0.25	0.25
Sand:				
Loose sand	1.39	4.17	0.20	0.36
Medium dense sand	4.17	6.94	0.20	0.36
Dense sand	6.94	11.11	0.30	0.40
Gravel:				
Loose gravel	4.17	11.11	0.20	0.35
Medium dense gravel	11.11	13.89	0.20	0.35
Dense gravel	13.89	27.78	0.30	0.40

As per AASHTO use an weighted average value when soil varies.

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

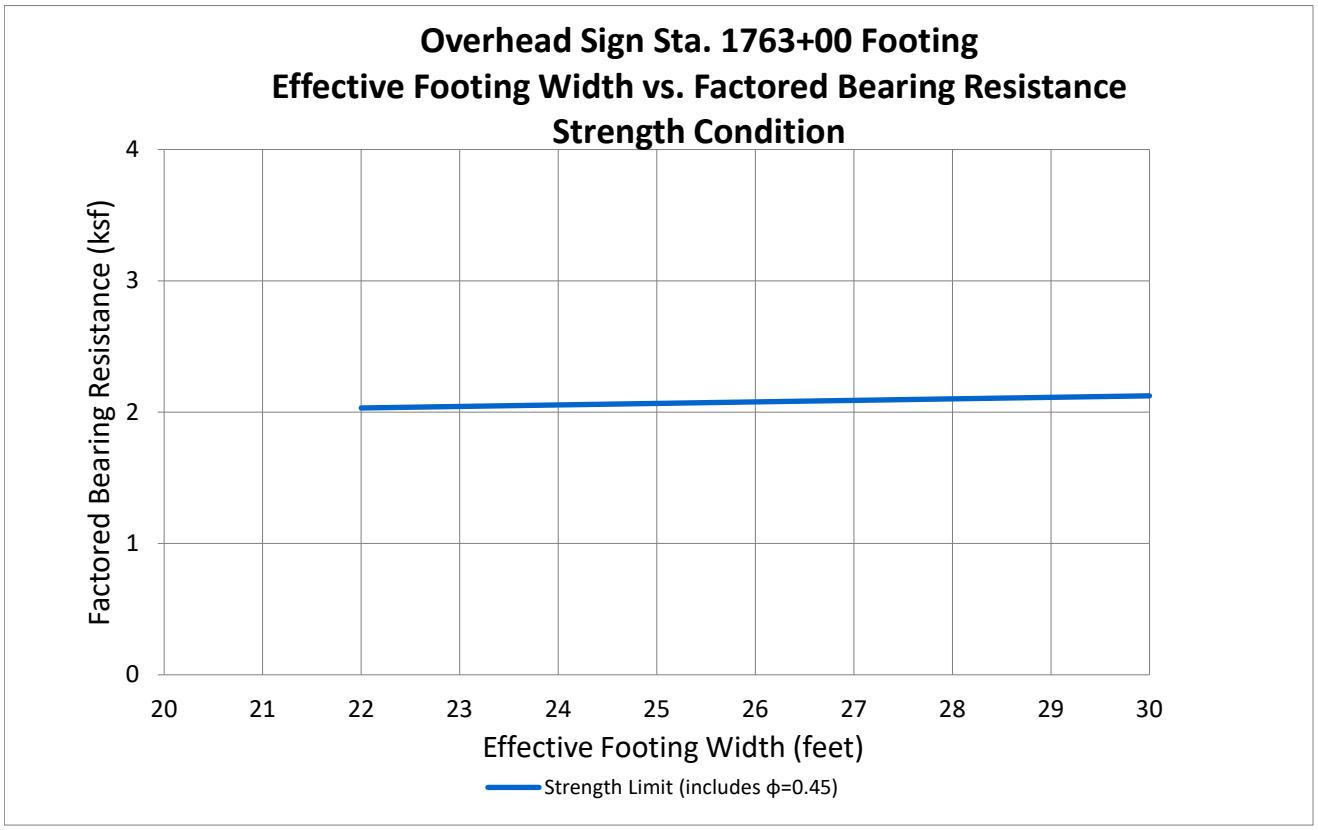
Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

Strength and Service Limit State Figure



Goosefare Brook Retaining Wall

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**Goosefare Brook Retaining Wall**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**
PROJECT NUMBER:	**179450125**
LOCATION:	**Saco, MA**

FACTORED BEARING RESISTANCE

Engineering Inputs:

Total unit weight of soil, ϒ:

Above footing (pcf)	125.0 pcf	Based on proposed backfill and embankment fill
Below footing (pcf)	120.0 pcf	Based upper sand deposit
Friction angle, ϕ	32	
Groundwater depth, D_w	0.0 ft	
Undrained shear strength	0.0 psf	
Footing Depth, D_f (feet)	5.0 ft	
Footing Length, L (feet)	40.0 ft	Lower portion will only be 40 feet long. Then steps up in elevation.
Bearing Strata	Medium dense fine sand	

Footing Depth	5 ft	5 ft	5 ft	5 ft	5 ft
Effective Footing Width	6.0 ft	8.0 ft	10.0 ft	12.0 ft	14.0 ft
Footing Length	40.0 ft	40.0 ft	40.0 ft	40.0 ft	40.0 ft
Bearing Strata	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand	Medium dense fine sand
Strength Limit State Resistance Factor	0.55	0.55	0.55	0.55	0.55
Nominal Bearing Resistance, q_n	13.0 ksf	14.8 ksf	16.5 ksf	18.2 ksf	19.7 ksf
Strength Limit (includes ϕ=0.55)	7.2 ksf	8.2 ksf	9.1 ksf	10.0 ksf	10.9 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	3.5 ksf	2.9 ksf	2.5 ksf	2.2 ksf	2.0 ksf

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

Performed by: TAD
Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.36	0.36	0.36	0.36	0.36
Youngs Nodulus, E_s	3.04	3.04	3.04	3.04	3.04
Shape factor, B_z	1.30	1.24	1.20	1.17	1.14
N_c	35.5	35.5	35.5	35.5	35.5
S_c	1.10	1.13	1.16	1.20	1.23
N_{cm}	38.98	40.14	41.30	42.46	43.62
N_q	23.2	23.2	23.2	23.2	23.2
S_q	1.09	1.12	1.16	1.19	1.22
N_{qm}	25.4	26.1	26.8	27.5	28.3
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	30.2	30.2	30.2	30.2	30.2
S_Υ	0.94	0.92	0.90	0.88	0.86
$N_{\Upsilon m}$	28.4	27.8	27.2	26.6	26.0
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v		
Clay:	Lower	Upper	Lower	Upper	
Soft clay	-	-	0.40	0.50	
Medium stiff	0.347	2.08	0.40	0.50	Use v = 0.45
Stiff clay	2.08	6.94	0.40	0.50	Use Es = 1.2 ksi
Very stiff clay	6.94	13.89	0.40	0.50	
Silt	0.278	2.78	0.30	0.35	
Fine Sand:					
Loose fine sand	1.11	1.67	0.25	0.25	
Medium dense fine sand	1.67	2.78	0.25	0.25	Use v = 0.25
Dense fine sand	2.78	4.17	0.25	0.25	Use Es = 2.2 ksi
Sand:					
Loose sand	1.39	4.17	0.20	0.36	
Medium dense sand	4.17	6.94	0.20	0.36	
Dense sand	6.94	11.11	0.30	0.40	
Gravel:					
Loose gravel	4.17	11.11	0.20	0.35	
Medium dense gravel	11.11	13.89	0.20	0.35	Crushed Stone
Dense gravel	13.89	27.78	0.30	0.40	

As per AASHTO use an weighted average value when soil varies.
From bottom of footing to a depth of 15 feet (about 1B):

	Thickness	Es (ksi)	v
Crushed Stone	2	12.5	0.25
Upper Sand	5	2.2	0.25
Medium Stiff Clay	8	1.2	0.45
Wieghted Average =		3.04	0.36

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

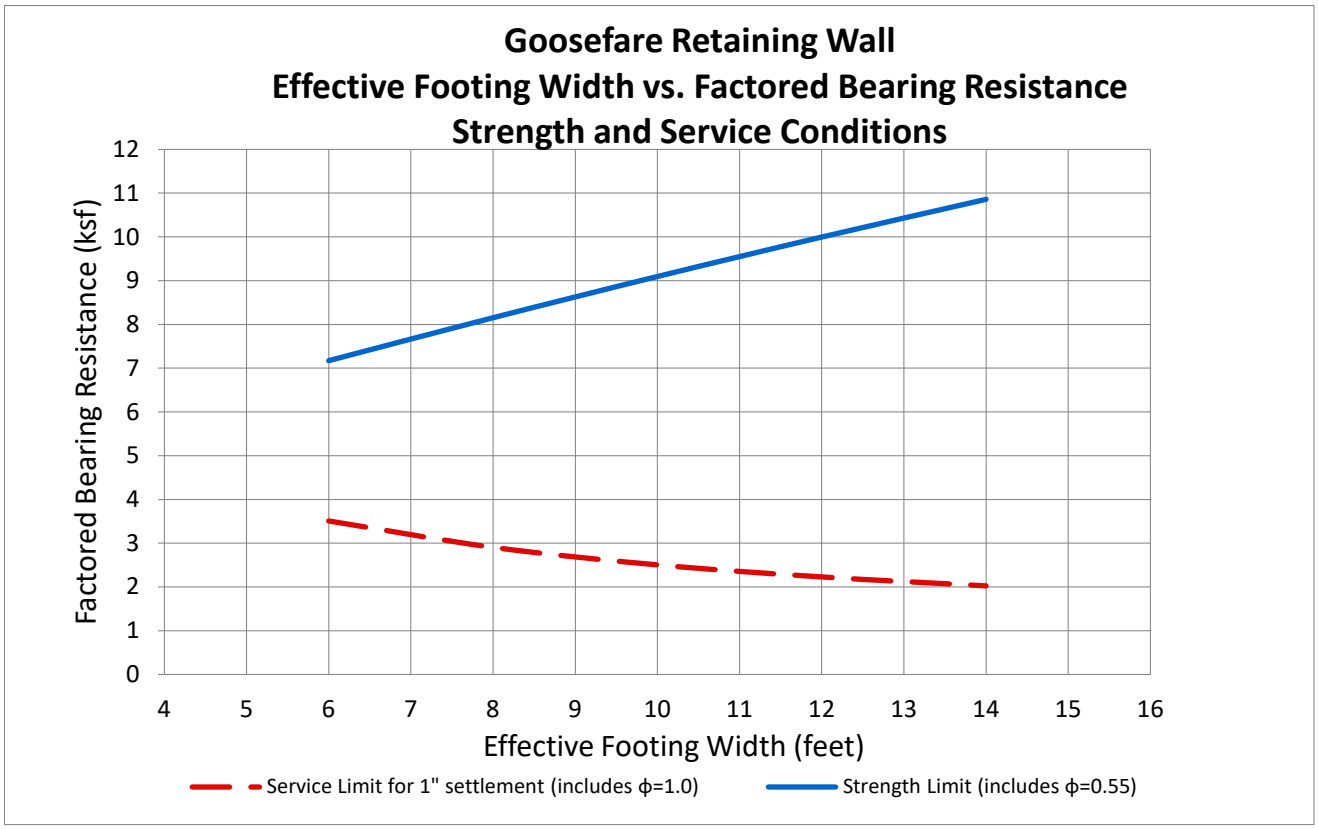
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

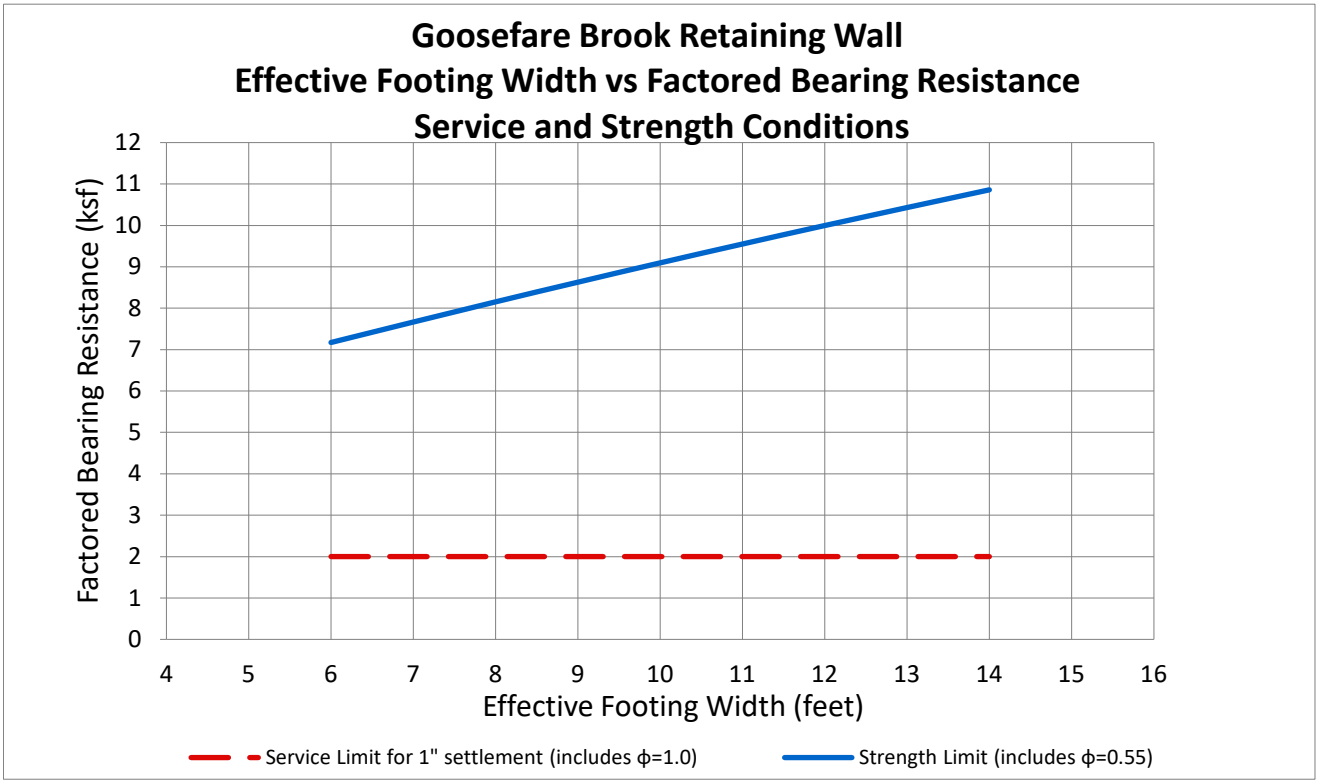
Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



Performed by: TAD
Checked by: LGH

Simplified Service Limit State Figure



	6 ft	14.0 ft
Service Lower Limit	2.0 ksf	2.0 ksf

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**Goosefare Brook Wall**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**
PROJECT NUMBER:	**179450125**
LOCATION:	**Saco, MA**

FACTORED BEARING RESISTANCE **CLAY ANALYSIS**

Engineering Inputs: This is for the clay layer below the sand layer using a "equivalent footing"

Total unit weight of soil, ϒ:		
Above footing (pcf)	125.0 pcf	Based on proposed backfill and embankment fill
Below footing (pcf)	115.0 pcf	Marine Clay Soft
Friction angle, ϕ	0	
Groundwater depth, D_w	0.0 ft	
Undrained shear strength	600.0 psf	
Footing Depth, D_f (feet)	11.0 ft	From proposed ground surface to top of clay
Footing Length, L (feet)	46.0 ft	Assumes 0.5H to 1V from ends of footing
Bearing Strata	Medium stiff	

Footing Depth	11 ft	11 ft	11 ft	11 ft	11 ft
Effective Footing Width	10.0 ft	12.0 ft	14.0 ft	16.0 ft	18.0 ft
Footing Length	46.0 ft	46.0 ft	46.0 ft	46.0 ft	46.0 ft
Bearing Strata	Medium stiff	Medium stiff	Medium stiff	Medium stiff	Medium stiff
Strength Limit State Resistance Factor (for Wall)	0.55	0.55	0.55	0.55	0.55
Nominal Bearing Resistance, q_n	3.9 ksf	3.9 ksf	4.0 ksf	4.0 ksf	4.0 ksf
Strength Limit (includes ϕ=0.55)	2.1 ksf	2.2 ksf	2.2 ksf	2.2 ksf	2.2 ksf
Service Limit for 1" settlement (includes ϕ=1.0)	2.3 ksf	2.1 ksf	1.9 ksf	1.7 ksf	1.6 ksf

Note: Ignore the settlement here because the settlement was calculated on the previous tab.

Bearing Restance for 1" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+Y*D_f*N_{qm}*C_{wq}+.5*Y*B*N_{Ym}*C_{wY}$

Performed by: TAD
Checked by: LGH

NOTE:
This analysis evaluates the bearing resistance at the top of the clay layer as an equivalent footing. Check if the clay has adequate bearing resistance to support the equivalent footing. Based on the granular analysis the footing size will be limited by the service condition at 2,000 psf. The maximum appllied factored bearing pressure would be 1.5 x 2000 psf = 3000 psf. This assumes a load factor of 1.5. Using a minimum footing width of 9 feet bearing at 5 feet, the equivalent footing would be a minimum of 15 feet wide at the top of clay (Df = 11 feet). So, the maximum applied factored bearing pressure would be (3000 psf)*(9/15) = 1.8 ksf. Based on the table and figures below the factored bearing resistance is at least 2.2 ksf. Therefore the clay is strong enough for the equivalent footing. Service condition was addressed in the granular analysis.

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.35	0.35	0.35	0.35	0.35
Youngs Nodulus, E_s	3	3	3	3	3
Shape factor, B_z	1.22	1.19	1.16	1.14	1.13
N_c	5.14	5.14	5.14	5.14	5.14
S_c	1.04	1.05	1.06	1.07	1.08
N_{cm}	5.36	5.41	5.45	5.50	5.54
N_q	1	1	1	1	1
S_q	1.00	1.00	1.00	1.00	1.00
N_{qm}	1.0	1.0	1.0	1.0	1.0
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_γ	0	0	0	0	0
S_γ	1.00	1.00	1.00	1.00	1.00
$N_{\gamma m}$	0.0	0.0	0.0	0.0	0.0
$C_{w\gamma}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

Performed by: TAD
Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v	
Clay:	Lower	Upper	Lower	Upper
Soft clay	-	-	0.40	0.50
Medium stiff	0.347	2.08	0.40	0.50
Stiff clay	2.08	6.94	0.40	0.50
Very stiff clay	6.94	13.89	0.40	0.50
Silt	0.278	2.78	0.30	0.35
Fine Sand:				
Loose fine sand	1.11	1.67	0.25	0.25
Medium dense fine sand	1.67	2.78	0.25	0.25
Dense fine sand	2.78	4.17	0.25	0.25
Sand:				
Loose sand	1.39	4.17	0.20	0.36
Medium dense sand	4.17	6.94	0.20	0.36
Dense sand	6.94	11.11	0.30	0.40
Gravel:				
Loose gravel	4.17	11.11	0.20	0.35
Medium dense gravel	11.11	13.89	0.20	0.35
Dense gravel	13.89	27.78	0.30	0.40

Performed by: TAD
Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

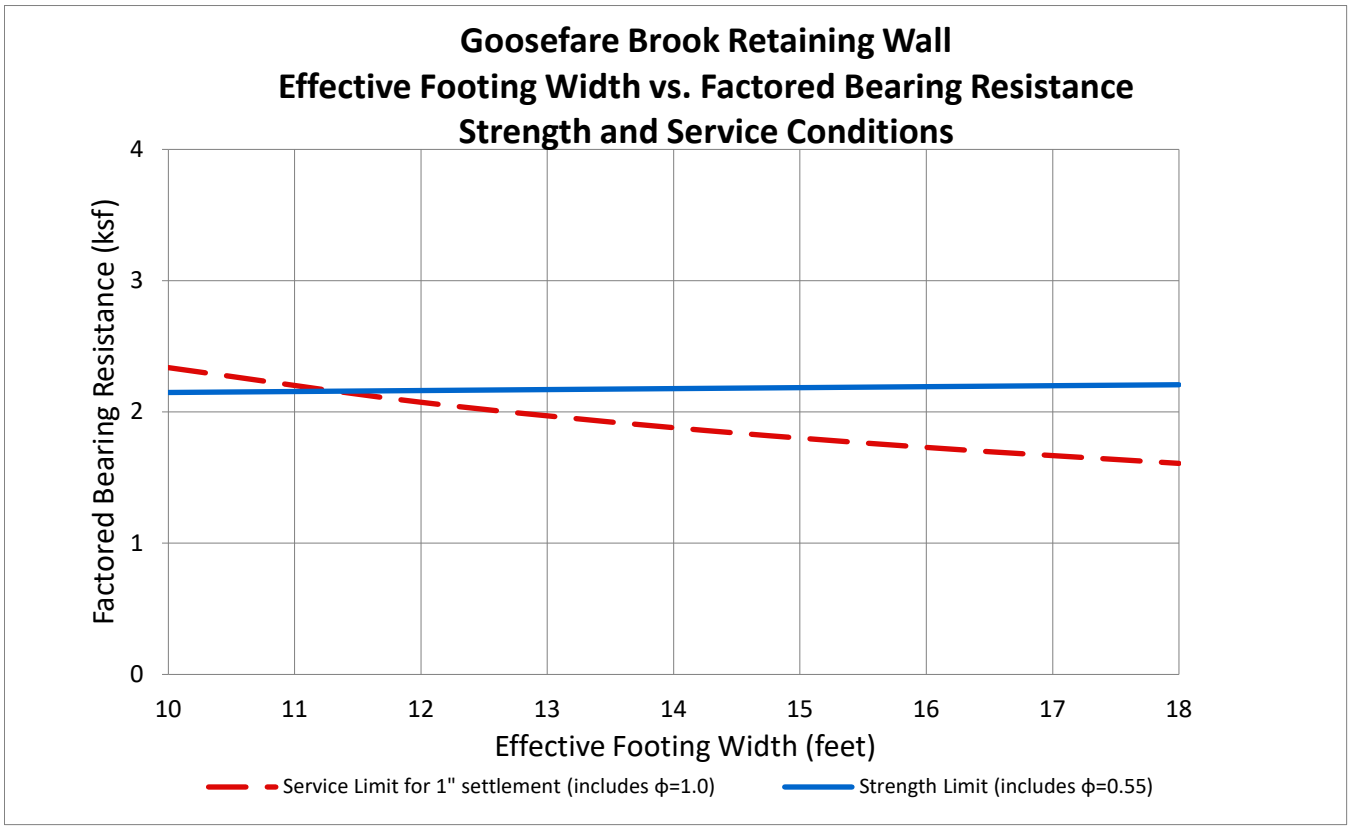
ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

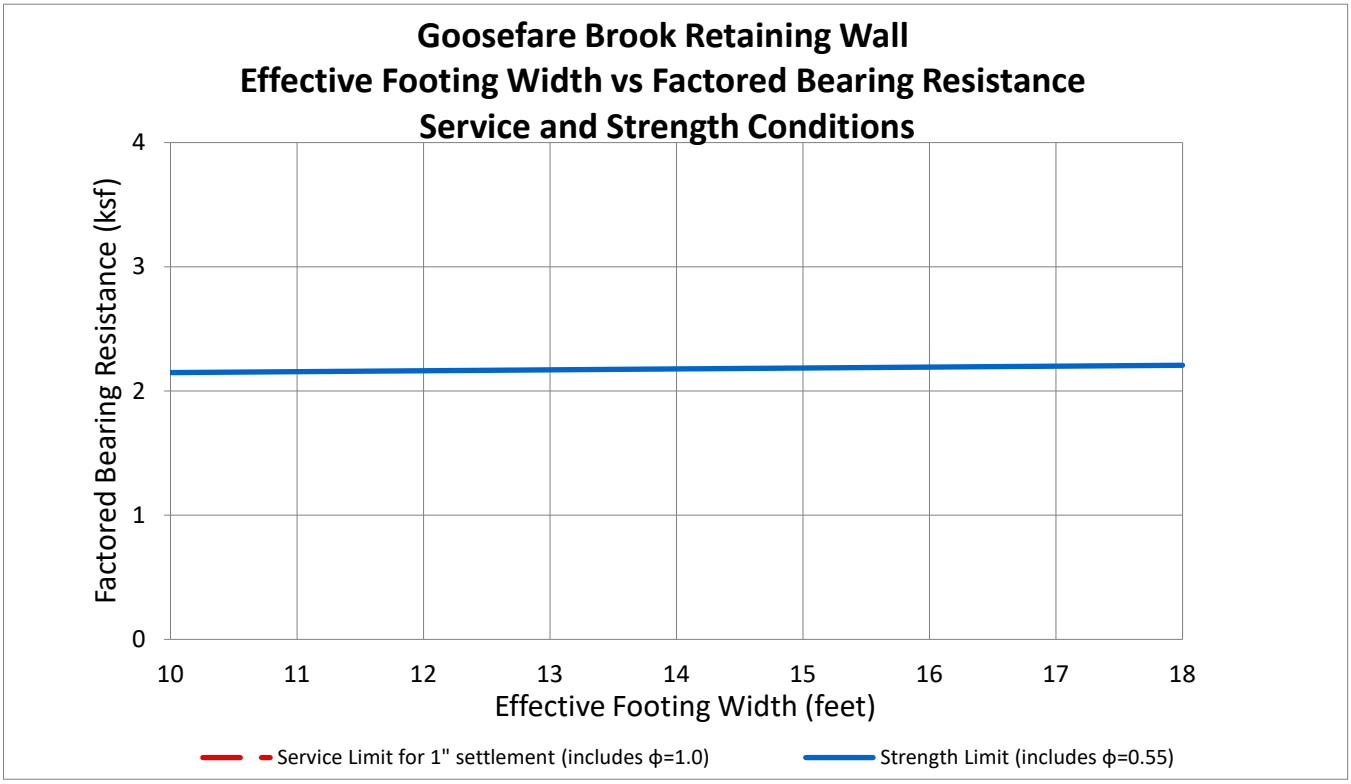
Performed by: TAD
Checked by: LGH

Strength and Service Limit State Figure



Performed by: TAD
Checked by: LGH

Simplified Service Limit State Figure



10 ft 18.0 ft

Service Lower Limit

Exit 35 NB Tolling Facility

Performed by: TAD
Checked by: LGH

LRFD BEARING RESISTANCE PLOTS

Structure	**Exit 35 NB Tolling Facility**
PROJECT NAME:	**Exit 35-36 Interchange Improvements**
PROJECT NUMBER:	**179450125**
LOCATION:	**Saco, MA**

FACTORED BEARING RESISTANCE

Engineering Inputs:

Notes:

Total unit weight of soil, ϒ:

Above footing (pcf)	120.0 pcf
Below footing (pcf)	110.0 pcf
Friction angle, ϕ	0
Groundwater depth, D_w	0.0 ft
Undrained shear strength	1500.0 psf
Footing Depth, D_f (feet)	5.0 ft
Footing Length, L (feet)	10.0 ft
Bearing Strata	Medium Stiff clay

Medium Stiff Clay

Footing Depth	5 ft	5 ft	5 ft	5 ft	5 ft
Effective Footing Width	2.0 ft	4.0 ft	6.0 ft	8.0 ft	10.0 ft
Footing Length	10.0 ft	10.0 ft	10.0 ft	10.0 ft	10.0 ft
Bearing Strata	Medium Stiff clay	Medium Stiff clay	Medium Stiff clay	Medium Stiff clay	Medium Stiff clay
Strength Limit State Resistance Factor	0.45	0.45	0.45	0.45	0.45
Nominal Bearing Resistance, q_n	8.3 ksf	8.6 ksf	8.9 ksf	9.2 ksf	9.6 ksf
Strength Limit (includes ϕ=0.45)	3.7 ksf	3.9 ksf	4.0 ksf	4.2 ksf	4.3 ksf
Service Limit for 1/2" settlement (includes ϕ=1.0)	4.0 ksf	2.5 ksf	2.0 ksf	1.7 ksf	1.5 ksf

Bearing Restance for 1/2" Settlement, $q_o=(144*E_s*B_z*S_e)/[(1-v^2)*sqrt(A')]$

Nominal bearing resistance, $q_u= c*N_{cm}+ϒ*D_f*N_{qm}*C_{wq}+.5*ϒ*B*N_{ϒm}*C_{wϒ}$

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Checked by: LGH

BEARING AND SETTLEMENT CALCULATION FACTORS					
Poisson's Ratio, v	0.4	0.4	0.4	0.4	0.4
Youngs Nodulus, E_s	2	2	2	2	2
Shape factor, B_z	1.24	1.13	1.09	1.09	1.08
N_c	5.14	5.14	5.14	5.14	5.14
S_c	1.04	1.08	1.12	1.16	1.20
N_{cm}	5.35	5.55	5.76	5.96	6.17
N_q	1	1	1	1	1
S_q	1.00	1.00	1.00	1.00	1.00
N_{qm}	1.0	1.0	1.0	1.0	1.0
C_{wq}	0.50	0.50	0.50	0.50	0.50
N_Υ	0	0	0	0	0
S_Υ	1.00	1.00	1.00	1.00	1.00
$N_{\Upsilon m}$	0.0	0.0	0.0	0.0	0.0
$C_{w\Upsilon}$	0.5	0.5	0.5	0.5	0.5

*For the modified bearing capacity factors: dq is conservatively assumed to equal 1.0. The effect of the load inclination is assumed to be minor and therefore the load inclination factor is assumed to be 1.0.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

*Applied vertical stress, q_o, is the ultimate pressure transered from the footing in which all load factors equal 1 and includes the footing weight itself.

*Shape rigidity factor interpolated from Table 10.6.2.4.2-1 based on Length/Base ratio.

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Checked by: LGH

Table C10.4.6.3-1 Elastic Constants of Various Soils (Modified after U.S. Departement of the Navy, 1982; Bowles, 1988)

Soil Type	Typical Range of Youngs Modulus Values, Es (ksi)		Poisson's Ratio, v	
Clay:	**Lower**	**Upper**	**Lower**	**Upper**
Soft clay	-	-	0.40	0.50
Medium stiff	0.347	2.08	0.40	0.50
Stiff clay	2.08	6.94	0.40	0.50
Very stiff clay	6.94	13.89	0.40	0.50
Silt	0.278	2.78	0.30	0.35
Fine Sand:				
Loose fine sand	1.11	1.67	0.25	0.25
Medium dense fine sand	1.67	2.78	0.25	0.25
Dense fine sand	2.78	4.17	0.25	0.25
Sand:				
Loose sand	1.39	4.17	0.20	0.36
Medium dense sand	4.17	6.94	0.20	0.36
Dense sand	6.94	11.11	0.30	0.40
Gravel:				
Loose gravel	4.17	11.11	0.20	0.35
Medium dense gravel	11.11	13.89	0.20	0.35
Dense gravel	13.89	27.78	0.30	0.40

As per AASHTO use an weighted average value when soil varies.

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Checked by: LGH

Table 10.6.2.4.2-1 Elastic Shape and Rigidity Factors, EPRI (1983)

L/B	Flexible, B_z (avg.)	Rigid, B_z
Circular	1.04	1.13
1	1.06	1.08
2	1.09	1.10
3	1.13	1.15
5	1.22	1.24
10	1.41	1.41

Table 10.6.3.1.2a-1 Bearing Capacity Factors N_c (Prandri, 1921), N_q (Reissner, 1924), and N_γ (Vesic,1975)

ϕ_f	N_c	N_q	N_γ
0	5.14	1	0
20	14.8	6.4	5.4
21	15.8	7.1	6.2
22	16.9	7.8	7.1
23	18.1	8.7	8.2
24	19.3	9.6	9.4
25	20.7	10.7	10.9
26	22.3	11.9	12.5
27	23.9	13.2	14.5
28	25.8	14.7	16.7
29	27.9	16.4	19.3
30	30.1	18.4	22.4
31	32.7	20.6	26.0
32	35.5	23.2	30.2
33	38.6	26.1	35.2
34	42.2	29.4	41.1
35	46.1	33.3	48.0
36	50.6	37.8	56.3
37	55.6	42.9	66.2
38	61.4	48.9	78.0
39	67.9	56.0	92.3
40	75.3	64.2	109.4

Table 10.6.3.1.2a-2 Coefficients C_{wq} and $D_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

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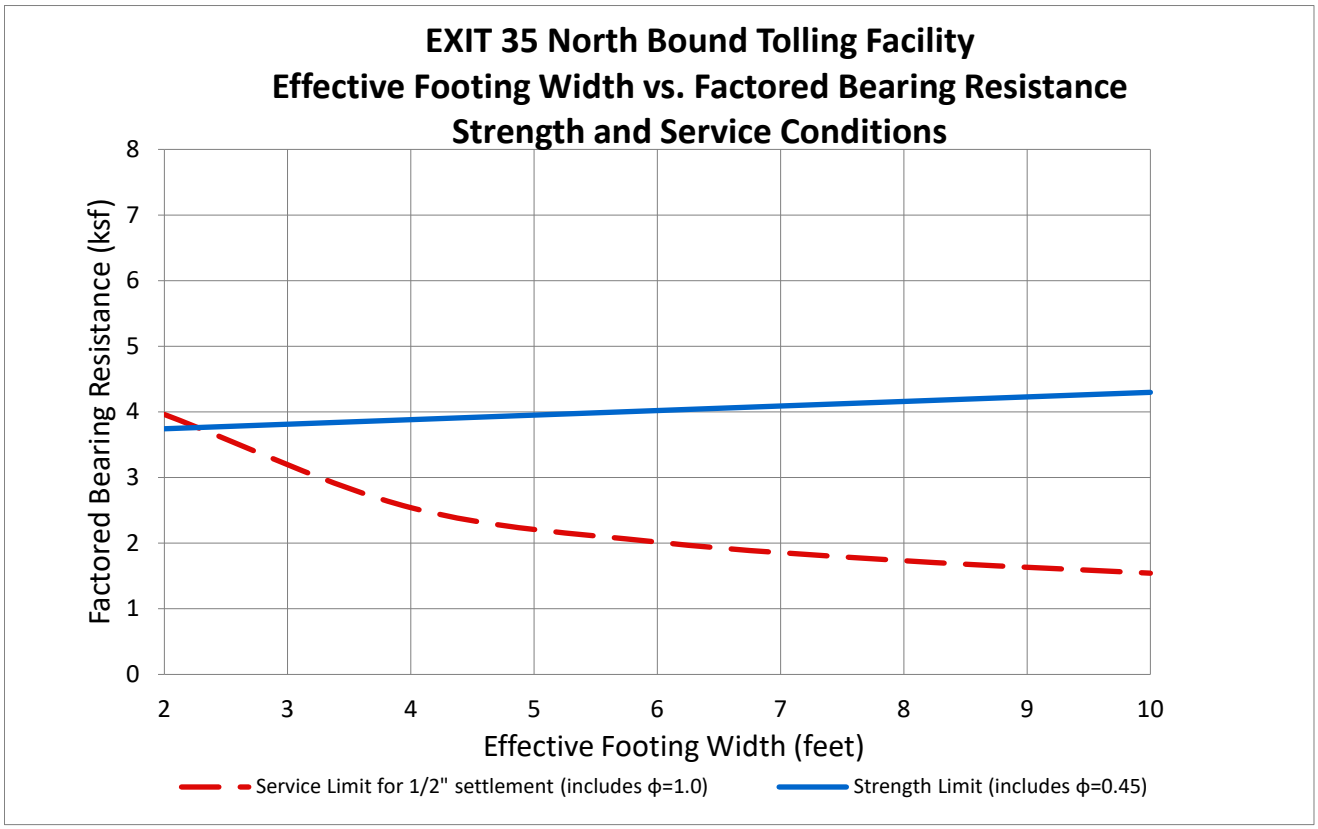
Checked by: LGH

Strength and Service Limit State Figure



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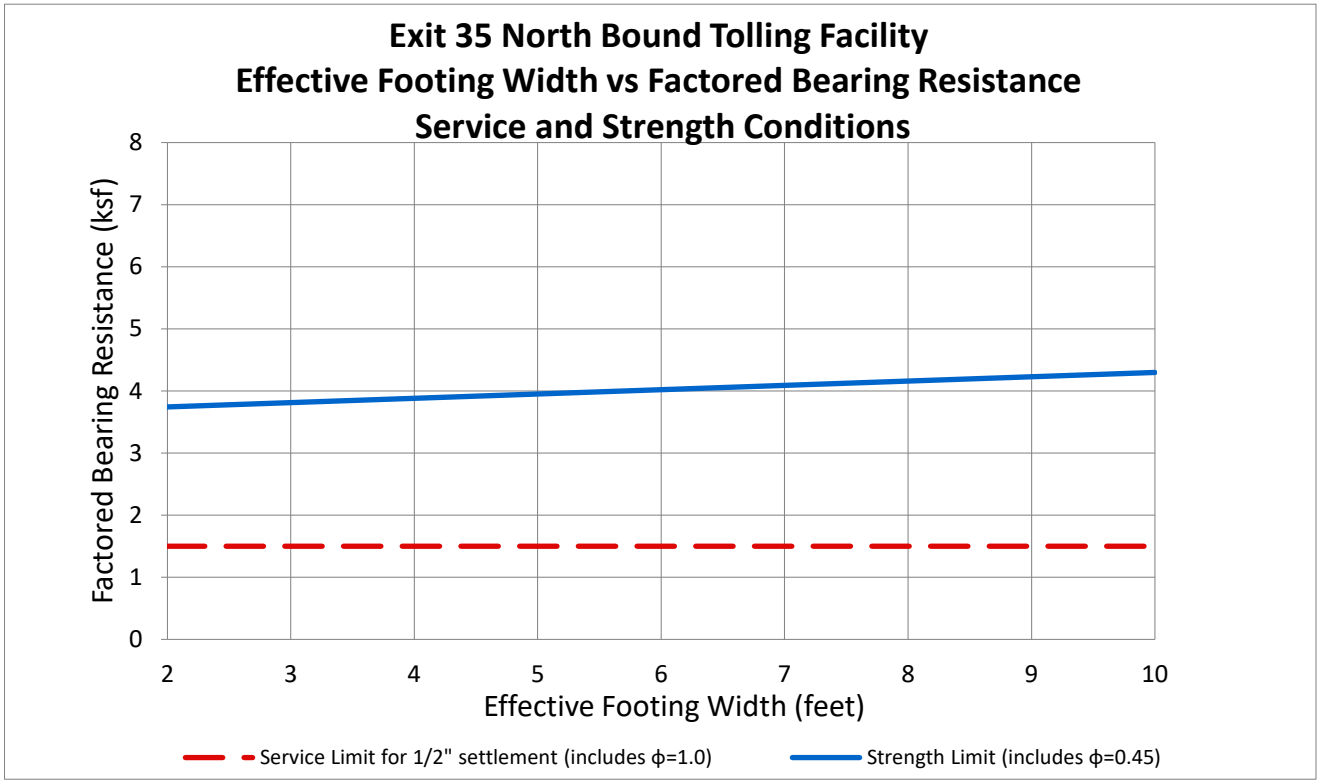
Simplified Service Limit State Figure



	2 ft	10.0 ft
Service Lower Limit	1.5 ksf	1.5 ksf

Exit 35 NB Administration Building

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Table C10.6.2.6.1-1—Presumptive Bearing Resistance for Spread Footing Foundations at the Service Limit State Modified after U.S. Department of the Navy (1982)

Type of Bearing Material	Consistency in Place	Bearing Resistance (ksf)	
		Ordinary Range	Recommended Value of Use
Massive crystalline igneous and metamorphic rock: granite, diorite, basalt, gneiss, thoroughly cemented conglomerate (sound condition allows minor cracks)	Very hard, sound rock	120–200	160
Foliated metamorphic rock: slate, schist (sound condition allows minor cracks)	Hard sound rock	60–80	70
Sedimentary rock: hard cemented shales, siltstone, sandstone, limestone without cavities	Hard sound rock	30–50	40
Weathered or broken bedrock of any kind, except highly argillaceous rock (shale)	Medium hard rock	16–24	20
Compaction shale or other highly argillaceous rock in sound condition	Medium hard rock	16–24	20
Well-graded mixture of fine- and coarse-grained soil: glacial till, hardpan, boulder clay (GW-GC, GC, SC)	Very dense	16–24	20
Gravel, gravel-sand mixture, boulder-gravel mixtures (GW, GP, SW, SP)	Very dense Medium dense to dense Loose	12–20 8–14 4–12	14 10 6
Coarse to medium sand, and with little gravel (SW, SP)	Very dense Medium dense to dense Loose	8–12 4–8 2–6	8 6 3
Fine to medium sand, silty or clayey medium to coarse sand (SW, SM, SC)	Very dense Medium dense to dense Loose	6–10 4–8 2–4	6 5 3
Fine sand, silty or clayey medium to fine sand (SP, SM, SC)	Very dense Medium dense to dense Loose	6–10 4–8 2–4	6 5 3
Homogeneous inorganic clay, sandy or silty clay (CL, CH)	Very dense Medium dense to dense Loose	6–12 2–6 1–2	8 4 1
Inorganic silt, sandy or clayey silt, varved silt-clay-fine sand (ML, MH)	Very stiff to hard Medium stiff to stiff Soft	4–8 2–6 1–2	6 3 1

10.6.2.6.2—Semiempirical Procedures for Bearing Resistance

Bearing resistance on rock shall be determined using empirical correlation to the Geomechanic Rock Mass Rating System, RMR. Local experience should be considered in the use of these semi-empirical procedures.

If the recommended value of presumptive bearing resistance exceeds either the unconfined compressive strength of the rock or the nominal resistance of the concrete, the presumptive bearing resistance shall be taken as the lesser of the unconfined compressive strength of the rock or the nominal resistance of the concrete. The nominal resistance of concrete shall be taken as $0.3 f'_c$.

Use allowable bearing capacity of 2 ksf or 2000 psf. This will be conservative due the thin clay layer.

9 – PILE RECOMMENDATIONS

PILE DESIGN

Exit 35 SB On Ramp
Exit 35 SB Administration Building
Exit 35 SB Off Ramp

GENERAL INFORMATION

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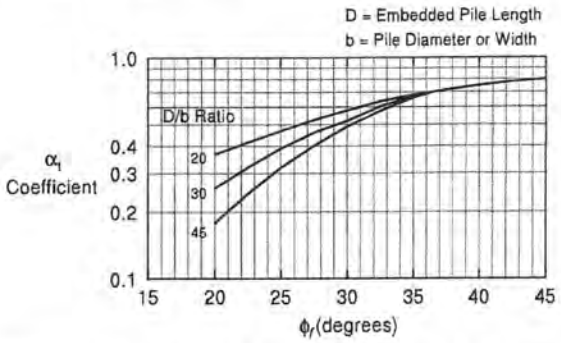

Figure 10.7.3.8.6f-7—α_t Coefficient (Hannigan et al., 2006 modified after Bowles, 1977)

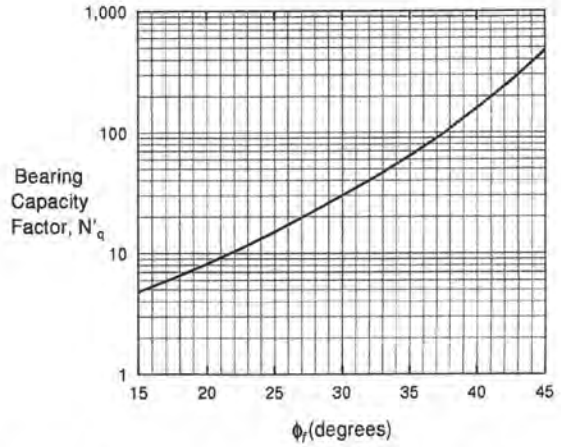

Figure 10.7.3.8.6f-8—Bearing Capacity Factor, N'_q (Hannigan et al., 2006 modified after Bowles, 1977)

Say 600 psf, for fractured and intact bedrock

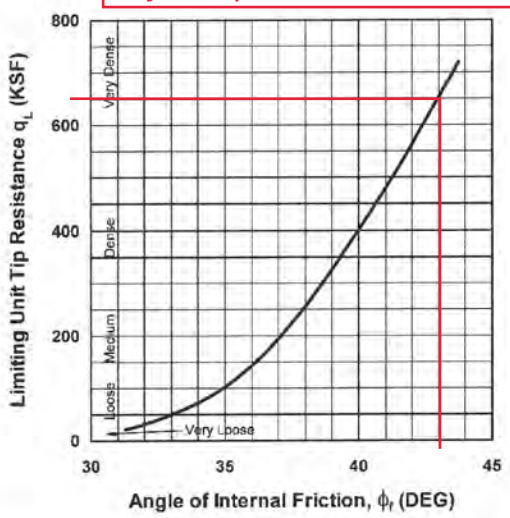

Figure 10.7.3.8.6f-9—Limiting Unit Pile Tip Resistance (Hannigan et al., 2006 after Meyerhof, 1976)

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Table 3.4.1-2—Load Factors for Permanent Loads, γ_p

Type of Load, Foundation Type, and Method Used to Calculate Downdrag		Load Factor	
		Maximum	Minimum
DC: Component and Attachments		1.25	0.90
DC: Strength IV only		1.50	0.90
DD: Downdrag	Piles, α Tomlinson Method	1.40	0.25
	Piles, λ Method	1.05	0.30
	Drilled shafts, O'Neill and Reese (2010) Method	1.25	0.35
DW: Wearing Surfaces and Utilities		1.50	0.65
EH: Horizontal Earth Pressure			
• Active		1.50	0.90
• At-Rest		1.35	0.90
• *AEP* for anchored walls		1.35	N/A
EL: Locked-in Construction Stresses		1.00	1.00
EV: Vertical Earth Pressure			
• Overall Stability		1.00	N/A
• Retaining Walls and Abutments		1.35	1.00
• Rigid Buried Structure		1.30	0.90
• Rigid Frames		1.35	0.90
• Flexible Buried Structures			
○ Metal Box Culverts, Structural Plate Culverts with Deep Corrugations, and Fiberglass Culverts		1.50	0.90
○ Thermoplastic Culverts		1.30	0.90
○ All others		1.95	0.90
ES: Earth Surcharge		1.50	0.75

Table 3.4.1-3—Load Factors for Permanent Loads Due to Superimposed Deformations, γ_p

Bridge Component	*PS*	*CR, SH*
Superstructures—Segmental Concrete Substructures supporting Segmental Superstructures (see 3.12.4, 3.12.5)	1.0	See γ_p for *DC*, Table 3.4.1-2
Concrete Superstructures—non-segmental	1.0	1.0
Substructures supporting non-segmental Superstructures		
• using I_g	0.5	0.5
• using $I_{effective}$	1.0	1.0
Steel Substructures	1.0	1.0

Table 3.4.1-4—Load Factors for Live Load for Service III Load Combination, γ_{LL}

Component	γ_{LL}
Prestressed concrete components designed using the refined estimates of time-dependent losses as specified in Article 5.9.5.4 in conjunction with taking advantage of the elastic gain	1.0
All other prestressed concrete components	0.8

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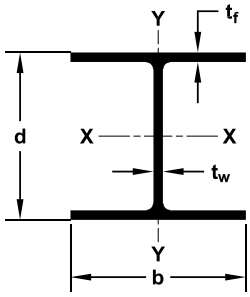
Steel H-Pile



SECTION	Weight lb/ft kg/m	Area in² cm²	Depth d in mm	Flange Width b in mm	THICKNESS Flange (t_f) in mm	THICKNESS Web (t_w) in mm	Coating Area ft²/ft m²/m	PROPERTIES AXIS X-X I in⁴ cm⁴	S in³ cm³	Z in³ cm³	r in cm	AXIS Y-Y I in⁴ cm⁴	S in³ cm³	Z in³ cm³	r in cm
HP 8 HP 200	36 54	10.6 68.4	8.02 204	8.16 207	0.445 11.3	0.445 11.3	3.92 1.21	119 4980	29.8 488	33.6 552	3.36 8.53	40.3 1670	9.88 162	15.2 249	1.95 4.95
HP 10 HP 250	42 62	12.4 79.8	9.70 246	10.10 256	0.420 10.7	0.415 10.5	4.83 1.50	210 8750	43.4 711	48.3 792	4.13 10.5	71.7 3000	14.2 234	21.8 358	2.41 6.13
	57 85	16.7 109.0	9.99 254	10.20 259	0.565 14.4	0.565 14.4	4.91 1.50	294 12300	58.8 968	66.5 1090	4.18 10.6	101 4230	19.7 325	30.3 500	2.45 6.23
HP 12 HP 310	53 79	15.5 99.8	11.80 299	12.00 306	0.435 11.0	0.435 11.0	5.82 1.80	393 16300	66.7 1090	74.0 1210	5.03 12.8	127 5260	21.1 344	32.2 525	2.86 7.26
	63 94	18.4 119.0	11.90 303	12.10 308	0.515 13.1	0.515 13.1	5.86 1.81	472 19600	79.1 1300	88.3 1450	5.06 12.9	153 6390	25.3 415	38.7 635	2.88 7.33
	74 110	21.8 141.0	12.10 308	12.20 310	0.610 15.5	0.605 15.4	5.91 1.83	569 23700	93.8 1540	105 1730	5.11 13.0	186 7710	30.4 497	46.6 763	2.92 7.40
	84 125	24.6 159.0	12.30 312	12.30 312	0.685 17.4	0.685 17.4	5.97 1.84	650 27000	106 1730	120 1960	5.14 13.0	213 8820	34.6 566	53.2 870	2.94 7.45
	89 132	25.9 167	12.36 314	12.32 313	0.720 18.3	0.720 18.3	6.04 1.84	689 28700	111.6 1830	126.3 2070	5.16 13.1	225 9370	36.5 599	56.2 922	2.94 7.48
	102 152	29.9 193	12.56 319	12.64 321	0.819 20.8	0.819 20.8	6.17 1.88	811 33800	129.3 2120	147.6 2420	5.20 13.2	276 11500	43.7 716	67.1 1100	3.04 7.71
	117 174	34.4 222	12.76 324	12.87 327	0.929 23.6	0.929 23.6	6.26 1.91	946 39400	148.2 2430	170.8 2800	5.24 13.3	331 13800	51.4 843	79.3 1300	3.11 7.89
HP 14 HP 360	73 108	21.4 138	13.60 346	14.60 370	0.505 12.8	0.505 12.8	6.96 2.15	729 30300	107 1750	118 1940	5.84 14.8	261 10800	35.8 585	54.6 891	3.49 8.86
	89 132	26.1 168	13.80 351	14.70 373	0.615 15.6	0.615 15.6	7.02 2.16	904 37500	131 2140	146 2380	5.88 14.9	326 13500	44.3 724	67.7 1110	3.53 8.96
	102 152	30.1 194	14.00 356	14.80 376	0.705 17.9	0.705 17.9	7.06 2.18	1050 43900	150 2470	169 2770	5.92 15.0	380 15900	51.4 845	78.8 1290	3.56 9.05
	117 174	34.4 222	14.20 361	14.90 378	0.805 20.4	0.805 20.4	7.12 2.19	1220 50800	172 2820	194 3180	5.96 15.2	443 18400	59.5 973	91.4 1490	3.59 9.11
HP 16 HP 410	88 131	25.8 167	15.30 389	15.70 399	0.540 13.7	0.540 13.7	7.52 2.29	1110 46201	145 2376	161 2638.3	6.56 16.7	349 14526	44.5 729	68.2 1117.6	3.68 9.35
	101 150	29.9 193	15.50 394	15.80 401	0.625 15.9	0.625 15.9	7.56 2.30	1300 54110	168 2753	187 3064.4	6.59 16.7	412 17149	52.2 855	80.1 1312.6	3.71 9.42
	121 180	35.8 231	15.80 401	15.90 404	0.750 19.1	0.750 19.1	7.62 2.32	1590 66180	201 3294	226 3703.5	6.66 16.9	504 20978	63.4 1039	97.6 1599.4	3.75 9.53
	141 210	41.7 269	16.00 406	16.00 406	0.875 22.2	0.875 22.2	7.69 2.34	1870 77835	234 3835	264 4326.2	6.70 17.0	599 24932	74.9 1227	116 1900.9	3.79 9.63
	162 241	47.7 308	16.30 414	16.10 409	1.000 25.4	1.000 25.4	7.75 2.36	2190 91154	269 4408	306 5014.4	6.78 17.2	697 29011	86.6 1419	134 2195.9	3.82 9.70
	183 272	54.1 349	16.50 419	16.30 414	1.130 28.7	1.130 28.7	7.81 2.38	2510 104473	304 4982	349 5719.1	6.81 17.3	818 34047	100.0 1639	156 2556.4	3.89 9.88
HP 18 HP 460	135 201	39.9 257	17.50 445	17.80 452	0.750 19.1	0.750 19.1	8.54 2.60	2200 91570	251 4113	281 4604.7	7.43 18.9	706 29386	79.3 1299	122 1999.2	4.21 10.7
	157 234	46.2 298	17.70 450	17.90 455	0.870 22.1	0.870 22.1	8.60 2.62	2570 106971	290 4752	327 5358.5	7.46 18.9	833 34672	93.1 1526	143 2343.3	4.25 10.8
	181 269	53.2 343	18.00 457	18.00 457	1.000 25.4	1.000 25.4	8.66 2.64	3020 125701	336 5506	379 6210.7	7.53 19.1	974 40541	108.0 1770	167 2736.6	4.28 10.9
	204 304	60.2 388	18.30 465	18.10 460	1.130 28.7	1.130 28.7	8.73 2.66	3480 144847	380 6227	433 7095.6	7.60 19.3	1120 46618	124.0 2032	191 3129.9	4.31 11.0

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Steel H-Pile

Available Steel Grades

AMERICAN			CANADIAN			EUROPEAN**		
ASTM	YIELD STRENGTH		CSA G40.21	YIELD STRENGTH		EN 10034	YIELD STRENGTH	
	ksi	MPa		ksi	MPa		ksi	MPa
A 36	36	250	**Grade 300 W**	44	300	**HISTAR 355**	51	355
A 572 Grade 50	50	345	**Grade 350 W**	50	350	**HISTAR 420**	61	420
A 572 Grade 60	60	415				**HISTAR 460**	67	460
A 588	50	345						
A 690	50	345						
A 709	50	345						
A 913*	60	415						
A 913*	65	450						

Highlighted fields represent the most commonly used and readily available steel grades. * Available for HP12x89 and larger. ** HISTAR only available in some sizes.

Splicer and H-Pile Point

Splicer

H-Pile Point

Delivery Conditions & Tolerances

	ASTM A 6	
Mass	± 2.5%	
Length§		
30 ft. and Under	± 0.375 in.	
Over 30 ft.	+ (0.375 in. + (length - 30)/80)	– 0.375 in.
Depth	± 0.125 in.	– 0.1875 in.
Flange Width	+ 0.25 in.	
Flanges out of Square		
HP 8 x 42 - HP 12 x 84	≤ 0.25 in.	
HP 14 x 73 - HP 14 x 117	≤ 0.3125 in.	
Web off Center	≤ 0.1875 in.	
Greatest Depth over Theoretical	≤ 0.25 in.	
Camber and Sweep***		
45 ft. and Under	(0.125")(Length in ft./10) but not over 0.375"	
Over 45 ft.	(0.375") + (0.125" (Length in ft. - 45)/10)	

§ For HP ordered as bearing piles, length tolerances are +5 in. and -0 in.
***For the HP 10 x 42, 12 x 53, 12 x 63, 14 x 73, and 14 x 89 ordered as columns, tolerances are subject to negotiation with manufacturer.

Maximum Rolled Lengths†

HP	130 ft.	39.6 m

† Longer lengths may be possible upon request.

U.S. Department of Transportation
Federal Highway Administration

Publication No. FHWA-NHI-16-009
FHWA GEC 012 – Volume I
September 2016

NHI Courses No. 132021 and 132022

Design and Construction of Driven Pile Foundations – Volume I

Developed following:

AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014, with 2015 Interim.

and

AASHTO LRFD Bridge Construction Specifications, 3rd Edition, 2010, with '11, '12, '13, '14, and '15 Interims.

NATIONAL HIGHWAY INSTITUTE
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7.2.1.4 Nominal Resistance of Single Piles to Rock

Pile foundations on rock are normally designed to carry large loads. For pile foundations driven to rock, which include steel H-piles, pipe piles or precast concrete piles, the exact area in contact with the rock, the depth of penetration into rock, as well as the quality of rock in the immediate pile contact area are largely unknown. Pile installation can also alter the characteristics of the rock formation, further complicating design procedures.

The distinction between soft rock and hard rock is not well defined. The AASHTO definition of soft and hard rock for driven pile foundation design is limited. In general, soft rock is defined as rock that can be penetrated by pile driving and hard rock is defined as rock that cannot be penetrated. Hence, piles are driven into soft rock and driven to hard rock. In many intact rock classification systems, the transition between soft rock and hard rock occurs between an unconfined compression strength of 200 and 1000 ksf. Kulhawy (1991) proposed 400 ksf as the an unconfined compression strength denoting the transition between weak and moderate rock. AASHTO notes that a definition of hard rock based on measureable rock characteristics has not been widely accepted.

Likins and Goble (1978) reported on the results of an Ohio DOT and FHWA sponsored research study on HP 10x42 H-piles driven to shallow bedrock with multiple, similarly sized pile hammers. Static and dynamic load tests were conducted at the two sites, one with hard rock and one with soft rock. The H-piles were driven to a penetration resistance of 20 blows per inch on rock at both sites. At the hard rock site, hard limestone with an unconfined compression strength of up to 1094 ksf was encountered around 22 feet. At the soft rock site, weathered shale with unconfined compressive strength of 172 to 316 ksf was encountered around 15 feet. The A-36 steel H-piles at the hard limestone site were statically load tested to as high as $0.93F_y$ without reaching the Davisson load test failure criteria which is described in Chapter 9. At the weathered shale site, significantly lower nominal resistances were achieved with failure occurring between 0.28 to $0.71F_y$. Relaxation occurred on the H-piles driven at the weathered shale site and higher nominal resistances were observed on piles that penetrated deeper into the shale. This study, even though it was performed with smaller hammers and piles then commonly used today, demonstrates that geotechnical aspects control soft rock design and structural aspects control hard rock design.

Tomlinson and Woodward (2015) state that piles driven to rock can create very high concentrated loads on the rock beneath the pile toe. The ability of the rock to

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Checked by: LGH

support the concentrated load depends in part on the compressive strength of the rock, the frequency of fissures and joints in the rock mass, and whether the fissures and joints are tightly closed or are open and filled with weathered material. They further note that very high loads can be supported if the rock is strong and has closed joints or joints on a shallow angle to horizontal. Conversely, steeply inclined and open joints may provide little resistance as the rock beneath the pile toe slides until the joints are closed or the rock mass becomes locked together. The driving of piles through weak or broken rock to hard rock can shatter weak rock such that shaft resistance is significantly reduced or eliminated. The resulting concentrated load may be acceptable for strong intact rock but it may be excessive for a strong but closely jointed rock mass.

Published results as well as empirical values for nominal shaft resistances are presented in Table 7-13. These results may be used for preliminary estimating purposes or as a check of values obtained from field tests. However, they are not intended to be used as final design values without the user determining the applicability of the underlying method or the suitability of a reported nominal resistance value to a given site or geologic formation.

Table 7-13 Published Nominal Shaft Resistance Values in Weak Rock Materials

Rock Description	Pile Type	Nominal Unit Shaft Resistance (ksf)	Source
Moderately strong, slightly weathered, Slaty Mudstone	H-pile	0.6	1.
Moderately strong, slightly weathered, Slaty Mudstone	H-pile	3.3	1.
Faintly to moderately weathered , moderately strong to strong, Mudstone	Pipe Pile	2.6	2.
Very weak, closely fissured argillaceous Siltstone (Mercia Mudstone)	Precast Concrete	2.7	3.
Very weak, coral detrital Limestone (carbonate sandstone/siltstone)	Pipe pile	0.9	2.
Limestone	H-pile	24.0	4.
Weak calcareous Sandstone	Pipe Pile	0.9	2.
Sandstone	H-pile	20.0	4.
Shale	H-pile	12.0	4.

Information sources:
1) George et al. (1976)
2) Tomlinson and Woodward (2015)
3) Leach and Mallard (1980)
4) Illinois DOT Geotechnical Pile Design Guide, AGMU 10.2 (2011)

Use 3.0 ksf as a limit for the fractured bedrock and intact rock.

Performed by: TAD
Checked by: LGH

Published results and recommended empirical values for nominal toe resistances are presented in Table 7-14. Once again these values may be used for preliminary estimating purposes or as a check of values obtained from field tests. However, they are not intended to be used as final design values without the user determining the applicability of the underlying method or the suitability of a reported nominal resistance value to a given site or geologic formation.

Table 7-14 Published Nominal Toe Resistance Values in Weak Rock Materials

Rock Description	Pile Type	Nominal Unit Toe Resistance (ksf)	Source
Weak carbonate Siltstone/Sandstone (coral detrital limestone)	N.A.	106.7	1.
Limestone	H-pile	240.0	2.
Weak calcareous Sandstone	Pipe Pile	62.6	1.
Sandstone	H-pile	200.0	2.
Shale	H-pile	120.0	2.

Information sources: 1) Tomlinson and Woodward (2015)
2) Illinois DOT Geotechnical Pile Design Guide, AGMU 10.2 (2011)

Based on the above discussion and information, the determination of nominal shaft and toe resistances of piles driven into or on rock is best made on the basis of static or dynamic load tests in conjunction with pile driving observations and local experience. In general, the design of small diameter piles supported on fair to excellent quality rock will be controlled by their nominal structural resistance as described in Chapter 8. A pile on hard intact rock will fail structurally before hard intact rock failure. Piles supported in soft, weakly laminated or weathered rock should be designed based on the results of static or dynamic load tests.

7.2.1.4.1 Piles Driven into Soft and Weak Rock

Tomlinson and Woodward (2015) note that the shaft resistance on piles driven into weak weathered rocks cannot always be calculated from the results of laboratory tests on rock cores. Factors such as degradation of the weak rock, reduction in shaft resistance due to shattering of the rock structure from driving adjacent piles, and formation of an enlarged hole around the pile hamper analytical methods.

The design of axial loaded piles in soft rock should be performed using the same procedures and methods used for piles in soil as presented in Section 7.2.2. Static and dynamic tests are recommended for design verification until local correlations

SUMMARIES

Performed by: TAD
Checked by: LGH

SUMMARY OF PILE CAPACITY
EXIT 35 AND 36 INTERCHANGE IMPROVEMENTS

LOCATION: **EXIT 35 SB ON-RAMP**
STRUCTURE: **GANTRY AND TOLLING EQUIPMENT**

PILES WILL BE DRIVEN TO FRACTURED BEDROCK AT THE ON-RAMP FACITLITY.

Resistance Factor (using PDA): 0.65

	GEOTECHNICAL RESISTANCE (KIPS)		NOMINAL DOWN DRAG (Kips)	DOWN DRAG LOAD FACTOR	DOWN DRAG METHOD	FACTORED DOWN DRAG (kip)
PILE SIZE	*NOMINAL	FACTORED		Table 3.4.1-2		
HP 14X117	785	510	93	1.05	Lambda	98

*Actual values were higher. These we lowered to match and be consistent with the Off-Ramp values.
*Based on static analysis 2 feet of penetration into fractured bedrock and 1 foot into intact bedrock using APILE software.
*Also based on past Exit 44 project which had same piles bearing in simliar bedrock.

Assumed bottom of pile cap El:	117	
Assumed Pile Cut Off El:	119	(2 feet into pile cap)
Assumed bottom of pile El:	61	(1 foot into intact bedrock)
Raw Length:	58	
Per Pile Contingency:	5	
Estimate Length per Pile	63	

PILE SHOES ARE RECOMMENDED FOR ALL PILES.
BECAUSE THE PILES WILL BE SEATED ON OR IN BEDROCK A STRUCTURAL RESISTANCE OF Φ_C = 0.5 IS RECCOMMENDED (AASHTO 6.5.4.2)

Performed by: TAD
Checked by: LGH

SUMMARY OF PILE CAPACITY
EXIT 35 AND 36 INTERCHANGE IMPROVEMENTS

LOCATION: **EXIT 35 ON-RAMP**
STRUCTURE: **ADMIN BUILDING**

PILES WILL BE DRIVEN TO FRACTURED BEDROCK

Using PDA testing, factor of safety = 2.5

	*Ultimate Capacity	Down Drag	Allowable Capacity
PILE SIZE	(kips)	(Kips)	(Kips)
HP 14X117	785	100	214

*Based on static analysis 2 feet of penetration into fractured bedrock and 1 foot into intact bedrock using APILE software.
*Also based on past Exit 44 project which had same piles bearing in simliar bedrock.

**Allowable Capcity = (ultimate/FS - Down Drag) Down Drag estimates are conservative.

Assumed Top of Slab El:	122	
Assumed bottom of pile cap El:	117	
Assumed Pile Cut Off El:	119	(2 feet into pile cap)
Assumed bottom of pile El:	61	(1 foot into intact bedrock)
Raw Length:	58	
Per Pile Contingency:	5	
Estimate Length per Pile	63	

PILE SHOES ARE RECOMMENDED FOR ALL PILES.

Performed by: TAD
Checked by: LGH

SUMMARY OF PILE CAPACITY
EXIT 35 AND 36 INTERCHANGE IMPROVEMENTS

LOCATION: **EXIT 35 SB OFF-RAMP**
STRUCTURE: **GANTRY AND TOLLING EQUIPMENT**

PILES WILL BE DRIVEN TO FRACTURED BEDROCK AT THE OFF-RAMP FACILITY

Resistance Factor (using PDA): 0.65

	GEOTECHNICAL RESISTANCE (KIPS)		NAL DOWN DRAG (Kips)	DOWN DRAG LOAD FACTOR	DOWN DRAG METHOD	FACTORED DOWN DRAG (kip)
PILE SIZE	*NOMINAL	FACTORED		Table 3.4.1-2		
HP 14X117	625	406	51	1.05	Lambda	54

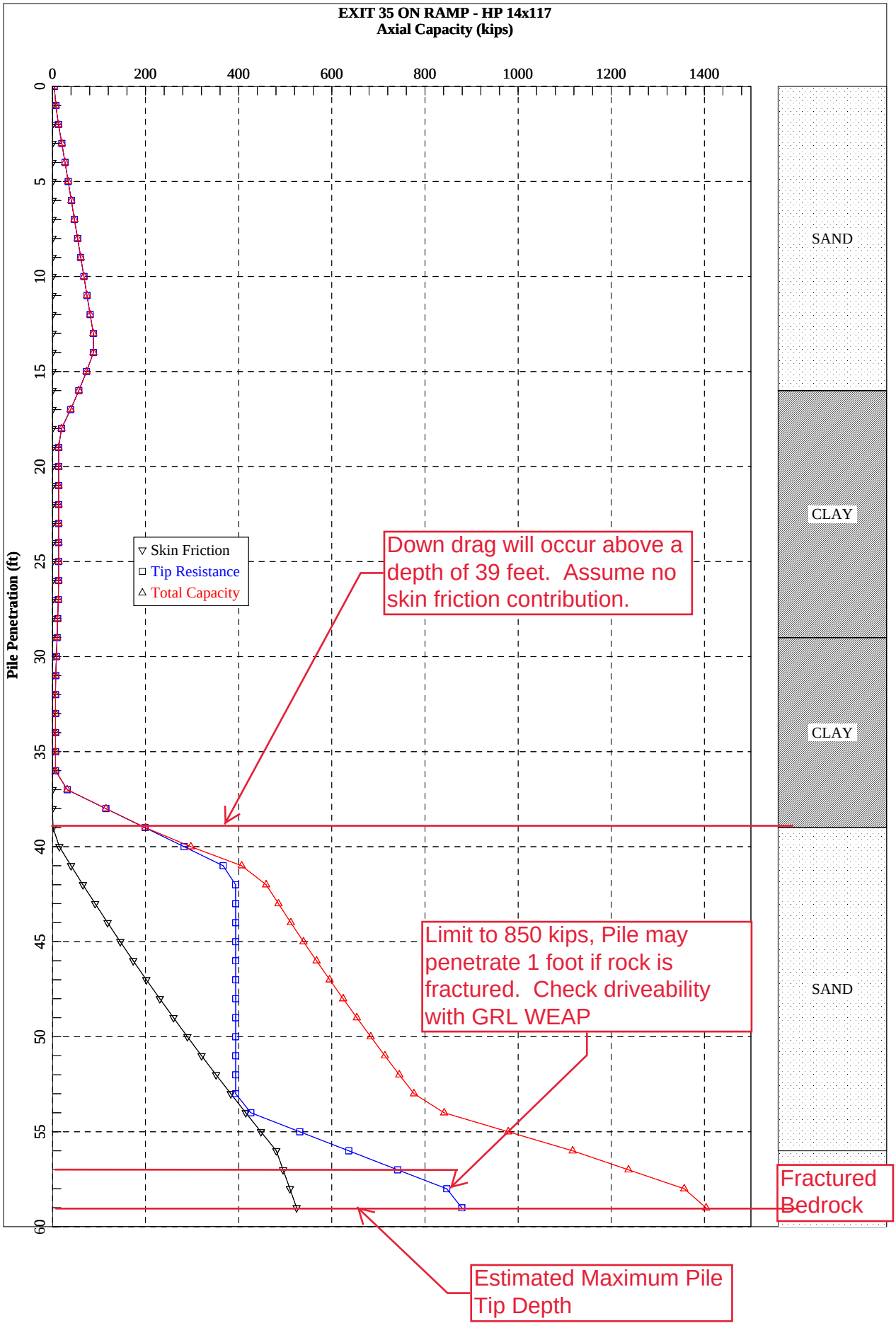
**Based on static analysis and less then 1 to 3 feet of penetration into fractured bedrock using APILE software
*Also based on past Exit 44 project

Assumed Top of Slab El:	101	
Assumed bottom of pile cap El:	96	
Assumed Pile Cut Off El:	98	(2 feet into pile cap)
Assumed bottom of pile El:	54	(3 feet into bedrock)
Raw Length:	44	
Per Pile Contingency:	5	
Estimate Length per Pile	49	

PILE SHOES ARE RECOMMENDED FOR ALL PILES.
BECAUSE THE PILES WILL BE SEATED ON OR IN BEDROCK A STRUCTURAL RESISTANCE OF Φ_C = 0.5 IS RECCOMMENDED (AASHTO 6.5.4.2)

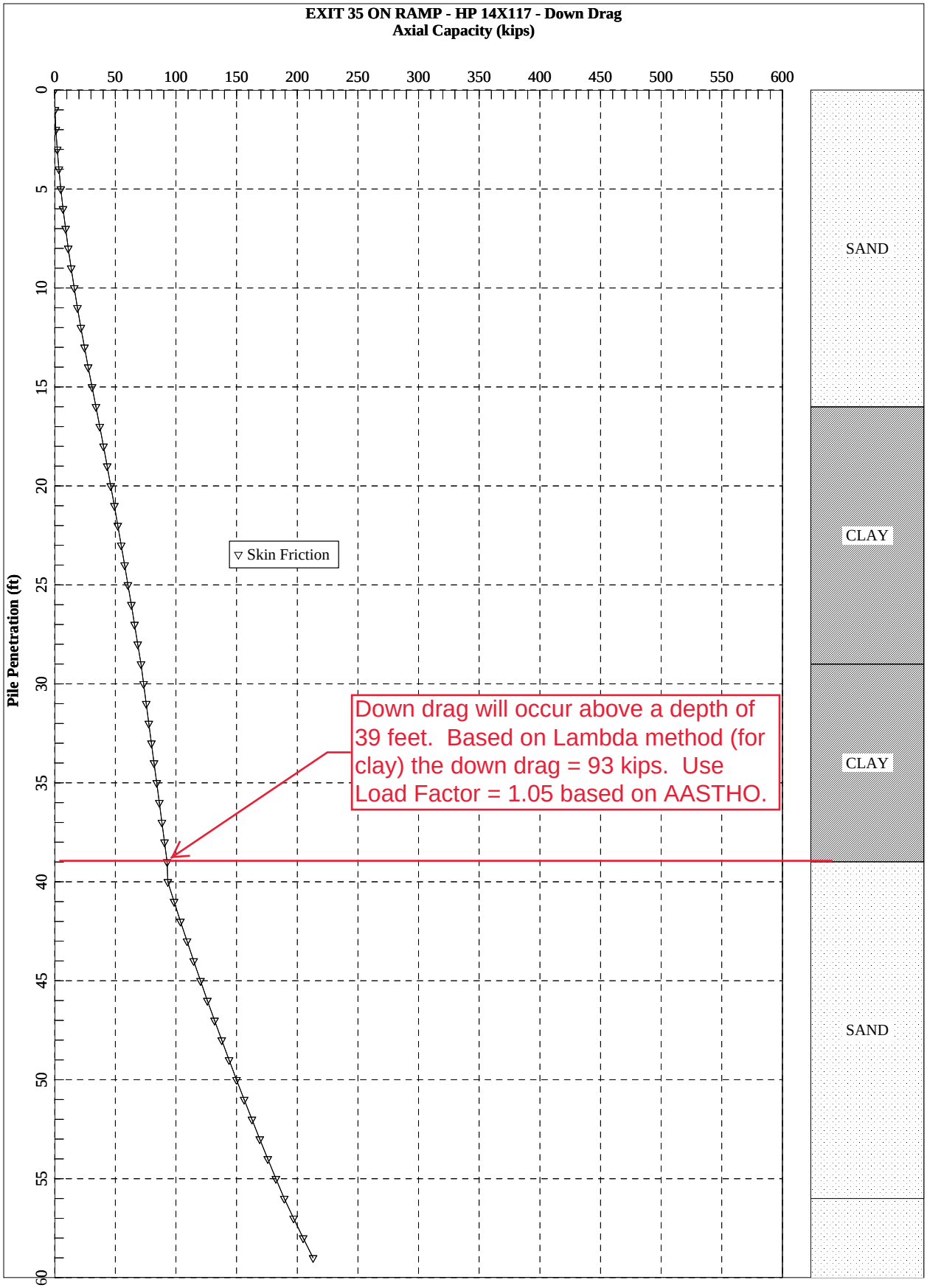
Exit 35 SB On Ramp - APile Static Capacity

Performed by: TAD
Checked by: LGH



Exit 35 SB On Ramp - Downdrag

Performed by: TAD
Checked by: LGH



Exit 35 SB On Ramp - GRLWEAP

Performed by: TAD
Checked by: LGH

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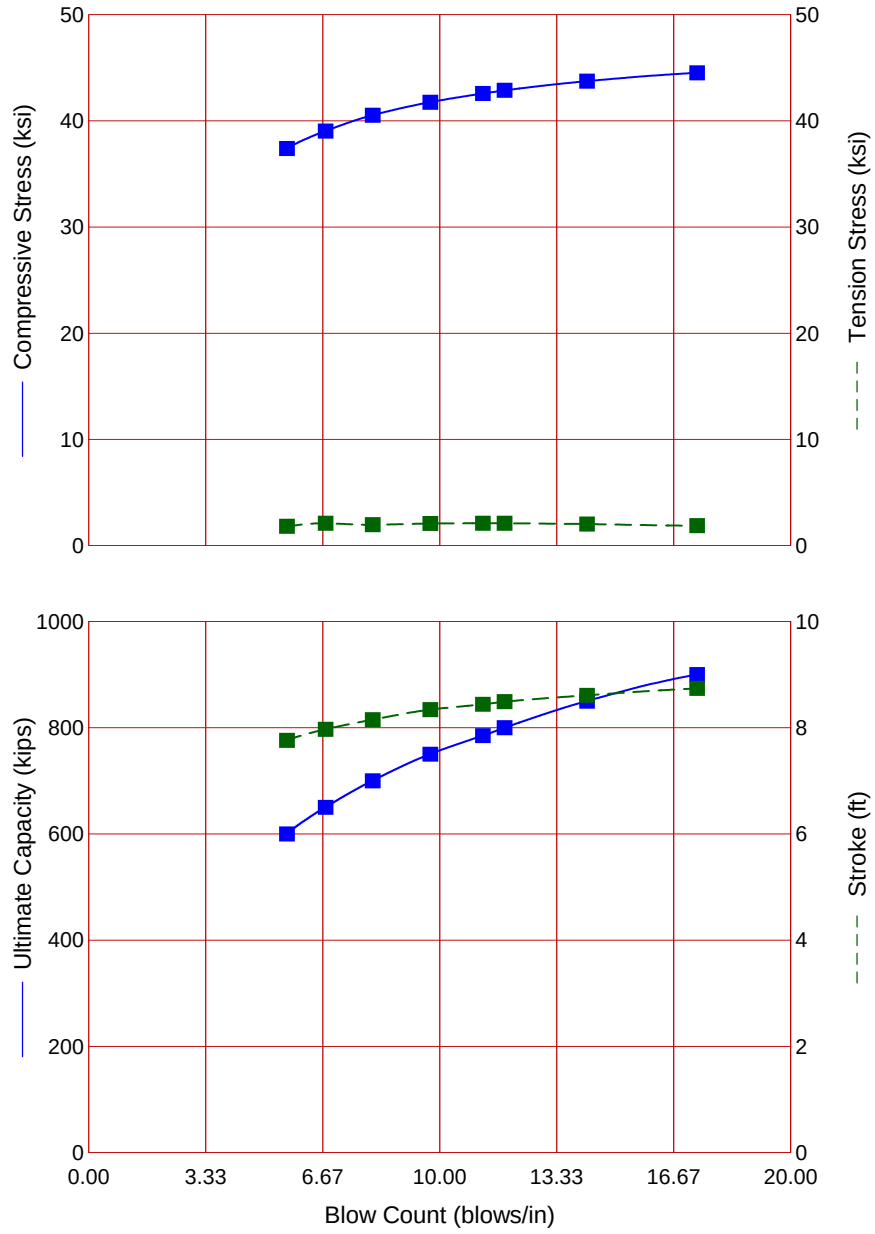
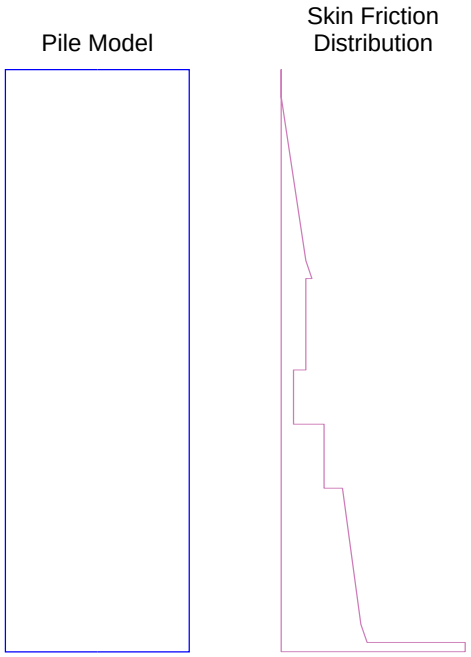


DELMAG D 36-32

Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	1215 (81%)	psi
Helmet Weight	1.90	kips
Hammer Cushion	60155	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.072	s/ft
Toe Damping	0.150	s/ft
Pile Length	64.00	ft
Pile Penetration	61.00	ft
Pile Top Area	34.40	in2



Res. Shaft = 15 %
(Proportional)

Performed by: TAD
Checked by: LGH

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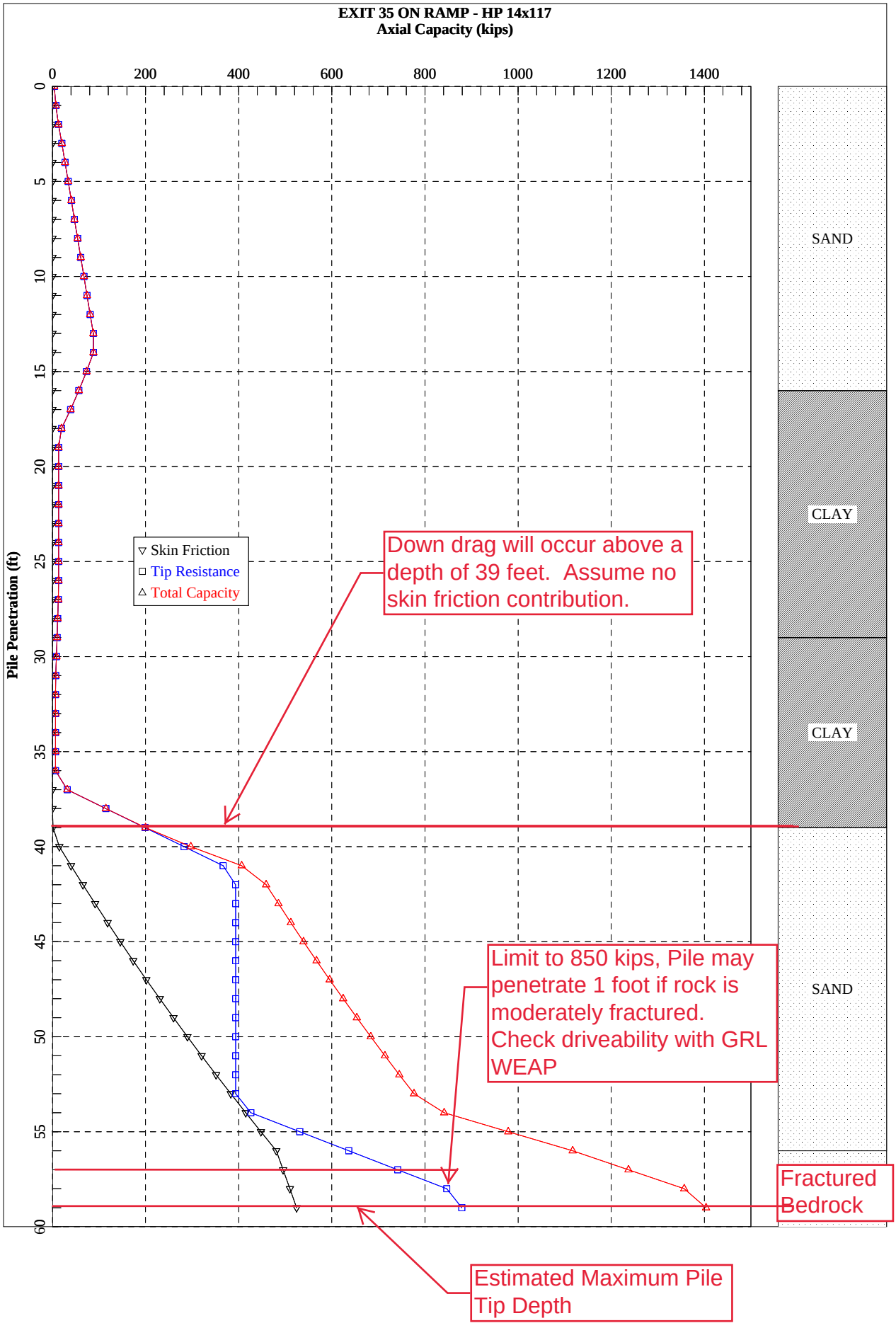
Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
600.0	37.38	1.82	5.6	7.76	32.02
650.0	39.02	2.11	6.8	7.97	32.92
700.0	40.52	1.97	8.1	8.15	33.66
750.0	41.74	2.09	9.7	8.34	34.48
785.0	42.56	2.11	11.2	8.44	34.86
800.0	42.86	2.11	11.8	8.49	35.01
850.0	43.73	2.04	14.2	8.61	35.52
900.0	44.52	1.88	17.3	8.74	36.02

Exit 35 SB Admin Building – APile Static Capacity

Performed by: TAD
Checked by: LGH



Exit 35 SB Admin Building – Downdrag

Performed by: TAD
Checked by: LGH

Pile Section = HP 14x117
Pile Legnth = 14.2 inch
Pile Diameter = 14.9 inch
Pile Area 1 ft of Length = 4.85 sq ft

Skin Friction Calculations
Fn = B*Po
Fn = unit skin friction
Po = Effective Vertical Stress
B = Empirical factor

	B	
Soil Type	Low	High
Clay	0.20	0.25
Silt	0.25	0.35
Sand	0.35	0.50

Boring: B-103

	Depth	Soil Type	B	Po -Incre (psf)	Po - Cumm (psf)	Down Drag Incre. (kips)	Down Drag Cumm (kips)
	1	New Fill	0.4	125	125	0.00	0.00
	2	New Fill	0.4	125	250	0.00	0.00
	3	New Fill	0.4	125	375	0.00	0.00
	4	New Fill	0.4	125	500	0.00	0.00
Top of Pile	5	New Fill	0.4	125	625	0.00	0.00
	6	New Fill	0.4	125	750	1.5	1
	7	New Fill	0.4	125	875	1.7	3
	8	New Fill	0.4	125	1000	1.9	5
	9	New Fill	0.4	125	1125	2.2	7
	10	New Fill	0.4	125	1250	2.4	10
	11	New Fill	0.4	125	1375	2.7	12
	12	New Fill	0.4	125	1500	2.9	15
	13	New Fill	0.4	125	1625	3.2	18
	14	New Fill	0.4	125	1750	3.4	22
	15	New Fill	0.4	125	1875	3.6	25
water	16	New Fill	0.4	125	2000	3.9	29
	17	Clay Crust	0.23	58	2058	2.3	32
	18	Clay Crust	0.23	58	2116	2.4	34
	19	Clay Crust	0.23	58	2174	2.4	36
	20	Clay Crust	0.23	58	2232	2.5	39
	21	Clay Crust	0.23	58	2290	2.6	41
	22	Clay Crust	0.23	58	2348	2.6	44
	23	Clay Crust	0.23	58	2406	2.7	47
	24	Clay Crust	0.23	58	2464	2.7	50
	25	Clay Crust	0.23	58	2522	2.8	52
	26	Clay Crust	0.23	58	2580	2.9	55
	27	Clay Crust	0.23	58	2638	2.9	58
	28	Clay Crust	0.23	58	2696	3.0	61
	29	Clay Crust	0.23	58	2754	3.1	64

Performed by: TAD
Checked by: LGH

30	Clay Soft	0.23	53	2807	3.1	67
31	Clay Soft	0.23	53	2860	3.2	71
32	Clay Soft	0.23	53	2913	3.2	74
33	Clay Soft	0.23	53	2966	3.3	77
34	Clay Soft	0.23	53	3019	3.4	80
35	Clay Soft	0.23	53	3072	3.4	84
36	Clay Soft	0.23	53	3125	3.5	87
37	Clay Soft	0.23	53	3178	3.5	91
38	Clay Soft	0.23	53	3231	3.6	95
39	Clay Soft	0.23	53	3284	3.7	98
40	Clay Soft	0.23	53	3337	3.7	102
	G Till					

Note: round to 100 kips, the settlement is not likely to extend to a depth of 40 feet.

Performed by: TAD
Checked by: LGH

Soil Properties

Stratum	Unit Wt (pcf)	Friction Angle	Cohesion (psf)
New Fill (Sand)	125	34	0
Upper (Sand)	125	32	0
Clay Crust	120	0	1000
Clay Soft	115	0	500
Lower Sand	120	30	0
Glaical Till	135	38	0
Bedrock	160	45	0

Boring: B-203

	Depth	Soil Type	B	Po -Incre (psf)	Po - Cumm (psf)	Down Drag Incre. (kips)	Down Drag Cumm (kips)
	1	New Fill	0.4	125	125	0.0	0
	2	New Fill	0.4	125	250	0.0	0
	3	New Fill	0.4	125	375	0.0	0
	4	New Fill	0.4	125	500	0.0	0
Top of Pile	5	New Fill	0.4	125	625	0.0	0
	6	New Fill	0.4	125	750	1.5	1
	7	New Fill	0.4	125	875	1.7	3
	8	New Fill	0.4	125	1000	1.9	5
	9	New Fill	0.4	125	1125	2.2	7
	10	New Fill	0.4	125	1250	2.4	10
	11	New Fill	0.4	125	1375	2.7	12
	12	New Fill	0.4	125	1500	2.9	15
	13	New Fill	0.4	125	1625	3.2	18
	14	New Fill	0.4	125	1750	3.4	22
	15	New Fill	0.4	125	1875	3.6	25
	16	New Fill	0.4	125	2000	3.9	29
	17	New Fill	0.4	125	2125	4.1	33
	18	New Fill	0.4	125	2250	4.4	38
	19	New Fill	0.4	125	2375	4.6	42
water	20	New Fill	0.4	125	2500	4.9	47
	21	Clay Crust	0.23	58	2558	2.9	50
	22	Clay Crust	0.23	58	2616	2.9	53
	23	Clay Crust	0.23	58	2674	3.0	56
	24	Clay Crust	0.23	58	2732	3.0	59
	25	Clay Crust	0.23	58	2790	3.1	62
	26	Clay Crust	0.23	58	2848	3.2	65
	27	Clay Crust	0.23	58	2906	3.2	69
	28	Clay Crust	0.23	58	2964	3.3	72
	29	Clay Crust	0.23	58	3022	3.4	75

Performed by: TAD
Checked by: LGH

30	Clay Crust	0.23	58	3080	3.4	79
31	Clay Soft	0.23	53	3133	3.5	82
32	Clay Soft	0.23	53	3186	3.6	86
33	Clay Soft	0.23	53	3239	3.6	89
34	Clay Soft	0.23	53	3292	3.7	93
35	Clay Soft	0.23	53	3345	3.7	97
36	Clay Soft	0.23	53	3398	3.8	101
	Lower Sand					

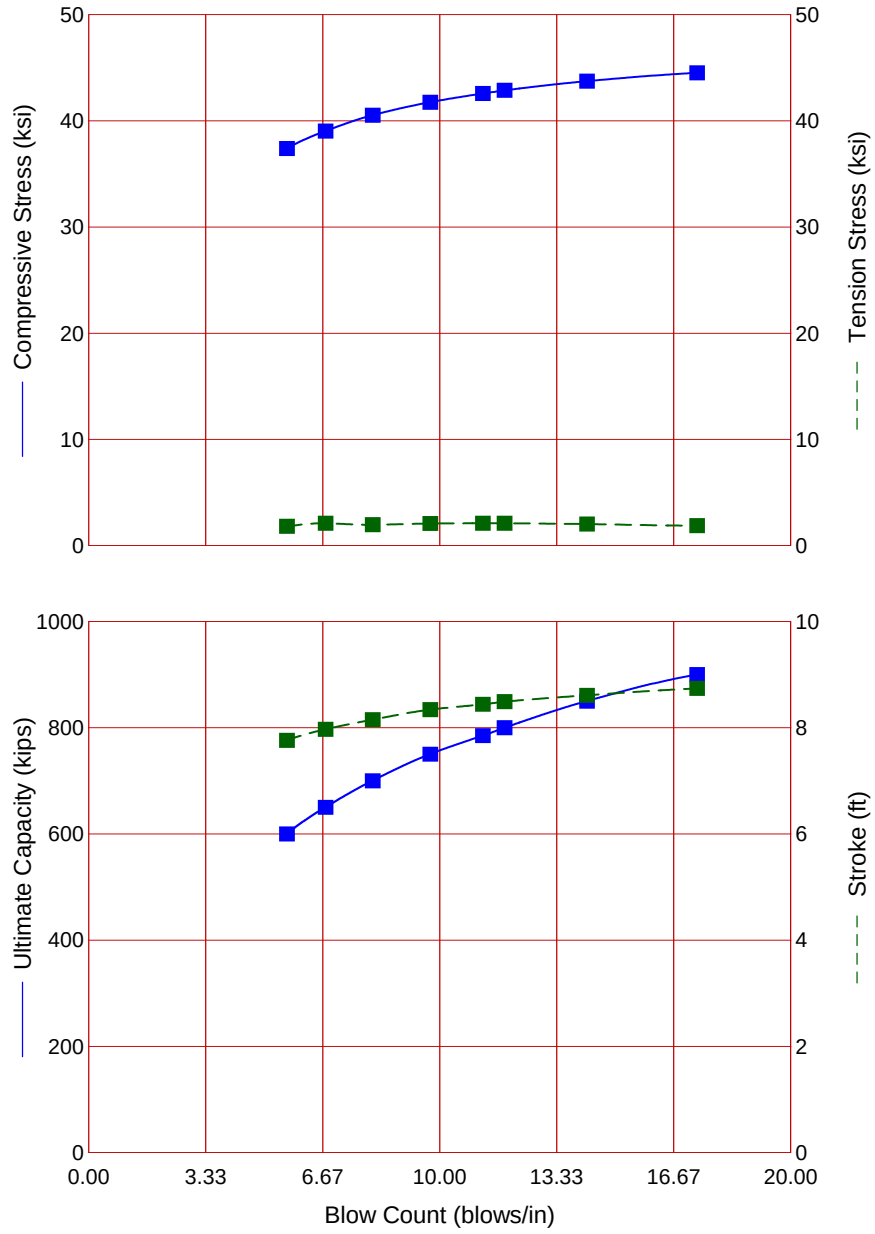
Note: round to 100 kips, the settlement is not likely to extend to a depth of 36 feet.

Exit 35 SB Admin building – GRLWEAP

Performed by: TAD
Checked by: LGH

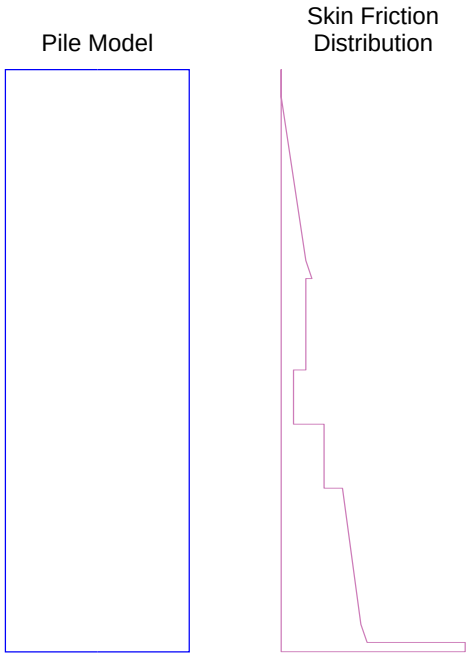
Stantec Consulting
SACO - On Ramp

16-Mar-2021
GRLWEAP Version 2010



DELMAG D 36-32

Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	1215 (81%)	psi
Helmet Weight	1.90	kips
Hammer Cushion	60155	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.072	s/ft
Toe Damping	0.150	s/ft
Pile Length	64.00	ft
Pile Penetration	61.00	ft
Pile Top Area	34.40	in2



Res. Shaft = 15 %
(Proportional)

Performed by: TAD
Checked by: LGH

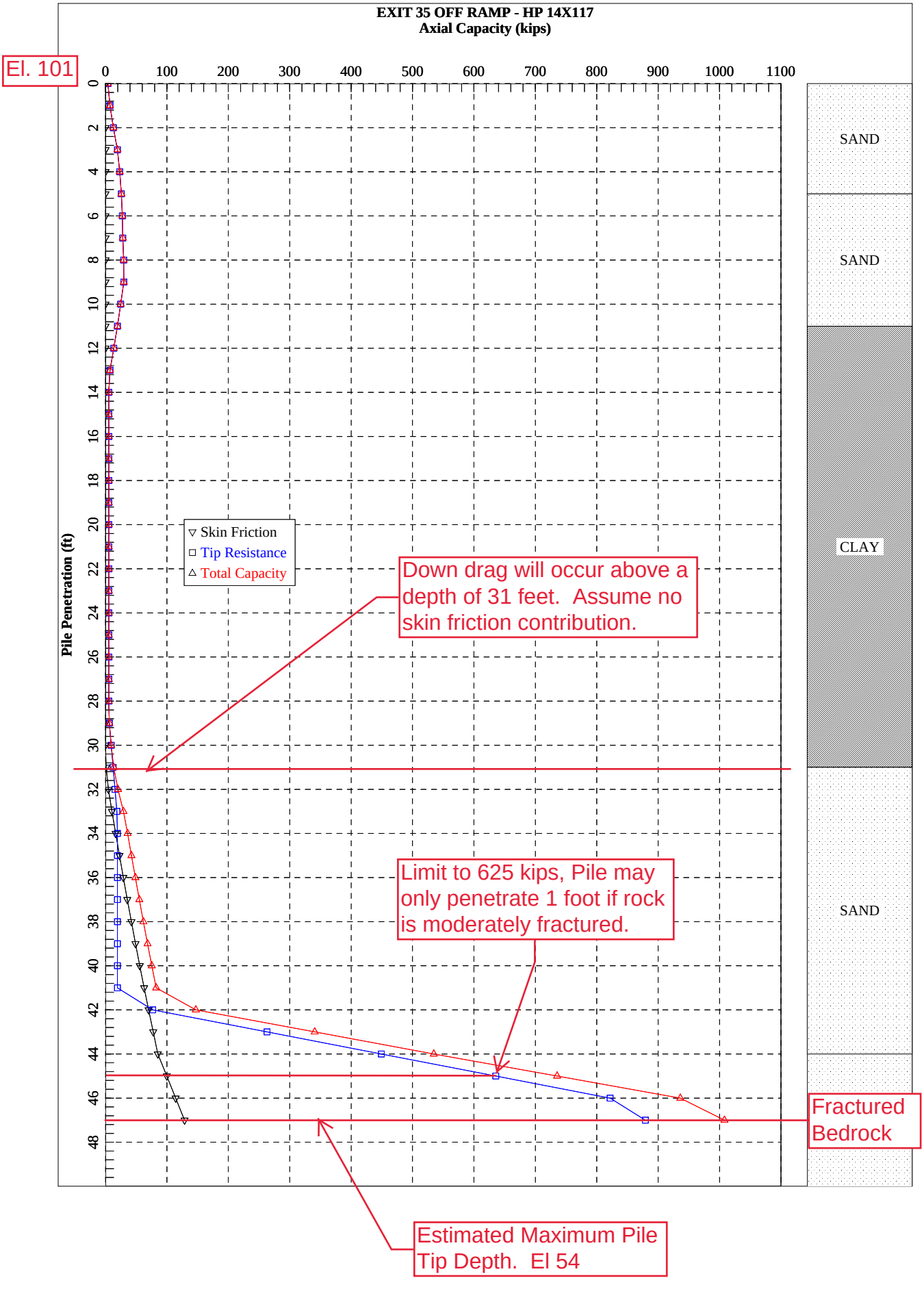
Stantec Consulting
SACO - On Ramp

16-Mar-2021
GRLWEAP Version 2010

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
600.0	37.38	1.82	5.6	7.76	32.02
650.0	39.02	2.11	6.8	7.97	32.92
700.0	40.52	1.97	8.1	8.15	33.66
750.0	41.74	2.09	9.7	8.34	34.48
785.0	42.56	2.11	11.2	8.44	34.86
800.0	42.86	2.11	11.8	8.49	35.01
850.0	43.73	2.04	14.2	8.61	35.52
900.0	44.52	1.88	17.3	8.74	36.02

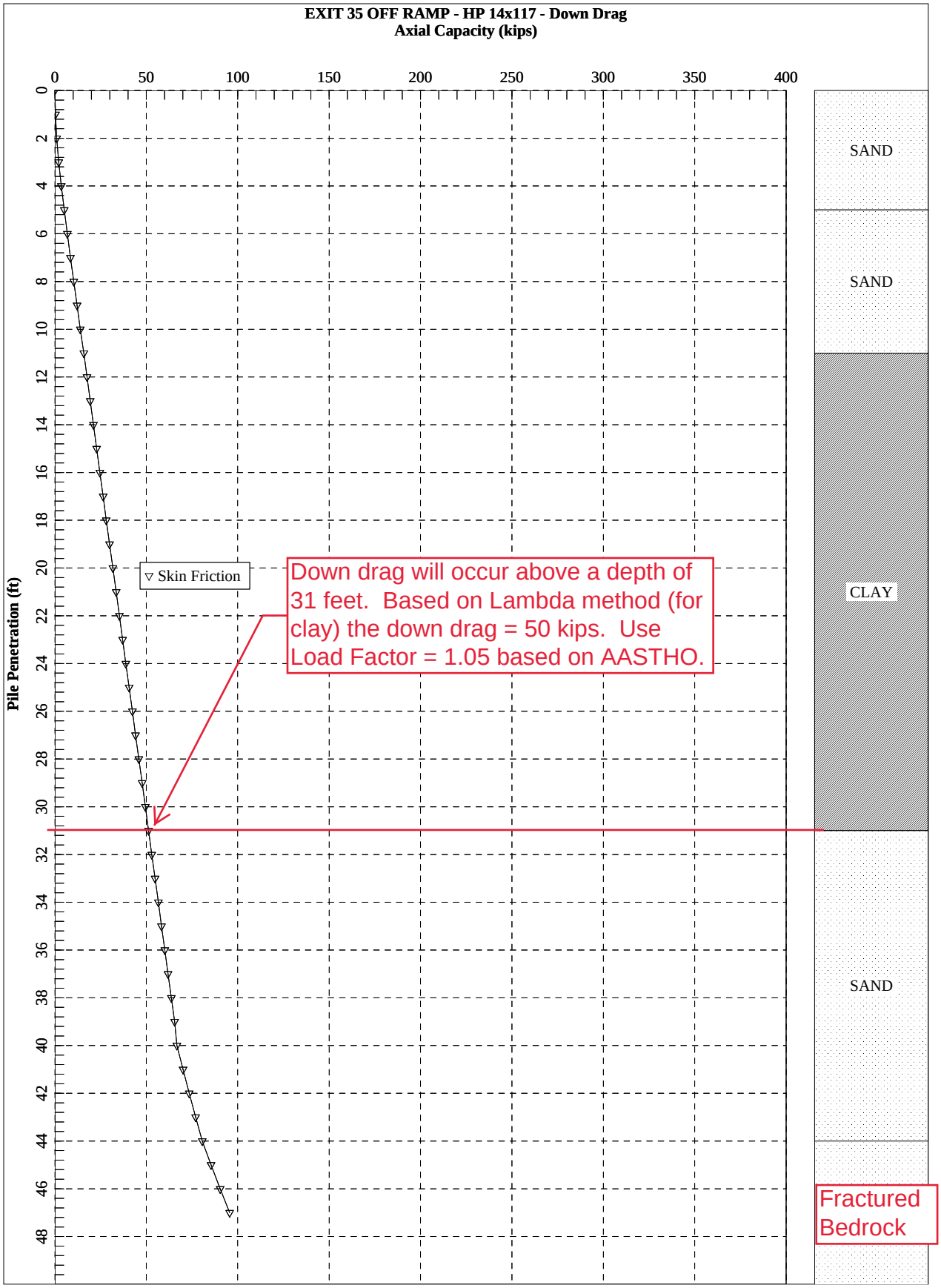
Exit 35 SB Off Ramp = APile Static Capacity

Performed by: TAD
Checked by: LGH



Exit 35 SB Off Ramp - Downdrag

Performed by: TAD
Checked by: LGH

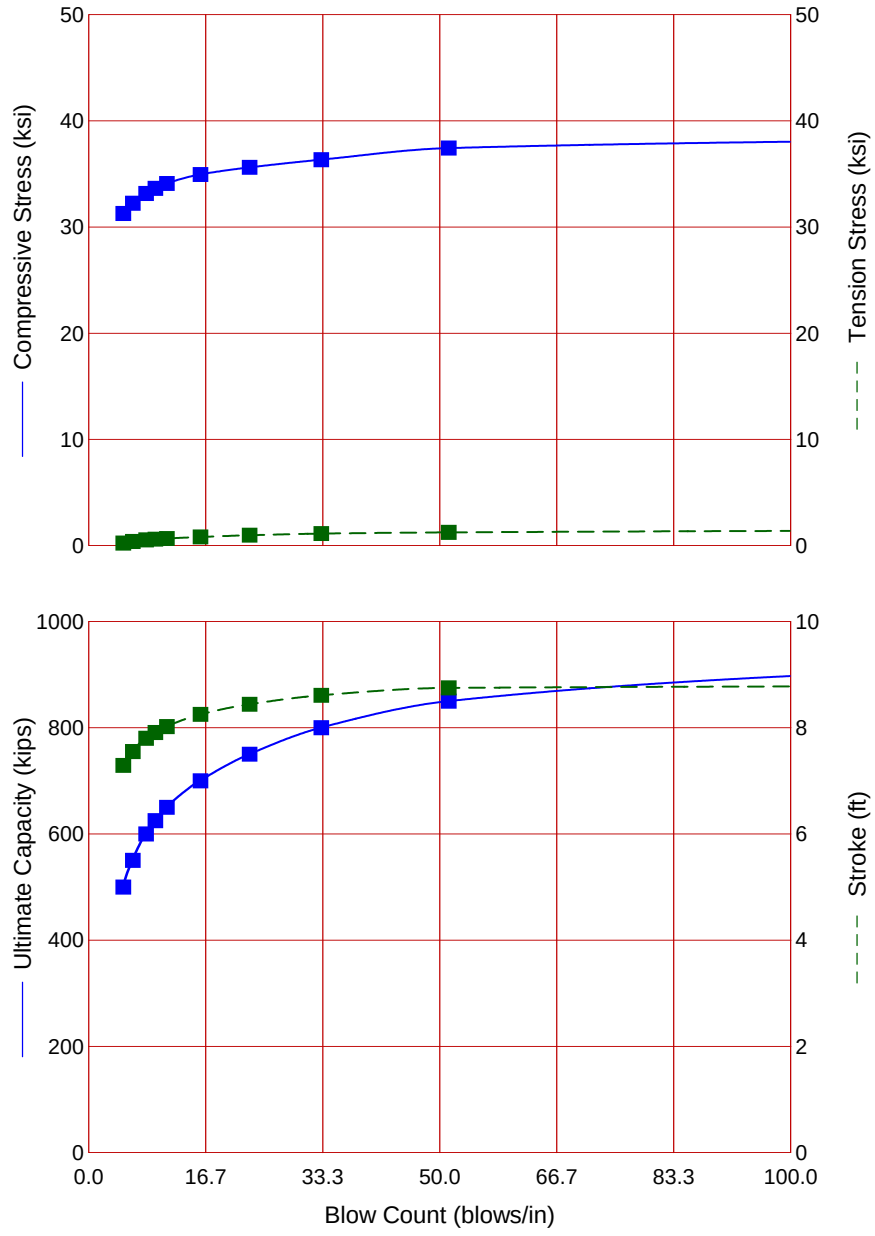


Exit 35 SB Off Ramp - GRLWEAP

Performed by: TAD
Checked by: LGH

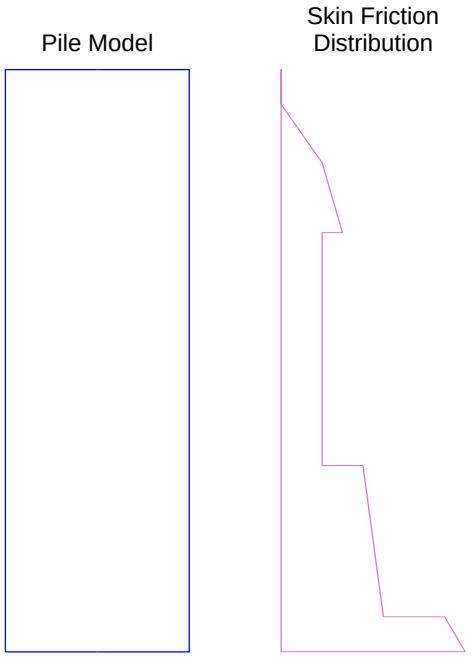
Stantec Consulting
SACO - Off Ramp

22-Mar-2021
GRLWEAP Version 2010



DELMAG D 36-32

Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	1215 (81%)	psi
Helmet Weight	1.90	kips
Hammer Cushion	60155	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.248	in
Skin Damping	0.062	s/ft
Toe Damping	0.150	s/ft
Pile Length	50.00	ft
Pile Penetration	47.00	ft
Pile Top Area	34.40	in2



Res. Shaft = 10 %
(Proportional)

Performed by: TAD
Checked by: LGH

Stantec Consulting
SACO - Off Ramp

22-Mar-2021
GRLWEAP Version 2010

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
500.0	31.27	0.24	4.9	7.29	30.17
550.0	32.23	0.40	6.3	7.55	30.63
600.0	33.15	0.54	8.2	7.80	31.32
625.0	33.64	0.61	9.5	7.91	31.64
650.0	34.09	0.68	11.2	8.02	32.01
700.0	34.94	0.82	15.9	8.25	32.74
750.0	35.61	0.99	22.9	8.44	33.37
800.0	36.34	1.14	33.1	8.61	34.15
850.0	37.43	1.25	51.3	8.75	34.66
900.0	38.06	1.40	104.2	8.78	34.73

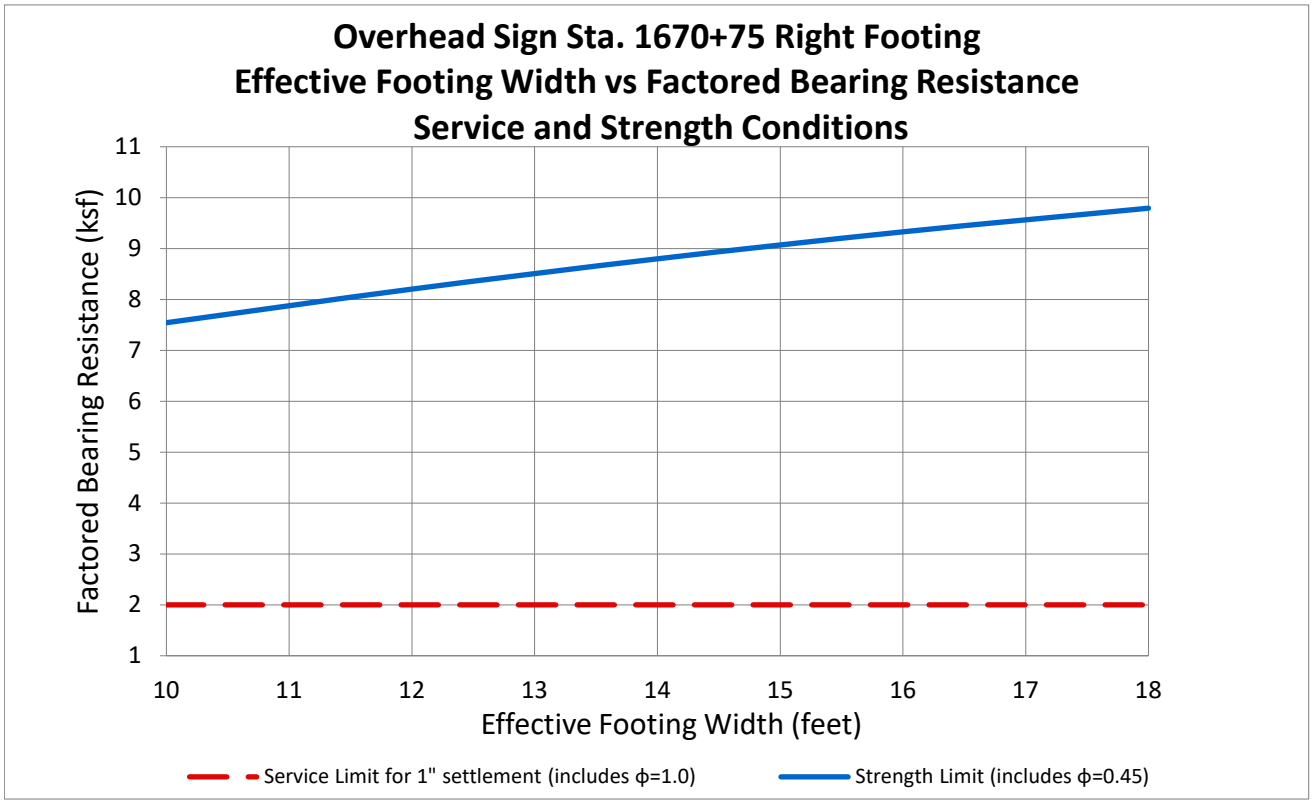
Appendix H Overhead Sign Structures

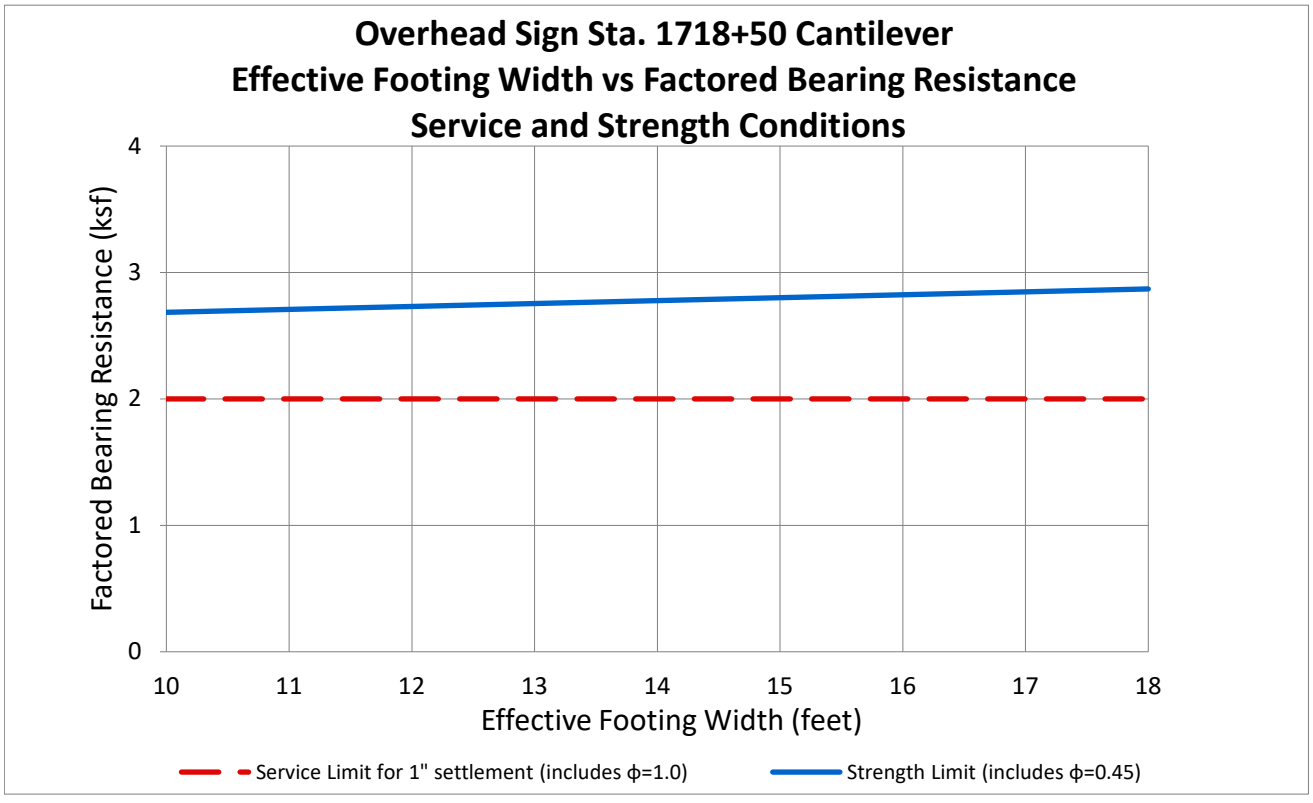
SUMMARY OF DRILLED SHAFT SOIL DESIGN PARAMETERS
PROJECT NAME: **Exit 35/36 Interchange Improvements**
PROJECT NUMBER: **179450125**
LOCATION: **Saco, MA**

Location	Water Depth (ft)	Depth (ft)	Elevation (ft)	Soil Type	Unit Weight (pcf)		Friction Angle (degrees)	Cohesion (psf)	Spring Constant (pci)		Clay ε50
					Above GW	GW			Above GW	Below GW	
1670+75 LEFT	4	0 to 4	118 to 114	Granular	120	-	32	0	90	-	-
		4 to 12	114 to 104	Granular	-	58	32	0	-	60	-
		12 to 21	104 to 97	Cohesive	-	58	0	800	-	-	0.010
		21 to 60	97 to 58	Cohesive	-	53	0	400	-	-	0.020
2728+74.77	3	0 to 3	99 to 96	Granular	125		34	0	90	-	-
		3 to 5	96 to 93	Granular	-	63	34	0	-	60	-
		5 to 11	93 to 88	Cohesive	-	58	0	1000	-	-	0.005
		11 to 24	88 to 75	Cohesive		53	0	500	-	-	0.020
		24 to 28	75 to 71	Granular	-	53	28	0	-	20	-
		28	71	Bedrock	-	103	Strong Rock qu = 4000 psi				
1789+00	5	0 to 5	125 to 120	Granular	120	-	32	0	90	-	-
		5 to 26	120 to 99	Granular	-	58	32	0	-	60	-

Notes: (1) Stationing references the MTA Centerline.
(2) GW = Ground Water

LRFD BEARING RESISTANCE PLOTS
PROJECT NAME: Exit 35/36 Interchange Improvements
PROJECT NUMBER: 179450125
LOCATION: Saco, MA





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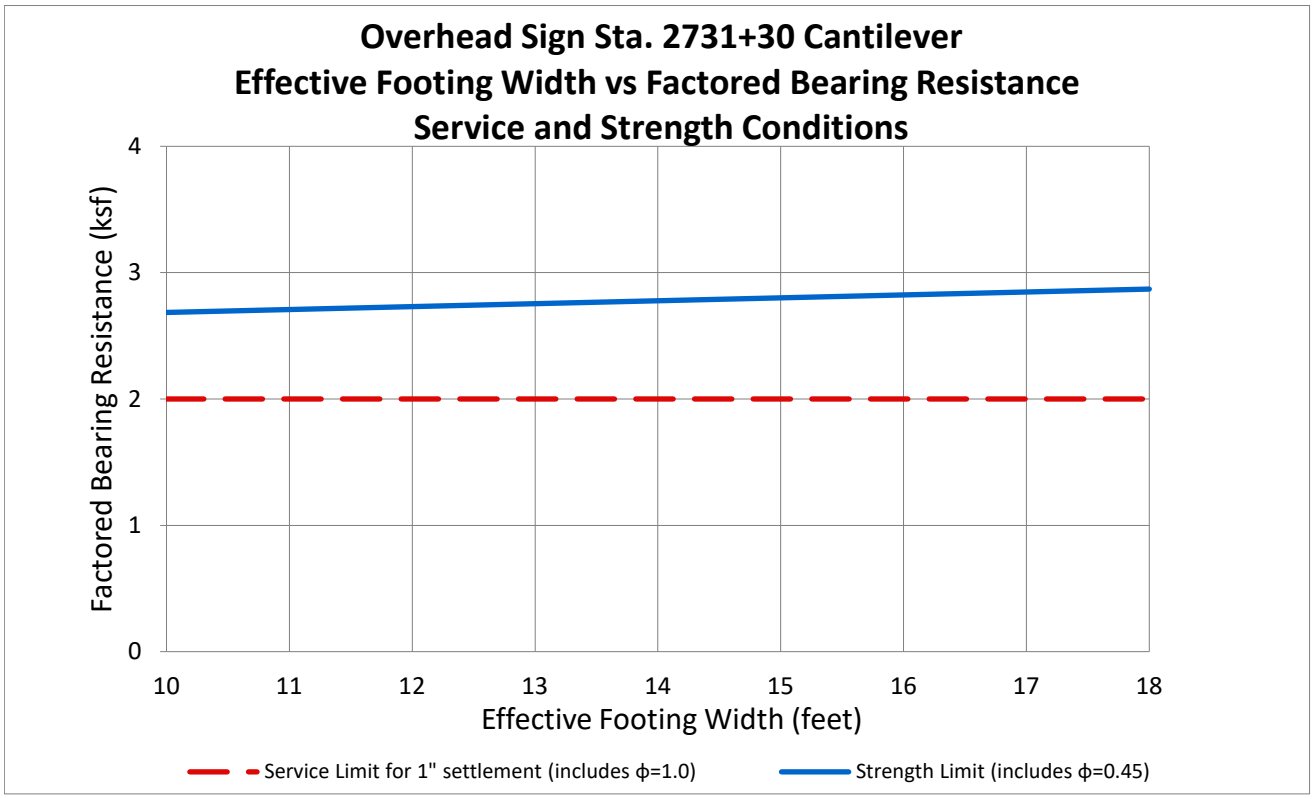
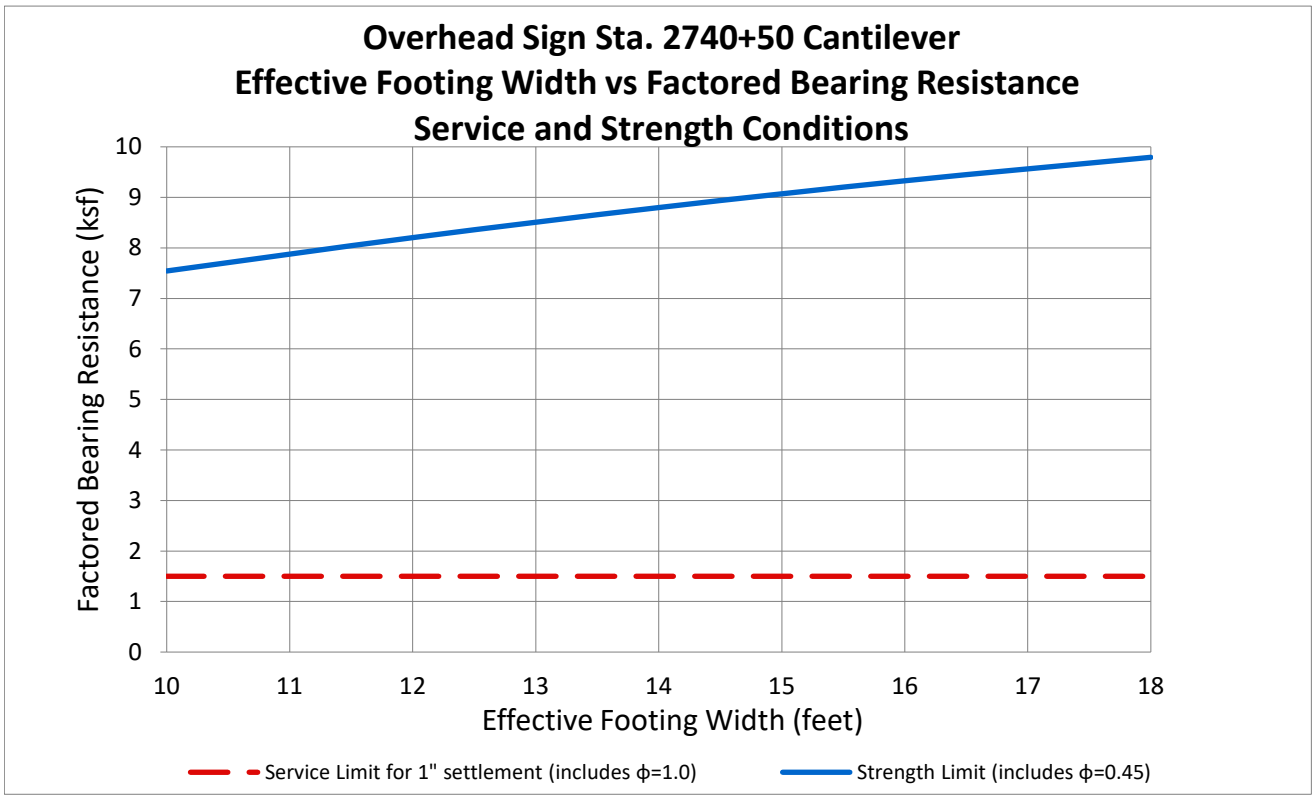
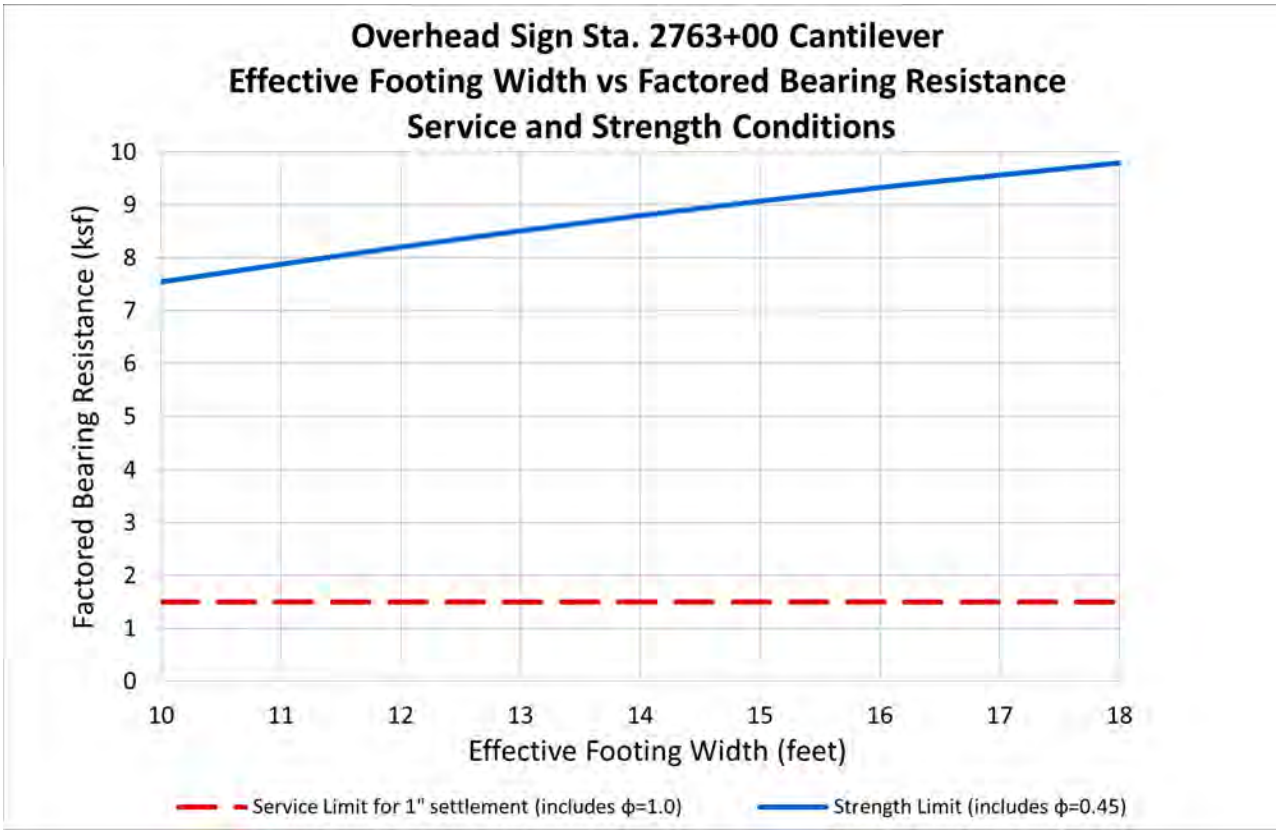
LOCATION: Saco, MA





LRFD BEARING RESISTANCE PLOTS
PROJECT NAME: **Exit 35/36 Interchange Improvements**
PROJECT NUMBER: **179450125**
LOCATION: **Saco, MA**



RECOMMENDATIONS FOR SLIDING RESISTANCE

PROJECT NAME: **Exit 35/36 Interchange Improvements**

PROJECT NUMBER: **179450125**

LOCATION: **Saco, MA**

Sign Location	Type	Foundation	Bearing Soil		Coeff of friction (tanδ) (AASHTO 10.6.3.4)	Resistance Factor (Φτ) (AASHTO 10.5.5.2.2.1)
			Type	Friction (deg.)		
1670+75	Sign Bridge	Right	Sand	30	0.58	0.8
1718+50	Cantilever	-	Clay	18	0.32	0.8
2731+30	Cantilever	-	Clay	18	0.32	0.8
2740+50	Cantilever	-	Sand	32	0.62	0.8
2763+00	Cantilever	-	Sand	32	0.62	0.8

Note: The coefficient of friction is for cast-in-place concrete footings bearing on sand or clay deposits.